AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

EXPLORER

AUGUST 2009

On the Beach

If all you see is fun in the sun, look again

See story, page 18

Vol. 30, No. 8
August 2009

AAPG EXPLORER

On the cover: The windward margin of Middle Caicos, study site for a team of ExxonMobil geoscientists who are using remote satellite sensing to better understand carbonate reservoirs. The reef margin is in the right, where the waves are breaking, and is relatively close to the beach, unlike other parts of the Caicos Platform that have a well developed lagoon. The result of a narrow lagoon is a higher energy beach. The Pleistocene-age outcrop is composed of eolian dunes and has a wavecut terrace. See story, page 18. Photo by Kelley Steffen.

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Photo courtesy of the Drake Museum

The big day has arrived: The 150th anniversary of the Drake Well will be celebrated Aug. 27 at – where else? – the Drake Museum in Titusville, Pa. Activities are planned that day at and around the museum's authentic replica of Edwin Drake's 1859 engine house and well, a site historically cited as the birth of the American oil industry. The celebration comes at the close of a year's worth of activities honoring Drake's discovery.

PRESIDENT'Scolumn

What's In It For Me?

By JOHN C. LORENZ

If you're reading this you're probably already an AAPG member, but you also probably get questioned from time to time about why anyone should want or need to join AAPG. I know at least one geologist whose attitude is, "I can get everything I need from AAPG through the library or through my company. Why should I join?"

The ethical implications of that question are worth a column by itself, but when confronted with such questions many of us come up short-handed: Sure, why *should* one bother to join?

There are many reasons, of course, or I wouldn't be posing the question and writing a column about it. These reasons range from the obvious to the ethereal. The most obvious are the tangible benefits a member gets, such as the monthly AAPG EXPLORER and AAPG BULLETIN – industry news and science at your doorstep, or whatever passes for an electronic doorstep, every month. We're an industry that develops and sells prospects based on geoscience and analogs, both of which can be found in the AAPG publications – and the more of them you can find and use, the better your chances of success in either wildcat or development operations. As an AAPG member you get not only the monthly BULLETIN but you also have free online access to the BULLETIN archives, as well as discounted prices on geoscience books published by AAPG and several affiliated societies.

Lorenz

Members get discounts on their registrations to AAPG scientific conferences and exhibitions and to the AAPG continuing education programs. How many of us have justified attendance at an AAPG meeting by showing management a relevant technical program? The concepts and analogs we encounter in publications and at conferences provide the basic tools with which we do our jobs.

Other tangible benefits vary in value, depending on whether an individual works independently or has the backing of a large company or organization.

See **President**, next page

Candidates Announced for 2010-11

AAPG officer candidates have been announced for the 2010-11 term.

Biographies and individual information for all candidates will be available online at www.aapg.org in mid-August.

The president-elect will serve in that capacity for one year and will be AAPG president in 2011-12. The vice president-Sections and treasurer winners serve two-year terms, and the elected-editor serves a three-year term.

Ballots will be mailed in spring 2010.

The slate is:

President-Elect

❒ **Ernest A. Mancini**, University of Alabama, Tuscaloosa, Ala.

❒ **Paul Weimer**, University of Colorado, Boulder, Colo.

Vice President-Sections

❒ **Marvin D. Brittenham**, EnCana Oil & Gas (USA), Denver.

❒ **Charles A. Sternbach**, Star Creek Energy, Houston.

Treasurer

❒ **James S. McGhay**, Mid-Con Energy, Tulsa.

❒ **James W. Tucker**, Saudi Aramco, Dhahran, Saudi Arabia.

Editor

❒ **Ashton F. Embry**, GSC, Calgary, Canada.

❒ **Stephen E. Laubach**, Bureau of Economic Geology, University of Texas at Austin.

GCS Area Opens on Web

An area on the AAPG Web site has been activated for members to discuss and comment on the AAPG Global Corporate Structure proposal.

The House of Delegates discussed the concept at the Denver convention (see July EXPLORER) and it now rests with the House Constitution and Bylaws Committee.

The proposal, under development for the past several years, was prompted by the need to protect Association assets as the Association provides services to members both internationally and domestically.

Also available on the site:

✓ Letters of explanation.

✓ Global Corporate Structure summary.

✓ Historic summary of AAPG global development.

✓ Corporate Structure White Paper.

✓ FAQ sheet on new Global Corporate Structure.

✓ AAPG Strategic Plan Goal Area: Global Presence.

✓ PDF downloads of a flow chart and a legal review of the proposal.

The timeline calls for a vote by delegates at their next meeting in New Orleans.

Assuming HoD approval of that proposal, the measure would go to the full membership for final ratification.

Following this scenario implementation would be in 2011.

President

from previous page

Access to the AAPG group insurance program is invaluable to many of our consultant members – not so much for the ExxonMobil employees. If you're a specialist, AAPG offers several focus groups you can be part of, ranging from the formal AAPG Divisions – the Energy Minerals Division, Division of Environmental Geosciences and Division of Professional Affairs – to smaller groups such as the History of Petroleum Geology and Astrogeology committees. Visit the AAPG Web site at www.aapg.org and check them out. All this can be had for modest membership dues that are among the lowest in the world for equivalent societies.

AAPG membership also offers *quasi*-tangible benefits – and for many members these less tangible benefits are more valuable. Going to AAPG meetings, and better yet, interacting with colleagues on AAPG committees, offers tremendous networking opportunities. Developing the geoscience is usually the primary reason for meetings or committee work, but while you're there you're also networking whether you realize it or not. Networking is an invisible benefit leading to contacts, ideas, friends and maybe your next job. It's better than Facebook – it's the real thing.

If you're a professor thinking about jobs for your students, AAPG offers connections to industry, a career-services Web site where one can post a résumé or a job opening, and contacts that can lead to research funding. AAPG supports many students directly with the Grants-in-Aid program. Moreover, according to the AGI Status of the Geoscience Workforce, 2009, 21 percent of geology MSc graduates went to work for the oil and gas industry in 2006, the largest block employer for MSc students, so it's worth being part of AAPG. If you're a student, volunteerism in a professional organization, especially AAPG, looks pretty good on a résumé.

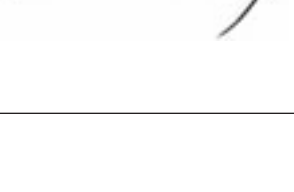
Networking is an invisible benefit leading to contacts, ideas, friends and maybe your next job. It's better than Facebook – it's the real thing.

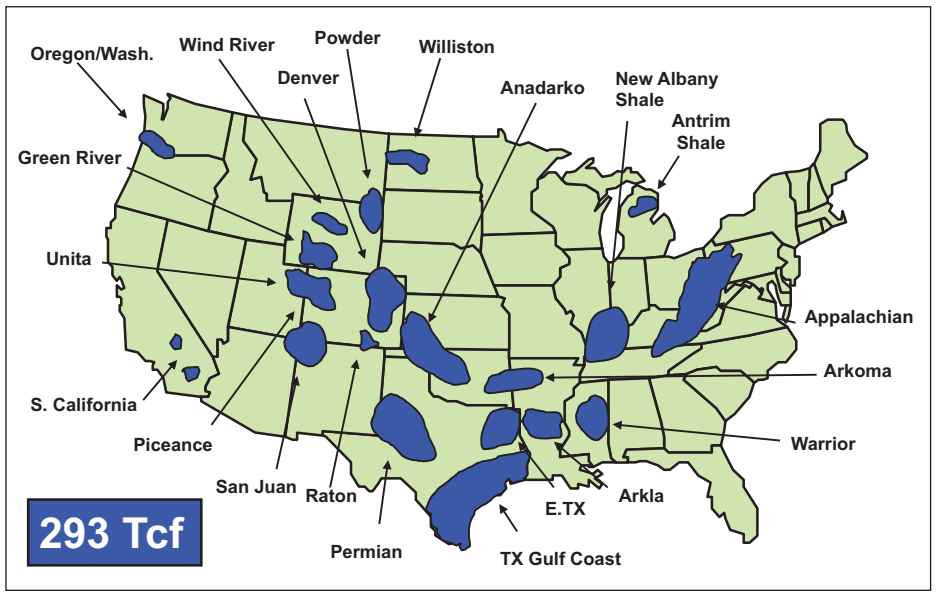
In addition, there are a variety of *in*-tangible benefits, including pride in belonging to the world's largest applied geoscience community and supporting the organization that's undoubtedly helped us to learn and practice our trade in ways we're often only vaguely aware of.

The AAPG Foundation works behind the scenes, contributing significant funds to support the dissemination of geoscience. AAPG runs research conferences, publishes that research and supports and organizes a respected and well-received program of itinerant and often exhausted Distinguished Lecturers. Supporting AAPG with membership keeps these and many other AAPG programs strong.

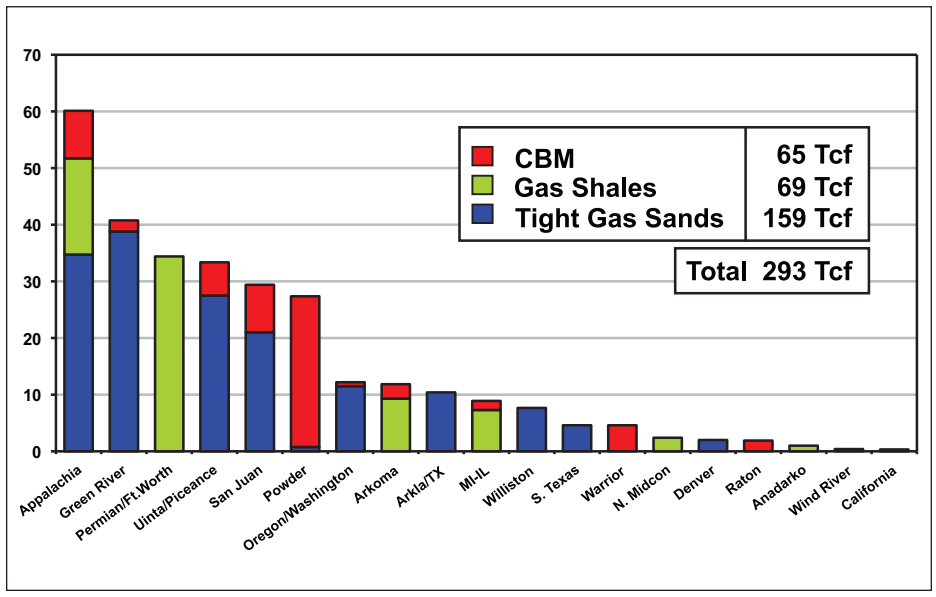
Finally, belonging to AAPG keeps one sharp. Taking in talks and posters at meetings and reading the BULLETIN exposes us to new scientific and business ideas and keeps us thinking. You're in danger of stagnation if you can't find something useful to your current line of work at an AAPG meeting or an AAPG publication.

So, why belong? If one had to wrap it up in a sound bite, "Because it's the right thing to do." Tell a fellow geologist.





Where it's at – A map showing major U.S. unconventional gas basins.



Technically recoverable unconventional gas (Tcf) – by geologic basin.

How will we get there?

Gas Has a Big Future to Live Up To

By DAVID BROWN
EXPLORER Correspondent

A lot of numbers relevant to exploration were discussed at the recent AAPG Annual Convention and Exhibition in Denver, and the most startling might have been "10."

W. David Montgomery, a vice president at Charles River Associates in Washington, D.C., gave the presentation "Climate Policy: Prospects and Impacts on Oil and Gas."

He said an additional 10 trillion cubic feet of natural gas production and consumption annually in the United States would have a major impact, cutting greenhouse gas emissions by 840 million metric tons, or about 12 percent of the current total.

That's right: An additional 10 Tcf.

The number is a mind-boggling thought, for several reasons.

✓ First, you can argue that the United States has not had any increase in gas production for almost 40 years.

The U.S. Energy Information Administration (EIA) estimated total domestic dry gas production at 21 Tcf in 1970. Since then, annual U.S. gas production has been mostly in the 17-19 Tcf range – and only recently, with the advent of unconventional gas, moved above 20 Tcf again.

✓ Second, domestic gas production is projected to decline this year by as much as five billion cubic feet a day.

Because of lower oil and gas prices, the U.S. rig count has dropped to less than half of its high a year ago.

✓ Third, there are no new technologies or new gas sources on the near horizon that would indicate such a dramatic increase.

Montgomery was talking about the 2010-50 time frame, leaving plenty of time for breakthroughs.

But if we're going to see a meaningful increase in U.S. gas production at some point, how much will it be – and how will we get there?

Positive Signs

"If we keep the focus on technology and continue to develop these gas shales and tight gas sands and so on, production will grow," said Kent Perry, director of E&P research for the Gas Technology Institute in Des Plaines, Ill.

> "If we keep the focus on technology and continue to develop these gas shales and tight gas sands ... production will grow."

Perry said GTI foresees a fairly steady increase in U.S. gas production going into the future, led by higher demand.

"In the longer term, there's more demand for natural gas – that's what our projections show," he noted.

The latest EIA energy outlook also projects an increase in gas production.

Its reference case puts annual U.S. production at 23.6 Tcf by 2030. With more favorable conditions – rapid development of technology and higher than anticipated natural gas prices – that number could reach 25.34 TCF, it said.

"Unconventional natural gas is the largest contributor to the growth in U.S. natural gas production, as rising prices and improvements in drilling technology provide the economic incentives necessary for exploitation of more costly resources," according to the outlook summary.

In the reference case projection, "unconventional natural gas production increases from 47 percent of the U.S. total in 2007 to 56 percent in 2030," it said.

Central to the projection of higher production is an increase in U.S. demand for natural gas. That could get an assist from governmental restrictions on CO_2 production, which will tend to favor gas consumption.

But new carbon-emission laws and regulations might do little to affect domestic exploration and production, said Eddie Thomas Jr., EIA operations research analyst in Washington, D.C.

"They mostly change demand, which kind of affects us indirectly," he said. "I don't know how much that would change our model on the production side."

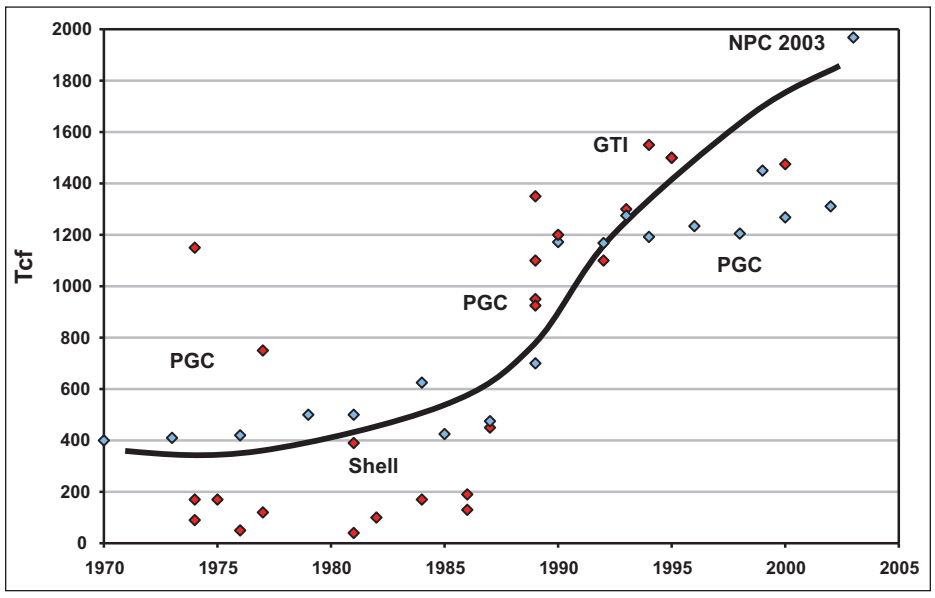
Thomas served as analyst for oil and gas production for the EIA outlook. He said the agency is required to base its projections on existing legislation, but has started to take the possibility of carbon-emission restrictions into account.

"Because we don't have an actual policy in place, we have to assume existing laws and legislation," Thomas said.

"We did make an assumption this year for the first time for what we call a 'carbon risk premium,'" he added.

That risk is influencing behavior as "investors see something coming down the road," Thomas explained.

The effect is already showing up in a reluctance to build new, coal-fired electrical power plants in the United States.



Goal #1: Increase the size of the technically recoverable unconventional gas resource base by 30 Tcf.

Other Factors

One significant contributor to gas production would be completion of an Alaskan gas pipeline.

The current EIA outlook assumes a gas line from Alaska will be operational by 2020, and will lift the state's gas production by 1.6 TCF per year as a result.

"This is partly based on economics, but it's mostly a model assumption," Thomas said. "We have no idea when it's going to happen. It's up to the operators in Alaska to reach an agreement."

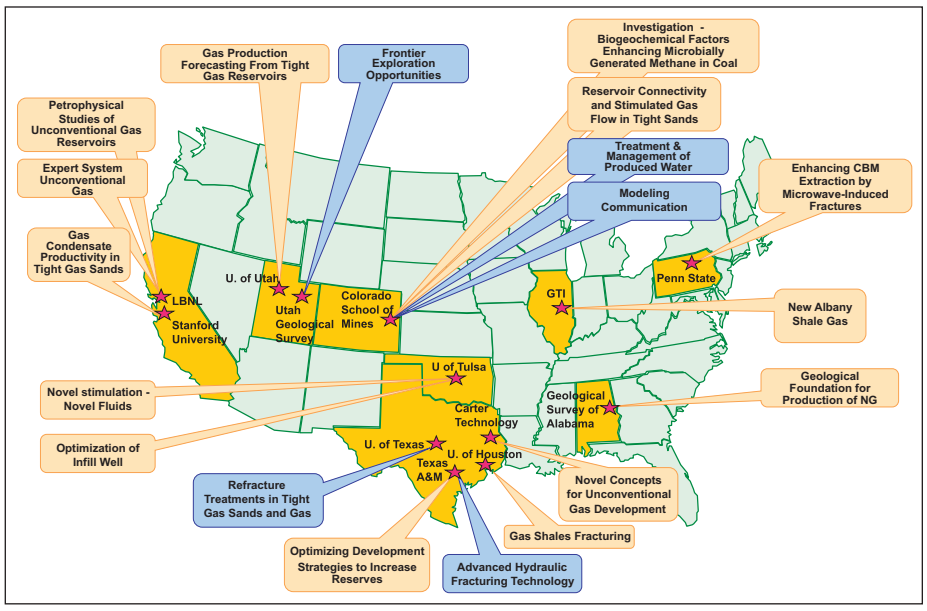
In fact, an Alaskan gas line has been in the plan for years, he noted. The projected completion date simply has been pushed back as operators and Alaska's state government have waffled and veered on details.

Net imports of gas decline in the EIA projection as domestic production increases, but LNG is something of a question mark. The outlook shows LNG imports rising to 1.5 Tcf in 2018 and then falling below one Tcf later.

"LNG is kind of a kicker. It's an additional supply source that will knock out some domestic production," Thomas observed.

"We see the capacity to take up to five Tcf (per year) of LNG domestically. Is that

See **10 Tcf**, page 8



Unconventional onshore projects – a lot of work started, a lot of work needed.

10 Tcf

from page 6

likely to happen? We think it's not likely to happen," he said.

In the outlook, gas prices are a bad-news/good-news story for the industry. The price doesn't exceed $8/Mcf out to 2030, in constant 2007 dollars. There's no return to the exceptionally high prices at the top of the gas market in recent years.

"In terms of a long-term trend, we don't expect to see those price levels again," Thomas said. "That's mostly a matter of supply and demand balancing."

The good news is that $8/Mcf gas is much better than current prices. And in nominal dollar terms, gas prices are forecast to rise above $10/Mcf in later years of the outlook.

Needed: Top Technology

Undeniably, technology will have to play a major part in any increase in domestic gas production. That includes new technologies in addition to predictable increases in efficiency in applying current technologies.

Perry said GTI has been working on research to improve effectiveness and increase applications of coiled-tubing drilling.

"The long and short of it is, by using coiled tubing and designing a drilling rig that can move quickly and take advantage of the technology, there are seven or eight benefits that accrue," he said.

"The bottom line is you can now drill a 3,000-foot well in one day" with coiled tubing, he noted.

Use of coiled tubing already has established a commercial foothold in wells to 5,000 feet in depth, Perry said. Advances in the technology should enable more use for faster, cheaper, deeper wells.

Because coiled tubing is light and flexible, it's not ideally suited for horizontal drilling when weight-on-bit is required.

GTI and others have conducted research into laser-bit drilling that can be used downhole in coiled tubing-drilled wells.

