



Paradise Found

Trying to coexist at Pinedale

See page 4



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PRESIDENT'S COLUMN

Do You Take Ethics For Granted?

By DAVID G. RENSINK

Last month I had the pleasure to hear DPA President Dan Tearpock's ethics talk to the Houston Geological Society.

You may not think a talk on ethics would draw a big crowd, but Dan is a terrific speaker, and those of us who are licensed in Texas are required to have an hour of ethics in the required 15 hours of professional development (continuing education) annually.

The place was packed.

* * *

Some of Dan's comments caused me to reflect on some of the events of my career. It is my contention that everyone will say when asked that they have above average intelligence, are an above average driver and have above average moral and ethical character. And as professional geologists, most of us would not seriously consider that we might have ever committed an unethical act, even inadvertently.

But one of the facets of ethical conduct that is most commonly violated is the requirement of confidentiality – and as Dan pointed out, it is often an inadvertent act.

How many times have we met an old friend or colleague at an icebreaker or a society meeting and have been asked what projects we were working on? If we are excited about a current project, we can tend to be effusive when we talk about it.

At what point have we said too much and potentially compromised our employer's proprietary position?

Even if your friend did not act on what was said, can the same be said about



AAPG President David Rensink (left) participated in the lighting of the ceremonial lamp at the opening of the recent Geo India 2011 conference, co-sponsored by AAPG and Association of Petroleum Geologists (APG), India.

the person standing behind you who overheard your conversation?

The same thing can apply to a conversation with a team member regarding a confidential project in the elevator of your office building or over lunch. You and your teammate are perfectly trustworthy, but can the same be said for the others in the elevator – or those seated at the next table?

I would like to say with certainty that this has never happened to me; I do not think it has. But can anyone be absolutely certain?

When we joined AAPG, we agreed to abide by the AAPG Code of Ethics, but I would expect that many of us have never read it. If you have never read it or

simply wish to revisit it, please follow this link: aapg.org/business/codethic.cfm.

Ethical conduct is a significant part of being a professional of any discipline. Yet, it is not something that occupies our daily thoughts. We take it as a given within ourselves and we expect it from our colleagues.

* * *

I am certainly not the first AAPG president to write about the ethical requirements of the profession in this column, and I do not expect to be the last. The following thoughts of three of my esteemed predecessors are worth repeating:

► "Ethics has quickly become today's most critical business and professional concern. Look around. It seems as though for every organization or individual receiving an ethical award, there's another being charged with some type of impropriety. And this has led more than a few to conclude that we are in the middle of an ethics crisis."

– Dan Smith, January 2003

► "All of us have or will eventually encounter an ethical dilemma in the workplace or in private life. Some situations are clear-cut and others fall into the gray zone (between right and wrong or good and bad). The 'code that you live by' guides you through many issues. That code is most likely a combination of your parents' attitudes, religious beliefs and life experience. For those situations that fall into the gray zone, you may also want to have a trusted group of friends (your 'kitchen cabinet') to bounce ideas off."

– Steve Sonnenberg, April 2004

► "Professionals in our society have responsibilities, most having to do with ethical obligations to their clients, society and colleagues. Professionalism requires capability beyond mere competence, and the willingness to be accountable. The basic fabric of modern society – commerce, research, communications, services – rests upon the expectation of ethical behavior."

– Pete Rose, July 2005

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Wyoming's Pinedale play: The area is popular to many interests.

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ON THE COVER:

Pronghorns grazing on the Mesa outside of Pinedale, Wyo., with a drilling rig and the Wind River Mountains for a backdrop. The region represents a blend of For a variety of reasons, the area is popular for nature lovers, environmentalists, hunters and the energy explorers – and all are trying to figure out the best way to coexist. Photo by Douglas McCartney, QEP Energy Company.

Scenic region valuable to many interests

Finding the Right Balance at Pinedale

By DAVID BROWN, EXPLORER Correspondent

If flashy exploration prospects are the racehorses of the industry and big development projects the show horses, the Pinedale and Jonah fields would have to be called work horses.

These greater Green River Basin, tight-sands fields produce natural gas abundantly, primarily from the Upper Cretaceous Lance Formation and Upper Mesaverde Group.

They stretch across more than 125 square miles of brush-covered plains in southwest Wyoming.

The forested, mountainous land to the north and northwest is a horse of a different color.

And because of that, operators in the region have added a new chapter to the book on how the industry and the environmentalists can get along.

"Over the last several decades there have been exploratory efforts there, but it's been harder and harder to get in and do that," said Tom Doll, state oil and gas supervisor for the Wyoming Oil and Gas Conservation Commission.

"Most of this (exploration activity) is on federal minerals within the Wyoming Range, a mountain range northwest of the Pinedale Field," he said. "This is a pretty pristine area."

Both environmentalists and sportsmen have opposed development of the mountain front area, which includes the Bridger-Teton National Forest and thousands of acres of recreational land.

"Recently, there was the Wyoming Range Legacy Act signed by President Obama that put about 1.2 million acres of that land aside and not available for leasing," Doll said.

Then in January, the Forest Service announced it would not authorize oil and gas leasing on 70 square miles of the Wyoming Range.

Plains Exploration and Production Co. (PXP) in Houston explores northwest of Pinedale, in an area where it has existing leases.

In an unusual move, PXP has offered to "retire" some of those leases, an arrangement it reached with the Wyoming Sportsmen for Fish and Wildlife and the Wyoming Outfitters and Guides Association.

It hopes to create a separation between the exploration area and the more environmentally sensitive recreation areas.

They Did It Because ...

PXP explained its decision to retire some of its leases in a statement prepared for the EXPLORER:

"PXP spent more than two years working with a wide variety of stakeholders to review concerns about the proposed development and identify ways to minimize resource impacts.

"This led to a collaborative effort and a comprehensive framework that maximizes multiple use opportunities in PXP's federal lease acreage, preserves the legitimate interests of sportsman in the lease area, promotes conservation principles and minimizes the environmental footprint of the development to the greatest extent possible.

"Our proposed agreement represents a historic opportunity to facilitate the addition of over 28,000 acres of habitat to an area currently protected by the Wyoming Range Legacy Act and establish a buffer between



Photos courtesy of Douglas McCartney

A beautiful sight, from many perspectives: Mesa Rig – Unit 323, outside Pinedale, Wyo., on Stewart Point in the Pinedale Field.

an area of the Wyoming Range and oil and gas activity east of the Wyoming Range.

"As part of the agreement, PXP has agreed to fund \$6 million over the life of the project to conduct important wildlife studies, monitor air, ground and surface water quality, and establish a fund to benefit local communities impacted by the development agreement."

Lease retirement is possible in this case because it was authorized as part of the Wyoming Range protection legislation.

"The withdrawal would take place under the Wyoming Range Legacy Act that was passed by Congress and signed into law in 2009. The Act permanently placed 1.2 million acres in the Wyoming Range off limits from future oil and gas leasing," said Scott Winters, PXP vice president of

corporate communications.

"The Act explicitly allows existing leases to be developed but provides companies the option to retire part or all of their lease holdings if they desire," he added. "Once retired, the lands would not be available for leasing in the future."

Still Going Strong

According to AAPG Honorary Member John Lockridge, environmentalists have created a "very contentious" atmosphere with the oil and gas industry in the exploration area north of Pinedale.

Lockridge, an independent geologist based in Los Angeles, works with partners in an exploration project north of Pinedale.

"The fact is, our play is not in the Teton

Range. It's in the hill country east of the Teton Range," he said.

He agreed that the lenticular sands and stratigraphic nature of this area of Wyoming would not indicate horizontal drilling for development.

"The geology is not so much structural as it is totally stratigraphic. There have been very significant drill stem tests," Lockridge said.

"It's a significant prospect area," he added.

Pinedale has its own environmental sensitivity, particularly related to the habitat of the prairie grouse. But no one should doubt that both Pinedale and Jonah will continue to boom, even at current natural gas prices.

"Development continues in both Pinedale and Jonah," Doll noted. "The activity has been constant over the past year, although the industry is becoming more efficient in drilling the wells."

QEP Resources Inc. in Denver drills the Mesa Township area of the Pinedale Anticline. Questar, a major operator in the Rockies, spun off QEP Resources as a separate, stand-alone company in 2010.

Through QEP Energy Co., it plans to drill and complete 85 to 100 Pinedale wells this year.

"Nearly all wells will be in the six square mile CDA (concentrated development area) within Mesa Township near the southern border of QEP's acreage block," said Dennis Beccue, general manager for QEP Energy's Pinedale Division in Denver.

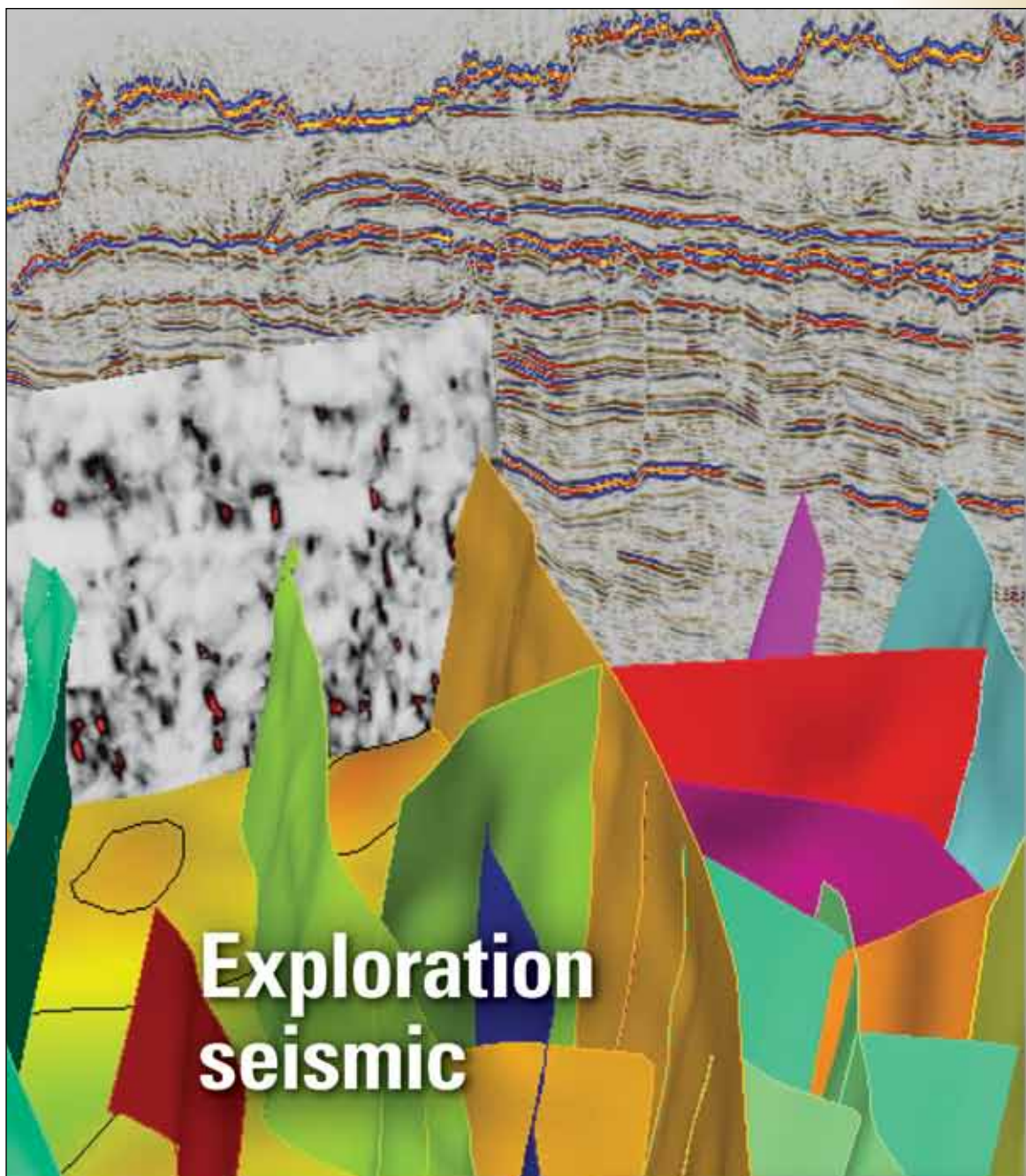
QEP has up to 1,300 Pinedale locations remaining on a combination of five- and 10-acre spacing and currently employs five rigs there, according to Beccue.

The company's completed well cost at

[See Pinedale, page 6](#)



Pinedale has its own environmental sensitivity – and the industry continues to try to operate in an environmentally sensitive manner there.



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Deadline Looms for Houston Registration Savings

The last chance to get a special reduced registration rate for this year's AAPG Annual Convention and Exhibition ends March 21 – and registering by that date could save you as much as \$120.

The AAPG meeting will be held April 10-13 at the George R. Brown Convention Center in Houston. The theme is "Making the Next Giant Leap in Geosciences," a topic that will embrace not only domestic but also international activities, research and advances in the geosciences.

The theme also recognizes "both the historic achievements of scientists and the essential need for forward-looking, creative approaches to solving our energy needs," said Stephen Levine, the meeting's general chair.

Meeting highlights will include:

- ▶ Eight special forums, covering topics that range from shale plays to business and exploration strategies to workplace conditions to "understanding the impact" of the Macondo oil spill.
- ▶ This year's Michel T. Halbouty Lecture, presented by David Lawrence, executive vice president for Shell Upstream Americas Exploration and Commercial.
- ▶ Several special luncheons, including the All-Convention Luncheon, featuring NASA astronauts Harrison "Jack" Schmitt, Kathryn Sullivan, James Reilly II and Andrew Feustel.
- ▶ This year's Discovery Thinking Forum, the fourth presentation of the AAPG 100th Anniversary Committee's program recognizing "100 Who Made a Difference."

- ▶ Nine field trips and 17 short courses.
- ▶ For the first time at an AAPG ACE, e-posters (in addition to the traditional paper posters).
- ▶ Specific activities and sessions for students and young professionals.
- ▶ A large exhibition hall, featuring the latest in cutting-edge technology and information, plus the International Pavilion.
- ▶ The opening session, including the presentation of AAPG honors and awards and featuring the presentation of the Sidney Powers Memorial Award to professor, researcher and visionary geologist John W. Shelton.

To register and for all details on the technical program and meeting to www.aapg.org/houston2011/index.cfm.

Pinedale from page 4

Pinedale is about \$3.7 million, he said – a significant decrease over costs just a few years ago – and drilling times also have dropped sharply.

"Advances in bit designs, use of oil-based drilling mud and down-hole mud motors, pad drilling with fit-for-purpose rigs, improved well design, consistent drilling crews – and operator experience have all helped bring drilling times down from more than 60 days per well to about 17 days per well or even less," Beccue explained.

"In addition," he noted, "advances in completion techniques combined with 24-hour operations have significantly reduced well costs and cycle times."

Practical Reasons, Too

The Pinedale area's geology has dictated a characteristic approach to development. Operators drill multiple directional wells from a single pad – and not just for environmental reasons.

Pinedale is one tight-sands gas field unlikely to see much horizontal well development, according to companies that work there

"Total measured drill depths can exceed 15,000 feet with average Lance Pool well depths being 13,500 feet to 14,500 feet, depending on where the wells are located on the anticline," said AAPG member Tom Meyer, geoscience manager for the Pinedale Division of QEP Energy.

"Since the pay section consists of hundreds of sand bodies that are spread over a 6,000-foot interval, vertical production holes are needed to intersect as many of these sand bodies as possible," he said "The stacked nature of these pays makes horizontal drilling impractical."

Production at the Pinedale Field relates to the structural position of the wells, Meyer noted. Wells higher on structure near the crest of the anticline tend to be better producers than those along the flank.

"The Lance Pool reservoirs are comprised of gas-saturated, over-pressured sandstones and siltstones of fluvial-origin deposited in an alluvial plain setting. Due to the nature of the deposition, the sand bodies tend to be small and isolated," Meyer said.


"The sandstones are also very tight," he added. "The effective reservoir has porosity ranging 6 to 12 percent, with an average of 9 percent. Air permeability at reservoir conditions ranges from 0.0001 to 0.1 mD, with an average of approximately 0.01 mD."

QEP is developing the field by directionally drilling wells from centrally located pads that can contain up to 52 wells. Multi-well pad drilling lets QEP minimize surface disturbance and allows production facilities for all of the wells on a pad to be centrally located, Meyer said.

In the Pinedale area individual sand bodies tend to be small, with many being five to 10 acres or even smaller.

"The tight character of the reservoir sands and small aerial extent of the sand bodies make it necessary to develop the field on tight density. QEP is currently developing the field on five-acre spacing along the southern portion of its acreage block," Meyer said.

Tight density also produces a huge portfolio of numerous potential well sites for operators throughout Pinedale.

Regardless of the results of exploration attempting to push development beyond the Pinedale-Jonah borders, these workhorses are likely to remain active for years to come. 

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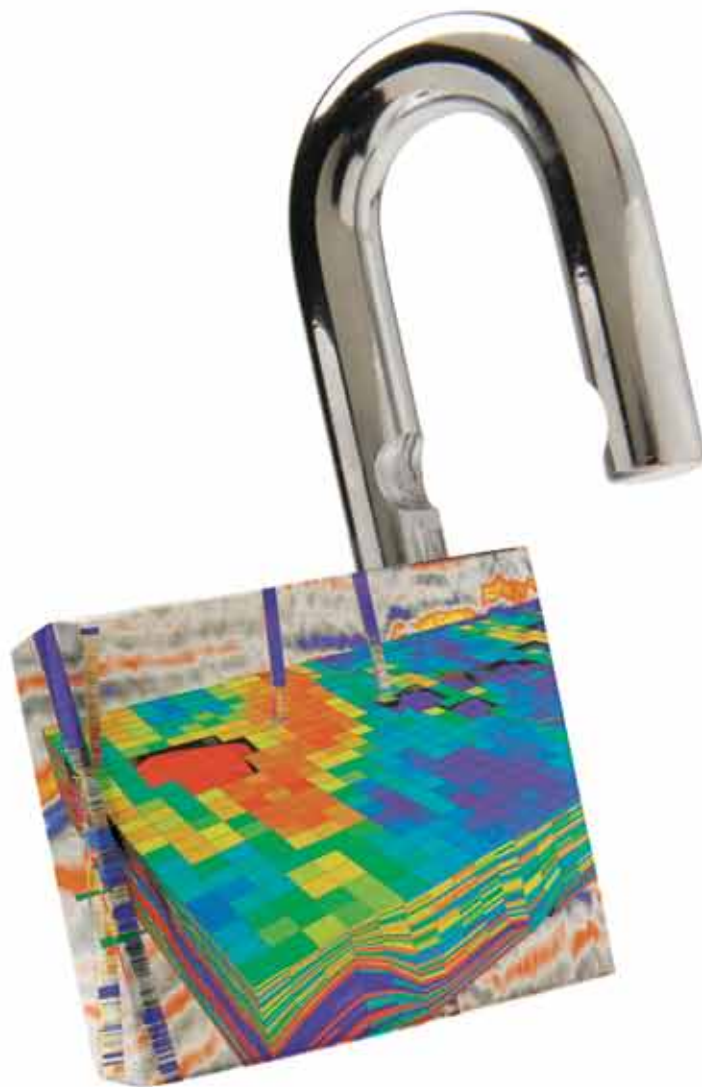


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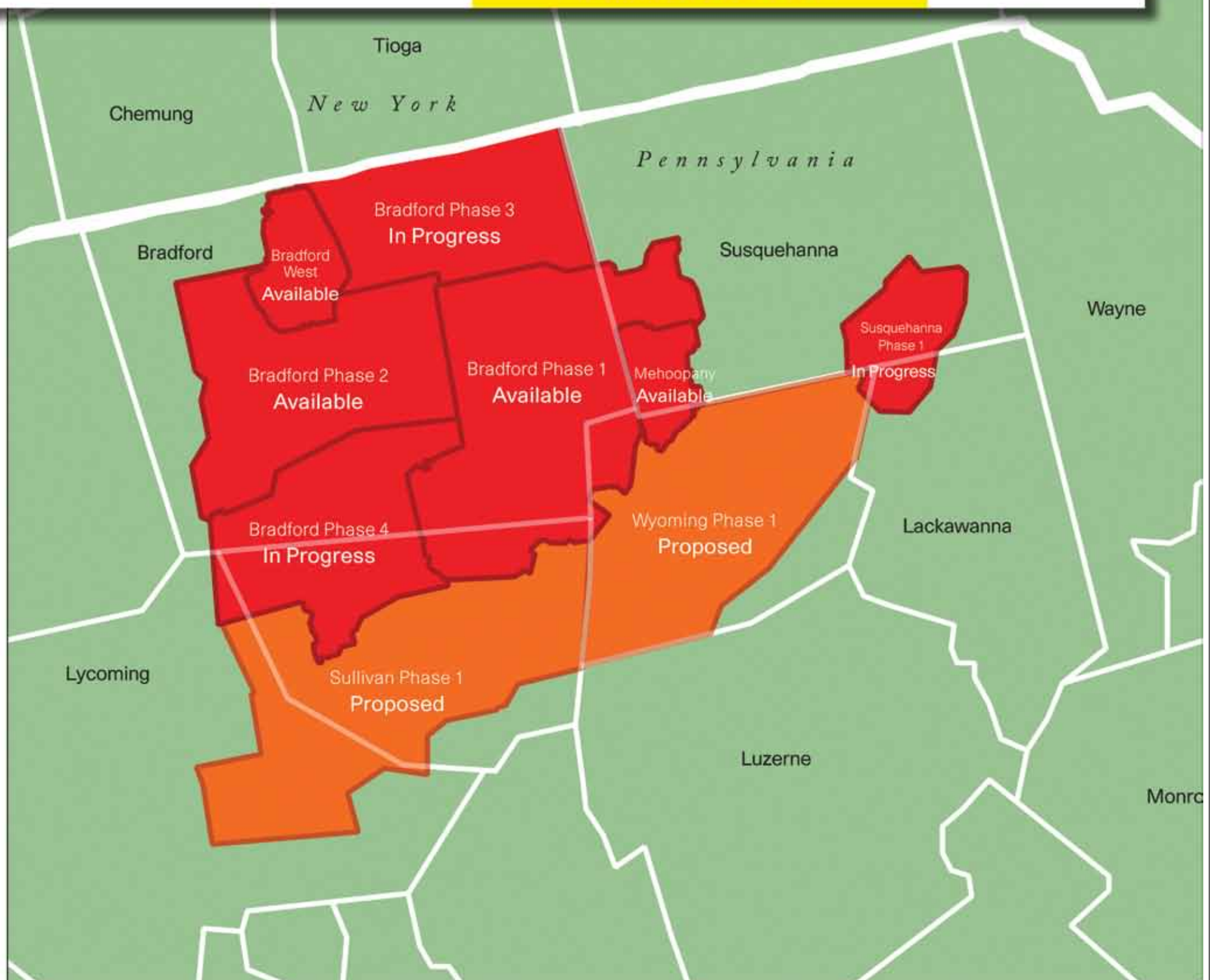


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MARCELLUS PLAY





Photos courtesy of PGS, Fairfield Industries



Whether in the hostile environment of the Arctic (left) or an urban landscape, seismic technology has long been the industry's shining star. But now many are asking, what's next?

