

AAPG EXPLORER

APRIL 2012



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See page 12



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PRESIDENT'S COLUMN

Welcome to the New, New Digital World

By PAUL WEIMER

My co-authors for this month's column are Steve Laubach, Elected Editor of the AAPG, and AAPG President-Elect Ted Beaumont.

Nobel laureate Niels Bohr putatively wrote that prediction is difficult, especially when it concerns the future. This aphorism applies to AAPG in many ways, but especially to our digital assets.

The continuous evolution of the digital world has made publishing and delivering scientific information an ongoing challenge for professional associations like ours. AAPG's digital information is its most valuable intellectual property. It embodies the scientific learnings that are the core of our value – and we sorely need to update its delivery to members. As a consequence, our Executive Committee has spent substantial time discussing this issue this year. It has become apparent that no one has a clear idea of where this field of digital publications is headed; nobody knows how to develop a sustainable policy for delivering scientific information. Several competing models exist for both commercial and open access. For example, we could partner with commercial entities and let our digital scientific information be delivered through a third-party. Alternatively, we could make all of our digits open access, available to the public.

This issue is important to us personally because all three of us joined the AAPG during the 1970s and 1980s because of the science that it provided to help us in our daily work. Later, our interest in generating the science drove us to become extensively involved because we independently recognized that AAPG is at its very best when it disseminates information about the



WEIMER

The bottom line is that AAPG members should always receive the information they need to practice petroleum geology, whether those data are digital or otherwise.

science of petroleum geology. Prior to the digital world, AAPG (simply) delivered hard-copy publications on a monthly basis. By contrast, these days, almost all professional societies have moved toward digital delivery of all information. For our Association to remain vital scientifically, we must continue to deliver the best scientific information, and do it as quickly and seamlessly as possible for our members.

The question is, how do we best

accomplish a unified digital future? AAPG currently delivers its digital information to members through website download via PDF files, HTML, GIS shape files and geodatabases (vectorized and attributed with data), GIS georeferenced raster images, and GIS ArcReader (freeware format) from seven offerings: AAPG BULLETIN (and other journals), some Special Publications, *Search and Discovery*, EXPLORER, website (including some

divisions), GIS-UDRIL (subscription), and GIS Open-File. Meanwhile, some information is still delivered through hard copy (BULLETIN, EXPLORER, and most Special Publications). These diverse formats reflect AAPG's response over the last two decades to the evolution of digital publishing. The current mix is not ideal. But making changes is challenging because the information is inter-related, exists in different formats, and the technology for search and delivery continues to evolve rapidly. Today's best digital solutions may be expensive. And there is always the risk of premature obsolescence.

We are now reconsidering how to best achieve this unified digital future. Our first assumption, as we've mentioned, is that delivering our scientific information is one of the most important services that we offer members. The second assumption

See President, next page

Voting Continues for AAPG Officer Candidates

Voting continues in the election of new officers for the AAPG 2012-13 Executive Committee.

Ballots were mailed in March and voting will remain open online through the May 15 deadline.

A special AAPG candidate insert was included in the March EXPLORER, offering a convenient compilation of biographies and individual information for all candidates.

Candidate bios, written responses to the question of why they accepted the invitation to stand for office plus video

comments from each candidate, filmed at last year's AAPG Leadership Days event in Boulder, Colo., remain available on the AAPG website.

The president-elect winner will serve in that capacity for one year and will be AAPG president in 2013-14. The vice president-Sections and secretary will serve two-year terms, beginning July 1.

The slate is:

President-Elect

Donald D. Clarke, geological consultant, Lakewood, Calif.

Lee Krystinik, Fossil Creek Resources, Arlington, Texas.

Vice President-Sections

Thomas E. Ewing, Frontera Exploration Consultants, San Antonio.
 Kenneth E. Nemeth, Schlumberger Seismic Reservoir Characterization, Houston.

Treasurer

Rebecca L. Dodge, Midwestern State University, Wichita Falls, Texas.
 Deborah K. Sacrey, Auburn Energy, Houston.

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TABLE of CONTENTS

8 Going up: The three-year trend of rising pay for petroleum geologists continues, according to the newest **AAPG annual salary survey**.

12 It's show time! Science, creative thought and cutting-edge technology are going to be the stars for this month's **AAPG Annual Convention and Exhibition in Long Beach, Calif.**

14 Best of the best: Pioneer researcher Koenraad Weber and past AAPG president Robbie Gries head the list of 37 people who will receive AAPG's highest **honors and awards** in Long Beach.

28 This is a place that's historic, innovative, hugely resourceful and enormously complex. When it comes to energy, **California** has it all.

32 Coexist – often easier said than done, especially when the **exploration industry** is attempting to work in highly populated or environmentally sensitive areas. So how does it work in California?

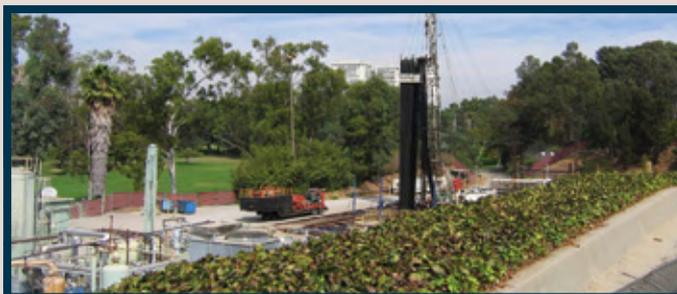
52 The times, they are a-changin' – and Sharon Mosher says if the profession is going to continue to **attract the top student talent** to its ranks, perhaps it needs to be making some changes, too.

REGULAR DEPARTMENTS

Washington Watch.....	56
Historical Highlights	58
Geophysical Corner	60
Making a Difference	62
Spotlight On	68
Foundation Update.....	72
Regions and Sections	76
www.Update	79
Professional News Briefs.....	80
In Memory	82
Classified Ads	82
Director's Corner	83
Divisions Report (DPA).....	83



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ON THE COVER:

The AAPG Annual Convention and Exhibition will be held this month in Long Beach, Calif. – and right up the coast you'll find the famed oil seeps and amazing geology of the Santa Barbara Channel – destination of an ACE field trip. Pictured is a view to the west toward Venoco's Casitas pier in Carpenteria; the outcrop is of shales in the lower part of the Miocene-H Monterey Formation. Photo by Michael Grant Edwards.

This page: Operations in an urban California setting – Hillcrest Beverly Oil's Rancho Park/Cheviot Hills site in Los Angeles.

Prep Continues for Singapore ICE

Organizers are putting the final touches on the program and announcement for this year's AAPG International Conference and Exhibition, set Sept. 16-19 at the Marina Bay Sands Expo and Convention Center in Singapore.

The meeting marks the first time Singapore will host an AAPG ICE venue.

More than 400 oral and poster presentations have been selected for the technical program, which will be organized around five areas:

- ▶ Exploring and Developing Asia-Pacific's Petroleum Provinces.
- ▶ Trap, Source, Reservoir and Seal Definition.
- ▶ The Past Is the Key to the Future.

- ▶ Facing the Future's Challenges Today.

- ▶ New Dimensions in Global Unconventional Resources.

Other special events include:

- ▶ A Discovery Thinking Forum will be held as part of the Singapore technical program – the first time the event has been part of an ICE.

The forum will feature five speakers who will discuss "Important Discoveries and Creative Thinking," with a special focus on Europe and Southeast Asia.

Those speakers are:

- ✓ Arild Jørstad, exploration geoscientist, Lundin.
- ✓ Fred Wehr, exploration and development manager Apache, David

Phelps and Eric Phinney.

- ✓ Bernard Duval, associate professor, IFP.

- ✓ Lawrence D. "Trey" Meckel III, exploration manager and chief geologist, Tately N.V.

- ✓ Sam Algar, vice president-Asia Pacific exploration, Murphy Oil.

- ▶ Scott Tinker, director of the Bureau of Economic Geology and the state geologist of Texas will be speaking at the Featured Speaker Luncheon, discussing "The Global Energy Transition: What Will It Take to Make the Switch."

Registration and the official announcement both will be available in May at www.aapg.org/singapore2012.

President from previous page

is that we have not been keeping up with how many of our members are using the information.

What changes have we begun to implement this year?

- ▶ We are expediting access to the state of the art science in our Association through online publication ahead of print for accepted BULLETIN papers. This will greatly shorten the time between acceptance and a citable paper. A similar procedure will soon be put in place for book chapters. Several of our peer societies have already moved to this model, and we must follow suit.

- ▶ Thorough and constructive reviews are essential for satisfied authors and readers. With a large pool of past and present associate editors who can contribute their experience to this effort, the BULLETIN and the Book series can provide exceptional value for contributors. Steve Laubach summarizes some of these initiatives in a related article in this EXPLORER (see page 78).

- ▶ We are in the initial stages of improving the search capabilities for Datapages, *Search and Discovery*, and the website. This is an essential step towards streamlining access to our science for members.

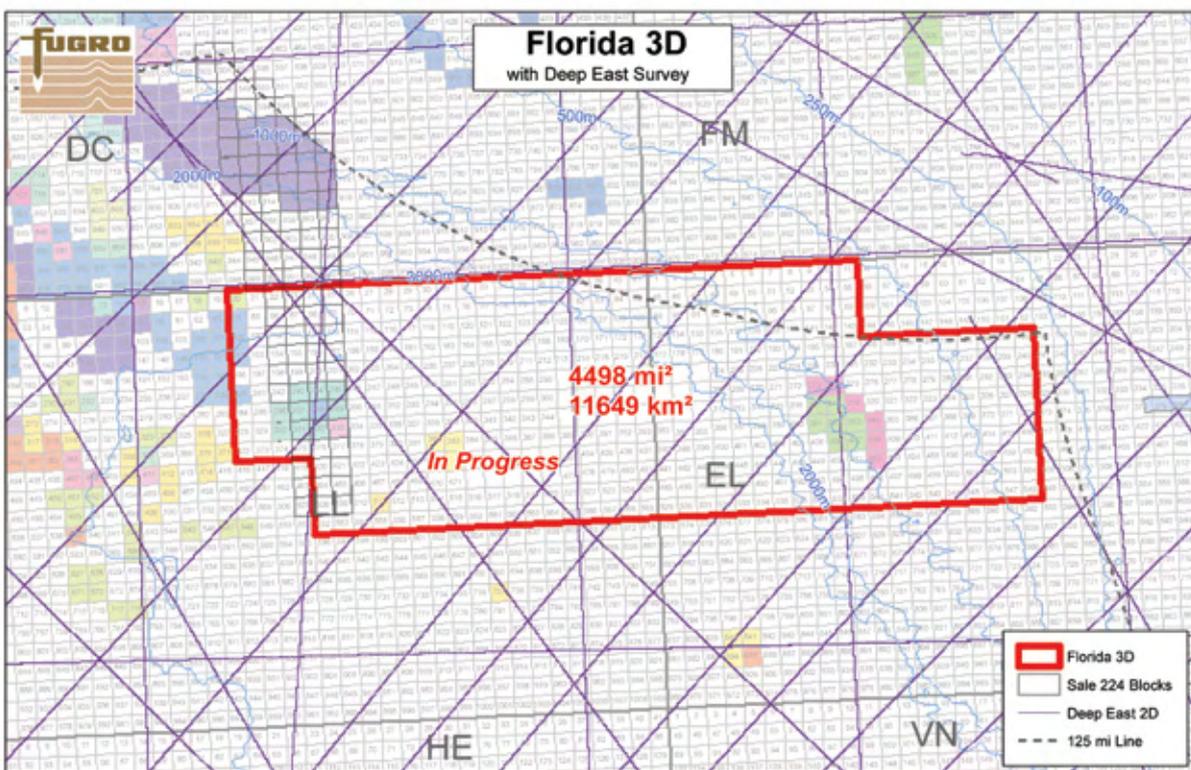
- ▶ A redesign of the website for improved usability is under way. We are bursting at our figurative digital seams. As our content collection grows, it needs to be restructured so that it can be more easily searched. These changes will make popular features like the videos for 100th Anniversary for Discovery Thinking and GeoLegends' interviews more easily found. These changes will be coordinated with revisions of *Search and Discovery*, which is currently attracting 500 new articles per year.

- ▶ Finally, an upcoming change is integrating GIS into all aspects of our deliverables. There are two aspects of this integration. First, we need to make Datapages content searchable in a map context, which is how many of us work. Second, the GIS Committee will seek to publish new documents that are specifically designed for GIS delivery. The GIS Committee already has started delivering some of these new digital GIS products, available on GIS-Open-File; Datapages is also delivering new GIS products, available on GIS-UDRIL and Open-File. We hope to encourage more publications and products of this type and want to develop a useful platform to deliver them.

In summary, as the digital world continues to morph, so will the ways that we access it. The bottom line is that AAPG members should always receive the information they need to practice petroleum geology, whether those data are digital or otherwise. We write this column as a preview to the Annual Convention, and we invite members to speak with us and to attend committee meetings (GIS) or other gatherings, because prediction is a challenge and we value your input. Enjoy the convention – we predict that you will have a great time!

Paul Weimer

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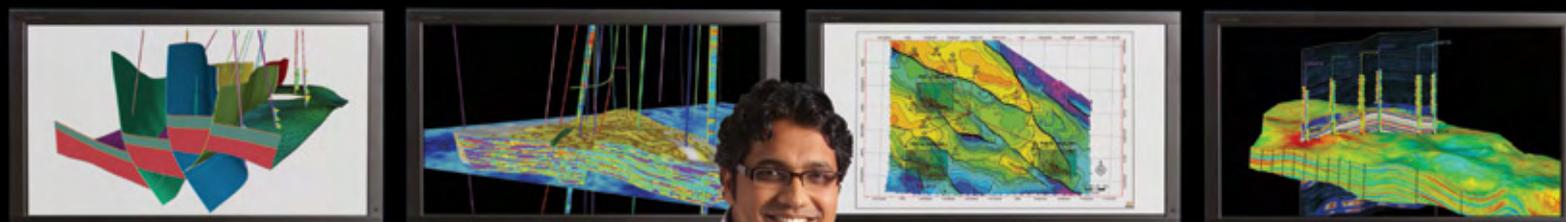
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Incentives beyond salaries coming into play

Geologists' Pay Continues Upward Trend

By LARRY NATION, AAPG Communications Director

With a 15 percent run-up in the salaries for petroleum geologists over the past three years, the AAPG Annual Salary Survey showed the upward trend continuing – with a few interesting caveats.

The weighted overall average salary for petroleum geologists was up 2.3 percent in 2011-12. However, take a look at who's getting what – and how.



AYLING

Mike Ayling, of MLA Resources in Tulsa, who has conducted the annual salary survey for AAPG since 1981, said the largest increases came in the high-demand 10-14 year experience group, with 10.3 percent hike in pay, and the 15-19 year experience group showing a whopping 28.1 percent gain.

Interestingly, the 25-plus year group showed a 3.3 percent decline. However, Ayling noted that the negative salary number is a bit misleading.

"This may be partly explained by a much lower maximum salary for the group," Ayling said, "but is also reflective of a change toward incentive compensation for highly paid individuals. Bonuses and participations can often exceed base salaries for this group."

2012 Geological Salary Survey

YEARS EXPER	HIGH	AVERAGE	LOW
0-2	\$ 110,000	\$ 98,700	\$ 85,000
3-5	128,000	109,400	90,000
6-9	207,000	137,300	107,000
10-14	195,000	153,400	113,000
15-19	238,000	193,600	144,400
20-24	270,000	199,200	150,000
25+	300,000	199,600	150,000

Average Salary By Degree

YEARS EXPER	B.S.	M.S.	Ph.D.
0-2	\$ 88,500	\$ 99,000	\$ 108,300
3-5	90,000	91,500	121,800
6-9	133,000	118,300	207,000
10-14	120,000	159,800	147,300
15-19	-----	196,000	191,200
20-24	175,000	187,500	270,000
25+	186,700	209,200	190,500

Historical Averages Salary

YEARS EXPER	2004	2005	2006	2007	2008	2009	2010	2011	2012
0-2	\$ 65,600	\$ 67,800	\$ 74,400	\$ 82,200	\$ 82,800	\$ 83,600	\$ 87,600	\$ 93,000	\$ 98,700
3-5	67,700	75,600	81,300	89,600	107,800	108,000	105,600	102,300	109,400
6-9	75,700	78,800	95,400	98,500	121,100	118,400	121,700	127,800	137,300
10-14	91,900	107,500	114,400	111,500	119,800	121,900	123,500	139,100	153,400
15-19	102,500	116,000	119,600	141,000	151,600	139,400	150,800	151,000	193,600
20-24	118,100	112,800	139,000	155,000	167,400	176,800	180,300	191,000	199,200
25+	125,100	128,300	134,100	149,900	162,800	171,700	186,800	206,300	199,600

Anecdotal information gathered by the EXPLORER backed up that view, with confirmed reports of advertised positions offering sometimes double the annual salary in bonuses or stock options.