"That's a little bit longer term, but the goal is to cut rock using laser energy and that precludes the need to put weight on the bit," Perry noted.

He sees a bright future for coiled tubing and associated, emerging technology.

"It's going to go a long way toward producing some of the marginal gas areas in the future," he said.

One area of technology that could open up a new gas source is improvement in production of gas hydrates, principally clathrate hydrate methane trapped in marine sediments.

A joint government-industry project recently identified heavy concentrations of gas hydrates in porous, permeable sands in the Gulf of Mexico.

"It's obviously a big potential source. It has been worked on for years by the Department of Energy, and we've been doing a little work on it," Perry said.

"That resource does not come into the picture for another 25 years or even longer than that time window, due to its complexity, its location, its difficulty to market," he added.

Future Shock?

Looking forward, an additional five Tcf of annual U.S. gas production should be within reach. The following could move production numbers even higher:

✓ New technologies that go beyond efficiencies in applying current technology.

✓ Gas prices high enough to sustain moderate-to-high levels of drilling activity and open new areas of production.

✓ A completed gas pipeline from Alaska and continued build-out of the U.S. gas transportation infrastructure.

✓ Increased demand from an improved economy – something almost sure to happen, although the question is, when?

✓ Carbon-emission regulations and limits that favor the use of natural gas, especially for generation of electricity.

Also, it's not completely impossible to think the United States could adopt a strong national energy policy, one that will encourage the development, production and use of its domestic natural gas resource.

In that case, the industry could forget the tired joke, "Natural gas is the fuel of the future – and it always will be."

Instead we'd have to say:

"Natural gas is the fuel of the future. And it will be for a long time." ❑

About as esoteric as it gets

Researchers Are Thinking Small

By LOUISE S. DURHAM
EXPLORER Correspondent

Research efforts have yielded an array of tools to enable recovery of high volumes of hydrocarbons from targeted reservoirs that would have been nonproducible even in the relatively recent past.

Even so, the U.S. Department of Energy (DOE) reported in 2006 that about 67 percent of all U.S. oil remains in place after initial production. The agency estimated that possibly 25 percent of this oil can be recovered using conventional recovery techniques.

So, you ask, what's an operator to do to find and recover all that leftover crude?

Research efforts funded by the Advanced Energy Consortium (AEC), which opened for business last year under the management of the Bureau of Economic Geology at the University of Texas at Austin, may ultimately provide the answer.

Smaller Is Big

The research objective of the AEC – which is comprised of oil industry leaders – is to locate and extract the billions of barrels of potentially available petroleum supply that remain in place following conventional recovery, according to consortium senior manager Sean Murphy.

Past AAPG president Scott Tinker serves as director of the organization.

To reach this lofty goal, the AEC program is funding scientific research in the infinitesimally small and relatively unexplored "nanorealm," which previously had not been examined seriously by geoscientists or petroleum engineers.

> "The data collected could ultimately enable a more efficient exploitation of hydrocarbon resources."

According to John Ullo, senior manager at Schlumberger Doll Research Center in Boston: "… with the depletion of conventional hydrocarbon resources and the need to explore and recover from unconventional sources, the industry now must understand where much of the remaining hydrocarbons are trapped – at the nano scale.

"This could very well be the beginning of a new field of geosciences (called) "nano-petrophysics," Ullo noted.

The AEC is focused specifically on the application of nano-scale technologies to the exploration and production of oil and gas, Murphy noted. He explained that nanotechnology is the field of science defined by the nanometer, noting that one nanometer is the equivalent of one-billionth of a meter.

No Hydrocarbon Left Behind

The extremely harsh downhole environments characteristic of many oil reservoirs are a particular challenge to nanotechnology application. Given the often excessive temperatures, pressures and corrosive fluids, conventional microelectronic sensors could not survive, much less operate and communicate.

This evolving technology is about as esoteric as it gets.

"The primary goal of the research consortium is to develop subsurface micro- and nano-sensors that can be injected into oil and gas wellbores," Murphy said. "By virtue of their very small size, these sensors would migrate out of the wellbores and into and through pores of the surrounding geological structure to collect data about the physical and chemical characteristics of hydrocarbon reservoirs," he said, "thereby helping to 'illuminate' these reservoirs in terms of additional information.

"The data collected could ultimately enable a more efficient exploitation of hydrocarbon resources," he added.

This could be particularly beneficial for enhanced oil recovery (EOR) applications.

"In general we see nanotech as being the one big quantum step that companies can take in getting additional information about a reservoir, and then also in exploiting and enhancing recovery," said David Zornes, technology adviser with the reservoir performance group at ConocoPhillips.

"The use of nanotech to deliver EOR chemicals is one big area that has a big future for companies," Zornes said, "in that we can go after the 30-to-50 percent remaining oil that is located in typical reservoirs after they are produced via primary (methods) and then with a secondary waterflood."

'Small' Jobs, Big Names

The roster of AEC members currently includes industry heavyweights BP America, Baker Hughes, ConocoPhillips, Halliburton Energy Services, Marathon Oil, Occidental Oil and Gas, Schlumberger, Shell and Total.

Rice University's Smalley Institute for Nanoscale Science and Technology (SINST) is a key technical partner, and a

See **AEC**, page 12

Online Registration Opens for Rio

Registration is open and the entire technical program is now available for AAPG's next International Conference and Exhibition.

This year's ICE will be held Nov. 15-18 in Rio de Janeiro, Brazil – AAPG's first return there since the record-setting conference in 1998 – with a technical program built on the theme "Broader, Further, Deeper."

The Associacao Brasileira de Geologos de Petroleo is the host society, and Haroldo Lima, director general of Brazil's ANP (National Petroleum Agency) is the general chair.

Registration fees will once again be in a tiered format, with price savings available for those who register early. For example, for an AAPG member the registration fees are:

✓ On or before Sept. 9 – $645.
✓ On or before Oct. 21 – $725.
✓ After Oct. 21 – $900.

Organizers have prepared a program that includes more than 300 oral and poster presentations, 14 short courses and five field trips.

Also included are two special sessions:

✓ A plenary session on "Opportunities in a High-Stakes Environment."
✓ "Giant Fields of the Decade: E&P Challenges."

Appropriately, the conference will focus largely on offshore activities while also including sessions that cover upstream areas.

Primary themes include:

✓ Regional Geology, Paleogeography and Tectonics.
✓ Technology Application to E&P Environmental Solutions.
✓ Stratigraphy – Clastics and Carbonates.
✓ Reservoir Characterization.
✓ Structure – Traps and Seals.
✓ Basin Modeling – New Concepts and Innovative Technologies.
✓ Petroleum Systems – Geochemistry, Source Rocks, New Technology Applications.
✓ Formation Evaluation and Drilling Innovations.
✓ Salt Basins – E&P Challenges.
✓ Deepwater Environments – E&P Challenges.
✓ Geophysics – Advances in Subsurface Imaging, Seismic and Non-Seismic Methods, 4-D Seismic Case Studies, Visualization Technology Advances, Imaging Below Salt, Integration.
✓ Risk Analysis and Assessment – Economic Analysis.
✓ New and Emerging Regions – New Ways to Look at Old Plays, New Opportunities in Frontier Basins.
✓ Unconventional Resources – Oil Shale, Shale Gas, Tight Gas, Heavy Oil, Coalbed Methane.
✓ Industry's Crew Change – Impact on Hiring, Training and Retaining Skilled Resources.

To register or for more information go to www.aapg.org/rio. ❑

AEC

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team of SINST professors already has built and is lab-testing hydrophilic carbon clusters informally dubbed nano-reporters.

These nano-scale entities contain signaling molecules designed to detect oil, water, certain chemicals, etc. in the reservoir. Upon recovery from the reservoir, these nano-reporters will reveal significant information about what they saw, according to Rice professor and project principal investigator Jim Tour, an AAPG member (see related story, page 14).

A list of promising technologies that conceivably can be employed to better characterize reservoirs and aid in recovery efforts includes a variety of nanoallomorphs of carbon, magnetic nanoparticles, chemotaxic micro- and nanotube structures, and nanoexplosive materials, according to Murphy.

He noted the consortium is convinced that building on ongoing research in smart dust, medical imaging and nanofluidics fields could lead to breakthroughs in "illuminating" the hydrocarbon reservoir.

The AEC currently is funding 22 individual research contracts, and Murphy categorized the projects under way:

❒ Passive sensors (molecular-based such at Tour's nano-reporters).
✓ Imaging (essentially contrast agents that assist in seeing something better).
✓ Targeted imaging (specifically identify location of something, such as oil).
✓ Inject and Retrieve (senses something but must be retrieved and analyzed in the lab).

❒ Active sensors (traditional electronics-based sensors that must be shrunk to size).
✓ MEMS scale (Micro-electro-mechanical systems) – currently are too large to fit into pores and fractures.
✓ NEMS scale (Nano-electro-mechanical systems): targeting 100-1,000 nm scale devices.

❒ Studies advancing fundamental knowledge.
✓ Predictive – modeling and simulation tools.
✓ Foundation – understanding the science of how, why and what will be necessary to enable nano-scale material to be transported through reservoir rock environments.

Murphy noted that new advances in technology being actively pursued by the consortium could enable autonomous, self-powered sensors that communicate parametric data that identify bypassed oil and gas. ❑

Researchers send molecules on assignment

‘Reporters’ Look for Leftovers

By LOUISE S. DURHAM
EXPLORER Correspondent

The petroleum industry is increasingly adept in devising new and innovative technology to recover the significant volumes of hydrocarbons that commonly remain in produced reservoirs.

In some instances, these “leftovers” may exceed 50 percent of the original volume.

Today, researchers have made considerable headway in an effort designed to send an unusual breed of reporter downhole and into the reservoir that later will return to the surface to be interrogated about what it saw – kind of like a spy returning from a clandestine assignment.

Don’t roll your eyes.

It may sound far out, but it’s for real.

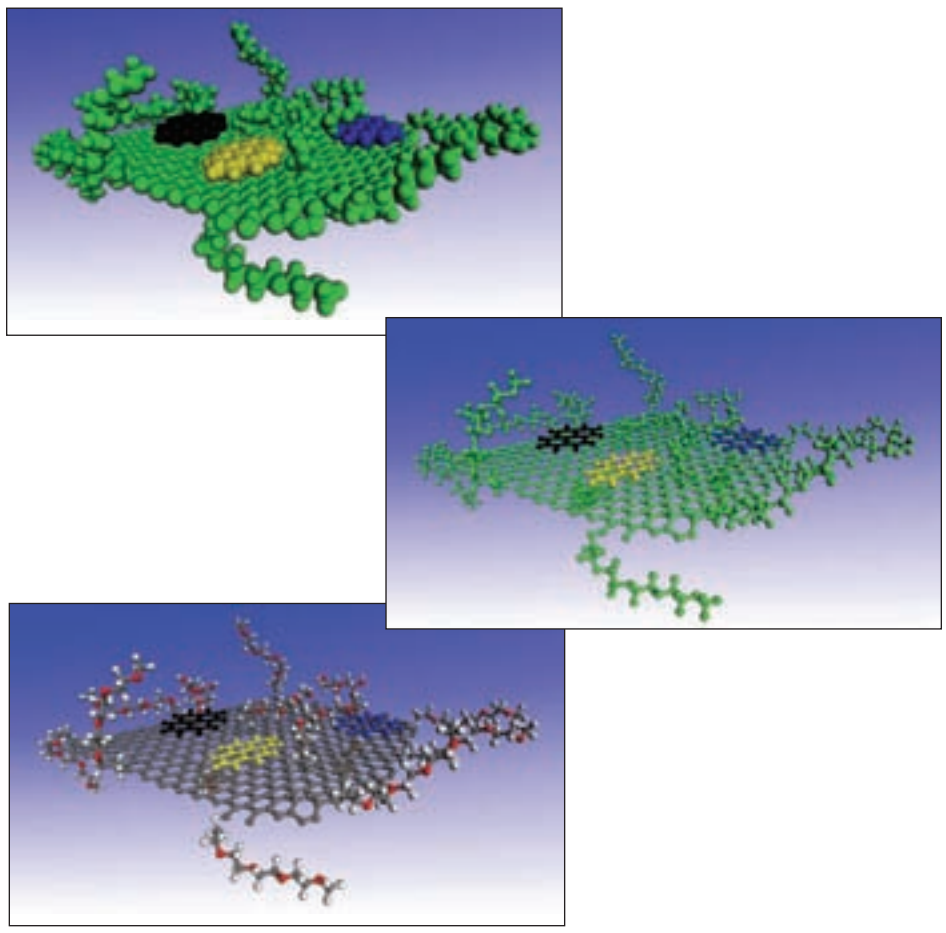
Informally dubbed nano-reporters, these hydrophilic carbon clusters incorporate signaling molecules engineered to detect oil, water, certain chemicals, pressure, etc.

The structures are dated molecularly via chemical bar-coding and, upon recovery following a tour of the reservoir, they have a story to tell.

‘Keeping Them Small’

Nano-reporters are the smallest “next big thing” the industry has seen.

“The key is keeping them small, embedding all this information, the molecular coding, the ability to gather information and do that in a nano-sized entity that’s somewhere smaller than 300 nanometers (one nanometer equals one-billionth of a meter), and particularly smaller than 100 nanometers,” said Jim Tour at Rice University, “so they never plug up any orifices and can go into the smallest crevices.”



Graphics courtesy of Rice University

A multi-channel nanoreporter carrying signaling molecules that will be released when different environments are encountered, such as the presense of oil.

Tour, who is a professor of chemistry, computer, mechanical engineering and materials science at the Smalley Institute for Nanoscale Science and Technology (SINST) at Rice, is principal investigator for the nano-reporter research project.

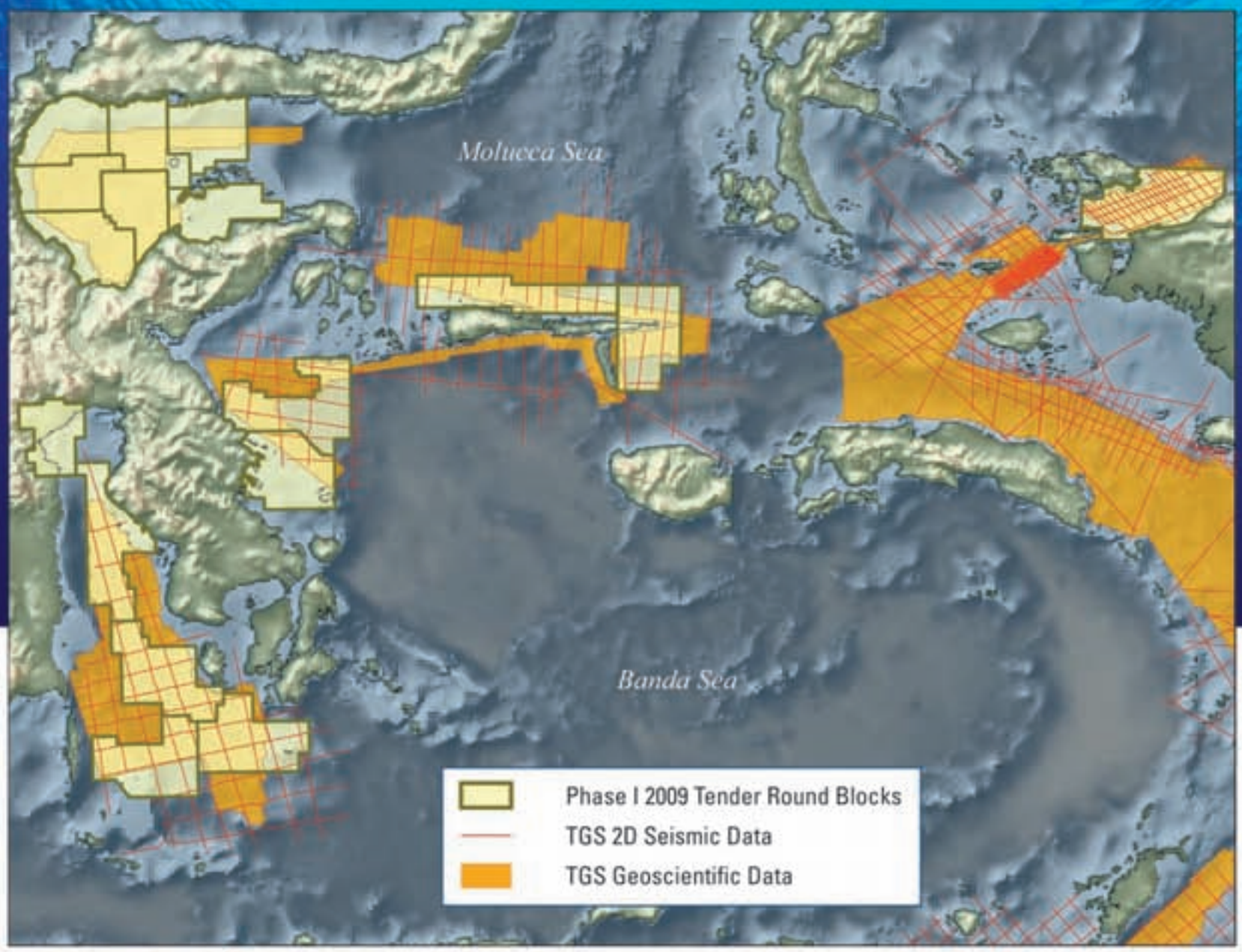
The project is sponsored by the Advanced Energy Consortium (AEC), which is funding a comprehensive research program in the field of nanotechnology. The consortium is managed by the Bureau of Economic Geology at the University of Texas at Austin, and the SINST serves as a key technical partner.

The nano-reporters are being made and lab-tested at Rice where Tour is working alongside fellow profs Michael Wong and

See **Nano**, page 16

Indonesia Phase I 2009 Blocks

Prospectivity Analysis Data Available



Open Tender Blocks ☑ = TGS Data Available

- ☑ Tomini Bay-I
- ☑ Tomini Bay-II
- ☑ Tomini Bay-III
- ☑ Tomini Bay-IV
- ☑ Tomini Bay-V
- ☑ Gorontalo Tomini-I
- ☑ Gorontalo Tomini-II
- ☑ North Bone
- ☑ Kolaka Lasusua
- ☑ Kabaena
- ☑ Jampea
- ☑ Buton III
- ☑ Menui Asera
- ☑ Morowali
- ☑ Sula-I
- ☑ Sula-II
- ☑ Bird's Head
- ☐ Sokang
- ☐ Penyu
- ☐ Senami Bahar

TGS has available a comprehensive collection of recently acquired modern geoscientific data to enable you to evaluate most of the open blocks available in the upcoming Indonesia Phase I 2009 bid round.

These non-exclusive data sets include 2D seismic, high resolution sea floor Multibeam, Gravity and Magnetic data; along with detailed geochemical analyses, sediment cores and heat flow probes.

For additional information or to schedule a review of these data please contact:

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Nano

from page 14

Mason Tomson from the chemical and environmental engineering departments, respectively.

Tour noted the AEC has a number of partner companies (see accompanying story, page 10) and said his group is partnering closely with Shell on the nano-reporter program.

The MO of these esoteric nano structures can be summarized quite simply:

"When this nano-sized entity goes downhole it will release the signaling molecules depending on what it sees," Tour said. "Then when the nano-reporters come back up we'll interrogate them and, based on the amount of material lost or retained, we'll be able to assess how much oil they saw versus water."

When the nano-reporters come back up it can be determined, based on the amount of material lost or retained, how much oil they saw versus water.

Using kinetics, it can be determined in the lab how much oil a cluster must have seen to be devoid of perhaps 98 percent of these molecules.

Getting a Complete Picture

Regarding the location of the oil in the reservoir, one only has to look at the bar code on the carbon clusters to determine if they were pumped in perhaps two years ago and just now surfacing.

"The time spent downhole will give us an assessment of how far away they were in what they saw," Tour said. "Some may come up after a month, but they didn't traverse as far and didn't see as much oil – this begins to give the topology of what's down there.

"Depending on what other molecules are there, you can do other things, like detecting how much hydrogen sulfide they saw, the pressure they saw," he added.

Tour said the idea is to put clusters down weekly throughout the life of the well – say, in soda pop can-size volumes – to have constant reporting of what's going on in the reservoir and what's changing.

"They're constantly coming up, so every week, or how often you can, you can take a little cup full of the mixture coming up from the production hole and in near real time analyze this," Tour said.

"Technically all you have to see is one nano-reporter, but you don't like to do that," he said. "You like to get an average of what they all saw.

"You interrogate and use some spectroscopy, and you look at tens of thousands of them in near real time," Tour noted.