Shale oil has market impact, too

Seismic Industry Seeks the Next Big Thing

By LOUISE S. DURHAM, EXPLORER Correspondent

Conduct a poll among E&P folks regarding seismic, and it's likely the consensus would be that advanced seismic technology – especially 3-D and 4-D – is the greatest thing to happen since sliced bread and cold beer debuted.

If you're among these believers, you may need to reach for a cold one before reading further.

According to a recent oil and gas capital spending survey, 3-D/4-D seismic has dropped to third place in the technology hierarchy.

Taking their place at the top on this scale is hydraulic fracturing, which ranks as the most important technology for exploration and development, followed by horizontal drilling.

Barclay's Capital conducted the survey late last year.

This is a total one-eighty from the phenomenon that kicked off in the mid-1990s when 3-D seismic began its rapid ascent as the must-have technology in E&P. Even in places where it wasn't needed, most investors refused to let you in the door if your prospect lacked 3-D.

All of which begs the question: What will the world of seismic now do for an encore?

Fractured Impacts

Seismic technology's rise to fame came about at a time when the companies were heavily focused on growing their reserves and production organically through the drill bit during the 1990s, noted G. Allen Brooks, managing director at Parks Paton Hoepfl & Brown.

The sudden drop on the technology favorites list, he said, could be blamed on the industry's newest darling: the ubiquitous shale plays.

"The shale gas phenomenon has come to drive virtually the entire industry's E&P efforts in the United States, and now even overseas areas," Brooks said.

Once it became clear that a shale is not a shale – they differ considerably, in both the mechanical and the mineralogical sense – the race was on to figure how best to produce these complex, often-intimidating reservoirs.

The new number one industry technology, hydraulic fracturing, is used to get the hydrocarbons to move out of the dense shales at an economical rate. Gas molecules normally migrate perhaps

Both the seismic technology and the applications are becoming evermore esoteric, demonstrating in large part that the shale plays and seismic no doubt will long be joined at the hip, so to speak.

only a few feet in a year in nano-darcy matrix permeability when left on their own, according to AAPG member Randy La Follette, manager of shale gas technology at BJ Services in Tomball, Texas.

Horizontal drilling enables staged fracs and more economical, efficient production. The single pad with its multi-laterals going into the formation also leaves a smaller footprint in what often are urban areas.

Ironically, seismic may be set to ascend back to the top of the tech popularity list – before most folks knew it had been knocked down a couple of notches.

"We're seeing early signs of the industry probably shifting back to emphasizing seismic more going forward," Brooks said. "The industry is saying seismic can be a very positive contributor to our success with shales."

Joined At the Hip?

Whereas seismic data initially had – at best – a minor role with most shales, that has changed considerably as the geoscientists attempt to better understand just what they are dealing with in order to devise the best drilling plan.

Both the seismic technology and the applications are becoming evermore esoteric, demonstrating in large part that the

shale plays and seismic no doubt will long be joined at the hip, so to speak.

Consider sweet spot I D, for example.

Vector Seismic Data Processing in Denver formed a consortium in 2009 to identify the seismic signature of fractured reservoirs in the Middle Bakken Shale via multi component seismic data. This ultimately led the company to determine that differences in the seismic image of shear waves over producing wells vs. dry holes in the Bakken formation are key for drilling success, according to AAPG member Scott Stockton, executive vice president at Vector.

Among the latest trends in seismic data acquisition in shales is multi-client 3-D surveys, which can be sizeable.

Global Geophysical, for example, has multiple crews shooting multi-client data across the increasingly active Eagle Ford shale play in south Texas (see related story, page 16). Further north, Geokinetics signed up more than 985 square miles of multi-client work in northeast Colorado in the Niobrara shale over a six-week period and then quickly booked another 644-square-mile multi-shoot in southeast Wyoming's Niobrara.

"Based on comments I hear, seismic is looking similar to the early '90s, where it's cycle driven by some of the new hardware that allows more channel

counts, ease of operation in areas hard to explore," Brooks said.

Opportunity Arises

In particular he sees potential for wireless or cableless systems – not just for conventional acquisition, but also for shales.

Brooks became intrigued with the potential for wireless systems when OYO Geospace announced the sale of a 7,000 single channel GSR wireless seismic data acquisition system to BGP Inc., a subsidiary of China National Petroleum Corporation and one of the largest seismic data acquisition companies globally.

BGP has entered into a joint venture with ION Geophysical, which is home to cable seismic systems in addition to its wireless system, FireFly®.

Wireless systems, in particular, can be crucial to data acquisition in certain shale plays where cables are too bulky and cumbersome – not to mention potentially destructive.

Brooks points to the Marcellus play in the northeast United States, which he says is a tough area topographically for seismic operations. Depending on the play, cable-averse situations include tree cover, small land parcels and proximity to populated urban areas.

Even in the fairly wide-open western United States, rugged terrain can be near impossible to traverse with a load of heavy, cumbersome cables.

"The critical consideration for a wireless system has been for customers to verify through use the performance claims," Brooks said. "That appears to be happening." ■

Most Important Technologies (ranked by percentage of responses)

	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Fracturing/Stimulation	28%	23%	26%	21%	26%	22%	16%	19%	14%	18%	11%	11%
Horizontal Drilling	25%	23%	22%	16%	14%	16%	16%	14%	15%	14%	17%	12%
3-D/4-D Seismic	19%	20%	19%	22%	22%	25%	29%	27%	29%	36%	58%	58%
Reservoir Recovery Optimization	7%	7%	7%	10%	9%	7%	8%	9%	10%	NA	NA	NA
Directional Drilling	6%	7%	7%	11%	10%	9%	9%	11%	11%	11%	4%	4%
Drill Bit Technology	5%	5%	6%	4%	5%	8%	9%	5%	4%	4%	3%	2%
Intelligent Well Completions	4%	2%	3%	3%	4%	4%	4%	5%	5%	6%	1%	1%
Measurement-While-Drilling	2%	5%	1%	3%	4%	2%	1%	1%	3%	2%	1%	1%
Underbalanced Drilling	2%	2%	1%	2%	2%	3%	2%	4%	4%	2%	2%	3%
Wireline Logging	1%	2%	2%	3%	4%	3%	3%	4%	2%	3%	1%	4%
Deepwater Technology	1%	2%	1%	2%	0%	1%	1%	1%	2%	2%	1%	4%
Expandable Products	1%	1%	1%	0%	0%	0%	1%	1%	0%	NA	NA	NA

Source: Barclays Capital estimates

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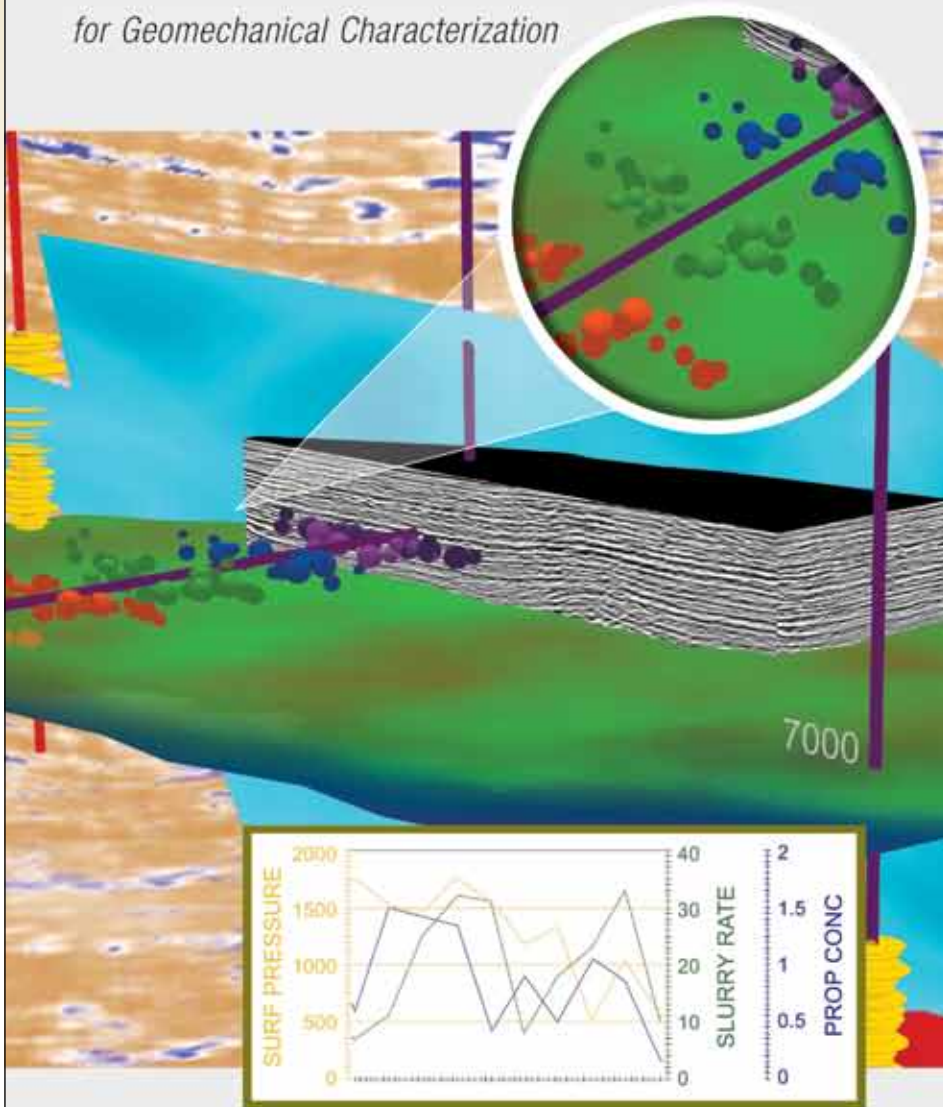


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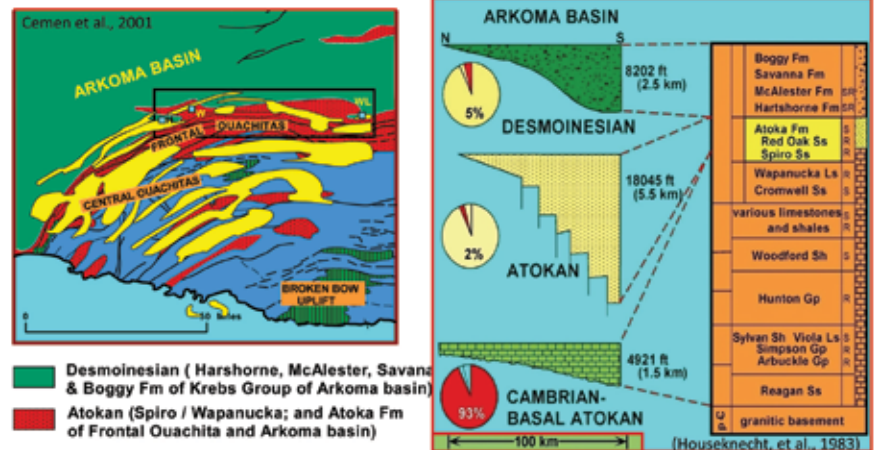


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Generalized Stratigraphy of the Ouachitas and Arkoma Basin



The Atoka Formation contains mostly deep marine shale deposits but also includes some sandstone units. The Spiro Sandstone forms the base of the Atokan Formation and is an important reservoir sand.

Old basin, new interest

3-D Use Rises in Arkoma

By LOUISE S. DURHAM, EXPLORER Correspondent

The Arkoma Basin has long been a popular drilling focus for the industry. As the saying goes, everything "old" is new again – and the Arkoma is no exception.

Lately it's been the focus of some renewed attention, including the evaluation of 3-D seismic inversion data as an aid in natural gas exploration.

The basin occurs in southeast Oklahoma and extends east from there into western Arkansas. Production is principally from upper Paleozoic reservoirs, including the lower Atokan Spiro, Panola and mid-Atokan Red Oak sandstones, according to AAPG member Ibrahim Cemen, professor and chair of the geological sciences department at the University of Alabama in Tuscaloosa, Ala.

He noted the Arkoma is a foreland basin of the Ouachita fold-thrust belt. It contains middle Cambrian to Late Mississippian miogeoclinal rocks about 5,000 feet thick, overlain by about a 20,000-foot thickness of Pennsylvanian flysch and molasse deposits.

The basin harbors over four Tcf of undiscovered natural gas, mostly within the shallow marine to deltaic Pennsylvanian sandstones of the Atoka formation, according to Cemen. The lower Atokan Spiro-Wapanucka reservoir has been a major exploration target.

The Alabama professor has been studying the basin since 1993, when he was a professor at Oklahoma State University (OSU). He was particularly intrigued with the Spiro sandstone, which he said is an especially good reservoir when it contains chamosite facies, which preserve porosity.

He embarked on a major project in the area, which was funded by the Oklahoma Center for Advancement of Science and Technology (OCAST).

"At OSU, we constructed balanced cross sections and placed the chamosite facies on the cross sections based on our study from cores in the Arkoma Basin with my colleague, the late Zuhair Al-Shaieb," Cemen said. "We restored the cross sections and found out there is probably chamosite facies to the south of the big structures everyone was looking at.

"When we submitted our final report to OCAST in 1995, a lot of oil companies got interested," he noted.

"During a field trip to the basin in 2004, I was talking about the importance of chamosite facies and pointing out the possibility of it being present beyond the structures already extensively drilled," Cemen said.

"A couple of BP geologists who were on the trip said BP had tested this hypothesis and discovered the South Hartshorn gas field," Cemen said. "They had more data, of course.

"That is exactly why OCAST supported our project," he added, "to help the oil and gas industry in Oklahoma."

Ibrahim Cemen will present the paper "Use of 3-D Seismic Inversion Data in Gas Exploration: An Example From the Arkoma Basin, Southeastern Oklahoma," at the AAPG Annual Convention and Exhibition in Houston.

Cemen's talk will be given at 11:25 a.m. Wednesday, April 13. He is professor and chair of the geological sciences department at the University of Alabama in Tuscaloosa, Ala.

His co-authors are AAPG members C. Hager, Rod Gertson and Jeffrey Fuchs.

The talk will be part of the session titled "Seismic Visualization and Attributes."

Porosity and Acoustic Impedance

Cemen noted that in 2006, his structure group entered into a project interpreting 3-D seismic data provided by Devon Energy. Both 2-D and 3-D seismic, well log and core data were used during the project to construct the structural sections to illustrate the Arkoma Basin's complex structure.

Structure is a big factor in Spiro productivity, but understanding and identifying changes in rock properties over an area of interest is on par with knowledge of structure.

"In the particular area of the structurally complex Arkoma where this study was done there's a number of low angle thrusts, and you get repeated Wapanucka-Spiro formations," said

See *Arkoma 3-D*, page 14

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Milito Named Teacher of the Year

Sharon Milito, a fourth grade teacher at Patrick Henry Elementary School in Colorado Springs, Colo., has been named the 2011 AAPG Earth Science Teacher of the Year.

AAPG's TOTY award, funded annually by the AAPG Foundation, is a \$5,000 prize that will be split into two parts: half is designated for Milito's personal use, and half goes to Patrick Henry Elementary School for educational use under Milito's supervision.

Milito said her teaching philosophy is based on the "Constructivist Learning Theory, which holds that children construct their own understanding through their experiences with the world around them."

Milito, introduced to geology by her grandfather, an amateur geologist,



received a master's degree in teaching integrated natural science in 2005 from Colorado College in Colorado Springs.

Milito nominated by the Rocky Mountain Association of Geologists. Nominees praised her method of using "hands-on experiences, which relate to (the students') own understanding of the real-world, enhanced by outdoor activities and numerous field trips" to nearby Red Rock Canyon and the Paint Mines."

She also will receive an all-expense paid trip to the AAPG Annual Convention and Exhibition in Houston on April 10-13, where she will be presented with her award at the All-Convention Luncheon.

An interview with Milito will be featured in the April convention issue of the EXPLORER.

PENNSYLVANIAN	DESMOINES.	Marmation Gp.	
		Cabiness Gp.	
	ATOKAN	Krebs Gp.	Boggy Fm.
			Savanna Fm.
McAlester Fm.			
Hartshorne Fm.			
MOR.	Atoka Fm		
	Red Oak Ss.		
	Panola Ss.		
	Cecil Ss.		
		Spiro ss.	
		Wapanucka Ls.	
		Springer Fm.	

Major Pennsylvanian sand units of the Arkoma Basin.

Arkoma 3-D from page 12

AAPG member Rod Gertson, senior geophysical adviser at Devon.

"Since the '50s, at least, there's been a lot of production in the Arkoma Basin from there," he said.

Cemen pointed out that they used an acoustic impedance inversion volume calibrated to well control to map porosity changes in the Spiro sandstone. Every well with a sonic log within the survey area was analyzed to understand velocity changes in the Spiro along strike and dip of the principal thrusting direction.

"Looking at the seismic inversion to understand which physical characteristics of the rocks and fluids might be predictable, we found an acceptable correlation between porosity and acoustic impedance," Cemen said.

The Good Predictor

One of the results of the interpretation of the seismic inversion data is that in areas where the Spiro sandstone experienced facies changes, the acoustic impedance value is a good predictor of porosity.


"We're finding things with the data that maybe we didn't know before," Gertson said. "From a scientific point of view, it's interesting to see if you can determine some things about areas of higher porosity within particular producing formations using the 3-D seismic."

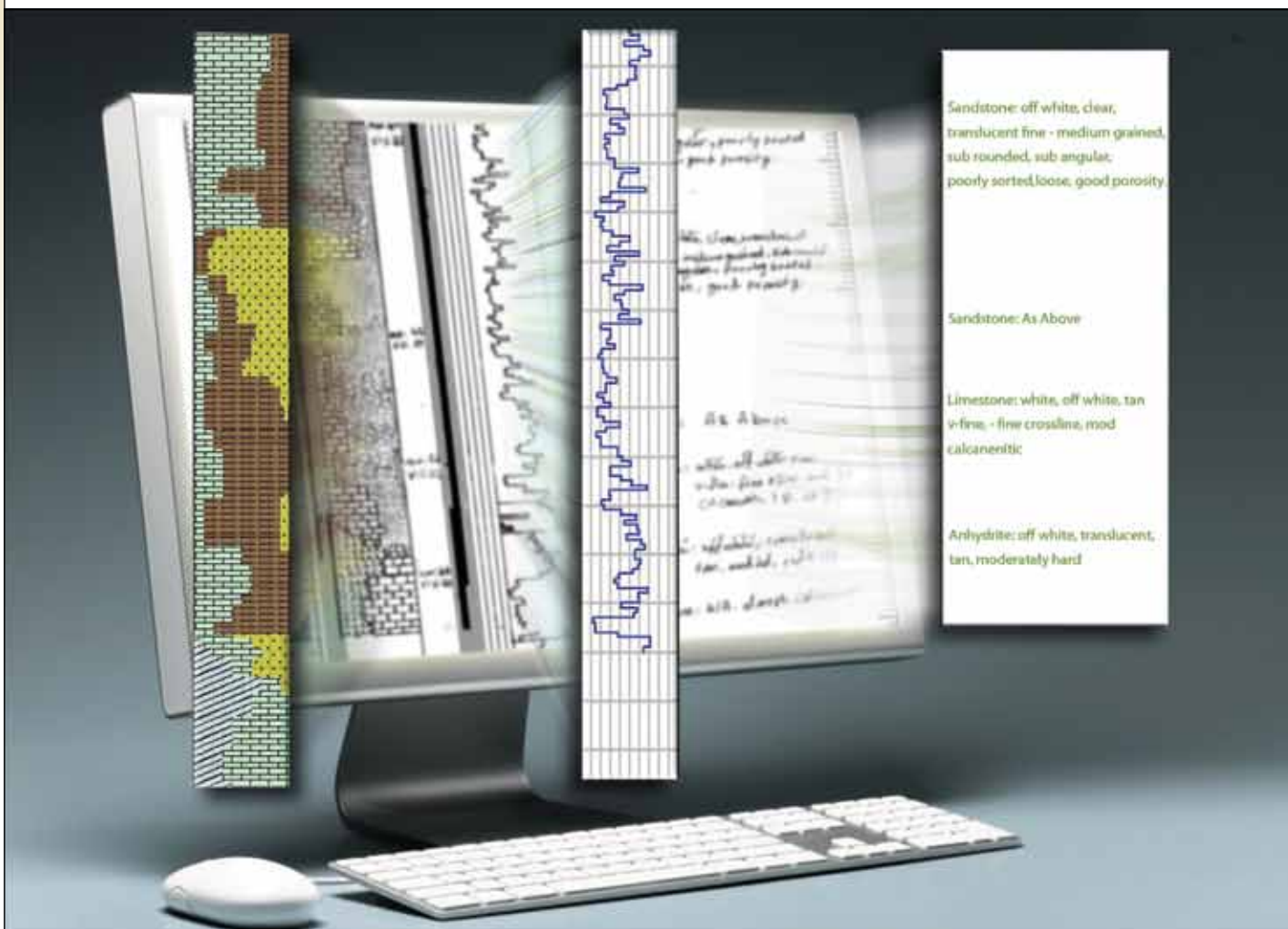
"There appears to be somewhat of a correlation between acoustic impedance and the porosities of the Spiro," Gertson said. "The Spiro sandstone is hard to distinguish from the Wapanucka because both are very high velocity, high density units."

"When there is some porosity in the Spiro as we saw from well logs, we hoped there was some correlation with inversion also, and that's what we appeared to see," he noted. "We haven't been out to test it in other ways, as our plays we're drilling right now are the shales."

Gertson and Cemen both emphasized that the 3-D seismic data used at OSU have been used by several students for theses focusing on structure and stratigraphy.

Cemen noted that he is continuing his Arkoma Basin project at Alabama, where he has one master's student working on the project.

Gertson serves on the students' thesis committee. 



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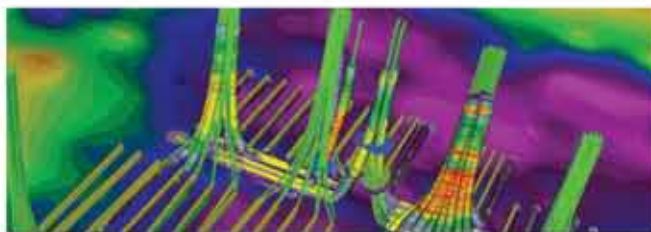
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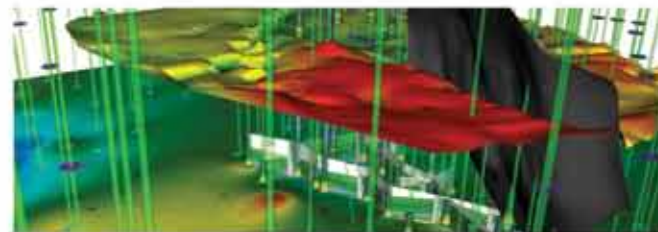
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'Mix of players' seeking more data

3-D Data a Big Need (Again) at Eagle Ford

By LOUISE S. DURHAM, EXPLORER Correspondent

Once it became clear that natural gas prices likely will remain dismal for some time, many companies working the shale gas plays recognized they had best punch up their production by adding some respectably-priced oil and liquids-rich gas.