The annual salary survey is based on employed, salaried geoscientists and is based on salaries alone. It does not include bonuses, overrides, employee benefits, autos or other perquisites.

It does not attempt to include anyone whose compensation is in the form of consulting fees, retainers or overrides.

Digging Deeper

The 0-2 year experience levels showed a small increase – average salaries for that category were up 6.2 percent.

"Recently graduated bachelor level geologists had a difficult time finding work," Ayling said, "and the few that did worked for lower salaries, depressing the overall average."

He pointed out that a master's degree is the "working degree" for petroleum geologists, and also noted that in the

average salary by degree for the 15-19 year experience group was nil this year "because there weren't any bachelor's geologists in that grouping to chart."

Otherwise on the hiring scene, Ayling said the activity was somewhat dampened due to regulatory uncertainties and the ambiguities of an ultra-high oil price and the bargain-basement gas prices.

The market dynamics of companies shifting focus from gas to oil and the

[See Survey, page 13](#)

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HoD to Consider Membership Simplification

By JEFF LUND, AAPG House of Delegates Chair

Look forward to seeing each of the delegates at the annual meeting of the House of Delegates (HoD), which will be held at 8 a.m. Sunday, April 22, in the Hyatt Regency Hotel's Ballroom A/B/C, Long Beach, Calif.

Registration will begin at 7 a.m.

We expect a record number of delegates and guests. Attendees will include past AAPG presidents, past chairs of the HoD, AAPG officer candidates, young professionals, AAPG staff and invited guests.

There are some legislative issues before



LUND

The Constitution and Bylaws Committee under the leadership of David Entzminger, will present proposed Bylaws amendments regarding the Strategic Plan and Membership Simplification.

us. The Constitution and Bylaws Committee under the leadership of David Entzminger, will present proposed Bylaws amendments

regarding the Strategic Plan and Membership Simplification. The proposals are available on the AAPG website, along

with an area for discussion and comments.

The HoD also will hear reports on the status of AAPG – including membership, finances, publications, the AAPG Foundation and the AAPG Divisions – and we will recognize meritorious members for their HoD service.

AAPG President Paul Weimer will address us, as will AAPG Executive Director David Curtiss.

Each of our HoD committee chairs will provide a report and introduce the hard-working members who served on their committee.

► The Resolutions Committee, chaired by Dennis Moore, has worked contacting societies that had lagged with their delegate appointments or elections and motivated them to act on their responsibility to have representation at the Houston meeting.

► Sandi Barber has chaired the Rules and Procedures Committee, which has experienced a relatively quiet year having addressed many issues last year under Sandi's leadership.

► The Honors and Awards Committee, ably chaired by Laura Zahm, had a number of qualified people to consider as recipients for the awards the House annually presents.

► Sigrunn Johnsen chaired the Nomination and Election Committee, which sought and received recommendations for persons to be nominated for the HoD offices of chair-elect and secretary/editor.

► David Cook chaired the Newsletter Committee, with the assistance of Rob Diedrich as vice chair. This committee has worked to continue the high quality and timeliness of Delegates' Voice issues.

► The Credentials Committee, chaired by David Dolph, has been keeping track of the changes in delegates for the affiliated societies and the Regions. The committee will coordinate and check-in delegates prior to seating them in the voting section for the annual meeting. Guests and alternate delegates awaiting credential confirmation will be seated in the non-voting area.

There is time on the agenda for AAPG officer candidates to acquaint us with their positions and reasons for allowing their name to be placed on the ballot. We'll also hear from the candidates for HoD chair and secretary – and vote.

Concluding our agenda will be time for new business. Refreshments will be available throughout the session.

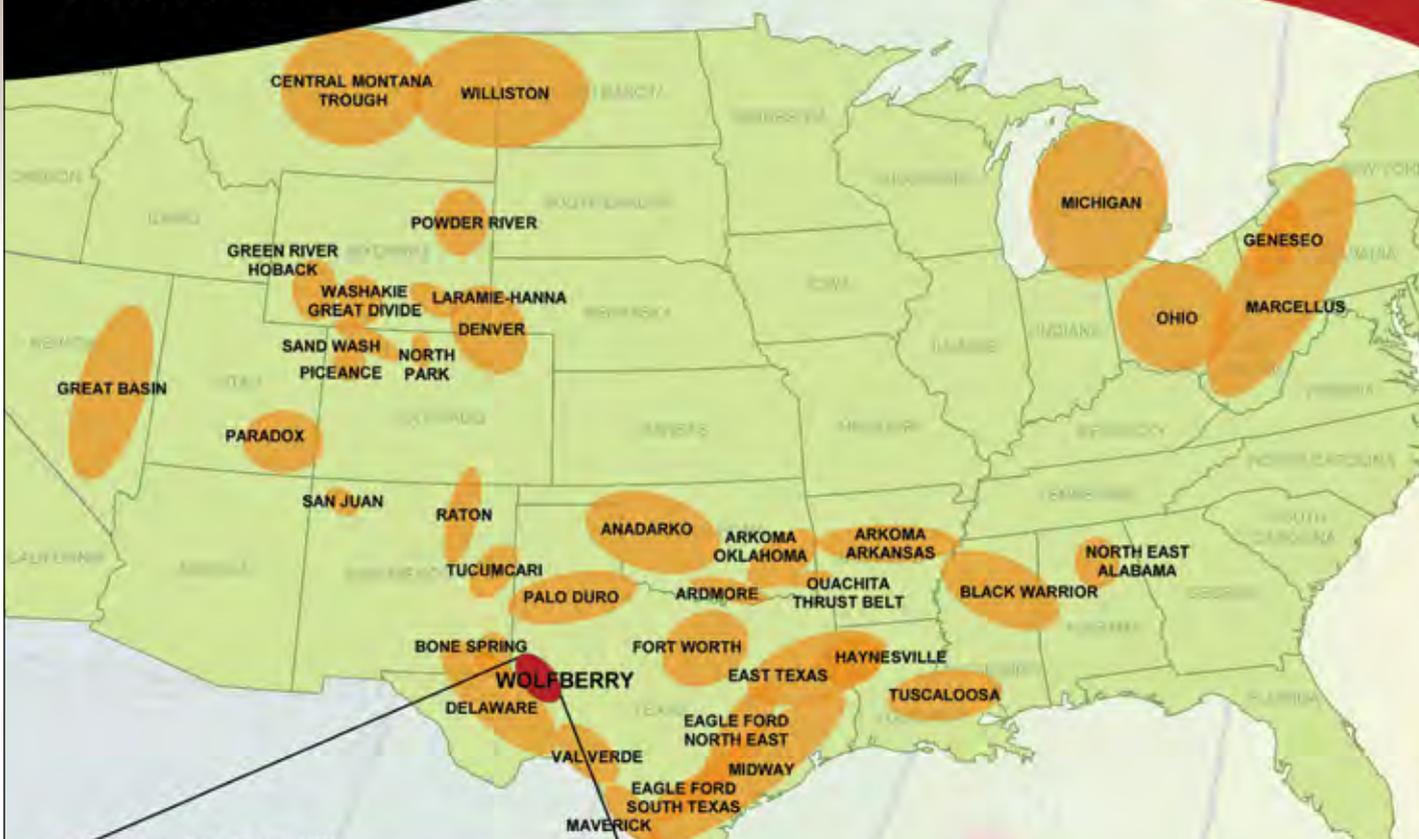
This year it has been my pleasure and great honor to serve the AAPG House of Delegates with two other fine HoD officers, Randy Ray, chair-elect, and David Cook, secretary/editor. We have worked smoothly as a team-advising, seeking answers, receiving input, assigning tasks and making decisions.

Our work was enhanced and enabled by the diligent and thoughtful efforts of the HoD committee chairs, vice chairs and members who worked tirelessly to be fair, thorough and meet deadlines. They were very successful in fulfilling their missions. All of us met for a productive mid-year meeting in Houston.

See you in Long Beach!

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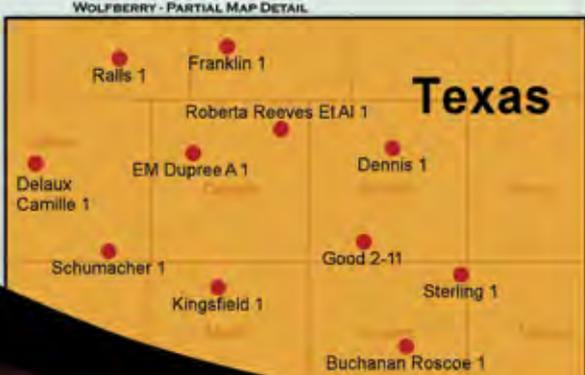
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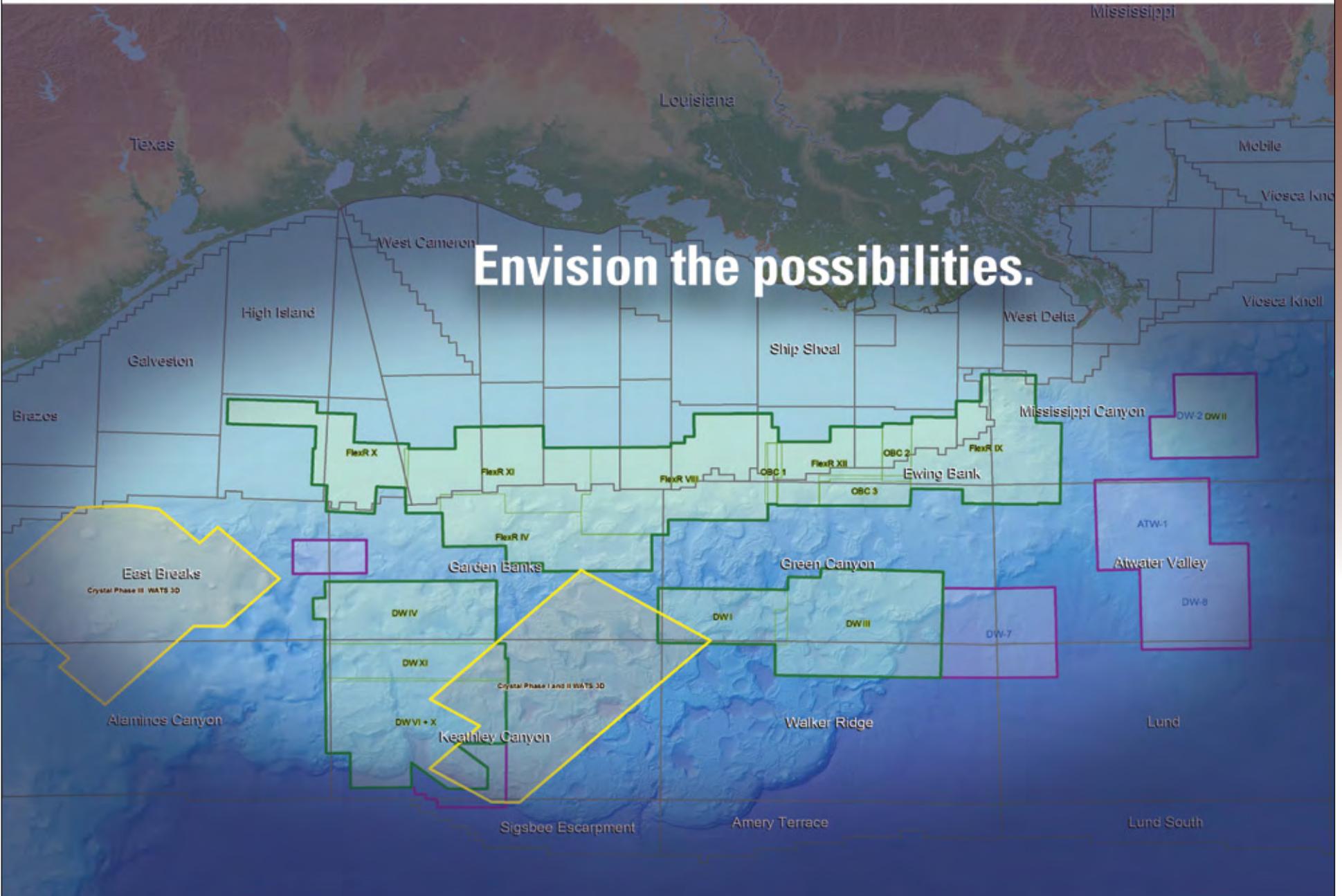


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Sharing the science in Long Beach

Convention Time Arrives for AAPG

By VERN STEFANIC, EXPLORER Managing Editor

Creative exploration concepts, cutting-edge technology and expert industry assessments from every corner of the earth provide the foundation for the next AAPG Annual Convention and Exhibition, set April 22-25 in Long Beach, Calif.

A comprehensive technical program comprising more than 1,100 oral and poster presentations, field trips and short courses has been built on the theme “Directing the Future of E&P – Starring Creative Ideas and New Technology.”

It’s all about sharing the science.

“Progress is all about communication and collaboration,” said ACE general chair Kay Pitts. “There are no substitutes for face-to-face communication to achieve real rapport and understanding.

“Sharing information and collaborating is what pushes us forward,” she added. “This is why we gather and have conventions.”

Much of the information sharing will occur on the exhibits hall floor, where more than 200 exhibitors will be sharing the latest information in technology and science, and where you’ll find this year’s International Pavilion, featuring representatives from around the world who are there to discuss global exploration opportunities.

And much more information sharing certainly will occur via the extensive technical program that’s built on 11 themes, with presentations ranging from emerging frontiers to unconventional resources to active oil fields to structural geology and neotectonics.

This year, activities for all attendees actually will begin earlier than usual – specifically, at 3 p.m. on Sunday, April 22, when for the first time ever the live announcement of the winning team for this year’s Imperial Barrel Award competition will be open for all to attend. The event will be in the Grand Ballroom, right before the start of the opening session and awards ceremony.

Other special events set for Long Beach include:



PITTS

▶ Three forums, including the annual **History of Geology Forum**, set from 1-3:10 p.m. Sunday, April 22, which this year will have an international scope, with talks on:

✓ Sir Roderick I Murchison, aka “King of Siluria,” and his Geological Trip to Poland in 1843.
✓ Birth of Oil Industry in the Northern Carpathians.

✓ The Dawn of Petroleum Geology in the Middle East: A Case Study of George Bernard Reynolds in Iran and Max Steineke in Saudi Arabia.

✓ The First Venezuelan Geological Oil Map: The Ralph Arnold History 1911-1916.

✓ Study on Hydrocarbon Accumulation Regularity of Hydrocarbon-Rich Depression in Bohai Sea, China.

▶ This year’s Michel T. Halbouty Lecture, set at 5:10 p.m. Monday, April 23, featuring **John Grotzinger** talking about “Mars Science Laboratory Rover Mission: The Search for Source Rocks.” (See story, page 66.)

▶ Ticketed luncheons, including:
✓ The All-Convention luncheon, on

Continued on next page

YPs Set Events For Long Beach

Two special events have been planned for all Young Professionals attending this year’s AAPG Annual Convention and Exhibition in Long Beach, Calif. – both intended to specifically help YPs maximize their ACE experience:

▶ The first event is the **YP Meet & Greet**, which begins Sunday, April 22, at 2 p.m.

The Meet & Greet is a great networking opportunity and one of your first chances to connect with other young and experienced professionals during the convention. Participants meet and are grouped with experienced AAPG attendees, who will serve as guides to newcomers to the convention experience.

You are then encouraged to attend both the opening session and Icebreaker as a group, where your new mentor will introduce you to other AAPG members and their colleagues.

▶ The second event is the **YP Networking Reception**, which begins at 7:30 p.m. Sunday (right after the Icebreaker) and is yet another opportunity to enjoy food, refreshments and the chance to continue your networking potential.

This YP-only event will be held at the Long Beach Rock Bottom Restaurant and Brewery, and there you’ll have the chance to meet members of the hosting YP Committee – and learn about all of the goals and initiatives that the committee has been tackling for the last few years. 