"You get information on what they're seeing, and you see changes over the life of the well," he said, "which means we won't leave as much (hydrocarbons) downhole."

Eco-Friendly

More good news: This technology provides no ammunition to the environmental activist community.

"We looked at the toxicity of these things in cells in mammals in collaboration with the medical center in a number of different studies," Tour noted.

"We're using things similar to this for drug delivery," he said, "and that's how we could move on this so swiftly – if it's the same thing being used for drug delivery, it has to be non-toxic."

Nano-reporters inarguably could be a magic bullet of sorts to help operators tap into previously undetected volumes of hydrocarbons.

Tour cautioned, however, that even if the nano-reporters are injected early in the life of a well, it could take as long as several months or even several years for an operator to acquire the assessment needed.

And don't look for these minuscule spies to appear soon in a reservoir near you.

They're just now being tested in core plug samples.

"It's at least a couple of years away before we start pumping these downhole," Tour said. "It's still basic research, not applied.

"But the energy sector is very aggressive," he noted, "and if they get something they want to start injecting it.

"So I might be pleasantly surprised." ❑

Abstracts Open For New Orleans

The call for abstracts is now open for the next AAPG Annual Convention and Exhibition, set April 11-14 in New Orleans at the Ernest N. Morial Convention Center.

The theme is "Unmasking the Potential of Exploration and Production." Proposed topics are:

- ✓ Technology and Techniques.
- ✓ Sedimentation and Stratigraphy (SEPM).
- ✓ Resource Assessment.
- ✓ Evolving Plays and Significant Discoveries.
- ✓ Structural Geology: Styles and Processes.
- ✓ Tectonics and Sedimentation.
- ✓ The Gulf of Mexico: Regional to Local, Mesozoic to Recent.
- ✓ Unconventional Resources: Shales (Oil and Gas), Oil Sands, Gas Hydrates, Uranium, Coal.
- ✓ Expanded Applications of Geosciences.
- ✓ U.S. Energy.
- ✓ Global Climate Change.
- ✓ Student Poster Sessions.

Abstracts are due Sept. 15. For more information go to www.aapg.org/neworleans.

Facies mapping aids carbonate understanding

Global Satellite View Revealing

By LOUISE S. DURHAM
EXPLORER Correspondent

All potential reservoir rocks have their own extraordinary characteristics, along with various quirks that must be evaluated before embarking on an exploration program.

Carbonates are no exception.

Accurate characterization of carbonate reservoirs can be tedious in that it requires an understanding of the variability and lateral distribution of the carbonate sediments.

Some explorationists are attacking the carbonate challenge using sophisticated global satellite facies mapping technology.

It can be highly revealing.

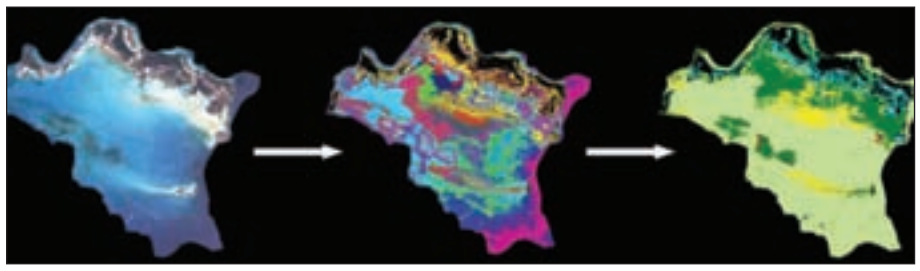
Remote sensing techniques may provide an efficient means for understanding lateral facies variability in modern carbonate environments and, in turn, ancient carbonate reservoirs, according to AAPG member Steve Kaczmarek, senior geoscientist at ExxonMobil Upstream Research Company.

Kaczmarek was one of six authors who presented a poster on the subject, "Global Satellite Facies Mapping: Modern Carbonates Revealed!" at the recent AAPG Annual Convention in Denver. His co-authors, all AAPG members who also are with ExxonMobil, were Melissa Hicks, Shawn Fullmer, Kelley Steffen, Tabitha Hensley and Lizbeth Miles.

"A big issue with field programs undertaken to generate facies maps," Kaczmarek said, "is they can encounter logistical issues in addition to being time and resource intensive."

Kaczmarek

"This project is global in scope, and that really sets it apart from a lot of other satellite-based research being done now."



Every picture tells a different story: From left to right, a Landsat (satellite) image of the Caicos Platform, one of the areas used in the ExxonMobil study; a classified image of the same platform created using statistics-based algorithms that bin individual pixels into statistically similar clusters; and an interpreted facies map that has been calibrated to sediment data collected in the field.

Kaczmarek noted ExxonMobil has completed a study using Landsat 7 satellite images (28.5m resolution), spectral analyzing software and sediment sampling to create facies maps of carbonate environments globally.

He pointed out that carbonate depositional settings are well suited for remote sensing work because carbonates generally thrive in shallow, relatively clear water – a necessity for satellite data acquisition in sub-aqueous environments.

"Prediction of facies distributions in ancient carbonate rocks is essential for accurate evaluation of reservoir-scale heterogeneity and even identification of exploration-scale fairways," Kaczmarek said.

"Creation of new high-resolution facies maps has led to a better understanding of sediment distribution and biotic variations within modern carbonate systems."

E&P INNOVATIONS

Global Research

Regions included in the ExxonMobil study are:

- ✓ Little Bahamas Bank.
- ✓ Great Bahamas Bank.
- ✓ The Caicos Islands (BWI).
- ✓ Cocos (Keeling) Islands.
- ✓ Glovers and Chinchorro (Belize).
- ✓ The Maldives.
- ✓ Australia's Great Barrier Reef.
- ✓ Parts of the Arabian Gulf, Red Sea and Southeast Asia.

"We specifically focused on mapping modern carbonates in a variety of structural, climatic and hydrodynamic regimes," Kaczmarek said. "As a result, the study includes isolated platforms, attached rims and ramps that are in macrotidal and microtidal regimes and tropical, subtropical and arid climates."

"Study regions also represent active and passive margins, open ocean settings and marginal seas," he added.

See **Facies Mapping**, page 22

August 2009

Midland Valley

Structure World

It's the August edition of Midland Valley's Structure World which means we have just one month to go until our 2009 Technology Meeting. For this month's interpreters tip we have explored curvature verses strain as a proxy for fracture intensity.

2009 Technology Meeting next month!

15th - 16th of September 2009
Glasgow, Scotland
Visit www.mve.com or email events@mve.com for details.

Excitement is growing for our 2009 Technology Meeting, Structural Geology for Uncertain Times, taking place in the Glasgow Science Centre (UK) next month. The Meeting will include speakers from industry and academia presenting on a range of structural geology topics including:

Tuesday Sessions

Setting the Structural Challenge
Integrated Workflows in Structural Geology
Training and Support Initiatives for the Next Generation
Structural Systems Approach to Mineral Resource Development and Exploration

Wednesday Sessions

Geometric and Geomechanical Algorithms
Adding Value to Data Investment
Establishing Best Practice for Structural Geology in Carbon Capture Sequestration and Rad-Waste
The Next Move...

Additional Activities that will be taking place around the Meeting are:

Workshop - Structural Systems Analysis for the Mineral Industry, Monday 14th.
Ice-breaker, Monday 14th.
Field Trip - Basin Margins and Faults, Solway Firth, Thursday 17th.
Structural Surgery, Thursday 17th and Friday 18th.

A full Meeting Prospectus and registration information can be found on our website **www.mve.com** or by emailing Sarah, **events@mve.com**. Don't miss out and sign-up now! We hope to see you there.

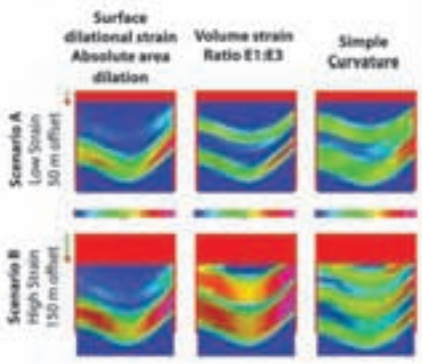
Interpreters Tip: Curvature versus strain as a proxy for fracture intensity

As fractured reservoirs become more common exploration targets, the ability to successfully model fracture intensity in deformed rocks becomes crucial, both in terms of the permeability of a fracture-enhanced reservoir and the sealing integrity of a cap rock. Knowledge of fracture intensity within a reservoir is usually restricted to spatially sparse well data therefore finding an effective proxy for fracture intensity is an important step in any fracture modelling.

Two surface (or volume) attributes are commonly used as proxies for fracture intensity in a model: surface curvature and strain. Which of these two proxies the user decides to employ during their fracture modelling will depend on a variety of factors including the fracture history and finite strain state of the rocks, and the complexity of the modelled deformation.

The key difference between curvature and strain attributes is how they are generated. Curvature depends purely on the geometry of the surface in its current state, whereas strain attributes captured during restoration are strongly model dependent. The choice of restoration algorithm will strongly influence the finite strain pattern that is generated. An advantage of using strain as the fracture intensity proxy is that strain can be captured in incremental stages during restoration. In contrast, curvature generally reflects the current deformation state (although it can also be captured at different stages during the restoration).

The figure below demonstrates some of the differences between patterns of finite strain and simple curvature during hangingwall deformation over a low angle thrust ramp.



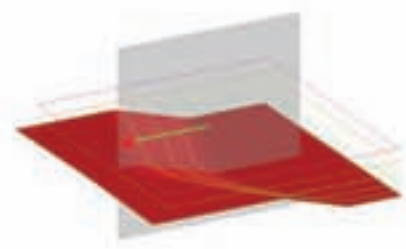


Figure 1: Strain and curvature attributes for hangingwall deformation over a curved thrust ramp deformed using Fault Parallel Flow for (a) 50m offset; (b) 150 m offset. Oblique view of model, with horizontal hangingwall horizons shown in outline view, forming structural contours along the fault ramp. Green and red arrow illustrates the slip direction.

move™ If you would like further information on the restoration and curvature analysis tools in Move, contact us through **help@mve.com.**

For further information contact us: +44 (0)141 332 2681 or email help@mve.com.

www.mve.com
The structural geology experts

It Takes a Team To Tackle Strat

Does Lamda-Mu-Rho make your eyes glaze?

By LOUISE S. DURHAM
EXPLORER Correspondent

A few holdouts remain, but most geologists today would never consider trying to generate prospects – or attempt most any E&P pursuit – without the aid of some form of 3-D seismic data.

In fact, it's only natural to think of geologists and geophysicists as being totally in sync these days, eagerly discussing inversions, spectral decomposition, etc., even while socializing in their off time over a cold brew.

Think again.

There's work to be done on the part of both groups before they each can fully understand and best utilize what the other brings to the table, according to Bruce Hart, director of Shale, Seal and Pressure Systems Group at ConocoPhillips in Houston.

The good news: This is certainly doable, as Hart points out when he discusses new directions in seismic stratigraphy.

"In the 1970s, the good folks at Exxon gave us seismic stratigraphy," Hart said. "This was a method of using reflection geometries – terminations, facies, etcetera – to evaluate sea level change, try to predict lithologies in exploration settings, and so on.

"That approach eventually morphed into sequence stratigraphy," Hart continued, "where people integrate seismic data with well information or outcrop or core or other types of information."

Out of Tune?

Typically when most sedimentary geologists are working with seismic data, they work with conventional seismic. With the advent of 3-D seismic, stratigraphers could see plan-view images of depositional systems, which considerably enhanced the interpretability of the seismically imaged strata.

"While all that was going on, geophysicists were developing a whole suite of tools to independently predict rock properties," Hart said, "independently in the sense it's independent of seismic sequence analysis.

"So, they have things like seismic inversion that allows them to predict acoustic impedance in various ways, and they use seismic attributes to try and help predict rock properties," he noted. "And sometimes they use multi-component seismic data – or shear wave seismic rather than P-wave – to look at rocks.

"My observation has been that in a lot of companies, the sedimentary geologists, the stratigraphers tune out when they see inversion results or seismic attribute-based results," Hart said. "Either that, or they're not granted access to those types of volumes even though sometimes these volumes can show stratigraphic features you can't see in original seismic data."

"In a lot of cases, sedimentary geologists will hear people talk about simultaneous inversion or Lambda-Mu-Rho volumes or various other things related to physics," Hart said. "Then the geologists get cold feet and back off."

Geophysicists were developing a whole suite of tools to independently predict rock properties.

Stratigraphic Gap

He proposes that stratigraphers should become more involved in working with the results of these physical properties predictions or the multi-component seismic data, emphasizing this will help them to be

See **Directions**, page 22

Hart Will Be This Year's AAPG-SEG Joint Lecturer

Bruce Hart, director of the Shale, Seal and Pressure Systems Group at ConocoPhillips in Houston, is this year's AAPG-SEG Joint Distinguished Lecturer.

He will make two tours this season – to eastern North American sites in November and to western North American sites in January and February.

He will be offering two talks:

✓ Reservoir-Scale Seismic Stratigraphy: A Call to Integration.
✓ Basin-Centered Gas Accumulations: Revisiting the Type Areas with Integrated Datasets.


Hart

For more information on his talks and schedule see the AAPG Web site at www.aapg.org.

A complete listing of all AAPG Distinguished Lecturers will be included in the September EXPLORER. ❑

Directions

from page 20

better stratigraphers.

Hart noted that in the 1960s and 1970s, members of the sedimentary geology community jumped onto the physics bandwagon when they decided they needed to understand how fluids transport sediments.

"I think a modern crop of sedimentary geologists could do the same," Hart said. "They could jump on the geophysics learning curve and become better stratigraphers because they understand how to use the new technology."

Given the growing recognition globally that the industry needs to be focusing more on stratigraphic plays, understanding the stratigraphy is key.

It's becoming essential to remove the roadblocks to doing so.

"If the stratigraphers don't understand the geophysics and the geophysicists don't understand the geology, there's a gap in communications," Hart said. "There's a crack things can fall through.

"I think there's a real need for people to comprehend how to milk the stratigraphic features out of the seismic data," he emphasized, "and I think in a lot of cases that's just not happening.

"Traditionally, I think new hires come out of geology programs not understanding a lot about seismic data," Hart said. "On the other hand, geophysicists come out not necessarily understanding a lot about stratigraphy.

"With time, hopefully the corporate culture will allow those people to get closer together," he added. ❑

Facies Mapping

from page 18

Kaczmarek noted this technology has been used before in different capacities, but it's the first time it's been used in this kind of investigation over large carbonate platforms.

"This project is global in scope," he said, "and that really sets it apart from a lot of other satellite-based research being done now."

First Separate, Then Define

An abbreviated blueprint reveals the basics of this technology application.

Step 1 in the quest to get a better handle on just how sediments are distributed in modern carbonate reservoirs entailed harnessing Landsat data and using statistics-based algorithms that bin, or group, pixels in each Landsat image into specific clusters. Each pixel in an image is put into a specific bin or cluster based on its spectral response.

"Statistically, what we're trying to do is separate all pixels in an image into bins," Kaczmarek said. "The difference between bins is maximized, and the difference between pixels within a bin is minimized, so pixels within a single bin are more similar to other pixels in that bin than pixels in a different bin."

The algorithms provide thematic class maps that are essentially color-coded bin maps.

"Where we have it available, we condition those thematic maps with field-collected sediment data from these different platforms," Kaczmarek said. "This allows us to extrapolate away from where we have data.

"For example, if you have one data point in each bin you can classify every bin in your image and give it a sediment type," he noted. "From there we make different comparisons."

Practical Applications

In addition to serving as instructional aids, the maps provide the geoscientists with modern analogs.

Kaczmarek noted, for instance, that they have a group of pictures of images from different size platforms from around the world that they can use to compare to subsurface reservoirs. He mentioned the images are used to generate rule sets for predicting how facies could be distributed in ancient reservoirs.

They also use the maps to try to better understand the controls on how the sediments are distributed on modern platforms. This is doable because they know what the modern constraints are, such as climate, currents, waves and wind.

Additionally, the images are used to provide constraint on the level of complexity within the different depositional environments.

For example, conventional facies maps are very homogeneous, lumping sediment types into big homogeneous kinds of facies belts.

"This work has allowed us to see a lot smaller scale heterogeneity in these systems," Kaczmarek said. "That has implications when you're trying to constrain the level of complexity, or the complexity or precision of how facies are distributed in geologic models, for instance."

He cautioned that with any remote sensing work data quality is paramount, adding that newer data tend to be somewhat better. He also noted the data can be compromised by certain weather conditions over a platform during a data satellite flyover.

But there are no doubts about the benefits of this technology.

"This research has provided significant uplift to multiple aspects of our carbonate program," Kaczmarek emphasized.

"It's proved to be relevant and has added significant value to a number of our exploration and development assets worldwide, including those in North Caspian, Indonesia, Qatar and Abu Dhabi." ❑

Learning curve continues

Elm Coulee Idea Opened New Play

By LOUISE S. DURHAM
EXPLORER Correspondent

Oil and gas finders are enamored with the Williston Basin these days, looking for the next big find in the upper Devonian-Lower Mississippian Bakken formation.

Even though there was considerable activity in the Bakken in the 1980s and 1990s, the focus was on the upper shale member, which yielded marginally economic, difficult-to-produce wells. This upper member became known as a re-entry bailout zone rather than a drilling target.

This take on the Bakken potential became passé beginning in 1995 when explorer Dick Findley determined there was good porosity and a likely oil zone in the fractured dolomitic middle section of the formation beneath the recognized source rock of the upper Bakken.

This was an idea that spurred Findley to action that ultimately lead to the development of the giant Elm Coulee field in the Bakken in eastern Montana.

The idea that became a reality was important for Findley on a personal level – it led to a high national profile and resulted in his receiving AAPG's Explorer of the Year award in 2006 – and on a national level it sparked a flurry of activity.

Current activity in this region no doubt has been fueled in large part by a fairly recent announcement by the U.S. Geological Survey that its assessment of the Bakken in the Williston Basin in Montana and North Dakota revealed about 3.65 billion barrels of undiscovered technically recoverable oil.

On top of this, the agency added 1.85 Tcf of associated/dissolved natural gas and 148 mbo of natural gas liquids.

> "Where the true significance of Elm Coulee comes in is that we have a world class source rock sitting right next to a good reservoir."

World Class Settings

When Findley ventured east from Montana into North Dakota in search of another Elm Coulee-type trap and reservoir, he did not find the kind of reservoirs they were dealing with over a large regional extent. Instead, there seemed to be local accumulations of reservoirs in Elm Coulee-type facies.

"Where the true significance of Elm Coulee comes in is that we have a world class source rock sitting right next to a good reservoir," Findley said.

"What the play really is, is looking for those occurrences.

"Once you take a look at that aspect of it," he said, "I think you find several instances in North Dakota where you actually do have good reservoirs in different facies, but certainly associated with the world class source rock.

"What we believe now is there's a huge amount of oil generated in these source rocks," Findley noted, "and it stayed close to home. It's difficult to find areas outside of the Lodgepole facies play where the oil actually migrated to other formations.

"This concept of the Bakken source system, I think, is a very significant piece of the puzzle," Findley added. "That to me is the true significance of Elm Coulee – and it's not just the Bakken.

"I refer to the Bakken and beyond because I think what we need to do is concentrate on this kind of unconventional reservoir worldwide," he said.

"There's obviously other world class source rocks, other reservoirs in that same situation," he added, "so I think there are other plays to be had."

'Optimistic About North Dakota'

Findley noted the bulk of the work in unconventional reservoirs in North America has concentrated on looking for natural gas. Elm Coulee takes on added import in that it has shown for the first

See **Findley**, page 28

Dick Findley, AAPG's Explorer of the Year in 2006, presented his paper "Perspectives of Elm Coulee Field, Williston Basin – The True Significance for the Bakken and Beyond," at the recent AAPG Annual Convention and Exhibition in Denver.

Findley's talk was part of the Discovery Thinking technical session chaired by Charles Sternbach and Ed Dolly, which featured several geologists discussing the process and stories behind significant discoveries.

Findley said that the Bakken shows "there are other plays to be had."

Findley


Graphic courtesy of JHL

Sometimes, look to the sky

It Takes Big Ideas To Drill Big Wells

By DAVID BROWN
EXPLORER Correspondent

Look! Up in the sky!

It's a blimp!

It's a zeppelin!

It's a whatchamacallit ... big thingy ... a dirigible!

To be exact, it's a SkyHook JHL-series heavy lifter.

If there's nothing cooler than a humongous helium-filled airship with helicopter rotors, it's because this thing was designed for the Arctic.

And specifically with the oil and gas industry in mind.