How better than to get in on the ground floor of shale oil plays.

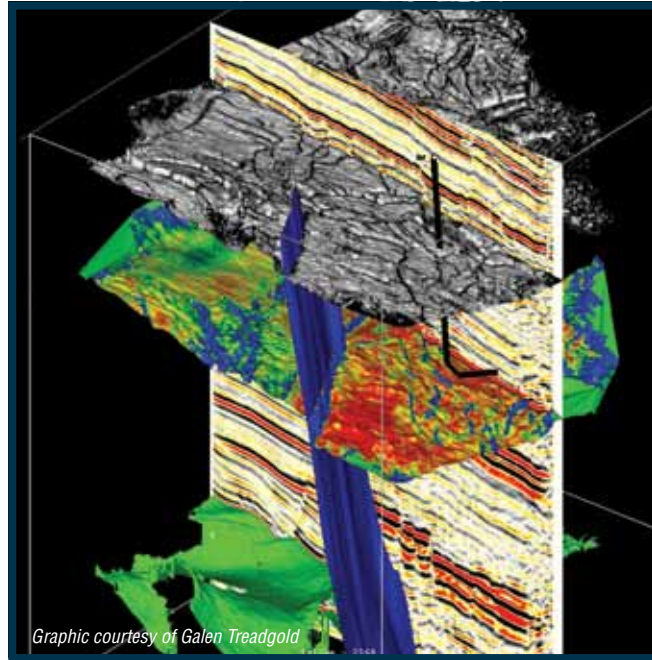
For those playing the dry-gas Haynesville shale play concentrated in north Louisiana and a part of east Texas, it was only a short romp to move into the Cretaceous Eagle Ford shale in south Texas. This shale is known for sourcing hydrocarbons to Austin Chalk fields and others, including the magnificent East Texas field.

Veteran Haynesville shale operator Petrohawk established a foothold in the Eagle Ford shale early-on when it drilled the discovery well in LaSalle County in the fall of 2008 in what would be dubbed Hawkville Field. The horizontal well flowed the 7.6 MMcf and 250 barrels of condensate per day from the shale.

The now-burgeoning play is a mix of players. Along with the smaller companies, the majors have begun jumping into domestic shale plays, including the Eagle Ford. For example, both ExxonMobil and ConocoPhillips bagged large acreage positions in the play fairly early.

A Need for 3-D Data

A key issue for the exploration



Graphic courtesy of Galen Treadgold

Galen Treadgold, with Weinman GeoScience in Dallas, will present the paper "Eagle Ford Shale Prospecting with 3-D Seismic Data Within a Tectonic and Depositional System Framework," at the AAPG Annual Convention and Exhibition in Houston.

Treadgold's paper will be presented at 10:25 a.m. Tuesday, April 12, as part of the session on "U.S. Active and Emerging Plays – Haynesville and Eagle Ford."

His co-authors are AAPG member Steven Sinclair, with Matador Resources in Dallas, and B. McLain and B. Campbell, both also with Weinman.

A 3-D view of the Eagle Ford: Some operators believe "linking the results of well tests to attributes derived from the seismic will provide operators with a far more reliable predictive capability in any shale play."

companies centers on determining exactly where to lease and how to optimize drilling plans for optimal gas and oil recovery.

Conventional subsurface data, such as wireline logs, cores and cuttings are not widely available to many of the companies exploring the play, according to Galen Treadgold, vice president at Weinman GeoScience, a division of Global Geophysical.

Consequently, many explorers lack in-depth knowledge of the play's

regional aspects.

Modern seismic data and interpretation techniques are a must-have to wrap your arms around this play.

"Newly acquired 3-D data sets provide a continuous characterization of the subsurface, highlighting drilling hazards (faults) and also offering the potential to identify intervals having better reservoir quality," Treadgold said.

"Extracting rock properties from the seismic should be the goal of any

processing and interpretation effort," he emphasized.

"Linking the results of well tests to attributes derived from the seismic will provide operators with a far more reliable predictive capability in any shale play."

Weinman has been working diligently on a study addressing Eagle Ford shale prospecting with 3-D seismic data.

They have plenty of data to work with, given that Global has multiple crews shooting multi-client data across the play.

"Ultimately, we'll be looking at three to six thousand square miles of 3-D in the play," Treadgold said. "We'll be integrating that with microseismic fracture monitoring and are working with companies to plan a large buried array across the Eagle Ford to do fracture monitoring and processing of that data for integration into our 3-D analysis."

"Others are acquiring seismic data in the

[See Eagle Ford 3-D, page 42](#)



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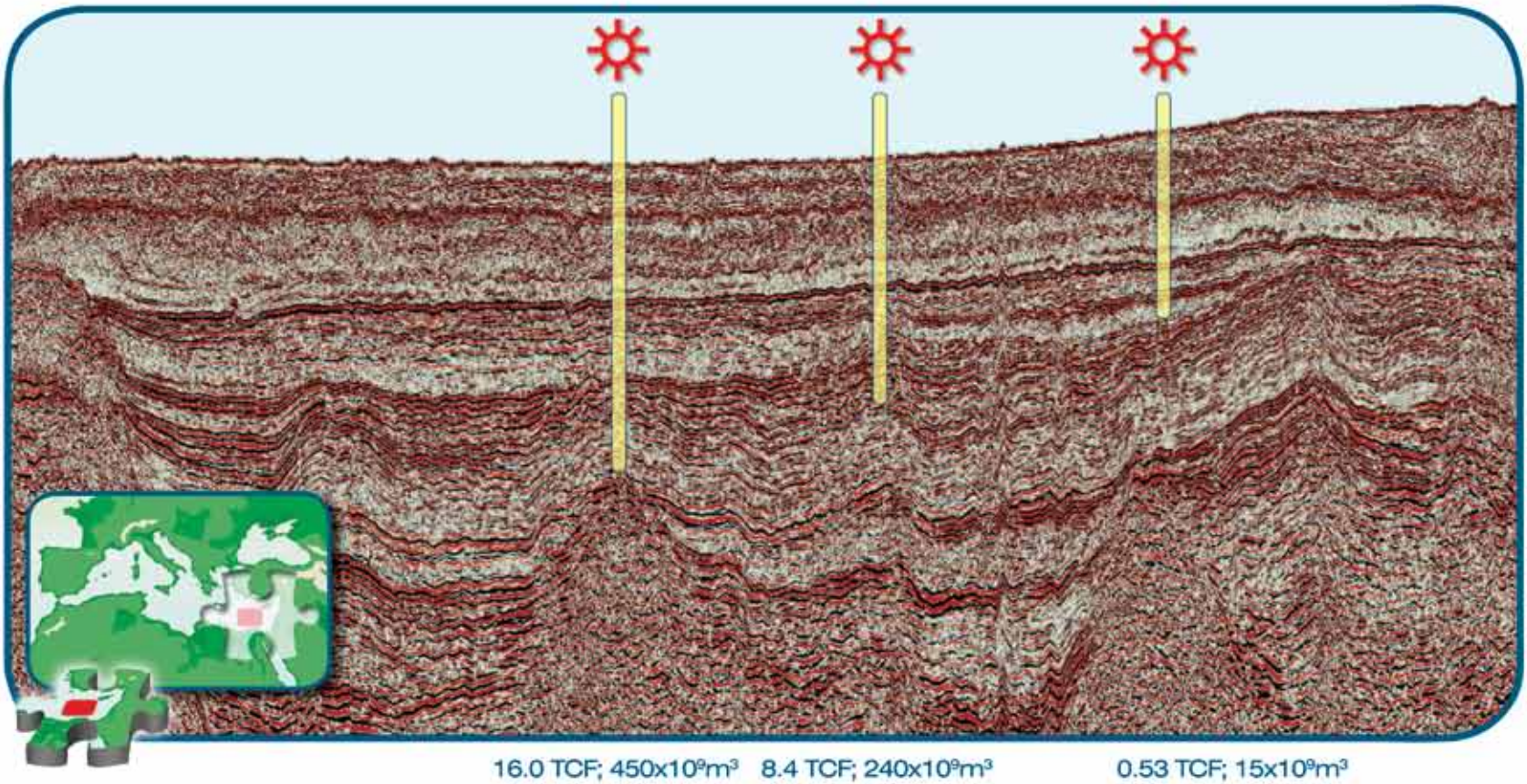
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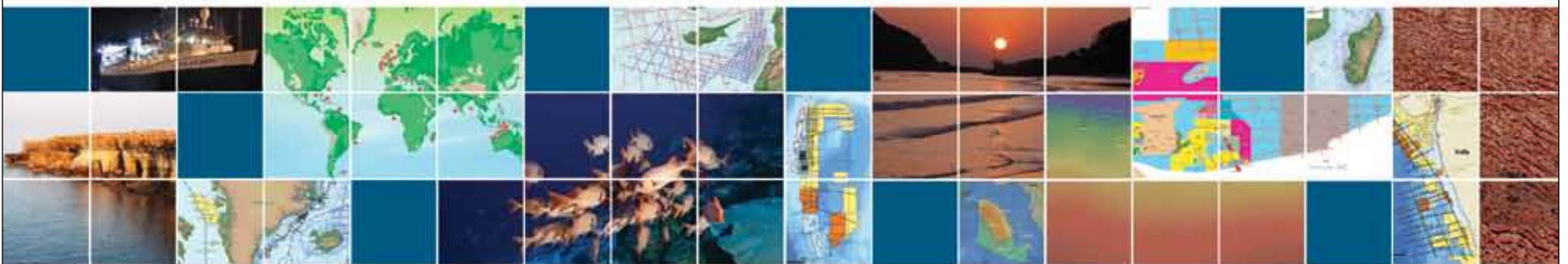


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Online Earth Science Course Starts in March

By COURTNEY CHADNEY, EXPLORER Correspondent

A five-week online workshop designed by an AAPG Honorary Member to provide high school teachers with the skills and information to better teach earth and space sciences will be available in March.

Rebecca Dodge, a geology professor at Midwestern State University in Wichita Falls, Texas, and an AAPG Distinguished Service Award winner, designed the course around the skill standards required by the Texas Essential Knowledge and Skills (TEKS).

The course, offered through the American College of Education, will provide teachers with specific information over class



DODGE

Her course will prepare teachers by giving them the background information necessary to ensure their classes are addressing the TEKS standards.

content, methods of teaching and activities – all accessible via the internet.

The course will examine:

► **Origins** – solar system and origins of

the earth's systems.

► **Solid Earth** – the earth's interior, plate tectonics and geosphere.

► **Earth in Space and Time** – geologic

history and fossils.

► **Fluid Earth** – hydrosphere and atmospheric energy distribution.

► **Earth Systems/Earth Resources** – weather and climate, earth resources.

Each week brings new readings, lectures, exercises, videos and online discussions that give teachers content knowledge and full access to teaching materials, activities and real-world applications.

The course also offers a laboratory element, including a laboratory notebook, applications and exercises.

Dodge says her course will prepare teachers for their classes by giving them the background information necessary for them to make sure their class is addressing the TEKS standards.

The course “allows teachers to cover all of the material necessary to begin teaching the course, in a compact time frame and on their own,” Dodge said.

This course serves as more than just a tool for ESS teachers – it also can be used as a graduate credit course or a professional development class.

And even though it is designed to meet Texas' TEKS standards, it is open to anyone in the United States needing any of the above.

Developing Informed Citizens

In Dodge's opinion, the geological community has been in dire need of the ESS high school level program for many decades.

“With the needs of the professional geologic community and industries for geology graduates at the college level, having earth science taught in high school is critical to bringing students into geology graduates at the college level,” Dodge said.

She believes the addition of this high school class will absolutely increase the college numbers.

“If we don't have earth science in our high schools it's hard to get students to want to major in geology at the college level – they just don't see it as a possible career path,” she said.

Simply getting the program into the high schools was a huge challenge for geologists.

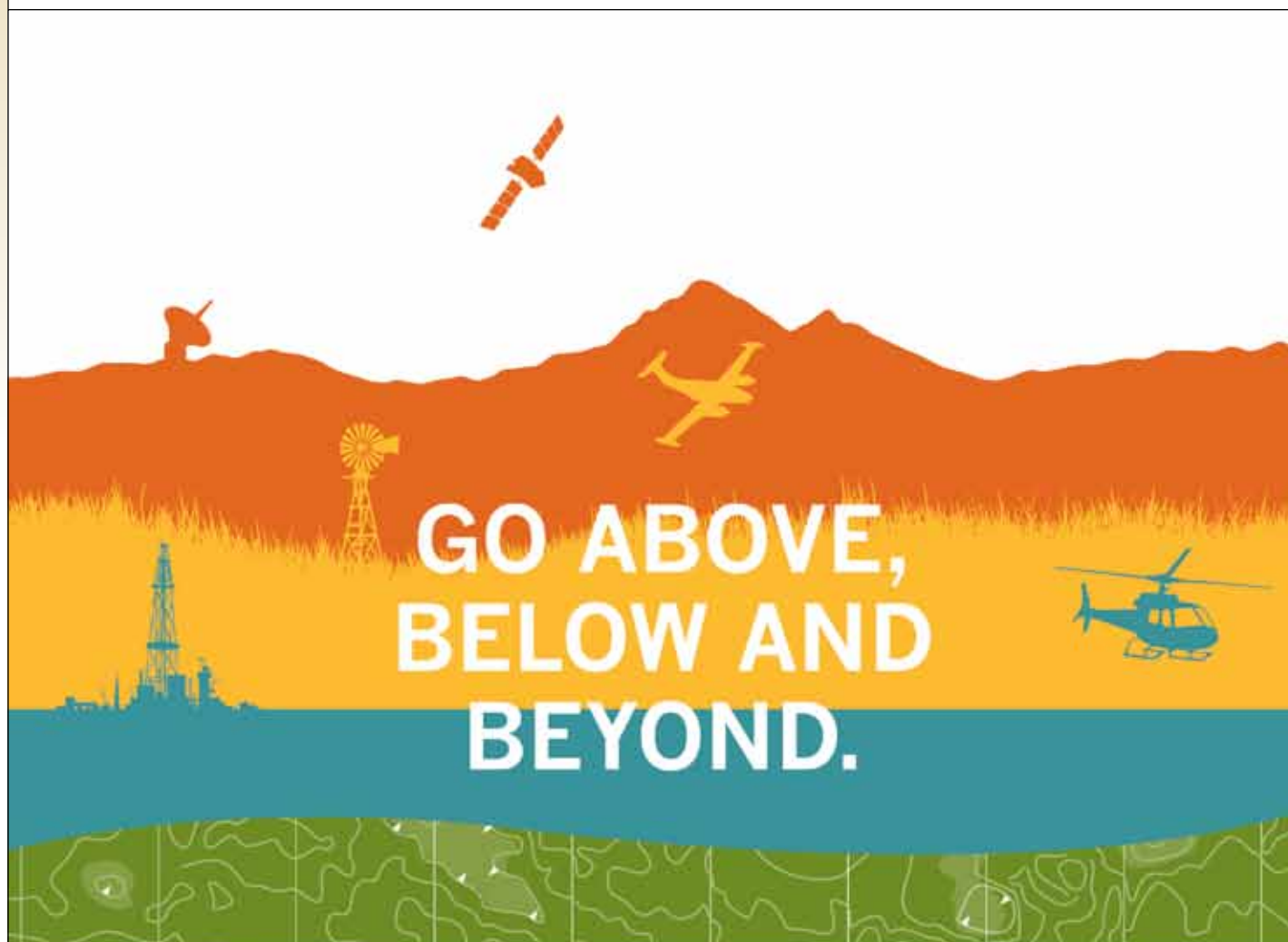
“It's been a real fight to get it into the high schools,” Dodge said. “A lot of AAPG members and other geologists from all over Texas worked really hard to make it happen.”

She credited specifically AAPG Honorary Member Stan Pittman for being an instrumental force in getting ESS approved in Texas.

Dodge estimates the battle to include ESS into secondary schools has been ongoing for at least 20 years – and although she is delighted that they have finally won, the educational system seems to have a lot of catching up to do.

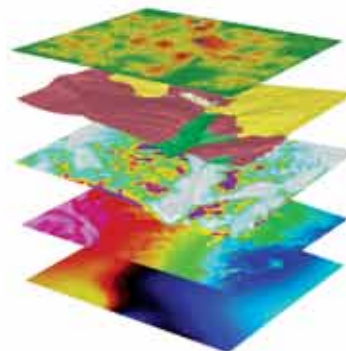
“Because ESS hasn't been taught in high school for many years, the colleges of education haven't spent a lot of time teaching their students how to teach these science concepts,” she said.

Now, not only are Texas schools struggling to find teachers certified to teach the class, many who are qualified have not been updated with the newest knowledge and information.



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See Teachers, page 38

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Teacher and Student, Together Again

By BARRY FRIEDMAN, EXPLORER Correspondent

While it's a big world geologically, the world of geology is often smaller, more insular.

In this world, connections made today may be connections made for life. And the manner of the connection may rise again and again in unexpected ways.

How else to explain the fact that this year's AAPG award-winning researcher will be honored on the same stage with his professor, who happens to be a winner of AAPG's top educator award?

A professor from Texas and a vice president of Norwegian oil company – connected by a history and a friendship that go back to 1990.

Ole J. Martinsen, vice president and head of exploration research for Statoil ASA, Bergen, Norway, will be honored in April at the AAPG Annual Convention and Exhibition as this year's winner of the Robert R. Berg Outstanding Research Award.

Ronald J. Steel, professor and David Centennial Chair at the University of Texas, Austin, as well as the Sixth-Century Chair of Sedimentary Geology at the University of Aberdeen, Scotland, will be one of two people receiving the Grover E. Murray Distinguished Educator Award on the same stage.

They met in a classroom at the University of Bergen in Norway. At the time, one was coming back to academia; one was about to make his mark.

But for both, the meeting marked a significant first in their lives.

"I had been working in Norsk Hydro for

nearly nine years (first in research, then in exploration)," Steel said, "and was about to leave and return to the University of Bergen as professor in reservoir geology. In planning my new academic career in 1990 and looking for graduate students and collaborators, I had heard about a young and enthusiastic, recently completed Ph.D. student, Ole Martinsen."

Martinsen, in fact, turned out to be Steel's first post-doctoral student.

"Ole quickly adjusted up from being a student to being an active leader in a fairly

"It is a very interesting way of crossing paths yet again."

large student research group working both in Europe and the USA."

Martinsen, too, not only recalls the moment but recognizes its significance, saying that Steel's influence was "very

instrumental" in his academic and professional career.

"I guess the Bergen story was more sort of Ron being the senior project founder and organizer who got me involved," Martinsen said of those early days, "and I was a junior executor, more than the typical professor-post-doc student relationship."

Connections

This characteristic may help explain the difference in career paths.

For his part, Steel, who has remained in education since the early 1990s, believes there is a special, almost inexplicable joy in academia.

"It has been a great pleasure for me to have been a teacher for so many years and in three countries," Steel said. "I'm not sure that it was always the teaching itself, but it was often a great experience to air current research concepts and ideas with graduate student classes, such as Martinsen."

Steel said this sharing of ideas – this kinship – is more common in the United States than it is in Europe.

Martinsen said he also believes the kinship is an important one, albeit one that, for him, manifested itself in business.

"There have been many scientific challenges and some professional ones," he said, "but I feel the geological community is one of great positivism and where scientific passion totally overcomes

Martinsen: Success in Both Worlds

One researcher, Jean Gerard, wrote of the AAPG award-winning researcher Ole Martinsen, "He is one of the few geologists working for a major oil company who has managed to combine high responsibility in his company and outstanding applied research."

Throughout the 1980s, Martinsen was on the faculty at the University of Bergen, where he received advanced degrees for his work in eustasy, tectonics and sedimentation.

In 1990 he did post-doctoral research at the Geologisk Institute and was a visiting professor at the University of Wyoming, Laramie. In 1993, he joined Norsk Hydro Research Center to work on various projects, including exploration off of



MARTINSEN

Norway's coast. Later, he became project leader, head geologist and geological adviser.

By 2003 he was the manager of geology/head geologist for the company.

Since 2007 he has been the company vice president and head of exploration research, for Statoil-Hydro.

In his career, he has been associate editor of *Sedimentology* and guest editor of the *Norwegian Journal of Geology*, as well as chief and co-editor of *SEPM*, *IAS*, *NGF* and *GSA*.

He has been a member of AAPG for 26 years and has been a presenter at the organization's conferences more than 30 times.

– BARRY FRIEDMAN

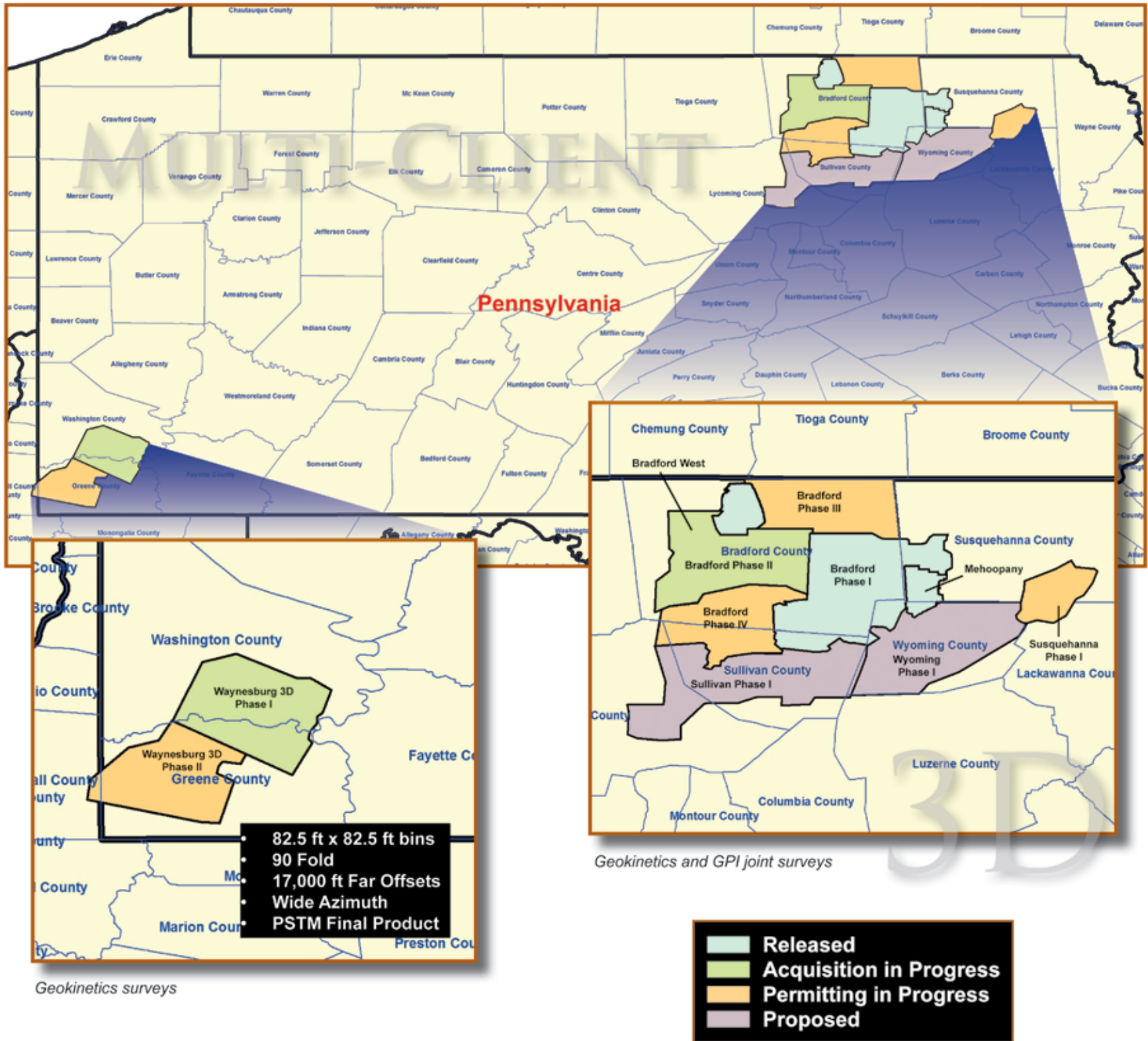
See Awardees, page 22

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Teaching Remained First Love for Steel

After receiving his doctorate from the University of Glasgow in 1971, Ronald Steel taught at the University of Manchester and then at the University of Bergen.