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Building upon our long partnership, Geophysical Pursuit and WesternGeco are combining data sets to produce a contiguous 742 square-mile program at the tip of the Mississippi Delta.

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To get a deeper understanding of this area, call Geophysical Pursuit at 713-529-3000.

Mississippi Delta Depth Phase 4
The combined datasets will result in a single contiguous PreStack Time and Depth Migrated 3D database of 742 square miles in this region.

26	27
49	50
56	57
79	80
86	87
107	108



AAPG returns for a second time to the Long Beach Convention Center for the Annual Convention and Exhibition, having met there previously in 2007.

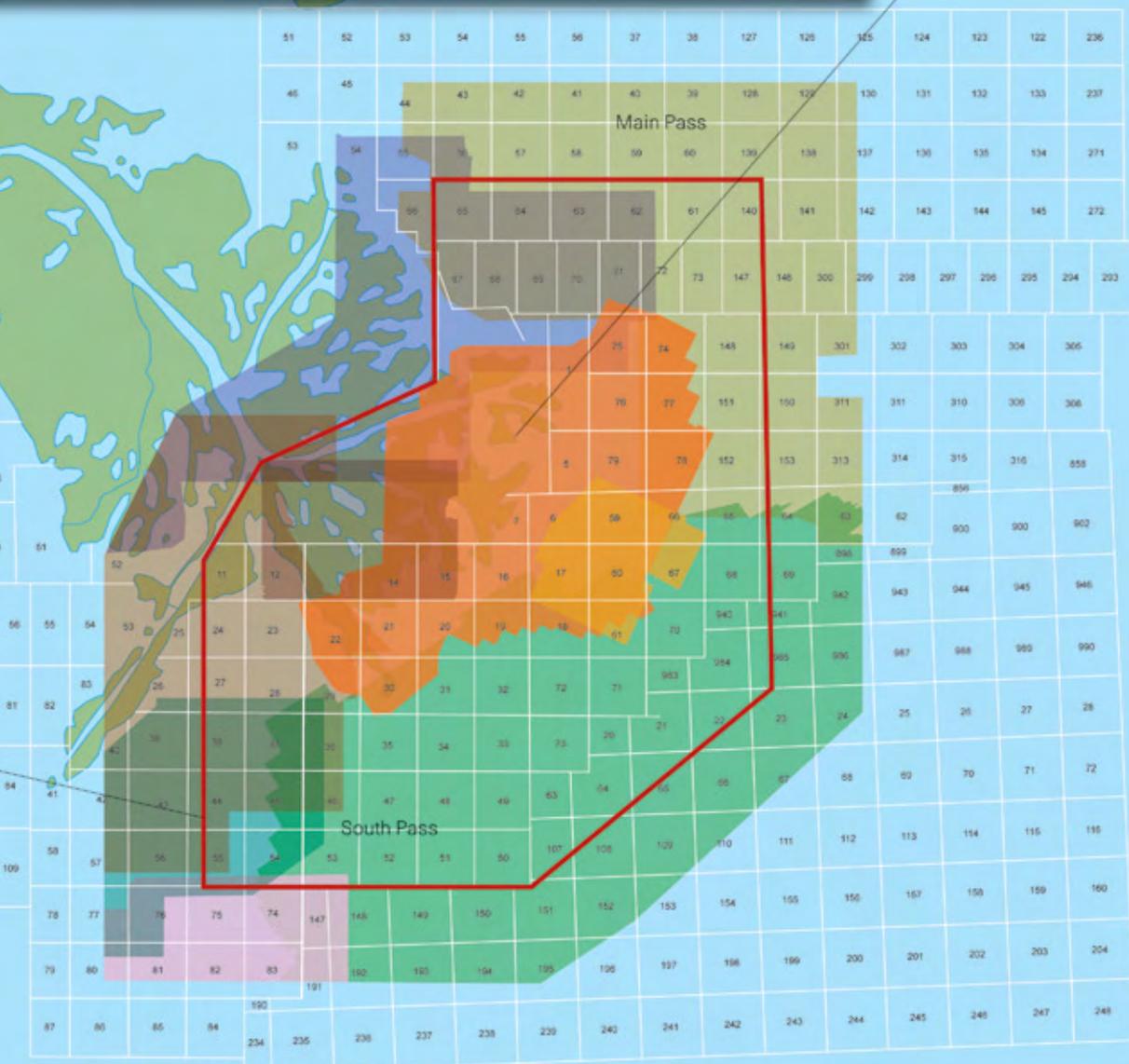


The camouflaged drill rig on the THUMS Island White – named in memory of NASA astronaut Edward White. The island is a popular sight in Long Beach Harbor.



235 square miles

The recently added 235 square-mile 3D survey completed our 742 square-mile coverage of this area.



Continued from previous page

Monday, April 23, featuring **J. Robinson "Robin" West**, founder and chairman of PFC Energy, discussing "The Future of Global Deepwater After Macondo."

✓ The Division of Professional Affairs-Professional Women in Earth Sciences joint luncheon, on Tuesday, April 24, featuring **Sally Benson**, director of the Global Climate and Energy Project at Stanford University, speaking on "Following Your Convictions: Even When the Going Gets Tough," and **Sharon Mosher**, dean of the Jackson School of Geosciences at the University of Texas at Austin, speaking on "Building a Diverse and Sustainable Geoscience Work Force." (See story, page 52.)

✓ The Division of Environmental Geosciences luncheon, on Wednesday, April 25, featuring **Steve Leifer** speaking on "Hydraulic Fracturing: Separating Myth From Reality." (See March EXPLORER.)

✓ The Energy Minerals Division luncheon, also on Wednesday, April 25, featuring AAPG member and award winner **M. Lee Allison**, and Irish journalist and documentary filmmaker **Ann McElhinney**, talking about "Geothermal Exploration: Everything Digital, Online and Interoperable."

► A special showing of the new feature-length film "**Switch**," a movie featuring past AAPG president **Scott Tinker**, which asks the question: What will it really take to make the transition from oil and coal to alternative energy sources? The movie will screen at 8 p.m. Tuesday, April 24, at the Cinemark at the Pike 99 theatre. [E](#)

Survey from page 8

resulting debt from buying expensive product have created somewhat of a manpower muddle as the companies geologists' skill sets to redefine a focus and the need for shift.

Meanwhile, as the AAPG salary survey indicates, the demand for petroleum geologists continues.

The survey is based on U.S. salaries only, considered the "gold standard" for the industry. The measurement for international salaries for explorationists is virtually on a country-by-country, case-by-case basis, Ayling said, which makes statistical averaging non-productive beyond the boundaries of any specific country.

Also, many ex-pats are paid U.S.-based salaries, while the national oil companies opt to pay compatriots on a different, lower scale. [E](#)



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AAPG to bestow honors in Long Beach

Weber Headlines Awards Ceremony

By SUSIE MOORE, Communications Project Specialist

Koenraad Weber, a pioneer researcher in hydrocarbon recovery and internationally recognized distinguished educator, will receive the 2012 Sidney Powers Memorial Award, AAPG's highest honor, during the opening session of the AAPG Annual Convention and Exhibition in Long Beach, Calif.

Weber is joined at the top of this year's AAPG awardees list by Robbie Rice Gries, president and CEO of Priority Oil & Gas LLC in Denver, who has been named recipient of this year's Michel T. Halbouty Outstanding Leadership Award.

The opening session is scheduled Sunday, April 22 at 4 p.m., at the Long Beach Convention & Entertainment Center in the Grand Ballroom. The program will be preceded in the same room at 3 p.m. by the first-ever open-to-all announcement of the winner of the AAPG Imperial Barrel Award competition.

In addition to honoring the awardees, the opening session also will feature the official welcome from ACE general chair Kay Pitts and the presidential address from AAPG President Paul Weimer.

AAPG awards, approved by the Executive Committee, are presented annually at the ACE opening session to recognize individuals for service to the profession, the science, the Association and the public.



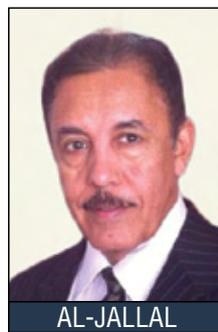
WEBER



GRIES



ADESIDA



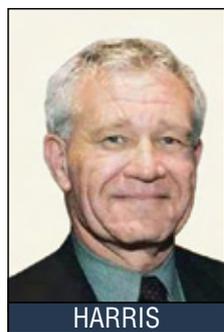
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See Awards, page 16

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Awards from page 14

Weber, who received AAPG Honorary membership in 2004, served a lengthy career as production geologist with Royal Dutch Shell while simultaneously teaching as professor of production geology at the Mining and Petroleum Engineering faculty at Delft University of Technology, Netherlands.

With Shell he worked both onshore and offshore fields (oil and gas) spanning five continents, having the fortunate opportunity of being involved with projects involving the Niger Delta, the Venezuelan Bolivar coastal fields and the Leman Bank field in the North Sea – to name a few.

Weber also has written many papers and been a sought-after keynote speaker for many conferences in a global capacity.

Gries, also an Honorary Member and AAPG past president is the sixth recipient of the Halbouty Outstanding Leadership Award, given in recognition of outstanding and exceptional leadership in the petroleum geosciences.

Interviews with both Weber and Gries are included in this EXPLORER (page 20 and 24, respectively), and biographies and citations of all award winners will be included in a future BULLETIN.

Award winners announced by AAPG and who will be honored along with Weber and Gries in Long Beach are:

Honorary Member Award

Presented to members who have distinguished themselves by their accomplishments and through their service to the profession of petroleum geology and to AAPG.

☐ **Adekunle A. Adesida**, Priority Oil & Gas, Denver.

☐ **Ibrahim A. Al-Jallal**, Sandroses Geological Consultancies, Khobar, Saudi Arabia.

☐ **Lee T. Billingsley**, Abraxas Petroleum, San Antonio, Texas.

☐ **Dudley W. Bolyard**, Bolyard Land & Exploration, Centennial, Colo.

☐ **Paul M. Harris**, Chevron Energy Technology, San Ramon, Calif.

☐ **Phillip H. Stark**, IHS Energy Group, Englewood, Colo.

Norman H. Foster

Outstanding Explorer Award

☐ **Dan A. Hughes**, Beeville, Texas (see story, page 38).

Robert R. Berg

Outstanding Research Award

☐ **Henry W. Posamentier**, Chevron, Houston.

Distinguished Service Award

Presented to those who have distinguished themselves in long-term service to AAPG.

☐ **Edith C. Allison**, consultant, Rockville, Md.

☐ **Susan M. Cunningham**, Noble Energy, Houston.

☐ **David A. Dolph**, Nexen Petroleum International, Calgary, Canada.

☐ **Paul F. Hoffman**, Allen-Hoffman Exploration, Houston.

☐ **Alain-Yves Huc**, Institut Francais Du Petrole, Rueil-Malmaison, France.

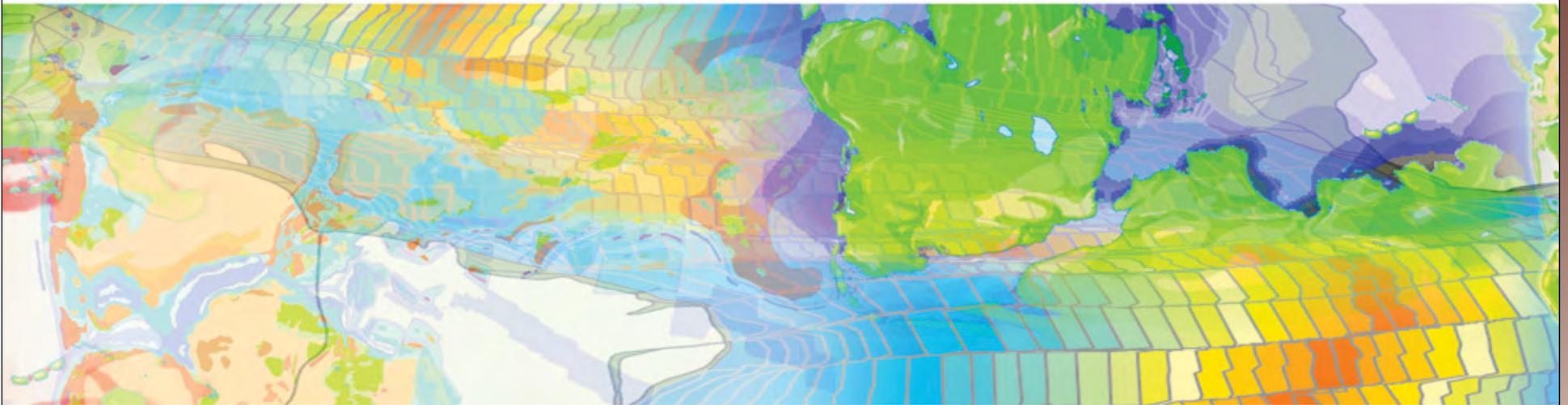
☐ **William A. Morgan**, ConocoPhillips, Houston.

☐ **Adedoja R. Ojelabi**, Chevron Nigeria, San Ramon, Calif.

☐ **Victor H. Vega**, Equion Energia,

See Honors, page 18

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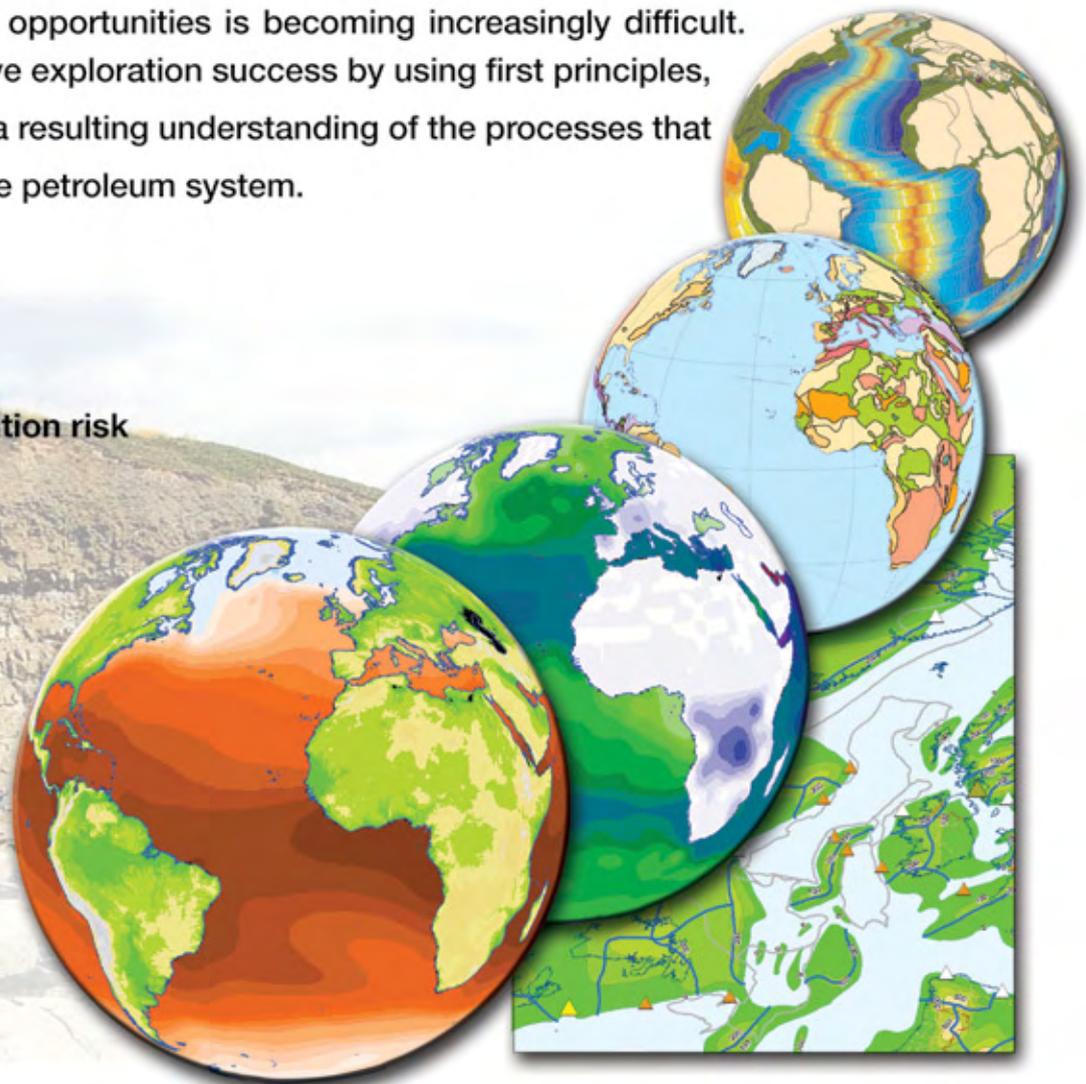
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SLATT



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EYLES



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Honors from page 16

Bogota, Colombia.