For the explorationist who has some ideas about prospects in remote areas that otherwise would be stranded, perhaps this big boy can make dreams become reality.

JHL stands for Jess Heavy Lifter, the brainchild of former helicopter pilot Pete Jess of Calgary, Canada.

"My whole concept stems from working 30-odd years in the logistics business of moving things around in the Arctic, and the expense and difficulty of doing that," he said.

Jess got the idea of a rotor-lift airship more than 20 years ago. He eventually took his concept to the working stage, and about three years ago founded the company SkyHook International in Calgary.

It partnered with Boeing to start making the heavy lifter a reality, with construction of a pair of production prototypes in Pennsylvania.

His basic idea was a thing of beauty. If you have a big huge helicopter with a big old huge motor for heavy loads, you have to lift both the helicopter and the payload.

"What makes mine different, and what the patent is," Jess said, "is this is a neutrally buoyant aircraft."

Keeping It Up

Because the JHL weighs out at zero, just about all the lift from its four Chinook helicopter motor-and-rotor sets goes toward lifting the payload. That allows the SkyHook airship to pick up a 40-ton to 50-ton load and carry it 100 miles.

"We could get something almost anywhere we wanted it in the Arctic," Jess recalled.

The problem was, getting the load the last few dozen miles without existing roads might cost 10 times as much as transporting it the first 2,000 miles.

As an example, Jess cited the challenge of moving drilling equipment into the western North Slope of Alaska.

"That's pretty gnarly country out there. It's very expensive to put in roads to drill exploration wells. Same with the Mackenzie Valley," he said.

With the JHL airship, companies could pick up payloads and deposit them into the most remote and rugged terrain, with little environmental consequence.

Jess is still enthused about his idea, even though he sold out his interest in SkyHook to an unnamed "big oil company" early in 2009. He continues to work on logistics problems in the Arctic for the oil industry.

See **Sky Hook**, page 28

Sky Hook

from page 26

Shell Technology Ventures Fund, managed by Kendra Capital, has been the lead investor in the SkyHook program.

Remote Control

Boeing has announced it expects the JHL craft to be in service in 2012. Even then, true helicopters will still continue to carry drilling rigs and equipment into remote areas.

State-of-the-art for chopper transport today is probably an average of 25,000 pounds for 25 miles without refueling, according to Walter Palubiski of Helicopter Transport Services Inc. in Corvallis, Ore.

HTS does most of its remote rig transport in South America, carrying big-time loads in helicopters that are 80 feet long.

"It's not for the faint of heart, and you have to have something of this size to haul them," Palubiski said.

The world's biggest helicopter in wide use is the Russian Mi-26, which can carry a payload of about 40,000 pounds.

Various militaries around the world and some companies have tried building bigger aircraft for heavy hauling, including dirigible-plus-rotor combinations. A notable attempt coupled a U.S. Navy blimp with four helicopters.

The SkyHook if successful, would be the biggest commercial craft. Current designs call for an airship 302 feet long and 118 feet high, with a loaded range of about 200 nautical miles and a speed of 70 knots.

Jess said he developed the idea of a heavy lifter with the oil industry in mind. He flew helicopters "as a kid in the 1970s" and wanted to find some way to move a truck-size load without the need for roads.

> For the explorationist who has some ideas about prospects in remote areas ... perhaps this big boy can make dreams become reality.

Airlifting would not only be cheaper, he knew, but it also would avoid the environmental problems and related expenses of road building.

"You add up the costs and it's staggering," Jess noted.

He said 65 percent of the cost of a $50 million exploration well in a far northern area could come from logistics costs and the expense of meeting environmental regulations and restrictions.

SkyHook airships will be operated by specially trained pilots who are experts in lift-and-move, navigating and steering the craft with instruments that probably will include a joystick control.

When you consider the benefits of a heavy-lift airship, and the fact that it might be one of the tools that opens the Arctic to exploration, you can't help but ask:

"Can I ride in it?"

Sadly, the answer is:

"No. You can't." ❑

Findley

from page 24

time that oil can be produced in economic quantities owing to technology advances in these unconventional-type reservoirs.

However, patience is the name of the game given that one must navigate a steep learning curve to unlock the potential of these reservoirs.

"We first discovered Elm Coulee in 1996, and the first horizontal well was drilled in May 2000," Findley said. "Then it took us maybe 18 wells before we actually got on the right track – and that learning curve to this day hasn't ended.

"Before Parshall was discovered (in North Dakota), a lot of wells were drilled using Elm Coulee-type fracing, and they were very uneconomic," Findley said. "Even now that learning curve is still being fine-tuned."

He cautioned that every reservoir is different, which necessitates considerable adjustment of the stimulation technique.

"I'm very optimistic about North Dakota," Findley said. "We've been hearing things like (it is) another Saudi Arabia and all those kinds of things, and I do believe very, very large amounts of oil have been generated.

"I think we're only going to be able to make a small fraction of that economic," he said. "But I think it will go a long way to reduce our dependence on foreign sources, so I think it will be a very important play for North America.

"It's naive thinking we can replace coal, oil and gas with wind and solar," Findley added. "But I think it will take a crisis before people wake up and start asking key questions about how do we solve our energy problems." ❑

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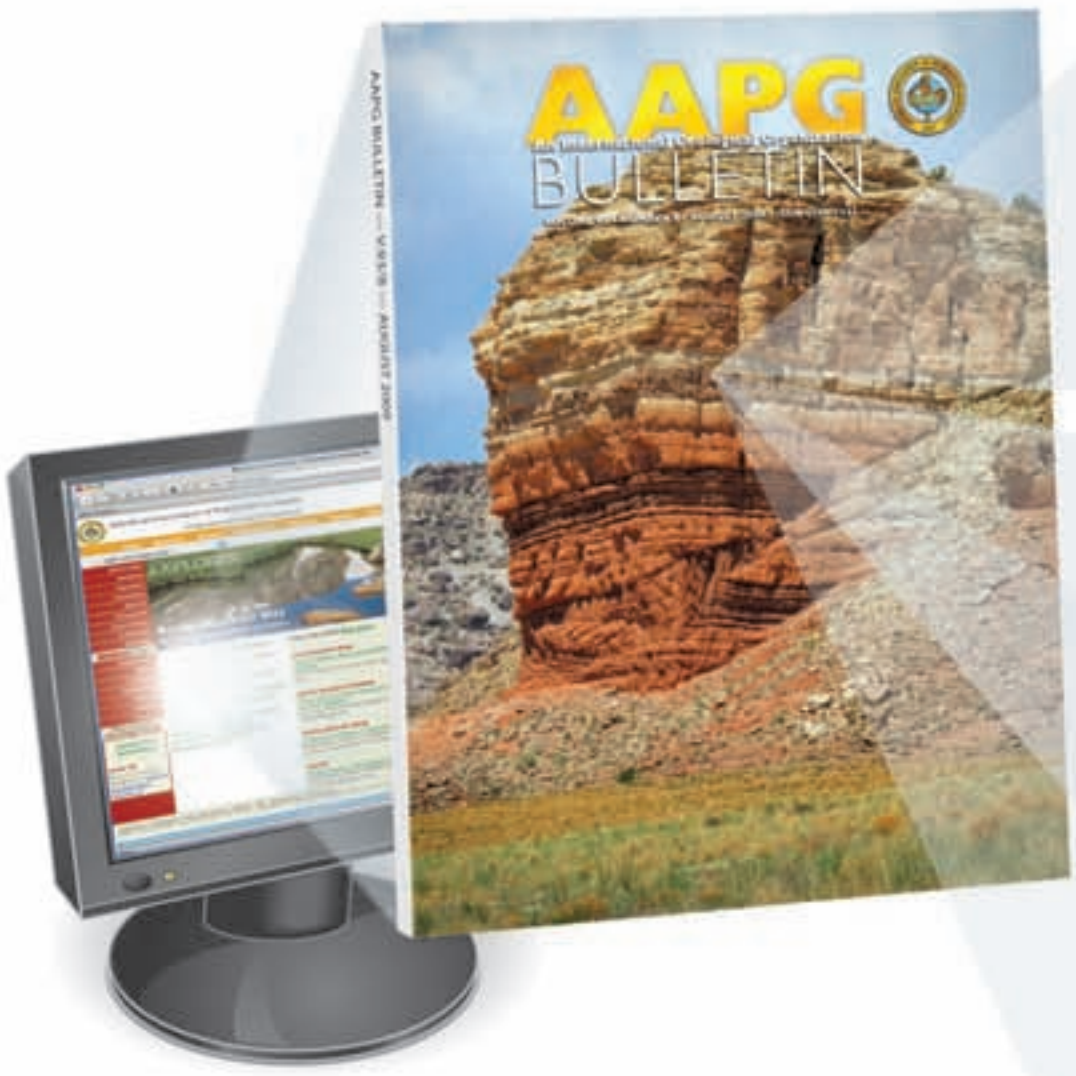

The AAPG Bulletin is a technical journal that is recognized in the industry as the leading peer-reviewed publication for information on geoscience and the associated technology of the energy industry.

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.

Article highlights include:

Implications for fractured carbonate reservoirs

Kajari Ghosh and Shankar Mitra

The Teton anticline is a good surface analog for fracture patterns and connectivities within subsurface-folded carbonate reservoirs. When the analysis of sparsely distributed fracture data from wells is integrated with an understanding of the controls of the macroscopic structure on fracture parameters, fracture patterns and connectivities can be simulated.

A Pliocene slope channel system

Nigel E. Cross, Alan Cunningham, Robert J. Cook, Amal Taha, Eslam Esmaie, and Nasar El Swidan

This paper describes the 3-D architecture and evolution of large composite channel complexes in the Sequoia field and demonstrates how spatial and stratigraphic variation in sand distribution is likely to impact reservoir heterogeneity and production performance. The conclusions from this study may be applicable to similar subsurface examples.

Geochemistry of formation fluids

Ye Zhang, Carl W. Gable, George A. Zyvoloski, and Lynn M. Walter

This paper evaluates the geochemistry of formation fluids in the Uinta Basin, Utah, at the regional scale. The understanding of basin-scale water or gas geochemistry within a hydrogeological framework is enhanced by innovative geological model building combining structure and stratigraphic data.

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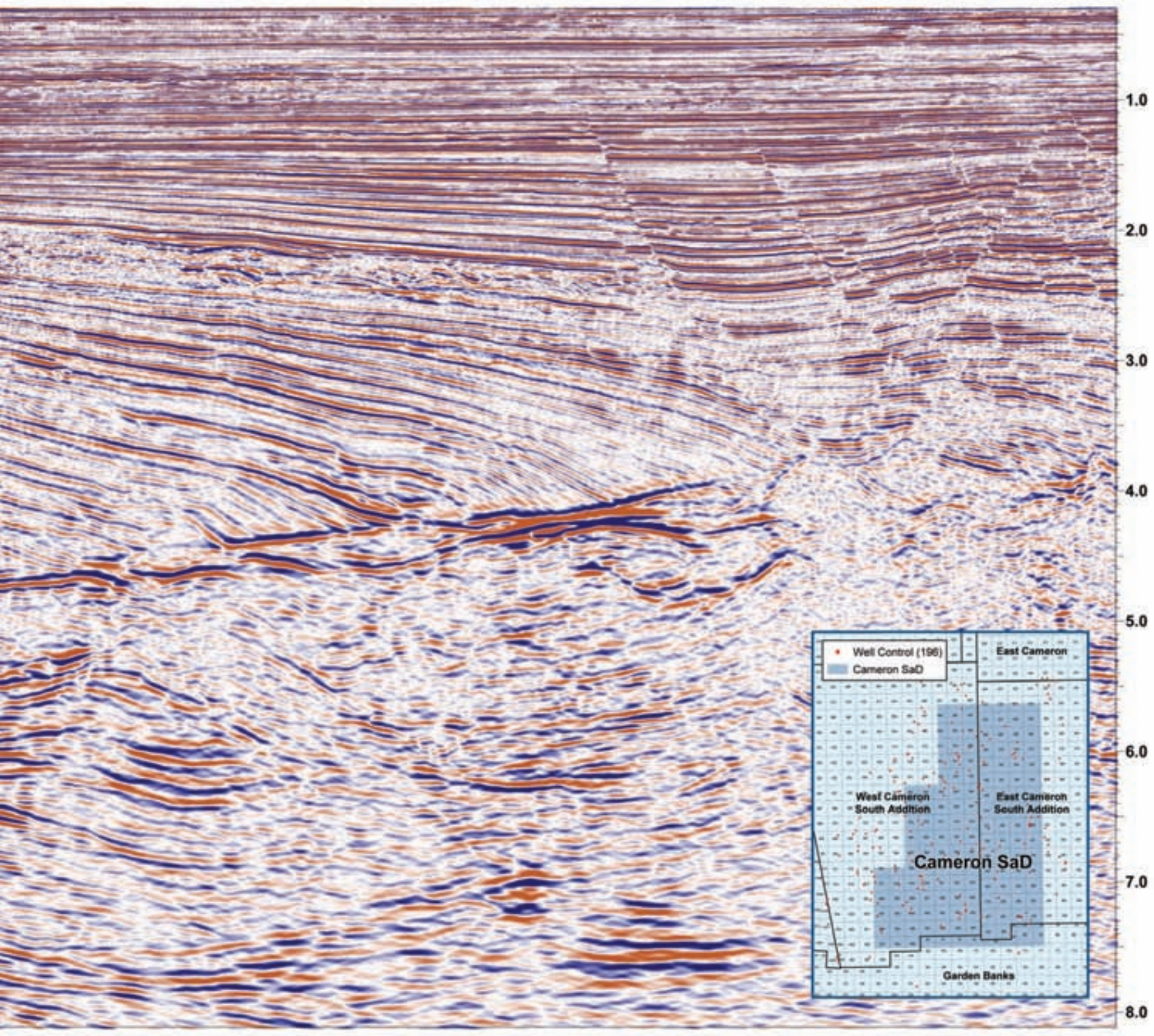
TION 3D PSTM



implemented to refine the velocity model that will be input into the **Anisotropic Kirchhoff Prestack Depth Migration**. For more information and a showing of these data, please contact your TGS marketing representative at: 713 860-2100.

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Passion Play: I

Big crowds, big emotions proc

There was plenty of "passion" on hand in Denver at this year's AAPG Annual Convention and Exhibition, but that's only part of the story.

The rest of the story? There also were plenty of people.

Despite a stressed global economy as well as dark clouds over the industry for the first half of the year, the 2009 ACE brought together 7,452 enthusiastic oil and gas professionals from nearly 90 countries – the third largest number of convention attendees since the 1993 meeting in New Orleans.

"I was thrilled that our registration and attendance was as strong as it was," said Randy Ray, Denver's general chair. "Because of economic challenges and the swine flu outbreak we were conservative with our projections, but we exceeded our expectations significantly."

Hosted by the Rocky Mountain Association of Petroleum Geologists and built on the theme "A Passion for the West Lives On: Are You In?" the conference featured more than 1,000 oral and poster presentations over three days, in addition to field trips and short courses spanning a week.

More than 260 exhibitors also were on hand to demonstrate the latest technologies and services available to the E&P industry – an offering that generated considerable traffic and excitement throughout the meeting's three full days.

An unconventional All-Convention Luncheon "talk show" format had Scott Tinker and Bill Fisher asking questions of investor and geologist T. Boone Pickens.

The same can be said about the meeting's official start.

The opening session, in

Denver Rocks

...oduce a Rocky Mountain high

addition to drawing a standing-room-only crowd to the large Four Seasons Ballroom, featured entertainment, videos, emotional moments and inspiring words that brought much applause and excitement to the event.

The "traditional" opening started in a non-traditional way, featuring the sounds of the award-winning Rocky Mountain Children's Choir and a surprise premiere showing of the "We Are AAPG" video (see related story, page 36). The session also featured words from Ray, a video sneak peek of Rio – destination for the 2009 International Conference and Exhibition – Scott Tinker's inspiring presidential address and the emotional honors and awards ceremony.

"This year's Opening Ceremony was very professional – just light years beyond what I've seen in the past," Ray said. "Scott Tinker's talk was just outstanding and reminded everyone that we are the minds that imagine the future."

Session highlights included:

✓ Tinker, after first describing the current global energy environment and noting the challenges looming in the coming decade, called on all to take personal responsibility for the world's energy future.

"Efficiency and diversification are vital," Tinker said. "We can and must be more efficient across the board in the way we use energy. As with stocks or real estate, the more diverse our energy options, the more secure we are."

He described some of the options.

"There "likely will be a growing electrification of the vehicle fleet," Tinker said. "Although it is difficult to know, thoughtful studies indicate that plug-in hybrid vehicles – those that run on liquids and electricity – represent a reasonable transition path to a more efficient car and light-truck

> "We were conservative with our projections, but we exceeded our expectations significantly."

See **Denver**, page 34

The opening session was a crowd-pleaser.

Scott Tinker with award winner Susan Landon.

Denver Mayor John Hickenlooper, an AAPG member, tells the Division of Professional Affairs luncheon of his journey from earning a bachelor's in English literature to becoming a successful geologist, a brewpub pioneer and ultimately one of Time magazine's top five big-city mayors. His secret for success: Build relationships, put together a good team, avoid petty fusses and look for new ways of thinking to create solutions.

We (or, at least, our resources) are not alone: Jeffrey Kargel gave an out-of-this-world presentation to the Energy Minerals Division's luncheon, when he talked about "Unconventional Far-Out Petroleum and Gas: Hydrocarbons from Mars to Titan and Beyond." There are, he said, a lot of great, practical reasons for knowing what the solar system holds.

Mike Jacobs, geoscientist with Pioneer Natural Resources, tells a Division of Environmental Geosciences luncheon group how his work on a Montana remediation effort turned from a potentially sour confrontation to a multi-agency, public/private cooperative effort. His team members were among those who were awarded the Department of Interior's Environmental Achievement Team Award for their work on the project.

Denver

from page 33

future. The electricity must come from somewhere!

"Alternative energies – solar, wind, tides, waves and geothermal – can and must grow. My forecast doubles alternatives approximately every seven years; no easy task. These are not limited by resource – there is plenty of wind and sun – but rather by efficiency, economics, kinetics, thermodynamics, resource limits and technology, energy density and infrastructure. Quite simply, wind, waves, tides, biomass and solar are low-density 'fuels' that require a tremendous amount of infrastructure and Earth surface area, given current technology.

"A grand challenge in energy involves major improvements in electricity storage and smart, efficient transmission grids," he said. "Battery technology has advanced, but batteries are still relatively inefficient, expensive and chemically intensive, and thus they represent an environmental challenge."

Tinker concluded that "we must build a bridge into the future.

"Given these challenges, the transition from a fossil-energy present to an alternative-energy future will take time," he said. "As with the building of any bridge, a solid foundation is vital. That foundation is fossil fuels.

"I am often asked, 'How we can reach the policy makers?' Perhaps it is not the policy maker who needs to be reached, as policy makers are simply instruments of the voting public. Poorly informed policies result from a poorly informed voter.

"If you want to influence a policy maker," Tinker said, "educate her voter base."

(Tinker's complete speech can be found online at www.aapg.org/denver/video.cfm; and a video of the presentation.)

✓ The annual honors and awards presentation ended with presentation of the Sidney Powers Memorial Medal to Marlin Downey – an emotional moment introduced by his daughter, Julie Garvin.

"What elevates and differentiates Dad beyond the

continued on next page

A big Denver draw – this year's Discovery Thinking Forum.

Matson, Braunstein Awardees Announced

The best paper and poster award winners have been announced for the AAPG Annual Convention and Exhibition in Denver.

✓ The George C. Matson Award, presented for the best oral presentation, goes to **Barbara Tilley**, with the University of Alberta, Edmonton, Canada, for the paper "Isotopic Evidence for Fault-Induced Gas Mixing in Sweet Spots of the Sukunka Gas Field, Western Canadian Foothills."

Her co-authors were Pradeep Bhatnagar, Scott McLellan, Bob Quartero and Byron Veilleux, all with Talisman Energy, Calgary; and Karlis Muehlenbachs, with the University of Alberta.

✓ The Jules Braunstein Award, presented for best poster presentation, goes to gaduate student **Nikki Hemmesch** and her adviser, **Nick Harris**, both with the Colorado School of Mines, for "Sequence Stratigraphic Architecture for the Late Devonian Woodford Shale, Southern Permian Basin, West Texas."

The awards will be presented at the opening session of the next annual convention, set April 11-14 in New Orleans.

* * *

The awards announcement came shortly after Hemmesch died suddenly on July 9 while returning from a Kazakhstan field trip.