In Norway, he says, he ran across an interesting hurdle: school officials directed him to teach students in the native language.

"They let me do it in English for three years, but after that I had to teach in Norwegian."

More challenging, he says that the country then needed countless geologists and geophysicists and, what he calls, "traditional Norwegian geology" and not an emphasis on petroleum geology, his specialty.



STEEL

In 1982 he joined Norsk Hydro, first into research in the new Hydro Research Center in Bergen, then moving toward exploration, which took him to Oslo. It was his job, he says, to move the home office to Oslo.

In 1990, though, he left Norsk and returned to teaching, first as professor of sedimentology and reservoir geology at the University of Bergen, then to Svalbard and then, from 1995-2003, as the Wold Centennial Chair of Energy and Professor of Geology and Geophysics, Department of Geology and Geophysics, University of Wyoming, where he also acted as a direct of the Institute of Energy Research.

(The Wold Centennial Chair in Energy

was established at UW in 1990 by John Wold, the first professional geologist ever to serve in Congress and a recipient this year of the AAPG Pioneer Award.)

Since 2002, he has been both professor and Centennial Chair at the University of Texas, Austin, and the Sixth Century Chair in Sedimentary Geology at the University of Aberdeen, Scotland.

He has published more than 150 papers, edited seven books, has received \$7.5 million in grants and has held Distinguished and Endowed lectureships for AAPG and for the Japan Society for the Promotion of Science.

Through his career, he supervised more than 95 graduate students at the universities of Bergen, Wyoming and Texas.

— BARRY FRIEDMAN

Awardees from page 20

professional struggles."

Martinsen adds the academic world sometimes must handle itself with more firmness and "clear direction."

One gets the sense that for Steel, the rewards of the relationships mean as much as the awards he gets for doing his job.

"Students are unfettered and have endless capacity, and so they provide great feedback in such situations," he said. "Geology, in addition, lends itself to field teaching, and there is nothing like field teaching to get commitment and excellence from students! Doing this in icy Spitsbergen, at 79 degrees north, is very rewarding."

And even though Martinsen has worked in industry for most of the past two decades, he still sees the parallels between he and his mentor, namely the desire to solve "natural science problems of importance to society in terms of exploring and exploiting energy resources.

"I work in industry because I am particularly concerned with not just the development of both but also the application of geological theories and hypotheses," Martinsen said. "I am also very engaged by not just executing geology but also planning research and developing strong teams."

Pride and Gratitude

There is, like most professor-student relationships, pride and gratitude for the work of each.

"I still remember stories about Ole being hauled out of mud where he had gotten his truck stuck in the Hanna Basin!" said Steel, who has had more than 95 graduate students – and who adds, "Ole's American work also had a significant influence on myself."

Martinsen, who readily admits to the influence of not only Steel but also Jim Steditmann and AAPG Distinguished Service Award Winner and former AAPG treasurer Randi Martinsen, says, "After all, geological science is about seeing the most, working with diverse problems and global experiences and applications."

And his friendship with Steel is one that endures.

"It is a very interesting way of crossing paths yet again," he said of the fact that both will be honored in Houston.

"We have met many times in the last 20 years since we cooperated at the University of Bergen," he said of Steel. "I take our joint interests and success back to the education and teaching culture at the University of Bergen."

It is something he wishes for others.

"I encourage all younger scientists to take international opportunities, seeing all the rocks they can see and apply the knowledge in exploration and exploitation of natural resources."

Steel agrees.

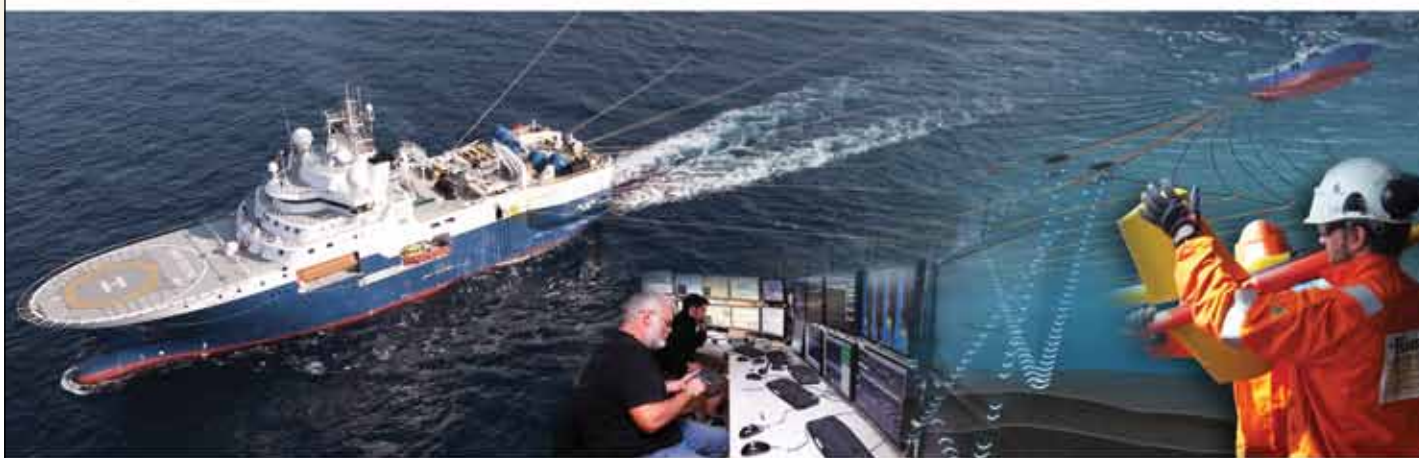
"Yes," he says of the coincidence of their two awards, "it would seem to be an unusual intersection! Although we never did have much joint research after Ole's post-doc period, we cross paths and talk frequently at gatherings and conferences because of our common interest in sedimentology and Norsk Hydro (now Statoil).

There is something else, too:

"When Ole also gets tired of management, maybe we will work again together," says the teacher.

"This would be quite a lot of fun," says his old student. ■

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Historical Highlight: Miri Field

Seeps Helped, But Success Was a Higher Calling

By RASOUL SORKHABI

Miri is a major city in Sarawak, located on northwestern coast of Borneo. Its growth from a small fishery village in the late nineteenth century to a modern town with an airport and a population of over a quarter million is largely related to the oil industry.

Indeed, it was in Miri in 1910 that the first oil field on Borneo (the world's third largest island) was discovered, and the following year (now one hundred years ago) 1,950 barrels of oil were produced from the discovery well, Miri No. 1.



SORKHABI

Looking for Seeps

Human settlement in the Miri area is thousands of years old. The modern history of Sarawak, began in the mid-nineteenth century when an Englishman, James Brooke, gradually but steadily brought the region under his control.

During the rule of the so-called White Rajahs of Sarawak, European scientists began to map the region. Thus, in 1892 Dr. T. Posewitz published "Borneo: Its Geology and Mineral Resources."

As in the world's other oil regions, oil seeps first attracted oilmen to explore and drill in Sarawak. Indeed, local inhabitants had extracted oil from hand-dug wells for centuries and used what they called minyak tanah ("earth oil") as medicine or for waterproofing boats and lighting lamps.

In the 1880s, Claude Champion de Crespigny, an officer working for the White Rajah Charles Brooke, listed 18 hand-dug oil wells in the Miri area and recommended "the oil district near the mouth of the Miri River should be thoroughly searched and reported on."

This task was pursued by de Crespigny's successor, Charles Hose (1863-1929), an Englishman who rose to be an eminent author and authority on the natural history of Sarawak.

Hose prepared a map of 30 oil seeps around Miri, and to do so, he even offered awards to the locals who would show him an oil seep.

After retiring from service and returning to England in 1907, Hose contacted the aging Charles Brooke, who happened to be living in England that year. Hose requested the Rajah's permission to show his map and samples of oil seeps from Miri to an oil company in London.

The Rajah gave his permission, and the oil company that Hose contacted was Royal Dutch Shell Company, which had just merged.

Surprise!

H.N. Benjamin, a branch manager in the company, was enthusiastic about exploring for oil in Miri, and the Rajah personally came to London to sign the first Sarawak Oil Mining Lease in 1909.

Royal Dutch Shell dispatched its senior geologist Josef Theodor Erb (1888?-1934) along with Charles Hose to Miri. From August 1909 to July 1910 (except for a leave in December-January), Erb mapped the Miri area and identified the Miri Hill



Location map for Miri, Sarawak



Charles Hose



Dr. Josef Theodor Erb



Photo by Rasoul Sorkhabi

A view of the Miri Well No. 1 derrick, affectionately called the Grand Old Lady, sitting near the Petroleum Museum on top of Miri Hill.

This article is the second of the EXPLORER's Historical Highlights series – a new feature that celebrates the "eureka" moments of petroleum geology, the rise of key concepts, the discoveries that made a difference, the perseverance and ingenuity of our colleagues – and/or their luck! – through stories that emphasize the anecdotes, the good yarns and the human interest side of our E&P profession.

The series' editor is Hans Krause, a consultant in Caracas, Venezuela. Krause is an AAPG Honorary Member, Distinguished Service Award winner and chairman of the AAPG History of Petroleum Geology Committee.

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.

(about 150 meters above sea level) as an anticline and a favorable site for drilling.

This surprised the local people, who had anticipated the well to be drilled in an oil seep like the hand-dug wells before. Before the drilling could begin, Erb and Hose had to convince the people that the well would not open the underground cave that was, according to a local legend, home for two evil tigers.

The well was spudded in on August 10, 1910, using a rig composed of wooden derricks and cable tool drilling.

The rig was engineered by a Canadian named "Mr. McAlpine"; therefore, the hill has been historically called the "Canada Hill."

On Dec. 22, 1910, the well struck light crude at 425 feet (130 meters) depth in the Upper Miocene deltaic sandstone. The discovery must have been a Christmas present for Hose and Erb.

Royal Dutch Shell then founded a subsidiary in Miri, the Sarawak Oil Field Ltd., which still operates today as Sarawak Shell Berhad.

Incidentally, the Miri field has so far been the only onshore oil field in Sarawak – exploration and production went offshore in the late 1950s, and that is where oil operations still are.

On Oct. 31, 1972, the Miri field was closed in.

'The Grand Old Lady'

During the six decades of operation, 624 wells had been drilled in the field and about 80 million barrels of oil had been produced. Miri No. 1 had faithfully produced over 0.65 million barrels and was still yielding several barrels a day in October 1972. But it was probably time for retirement.

Although oil seeps are still notable in and around Miri, urbanization has discouraged further drilling.

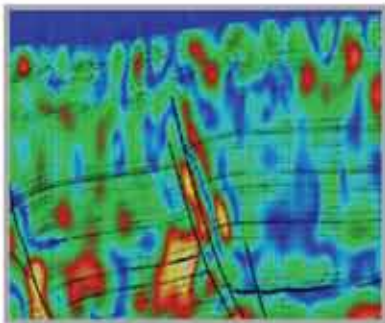
Today, the 30-meter high Miri Well No. 1 derrick, affectionately called "The Grand Old Lady," sits on top of the Canada Hill (renamed Bukit Telaga Minyak in Malay in 2005), next to the Petroleum Museum that was opened in 2005.

If you happen to be in Miri, a visit to this museum is worth the effort.

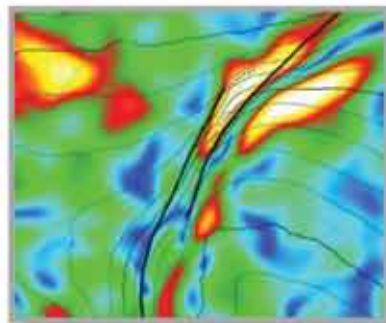
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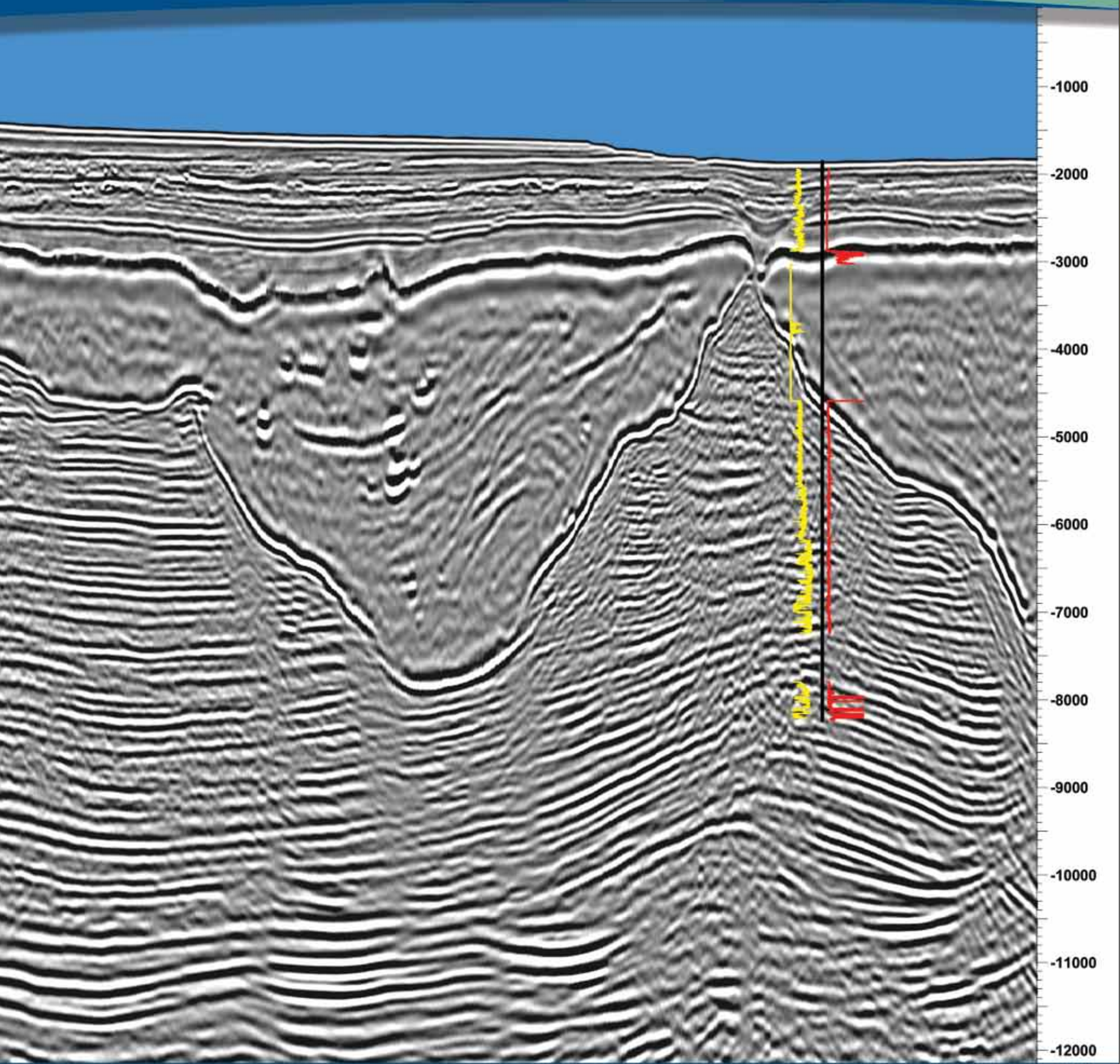
Time (Horizon) Slice

Seismic attribute analysis enabled the interpreter to better understand the interplay of local structure, fracturing and stresses.

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Will the third time be the charm?

Well Numbering System Once Again Studied

By BARRY FRIEDMAN, EXPLORER Correspondent

Since 1966, the American Petroleum Institute has set the standards for numbering the more than three million oil and gas wells in the United States, with regulatory agencies typically being the creator of the actual numbers assigned.

This well numbering standard has not been officially updated since 1979, despite the many technology changes that have occurred.

In this standard, the API D12A Committee laid out a 10- or 12-digit number (called API number), which included the state and county code, a well identifier number within the country, and a direction sidetrack code (if applicable).

In setting this standard, it was anticipated that each well/wellbore drilled in the United States could be recognized uniquely with a number that would not change – and that the many different well data types (logs, cores, directional surveys, tops, production, etc.) could be successfully linked or integrated in a digital mode.

The problem is this: The way the API number is used by different groups has evolved since the late 1970s, and the variability in the number assignment is a key issue.

During that time three efforts were organized to close that gap.

The latest is happening now.

AAPG member James Stolle, business development manager for TGS Geological Products, Houston, is among those spearheading the new numbering schema,

“The API number is like the Social Security Number to Americans – it is the one common way across the U.S. of identifying uniquely the wells drilled in the U.S. and the various states.”

which he says is long overdue.

The initiative is coming from the Professional Petroleum Data Management Association (PPDM), a member-driven, international organization dedicated to providing data management standards for the petroleum industry.

PPDM's work “supports the growing data management needs of a diverse worldwide membership” that includes oil and gas companies of all sizes, national and international oil companies, software and data vendors and oilfield service companies.

Stolle said the API number is still following numbering practices and procedures from the 1970s onshore and it affects the efforts of all trying to do interpretation efforts – particularly in areas with lots of historic well data.

“I personally believe that was a bit too restrictive in what received an API number,” he said. “Virtually every well drilled, regardless of its purposes, has subsurface information that can be utilized by those

doing interpretation. Where the well/wellbore does not get ‘officially’ recognized with at least a 12 character API number, the presence of the wellbore, its well path and all the associated well data is essentially lost in today’s computer driven efforts.”

To put it another way, he says, “The API number is like the Social Security Number to Americans – it is the one common way across the U.S. of identifying uniquely the wells drilled in the U.S. and the various states. Revenues and royalties are tracked using the API number.”

The number also is used by those looking for new fields and exploiting older discovered fields, and as the primary way of integrating all the digital types of well information

“When I started in the industry in the mid-1970s, data integration was a manual effort,” Stolle said. “It was slow, manual and, because of the slowness, less subject to linking the different well data types incorrectly.”

Number, Please

Granted, the “old” system worked. But like a city that runs out of exchanges for its one area code, the demand was putting strains on the system.

“Jump forward 20-plus years, and the digital data with our collection of G&G interpretation applications can be linked together data on thousands of wells in seconds,” he said. “That linkage assumes that all the different sources of well data are uniform in the reference number associated with the data (the API number).”

And that’s the key.

“Therein is the fundamental problem and the need today,” he said. “How the API number is implemented has varied between regulatory agencies, operators and vendors and has evolved over the last 20-plus years. Data gets incorrectly linked because of minor differences in the API number assigned by the different data.”

Other problems, too, were evident.

“Another area of concern to me,” Stolle said, “is that all drilled wellbores, even those drilled for oil and gas purposes, do not get officially designated with an API number, which includes 12 characters or more. From the research that I have been involved with over the years, there are at least 10-20 percent more well bores drilled (onshore and offshore) than have been ‘officially’

See Numbering, page 30

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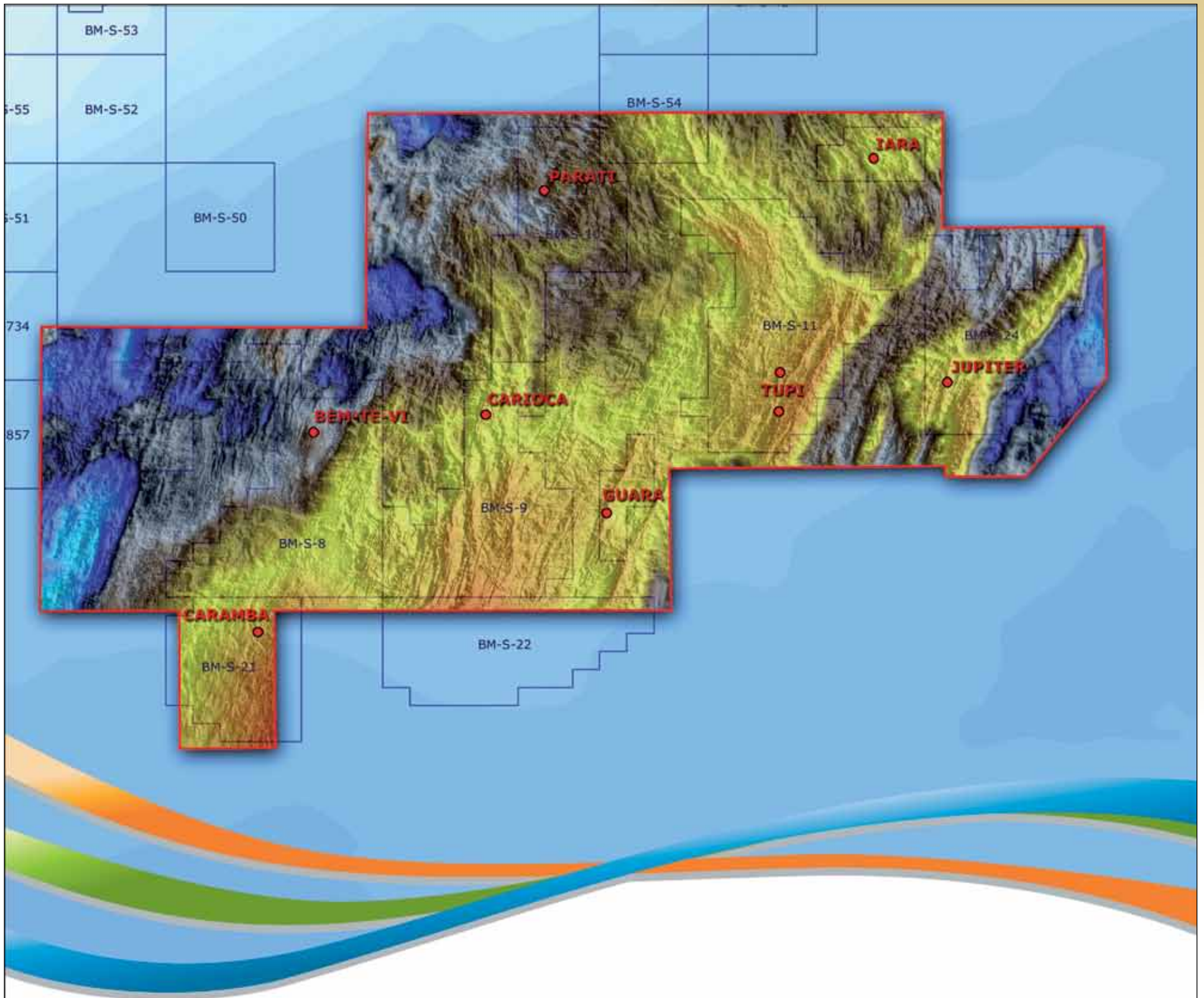
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Numbering
from page 28

recognized with API_12 length numbers.”
He cites an “absurd” example of a well in Cameron Parish, Louisiana, which shows a 5,900-foot producing well that became the well/wellbore of record and received the “official” API number – it happen to be the sidetrack 1. The original hole that went to 10,750 feet and logged to TD, but was not assigned an API_12 – meaning, he said, it was forgotten and essentially lost to the industry.
“A few years back I had the experience of finding a big, black mark on my credit report and a serious charge,” he said. “As it ended up, a minor mistake in a social security number from another person in another state who was passing bad checks

was linked to my credit data through the social security number.
“Now consider how we link well data with the API number ... very much like the social security number,” he said. “And any minor differences will cause data to be linked incorrectly.”