□ **Mark L. Wilson**, Santa Maria Pacific Holdings, Bakersfield, Calif.

Grover E. Murray Memorial Distinguished Educator Award

Presented for distinguished and outstanding contributions to geological education, both at the university level and toward education of the general public.

□ **Andrew Hurst**, University of Aberdeen, Aberdeen, Scotland.

□ **Howard D. Johnson**, Imperial College, London, England.

Harrison Schmitt Award (Previously "Special Award")

□ **Jill Stevens**, ExxonMobil, Melbourne, Australia (see story, page 62).

Pioneer Award

Presented to long-standing members who have contributed to the Association and who have made meaningful contributions to the science of geology.

□ **Tim T. Schowalter**, independent, Grandby, Colo.

Wallace E. Pratt Memorial Award

Presented to honor and reward the author(s) of the best AAPG BULLETIN article published each calendar year.

□ **Robert H. Lander and Linda M. Bonnell**, for "A Model For Fibrous Illite Nucleation and Growth In Sandstones," which appeared in the August 2010 BULLETIN.

Both are with Geocosm, Austin, Texas.

Robert H. Dott Sr. Memorial Award

Presented to honor and reward the author/editor of the best special publication dealing with geology published by the Association.

□ **Michael Pöppelreiter, Carmen García-Carballido and Martin Kraaijveld**, for AAPG Memoir 92: *Dipmeter and Borehole Image Log Technology*.

Pöppelreiter is with Shell Kuwait, Kuwait City, Kuwait; García-Carballido is with Kiethfield Smithy, Aberdeenshire, Scotland; and Kraaijveld is with Shell, Rssjswijk, Netherlands.

J.C. "Cam" Sproule Memorial Award

Presented to recognize and reward younger authors of papers applicable to petroleum geology.

□ **Alexei V. Milkov**, for "Methanogenic Biodegradation of Petroleum in the West Siberian Basin (Russia): Significance for Formation of Giant Cenomanian Gas Pools," which appeared in the October 2010 BULLETIN.

Milkov is with BP Russia, Houston.

John W. Shelton Search and Discovery Award

Presented to honor and reward the author(s) of the best contribution to the *Search and Discovery* website in the past year.

□ **Katherine Giles**, for the article "Tracking the Migration of Salt Diapirs Using Halokinetic Sequence Stratigraphy."

Giles is with New Mexico State University, Las Cruces, N.M.

George C. Matson Award

Presented to honor and reward the best oral presentation at the 2011 AAPG Annual Convention and Exhibition in Houston.

□ **Lars Wensaas**, for the paper "Source Rock Prediction From Seismic Part I: Links Between Rock Properties and Seismic Attributes."

His co-authors were **Marita Gading, Helge Loseth and Michael Springer**.

Wensaas is with Statoil, Trondheim, Norway.

Jules Braunstein Memorial Award

Presented to honor and reward the best poster presentation at the 2011 AAPG Annual Convention and Exhibition in Houston.

□ **Roger M. Slatt and Younane Abousleiman**, for the poster "Multi-Scale, Brittle-Ductile Couplets in Unconventional Gas Shales: Merging Sequence Stratigraphy and Geomechanics."

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See Honorees, page 26

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Powers Medalist a 'nomadic personality'

Weber: Geologist, Engineer, Artist

By BARRY FRIEDMAN, EXPLORER Correspondent

No phone call, no email. Nothing that usually defines how modern journalistic interviews are conducted, especially when the interviewer and subject are an ocean apart.

Instead, inside the FedEx package were eight carefully hand-written pages of responses on legal-sized European lined paper – graphs, too, as well as speeches, abstracts and illustrations, one, haunting, of a lone geologist at the base of an outcrop.

"I can't type," Koenraad Johan Weber, this year's winner of the Sidney Powers Memorial Award, writes on page one, adding, "I always had a very competent typist at my disposal, a luxury that is no longer provided."

Retired geologists lose their staffs – not their memories, not their attention to detail.

And certainly not their reputations.

The eight pages are reflective, combative, melancholy.

Now 77, Weber has been a mining engineer; studied ancient analogs of the Rotliegendes desert deposits in the United States; traipsed around Nigeria, studying potential energy resources – and along the way, saved lives; worked for Royal Dutch/Shell's Exploration and Production Laboratory in Rijswijk; lectured through the world for AAPG and EAGE; co-authored the "Petroleum Geology-Production" chapter in the Encyclopedia



WEBER

"I don't like to stay too long in one place, and I hate routine jobs."

of Geology; and studied environmental impacts in North Africa and the Middle East.

But before Weber talks about any of that, he has something else on his mind.

"My youth was very much influenced by the war," he says, referring to World War II and its devastating impact on everyday life throughout Europe – and, here, he remembers the worst day:

"... May 10, with bombardments and parachutist landings on and around the Hague. My father, being a Jew, had intended to flee in our car to the south. Exit from the Hague was impossible."

During a pause in the shooting, his family did leave – but at an intersection right outside their apartment they were side-swiped, causing Weber to be thrown from the car and through a shop window.

"My right leg was almost cut off."

'They Offered Everything'

"My maternal grandmother, who looked like Barbra Streisand, was a retired Shell engineer," Weber writes, "and my mother was actually born on an oilfield in Sumatra."

But it was his father, who survived the war, and introduced Weber to the profession and stoked his curiosity.

"My father was a Delft mechanical engineer, dealing in roller bearings and driving chains. I'd often accompany him on inspections to quarries and shipyards. I was allowed to roam around in the Cretaceous Chalk quarries and I collected a large collection of shells, echinoids, shark teeth, and even a Mosasaurus tooth."

"I was expected to go to Delft (University of Technology) as well."

He did.

And while he leaned toward biology or physics, Weber said it was the mining faculty that won him over.

"They offered everything: Geology, paleontology, physics and adventure."

After graduation, he was on the Delft faculty and was also hired by Shell.

"Two days later I was working in the

Because of the wounded soldiers crowding the hospital, his leg was, he says, "roughly thrown together and I was taken home."

His early goals, then – before education, before geology, before any discovery of soft science or outcrops or determining the potential of oil fields in the Niger Delta – were more immediate.

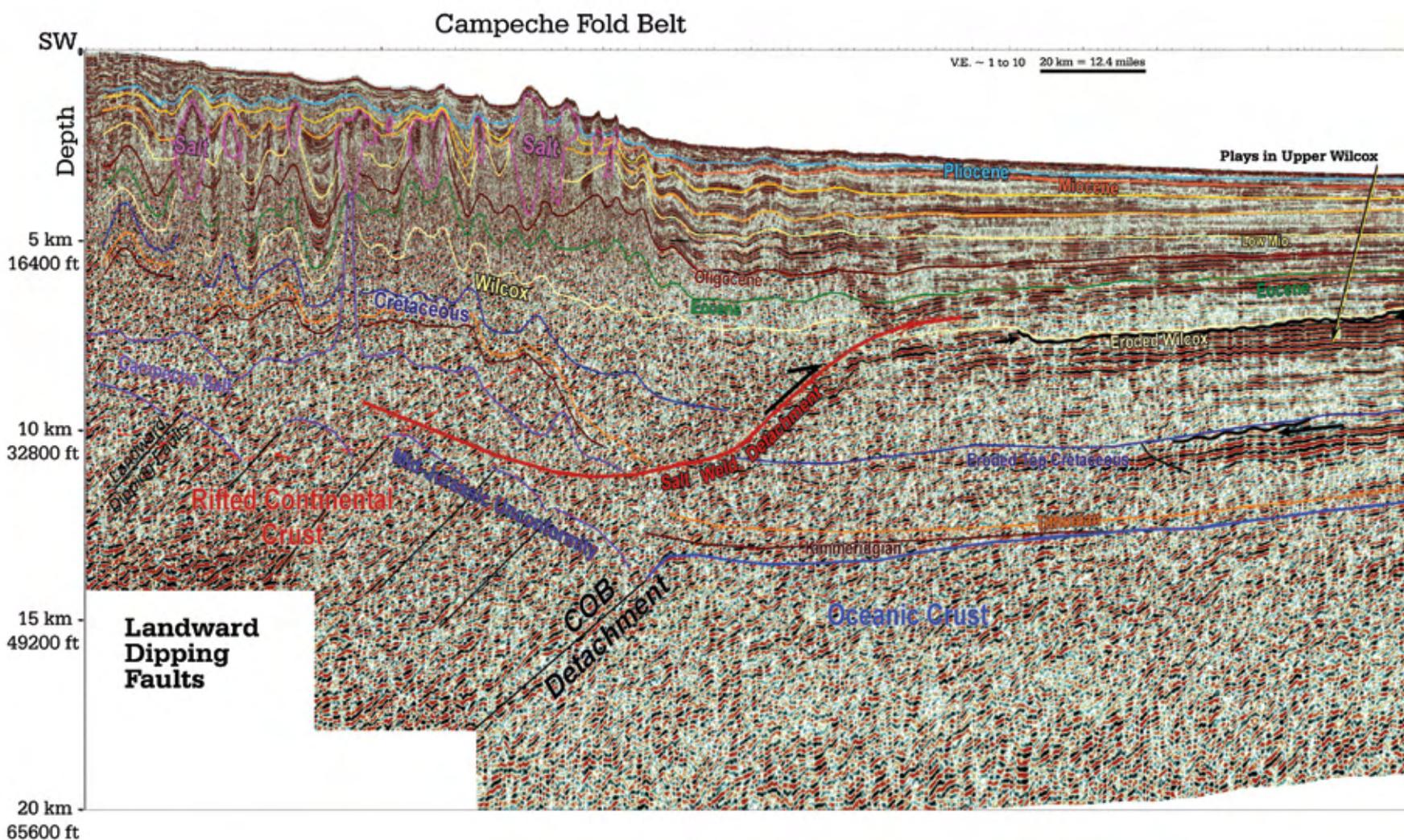
"My youthful ambitions were to learn to walk again."

And then there was the matter, he says, of food and firewood and death.

"My mother was not Jewish and thus we survived. The rest of my father's family in Holland didn't."

Geology would have to wait. It did. Patiently.

Continued on next page



Continued from previous page

E&P laboratory." Manned entirely by physicists, chemists and engineers, Weber says, "I was the only one with any geological knowledge."

Even now, he says, he remembers one of the greatest lessons of that time.

"I learned the hard way how to write a report that can be understood by a non-geologist."

"It was also pointed out that I had too much imagination, I talked too much and that I shouldn't sing Yiddish love songs when sitting behind my telescope."

There was something else, he says, that always seemed to motivate him – what he calls his "nomadic" personality.

"I don't like to stay too long in one place, and I hate routine jobs."

Which may explain the work he did in the iron mines in Spain, as well as the work in Switzerland, Germany, Italy, England and the place that made the strongest indelible mark, Nigeria.

But more on that in a moment.

A 'Slightly Devious Technique'

You ask Koenraad Johan Weber about what's changed and what hasn't in the profession that now claims him as a superstar, he starts with the most fundamental difference – getting there. Literally.

"Can you imagine traveling from London to Delhi by bus?"

He tells a story about sitting at a bar in a guesthouse at Masjid-i-Suleiman, Iran, when a bus full of passengers stopped to use the restroom.

"They had traveled through the Balkans, Turkey and Iran, and were on the way to Kabul and the Khyber Pass, Lahore and New Delhi."

"Today, I don't think you would get farther than Turkey (or perhaps make a tour through Syria and Iraq and end up taken hostage by Al Qaeda)."

But what hasn't changed is "the value of the well-trained specialist."

This, he says, has not been taken over by computers: "The approach to field appraisal with respect to data analysis, risk evaluation and economics is much the same ... and still often done poorly."

He says the past 55 years or so has been an exciting time, with spectacular progress in subjects such as continental drift, sedimentology, diagenesis, faulting, trap types, migration, source rock, maturation and paleontology.

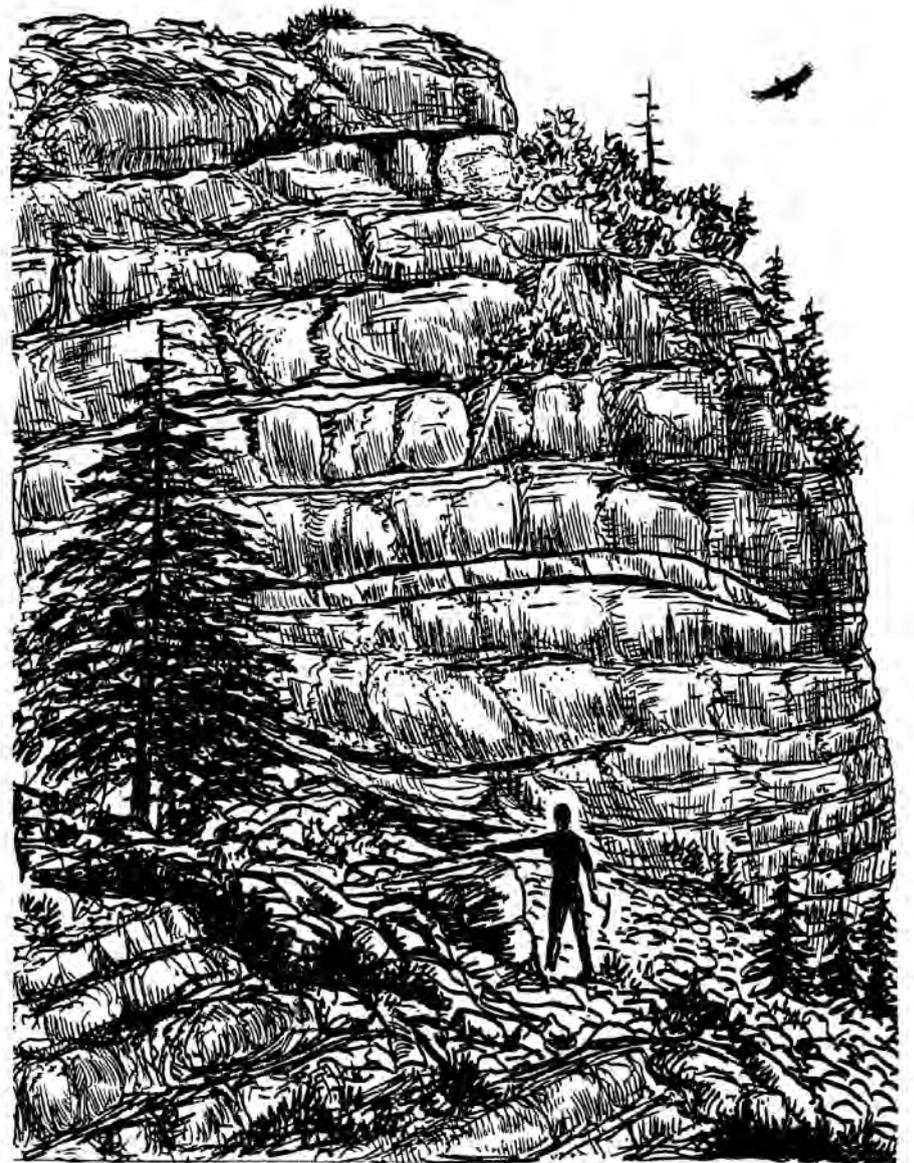
Still, Weber believes a boardroom can be just as maddening as an outcrop.

"I was always confronted by colleagues and supervisors who had little or no knowledge of geology. For this reason one has to develop a special, often slightly devious technique to convince the audience."

He points to a study with which he was once involved, concerning rubber-sleeve cores in Venezuela's Tia Juana field.

"These were the first cores ever taken in the reservoirs of the Bolivar coast," he said.