Hemmesch, who as president of the AAPG student chapter at Colorado School of Mines had been recognized in Denver as heading one of AAPG's top student chapters, reportedly collapsed upon arrival at the airport in Frankfurt, Germany.

Initial reports from Germany indicated that blood clots in her leg had dislodged and affected her heart. School officials reported she never gained consciousness after her collapse.

At Colorado School of Mines she was a Ph.D candidate in geology and last year's recipient of the school's Robert Burch Graduate Scholarship. During her time at the school she and Harris created the Woodford Shale Consortium, a research group that serves many members of the oil and gas industry. ❑

Photo courtesy of Colorado School of Mines

Braunstein awardee Nikki Hemmesch

continued from previous page

level of a highly successful businessman is his regard for the human element of this business," Garvin said. "He may have been the first to come out with the notion of the value of people, back when the exploration staff was just considered a large overhead expense and the first thing cut during tough times."

Garvin quoted a "landmark" paper Downey wrote in 1992: "It all begins with people … profitable exploration requires wise investment of risk capital in people's ideas," he wrote.

"You can use all sorts of fancy risk management techniques, but if applied to poor exploration ideas (it) will not create an iota of value," she said. "And in order to create great exploration ideas, you must invest in people and provide an environment that stimulates innovation."

After a brief video presentation of Downey's personal experiences and professional career, Garvin said "as a public figure, this is how we've seen him as both the professional, and the man. But from my perspective, it's his incredible warmth, down to earth style and his unquestionable honor and integrity that makes us all feel very lucky to be associated with him."

"It's why we honor him today."

(A video of Garvin's presentation and Downey's acceptance of the Powers award can be found online at www.aapg.org/denver/video.cfm.)

Other convention highlights included:

✓ All-Convention Luncheon speaker T. Boone Pickens spoke to a record luncheon audience of 1,200-plus about the future of energy, using an interactive Q&A format.

"(It) was wonderful," Ray said. "The interview style went very well, and of course T. Boone Pickens is very entertaining to listen to."

✓ The Michel T. Halbouty Lecture featured Guilherme de Oliveira Estrella, director of exploration and production for Petrobras, who gave a comprehensive look at the company's exploration history and hopes for the future.

✓ Division of Professional Affairs Luncheon speaker John Hickenlooper, geologist-turned brewpub pioneer and current mayor of Denver, talked about public service and ways to become involved.

✓ This year's Management Forum, offering a business-world look at the profession and industry, featured Pete Carragher, BP's vice president of geoscience and exploration; Mehmet Uysal, the Turkish Petroleum Corp.'s president and CEO; Lynda Armstrong, Shell's technical vice president; Abdulla Al Naim, Saudi Aramco's vice president of exploration; Sue Payne, ExxonMobil Exploration's resource operations manager; Mike Bahorich, Apache's executive vice president and technology officer; and Fernando Aguilar, CGG Veritas' president-Eastern Hemisphere. ❑

Congratulations went to Herve Kplohi of Cote d'Ivoire, the grand-prize winner of the Explore the Floor contest. He won a new 2009 PT Cruiser on the final day of the 2009 Annual Convention and Exhibition in Denver.

The room was packed for Guilherme de Oliveira Estrella's Halbouty lecture.

Students and young professionals made their presence known in Denver.

wwwUpdate

Videos Capture Denver Moments

By JANET BRISTER
AAPG Web Site Editor

Scott Tinker's presidential address in Denver must have been quite powerful, because the requests to see it online have been numerous and often.

You asked for it. You got it – and a lot more, too.

AAPG has established a YouTube channel (YouTube.com/AAPGWeb), marking the beginning of our official AAPG video collection.

✓ The first video clip to be posted was the one-minute, 14-second (1:14) recording of Tinker interacting with AAPG student members just outside the student lounge in the exhibit hall in Denver – an informal, spontaneous gathering, with Tinker answering several of the students' questions.

✓ The second clip posted was the 2:44 movie of "We Are AAPG," debuted at the annual meeting's opening session to an enthusiastic response. This AAPG-produced video already has been viewed over 700 times. It is one that many AAPG members and affiliates may want to incorporate into their meetings and presentations.

✓ Next comes the presentation of the 2008 Imperial Barrel Awards – an 8:35 clip that captures the excitement and energy of the evening.

✓ All these are followed by Tinker's address to attendees at the opening session, divided into three parts for easy, segmented viewing.

"We Are AAPG" (above) and the Sidney Powers Medal acceptance (right) are included in the AAPG video collection.

Tell Your Friends

If you want someone to look at the video, simply direct them to YouTube.com/aapgWeb or instruct them to go to YouTube and search on "AAPG" or "AAPGWeb."

So, what about a copy for your own use?

It's evident that many people are viewing the "We Are AAPG" video, based on YouTube's report of 700-plus viewings. It was prepared for the use of our membership. It's ideal for opening or closing a presentation – especially for a non-AAPG audience. It's just under three minutes in length and presents a positive message about AAPG.

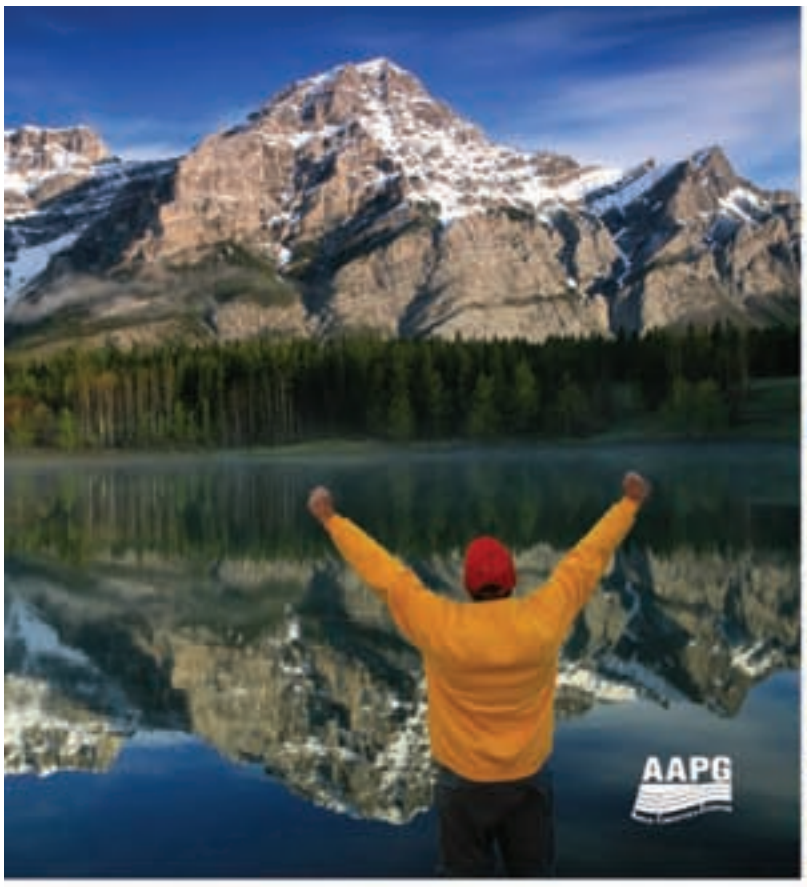
So, with this presentation and other video on the AAPG site we have established a Video Vault – all video prepared by AAPG that is posted to YouTube by the AAPG Web team also will be available for download.

Video that is peppered throughout our Web pages will be collected there as well.

You can find the Video Vault at www.aapg.org/videos/. Two video formats are provided: QuickTime (.mov) and Windows Media Player (.wmv).

All you have to do is click on your preferred format and save the file somewhere on your computer.

Good browsing! ❑



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WASHINGTONwatch

The 'Sausage' of Climate Change

By DAVID CURTISS
GEO-DC Director

"To retain respect for sausages and laws, one must not watch them in the making."

– Otto von Bismarck

As is often the case with legislation in the U.S. Congress, it takes a crisis to pass it. Absent a handy crisis, a looming Congressional recess can usually provide the necessary motivation to get legislation to the floor for a vote.

That is what happened before Congress left for its July 4 holiday, with the House of Representatives narrowly passing the American Clean Energy and Security Act of 2009 by a vote of 219 to 212. Forty-four Democrats voted against it and eight Republicans voted in favor.

The Waxman-Markey bill, as it's often referred to, is named for its primary authors, Energy and Commerce Committee chairman Henry Waxman (D-Calif.) and Energy and Environment subcommittee chairman Edward Markey (D-Mass.).

It didn't look likely to come to a vote ahead of the July 4 recess. Just a week earlier, on June 19, Majority Leader Steny Hoyer (D-Md.) stated on the House floor, "At this point in time, I have no reason to believe that it's going to be on the floor next week, but I want to make it clear to the members that work is being done as we speak on this bill."

That work largely consisted of breaking deadlocked negotiations between Waxman and Agriculture

Curtiss

Committee chairman Collin Peterson (D-Minn.) over how the bill's allocation of emissions credits (often called offsets) would affect farmers. Roll Call, a Capitol Hill newspaper, quoted Peterson on June 19 saying that the negotiations on the offsets "by and large blew up last night."

But Waxman is known in Congress as a skilled tactician and consummate legislator. By the following Monday he had a deal with Peterson that gave authority for allocating agriculture offsets to the U.S. Department of Agriculture rather than the Environmental Protection Agency.

That was enough to secure Peterson's vote for the bill – along with that of many Agriculture Committee members.

The deal was essential to the passage of the bill, because House Democrats needed the Agriculture Committee Democrats to vote for it, but that alone would not suffice. During the week Waxman negotiated with other representatives, tweaking the bill here and there such that it would garner their support. Every stakeholder group was part of the action.

The New York Times reported that these changes included projects to "bring home the bacon" to various legislators' districts, such as a $50 million hurricane research center coming to the district of a junior Florida representative, or $1 billion in new energy job training and energy efficiency funds allocated to the district of a Congressman from Illinois.

To be fair, this type of activity is not unusual – it's called legislating. It is the complicated and often unsavory process our nation uses to develop the body of law that governs our society.

But it also brings to mind Bismarck's famous likening of legislating to sausage making.

Major provisions in the bill include:

✓ A federal renewable energy standard of 15 percent by 2025.

✓ Boosts to energy efficiency requirements.

✓ A federal cap and trade system to curb greenhouse gas emissions.

✓ Programs to deal with the effects (mostly financial) of transitioning to a clean energy economy.

All four of these provisions were in the original draft legislation, but were modified as part of the negotiations.

There were two significant changes that had the bill's supporters grousing that the resulting legislation had lost its teeth:

✓ One was the reduction in the federal renewable energy requirement from 25 percent by 2025 in the original draft to 15 percent in the final bill. This was at the behest of southeastern states that do not have large amounts of qualifying renewable energy, and would have been forced to import such energy from other states to meet the standard.

✓ The second major change was to the cap-and-trade scheme initially allocating 85 percent of the emission allowances to industry groups for free, as was done in Europe, rather than auction them to the highest bidder. This should prevent a rapid increase in prices for carbon-intensive fuels or industries.

The bill now moves to the Senate, where Sen. Barbara Boxer (D-Calif.), chair of the Environment and Public Works Committee, is holding a series of hearings to draft a Senate climate change bill. They will undoubtedly use much of the House bill as a guide.

The objective is to pass a bill out of the Senate by September. That is ambitious, because the Senate remains backlogged with political appointments yet to be confirmed for the administration, confirmation of Supreme Court Justice nominee Sonia Sotomayor and the annual appropriations cycle that (in theory) should be concluded by Sept. 30.

But if the political will remains, it is possible.

* * *

Can a climate bill pass the Senate?

Yes, but not easily.

It will be tough to get 60 votes, even though Democrats now control 60 seats in the Senate. There are 16 Democrats in the Senate who have historically been skeptical about climate legislation, and there are a handful of Republicans who are likely to support such legislation. It will be difficult to assemble that coalition; expect more sausage making in the months ahead.

Sen. John Kerry (D-Mass.), chairman of the Senate Foreign Relations

continued on next page

Let's Go Talk To Congress At geoCVD

The Washington Advocacy Group, a subcommittee of the DPA Government Affairs Committee, is dedicated to helping AAPG members engage in the policy making process. Its goal is to create opportunities where AAPG members can use their scientific and technical expertise about the energy geosciences to educate and inform decision-makers.

One such opportunity is the Geosciences Congressional Visits Day (geoCVD), set for Sept. 15-16 in Washington, D.C., where we join with the American Geological Institute and many of its member societies.

Over the course of two full days we will receive updates on current legislative issues and meet with policy makers and their staff to discuss issues of concern to AAPG members.

If you work in industry or academia, you are invited to join us. Contact David Curtiss (202-684-8225) to reserve your spot.

Please note that AAPG does not provide funding for members' participation at geoCVD, but Divisions and Sections can consider sponsoring one or more of their members to ensure representation.

– DEBORAH SACREY
Chair-Washington Advocacy Group

continued from previous page

Committee, is taking a global view. According to Bloomberg.com, Kerry believes the Senate can muster 60 votes to pass climate change legislation. He is much less certain they can get 67 votes to ratify an international treaty in December in Copenhagen to replace the Kyoto Protocol.

Of course, it's not just up to the Senate. The public also factors into the political calculus, and according to a July 1 poll by Scott Rasmussen:

✓ 56 percent of Americans polled say they are unwilling to pay higher prices for clean energy and to combat global warming.

✓ 21 percent are willing to pay an extra $100 per year.

✓ 14 percent are willing to pay more than that.

Consequently, as veteran political pundit Charlie Cook explained in his *National Journal* column (June 29, 2009), "Winning major policy debates often comes down to which side better defines or frames the issue. With the House's razor-thin passage of the climate change bill … the fight now becomes which side will succeed in winning public support for its take on the legislation.

"Will the public see it as a long overdue first step toward reversing dangerous changes in our climate, as President Obama and Democrats would like to frame it? Or is it a massive tax increase with grave implications for our fragile economy, the case made by most Republicans?"

Do you have an opinion on this issue? Have you expressed that opinion to your elected officials? How about to your friends, co-workers and neighbors?

I've said before that representative democracy is an active, not a passive, pursuit. You get the government you deserve.

Perhaps now is the time to get personally involved, and encourage your friends to do likewise. ❑

GEOPHYSICALcorner

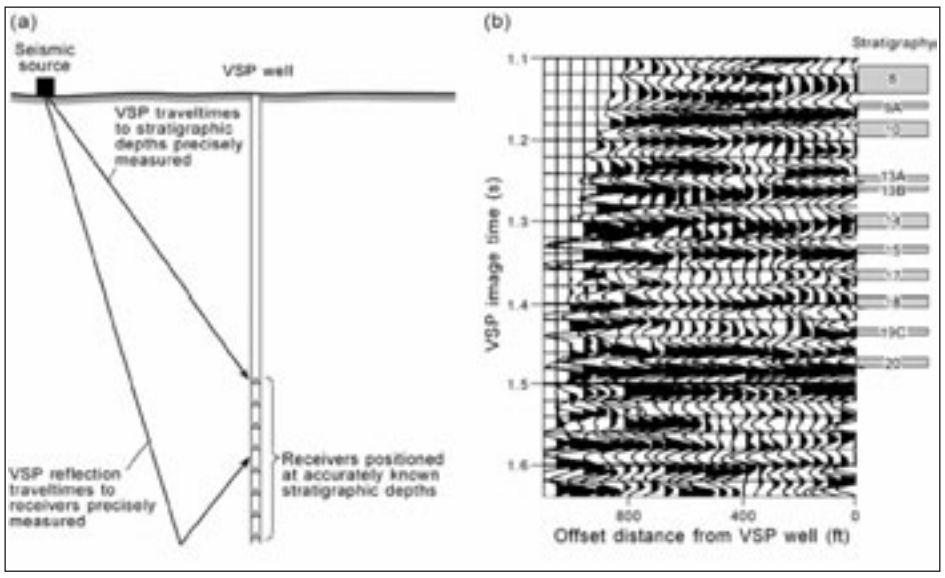

Figure 1 – Concept of VSP depth-to-time calibration. VSP data are unique in that they are the only seismic data that are recorded simultaneously in the two domains that are critical to geologic interpretation: straigraphic depth and seismic reflection time (a). As a result, specific stratigraphic units – known as a function of depth from well log data – can be precisely positioned in their correct VSP image-time windows (b). With the exception of unit 8, each reservoir labeled here is a thin-bed penetrated by the VSP well. When the VSP image is shifted up or down to better correlate with a surface-recorded seismic image, the VSP-defined time window that spans each thin-bed unit should be considered as being welded to the VSP image, causing the stratigraphy to move up and down in concert with the VSP image as an optimal match is established between the VSP and seismic images.

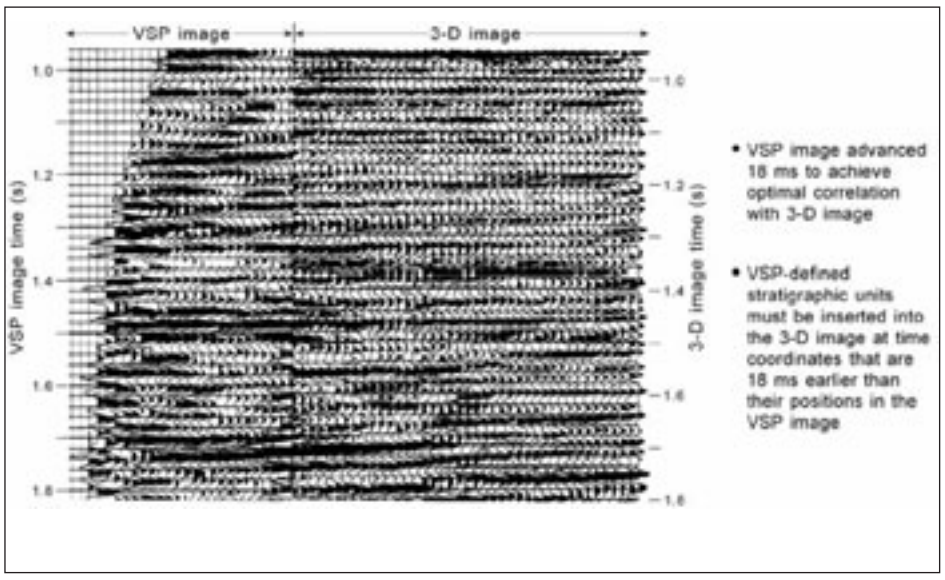

Figure 2 – VSP-based calibration of thin-bed stratigraphy in 3-D seismic image space. The rigid welding of stratigraphic depth to VSP image time described on figure 1 is used here to interpret a 3-D data volume. In this example, the VSP image from figure 1b must be advanced (moved up) by 18 ms to optimally align with the 3-D seismic image. Because the stratigraphy penetrated by the VSP well is welded to the VSP image, the positions of the stratigraphic time windows in the 3-D image must also move up by 18 ms. The fact that VSP technology provides not just a time-versus-depth calibration function but also an independent image that can be time shifted to correlate with a surface-recorded image is the unique feature that makes VSP calibration of stratigraphy to 3-D seismic image time more reliable than check-shot-based stratigraphic calibration.

Welding Geology to Seismic Images

Up-Down: Matching VSP, 3-D movements is the key

(The Geophysical Corner is a regular column in the EXPLORER, edited by Bob A. Hardage, senior research scientist at the Bureau of Economic Geology, the University of Texas at Austin. This month's column deals with welding geology to seismic images.)

An interpreter often has to shift a VSP image up or down relative to a 3-D seismic image to determine an optimal match between the two images.

By BOB HARDAGE

Vertical seismic profiling (VSP) is a measurement procedure in which a seismic sensor is lowered to a sequence of selected depths in a well by wireline, and at each of the downhole receiver stations that sensor then records the downgoing and upgoing seismic wavefields produced by a surface-positioned source (figure 1).

Hardage

An important concept to understand regarding VSP imaging is that VSP recording geometry causes the stratigraphy at a VSP well – where sequence boundaries are known as a function of depth from well logs and core control – to be welded to the VSP image, which is known as a function of VSP reflection time.

This welded relationship between stratigraphy and a VSP image results because VSP receivers are distributed vertically through geologic image space, allowing both stratigraphic depth and seismic travel time to be known at each downhole receiver station.

This dual-coordinate domain (depth and time) involved in a VSP measurement means that any geologic property known as a function of depth at a VSP well can be accurately positioned on, and rigidly welded to, the time coordinate of the VSP image (figure 1).

The reverse situation also is true; the VSP image can be accurately positioned on, and welded to, the depth coordinate of the stratigraphic column at a VSP well.