Stolle says it is not a rare problem, either. “It is too common, and it can cause very expensive mistakes in interpretation. This is ‘Why the need?’”

Try, Try Again

That need, he says, has been around for 20 years.
“In the early 1990s, efforts to renumber the system were about 90 percent complete,” Stolle recalled. “Then the then-leader of the D12A committee passed away unexpectedly, and there was confusion as to the whereabouts of the unpublished

manuscript.”
The program languished for 10 years, but around the year 2000 the API was approached again on the idea of updating the D12A standard.

There were several responses, Stolle recalled, including someone from the API saying, “We do not perceive the API number as much of a problem, as none of the board members are complaining, so it must not be much of a problem.”

Nevertheless, he was told if he wanted to pursue it, API would publish his findings. There was a caveat: no funding.
Stolle said he demurred, because, “I did not have the time, being self-employed, to devote six months to the rewrite.”
The project died again.
Then, in 2008, while under the employ of P2ES, Stolle found the time and re-approached API on updating the standard. There were challenges: Once he was

able to determine who was in charge of the original project – not an easy task – he was told API might consider transferring the standard to another organization.

“A number of potential alternatives to taking over the standard were reviewed,” he said, “and in the end I was impressed most with PPDM’s approach, thoughtfulness and recognition of the effort they were going to have to perform.”

But PPDM, according to Stolle, had to address:
▶ Addressing all the wells.
“What and how the standard was written to be used 30 years ago has evolved,” he said, “and our data management practices today require some different approaches.”

▶ Wells had to be assigned numbers from one source and not, as was the case, from various regulatory agencies, operators and vendors.
“Without an absolute standard that all users of well data can ‘sync’ to, there will always be differences in what API numbers get assigned and used.”

To succeed, he and his team – which includes AAPG members Steve Cooper, PPDM project coordinator, and Bruce Smith, vice president at IHS in Denver – worked with the Interstate Oil and Gas Compact Commission (IOGCC) and various state regulatory groups to number new wells with at least an API_12-like number and in the manner prescribed by the current and PPDM’s new version of the D12A.

Paying the Price

Stolle wants to make clear that a guiding principle is to avoid changing an API number once assigned.

“The unique identity (API Number) must be fixed and unchangeable throughout time,” he said. “Thus for the U.S., I do not see a new well identity number being assigned to existing wells that already have API numbers.”

Cases where incorrectly assigned API numbers are noted, however, would be better handled with a change.

He says that clarification on how wells are assigned numbers (and what designates a well) will benefit all.

“There have been many drilling technology improvements over the last 30 years with horizontal drilling, for one,” he said. “Today, with I believe over 60 percent of our new wells in the U.S. as deviated or horizontal, we need to recognize any and every well and wellbore and their well paths and be able to number them consistently.”

Successful completion of the project will require industry funding to support the participation of some key experts, communication, technical and administrative costs.

“At this time, we estimate that the total cost of the project will be approximately \$250,000 (US). The PPDM Association is presently soliciting this sponsorship, so that the project can be launched and completed in a timely and efficient manner.”

To date, sponsors include Anadarko, BP, Chesapeake Energy, Chevron, ConocoPhillips, ExxonMobil, geoLogic, Hess, IHS, Marathon and TGS.

According to the PPDM website, the new standards have been adopted – inconsistently – by most of the United States, but not by Canada or Mexico.

“Our API effort will not be free,” Stolle said, “but it will work and cause the data management and interpretation efforts for the whole industry to be far more comfortable and beneficial than they currently are.”

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42010000100	HAMBELT OIL & REFINING	HAS E OILFIELD HALEY	1	ATASCOSA	1620	2091
42010000200	COCHRAN, DAVID T	HENRY, B W	1	ATASCOSA	1514	1924
42010000300	TRIN AM PETRO CORP	R K BIRDWELL	4	ATASCOSA	4323	2022
42010000400	SHELL OIL CO	WHEELER, GERTHA H	1	ATASCOSA	1676	1970
42010000500	SHELL OIL CO	WILSON, J W	1	SEE	1940	2000
42010000600	SHELL OIL	ROBERTS, A S	1	SEE	1700	1900
42120000000	TEXAS EASTERN TRANS CORP	BARNE SMO UNIT	1	DE WITT	1927	1940
42120000100	SHELL OIL	BROWN, CORA S	1	DE WITT	1732	1900
42120000200	ARCO OIL & GAS	ARCO HOBBS	1	DE WITT	1920	1470
42120000300	MSF OIL Corp	BECKER	1	FROD	1540	1640
42140000000	ATA OIL PRODUCTIONS	TWA JV-P HARTZ	1	FROD	1530	1710
42140000100	FLAC-NEPHER OIL Co	MUD	1	FROD	1540	1730



Upgrades Made To IBA Website

By JANET BRISTER, AAPG Website Editor

Five years ago AAPG adopted the Imperial Barrel Award program from the Imperial College in London, England – and what once was a program focused on the North Sea with interpretations created using color pencils has become a worldwide event.

Today, the IBA focus is on new technology and complex, real-scenario datasets for basins from around the world.

To reflect that progress, a new look also has been given to the IBA website – a design that captures the global scope of the competition, emphasizes its importance to encourage young geoscientists in their profession and feeds the excitement that is beginning to ramp up as the final competition approaches.

Changes/additions include:

- ▶ Countdowns to important deadlines.

Throughout the competition there are deadlines to sign-up, acquire databases, provide visas and, of course, actual competition dates. The site's countdowns change to reflect the next critical step in this six- to nine-month experience.

- ▶ Specific sections devoted to each region- and section-wide preliminary competition as teams vie this month for the honor to represent their Region at the AAPG annual meeting.

- ▶ A past competitions section highlights the growth of the IBA program.

The 2007 highlights reflect the very local focus that IBA began with; only Sections

in the United States competed against a couple of European Region teams.

But immediately in 2008 you see where all other regions caught the vision, and from that point on IBA has grown.

- ▶ Testimonials and reports from different competitors or competitions are included in the site.

There are some serious awards to receive for the efforts of those who participate.

The IBA gives out over \$50,000 to winning and participating teams.

The software, datasets and volunteer time add up to several hundred thousand dollars in donations.

But the real value may be what the participants gain from the experience.

Students who compete learn what is going to be expected of them in order to convince their client that a play has potential, or not, and why the data indicates this is where you should (or should not) find a reservoir.

To be forced to apply the textbook information to real data under the guidance of a professor or corporate professional in a scenario that matters is one of the benefits afforded each competitor.

Soon the IBA will have a mobile version that will make it even easier to keep up with what is happening throughout the year.

This should be an area of aapg.org worthy of repeat visits.

Good browsing!

AAPG Social Media Is Growing

By BOGDAN MICHKA, AAPG Website Producer

An update on AAPG's social media initiative is simply this: It's growing.

- ▶ The LinkedIn group for the AAPG is approaching 2,500 participants.

Are you a part of it? Can we grow the group to 3,000 by the start of this year's AAPG Annual Convention and Exhibition?

- ▶ The AAPG Facebook fan page has 1,900 fans and is growing. Last year there were probably less than 300.

- ▶ AAPG has nine fan pages, and at the end of January there were a total of 3,538 fans.

- ▶ There are seven AAPG Twitter accounts and three AAPG individual Twitter accounts. Their accumulative total followers are 2,373. Just before the 2009 annual meeting there were only six Twitter accounts AAPG used, and none had more than 200 followers.

Are you a part of the conversation? Visit the [wwwUpdate](http://wwwUpdate.com) blog at blog.aapg.org/web/ and weigh in on whether or not you even want to be conversing with the rest of the world.

Just look for the post "Joining the conversation – why not blog?"

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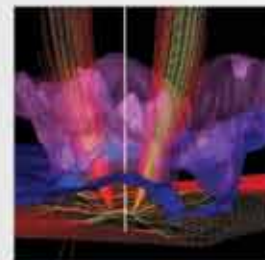
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PSAAPG 2011 CONVENTION; ANCHORAGE, ALASKA, MAY 6-14: ORAL AND POSTER PRESENTATIONS MAY 9-11, with FIELD TRIPS AND SHORT COURSES PRECEDING AND FOLLOWING ORAL/POSTERSESSIONS.

Alaska in the spring! An excellent time to see the beauty of the Last Frontier and take in more than just a little geology. In addition to the oral and poster sessions the conference will offer unique cultural and geological opportunities for those in attendance. The cultural aspect is highlighted by an evening at the Alaska Native Heritage Center, with an Alaskan menu, native dance and native Olympics demonstrations, plus a tour of the grounds featuring a variety of authentic native dwellings.

The geology of southcentral Alaska is on display through 4 field trips. A more detailed description of these trips can be found on the PSAAPG website. 1.) The Turnagain Arm-Resurrection Bay field trip (May 6-7) features the Mesozoic accretionary complex, a portion of the 1964 megathrust deformation zone, and Eocene ophiolites. A boat tour of Resurrection Bay is included, with great scenery and excellent opportunities to view coastal birds and marine mammals. 2.) Sedimentology, Reservoir Quality, and Tectonic Setting of Late Miocene-Early Pliocene Gas-Bearing Formations, Upper Cook Inlet (May 12-14). This field trip examines the characteristics of gas-bearing late Miocene and early Pliocene strata exposed in coastal bluffs between Soldotna and Homer. The tectonic context of the forearc basin is explored by stops in the Mesozoic accretionary complex. 3.) Wishbone Hill Field Trip (May 12) examines the bituminous coal fields of the area, which were integral to the early development of Anchorage and vicinity and as fuel for the early 20th century Pacific Fleet. 4.) Tertiary Coal-Bearing and Holocene Deposits, Nenana Basin, Alaska (May 11-13). The trip includes a general tour of southcentral Alaska, with views (weather permitting) of Denali (Mt. McKinley), large scale fluvial depositional systems, and detailed outcrop examples of Tertiary to Holocene fluvial and alluvial sequences of the Nenana Basin.

Two short courses/workshops dedicated to Alaska are also offered (see PSAAPG website for details). A core workshop on the reservoir potential of the western North Slope is offered on May 6 and will consist of a number of cores covering the key reservoirs. Apart from core descriptions, other information will include facies analysis, porosity and permeability determinations and petrology. The second Alaska oriented short course (May 7) is the Tectonic Evolution of Arctic Alaska and its Influence on Basin Evolution and Petroleum Systems. The course objective is to provide a regional context in which to place the deposition of source and reservoir rocks, generation and migration of hydrocarbons, and formation of structural and stratigraphic traps, with special emphasis on the Jurassic to present.

An additional workshop titled, Managing Your Business using PRMS is scheduled for May 12. In March 2007, the Society of Petroleum Engineers (SPE) released new guidelines for the classification of petroleum reserves and resources. This **Petroleum Resources Management System (PRMS)** is co-sponsored by the World Petroleum Council (WPC), the American Association of Petroleum Geologists (AAPG), and the Society of Petroleum Evaluation Engineers (SPEE). These same sponsors have formed a Joint Committee for Reserves Evaluator Training (JCRET) to review and endorse training courses in the area of resource assessment and reporting. This course is the first endorsed

by JCRET and discusses how companies are implementing **PRMS** to better manage their business. The details of this course can be found at the PSAAPG convention website.

Registration site for conference and hotel registration link (Sheraton Hotel Anchorage) will be operational by February 20, 2011. Check PS-AAPG or Alaska Geological Society (AGS) websites.

David Curtiss, head of AAPG's Geoscience and Energy Office in Washington, D.C., can be contacted at dcurtiss@aapg.org; or by telephone at 1-202-684-8225.

WASHINGTON WATCH

GOM Permits Delayed
Disaster Unmitigated

By DAVID CURTISS, GEO-DC Director

One month after the tragic loss of the Deepwater Horizon drill rig in the Gulf of Mexico, President Obama signed an Executive Order establishing the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling.

Even as BP and federal officials struggled to stop the flow of oil into the Gulf there was recognition that the nation needed a full accounting of the events leading up to and following the explosion and sinking of Deepwater Horizon. Perhaps more importantly, we needed to understand what occurred so we could prevent it from happening again.



CURTISS

The president appointed former Florida governor and senator Bob Graham (D) and former Environmental Protection Agency Administrator William Reilly, who served President George H.W. Bush, as co-chairmen.

In addition, he appointed five commissioners:

- ▶ **Frances Beinecke**, president of the Natural Resources Defense Council.
- ▶ **Donald Boesch**, president of the University of Maryland Center for Environmental Science.
- ▶ **Terry Garcia**, executive vice president of the National Geographic Society.
- ▶ **Cherry Murray**, dean of the Harvard School of Engineering and Applied Sciences.
- ▶ **Fran Ulmer**, chancellor of the University of Alaska Anchorage.

The Commission delivered its final report Jan. 11, 2011. It found that the explosion aboard Deepwater Horizon and subsequent disaster was "foreseeable and preventable."

"Our investigation shows that a series of specific and preventable human and engineering failures were the immediate causes of the disaster," Reilly said in a written statement. "But, in fact, this disaster was almost the inevitable result of years of industry and government complacency and lack of attention to safety. This was indisputably the case with BP, Transocean and Halliburton, as well as the government agency charged with regulating offshore drilling – the former Minerals Management Service.

"As drilling pushes into ever deeper and riskier waters where more

of America's oil lies," the statement continued, "only systemic reforms of both government and industry will prevent a similar, future disaster."

The Commission's recommendations and explanatory text fill a 63-page booklet. Among 15 "key" recommendations:

- ▶ They call for an updated federal regulatory structure and improved offshore safety culture.
- ▶ They want to see establishment of a separate safety agency within the Department of Interior and creation of an industry-funded safety institute.
- ▶ They recommend additional funding for science and technology R&D.
- ▶ They want a significant increase in liability for operating companies, including a risk-pooling program to enable smaller operators to continue working offshore.

* * *

Reaction to the Commission's recommendations was swift.

The American Petroleum Institute said it was "deeply concerned that the commission's report casts doubt on an entire industry based on its study of a single incident."

"This does a great disservice to the thousands of men and women who work in the industry and have the highest personal and professional commitment to safety," API Upstream Director Erik Milito said, noting also the additional steps the industry had taken since the disaster to reinforce existing best practices and procedures.

The National Offshore Industries Association rejected the notion that there was a "systemic" problem in offshore energy production, and pointed out that the industry's enviable safety record in the Gulf of Mexico was "not because the industry has been lucky."

In addition, "the report is not an indictment of offshore oil and gas production," noted NOIA President Randall Luthi. "While many opposed to offshore exploration will undoubtedly use the report to bolster their calls to stop offshore oil and gas development, even the Commission members themselves recognize the importance of moving ahead with additional development."

Unfortunately, however, that development has yet to resume.

The administration lifted the moratorium in late 2010, but as of February has yet to

[See Washington, page 34](#)

Here's Your CVD Invitation

By DEBORAH SACREY, Chair, DPA Governmental Affairs Committee

The 112th Congress has been sworn in and is getting down to business.

Making sure that Congress and the administration have sound scientific information and professional input in the areas of petroleum, energy minerals and the environment is essential. And I'd like to invite you to join us in doing this.

Mark your calendars for May 23-25, 2011, and join us in Washington, D.C., for AAPG Congressional Visits Day 2011.

Over the course of three days you'll be briefed about current legislative

and regulatory events and have the opportunity to meet with policy makers and their staff in Congress and federal agencies to discuss the vital issues facing our science and profession.

We are looking for folks from industry, the consulting world and academia to showcase the broad experience and knowledge that AAPG members have.

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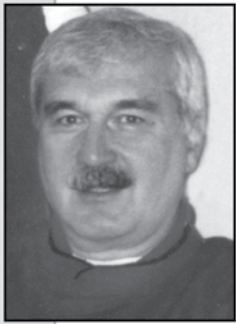


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ATC Draws Over 1,200 Arctic Explored

Over 700 delegates and 1,200 total registrants heard of the perils – and opportunities – at the inaugural OTC Arctic Technology Conference (ATC) held at the George R. Brown Convention Center in Houston in February.

The ATC was based on multidisciplinary cooperation and contribution, with 14 technical societies and organizations working together to present the conference, said Pierre-Alain Delaitre, chair of the ATC Technical Program Committee. AAPG served as conference organizer.

The program included over 130 technical presentations and an Exhibits Hall

with over 50 exhibitors.

In 2008 the U.S. Geological Survey completed an assessment of undiscovered conventional oil and gas resources in all areas north of the Arctic Circle, revealing unlimited opportunities for companies and countries that can find solutions to the Arctic's many challenges. The agency determined that 90 billion barrels of oil, 1,669 trillion cubic feet of natural gas and 44 billion barrels of natural gas liquids have the potential of being discovered in the circum-Arctic.

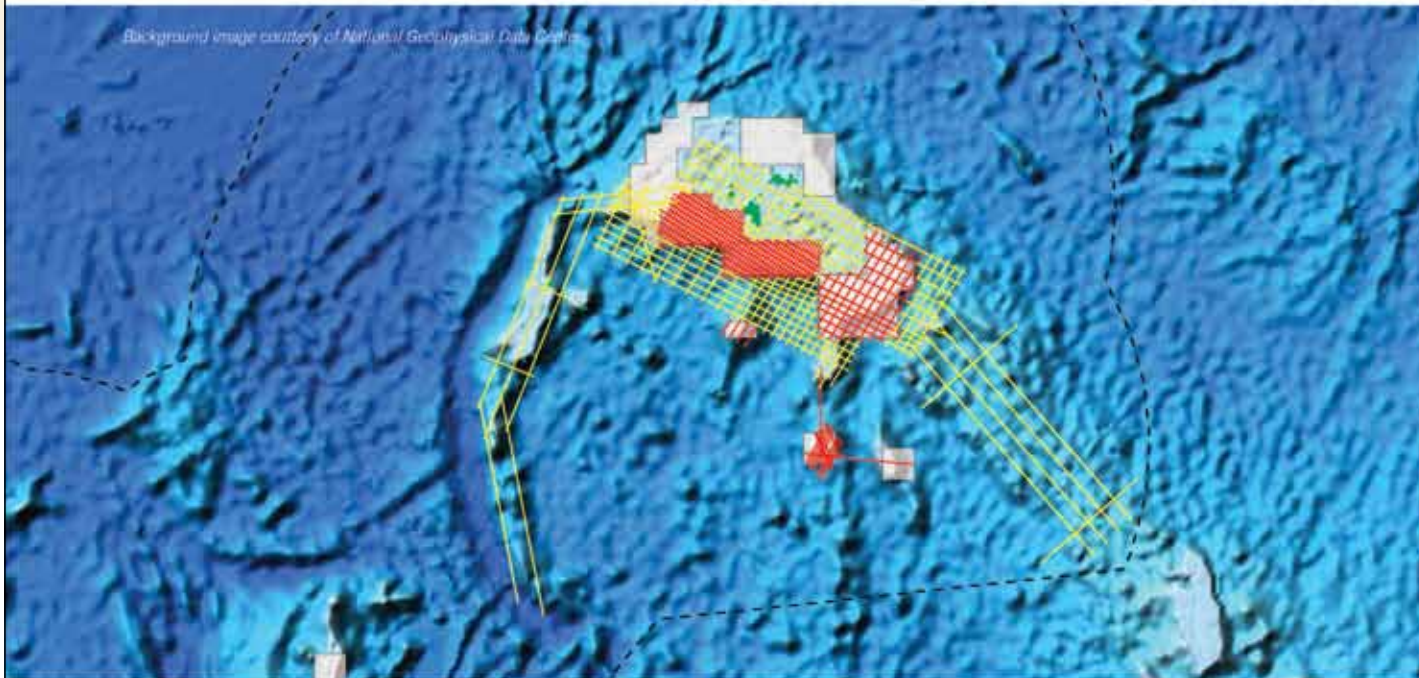
More than 70 percent of the mean undiscovered oil resource is estimated to occur in five provinces: Arctic Alaska, Amerasia Basin, East Greenland Rift Basins, East Barents Basin and West Greenland-East Canada.

Three provinces are thought to hold more than 70 percent of the undiscovered natural gas: West Siberian Basin, East Barents Basin and Arctic Alaska.

About 84 percent of the entire resource is expected to occur in offshore areas.

The technical presentations will cover seven key topical areas: resources; exploration drilling; production drilling, facilities and export; physical environment; logistics and marine transport; and regulatory and environment, and included attendees from 22 countries.

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Washington from page 32

approve a new deepwater drilling permit. This has forced companies to relocate drill rigs to other parts of the world, and created more economic uncertainty along the Gulf Coast.

In mid-January Michael Bromwich, director of the Bureau of Ocean Energy Management, Revenue and Enforcement (BOEMRE), said permitting would likely resume before the middle of 2011.

But only a few days later Bromwich was quoted saying, "I don't want to hazard a guess as to exactly when the first deepwater permits will be issued," but he hoped they would "be approved before too long."

* * *

Meanwhile, Congress is conducting hearings on the Commission's findings and considering possible legislative remedies.

The Administration continues its reorganization of BOEMRE into two separate bureaus – one focused on safety and the other focused on leasing and resource management. Collecting revenues from oil and gas development on federal lands had already been separated from BOEMRE late last year. In addition, Interior Secretary Ken Salazar announced the formation of an Offshore Energy Safety Advisory Committee.

But as a recent analysis by consultancy Wood MacKenzie shows: "Nearly one-third of U.S. deepwater production could be rendered uneconomic [by deepwater permitting delays], which could significantly impact deepwater production, resulting in less energy production, less investment and less revenue to government."