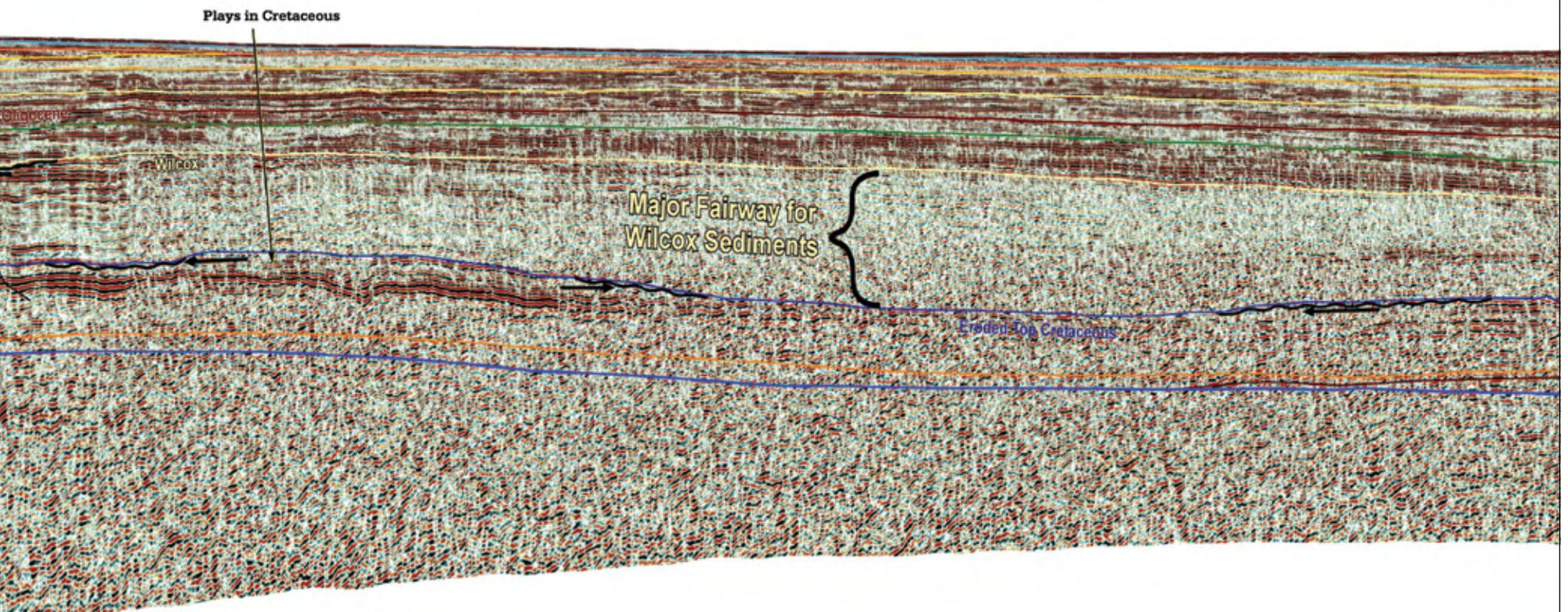
See Weber, page 26



Weber, the artist: His experiences often were recalled in detailed drawings.

Mexico Offshore

20 km = 12.4 miles



'... A profession that is also my hobby'

An Interesting, Satisfying, Adventurous Occupation

BY KOENRAAD J. WEBER

In his own words: Excerpts from "Adventures in Soft Science," by Koenraad Weber.

Weber's talk, "Production Geology, Tangent Plane Between Geologist and Engineer," was presented Dec. 1, 1999, at Delft University of Technology.

At the beginning of my career, petroleum engineers tended to be physicists with a strict observance of physical principles and a deep belief in the power of mathematics. Something that couldn't be calculated or measured to a few decimals behind the comma should be considered to be a dubious property, better left alone.

Geologists at this time tended to take the opposite view – virtually nothing was measured and most geological processes were poorly understood and rarely underbuilt by solid physical theories. Statements were vague and full of jargon, alien to the engineer's ear.

Mining engineers form a hybrid group situated between physicists and geologists. Their work always involves problems related to geological features which are not fully understood and for which there is no representative data base – thus there is need for estimating ranges of parameter values and for the determination the significance of the inherent uncertainty levels toward the economics of a project ...

Safety margins should not be carried



Koenraad Weber, geoscientist, author and artist: "Sitting quietly behind my table, accompanied by a few hungry mice, I was suddenly struck by a soft, mumbling sound."

too far, as was shown by the bridges on Sumatra built by Delft mining engineers before the war. When these had to be blown up to retard the Japanese advance, this proved to be almost impossible. This example also demonstrates the reluctance of the mining engineer to believe in the outcome of theoretical calculations, being used as they are to the unpredictable surprises prepared by nature.

Thus, the world of the mining engineer is one of calculated risk. One must be inventive, pragmatic and sufficiently courageous to reach the necessary operational decisions at the right time.

This doesn't guarantee a glorious career, because in my experience high positions often go to people who systematically avoid having to make any significant decision. However, it will certainly result in a very satisfactory working life.

While in Iran I made long trips on the weekends to study archeological sites and do some clandestine digging.

One day coming down from the mountains I noticed the faint outline of streets in the valley, marked by slight

variations of vegetation highlighted by the low sun. Digging in the corner of a buried house wall I discovered pottery fragments – and underneath a silver drachme of Alexander the Great.

You will understand that I have the fondest memories of these weekends in the wild, almost deserted mountains, seeing bears, wolves and mountain sheep. I still have a little carpet from the Qasgai nomads, whose camp I visited. I noted innumerable caves that still beg to be excavated. What a wonderful place to work in!

* * *

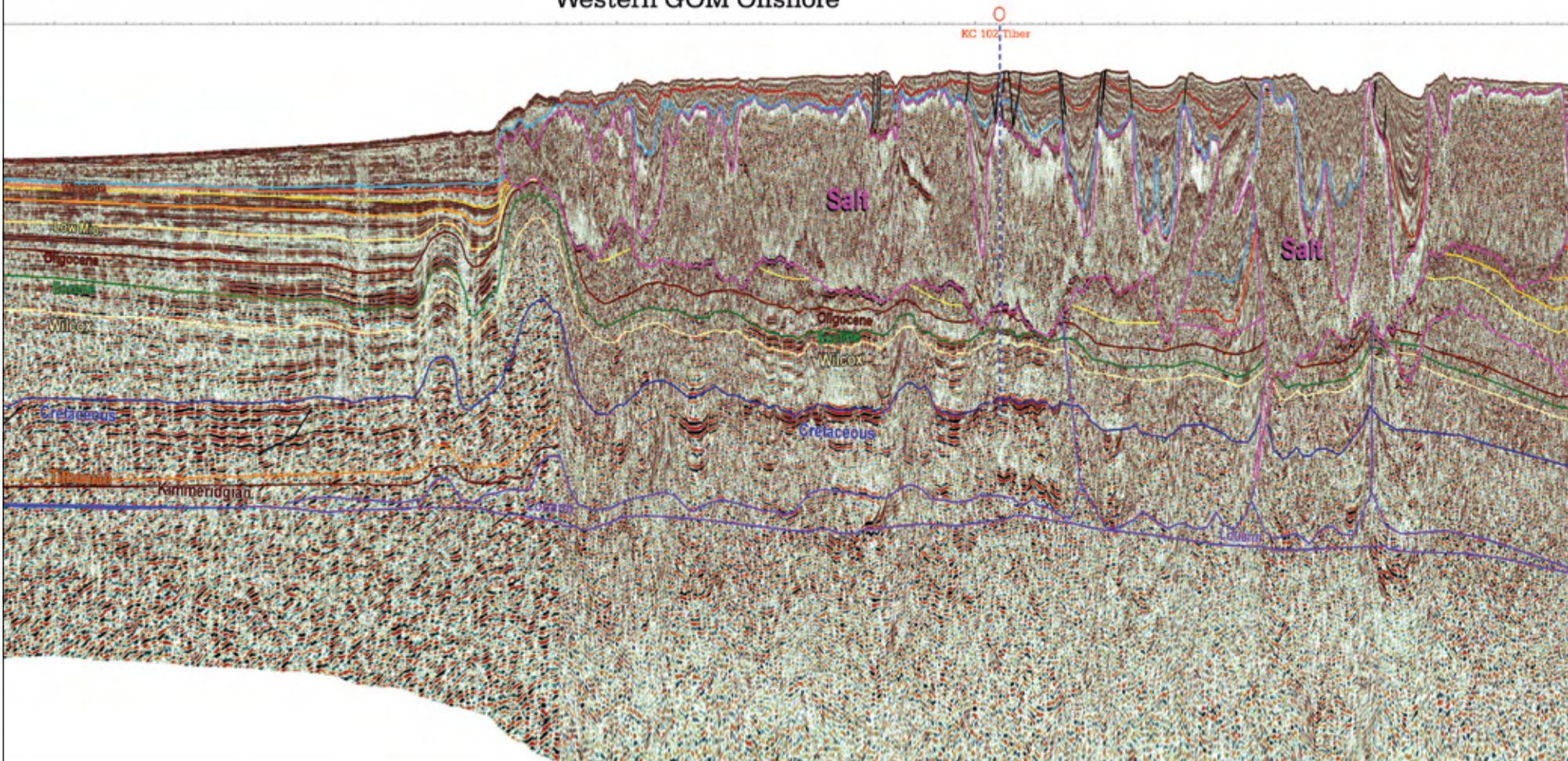
(In describing his work on the North Sea's Leman gas field, near the Norfolk coast, where the reservoir is the Rotliegendes Sandstone Formation – and a corresponding trip to America.)

Luckily, I already had seen an ideal analog for the Leman Rotliegendes in northern Arizona, in the Canyon de Chelly. There one finds an Aeolian Permian sandstone with the same thickness and the same cross-bed set types as in the Leman field.

A short field trip was planned to measure the necessary data. Arriving at the Chelly Canyon National Park I found the hotel permanently booked by tourist groups.

Continued on next page

Western GOM Offshore



Continued from previous page

A kind Navajo girl in the park entrance lodge referred me to the mission post run by a Methodist vicar and his family. This was a journey back in time. These marvelous people, straight from a western movie, lent me their schoolroom plus a camp bed for the duration of my stay, and I was in business.

I already had planned a tight schedule of sketching and photographing a series of cliff faces pre-selected on the basis of detailed maps and photographs in the splendid magazine *Arizona Highways*. Sketching from the edge of the cliffs in this fantastic landscape I gradually detected more and more Indian ruins of the famous cliff dwellers.

Sitting still for hours on end, the animals became curious. Squirrels sat next to me and the vultures spiraled in ever-tightening circles.

In the evening I worked out my drawings with the aid of Polaroid camera photographs. On Ascension Day a large party of Indians arrived for an all-night service. Sitting quietly behind my table, accompanied by a few hungry mice, I was suddenly struck by a soft, mumbling sound. Looking around I saw a series of round spots on the fogged windows. Immediately there came a knocking on the door and a string of little Indians filed in – the way to the toilet was via my room, but, of course, the real reason for their activities was formed by the stack of peppermints and chocolates piled on the table. They were a very polite, delightful bunch of rosy-cheeked children, thickly bundled against the cold of a May evening on a Colorado plateau. When my goodies were finished the trips to the toilet dwindled fast.

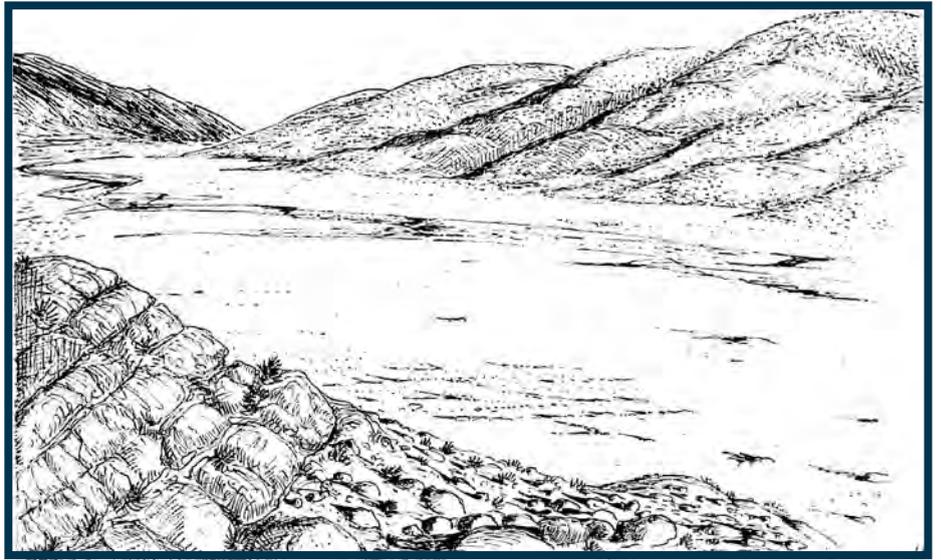
The use of the outcrop data was based on a typical soft science type consideration. Having made a model of the large-scale festoon cross-bedding of the Rotliegendes based on small German outcrops, I was struck by the resemblance to fluvial trough cross-bedding. Because that type of cross-bedding shows a clear relationship between thickness, length and width, I reasoned that the same might be true for the Aeolian cross-bed sets. Even when the full length or width of a cross-bed set is not exposed, this still allows for making an estimate of the width/thickness and the length/thickness ratios by measuring exposed lateral continuity, bed thickness and lateral terminations of a bed.

Through a normalizing process one can add up all information and derive average values ...

I would like to refrain from making comments or of suggesting all kinds of great ideas for the future. I think it is a bad habit for departing people to try to influence the coming generation ...

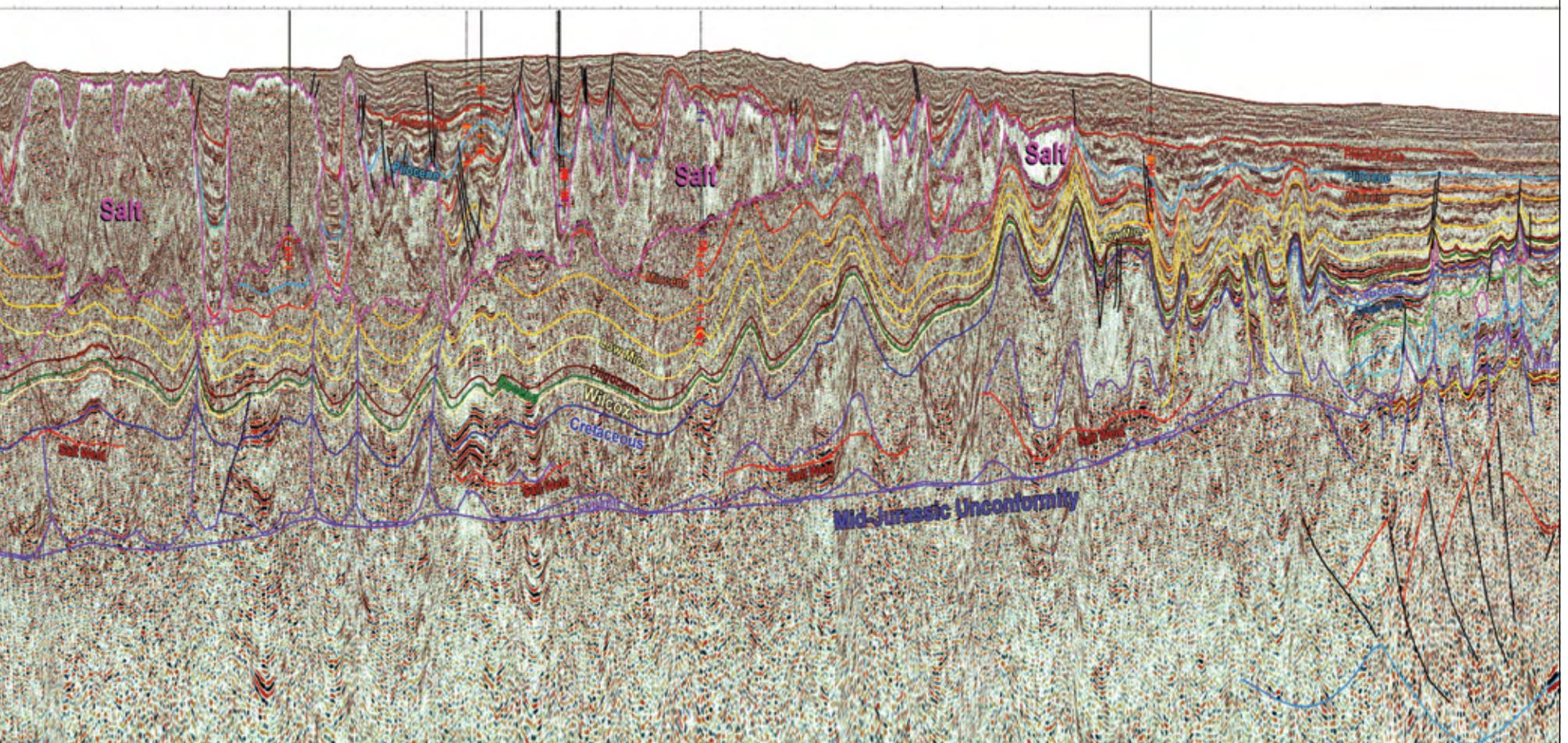
Production geology is not a discipline in which Nobel prizes are likely to be awarded. It is characterized by a continuous confrontation with new challenges and the gradual development of improved understanding and methods. As such it is a most interesting, satisfying and adventurous lifetime occupation.