This latter option of transforming a VSP image to the stratigraphic depth domain is not done as often, because the usual objective of prospect interpretation is to insert stratigraphy into 3-D seismic data volumes that are defined as functions of seismic image time, not as functions of stratigraphic depth.

* * *

A VSP image and a 3-D seismic image often have different time datums, because the images were made by different contractors who used:

✓ Different depth datums for the time origin.

✓ Different replacement velocities to move source stations to this depth datum.

✓ Different illuminating wavelets.

As a result, an interpreter often has to shift a VSP image up or down relative to a 3-D seismic image to determine an optimal match between the two images.

The concept of a welded bond between a VSP image and the stratigraphy at a VSP well means that whenever an interpreter moves a VSP image up, say by 20 ms, to better correlate with a 3-D seismic image, the stratigraphy moves up by the same amount (20 ms) in 3-D seismic image space.

Likewise, if the VSP image has to be moved down to create an optimal waveform character match with the 3-D data, then the straigraphy shifts down by the same amount in the 3-D seismic volume.

The fact that VSP data provide an independent image that can be moved up and down to find an optimal match between VSP and 3-D seismic reflection character is the fundamental property of the VSP-to-seismic calibration technique that establishes the correct time shift between 3-D seismic image time and VSP image time.

When the time shift between the 3-D seismic and VSP images is determined, then the correct time shift between the 3-D seismic image and the stratigraphy at the VSP calibration well is also defined, because that stratigraphy is welded to the VSP image and moves up and down in concert with the VSP image-time axis.

* * *

An example of a VSP-based stratigraphic calibration of a 3-D data volume is shown as figure 2. This VSP image is the same one displayed in figure 1 and was produced from a large-offset VSP survey where the source was positioned 600 meters (2,000 feet) from the receiver well.

The fact that stratigraphy is welded to the VSP image, causing stratigraphic interfaces to move up and down in concert with the VSP image during the VSP-to-seismic image calibration process, is what ensures that targeted thin-bed units are positioned in the correct time windows in the 3-D seismic volume when an optimal alignment is established between the VSP and 3-D images.

In figure 2, this VSP-based interpretation procedure leads to the conclusion that although the tops of thin-bed units 19C and 15 are positioned at VSP image times of 1.432 s and 1.333 s, respectively, they have to be inserted into the 3-D data volume 18 ms earlier in image time at 3-D image times of 1.414 s and 1.315, respectively.

Note that this interpretation procedure leads to the conclusion that:

✓ Some thin-bed units correlate with peaks in the 3-D volume.

✓ Some thin-beds are associated with troughs.

✓ Some thin-beds are positioned on zero-crossings of the 3-D wiggle-trace data.

However, for each thin-bed unit we can be sure that we have defined the proper 3-D seismic data window at the VSP calibration well, where seismic attributes can be calculated to study the distribution of each thin-bed reservoir throughout 3-D image space. ❑

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Leaders: Alan Carroll, University Of Wisconsin, Madison, WI; Meredith Rhodes Carson, Geofuels LLC, Madison, WI

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September 24 - October 1 / Begins and ends in Grand Junction, CO
Leaders: Keith W. Shanley, Consultant, Denver, CO; J. Michael Boyles, Shell International E&P, Houston, TX

Modern Terrigenous Clastic Depositional Environments
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REGIONS&sections

Wanted: Data Sets For Barrel Award

(Editor's note: Regions and Sections is a regular column in the EXPLORER offering news for and about AAPG's six international Regions and six domestic Sections. Contact: Carol McGowen, AAPG's Regions and Sections manager, at 1-918-560-9403; or e-mail to cmcgowen@aapg.org.)

The AAPG Imperial Barrel Award has had two years now of dramatic growth and enthusiasm. Teams for universities all around the world are looking forward to competing each year in their sectional and regional programs, all hoping to make the final at the AAPG Annual Convention and Exhibition.

With more schools participating, the need for more datasets to be used in the program continues to increase.

An IBA dataset comprises a 3-D survey (of 400 to 1,000 square kilometers), 2-D data (1,000 to 5,000 kilometers) and a minimum of four to six wells with full suites of wireline logs.

The dataset can be anywhere and does not have to be located over existing production.

The IBA Technical Subcommittee gratefully accepts any donation of a dataset – and works to ensures that all datasets are fairly matched for universities to use for the IBA program.

If you have a dataset and can make a donation, or have any questions related to the datasets for the IBA program, contact Steven Veal at dcxresources@btinternet.com, or at the AAPG European Office in London at +44 (0) 207-434-1399.

We need your help to continue to present a quality IBA program.

* * *

Three AAPG Sections and one Region are making final preparations for their annual meetings as the fall meeting schedule nears.

Upcoming Region and Section meetings are:

✓ Eastern Section – Sept. 20-22, Evansville, Ind.

✓ GCAGS – Sept. 27-29, Shreveport, La.

✓ Mid-Continent Section – Oct. 10-14, Tulsa.

✓ Europe Region – Nov. 23-24, Paris-Malmaison, France.

Details on all meetings can be found online at www.aapg.org/meetings.

* * *

The theme of this year's Eastern Section meeting is "Forging the Future from the Past," reflecting the challenges in exploring, developing and responsibly utilizing energy resources in the Section's mature basins.

The technical program – 76 oral and poster presentations are scheduled – emphasizes unconventional natural gas resources, with technical sessions on Devonian black shale's, coalbed methane, reservoir geology and new carbon sequestration research.

Also offered are:

✓ Three workshops – Geophysics and Geology Applied in Industry, a student workshop presented by Fred Schroeder of ExxonMobil; and Appraising Shale Gas Reservoirs and Appraising Coalbed Methane Reservoirs, both led by Creties Jenkins, past president of AAPG's Energy Minerals Division.

✓ Three PTTC-sponsored field trips – a pre-meeting trip on the New Albany Shale; a trip to Pennsylvanian-age coal deposits in Indiana and eastern Illinois to examine the paleoclimate and depositional features that created mineable coal deposits; and a post-meeting field trip to Middle Devonian carbonate reservoir strata exposed in east central Indiana.

The Geneva Dolomite is host to prolific fields in Illinois and Indiana. Spectacular corals, other fossils, and dissolution features that provide reservoir analogues will be seen.

Space is limited for field trips and workshops, so early registration is encouraged. For details go to www.esaapg2009.org.

* * *

A full-day symposium on the Haynesville and other shale plays will kick-off the GCAGS annual meeting, built on the theme "A Fusion of Geology and Technology."

The symposium will feature 17 talks that assess in detail the Haynesville, Marcellus, Woodford and other shale plays.

Field trips are:

✓ Midway Formation and Wilcox Group (Paleocene) Contact.

✓ Chemard Lake Lignite Lentil – A Paleocene Upper Deltaic Interdistributary Swamp Environment.

✓ Haynesville Shale – Natural Gas Producton from an Unconventional Resource.

For details go to www.gcags2009.com. ❑

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The names that appear here are of those who have made donations to the AAPG Foundation in the past month–predominately through adding some additional monies on their annual dues statement.

To these people, and to those who have generously made donations in the past, we sincerely thank you.

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15 percent were 'Leavers'

Women Weigh-In on Workplace

By CAROL McGOWEN
Regions and Sections Manager

The results of AAPG's PROWESS Work Force Retention Survey analysis have been announced, providing a clearer and more complete picture of the industry's demographics, its workplace climate and its support of women and general employee satisfaction.

The survey goals were:

✓ Assess the industry workplace climate for women.

✓ Identify industry practices that support working women and contribute to employee satisfaction.

✓ Provide recommendations for future action.

The survey identified the big climate issues in industry, with an emphasis on workplace conditions, retention and reclaiming of lost talent.

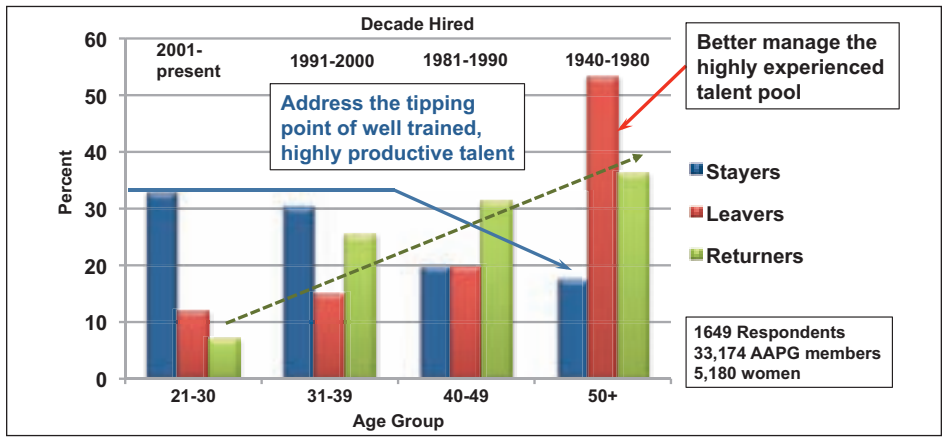
The survey, designed by the PROWESS (AAPG Professional Women in Earth Sciences) committee, offered quantitative multiple-choice questions with opportunities for qualitative comments. The target audience was degreed women geoscientists of all ages and stages of a career in the energy industry, regardless of their current employment status.

Findings focused on respondents' perceptions of:

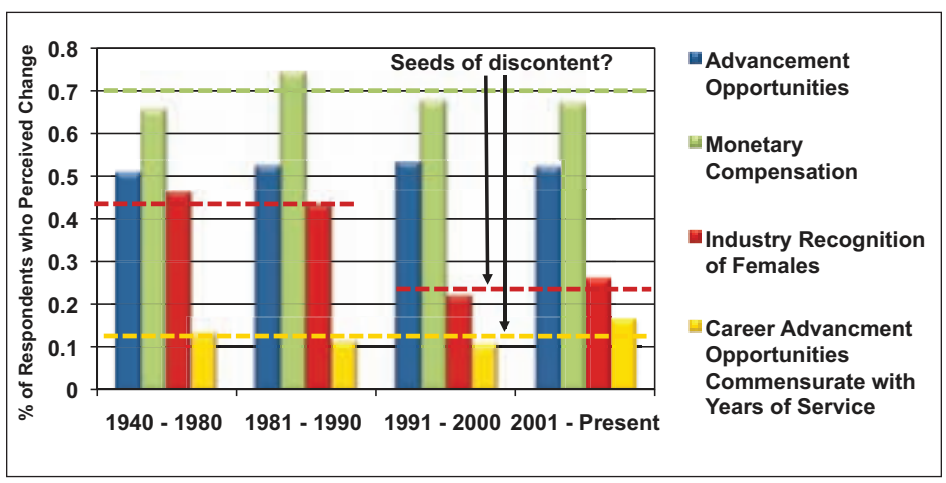
✓ The rewards and challenges of working as a geoscientist in the petroleum industry.

✓ The factors that would help to retain women in the field.

✓ The work climate for women in the industry.



(73%) Stayers – Geoscientists currently employed in industry, academia or government.
(15%) Leavers – Former employees who left the industry.
(12%) Returners – Industry employees who left, then returned after a time.



PROWESS Survey results gave a picture of perceived challenges in work climate.

PROWESS At Work

Denise Cox and Edie Allison, co-chairs of the Professional Women in Earth Sciences Committee, and AAPG staff liaison Carol McGowen reported the PROWESS Work Force Retention Survey findings at the recent AAPG annual convention in Denver.

The survey results were first presented to the AAPG Executive Committee during its June 6 meeting and again the following day to the AAPG Corporate Advisory Board.

The results were then presented to the membership at large at the PROWESS luncheon in Denver, to its record audience of 170.

Chandra Muller, Christine Williams and Jessica Dunning-Lozano, Department of Sociology, University of Texas at Austin, led the audience through their analysis of the survey data.

– CAROL McGOWEN

✓ Whether the work climate for women has improved, declined or not changed since the respondent first entered the industry.

Surveys were e-mailed to all AAPG members and posted on the AAPG Web site, with members asked to forward the survey to other women geoscientists including co-workers, friends, university alumni, etc.

Ultimately the survey was

continued on next page

continued from previous page

administered to approximately 1,850 women geoscientists who are currently working or have previously worked as geoscientists in the petroleum industry. Of those who started the survey, 1,700 (about 90 percent) completed the survey.

The age range of the respondents was fairly equally balanced among the decades: 21-30 (27.1 percent); 31-40 (27.5 percent); 41-50 (20.6 percent); 51-60 (22.5 percent); 61-plus (2.4 percent).

As a point of reference, as of July 1, 2009, total AAPG membership was 33,174, with female membership totaling 5,180.

Full reports are available from the AAPG Web site (www.aapg.org; click on Membership, then Professional Women to access links to all AAPG PROWESS survey documents and presentations); or, for the next 30 days, look for the link to survey under "Today's News."

Survey Analysis

❒ Are you a Stayer, Leaver or Returner?

Survey respondents can be divided into three main groups on the basis of their employment status within the industry at the time of survey:

✓ Stayers are geoscientists currently working in the industry, academia or government who have never left (73 percent of respondents).

✓ Leavers are former employees who subsequently left the industry (15 percent of respondents).

✓ Returners are those who returned to work in the industry after having been out for a time (12 percent of respondents).

By comparing the decade of entry into the industry work force with their employment status, the data showed that Stayers tend to be younger (21 to 39) and more likely to have entered the industry in the last decade, since 2001.

Overall, the majority (63 percent) of survey respondents entered the field in the last two decades, since 1991. The leavers and returners predominantly entered the industry prior to 1980.

❒ Perceived Rewards.

Respondents were asked: What are the most rewarding and challenging aspects of working as a geoscientist in the energy industry?

Overall, the scope of work, opportunities for making an intellectual contribution and monetary compensation were seen as the most rewarding aspects of a geoscience career in the energy industry. In other words, they valued rewarding work for rewarding pay, regardless of when they entered the industry.

However, those who entered the industry more recently tended to identify monetary compensation as important; those with more experience found the opportunity for intellectual contribution to be more important, but also need to be perceived as having intrinsic value to the company.

❒ Perceived Challenges and Reasons to Leave.

What are the biggest challenges women face in the workplace?

See **PROWESS**, page 48

Today's Lesson: Be Prepared to Change

Julie A. Kupecz opened her keynote address for the AAPG PROWESS luncheon in Denver with a hypothetical question:

"Why do I love my job?"

Kupecz, Shell E&P's senior technology adviser for carbon capture sequestration, was speaking on "Career Ownership and Personal Opportunity in Today's Industry: Redefining Success."

Kupecz

She illustrated her point with a map of the world, punctuated with dots on every continent where she had lived, worked or traveled – and reflected on her career path choices.

Kupecz grew up in Grand Junction, Colo., and spent summer days climbing around on the rock outcrops as a child. Her love of the outdoors and aptitude for math, science and art motivated her to look at geology as a career path.

"Geology is perfect for me," she said, "as it incorporates technical, observational and creative skills."

But picking geology as the right career path was not the end of Kupecz' story. The reality of a career choice in the energy industry is change – often without warning. And with change comes the opportunity to redefine oneself.

From Arco Alaska, Kupecz transferred to a research lab in Plano, Texas. Then after many rounds of layoffs, she took a package and set herself up as a consultant, spending five years in Venezuela. From there, her family returned to the United States and Kupecz was hired on with Anadarko, and then with Shell.

After a time as Grosmont subsurface venture manager, she moved to the CO_2 group as senior technical adviser for the Americas.

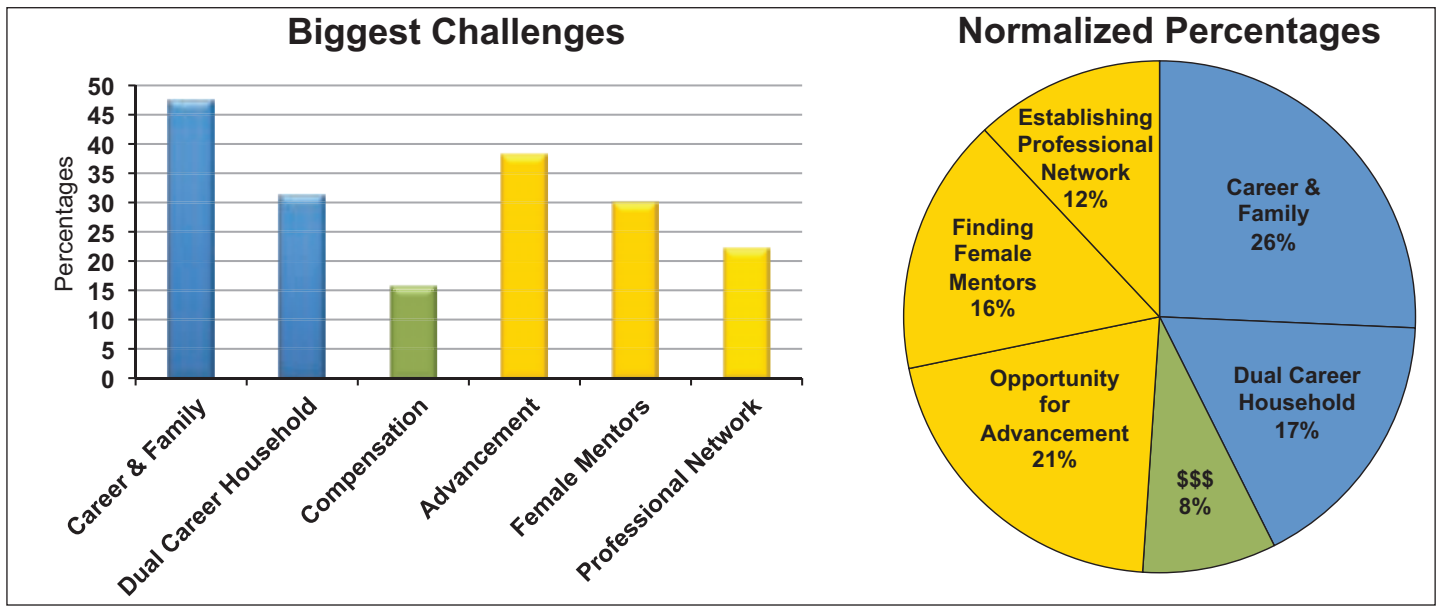
Her advice: "Don't be afraid to move, but be smart about it."

And to demonstrate this life lesson Kupecz quoted a statement from Charles Darwin:

"It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change."

She would know.

– CAROL McGOWEN



Main challenges: 43 percent of selected responses are “work-life balance” issues; 49 percent selected “work climate” issues.

PROWESS

from page 46

From a “select all that apply” list, respondents’ selections can be broken into work-family balance issues (43 percent of respondents) and work climate issues (49 percent of respondents).

Under the category of work-family balance, 47 percent of respondents identify the greatest concern with balancing career and family, and 31 percent selected dual career households.

Work climate issues selected by respondents include lack of opportunity for advancement (38 percent), lack of female mentors (30 percent) and lack of a professional network (22 percent).

Compensation was the least selected (16 percent of respondents).

Why do women geoscientists leave the petroleum industry?

The respondents’ perceptions were weighted more toward work-life balance issues, with 78 percent selecting balancing family and career, and 13 percent citing lack of support for a male spouse.

Work climate issues were raised, with 21 percent citing lack of advancement and 15 percent citing lack of industry recognition.

Other responses on this “select all that apply” question included 8 percent who changed careers, 2 percent with health issues and 6 percent noting “other.”

❒ Changes and Improvements in the Workplace.

When asked, “How do you think the industry has changed since you entered it?” predictably those who entered longer ago perceived the most change. Flex time, working remotely, monetary compensation and advancement opportunities were seen as having changed the most for those with the longest time in industry.

To those who entered the industry in the last two decades, recognition of females and career advancement commensurate with years of service have changed little.

For all respondents, money and advancement opportunities are perceived to have greatly improved BUT not in proportion to years of service. Perceived industry recognition of women is alarmingly low for newer hires.

When “leavers” were asked what would motivate them to return to industry, job flexibility was at the top of the list of incentives. Similarly, 75 percent of all survey respondents said that improvements in flexible work options such as part-time work, job sharing or working remotely and a work culture that truly supports these choices would help retain women geoscientists in the energy industry.

Not to be ignored are the more than 40 percent of women who identified better career opportunities as a motivating factor to return to the petroleum industry.

* * *

Full reports of the PROWESS Work Force Survey are available on the AAPG Web site – click Membership, then Professional Women to access links to all documents and presentations. ❑

Survey Responses Raise New Questions

Coming soon: Phase 2 will pinpoint perceptions

Why do some women stay and some leave the profession? AAPG's survey provided some answers, but more data is needed.