That is no recipe for enhanced energy security and economic vitality.

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Getting More From Frequency-Enhanced Data

By SATINDER CHOPRA, KURT J. MARFURT and SOMANATH MISRA

Seismic attributes are particularly effective for extracting subtle geologic features from relatively noise-free seismic data. However, seismic data are usually contaminated by both random and coherent noise, even when the data have been migrated reasonably well and are multiple-free.

As you can see here, certain types of noise can be minimized during interpretation through careful structure-oriented filtering and post-migration suppression of data-acquisition footprints.

Another problem sometimes encountered by interpreters is the relatively low frequency bandwidth of seismic data. Although significant efforts are made during data processing to enhance frequency content of reflection signals, such efforts often fall short of the objective. Thus suitable ways need to be adopted to achieve improved frequency content of reflection data during data interpretation.

We discuss both of these problems here – the suppression of acquisition footprints from seismic data, and frequency enhancement of data before final interpretation is done.

Noise Suppression

► Suppression of random noise.

Mean filters and median filters are commonly used during interpretation to suppress random noise.

One valuable application is the use of dip-steered mean or median filters, which enhance laterally continuous events by reducing random noise yet does not suppress details consistent with geologic structure. Such a filter spans a defined number of data samples (N) within an aperture that follows local dip and azimuth and replaces the amplitude of the central sample with the median value of all N amplitudes spanned by the filter.

Median filters can be applied iteratively, reducing random noise at each successive iteration, but they do not significantly increase the high-frequency geological components of the surface along which they operate.

Dip-steered mean filters work well on prestack data in which discontinuities appear as smooth diffractions, but they tend to smear faults and stratigraphic edges on migrated data. Dip-steered median mean filters work somewhat better, but they too can smear faults.

Structure-oriented filters operate parallel to reflectors and do no filtering or smoothing perpendicular to a reflector.

► Suppression of acquisition footprint.

An acquisition footprint is defined as any amplitude or phase anomaly observed in seismic data that correlates to surface data-acquisition geometry rather than to subsurface geology.

Spatially periodic changes in stacking fold, source-receiver azimuths and source-receiver offsets cause spatial periodicity in enhanced seismic signal and in noise rejection. Most seismic attributes react to these periodic changes in seismic data quality and create artifacts that mimic the source-receiver geometry.

One of the simplest methods for suppressing data-acquisition footprints is to apply k_x - k_y filters on seismic amplitude time slices.

We show an example of this type of

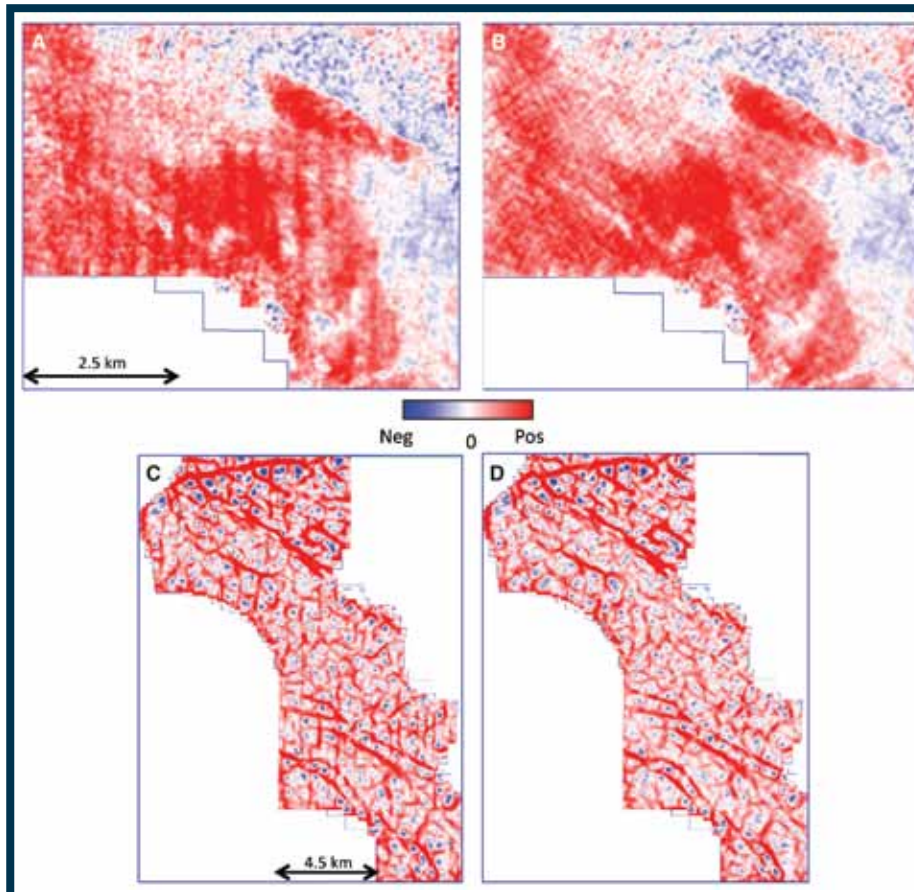


Figure 1 – Time slices of reflection amplitude at 769 ms (a) without, and (b) with k_x - k_y filtering for suppression of acquisition footprint. The vertical striations (acquisition footprint) seen on panel a are removed on filtered panel b. Stratal slices of most-positive curvature calculated from data (c) before, and (d) after footprint filtering. Numerous vertical trends seen on panel c are eliminated on panel d.

noise suppression on figures 1a and 1b, where much of the vertical striping seen on the amplitude data exhibited on figure 1a is removed on figure 1b.

Attributes calculated from seismic data that have no acquisition footprint do not display acquisition geometry artifacts and provide more accurate geologic interpretation. As an example, notice vertical receiver-line imprints that appear on the time slice of the most-positive curvature attribute on figure 1c are not seen on the equivalent time slice in figure 1d after the data-acquisition footprint is filtered from the amplitude data.

Frequency Enhancement

Thin-bed spectral inversion is a process that removes time-variant wavelets from seismic data and extracts



CHOPRA



MARFURT



MISRA

reflectivity to image bed thicknesses far below seismic resolution.

In addition to enhanced images of thin reservoirs, these frequency-enhanced inverse images are useful for mapping subtle onlaps and offlaps, thereby facilitating the mapping of parasequences and the direction of sediment transport.

In addition to viewing spectrally broadened seismic data in the form of reflectivity, data also can be filtered to any desired frequency bandwidth that allows useful information to be better

seen for interpretational purposes.

Depending on the quality of data being interpreted, as well as access to the methods discussed here, data need to be preconditioned to optimize noise removal (whether the noise removal involves random noise or unwanted acquisition footprints) and to achieve optimal frequency-enhancement before attributes are computed. Once such data preconditioning is done, attribute computation then yields attribute maps devoid of artifacts and allows a more accurate geologic interpretation.

To illustrate the importance of data preconditioning, figure 2 shows stratal slices from coherence volumes run on (a) input data, (b) input data with inverse Q filtering, (c) spectrally whitened input data and (d) input data transformed to filtered thin-bed reflectivity inversion.

Notice these coherence slices show increased resolution in this a-b-c-d order of data preconditioning, with the highest lateral resolution seen for coherence computed from filtered thin-bed reflectivity inversion.

We emphasize that computation of attributes is not a process that involves pressing some buttons on a workstation, but requires careful examination of input seismic data in terms of signal-to-noise ratio, noise contamination, and frequency content.

* * *

In our studies, we find that:

► Attributes calculated from seismic data that have a high signal-to-noise ratio and that are processed for acquisition footprint suppression exhibit geological features clearly without any masking.

► Enhancement in the frequency content of data volumes occurs in the order shown on figure 2.

Some of these data-conditioning methods may not be available to an interpreter; we hope these examples assist in decisions about how seismic interpretation software and workstation capabilities may need to be adjusted to improve data interpretations.

We wish to thank Arcis Corporation for permission to present these results.

(Editor's note: AAPG member Satinder Chopra and Somanath Misra are with Arcis Corp., Calgary, Canada. AAPG member Kurt J. Marfurt is with the University of Oklahoma, Norman, Okla.)

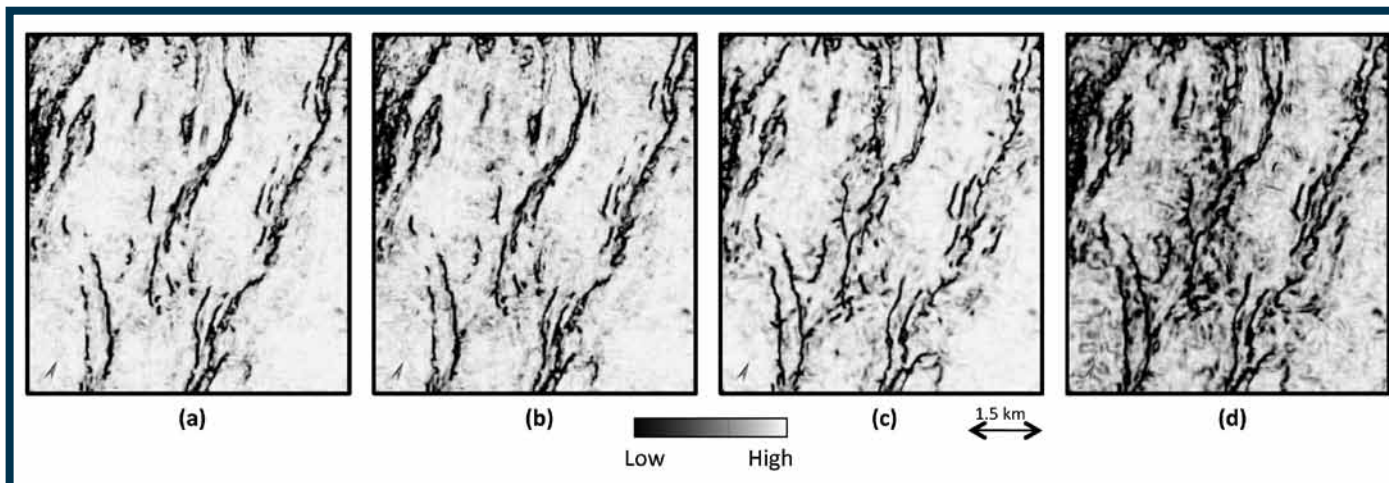


Figure 2. Stratal slices from coherence attribute calculated (a) from input data, and after (b) Q compensation, (c) time-variant spectral whitening and (d) filtered thin-bed inversion. More detail is seen as data conditioning steps progress from a to d.


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John and Colleen Silcox

“I strayed into the geologic profession quite by accident, in spite of having been raised among California's prolific oil fields. I highly value two of our Foundation's activities – the K thru 12 program to reach youngsters during their impressionable age and the Grant-in-Aid program to support those already committed to a career in science, as being potential recruiting tools to sustain the vitality of our profession and thus worthy of our investment.”



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PROFESSIONAL news BRIEFS

Nadeem Ahmad, to senior manager, Pakistan Petroleum, Islamabad, Pakistan. Previously manager-exploration, Pakistan Petroleum, Islamabad, Pakistan.

Andrei Belopolsky, to exploration new business team leader, Premier Oil, London, England. Previously senior exploration geoscientist, BP Exploration, London, England.

Marc Bond, to manager-subsurface assurance, BG Group, Reading, England. Previously manager-exploration assurance, BG Group, Reading, England.

Isaac "Ike" Crumbly has received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring from President Obama, for his work as founder and director of the

Cooperative Developmental Energy Program at Fort Valley State University, Fort Valley, Ga. Crumbly received an AAPG Special Award in 1999 for his work at Fort Valley, and the AAPG Foundation's Isaac J. Crumbly Minorities in Energy Grant is awarded annually to a deserving graduate student through the Grants-in-Aid Program.

Chris J. Donofrio, to senior geological adviser, Oxy Oman, Muscat, Oman. Previously senior geological adviser, Oxy Permian, Houston.

Matt Frankforter, to geologist-deepwater gas exploration, Chevron, Perth, Australia. Previously technical team leader, Chevron, Anchorage, Alaska.

Michael Harbin, to senior staff geophysicist, Murphy Oil, Houston. Previously geophysical adviser, Devon Energy, Houston.

Stanley L. Lindsey, to vice president of exploration and development, Victory Energy, Austin, Texas. Previously chief geologist, Austin Exploration, Austin, Texas.

Jim Ligon, to exploration manager, EOG Resources, Denver. Previously division geophysical specialist, EOG Resources, Denver.

Daniel B. Linger, to exploitation manager, Petrohawk Energy, Houston. Previously senior geologist/team lead, Petrohawk Energy, Houston.

Andrew Miall has been appointed a member of the Oil Sands Monitoring Panel, formed by the Minister of Environment in Alberta, Canada. He previously served as a member of the Oil Sands Science Advisory Panel. Miall is a professor of geology at the University of Toronto, Toronto, Canada.

James R. Van Meter, to senior geologist-Rockies, Rex Energy, Englewood, Colo. Previously consulting geologist, Van Meter Geosciences, Conifer, Colo.

Qingming Yang, to executive vice president-business development and geosciences, Approach Resources, Fort Worth. Previously vice president-exploration, Approach Resources, Fort Worth.

Teachers from page 18

Dodge was happy that AAPG members responded so quickly to help in the effort.

"They thought, 'Okay, people are going to have to teach this class well, so what do they need, and how can we help them?'" Dodge said.

Her first suggestion: AAPG members can help by going into the high schools and volunteering to be a classroom speaker.

"This is a great opportunity where geologists can share their knowledge, perspectives and career experiences with students," she said.

Finally, Dodge hopes that this ESS class will allow teachers and the geological community to help students understand the role and need for natural resources in our society.

"We need to look at this course as a way to develop informed citizens," she said, "not just geology majors."

The course begins March 14; for more information, go to www.ace.edu/ESS.



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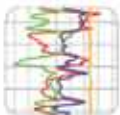
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REGIONS and SECTIONS

Canada's URs Offer Opportunities

By CAROL MCGOWEN, Regions and Sections Manager

Canada's unconventional resources continue to excite the imaginations of geoscientists, as Canadian companies – with operators and investors from North America, India and Southeast Asia – are doggedly working to unlock the country's unconventional resource play potential.

Resource plays represent significant new opportunities to expand production across Canada:

- ▶ Repeated successes in the Horn River and Montney formations in British Columbia are supported and encouraged by established governmental regulation and incentive programs, pipeline infrastructure and a planned export facility connecting western Canada production to markets in Asia.

- ▶ Additional shale-gas resource plays are being evaluated in the Devonian Duvernay of central Alberta, and Exshaw in southern Alberta, both of which have oil potential.

- ▶ In Eastern Canada, the Ordovician Utica Shale and the Mississippian Albert Formation in New Brunswick are getting attention.

Where the Action Is

Although not the first region to capture new reserves from the Devonian Bakken Formation, Canada is continuing to develop new technologies and concepts to maximize recovery from this huge and prolific resource play.

Production in January averaged 75,000 boepd from 1,776 wells in Saskatchewan,

GTWs Target Unconventionals

Unconventional exploration targets call for unconventional learning environments – and the AAPG Geosciences Technology Workshops (GTWs) are a model for unconventional thinking and creative learning.

A Canada GTW, "Resource Plays in Tight Unconventional Reservoirs: Multi-Disciplinary Technological Challenges and Solutions," will be held June 12-14 at the Banff Centre in Banff, Canada.

where test water-flood/pressure maintenance schemes have demonstrated increased hydrocarbon recoveries.

However, it is not only the Bakken that has captured the attention of small and large exploration companies – new resource plays are consistently being identified and exploited. To date, these include:

- ▶ Numerous oil projects, such as the Cretaceous Cardium and Viking Formations, plus the Jurassic Nordegg, Shaunavon and Amaranth Formations, along with Devonian Swan Hills and Pekisko reefs.

- ▶ Liquid-rich gas projects include the Triassic Montney, along with the Cretaceous Glauconite, Bluesky, Wilrich, Nikanassin and Notikewin formations.

Shale gas exploitation in British Columbia's Horn River Basin has been ongoing for several years. Here, the Devonian

The 2-1/2 day intensive learning environment will provide expert presentations, case histories and global analogs. Small group, cross-disciplinary discussions among all GTW participants will facilitate knowledge sharing.

For more information and to register for GTW Canada, go to aapg.org/gtw/CanadaResourcesBanff/index.cfm.

Early bird registration pricing is effective through May 1.

Muskwa and Otter Park shales are the main targets.

This Devonian interval – if the Cordova Embayment and extensions into the Northwest Territories are included – is potentially the largest shale-gas resource in North America.

As in most shale gas plays, horizontal well completions along with multi-stage fracture stimulations are the key to effective recoveries, with typical completion costs topping \$9 million (C), according to the Daily Oil Bulletin. Initial production rates can exceed 10 mmcf/d.

If land sale prices are any indication, interest remains high in Canadian shale gas resource plays despite depressed North American natural gas prices. In fact, in 2010 British Columbia recorded its fourth-highest annual land bonus ever. The record-setting bonus totaled \$844.4 million (C) for 381,132 hectares – an

average of \$2,215 per hectare.

The 2010 bonus followed on the heels of a 2009 bonus of \$892.9 million for 389,664 hectares – in this case, an average price of \$2,291 per hectare. Top bids have exceeded \$5,000 per hectare.

Many operators have indicated a reduction in drilling activity in the basin, however, as a result of low gas prices.

Gaining Momentum

The Triassic Montney tight gas play of northeastern British Columbia and North central Alberta continues to be attractive due to its generally shallower depths and, in some areas, higher natural gas liquids (NGL) content.

This play varies, from traditional "shale-gas" along the Alberta/British Columbia border to tight calcareous siltstone and sandstone in central Alberta.

In Alberta, more than 400 horizontal wells, most with multi-stage hydraulic fracture stimulations, have been drilled since January 2008. As in the Horn River Basin shales, the Montney can be quite prolific, with initial production rates exceeding 10 mmcf/d.

Current production is 1.36 bcfe/d from 749 wells.

The Cretaceous Cardium tight-sand oil resource play in central Alberta has gained real momentum following some early miscues after numerous un-economic

See [Canada](#), page 42

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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.

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

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Canada from page 40

horizontal wells were drilled.

The majority of successes there have been along the flanks of Canada's largest oil field at Pembina, with conventional reserves estimated at 7.8 billion barrels of oil-in-place.

Since the first well was drilled there in December 2009, over 370 wells have been rig-released on the field's flanks. Production in November 2010 averaged 22,000 boepd from 213 wells.

"Efforts are under way in Alberta to update resource-appraisal and forecasting methods for both conventional and unconventional resources," said AAPG member Fran Hein, chief geologist for the Energy Resources Conservation Board of Alberta, "and to move the regulatory framework to a play-based approach."

Eastern Expansion

Moving eastward, finding economically viable prospects means solving new challenges. And the exact combination of drilling and completion methods needed to yield economic oil and gas production from unconventional resource plays can be elusive – particularly completion methods that yield consistent replicable results.

Canada's newest shale gas plays are found in the eastern Canadian provinces of Quebec, New Brunswick and Nova Scotia.

Early estimates of recoverable gas in place from the Utica Shale in Quebec bode well for the economic viability of this emerging resource play.

Challenges, however, remain. Since the January 2010 EXPLORER article by correspondent (and AAPG member) Susan Eaton on Quebec's exciting Utica shale gas trend, Quebec has yet to implement environmental regulations.

Some advancement toward regulation was made at the end of August, when Quebec's minister of Sustainable Development, Environment and Parks mandated BAPE (Bureau d'audiences publiques sur l'environnement – Public hearings on the Environment Board) to propose a new regulatory framework for shale gas exploration and development in the province.

The impact on industry activity was felt by mid-January, when Questerre Energy Corporation delayed its Utica shale gas development program in the St. Lawrence Lowlands of Quebec, pending receipt of the BAPE regulations.

Release of the regulations was anticipated by end of February.

Any offshore drilling and assessment of Quebec's resource potential will likely be delayed even longer. At present, there is a moratorium on oil and gas exploration in the Gulf of St. Lawrence pending a federal government review. ☐

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- Molecules to Marketplace: The Business of Energy
- Global Deepwater Reservoirs: Giant Leaps in E&P
- Worldwide E&P: Opportunities in the New Decade
- Challenged Resource Frontiers

- Mudstones and Shales: Unlocking the Promise
- Siliciclastics: Advancing Research to Resource
- Insight into Carbonates and Evaporites
- Breakthroughs: Tectonics, Salt and Basin Analysis
- Integrating New Technology, Geophysics and Subsurface Data
- Energy and Environmental Horizons

Other highlights include:

All-Convention Luncheon featuring four geoscientist-astronauts — Apollo astronaut Harrison H. "Jack" Schmitt, and space shuttle astronauts

Kathryn D. Sullivan, James F. Reilly II and Andrew J. Feustel. These scientists together represent a near uninterrupted timeline of the entire NASA manned space program, initiating in 1965 with Apollo training, to the latest space shuttle mission scheduled for Spring 2011.

Halbouty Lecturer David Lawrence, Executive Vice President, Shell Upstream Americas Exploration and Commercial, speaking on The Next Era of Exploration.



Eagle Ford 3-D from page 16

Eagle Ford," he added, "but they're not doing the next phase of the work, which is the interpretation, the inversion and the microseismic."

Multiple Targets

The seismic data used by Weinman are being acquired in full azimuth fashion, and some processing has been completed.

"A lot of variability in the geology is coming out in the seismic, and that's the key" Treadgold said. "We have graphics that help illustrate the amount of variability in the section and the importance of using seismic to understand it and to hi-grade and direct drilling activities."

Eagle Ford is not the be-all/end-all here. This petroleum-rich province has multiple targets – conventional and unconventional.

"Serendipity will win the day, and there will be plenty of opportunities beyond the shale that these high resolution 3-Ds will help us identify and exploit," Treadgold noted. "Wells have been drilled here for years, and coarser 3-Ds have allowed for basic exploration.