This is certainly the case for me, and I find myself lucky to have a profession that is also my hobby. 



Above, in Iran: "You will understand that I have the fondest memories of these weekends in the wild, almost deserted mountains." Below, observed by vultures in Arizona.

Central GOM Offshore



Halbouty Award winner

Robbie Gries: A Career of Many 'Firsts'

By MARY FRITZ, EXPLORER Correspondent

How does a girl from the Texas Gulf Coast, a self-described traditionalist who had never even heard of geology, become the very first female geology graduate at Colorado State University and the first woman to serve as AAPG president?

And, for that matter, how does she become the first woman to receive AAPG's Michel T. Halbouty Outstanding Leadership Award?

Brains, yes. Hard work, obviously. Fortunate choices, no doubt.

All of these were part of it – along with unfailing enthusiasm, a boatload of optimism and energy and, according to the woman herself, a lot of support from her friends.

Denver independent Robbie Gries will be presented the 2012 Halbouty Award at the AAPG Annual Convention and Exhibition in Long Beach, Calif.

It will be an occasion made all the more memorable by the presence of so many of the cherished friends she has made during her 30-plus years in the industry and AAPG.

"I think what I have enjoyed most about AAPG is the people, the friends I've made along the way," she said. "My term as president allowed me the opportunity to get to know leading geoscientists around the world.

"This is such a wonderful thing and wouldn't have been possible any other way."



GRIES

"My term as (AAPG) president allowed me the opportunity to get to know leading geoscientists around the world."

A Love Affair Begins

Gries grew up in Ingleside, Texas, the daughter of a Gulf Coast shrimper. As a child she remembers collecting rocks any time the family traveled, and in middle school, given a choice between home economics and a basic science course, she jumped at the latter.

Still, it wasn't until she was a sophomore at Del Mar Junior College in Corpus Christi, Texas, that she even heard of the science of geology.

"I thought it sounded interesting, so I enrolled in a basic geology course taught by Dr. Hugh Doney," she recalled. "I knew I had found what I wanted to do.

"His lectures were mesmerizing," she continued. "He took us on these fun field trips, which I found fascinating. We were introduced to physical geology, history of geology and paleontology – and I was hooked."

She completed her courses at Del Mar, planning to go on to the University of Texas at Austin. She hit a snag, though when UT wouldn't accept all of the junior college credits. Eager to delve deeper into geology, Gries went outside the Texas system to Colorado State University, which not only accepted her hours from Del Mar, but honored her scholarship.



Robbie Gries, with Beijing University geoscience students and professors: "I think what I have enjoyed most about AAPG is the people, the friends I've made along the way."

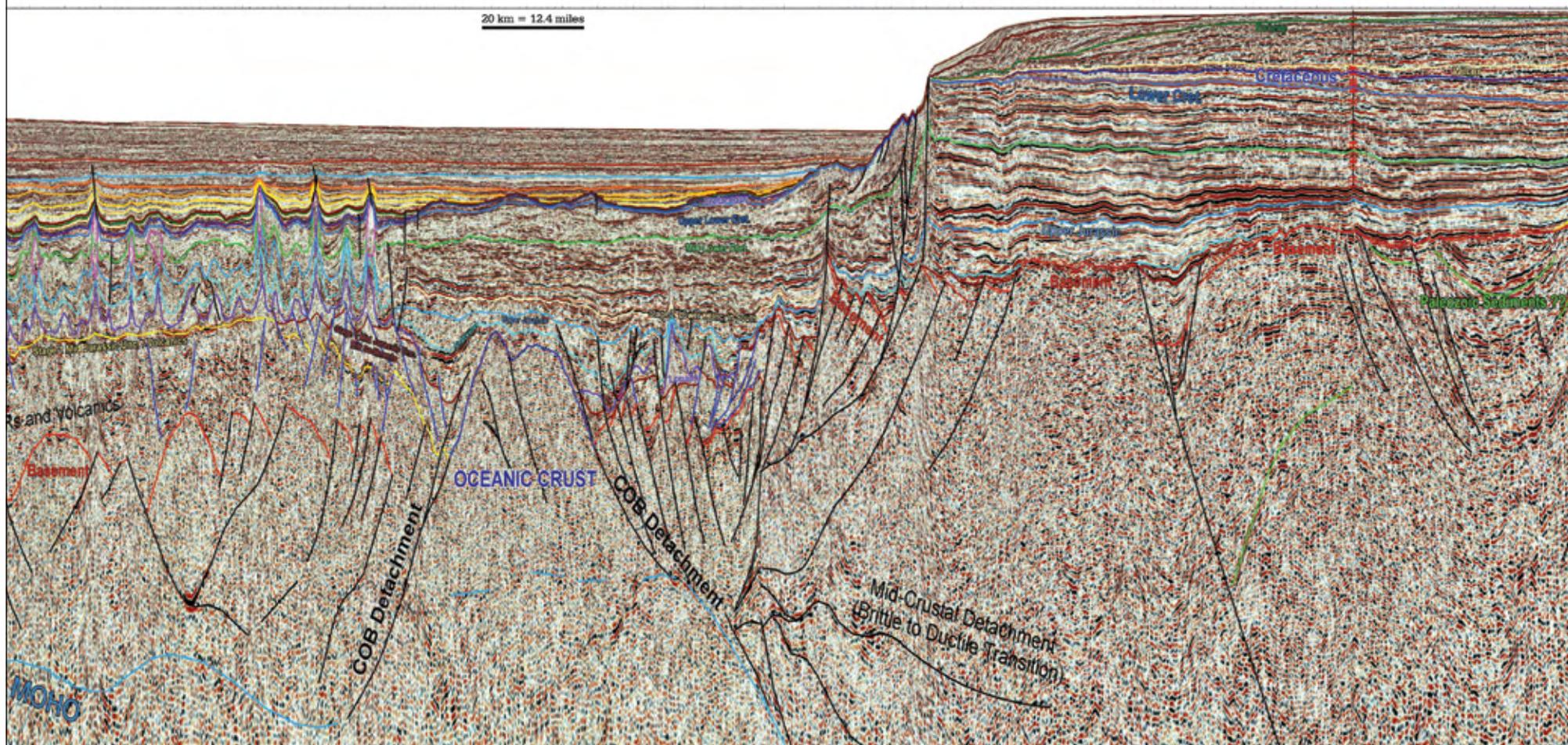
Continued on next page



Eastern GOM Offshore

Florida Shelf

20 km = 12.4 miles



Land data supplied by **GEOPHYSICAL PURSUIT, INC.** and **SEI**

Southern data in conjunction with

Continued from previous page

"Even though I was paying out-of-state tuition, I figured out that I could live there with my aunt and with my scholarship and not having to take those basic courses again it would cost me less," she said.

It was a serendipitous solution. She fell in love with Colorado's mountains and trees and seasons – and most of all, its spectacular geology.

It was at CSU that she accomplished two important "firsts" – first female geology student to go to field camp and the school's first female geology graduate. She thrived there in the relatively small geology department and established lifelong friendships.

On Second Thought ...

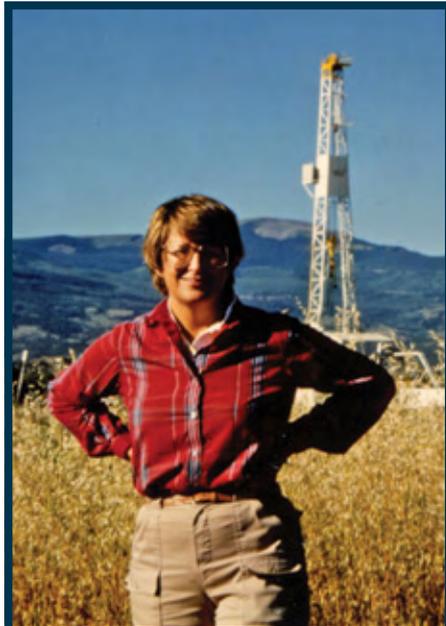
Nationally, the feminist movement was gaining momentum, but it didn't occur to Gries or her professors that she would seek a job in industry.

While working on her bachelor's and master's degrees, her professors "didn't even tell me when there were recruiters on campus," she said. "I think they thought it would be useless for a woman to even apply for an oil company position. I didn't think about it because I had my heart set on teaching."

She earned her master's degree from the UT Austin, married, had a baby and learned something else about herself: She wasn't cut out to be the traditional homemaker she'd always thought she wanted to be.

She did get the opportunity to teach night classes at Wichita State University for a short time.

"I enjoyed teaching very much," she said, "but that was my first exposure to the



The big break: Drilling – successfully – in Colorado's San Juan Sag.

political side of academia. I didn't think that was for me. I thought I probably did not have the temperament for it."

There was a divorce, and Gries took her daughter and went back to Colorado to work for Texaco.

It was an exciting time. Women were making great strides in the workplace and Gries was perfectly positioned to take the ball and run with it – and once again she experienced more "firsts":

► She was among the first women geologists at Texaco to be allowed well site access.

► A few months later, while working for Reserve Oil, was one of the first two women to be accepted for membership in the

Denver Petroleum Club.

► She was welcomed into professional groups, including the Rocky Mountain Association of Geologists, and became involved in her first volunteer job, as program chairman.

"I absolutely loved it!" she said. "I got to meet so many highly respected geologists, and became friends with many of them. Several became mentors and played a big part of the success I've enjoyed in my career."

From them she learned the how-tos of working as an independent consultant – and some years later, organizing her own company, Priority Oil & Gas.

At least two of these mentors – Jack Parker and Norm Foster – went on to serve as presidents of AAPG, as did Gries in 2001-02.

Outside the Box

Thinking outside the box is a hallmark of Gries' career, both as a petroleum geologist and a volunteer. One example that may be her most gratifying experience as an explorationist was a successful well her company drilled for a client in the San Juan Sag basin in southern Colorado.

"For years the USGS and others insisted that the surface volcanics that covered this area went all the way down to basement," she recalled. "But research of the old literature, field work and lab tests convinced me that there had to be an oil-producing basin concealed below the volcanics.

"It was tense waiting to see whether the project would hit Cretaceous rocks or not. When we did, verifying the existence of the Sag basin, it was one of the best days of my career."

She likewise does not hesitate to

think and act with innovation in regard to professional societies. The résumé of her service to AAPG alone contains more than 40 entries, covering a wide range of jobs from Membership Committee to House of Delegates, to Distinguished Lecturer, chair of the 1994 AAPG Annual Convention and Exhibition, Executive Committee and many others.

Earlier AAPG honors also are numerous, including several Certificates of Service and Certificates of Merit, Honorary Membership, the Distinguished Service Award and the A.I. Levorsen Award.

She helped create AAPG's PROWESS Committee (Professional Women in Earth Sciences), whose purpose is to help women geoscientists overcome obstacles to career advancement.

As a woman who understands the challenges motherhood brings to building a career, it's a project she believes will serve women and industry equally well.

She pointed out that there is a great deal of talent, education and experience – extremely valuable commodities – that is wasted when women cut their professional careers short.

"We have needed to emphasize to companies how important it is for them to create a working environment that promotes retention of women; one that allows women to continue their careers while going through their child-rearing years," she said.

The committee will sponsor a session, "Women in the Energy Industry: Developing Negotiation Skills," at the annual meeting in Long Beach.

And it's a safe bet Gries will be there, making new friends and greeting old ones, leading the next generation toward careers as successful and satisfying as her own.

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GEOVENTURES™



Weber from page 21

Weber's take, unlike others – including the chief geologist who described the reservoir as stacked point bars, extending over a large area – was that the reservoir was probably of limited width and meandering.

Expecting criticism, Weber prepared a model consisting of a slotted platform in which a number of perspex sections could be inserted showing the channel sands and crevasses in color.

"When indeed the head of production blew his top, I unveiled my model," he said. "No further debate was necessary."

He looks back now on that and

the rest of the stories, challenges and disappointments, and far from regret, far from regaling one with tales of a wild ride, he sees calm.

"I have led a regular type of life," he said, "in which everything went fairly smooth."

His Brilliant Career

Even his time in Nigeria, he says – a place he worked for six years and visited an additional 10 times.

"I was in charge of the Shell study teams that did much of the work on Nigerian fields."

There, he says, his training as a Boy Scout helped him save two little girls who were drowning.

"The training to take care of yourself in

the woods and to cook your own meals is a splendid prelude to a geologist's life," he said.

And of his work at Shell and his belief – well documented – on the importance of sharing information, he says, "I think I saved both Shell and other companies much money in preventing wild goose chases and supporting wrong concepts."

Of it all, he says, "My work was my hobby."

Another hobby was his artwork, of which he says, "I am both an engineer and a geologist."

Most of the drawings are of landscapes and ships.

And of a man and an outcrop.

Still feisty, Weber says he is positive on the future of energy, adding, "I am not a follower of Al Gore and I don't

think burning oil and gas makes much difference."

Now retired, he still reads geology magazines – for fun.

He still keeps up, though, if at a slower pace. Just last year, he published a paper titled "Metamorphosis and Mining."

"I have never had great ambitions but rather a general urge to do interesting scientific work of an innovative nature."

His leg – yes, that same leg nearly lost as the Nazis attacked – still hurts, but now he has time to put it up on the desk on top of all those geology magazines, take out a pad, draw ships and landscapes, write letters in longhand, lean back in his chair ...

And sing Yiddish love songs. 

Honorees from page 18

Slatt, an AAPG Honorary Member, is with the University of Oklahoma, Norman, Okla.

Gabriel Dengo Memorial Award

Presented to honor and reward the best oral presentation at the 2011 AAPG International Conference and Exhibition in Milan, Italy.

☐ Jonny Hesthammer, with Emery Exploration AS in Bergen, Norway, for his paper "CSEM Efficiency – Evaluation of Recent Drilling Results."

His co-authors are Susanne Sperrevik and Aristofanis Stefatos.

Ziad Beydoun Memorial Award

Presented to honor and reward the best poster presentation at the 2011 AAPG International Conference and Exhibition in Milan, Italy.

☐ Stan Abele and Rocky Roden, for the poster "Multi-Scale, Brittle-Ductile Couplets in Unconventional Gas Shales: Merging Sequence Stratigraphy and Geomechanics."

Both are with Seismic Micro-Technology, Houston. (See story, page 50.)

Geosciences in the Media Award

Presented for notable journalistic achievement that contributes to public understanding of geology, energy resources or the technology of oil and gas exploration.

☐ Nick Eyles, professor of geology at University of Toronto in Canada, has authored more than 150 publications on ice age geology and environmental geology.

Two separate awards also will be presented during the opening session:

► William J. Barrett, retired CEO and chairman of Denver-based Bill Barrett Corp., will be honored as the recipient of this year's L. Austin Weeks Memorial Medal, presented by the AAPG Foundation.

The Weeks Medal is presented annually by the AAPG Foundation in recognition of extraordinary philanthropy and service in advancing the mission of the AAPG Foundation.

It is the Foundation's highest honor.

► Sven Treitel will be presented with AGI's Marcus Milling Legendary Geoscientist Medal. AGI renamed its Legendary Geoscientist Award in honor of Marcus E. Milling (AAPG Honorary Member) upon his death in October 2006. Milling served as AGI executive director for 14 years. 

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Photo by Joe A. Austin

Including regulations

When it Comes to Energy, Cal Has It All

By DAVID BROWN, EXPLORER Correspondent

For the oil and gas industry, California has always been a major energy-consuming state.
 A heavy-oil state.
 A highly innovative state.
 And, maybe most of all, a highly regulated state.

"We've got everything out here. We've got hydroelectric. We have nuclear. We've got solar – solar has taken off like gangbusters out in the desert areas. We have wind farms," said AAPG member Tim Kustic, state oil and gas supervisor for California's Division of Oil, Gas and Geothermal Resources in Sacramento.