By CAROL McGOWEN
Regions and Sections Manager

While this first phase of the PROWESS Work Force Retention Survey is not absolutely conclusive, there are implications worth thoughtful consideration.

✓ Brain Drain.

The survey indicated "leavers" are older (50-plus) and presumably have more industry experience. Despite the obvious correlation to downturns in the petroleum industry, survey analysts surmised that if the AAPG PROWESS survey is indicative of the industry overall, then talent management policies may be responsible for an unnecessary loss of geoscientists with experience.

At a critical stage for the petroleum industry – when the best minds are needed to both extend the world's reserves of oil and gas and help transition the world from fossil fuels to alternative energy sources – a revision of employment practices that encourage experienced workers to stay may be in order.

✓ Tipping Point.

Workers between the ages of 21 to 39 who were hired since 1991 have consistently stayed in the industry. In general, the percentage of workers who have stayed in the industry drops significantly in the group aged 40 and older.

This trend suggests a need to address the challenges facing newly-trained and highly productive geoscientists at the tipping point of 10-20 years of experience.

Next Phase Recommendations

The AAPG Corporate Advisory Board endorsed plans for a follow-up survey – its endorsement and input are helping shape plans for a "phase 2" survey, designed and conducted by experienced survey professionals.

Human Resource departments of key industry companies have offered to work with AAPG to provide input on the kind of work force information they need to adequately address workforce retention issues.

Phase 2 recommendations from both the University of Texas at Austin Sociologists and the Corporate Advisory Board include:

✓ Ensure systematic representative sample of ALL industry geoscientists, both men and women.

This involves collecting demographic data with respect to North America and Global petroleum industry locations; data on workplace conditions, work climate and status of women; and longitudinal data about geoscience careers (over time).

✓ Place survey "perceptions" in the context of status in the petroleum industry.

This means capturing the full range of respondents' experience levels from tech support to upper management.

✓ Quantify the value of women geoscientists in the petroleum industry.

✓ Conduct in-depth analysis of potential industry-specific policy solutions – a mixed-method approach of both quantitative and qualitative data. ❑

3-P participants will have the chance to visit the Domodedovo Quarry, a Middle Pennsylvanian (Moscovian) shallow marine cyclic carbonate succession.

Sept. 30-Oct. 2

Meet to Explore Polar Potential

Online registration continues for AAPG's inaugural 3P Polar Petroleum Potential conference, which will provide an intense and comprehensive look at the geology and exploration potential of the entire Pan-Arctic area.

Those who register on or before Sept. 1 will receive big savings – up to 50 Euros – on their registration fee.

The conference, sponsored jointly with RosGeo, will be held Sept. 30-Oct. 2 at Gubkin Russian State University of Oil and Gas in Moscow, Russia.

"3P Arctic" is a geological/geophysical conference and exhibition focused on the circum-Arctic basins that are within the Russian, Norwegian, Greenlandic (Danish), Canadian and Alaskan onshore and offshore basins.

The meeting will bring together for the first time the professionals and experts working on these regions, with a technical program comprising 15 sessions, 130 oral presentations and 25 poster sessions.

The conference's main themes include:

✓ Resource and Exploration Potential of Petroleum Provinces within Russia, Canada, Norway, Greenland and Alaska Basin.

✓ Tectonic and Paleogeographic Evolution of the Arctic in the Phanerozoic.

✓ Circum-Arctic Plate Tectonic Models.

✓ Geodynamic Modeling of the Arctic Margins.

Also being offered is a one-day, pre-conference field trip to the well-known Domodedovo Quarry, about 15 kilometers south of Moscow.

The Domodedovo Quarry is a Middle Pennsylvanian (Moscovian) shallow marine cyclic carbonate succession in central part of the East European Platform.

Participants will be able to observe a 30-plus-meter cyclic succession of Late Carboniferous shallow-water carbonate rocks deposited in a marginal part of a vast epicontinental marine basin that existed over most of the East European Craton 295–312 Ma.

It is a nice example organizers say, of the shallow marine environment of the Late Paleozoic icehouse world, influenced by glacioeustatic fluctuations of sea-level as well as one of the classical sections of international Moscovian Stage abundant in macro- and microfossils.

The Moscovian beds are overlain by lowermost Kasimovian, demonstrating important changes in sedimentation and marine biota during transition from Middle to Upper Pennsylvanian.

The rocks are abundant with brachiopods Choristites, calcareous sponge Chaetetes, colonial tetracoral Petalaxis. The sponges and tetracorals do not cross Moscovian/Kasimovian boundary. Tiny Foraminifera (fusulinids) and phosphatic conodonts as biostratigraphic markers are abundant in some beds. Secondary dolomitization is common feature in the quarry.

Close to the quarry are underground mines with more than 200 kilometers of tunnels excavated in white Moscovian limestones on the right bank of the Pakhra River as early as XV century. These and similar limestones from the Moscow region were used for construction of all Russian orthodoxies churches in Pre-Mongolian period and for walls and houses of the "White Stone" Moscow.

The trip will be led by Alexander Alekseev, geological department professor at Moscow State University. Lunch will be at the Gorki Estate, where the participants can visit the memorial museum and park.

Gorki Estate dates to the end of the 18th century, although the museum was opened in 1949. It holds a unique complex of archaeology, historical and architect monuments and the remains of relict forest.

Meeting information, lodging and visa instructions plus technical program details can be found at the 3P Web site, http://www.3parctic.com/modules/content/index.php?id=1. ❑

PROFESSIONALnewsbriefs

James Beer, to petroleum exploration manager-South Oman, Petroleum Development Oman, Muscat, Oman. Previously exploration geologist, Shell Sarawak Berhad, Miri, Malaysia.

Julio de la Colina, to team leader-reservoir modeling, Chevron Energy Technology, Houston. Previously senior staff geologist-new ventures oil sands, Chevron Canada Resources, Calgary, Canada.

Randall Cooper, to senior technical consultant and manager of operatonal petrophysics, Marathon Oil, Houston. Previously senior technical consultant, Chevron Indonesia, Jakarta, Indonesia.

Harold Davis, to senior geologist, Repsol, The Woodlands, Texas. Previously senior geological adviser, Devon Engergy, Houston.

Richard Easley, to asset manager Anadarko deep, Linn Energy, Oklahoma City. Previously geological and geophysical manager, Linn Energy, Oklahoma City.

Robert Hobbs, to chief executive officer, TGS, Houston. Previously chief operating officer, TGS, Houston.

Peter S. Joslin, to general manager-Texas operations, Venoco, Houston. Previously exploitation manager, Venoco, Houston.

Lorcan Kennan, to research structural geologist, Shell, Rijswijk, Netherlands. Previously geologist, Tectonic Analysis, Duncton, England.

Todd Lapinski, to senior geologist, BP Libya, Tripoli, Libya. Previously exploration geologist, BP America, Houston.

James C. Peterson, to exploration geologist, Beacon E&P, Denver. Previously consulting geologist, Orion Energy Partners, Denver.

Brad Watts, to manager-unconventional resources, Hess Corp., Houston. Previously senior geological adviser-unconventional resources, Hess Corp., Houston.

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

IPTC Registration Opens

A record number of papers have been received and the technical program is now in place for this year's multi-disciplinary International Petroleum Technology Conference (IPTC), which will be held Dec. 7-9 in Doha, Qatar.

The IPTC call for papers attracted a record number of 1,128 papers submitted, the highest amount ever to be received in the history of the IPTC.

The final program, built around the theme "World Energy Challenges: Endurance and Commitment," consists of nearly 600 papers, representing 130 companies from 35 countries.

"The response has been unprecedented and we applaud our industry colleagues for making such a valuable contribution to the development of the oil and gas sector," said Khalid Al-Hitmi, manager-gas development at Qatar Petroleum and co-chairman for the IPTC program.

"All 52 technical topics we initially proposed for the event will be addressed – and due to the caliber of the papers, we have added a further six technical discussions so that delegates truly get the most out of the conference."

ITPC is sponsored by AAPG, EAGE, GPA, SEG and SPE.

Online registration for ITPC is available at www.iptcnet.org/2009. The early bird registration deadline is Oct. 19. ❑

Nominees Sought For 2010 TOTY

The new school terms are about to begin, which means it's time for Sections and local societies to start thinking about nominations for the AAPG Foundation's annual Teacher of the Year award.

Each year the Foundation awards $5,000 to honor "Excellence in the Teaching of Natural Resources in the Earth Sciences" by the top K-12 teacher.

The award comprises $2,500 to the teacher's school – for the winning teacher's use – and $2,500 for the teacher's personal use.

The winner will receive an expense-paid trip to the AAPG Annual Convention and Exhibition, where the award is presented during the All-Convention Luncheon. This year's meeting is April 11-14 in New Orleans.

Foundation officials see the TOTY program as "an opportunity to offer something of significant appeal to teachers in your area, to get some interaction going and to give local recognition to a teacher and to the teaching of Earth science.

Societies and Sections are "free to choose their awardees in whatever manner they wish," officials said, although final nominations to AAPG should use the form found online at foundation.aapg.org/toty/index.cfm

The deadline for submitting Section nominees to Tulsa is November 1.

For more information contact Angela Taylor at ataylor@aapg.org. ❑

MEMBERSHIP& certification

The following **candidates** have submitted applications for membership in the Association and, below, certification by the Division of Professional Affairs. This does not constitute election nor certification, but places the names before the membership at large.

Any information bearing on the qualifications of these candidates should be sent promptly to the Executive Committee, P.O. Box 979, Tulsa, Okla. 74101.

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

Colorado
Gianniny, Gary L., Fort Lewis College, Durango (R.H. Dott, K. Miskell-Gerhardt, T.A. Casey); **Powell, Jason Allen**, Samson Resources, Centennial (C.A. Burshears, R.K. Gray, J.L. Daniels); **Wood, Mark Randall**, Weatherford Laboratories, Evergreen (L.L. Wray, T.E. Ruble, M.T. Walker); **Xu, Guangping**, Colorado State University, Fort Collins (N.F. Hurley, E.A. Erslev, J.L. Hannah)

Mississippi
Johnson, Charles G., McGowan Working Partners, Jackson (J.B. Furrh, R.T. Hines, D.J. Hughes)

Texas
Blythe, Nathan O., Marathon Oil, Houston (N.M. Rigg, E.J. Valek, J.J. Helmich); **Calvert, Craig**, ExxonMobil Upstream Research, Houston (J.K. Miller, G.S. Benson, D.F. Kosich); **Cullen, Terry R.**, OMNI Laboratories, Midland (reinstate); **Decesari, Robert Charles**, ExxonMobil, Houston (R.A. Livieres, D.L. Vixo, W.A. O'Neill); **Francis, Jason Michael**, Chevron Energy Technology, Houston (M.W. Quearry, T.W. Dignes, R.A. Welch); **Gevirtz, Joel Leo**, Halliburton Consulting, Houston (reinstate); **Hildick, Alice M.**, ExxonMobil, Houston (R.B. Wheeler, S.L. Gibbins, A.R. Liesch); **Hou, Anning**, Explora Seismic Services, Katy (K. Marfurt, F.J. Hilterman, B.L. Gidman); **Ingles, Dennis L.**, Nexen Petroleum, Plano (J.B. Wagner, J.J. Coryell, W.A. Spears); **Johnson, Laura**, Geoscience Earth & Marine Services, Houston (M.J. Kaluza, D.R. Phu, E.W. Janes); **Lynn, Richard Dale**, Grayson County College, Sherman (C.R. Ossian, P.A. Scholle, P.S. Mozley); **Olopade, Olabisi Adetola**, ExxonMobil, Houston (E.O. Olopade, I.O. Arowolo, S.O. Akande); **Shmyglya, Dmitry**, ExxonMobil, Houston (A.W. Schnacke Jr., J.C. Tingey, A. Korneva)

Utah
Vanden Berg, Michael David, Utah Geological Survey, Salt Lake City (S.M. Carney, C.D. Morgan, T.C. Chidsey Jr.)

Algeria
Ait El Djoudi, Schahrazede, Sonatrach, Algiers (D.E. Thomas, R.S. Tye, H.W. Peace); **Artebasse, Fatima**, Sonatrach, Kouba (D.E. Thomas, R.S. Tye, H.W. Peace)

Bangladesh
Elahi, Md. Maqbul-E-, EMRD, Dhaka (A. Shamsuddin, J.J. Lambiase, P.M. Lloyd)

Canada
Gonzalez, Carlos Alberto, CG Kryztal Consulting, Calgary (T. Hurley, J. Vandenbrink, G.D. Turcotte); **Russel-Houston, Jen**, Osum Oil Sands, Calgary (P.E. Putnam, M.C. Pagan, C.R. Tippett)

Democratic Republic of the Congo
Lukidia, Benjamin Lukombo, Universite De Kinshasa, Kinshasa (M.R. Mello, Y.F. Sun, M. Kalubi)

England
Bhattacharya, Robin, independent consultant, Hereford (J. Redfern, N.M. Hardy, P. Copestake); **Keym, Matthias**, IGI Ltd., Bideford (C. Cornford, B. Horsfield, R. di Primio)

France
Bennaceur, Kamel, Schlumberger, Paris (S. Rueff, M. Verliac, S.W. Tinker)

Germany
Joppen, Thorsten, Schlumberger, Aachen (D. Palmowski, G.J. Port, B.P. Wygrala)

continued on next page

Certification

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

Petroleum Geologist

Indiana
Gene A. Gebhart, geologist, Evansville (R. Sumner, J. Smith, R. Snyder)

Ohio
Jason F. Henthorne, geologist, Wooster (L. Wickstrom, S. Zody, J.G. Henthorne)

Texas
Ellya Saudale, senior geologist, Houston (R.K. Cornell, R.J. Amstadt, W. Xu)

FOUNDATIONupdate

Corporation Members Re-Elected in Denver

Six Members of the AAPG Foundation Corporation were re-elected as regular members at the group's recent meeting in Denver during the AAPG Annual Convention and Exhibition.

Regular members re-elected to five-year terms were:

- ❒ Robert J. Ardell.
- ❒ Byron F. Dyer.
- ❒ Donald A. O'Nesky.
- ❒ John W. Shelton (who also was honored in Denver by the Foundation with the Chairman's Award).

Regular members re-elected for three-year terms were:

- ❒ James A. Gibbs.
- ❒ William E. Gipson.

The members of the corporation's next meeting will be April 12, in New Orleans, during the 2010 AAPG convention.

* * *

In other Foundation news, a new memorial grant has been established through a generous contribution from AAPG past president, Honorary Member and past Foundation Chairman **Larry Funkhouser** and his wife, **Jean Stoneburner Funkhouser**, of Palo Alto.

The Roger W. Stoneburner Memorial Grant-in-Aid will provide a $1,000 grant annually to a deserving graduate student selected by the AAPG Grants-in-Aid Committee.

Funkhouser also provided an additional contribution to the James E. Wilson Memorial Grant, which will be awarded in the amount of $500 beginning with the 2010 Grants-in-Aid Program.


Ardell


Dyer


O'Nesky


Shelton


Gibbs


Gipson

For additional information regarding AAPG Foundation programs contact Rebecca Griffin at 918-560-2644. ❑

continued from previous page

India

Bhosle, Balaji, Weatherford Laboratories, Ahmedabad (D.J. Schultz, S.C. Talukdar, D.W. Jordan); **Cornelius, Loreta Gabriel**, Oil and Natural Gas Corp., Mumbai (J. Peters, S.K. Singh, V. Ranjan); **Jain, Mukesh**, Essar E&P India, Mumbai (S.K. Singh, A. Kumar, J.S. Devgan); **Jee, Baban**, Essar E&P India, Mumbai (K. Ashish, S.K. Singh, J.S. Devgan)

New Zealand

Harford, Benjamin John, Crown Minerals, Wellington (R.A. Cook, J.P. Salo, J.M. Beggs); **Van Koughnet, Roderick William**, L&M Petroleum, Wellington (S.J. O'Connor, J.M. Beggs, P.R. King)

Nigeria

Adeleke, Ojo, Pan Ocean Oil (Nigeria), Lagos State (E.O. Olopade, L. Oaiya, O.A. Ajayi); **Adeleye, Kolade Oluwole**, Chevron Nigeria, Lagos (O.E. Ajao, A.R. Ojelabi, I.O. Ogun); **Adepelumi, Adekunle Abraham**, Obafemi Awolowo University, Ile-Ife (A.R. Ojelabi, N. Omorodion, J.K. Agbenorto); **Afolayan, Olufemi Joseph**, Chevron Nigeria, Lagos (I.O. Ogun, J.M. Roth, A.R. Ojelabi); **Aina, Temitope Oluwatosin**, Chevron Nigeria, Lagos (K.A. Fabiyi, G.O. Agunwoke, O.E. Ajao); **Akinyemi, Fisoye**, Chevron Nigeria, Lekki-Lagos (O.E. Ajao, O. Bakare, G.N. Okeke); **Ejika, Emeka Charles**, Chevron Nigeria, Lagos (E.O. Ajao, G.O. Agunwoke, O. Bakare); **Evbotokhai, Paul Ohiolei**, Chevron Nigeria, Lagos (E.O. Ajao, A.R. Ojelabi, O. Bakare); **Fowora, Oluwabamiwa**, Andora Technologies, Ibadan (A.O. Akinpelu, M.L. Afe, O.A. Ehinola); **Ikeneku, Ojiyovwi Alex**, Chevron, Lagos (I.O. Ogun, A.R. Ojelabi, O.E. Ajao); **Lufadeju, Aderinola Olugbenga**, Department of Petroleum Resources, Lagos (A.A. Adesida, A.O. Akinpelu, N. Omorodion); **Mohammed, Bilyaminu Hamza**, Chevron, Lagos (A.R. Ojelabi, O.E. Ajao, A.O. Okeahialam); **Obetta, Kenneth Ofobuike**, Chevron Nigeria, Lagos (O.E. Ajao, I.O. Ogun, A.R. Ojelabi); **Ogedengbe, Oluwatomijogun Opeyemi**, Chevron Nigeria, Lagos (A.I. Akinola, O.E. Ajao, A.R. Ojelabi); **Okorie, Victoria Nneka**, Chevron, Lagos (A.O. Esan, A.O. Okeahialam, O.E. Ajao); **Okpokam, Ekok Ajom**, NNPC-NAPIMS, Lagos (D.S. Sejebor, M.D. Bako, E.O. Olopade); **Olonode, Olusegun Josiah**, Chevron Nigeria, Lagos (O.E. Ajao, G.O. Agunwoke, A.R. Ojelabi); **Oyegwa, Akomeno Daniel**, Chevron Nigeria, Lagos (A.R. Ojelabi, J.M. Roth, O.I. Ogun)

Norway

Sylta, Oyvind, Migris AS, Trondheim (A. Tommeras, R.H. Lander, C. Hermanrud)

United Arab Emirates

Noskova, Natalia Gennadievna, Dubai Petroleum, Dubai (F. Esmaeli, I.E. Ifeonu, F. Chemin) ❑

Commentary

Curriculum Accreditation Needed

By DARREL SCHMITZ

Schmitz

A recent survey overwhelmingly indicates that professional geologists recognize a need for program accreditation in the geosciences and a crucial need to assure and express quality in the educational program for geologists.

In a perfect world, accreditation would not be necessary because a general agreement would exist as to what coursework, content and educational outcomes are needed for the degree; and academic administrations would provide proper resources for degree programs simply because of need.

However, those are not today's reality. As reported by Tepel (2002) and Schmitz (2002), "suggested" curriculum for a geology program has been provided by several different professional groups – AAPG, AIPG and AEG, to name a few.

Hence, program accreditation is desperately needed to establish a quality baseline for educational quality and to provide leverage for resources.

* * *

Without geology degree program accreditation, no benchmark exists as to what a bachelor of science degree should contain. Further, absent accreditation, the public has no means to compare programs or to understand the outcomes of the education.

This has resulted in great variation in curriculum among programs granting geology degrees, reducing the overall credibility of the degree itself. Educational accountability is not measured nor is the essential utility of the degree program evident compared with programs that are accredited.

Academia, former students, employers and state boards of registration/licensure report vast variability in geology curricula. Hence, the following questions are unanswered or unanswerable:

✓ Does the degree ensure enough coursework for the student to be successful in geology graduate programs?

✓ Are there deficiencies in the coursework?

✓ Does the course title on the transcript guarantee that the material in the course was covered adequately?

✓ Students may be admitted to graduate school based on the reputation of the undergraduate degree program. Are students from a less-known program as likely to be admitted?

Employers report a great variety in geology curricula on transcripts. Many employers hire entry-level geologists based upon the reputation of a program and institution, rather than just looking for the degree. This same criteria is applied in graduate school admissions as well.