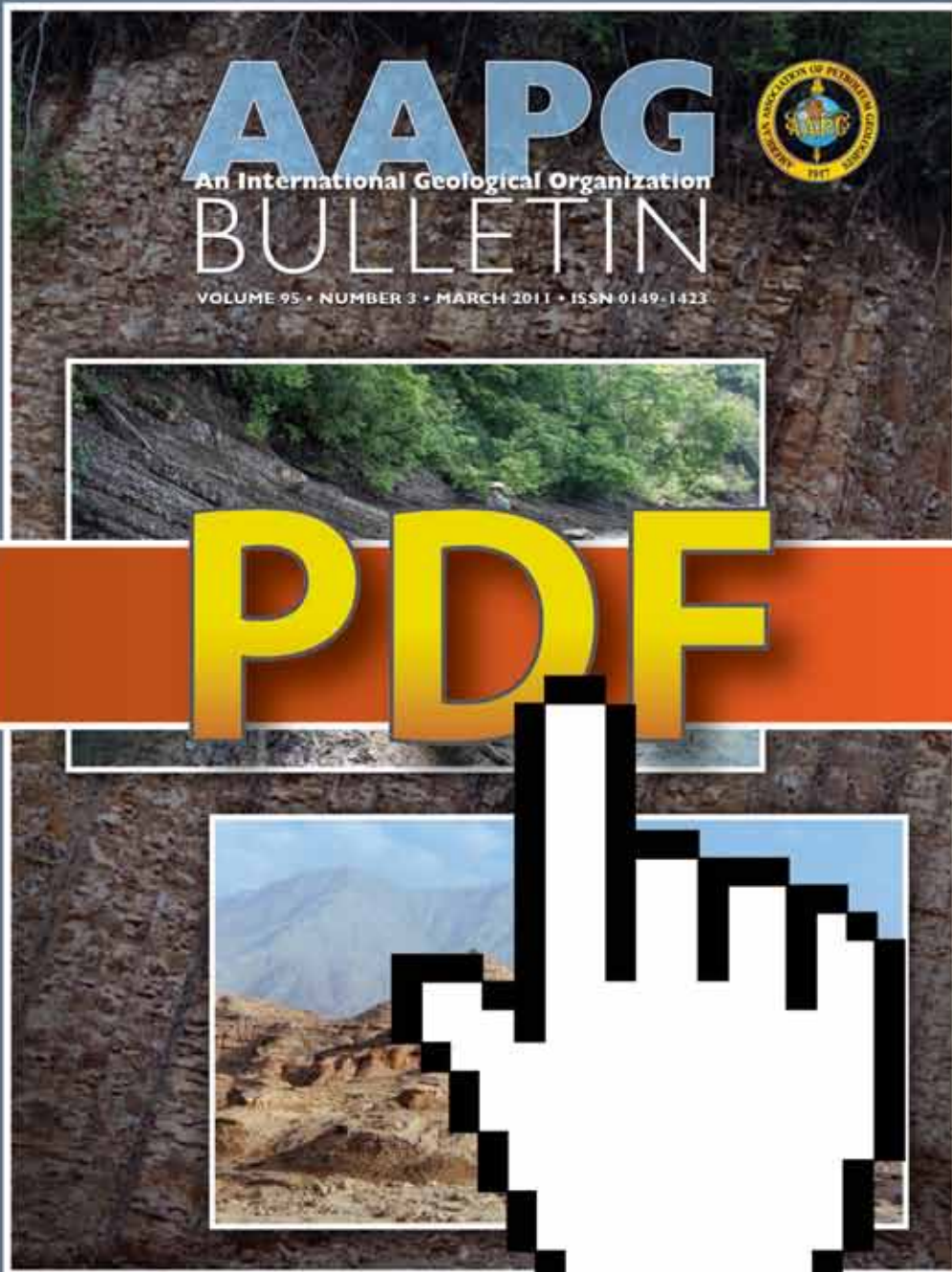
"Now with newer data sets, there can be a more quantitative exploration effort focused both on conventional and unconventional opportunities," he emphasized.

"It's an exciting moment." ☐

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Article highlights include:

The overpressure generation

Mark Webster, Stephen O'Connor, Bitrus Pindar, and Richard Swarbrick



In addition to safety issues, overpressure helps to understand subsurface fluid flow and the identification of hydraulic baffles or seals. The authors examine the evidence for each of the potential causes of overpressure generation to establish the primary controls on its distribution.

The midcontinent rift system

Olubunmi O. Elebiju, Shane Matsen, G. Randy Keller, and Kurt J. Marfurt



From interpretation of gravity, magnetic, and 3-D seismic data, the authors propose that the Precambrian basement controls the Mississippian chert and Arbuckle Group reservoirs. Basement structure lineaments are parallel in orientation to those seen within these karst reservoirs.

Best potential: fluvial sandstones

Jonathan Antia and Christopher R. Fielding



The Dakota Sandstone in the Henry Mountains represents a low-accommodation depositional setting in the Cretaceous Western Interior Basin. Potential hydrocarbon reservoirs in settings similar to the Dakota may be present in shoreface sandstones, tidal inlet facies, and fluvial sandstones.

Two new trap models

Takashi Tsuji, Yasuhiro Masui, and Satoru Yokoi



Neogene siliceous rocks in the Yuihara and Toyotomi fields of Japan form traps and reservoirs but behave quite differently depending on burial depth. Two new models are proposed with potential implications in other siliceous rocks such as in the Monterey Formation of California.

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/march_bulletin



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

AAPG GEOSCIENCES TECHNOLOGY WORKSHOPS

Unconventional exploration targets call for unconventional learning environments. AAPG GTWs offer the perfect venue for unconventional thinking and creative learning by mixing professionals with different perspectives and expertise. The GTW focused, intensive learning environment can lead to more innovation and a faster learning curve.

For more information and to register, please go to <http://www.aapg.org/gtw>.

AAPG GEOSCIENCES TECHNOLOGY WORKSHOP



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

12-14 June 2011 • Banff, AB, Canada • The Banff Centre

Canada, considered one of the few remaining onshore frontiers for unconventional resources, continues to excite the imaginations of geoscientists. From west to east, Canadian companies together with other North American operators and investors from India and Southeast Asia are applying the latest science and investing significant money to unlock the potential of Canada's unconventional resource plays.

Resource plays represent significant new opportunities to expand production across Canada. Repeated successes in the Horn River and Montney formations in the western Province of British Columbia are supported and encouraged by established governmental regulation and incentive programs, pipeline infrastructure and a planned export facility connecting western Canada production to markets in Asia. Additional shale-gas resource plays are being evaluated in the Devonian Duvernay and Exshaw in Alberta, both of which have oil potential. And Canada continues to develop new technologies and concepts to maximize recovery from the Devonian Bakken in Saskatchewan. In Eastern Canada, the Ordovician Utica Shale in Quebec, the Horton Bluff formation in New Brunswick and Nova Scotia, and the Mississippian Albert in New Brunswick are getting attention.

Finding economically viable prospects means solving new challenges. And the exact combination of drilling and completion methods needed to yield economic oil and gas production from unconventional resource plays can be elusive. GTW Canada will focus on identifying oil and gas resource opportunities in various rock types and the latest technologies used to economically extract these resources. GTW Canada will provide expert presentations, case histories and global analogues. Small group, cross-disciplinary discussions among all GTW participants will facilitate knowledge sharing.

AAPG GEOSCIENCES TECHNOLOGY WORKSHOP



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

26-28 June 2011 • Buenos Aires, Argentina • The InterContinental Hotel

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.

New membership benefit

GeoCare Adds Annuities To Member Portfolios

A new membership benefit – a tool to use when planning for a financially secure future – is now available for AAPG members.

GeoCare Fixed Annuities, a first-of-its-kind benefit for national professional associations, provides members with “an exceptionally high level of annuity consulting expertise,” said Terry Hollrah, chairman of the Committee on Group Insurance.

With GeoCare Fixed Annuities, members have a choice of policies from highly rated insurance companies and a GeoCare adviser to help select one that best suits their needs, Hollrah said.

The service provider is FSD Financial Services, an independent and experienced provider of national annuity brokerage services.

An annuity basically performs the opposite function of life insurance – because it promises to distribute benefits during the lifetime of an individual instead of upon his/her death.

A “fixed” annuity is an annuity that has a fixed rate of return that is guaranteed by the insurance company – you can get 100 percent of your investment back and provide income payments that you cannot outlive during your retirement years.

Due to stock market declines and volatility, fixed annuities recently have seen a dramatic increase in popularity as a high-quality personal

and financial planning tool, Hollrah said. Annuities are now considered an acceptable and attractive alternative to CDs, stocks and mutual funds.

“For someone who wants a guaranteed income or wants to accumulate assets that are guaranteed to increase every year, a fixed annuity is exceptionally suitable,” he said.

Options include:

- ▶ The number one fixed annuity product across all ages is a **single premium deferred annuity**, providing an attractive alternative to lower-yielding CDs with interest rates that are guaranteed from three to 10 years.

- ▶ The **indexed annuity** pays a return linked to the S&P 500 index, and guarantees no losses in a down market.

- ▶ The **immediate annuity** pays a guaranteed lifetime income, with available inflation protection and a 100 percent money-back refund guarantee.

The indexed and immediate benefits can be two to three times what can otherwise be obtained with current yields.

For more information or a free consultation contact FSD Financial Services and ask for a GeoCare adviser, at 800-373-9697; or send an e-mail to GeoCareAnnuities@FSDFinancial.com.

INMEMORY

Thomas D. Barrow, a player in some of the 20th century's major discoveries – Prudhoe Bay, offshore California, North Sea, Malaysia and East Texas – died January 27 in Houston. He was 87.

Barrow joined Humble as a geologist in California in 1951 after graduating from the University of Texas at Austin. He received a doctorate from Stanford University in 1953. With Humble he moved up through exploration to become company president in 1970.

In 1972, Barrow was named senior vice president and a director of Exxon, guiding its worldwide exploration and production activities and various other corporate dealings.

He retired from Exxon in 1978 and was elected CEO and chairman of the board of Kennecott, a worldwide minerals business. Kennecott was acquired by Standard Oil of Ohio in 1981 and Barrow became Sohio's vice chairman, guiding a variety of exploration, production, engineering and technical activities until 1985.

Returning to the East Texas Basin, which was the subject of his doctoral thesis, Barrow helped find and develop

major natural gas resources from Jurassic and Cretaceous strata in the basin's western regions.

Barrow was an AAPG Foundation Trustee Associate and received the AAPG Pioneer Award in 2010.



BARROW

- Thomas D. Barrow**, 87
Houston, Jan. 27, 2011
- Peter Ingram Bediz**, 96
Calgary, Canada, Dec. 4, 2010
- Gene Edward Congdon**, 81
Killingworth, Conn.
Dec. 29, 2010
- Delbert James Costa**, 100
Council Grove, Kan.
Aug. 22, 2010
- * **Robert Ernest Klabzuba**, 91
Fort Worth, Nov. 20, 2009
- Francis Alfred Petersen**, 86
Lakewood, Colo., Oct. 3, 2010
- William Duncan Piety**, 63
Arvada, Colo., Oct. 29, 2010
- Merrill J. Reynolds**, 86
Disney, Okla., Dec. 28, 2010
- Clement Beal Thames Jr.**, 79
Marble Falls, Texas
Aug. 24, 2010
- Lawrence Weiss**, 89
Sarasota, Fla., Jan. 9, 2011

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

— UPCOMING — EDUCATION SCHEDULE

SHORT COURSES

Basic Well Log Analysis
Denver, Colorado

July 18 – 22

FIELD SEMINARS

Seismic Interpretation of Compressive Structures
Canada

July 16 – 22

Fractures, Folds, and Faults in Thrusted Terrains
Montana

July 18 – 23

LAST CHANCE

Field Safety Course for Field Trip Leaders
Houston

March 31 – April 1

The Applications of Geomechanics in Unconventional Resources
Houston (With Annual Convention)

April 9 – 10

Decision-Making in E & P
Houston (With Annual Convention)

April 14 – 15

Natural Fractures in Hydrocarbon Reservoirs
Houston (With Annual Convention)

April 14 – 15

Deep-Water Siliciclastic Reservoirs
California

April 14 – 19

Modern Terrigenous Clastic Depositional Systems
South Carolina

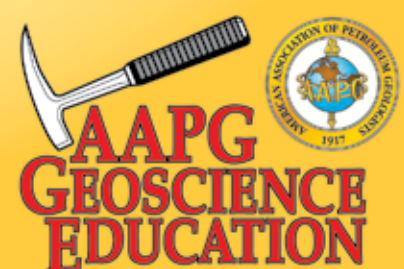
April 27-May 4

Clastic Reservoir Facies and Sequence Stratigraphic Analysis of Alluvial-Systems Plain, Shoreface, Deltaic, and Shelf Depositional
Utah

April 30-May 6



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WHY I DONATE TO THE AAPG FOUNDATION:



Robert Weimer

“The fuels for exploration are new scientific ideas and new technology so well demonstrated, not only by the current “shale plays”, but also by the worldwide success of deep water exploration, and new methods for additional recovery from mature fields. These activities were not a part of the exploration effort when I joined AAPG in 1950, and I support the Foundation because their programs have assisted in development of the new fuels so vital for future success.”



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

Weeks Medal Recipient Threet Honored

By NATALIE ADAMS, AAPG Foundation Manager

Houston independent oilman **Jack C. Threet**, who as then-AAPG Foundation chairman helped design the current initiative to increase funding for key existing and numerous new programs, has been named the recipient of this year’s L. Austin Weeks Memorial Medal.



THREET

The Weeks Medal, created and named in honor of one of the most generous benefactors of the Association, is presented annually by the Foundation in recognition of extraordinary philanthropy and service in advancing the mission of the AAPG Foundation.

It is the Foundation’s highest honor, and Threet now becomes the fourth recipient.

Threet, an Honorary AAPG member and Foundation Trustee Associate, is president and CEO of Threet Energy, and has been an independent since 1989. He previously had a 36-year career with Shell Oil, holding various executive positions in the United States, Netherlands, Australia and Canada.

Threet will receive the award April 10, during the opening session of the

AAPG Annual Convention and Exhibition in Houston.

Other Foundation awards are:

► The Chairman’s Award, to **William E. “Bill” Crain**, for his contributions to the Foundation. Crain is the award’s 12th recipient. He’ll receive his honor at the annual Trustee Associates meeting in Lake Tahoe, Calif., in September.

► Teacher of the Year award, to **Sharon Milito**, a fourth grade teacher in Colorado Springs, Colo. Milito will receive her award at the All-Convention Luncheon during the AAPG convention. (See related story page 14.)



CRAIN

► The Holland Award of Excellence, to **Christopher McNair**, dean of the Holland School of Sciences and Mathematics at Hardin-Simmons University, Abilene, Texas. This award is provided through an endowment established by David “Scotty” Holland (Trustee Associate since 1988) and will be used to purchase equipment for the general physiology lab at Hardin-Simmons.



MILITO

Continued on next page

2011 Open Enrollment Course Schedule

Rose & Associates

Risk Analysis, Prospect Evaluation & Exploration Economics

Denver, Colorado	Calgary, Alberta	Houston, Texas
August 22 – 26	April 4 – 8 September 26 – 30	May 9 – 13

Risk and Uncertainty Analysis for Unconventional Resource Plays

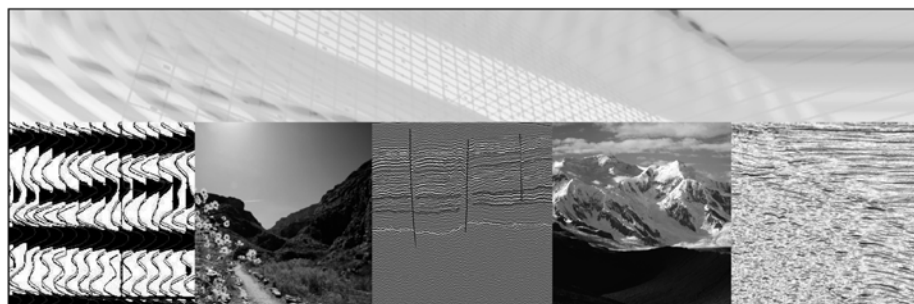
Houston, Texas	
May 2 – 3	November 29 - 30

Play Based Exploration: Mapping, Volumetric and Risk Analysis

Houston, Texas	
March 21 – 23	September 26 – 28

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DLs Will Be Busy in March

Distinguished Lecturer Steve Dorobek’s Asia Pacific Region tour, originally slated for March, has been delayed until May – but the AAPG DL program will remain active in March with four speakers ready to tour.

The program, funded largely by the AAPG Foundation, is the Association’s flagship initiative for spreading the latest in science, technology and professional information.

Those touring in March include one international and three domestic speakers.

□ The international DL speaker for March is **Mohammed S. Ameen**, leader of the Structural and Rock Mechanics Group, Saudi Aramco, Dhahran, Saudi Arabia.

Ameen’s tour will take place March 20-23, speaking to groups in Abu Dhabi, Muscat, Doha and Kuwait.

AAPG officials said that Ameen’s venues have been subject to change pending the region’s current political situation, and encouraged local groups to contact the AAPG website for updated information.

His lecture is titled “A Paradigm Shift in Understanding Fracture Origin and Fracture Influence on Deep Carbonate Reservoir Performance: A Study of Onshore Permo-Triassic Deep Reservoirs in Saudi Arabia.”

Domestic DL speakers will be:

□ **Steve Cumella**, geologist with Bill Barrett Corp., in Denver, and this year’s Haas-Pratt Distinguished Lecturer. He will tour western North American sites through

March 11, offering two lectures:

► “Geology of the Giant Continuous Gas Accumulation in the Mesaverde Group, Piceance Basin, Colorado.”

► “Important Characteristics of Rocky Mountain Tight Gas Accumulations.”

□ **Matthew D. Jackson**, senior lecturer in geological fluid mechanics and reservoir engineering, Imperial College, London, England, and this year’s Allan P. Bennisson lecturer.

The Bennisson DL is an international lecturer who makes a U.S. tour, funded by contributions from the late Allan Bennisson, a long-time Tulsa geologist.

He will be speaking to groups in western North America March 14-25, offering two lectures:

► “From Outcrop Analog to Flow Simulation: Understanding the Impact of Geologic Heterogeneity on Hydrocarbon Production.”

► “Integrating Production Geoscience and Engineering: Can Smart Wells Mitigate Uncertain Reservoir Behavior?”

□ **Donald Arthur Medwedeff**, consulting research scientist, Chevron Energy Technology Co., San Ramon, Calif.

Medwedeff’s lecture is titled “Insight in Lieu of Truth: An Approach to Probabilistic Fault Seal Analysis.”

His lectures to groups in eastern North America will be from March 7-18.

For more information on the speakers, their tours or the DL program go online to www.aapg.org.

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L. Austin Weeks Memorial Fund

Marta S. Weeks

Continued from previous page

* * *

The Foundation Trustees recently approved several worthy projects, including:

▶ The archived BULLETIN memorials will be scanned and entered into Datapages with the aid of \$9,878 from the L. Austin Weeks Memorial Fund.

▶ The John Silcox Named Grant was established with a \$13,000 gift from John and Colleen Silcox from Tiburon, Calif. Silcox has been a Trustee Associate since 1990.

▶ The AGI Geoscience Workforce Program has received \$25,000 for "Promoting Geoscience Careers." A total of \$125,000 has been given since 2008 to the program.

▶ The Ellison Miles Geotechnology Institute continues to benefit from the generosity of John Bookout. His \$50,000 donation will support teacher workshops in Texas. The Foundation is looking to begin similar initiatives in Oklahoma and other states.

* * *

Many thanks to all of the wonderful donors on the list above. Without your

support, the many programs and services that the Foundation provides would not be possible.

Special thanks to the T. Boone Pickens Foundation for the \$240,000 contribution toward the OSU-GIS initiative; to Marta Weeks for her \$500,000 contribution; and to Jack Threet for \$40,000 to the Jack C. and Catherine I. Threet Endowed Fund, which is a Named Public Service fund.

This fund allows earnings from the endowment to be used by the Trustees at their discretion for new initiatives and proposals, which further the mission of the Foundation.

* * *

The Foundation's Meeting Challenges ... Assuring Success campaign has raised \$30,915,622 since 2005, 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.

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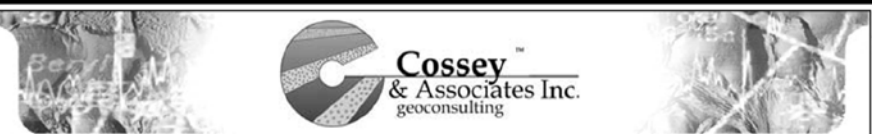
Jon R. Withrow

“As a member of the AAPG for 45 years, it is a privilege for me to fund AAPG named scholarships for university geology students.”

Jon and Cathryn Withrow established an endowment in 2008 which funds an annual \$1,500 scholarship for a University of Oklahoma graduate student. The Withrow's live in Norman, OK.