"But we're still mostly a hydrocarbon state," he added.

Not often considered part of the oil patch, California has ranked as the third largest oil-producing state in the United States, behind Texas and Alaska.

North Dakota may have eclipsed that spot now, but California's hydrocarbon production remains prolific and impressive. In 2010 the state produced 200.8 million barrels of oil and 255.4 billion cubic feet of natural gas, and saw about 2,100 new wells drilled.

Even with California's long history of field discoveries and well-developed production, the search for new hydrocarbon reserves in the state continues.

"We're an old state when it comes to oil and gas production," Kustic noted, "but there are still reserves out there, and the industry is pursuing them."

Home of Innovations

The state's energy demand and varied resources led California to become a



KUSTIC

"The biggest issues that the industry faces in California now relate to state climate change initiatives."

production innovator, according to Kustic.

"With its heavy oil, California is a testing ground or R&D site for other recovery methods," he said.

Both primary and enhanced production goes on in the San Joaquin Valley region, the state's primary oil-producing area. Innovative approaches are being developed to tap more oil in the Santa Maria Basin, near California's central coast, Kustic said.

In the Los Angeles Basin, "due to air emission restrictions, steaming is not the approach of preference. There's more waterflooding there," he said.

Occidental Petroleum Corp. holds a 78 percent interest in Kern County's Elk Hills Field, one of the largest oil and gas fields in the United States, where the company announced a major discovery in 2009.

It recently began a significant unconventional development program.

Oxy expected to drill about 140 wells in its California shale program in the first half of 2012, with about 60 of those inside Elk Hills. The 30-day initial production rates for drilled wells have been 300-400 barrels of oil equivalent per day, the company said.

With established and developing production, Kern County and the

surrounding area have become investment hot spots for the industry.

Oxy is "still doing a lot of capital investment. They're building a huge new gas plant. It's boom time out there," Kustic said.

"When it comes to where money is being spent on E&P in California, Elk Hills has to be close to the top of the list," he added.

But the biggest energy success story in California in recent memory – and the one with the best nickname – involved The Geysers geothermal operation, Kustic said.

The Geysers Field, north of San Francisco, is the largest geothermal field in the world.

By the late 1980s it was badly in need of water for injection to produce steam. Meanwhile in northern California, Lake County and the city of Santa Rosa in Sonoma County were looking for ways to dispose of treated effluent from sewage plants.

A pair of pipelines was built to move the effluent to The Geysers, resulting in increased electricity production – and numerous environmental benefits.

"It was a real win-win story," Kustic said. "'Flush to Flash' was the nickname it was given."

Challenges Ahead

A growing worry in California is the amount of crude oil the state must import for its refineries.

According to a report in the San Francisco Chronicle newspaper in March, California now gets more oil from the Persian Gulf than from Alaska. In 2010, about 21 percent of California's oil supplies passed through the Straits of Hormuz, the paper said.

California produces only 38 percent of the crude it refines. And that number would decline if local producers begin shipping their oil production out of state.

New regulations could put pressure on California producers, said Tupper Hull, vice president-strategic communications for the Western States Petroleum Association (WSPA) in Sacramento.

"The biggest issues that the industry faces in California now relate to state climate change initiatives," Hull noted. "These are all taking different approaches that will have major impacts on the petroleum industry."

He identified three major regulatory actions that will affect the oil and gas industry:

► Global Warming Solutions Act (AB32).

Under AB32, California will try to reduce its greenhouse gas emissions to 1990 levels by 2020. Plans include a cap-and-trade mechanism.

"Companies that both produce oil as well as refine oil are in a relatively small basket of companies that will have to buy credits," Hull said.

See California, page 30



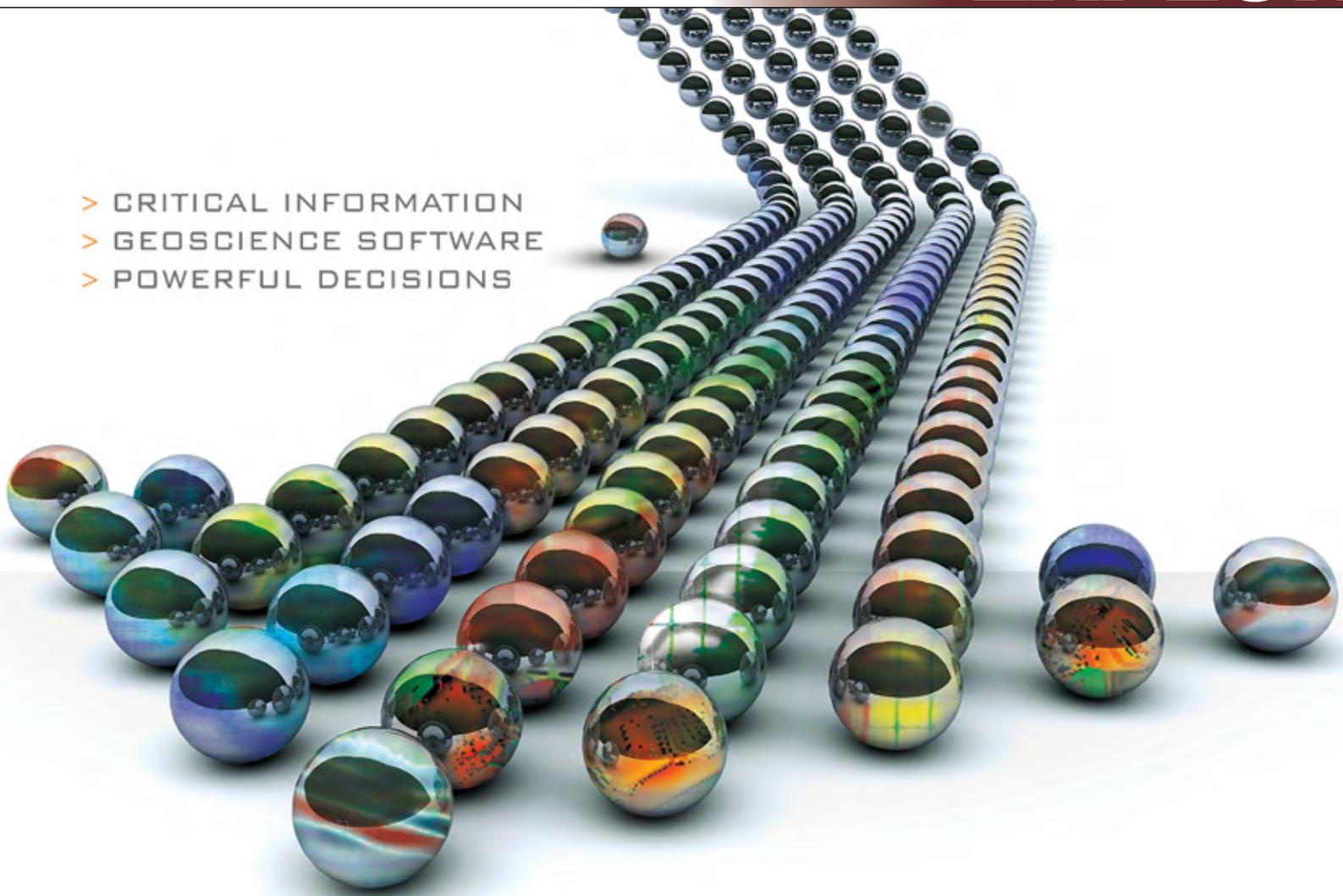
Photo by E. Johnson

Mammoth Pacific Lp's geothermal injection well CA-11667 (SFI) 44-32, with the cooling towers of power plant MP II on the left.



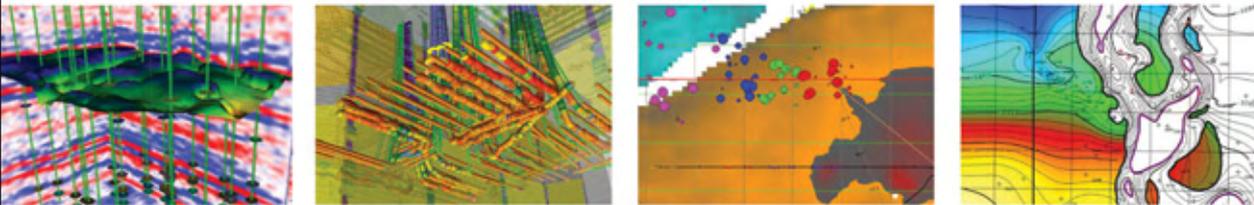
The industry and American culture – and the general public – have been good neighbors at Signal Hill McDonald's well.

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Technology has helped make drilling operations possible in urban areas – and has inspired the California industry to find creative ways to make such activity possible. Above left, Venoco BHHS1, the famed drill site at Beverly Hills High School; right, a modern-day look at activity on Signal Hill.

California
from page 28

He predicted the result will be equivalent to a “multi-hundreds of millions of dollars if not a billion-dollar tax” on the industry.

“There are a ton of details that have to be worked out about how you actually conduct these (emissions credit) auctions that are supposed to take place in California,” he said.

► **Low Carbon Fuel Standard Program.**

This program calls for a reduction of at least 10 percent in the carbon intensity of

California’s transportation fuels by 2020.

“Relatively simple sounding, it’s proving to be exceptionally difficult to achieve,” Hull said.

An initial approach involved blending transportation fuels with other, lower-intensity fuels, like biofuels. But “you quickly run into the problem of having a biofuel with sufficiently low carbon intensity to bring down the carbon intensity of the original fuel,” he noted.

Hull said WSPA studied the likely effects of the fuel-standard program and found that it was not a workable regulation.

“If the Low Carbon Fuel Standard goes forward, it will have another profound effect on the petroleum industry,” he said.

► **Clean Fuels Outlet Regulation.**

According to the California Air Resources Board, the clean-fuels regulation is “designed to support the commercialization of zero-emission hydrogen fuel-cell vehicles planned by vehicle manufacturers by 2015, which will require increased numbers of hydrogen fueling stations.”

“It requires refiners in the state to build and then maintain and supply hydrogen fueling stations throughout the state,” Hull said.

The rule could require creation of 500 fueling stations at \$200 million each and cost the industry up to \$1.25 billion, according to Hull.

It sets a “very high target for the number of hydrogen-powered and hydrogen fuel-cell powered vehicles on the market in the state, the addition of several tens of thousands of alternative cars” he said.

Hull believes California could see “crude-shifting,” where some crude oil produced in the state is disadvantaged under the new regulations and goes to other places.

“This is a cascade of regulations,” Hull said. “Our members and I think most economists who have looked into this expect this to add enormous cost to providing transportation fuels in the state.

“We are in uncharted waters.”



Earth Sciences

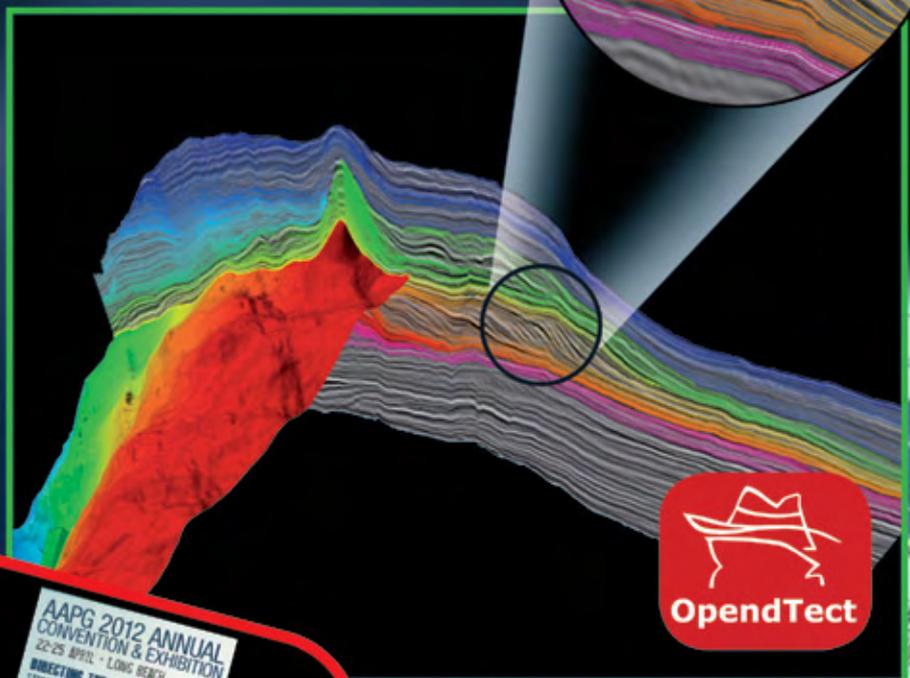
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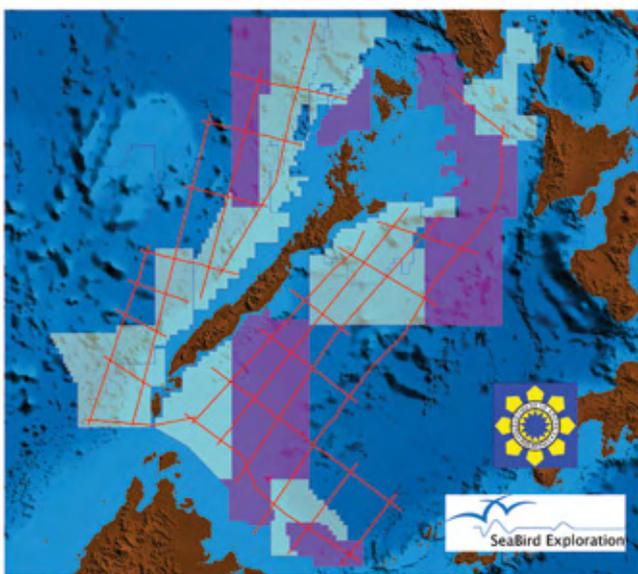
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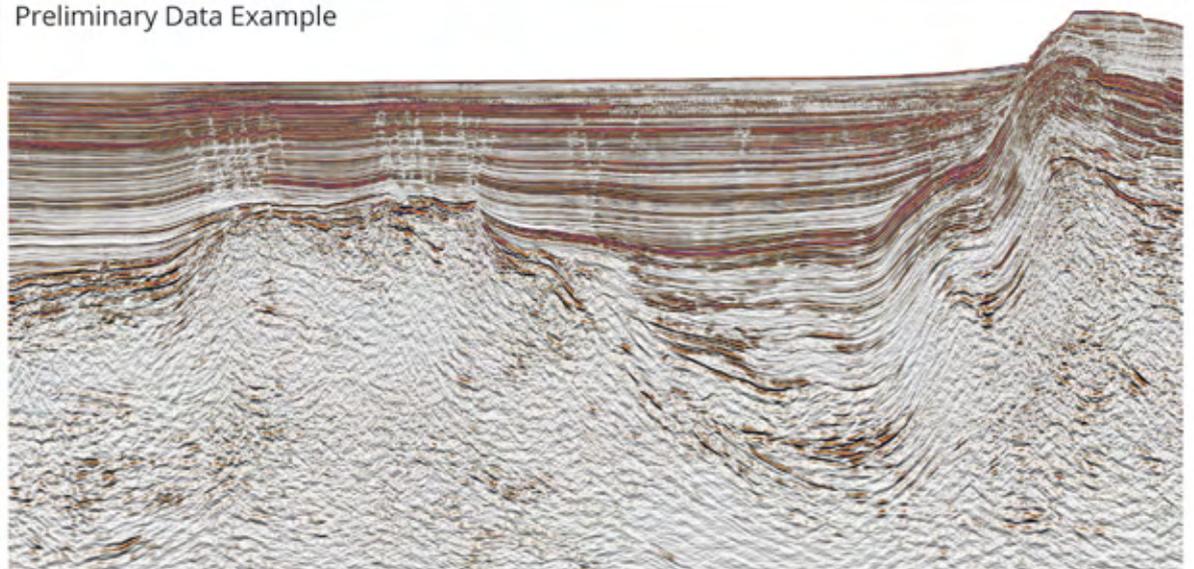
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6,011 KM - East & West Palawan - Philippines



Preliminary Data Example



The Pala-Sulu 2D Seismic Survey

- The Pala-Sulu 2D new acquisition comprises 6,011 km of long offset 2D seismic data over the Palawan, Mindoro-Cuyo, Sulu Sea and Sandakan Basins which provides, for the first time, a stratigraphic link between West and East Palawan with approximately 30 well tie locations.
- The survey was designed to better define the tectonic framework of the Philippines' most important petroleum basins and improve the imaging of syn-rift Eocene grabens and basement in and around Palawan with well-tie lines acquired in acreage release blocks for evaluation.
- The survey data is of high quality and has identified multiple structures adjacent to potential source areas with shallow inversion structures and amplitude anomalies throughout. The dataset is a key tool for companies evaluating the acreage release blocks of the Philippines and who wish to establish a regional perspective of the basins around Palawan.