Many employers report through communications or in forums that the great variety of coursework between different programs is of serious concern.

* * *

State boards of licensure also report the great variety of content found in a geology degree.

Each board reviews the coursework shown on each applicant's transcripts during processing of an application for registration and licensure – not just for the degree itself, but for the content of the coursework. State boards have discovered transcripts/dossiers from graduates of programs that grant a degree in geology from a curriculum whose minimum requirements were 12 hours of geology coursework above the introductory level – about 20 hours total geology coursework.

Is that a sufficient amount of coursework for the degree? If so, then why do other programs require as much as three, maybe four times that much geology coursework? Is that too much?

In the states that have registration/licensure of geologists, the passing of a "fundamentals" examination

continued on next page

A Suggested Solution

Accreditation can be established without the prescriptive nature that was the case decades ago.

It is not necessary to mandate certain courses by specific names, with a specified number of hours, faculty or other resources. Accreditation can be established in a manner that considers content across the curriculum, regardless of the course title or even number of courses, as long as a minimum content is provided.

Today's accreditation can have flexibility in assessing faculty and resources by looking at the faculties' capability in terms of expertise to teach certain content, and number of faculty needed based upon a program's purpose.

Essentially, a degree program faculty unit may establish its objectives (what its graduates will be anticipated to accomplish in the first few years after graduation); it also may establish its outcomes (what graduates know and can accomplish by graduation). Accreditation would be awarded for the program that shows objectives and outcomes being achieved by graduates.

Two or three faculty may be acceptable for a bachelor's degree only program with teaching-only faculty members. Such would obviously not be the case if the program was expected to conduct research. Similarly, resources would be assessed with respect to a program's expectations.

– DARREL SCHMITZ

Entries still sought

Geology Art Shows Set

Geology and the world of art are coming together in two shows designed to celebrate the concept of incorporating geologic principles into artworks.

✓ First up is a show called "Fabric of the Land," a new event which will be held at the University of Aberdeen, Scotland, Aug. 25-Sept. 11.

The show will feature the works of more than 60 artists with creations that relate to the theme "the geology of Scotland." Organizers hope that the show, which they expect to be an annual event, will eventually send exhibits of art and geology throughout Scotland.

✓ A similar event is planned in the United States – and geologists still have a chance to be part of the show.

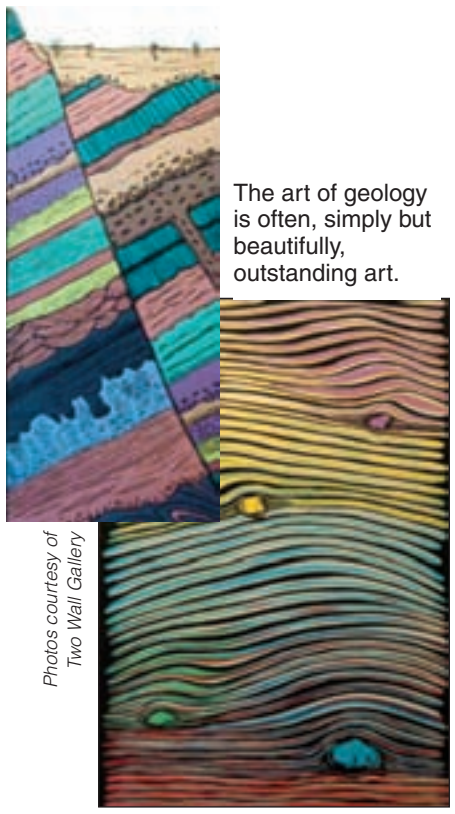
The Two Wall Gallery on Vashon Island, Wash., has issued a "call for artists" who also are geologists (or other earth-related scientists) to submit works for consideration of inclusion in our upcoming show titled "Geo Sapiens – The Fusion of Geology and Art."

The exhibit is planned for November 2009.

The show's theme is centered on the idea of incorporating geologic principles or features in artworks, building upon the observation that earth scientists think in ways that often are different from the general population but that are fundamental to our collective understanding of the universe.

Works that incorporate geology to make definitive statements regarding some issue of relevance to human society are appropriate, as are works that simply celebrate geologic thought.

Works in all media are invited. Entry is open to degreed earth scientists and students studying earth science topics. You do not have to be a practicing or employed geologist to apply. All earth science professionals are included in the invitation.



The art of geology is often, simply but beautifully, outstanding art.

Photos courtesy of Two Wall Gallery

Up to three works may be submitted as slides or on a CD. Works should be available for sale unless other arrangements are made.

For more information contact Greg Wessel at SleepingDogCafe@aol.com.

Submissions will be accepted until Sept. 1.

continued from previous page

is used to ensure a certain minimal level of knowledge was attained as a part of obtaining the registration/licensure. This is necessary is because of the lack of a baseline for curriculum requirements and quality of learning outcomes leading to a geology degree.

Additional evidence of the variety of coursework and content in curricula is provided by former students, from two different perspectives.

✓ One is by exposure to other programs while they are in graduate school. "I can't believe they don't teach that in this program," or "Why didn't my program have that course?" are commonly heard.

✓ Former students also provide evidence from an employee perspective in somewhat similar form: "I am glad we had that course/experience, it has really been a benefit," and "I couldn't believe that my co-worker's program did not have it," as well as "I needed to have that, like my co-worker's program did."

Without degree/program accreditation there is no identifiable baseline for curriculum and for educational outcomes.

Availability of resources further intensifies this situation – budget cuts have resulted in losses of partial or entire programs … but degrees are still being awarded.

How often does a degree with program accreditation get eliminated? Academic administrations flaunt accredited programs.

* * *

Accreditation is needed in today's world not only to provide a quality baseline for educational content, but also to obtain and maintain necessary resources for programs.

Program accreditation for geosciences will assure respect as in other professions and protect academic programs from erosion in challenging economic times. ❑

Editor's note: Schmitz, a 30-year AAPG member, is a geology professor and head of the department of geosciences at Mississippi State University. He also is vice president (and former president) of the Mississippi Board of Registered Geologists and past president of the Association of Environmental and Engineering Geologists (AEG) and National Association of State Boards of Geology (ASBOG).

Darrel Schmitz was joined by several other educators in preparing his commentary – a group that he cited for its expertise but also its diversity.

"They represent department heads and chairs, full professors to assistant professors, tenured and un-tenured, state registered and non-registered," he said. "There is a female and a foreign national. The institutions represented range from large to small and private to public.

"There could have been more contributing authors," he added, "but that did not seem to add any to the diversity."

A list of the co-authors can be found in the online August EXPLORER.

INmemory

AAPG member Michael P. Harris and his wife, Anne, were among the 216 killed when Air France Flight 447 crashed in the Atlantic June 1 on a flight scheduled from Rio de Janeiro to Paris.

Harris, 60, had started with Devon Energy as a Houston-based contractor in 2004 and became a full-time employee there in 2006, according to the company. He moved from Devon's Houston office to Rio de Janeiro in July.

Harris and his wife were headed to Europe for a seminar in Barcelona followed by a vacation in Paris.

He graduated from Clemson University in 1972 with a bachelor's degree in geology, joined AAPG in 1976 and was a member of the Division of Environmental Geology.

* * *

Nikki Hemmesch, this year's Jules Braunstein Award winner for best poster at the Denver annual meeting, died July 9 in Frankfurt, Germany. See related story, page 35.

Ewart M. Baldwin, 93
Eugene, Ore., May 2, 2009
Logan W. Cary, 79
New Orleans, May 11, 2009
Jack O. Colle, 93
Houston, June 5, 2009
Edward F. Durkee, 80
Las Vegas, June 1, 2009
Matthew Edmonds, 34
Tulsa, June 11, 2009
A.J. Field, 85
Ventura, Calif., Jan. 25, 2009
Ralph J. Gray, 85
Monroeville, Pa., March 2009
Michael P. Harris, 60
Spring, Texas, June 1, 2009
Nikki Hemmesch, 30
Golden, Colo., July 9, 2009
Francis L. Hill, 82
Portales, N.M., April 3, 2009
Gordon R. Hinz, 81
Houston, May 5, 2009
Tor Finn Kristensen, 57
Zagreb, Croatia, Feb. 7, 2009
Marvin D. Mangus, 84
Anchorage, Alaska, Feb. 20, 2009
Brian J. O'Neill, 54
New Orleans, June 26, 2008
Ernest P. Otto, 59
Denver, June 13, 2008
John H. Palsgrove, 85
Calgary, Canada, Jan. 29, 2009
William W. Patton Jr., 86
Menlo Park, Calif., June 2, 2009
James B. Richter (EM '54)
Highlands Ranch, Colo.
James H. Ruffin, 77
Houston, Jan. 16, 2009
Lorin J. Rulla, 75
Midland, Texas, April 26, 2009
Terry A. Scowcroft, 63
Houston, Feb. 23, 2009
M.H. Vaughn (AC '51)
Norman, Okla.
James B. Veteto, 84
Hobbs, N.M., March 8, 2009
Donald F. Weber, 75
Ocala, Fla., April 14, 2009
Darol J. Wigham, 78
Calgary, Canada, April 17, 2009

(Editor's note: "In Memory" listings are based on information received from the AAPG membership department. Age at time of death, when known, is listed. When the member's date of death is unavailable, the person's membership classification and anniversary date are listed.)

EMD

from page 58

"Diffusion Theory" to explain that early in the life cycle of new ideas and technologies, only a small percentage of a given population understands and applies this knowledge. Later on, more people accept it based on the experience of those that have preceded them. And finally, nearly everyone embraces this new way of thinking or doing things based on its momentum.

The accompanying diagram (page 58) illustrates how the EMD membership could be classified as the "Innovator" or "Technology Enthusiasts" group within AAPG.

The growing acceptance of the ideas and technologies underpinning the exploration and development of unconventional reservoirs is a good example of diffusion theory in action. Using this model, EMD members represent the innovators who benefit from the early acceptance of this knowledge, and who work to extend this knowledge to others.

The Diffusion Model also predicts that about 15 percent of the total population (innovators and early adopters) need to embrace these new ideas and technologies to help combat the 15 percent skeptics/laggards within the greater population, before there is enough momentum to capture the larger population.

This argues that EMD needs to nearly quadruple its membership to be an effective force for change within AAPG.

If you have this "Innovator" spirit, come join us! You can visit our Web site at http://emd.aapg.org to learn about the benefits of EMD membership – and to submit an application today.

We look forward to welcoming you. ❑

CLASSIFIEDads

POSITION AVAILABLE

University of Arkansas
Tenure-Track Assistant Professor Geosciences

The Department of Geosciences, University of Arkansas-Fayetteville invites applications for a 9-month appointment as a tenure-track assistant professor with an anticipated start date of August 2010. We are seeking an outstanding individual with expertise in broad areas of structural geology and tectonics. Applicants must demonstrate ability and commitment to develop an independent externally funded research program as well as the potential for collaboration and synergism with ongoing research in the Department of Geosciences (http://geosciences.uark.edu). The successful applicant will be an integrated scholar with a strong commitment to teaching at all levels, including possible participation in our required summer field course, in concert with supervision of graduate research.

Review of applications will begin October 1, 2009 and will continue until the position is filled. Applicants should submit their curriculum vitae, brief statements of research and teaching interests, and the names, addresses and contact information for at least three professional references to: Dr. Ralph Davis, Chair, Department of Geosciences, 113 Ozark Hall, Fayetteville, AR 72701.

The University of Arkansas is a nationally competitive student-centered research university located in Fayetteville, Arkansas. It is the flagship campus of the University of Arkansas system. The Department of Geosciences offers bachelors and masters degrees in geology and geography, and participates in two interdisciplinary graduate programs, Space and Planetary Sciences and Environmental Dynamics, providing opportunity for supervision of PhD students.

Fayetteville, nestled in the Ozarks of Northwest Arkansas, is part of a metropolitan area of about 420,000 people that retains its small college town atmosphere. It is the sixth fastest growing metropolitan area in the U.S. spurred by opportunities with national companies including Wal-Mart, Tyson, Inc., and J.B. Hunt. The quality of life is high and it's a great place to work, play, and raise a family.

The University of Arkansas is an Affirmative Action/Equal Opportunity Employer and applications will be accepted without regard to age, race, color, sex, or national origin. Applicants must have proof of legal authority to work in the United States as well as all PhD requirements completed at the time of the appointment. Women and minorities are encouraged to apply.

* * * * * * * * * * * * * * * * * * * *

Western State College of Colorado invites applications for the tenure-track faculty position of Moncrief Chair in Petroleum Geology starting January or August 2010. Teaching responsibilities include courses in an expanded petroleum geology curriculum and core courses in the geology curriculum. Requirements include a doctorate in geology or related field and a commitment to undergraduate education and excellence in teaching. For full position information and application procedures, visit http://www.western.edu/hr/jobs. Applications will be accepted until the position is filled. AA/EOE

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You can reach about 30,000 petroleum geologists at the lowest per-reader cost in the world with a classified ad in the EXPLORER.

Ads are at the rate of $2.90 per word, minimum charge of $60. And, for an additional $50, your ad can appear on the classified section on the AAPG web site. Your ad can reach more people than ever before.

Just write out your ad and send it to us. We will call you with the word count and cost. You can then arrange prepayment. Ads received by the first of the month will appear in the subsequent edition.

DIRECTOR'Scorner

Our Goal: No Geologist Left Behind

By RICK FRITZ

In his first EXPLORER column in July, AAPG President John Lorenz noted that his focus this year will be on "advancing the science."

It's an important message and a key goal for all of AAPG – we know if we can provide the best science possible, then professionals and students will want to join AAPG and contribute.

Fritz

> We know if we can provide the best science possible, then professionals and students will want to join AAPG.

As part of the focus on providing the best science, AAPG is reviewing all of our products and services against the needs of the membership.

For example, we are upgrading AAPG's professional development program through its new Education Directorate. Susan Nash, AAPG's education and professional development director, is working with the Education Committee, Research Committee and the Divisions to build a comprehensive program. The membership of the committees and Divisions provide key resources and guidance for staff to build AAPG's education program.

The following is a list of educational offerings for this new fiscal year:

✓ Fall Education Conference: This year's theme is "The Business of Oil and Gas." It will provide strong offerings of courses designed to help you succeed in quickly changing environments.

✓ Spring Education Conference: The 2010 theme is Unconventional Resources. With four concurrent tracks and courses spread over five days, you have an opportunity to mix and match to meet your needs in shale gas, coalbed methane, resource plays and more.

✓ New short courses: Educational offerings are designed for both new and experienced geoscientists.

New course content focuses on science and technology, with practical applications. New "Getting Started" courses include petroleum geoscience, salt tectonics and more. Courses range from one to five days with various cost levels to provide affordable alternatives.

Please check out our online courses as well as our traditional classroom settings – online courses are an affordable, convenient way for you to obtain education when and where you need it.

✓ e-Symposium series: This is an affordable and convenient new delivery format, great for getting started or expanding your knowledge.

Each e-Symposium course includes a one-hour live interactive webinar combined with a full day of independent study materials, which can be accessed any time, any place. The webinar's archived version also is available after the event, so if you miss the live event, you can access it later. You also can sign up for the archived event after the fact.

Forthcoming topics include 3-D seismic of shale plays, integrated geothermal operations, thermogenic gas, and carbon capture and sequestration, plus new courses on renewable energy such as wind farm operations.

(Remember, if you miss it, you may always sign up for the archived version.)

✓ Geoscience Technology Workshops: AAPG's new GTW program is designed to provide quick-to-market information on hot topics. The format is exciting and dynamic, with an emphasis on sharing real-life experience, case studies, "lessons learned" and new directions.

Several GTW's are planned for the coming year, including those on reserves reporting, unconventional resources and carbon capture and sequestration.

✓ Renewable energy: Stay tuned as we launch new courses, seminars and online certificate programs in renewable energy. Our goal is to provide you up-to-date and relevant education on wind, geothermal, solar, biomass and integrated renewable/non-renewable solutions.

Empower yourself with knowledge in this dynamic, quickly evolving area.

✓ Hedberg Research Conference: This season's first Hedberg Conference will be held on Aug. 16-19 in Vancouver, Canada, titled "Carbon Capture and Sequestration." A second Hedberg is planned on deepwater fold belts on Oct. 4-9, in Tirrenia, Italy.

Hedbergs often are followed by GTWs on similar topics. More Hedbergs are in the planning stage, so watch the calendar for new offerings.

* * *

One of the keys to AAPG's success in building this new professional development program is to find key research – especially cutting-edge research – that can be used to educate AAPG membership and other professionals. To that end, we need more volunteers who are willing to advance the science by sharing their knowledge.

Interested?

If so, please contact Susan Nash at snash@aapg.org – she'll be glad to discuss possibilities and connect you with the right committees.

I know it is hard to find time to invest in professional education when times are good, because you're busy – and when times are slower, it is difficult because of the economics.

AAPG's courses are affordable and good quality.

Take another look. Now is the time to invest in yourself, to expand your skill sets and knowledge base for your future success.

'Innovators' and 'technology enthusiasts'

EMD an Unconventional Resource

By FRANK WALLES
EMD President

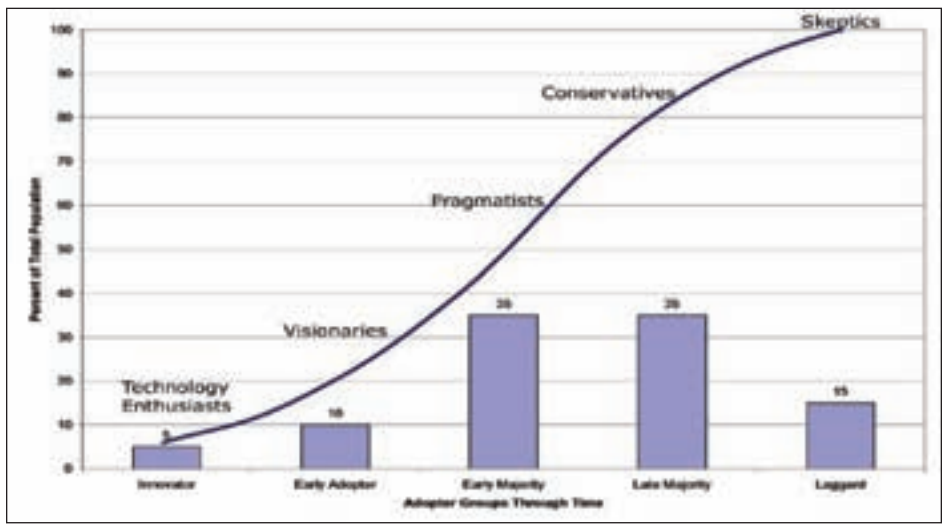
Walles

Are you passionate about unconventional energy resources? Would you like to learn as much as possible about the latest concepts and technologies to explore and develop these?

Then look no further than AAPG's Energy Minerals Division, which has been devoted to unconventionals for over 30 years!

Does this surprise you? It might, because people don't immediately make the link between unconventionals and energy minerals. And that's the key reason for this article – to make AAPG members aware that the EMD should be your unconventional resource.

EMD strives to be a recognized technology and scientific center of excellence of unconventional energy and energy minerals resources within AAPG. We focus on generating and compiling technical information and delivering this to our members in our "Members Only" site and through an ever-expanding number of oral and poster presentations, workshops, conferences, short courses, fieldtrips and publications.



Diffusion Theory as a model for the life cycle of a company or play.

Perhaps you also have noticed the "standing room only" EMD-sponsored and organized sessions at the past three AAPG conventions.

The engine for this information is a set of 12 technical committees, staffed with some of the best and brightest people from industry, academia and government. These committees are focused on:

✓ Tight gas sands.
✓ Gas shales.
✓ Oil sands.
✓ Coal.
✓ Coalbed methane.
✓ Geothermal energy.
✓ Oil shales.
✓ Nuclear minerals.
✓ Gas hydrates.
✓ Geospatial information.
✓ Energy economics and technology.
✓ Renewable energy resources (jointly with the Division of Environmental Geology).

The need for this type of resource has never been greater. Did you realize, for example, that more than 90 percent of the wells being drilled in North America today are completed in unconventional reservoirs? How is it possible that this could be true, and yet only 1,450 of AAPG's 35,000 members (4 percent) belong to EMD?

Perhaps the answer is that EMD members are the innovators, generating and disseminating information on the technical characterization of unconventionals within AAPG. Support for this concept comes from the article "New Ideas and Their Diffusion," published by Art Berman in the November 25, 2006, HGS Bulletin (http://www.hgs.org/en/art/1019/).

Art's paper uses the concept of

See **EMD**, page 57