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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

Allen, Jonathan Patrick, Chevron, Bakersfield (L.C. Knauer, S. Mazzoni, C.R. Fielding)

Illinois

Schonert, Bruce A., Rex Energy, Bridgeport (S.T. Whitaker, J.E. Crockett, J.S. Brenizer)

Minnesota

Stoelting, Raymond Dudley, Golder Associates, Roseville (reinstatement)

Ohio

Atha, Thomas M., Clermont Natural Gas, Newark (J.L. Wicks, P.L. Archer, M.R. Griffith);
 Watts, Doyle Robin, Wright State University, Dayton (J.L. Wicks, B.R. Kulander, M.T. Baranowski)

Oklahoma

Condray, Gregory Thomas, Chesapeake Energy, Oklahoma City (T.L. Hopkins, S.A. Callantine, J.D. Peterson);
 Pickup, Barbara E., Samson Resources, Tulsa (J.R. Alnes, A.M. Richardson, R.F. Grabb)

Pennsylvania

Jarvis, Michael Aaron, Talisman Energy, Warrendale (S.J. Murphy, T.R. Moore, J.J. Hanlon);
 Kostelnik, Jaime, Department of Conservation and Natural Resources, Pennsylvania Geological Survey, Pittsburgh

(K.M. Carter, J.A. Harper, T.G. Whitfield)

Texas

Bullock, Brian R., Apache Corp., Houston (T.B. Brady, M.J. Oldani, B.L. Steer);
 Burns, Kirstin, Shell Oil, Houston (M.T. Cisar, M.K. Davis, B.D. Hampton);
 Corrales, Juan Fernando, Schlumberger, Pearland (C. Stahn, A.R. Luna, G.J. Stefaniak);
 Degenhardt, John Jerome, W.D. Von Gonten & Co., Houston (C.E. Davis, C.C. Mathewson, A.E. Prelat);
 Friend, Malene Rank, Maersk Oil, Houston (E.S. Reuber, C.F. Elders, L.E. Duncan);
 Gates, Brian T., Oasis Petroleum, Houston (G.J. Smith, D.A. Billman, R.J. Candito);
 Gournay, Jonas Paul, ExxonMobil, Houston (J.A. Simo, S.A. Guidry, I.G. Johnson);
 Kalyanaraman, Nishanth, Occidental Petroleum, Houston (J.A. Russell, C.C. Kemp, R.W. Cooper);
 Lentz, Sandra Ann, Marathon Oil, Houston (S.V.C. Dronamraju, P.I. Hagar, A.L. Schumacher);
 Newton, Sharon Elizabeth, Chevron, Houston (L.M. Lee, S.A. Smith, D.E. Self);
 Nyanat, Kawan Thomas Kuud, Shell Upstream Global Solutions, Katy (A.E. Sullivan, C. Xu, R.C. Ferguson);
 Phu, Dianna Ruth, Geoscience Earth & Marine Services, Houston (L.R. Sternbach, J.L. Honganen, R.J. Bruce);
 Scott, Mark Steven, Denbury Onshore, Plano (D.A. Robinson, J.P. Herber, C.P. Doubek);
 Sims, Darrell W., Southwest Research Institute, San Antonio (D.A. Ferrill, K.J. Smart, A. Morris);
 Spies, Christopher Miles, Murphy Exploration and Production, Houston (R.E. Birkenfeld, E. Hiemstra, P.A. Dore);
 Williams-Vestal, Laura M., Chevron Energy Technology, Houston (W.C. Dawson, W.R. Almon, J.L. Jones);
 Winton, Bradley Gene, Denbury Onshore, Plano (C.P. Doubek, J.P. Herber, M.S. Scott)

Bangladesh

Hossain, S.M. Zabir, Bangladesh Petroleum, Dhaka (S.H. Chowdhury, A.N. Lodhi, A.M. Shamsuddin);
 Khan, Haniyum Maria, Bangladesh Petroleum E&P, Dhaka (S.H. Chowdhury, A.N. Lodhi, A.M. Shamsuddin)

Cameroon

Nkoa Nkoa, Pierre Eric, National Hydrocarbons Corp., Yaounde (A.O. Akingbade, A.A. Adepelumi, E.O. Olopade)

Continued on next page

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Certification

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

Petroleum Geologist

Colorado

Sarg, Joseph Frederick, Colorado School of Mines, Golden (J.W. Snedden, S.A. Sonnenberg, P.W. Weimer);
 Sturdavant, Janine Mary, Shelby Resources, Lakewood (reinstatement)

Florida

Acquaviva, Daniel J., Sachem Resources Corp., Estero (American Institute of Professional Geoscientists, J.F. Schindler)

Illinois

Drexler, Timothy J., U.S. EPA, Chicago (reinstatement)

Louisiana

Goddard, Donald A., Tekxon, Baton Rouge (S.C. Talukdar, C.J. John, E.A. Mancini);
 Helms, Travis Adam, Helms Mineral Consulting, Lafayette (reinstatement);
 Moore, John Michael, independent, Shreveport (reinstatement)

New York

Drazan, Donald J., New York State Department of Environmental Conservation, Albany (D.A. Billman, K.J. Beinkafner, E.S. Kaszubski)

Texas

Akingbade, Atinuke Olubunmi, Noble Energy, Houston (N. Omorodion, E. Enu, O.K. Ulu);
 Davis, Gary Wayne, Haas Petroleum Engineering Services, Dallas (R.G. Green, M.A. Norville, D.B. Steward);
 Drumheller, Richard Ernest, Anadarko Petroleum, The Woodlands (T. Fasnacht, D. McGuire, J.M. Yarus);
 Hakkinen, Joseph W., Marathon Oil, Houston (S.W. Tinker, R.W. Nordquist, G.W. Hobbs)

New Zealand

Hart, Alan Walter, Golden Downs Consulting Ltd., Wakefield (J. Kaldi, H.F. Miller, D.J. Tearpock)

Petroleum Geophysicist

Connecticut

Nolen-Hoeksema, Richard, e4sciences/Earthworks LLC, Sandy Hook (American Institute of Professional Geoscientists, E. Eslinger, P.M. Harris)

Continued from previous page

Canada

Barrie, Kyle W., Talisman Energy, Calgary (B. Faraj, J.T. LaMothe, J.D. Chatellier); Foo, Gordon, Parex Resources, Calgary (I.E. Zapfe-Smith, L.L. Orr, P.J. Meehan); Politylo, Andre, Cenovus Energy, Calgary (D.A. Dolph, D.G. Bryan, P.G. Elliott)

England

Akindipe, Olutunde James, Perenco, London (C. Wood, M.E. Drake, A.A. Adepelumi)

France

Soubeyrand, David, Perenco, Paris (H. Darman, A.W. Martinius, C. Wood)

India

Gupta, Manoj Kumar, Reliance Industries, Navi Mumbai (S.P. Sharma, N. Sinha, M. Choudhuri)

Indonesia

Bachtiar, Andang, Exploration Think Tank Indonesia, Jakarta (M. Syaiful, D. Rahayu, H. Darman); Sapiie, Benyamin, Department of Geology ITB, Bandung (Y.H. Setiawan, N. Guritno, H. Darman); Sosrowidjojo, Imam Budiarto, Lemigas, Jakarta (S. Susilohadi, H. Darman, E.A. Subroto)

Netherlands

Lafuente-Hernandez, Virginia, Wintershall, Rijswijk (E. Breman, B. de Wijn, F. Smulders)

Nigeria

Adeleke, Victor Akinkunmi, Platform Petroleum, Lagos (G.E. Omolaiye, A.E. Guzman, M. El Alji); Adeola, Olabisi James, Nigerian National Petroleum Corp., Benin City, Edo State (Y.Y. Bubu, K.O. Adeleye, M. L. Afe); Adigwe, Helen-Nellie Afure, Sahara Energy Field, Lagos (A.E. Guzman, J.I. Nwachukwu, N. Omorodion); Agbaje, Kehinde Emmanuel, Talisman Energy, Lagos (A. Adesida, E.O. Adeniyi, K. Olafiranye); Akinbodewa, Oluwapelumi Samson, Danvic Concepts, Lagos (Y.Y. Bubu, N. Omorodion, M.L. Afe); Akinola, Toyin Caroline, Pan Ocean Oil, Lagos (E.O. Olopade, A. Ojo, A.O. Ogunjobi); Akinsulere, Gbemisola Anne, Nigerian Association of Petroleum Explorationists, Lagos (A.A. Adesida, C.A. Chukwuka, A.O. Esan); Akpan, Ekere Udo, Universal Energy Resources, Uyo (N. Omorodion, A.O. Ogunjobi, E.O. Olopade); Akpoda, Elotto Kate, Pan Ocean Oil, Lagos (E.O. Olopade, A. Ojo, E.G. Odior); Bazuaye, Ehi Oghogho, Nigerian Agip Oil, Abuja (D.A. Orubiri-Bokolo, B. Olaleye, J.C. Ashiedu); Dogo, Yakubu T., Department of Petroleum, Lagos (O.O. Osho, N. Omorodion, A.O. Akinpelu); Gbadamosi, Taju Olalekan, Platform Petroleum, Lagos (G.E. Omolaiye, A.E. Guzman, M. El Alji); Ibe, George Nnamdi, Bulwark Services, Port Harcourt (A.E. Guzman, N. Omorodion, A.R. Ojelabi); Ibilola, Olaoluwa Olamigoke, Korea National Oil, Lagos (Y.Y. Bubu, K.O. Adeleye, M.L. Afe); Ipoola, Fisayo Jordan, Platform Petroleum, Lagos (G.E. Omolaiye, A.E. Guzman, M. El Alji); Irifeta, Ovwigho Owen, Shell Petroleum Development, Port Harcourt (O. Uruh, A.A. Adesida, D. McPherson); Isiwele, Dannity Oseyande, Deep Green Geophysical & Energy, Ewu-Ishan (J.S. Ojo, O.O. Falade, M.T. Duze); Jaiyeola, Jeffrey Ifihan, SINOPEC International E&P, Lagos (G.E. Omolaiye, A.I. Tihamiyu, O.S. Adegoke); Muhammed, Musa Maikaya, Nigerian National Petroleum Corp. (NNPC), Port Harcourt (A.E. Enemuoh, M.B. Ozumba, O.K. Ulu); Obioha, Nnamdi Henry, Platform Petroleum, Lagos (G.E. Omolaiye, A.E. Guzman, M. El Alji); Omotoyinbo, Olumayowa Ayokunle, Degeconek Nigeria, Lagos (A.O. Adesanya, A.O. Lanisa, O.A. Aboaba); Taiwo, Emmanuel Olayinka, Danvic Concepts International Nigeria, Lagos (Y.Y. Bubu, M.L. Afe, N. Omorodion)

Romania

Diaconu, Alexandru, Prospectiuni, Bucuresti (S. Bartz, J.A. Minch, S.T. Hector); Dutu, Constantin, Prospectiuni, Bucuresti (S. Bartz, J.A. Minch, S.T. Hector); Semen, Virginia, Prospectiuni, Bucuresti (S. Bartz,

J.A. Minch, S.T. Hector)

Russia

Malysheva, Svetlana Valentinovna, Gazpromneft NTC, St. Petersburg (J.C. Dolson, S.G. Pemberton, S. Khafizov)

Scotland

Usmani, Fahri, Medco E&P Indonesia, Aberdeen (H. Darman, C.A. Tanos, J. Boast)

Thailand

Koysamran, Suwisa, Salamander Energy, Bangkok (J.F. Bell, K. Moriyama, N.J. Comrie-Smith)

Trinidad & Tobago

Kokaram, Gabriella Violet, Repsol, Port of Spain (C.L. Archie, L.M. Philip, N.R. Lewis)

United Arab Emirates

Sellar, Christopher Nicholas, Dubai Petroleum, Dubai (M.A. D'Cruz, F. Esmaeili, E. Akien)

Candidate Info Available Online

Video comments by candidates for AAPG office continue to be available online at www.aapg.org.

The comments show the Executive Committee candidates talking about why they accepted the invitation to stand for an AAPG office.

Biographies and individual information for AAPG officer candidates also are available online.

Ballots will be mailed in spring 2011. The president-elect will serve in that capacity for one year and will be AAPG president in 2012-13. The vice president-Regions and secretary serve two-year terms.

Complete election campaign rules also are available online.

The slate is:

President-Elect

- Edward A. "Ted" Beaumont, independent consultant, Tulsa.
- John C. Dolson, DSP Geosciences and Associates, Coconut Grove, Fla.

Vice President-Regions





- David C. Blanchard, El Paso Egypt Production, Lasilky, Maadi, Egypt,
- Stuart D. Harker, Circle Oil Plc, Finchampstead, U.K.

Secretary

- Charles A. "Chuck" Caughey, ConocoPhillips, Houston.
- Denise M. Cox, Storm Energy, Panama City, Fla.

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Petroleum Technology Transfer Council calendar of events

visit www.pttc.org for the complete calendar



Eastern Region Workshop

3/31 Michigan field experiences – Mt. Pleasant, MI.

Midcontinent Region Workshop

4/6 Comparing EOR processes – Wichita, KS.

Rocky Mountain Region Workshops

3/14-16 How to find bypassed pay in old wells using DST data (Montana Geological Society) – Billings, MT.

4/11-15 Complex well, core competency 2011 – Golden, CO.

Texas/SE New Mexico Region Workshop

3/22 Advances in sequence stratigraphy, as applied to Texas O&G plays – Houston, TX.

CCS Short Course

4/9 The Reservoir – Characterization, Modeling and Monitoring – AAPG Annual Meeting, Houston, TX.

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READERS' FORUM

Too Many Agencies

My concern is what is happening to our government in Washington, D.C. It has become a government run by agencies!

Many of these agencies have become autocratic, assuming excessive authority to regulate, dictate and direct our businesses community. How did this happen? Congress and administrations change by our electoral process – but the agencies live on.

Case in point: EPA. This agency has done unbelievable harm in frustrating our fossil fuel industry. Their constant flow of regulations, denial of permits to drill and other roadblocks has cost our country billions of dollars in delaying drilling and development of our oil and gas reserves.

EPA's stand on CO₂ is based on flawed science. CO₂ is neither a pollutant nor driver of climate change. CO₂ is essential to plant and human life. Its introduction in earth atmosphere from fossil fuel is so small that its effect, if any, is nil.

In addition to the above, EPA has authorized increase of ethanol up to 15 percent from 10 percent. This is obviously a political move favoring the corn lobby. Food-to-fuel is morally wrong and economically unsound, as it costs more to

produce a gallon of ethanol than a gallon of gasoline, delivers less energy and, in many cases, is damaging to automobile engines.

The irony of this is that ethanol is not needed as we have an abundance of oil and gas in North America, sufficient to last for decades to come. Natural gas – now assured in abundance – a clean burning fuel, is the bridge to the future. Conversion of transportation, power generators and, where appropriate, other consumers of fossil fuel to natural gas saves billions in subsidies now being spent on inefficient alternative sources of energy.

It's not that we don't need committees, etc. We do need them. But Congress and the administration are so concerned with partisan politics and campaigning for re-election that they lose sight of their responsibility in this area. They must re-establish their oversight and exercise their authority to rein in those agencies that have overstepped their authority by mandating rules and regulations based on lack of knowledge and use of flawed science.

This is regulation not for the right reasons, but rather for political approval, thus ensuring their survival.

Dick Baile
Houston

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DIRECTOR'S CORNER

ACE 2011 – Disseminating the Science

By RICK FRITZ, AAPG Executive Director

Science is the heartbeat of AAPG. It is the key for innovation in our industry, and AAPG is dedicated to finding new scientific developments and related new technologies.

Once again it's time to disseminate science at ACE – AAPG's Annual Convention and Exhibition, and as usual, meeting along with SEPM. Once again the meeting is in Houston, and the meeting's theme is fitting for the locale: "Making the Next Giant Leap in Geoscience."

It will be held April 10-13. Thousands of geoscientists, engineers, managers, professors, producers, teachers and students will be coming to share their findings and explore new ideas. With more than 400 oral presentations and more than 400 full-day posters, the technical program is the heart of the ACE.

There are 11 themes this year – and as you can see, there is something for everybody:

- ▶ Molecules to Marketplace: The Business of Energy.
- ▶ Global Deepwater Reservoirs: Giant Leaps in E&P.
- ▶ Worldwide E&P: Opportunities in the New Decade.
- ▶ Challenged Resource Frontiers.
- ▶ Mudstones and Shales: Unlocking the Promise.
- ▶ Siliciclastics: Advancing Research to Resource.
- ▶ Insight into Carbonates and Evaporites.
- ▶ Breakthroughs: Tectonics, Salt and Basin Analysis.



FRITZ

With more than 400 oral presentations and more than 400 full-day posters, the technical program is the heart of the ACE.

- ▶ Integrating New Technology, Geophysics and Subsurface Data.
- ▶ Energy and Environmental Horizons.
- ▶ The Next Geo-Generation: Who, What and Where.

In addition to the technical program, one of my favorite places is the exhibit hall. Houston always has a great exhibition, and this year will be no exception. It is one of the best places to network while exploring new technology.

You can go online at www.aapg.org/houston2011/ to check which exhibitors and technical sessions you want to visit.

Of course, there are many ancillary activities at the convention – field trips, short courses, student activities, luncheons, forums, panels, special sessions, committee meetings, spouse activities and entertainment.

Some of the highlights include the opening session and awards ceremony on Sunday, April 10, from 4-5 p.m. in the George R. Brown Convention Center. If you

have not attended the opening session lately, now is the time to enjoy an exciting program, which includes a keynote speech by AAPG President Dave Rensink.

The opening session is a great opportunity to recognize the great scientists and leaders of AAPG.

On Monday, April 11 there will be a special All-Convention Luncheon featuring four NASA astronauts, as well as one of my favorite programs – the Discovery Thinking Forum, which this year will feature five top executives discussing their success exploring for and finding hydrocarbons.

There also are numerous events for students and young professionals. One of the member's favorites is the student reception on Monday night, when awards are provided for best student paper and poster and the winners of the Imperial Barrel Award (IBA) competition are announced.

It is important to thank the members and staff who work tirelessly to make a great program at ACE. We also thank all of the sponsors who help make ACE a reality at a reasonable cost.

I have attended every ACE since 1977, through good times and hard times. I always found it well worth the trip.

* * *

Please come and join us in Houston.

Rick



Networking potential is always high at the AAPG Annual Convention and Exhibition.

DIVISIONS' REPORT

Changes Bring Opportunities

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

Since the time of my last EXPLORER column in December, the petroleum industry has experienced many changes:

- ▶ The moratorium on drilling in the eastern Gulf Coast of Mexico was lifted in October 2010.
- ▶ The former Minerals Management Services (MMS) became the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE).
- ▶ The revenue collection arm of the former MMS became the Office of Natural Resources.
- ▶ In January the federal government divided the BOEMRE into two bureaus – the Bureau of Ocean Energy Management, which will be in charge of the development of offshore energy and resources in an environmentally and economically responsible way; and the Bureau of Safety and Environmental Enforcement, which will enforce safety and environmental regulations.

All these extra acronyms aside, what do these various changes really mean for us?

There's a saying that "amongst chaos is opportunity," so let us take advantage.

First and foremost, these regulatory changes provide an opportunity for AAPG and its Divisions to work with the Geoscience and Energy Office in Washington, D.C., and the new bureaus of the BOEMRE. AAPG members have the expertise to assist in the development of the new regulations, thereby creating a positive impact on our industry.



HARRIS

This is an opportunity for us to provide technical experience regarding potential environmental impacts and mitigation efforts should the need arise.

Secondly, this is an opportunity for us to provide technical experience regarding potential environmental impacts and mitigation efforts should the need arise.

Lastly, AAPG can assist the BOEMRE in responsible development of the Outer Continental Shelf.

If I know our GEO-DC director David Curtiss, he is already working on these issues (see related story, page 32). I plan on visiting with David during my next trip to D.C. to see how DEG can get involved and assist with his efforts.

This is a time to become actively engaged and help David as he works with various agencies and politicians in our nation's capital. Decisions made here will have a global impact.

* * *

Moving on, let's talk about the Environmental Geosciences Journal.



The Winter 2010 edition featured papers on the use of shallow geophysical methods in environmental applications, and the upcoming Spring 2011 edition will feature manuscripts on ongoing geologic carbon dioxide research.

Work on our upcoming special issue regarding the Marcellus shale gas play in the Appalachian Basin, which is being co-sponsored by DEG and EMD, is under way, and the call for papers can be found on the AAPG/DEG linked-in website at linkedin.com/groups?mostPopular=&gid=1916317.

In the meantime, if you want to read a good primer on the Marcellus shale play in Pennsylvania, check out the online report by AAPG members John Harper and Jaime Kostelnik, both of the Pennsylvania Geological Survey at www.dcnr.state.pa.us/topogeo/oilandgas/Marcellus.pdf. They provide:

- ▶ An overview of the geology of the Marcellus shale.

- ▶ An historical overview of shale gas drilling from the 1820s to the present.
- ▶ Drilling and completion methods, including fracing techniques and materials.
- ▶ Well production and economics.
- ▶ Water resources.
- ▶ Environmental challenges.
- ▶ Other interesting information about this popular reservoir.

* * *

In other news, AAPG DEG will be represented at the SEGSA annual meeting, to be held in Wilmington, N.C., March 23–25. DEG is sponsoring a session to honor the career of Paul Thayer, who has been an AAPG member since 1967. I am co-chairing the session with Harry Roberts of Louisiana State University, another long-time AAPG member.

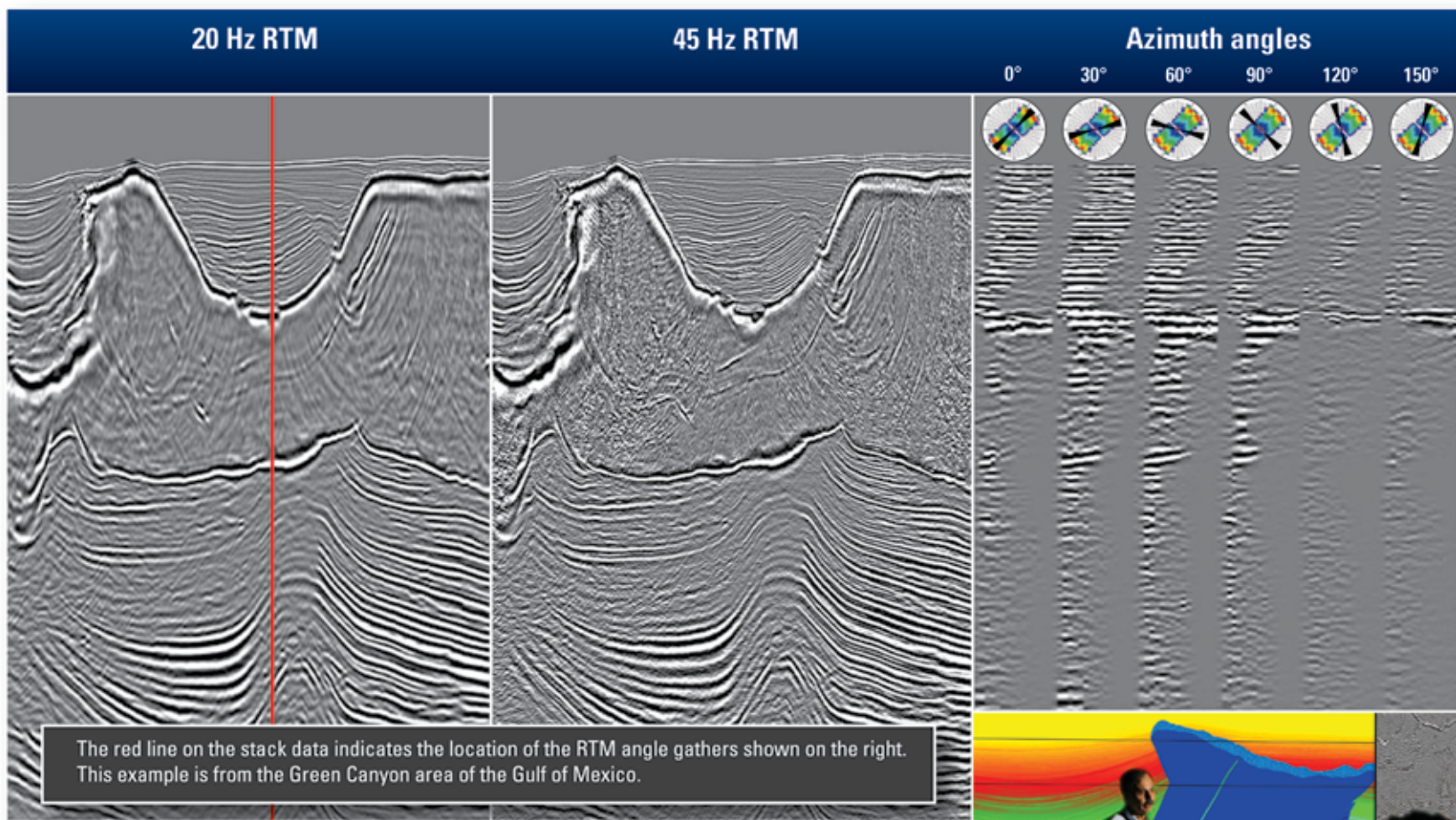
* * *

Recent actions taken by the DEG Executive Committee include the reduction of DEG annual dues from \$45 to \$25, which was made possible in large part by our decision to "go green" and publish the Journal digitally beginning later this year.

As I end this column, I will once again ask you to think about 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. ☐

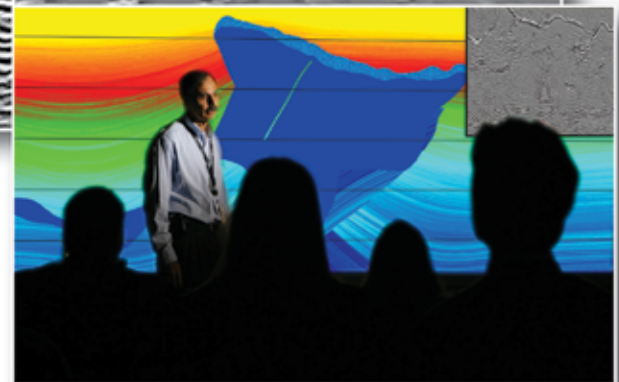
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The red line on the stack data indicates the location of the RTM angle gathers shown on the right. This example is from the Green Canyon area of the Gulf of Mexico.



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