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'Stealth seismic' leaves no footprint

Technology Solves California Challenge

By LOUISE S. DURHAM, EXPLORER Correspondent

Seismic data acquisition programs typically present a spate of challenges. In some instances, the technology being used in the field just doesn't measure up to the task at hand.

That's when it's time to regroup and go to Plan B, which can entail latching onto a whole new breed of acquisition technology.

This was the case in 2006 when Signal Hill, California-based Signal Hill Petroleum Inc. (SHPI) wanted to shoot a 3-D survey in the old Long Beach oil field, which sits smack-dab in the midst of what is best called a dense urban jungle.

Often referred to as Long Beach/Signal Hill, the giant field has kicked out more than one billion barrels of oil from Miocene and Pliocene-age rocks considered to be sourced by the Miocene-age Monterey. SHPI operates the majority of the field.

Modern seismic technology has not been applied to most of the Los Angeles Basin, according to Dave Slater, executive vice president and chief operating officer at SHPI.

"We had issues with cables, noise, vibrations, so we stopped after a couple of days and said this is not the way to do this; let's do it right," said AAPG member Dan Hollis, managing partner at NodalSeismic (nee Seismic Imaging Solutions, or SISCO),

which is wholly owned by SHPI.

"We decided to build a crew from the ground up, and that's when SISCO was formed," he said. "But a cable system was never meant to work in Long Beach, so we waited to contract the ZLand nodal seismic system from FairfieldNodal. In the process, we dissolved SISCO to create NodalSeismic."

Urban Action

Dense urban environments may never become just another day in the park for seismic data gatherers. Nodal technology, however, is a step in that direction.

The small, self-contained, battery-operated recording units can be temporarily secured to the ground – even covered with several inches of soil if necessary. Ordinarily sourced via vibroseis, they record continuously.

Troubleshooting is essentially history, mainly because the nodal systems ordinarily lack the cumbersome, break-prone cables that can create myriad problems during the course of data acquisition.

Additionally, nodes leave essentially no footprint, meaning they are about as green as can be – plus they are capable of providing superior quality data and



A wide-bin 3-D seismic survey using nodal technology system to better understand a promising Monterey oil prospect near Santa Maria, Calif., was successfully completed last year. Details on page 34.

economy of scale.

After contracting for the land node system, NodalSeismic conducted a 2-D survey at Long Beach, which was followed by a small 3-D pilot project. Then the company implemented a 22-square-mile 3-D program over the field beginning in January 2011.

Using its own newly acquired ZLand system of 6,000 channels, NodalSeismic got creative during the Long Beach 3-D program, actually taking some of the nodes

to use simultaneously in the central coast area.

"You can break it apart to do many jobs with it," Hollis said, "as long as you have enough channels."

Given its geologic history of folding, thrusting and faulting, the highly complex Long Beach field might best be called a mess that's been waiting for some top-of-the-line seismic data.

See Nodes, page 34

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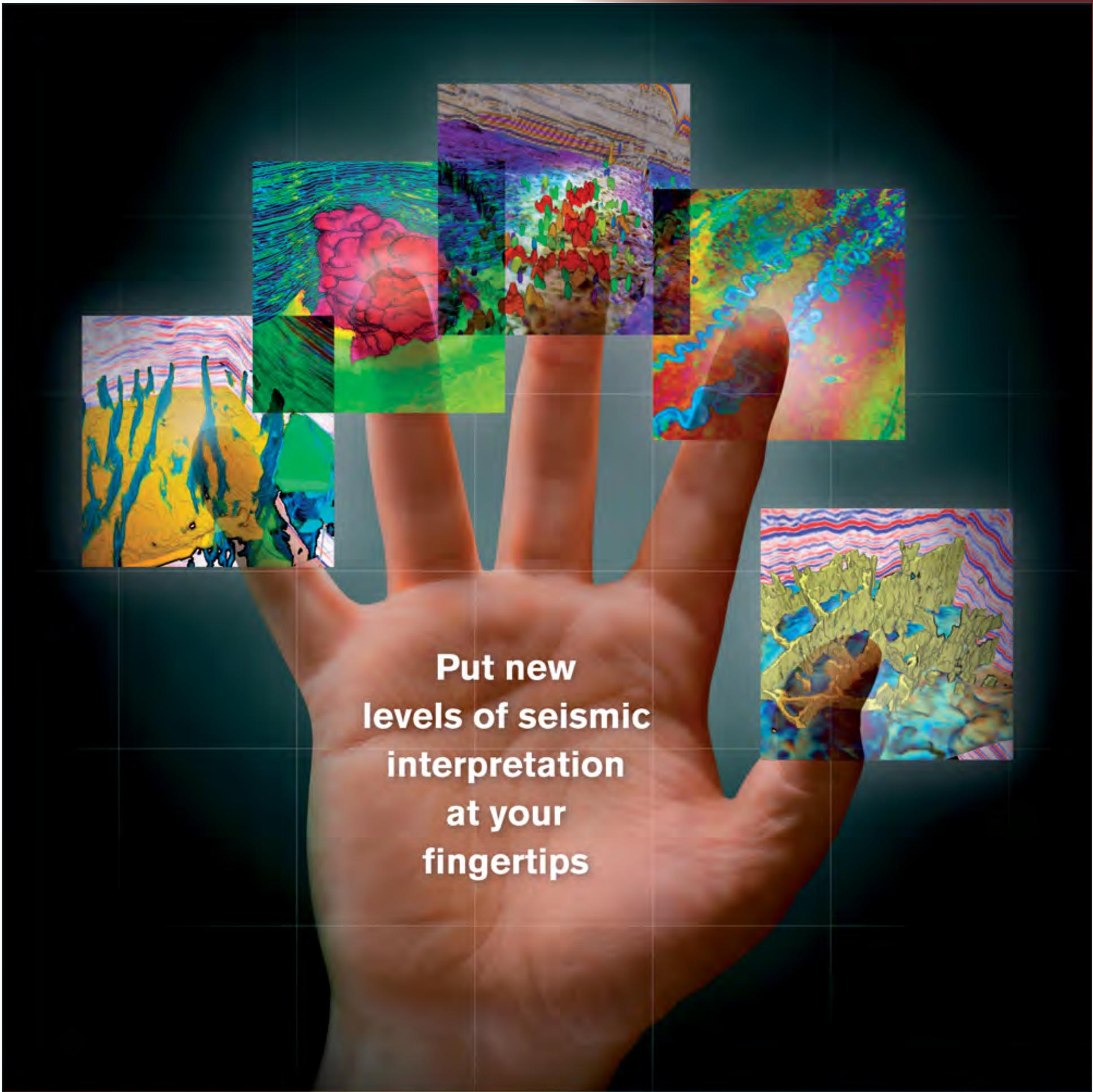


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Solo Nodes Combine for Seismic Choir

By LOUISE S. DURHAM, EXPLORER Correspondent

A wide-bin 3-D seismic survey using the ZLand nodal seismic technology system to better understand a promising Monterey oil prospect near Santa Maria, Calif., was successfully completed last year.

AAPG member Dan Hollis, with contractor NodalSeismic, worked alongside counterpart Dana Brock, with survey client Underground Energy, to manage the operations.

Together they offer here a concise look at this advanced technology survey, reflecting on what was done, and why.

The survey used a set of new innovative tools and technology to significantly reduce the environmental impact of our work, as well as the manpower requirements and costs.

At the heart of the survey was a seismic recording unit known as a node, which is very different from conventional geophone recorders that are still used in most seismic surveys.

Geophones are connected together using miles of cabling, which is costly, prone

to malfunctions and requires considerable manpower to set up in the field.

The node, however, is completely self-contained, drawing power from its own battery and recording seismic data to built-in flash memory.

To set up a node survey simply requires planting each node securely in the ground and activating it with a hand-held terminal.

Underground Energy worked with NodalSeismic to conduct the survey.

In only two days, the NodalSeismic team placed 2,700 nodes – one every 55 feet – along a 13-mile course in steep, deeply

dissected terrain.

Two 30-ton trucks provided seismic vibrations for the nodes to record. Stopping at a node, the trucks lowered a hydraulic plate and vibrated it to send seismic waves deep into the ground.

As the vibration trucks shook the ground, nearby nodes recorded strength and direction of seismic waves as they reflected off underground strata, fluids, faults and other features.

The trucks left behind only a shallow footprint in the dirt road. This was easily repaired at the end of the survey.

High above the course, the mobile command station and GPS tower controlled the work done by the vibration trucks. At the station, the computer automatically triggered the vibrations made by the two trucks, while also marking the time of each vibration and nearest node.

Once the nodes are collected, this information guides engineers to the best slices of the seismic recordings to study.

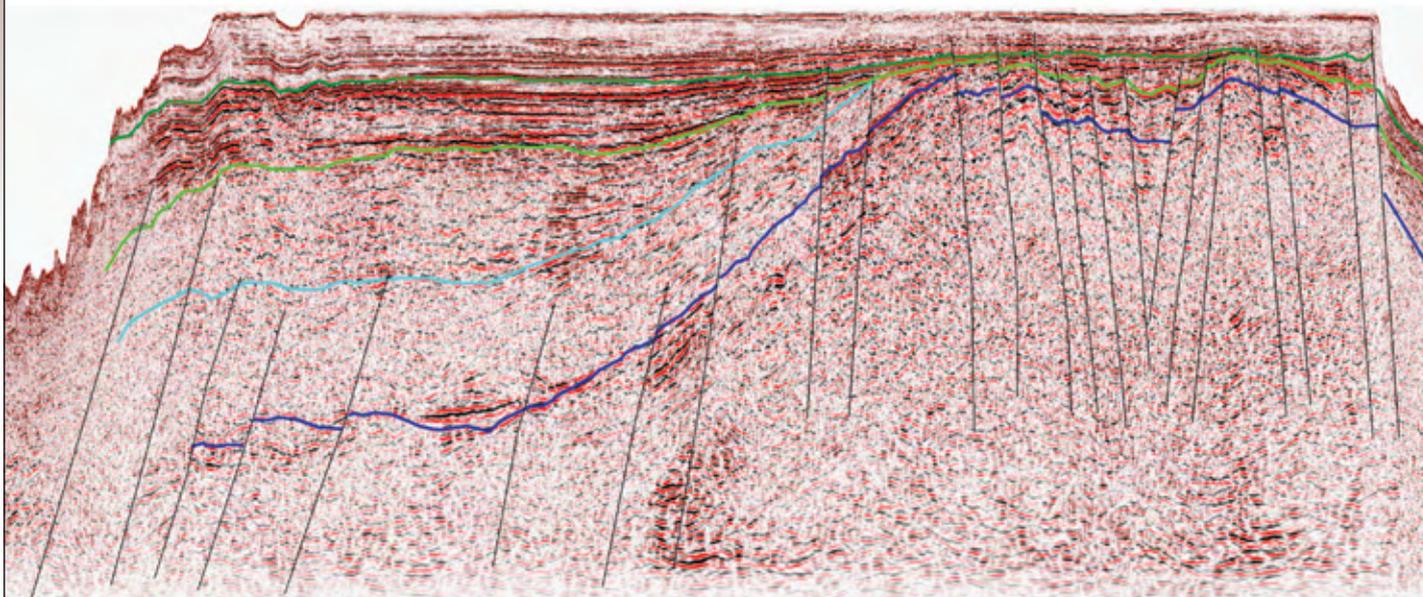
For four days, the vibrator trucks made their way along the narrow winding road, stopping at 2,700 nodes. Afterward, NodalSeismic collected the nodes, moving them to its offices.

There, the team plugged each node into a specialized rack that downloaded the node's flash memory, recharged its battery and ran diagnostic tests.

Computers processed over a terabyte of raw seismic data representing nine million vibrate sweep traces to create detailed visual cross sections revealing the underground features of the project site.

With a clear understanding of that geologic structure, Underground Energy can more quickly identify the most promising areas for drilling. 

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Nodes from page 32

"Three-D is critical here and shows it's more complicated than we imagined," Hollis noted. "It showed SHPI new areas of interest in the Long Beach field."

"Based on having the 3-D in hand, the company bought a new drilling rig with deeper capability, and it's going through a check-out now," he said. "We'll do a deep test based on the 3-D."

Slater offered a succinct take on the nodal program.

"Our ultimate objective with the seismic at the field," he said, "is to get at the two billion barrels we think are still in place."

Getting Into the Mix

Meanwhile, NodalSeismic has been busy in varied locales.

The group implemented a 4-D survey in the famed Barnett Shale for a major company client and has conducted a 3-D in the Eagle Ford for Sigma Energy Ventures, which is a joint venture that includes SHPI.

And California has additional needs for this technology.

Think Monterey Shale, which is one of the hot plays of the moment in the Golden State.

Besides being a prolific reservoir rock,

See Seismic, page 36

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Seismic
from page 34

the Monterey has sourced most of the oil in California. It's thought to contain perhaps as much as 300 billion barrels of oil in place.

Just don't call it a "shale," say many folks.

The Monterey is a mix of rock types – it's basically a large deposit of diatomaceous material.

In what is known as the Opal A phase, it's low permeability unaltered dolomite. As pressure and temperature increase with depth, the Monterey becomes more brittle and fractured as it alters into cristobalite trydimite, dubbed the Opal CT phase. It evolves into a quartz phase as lithification progresses.

Underground Energy in Santa Barbara is



HOYT

"You get the opportunity to have to some effect a 3-D layout and shoot with very low impact – and it's very, very cost-effective."

highly focused on the Monterey potential in California, particularly the central coast area.

When the company sought assistance to zero-in on the details of some of their acreage, NodalSeismic hit the scene with nodes on hand.

"We did a couple of two-and-a-half 2-D swaths, or what some call a wide bin 3-D, of about 20 square miles each," Hollis said.

"Shooting a 2-D swath line in effect can generate a pseudo 3-D," noted

AAPG member David Hoyt, vice president of exploration and development at Underground Energy. "You get the opportunity to have to some effect a 3-D layout and shoot with very low impact – and it's very, very cost-effective."

He emphasized they achieved almost a zero footprint. This jibes with the company's emphasis on being a "green" oil company.

Hollis commented on the less frequently discussed advantages of nodes.

"We've actually been preserving the passive data," he said. "These things record 24/7, and I think analysis of that passive data is going to yield fantastic results – being able to improve velocity models, being able to monitor micro-earthquakes."

In fact, NodalSeismic conducted a seismic hazard analysis for the Diablo Canyon nuclear power plant, where safety is paramount – particularly in earthquake country. The original site study was conducted in the 1970s.

A Fast Start

With its new seismic in hand, Underground Energy is wasting no time

On the Zaca prospect about seven miles from its Asphaltea project in the Santa Maria basin, the company has plans to drill five-to-seven wells between now and August, according to Hoyt. Depending on successes, a number of others could follow. The initial Zaca well was being spud at press time.

"There are a number of new structures we identified with our 2-D seismic that have remained undeveloped," he said. "We control the leases on those particular structures."

"The field has produced 32 million barrels from about 60 wells that range in cumulative production from about 400,000 to over a billion-and-a-half barrels per well," Hoyt said.

"Basically, it's 11-degree-gravity oil," he said, "and it comes out of the ground at a temperature about 175 degrees, so when it comes out it flows – it's a very hot reservoir."

Drilling depth to the Monterey will be in the 5,500 to 6,500-foot range. Hoyt emphasized they will be drilling vertical wells along with some deviated ones.

"We'll stay in the conventional framework of Monterey development," he said. "We think keeping it simple is a wiser, more efficient choice for economic gains."

"The Monterey has not turned out to be the quote-unquote resource play as envisioned, but more of a fractured quartz play enhanced by structure and stratigraphic pinchout," Hoyt noted.

"We think it's aligned to a structural-stratigraphic model, that it's a conventional reservoir where you have to have a defined structural trap where the fractures are enhanced by folding and faulting."

"You need structure and/or stratigraphic closure to trap the Monterey effectively and commercially," he emphasized.

The Driver

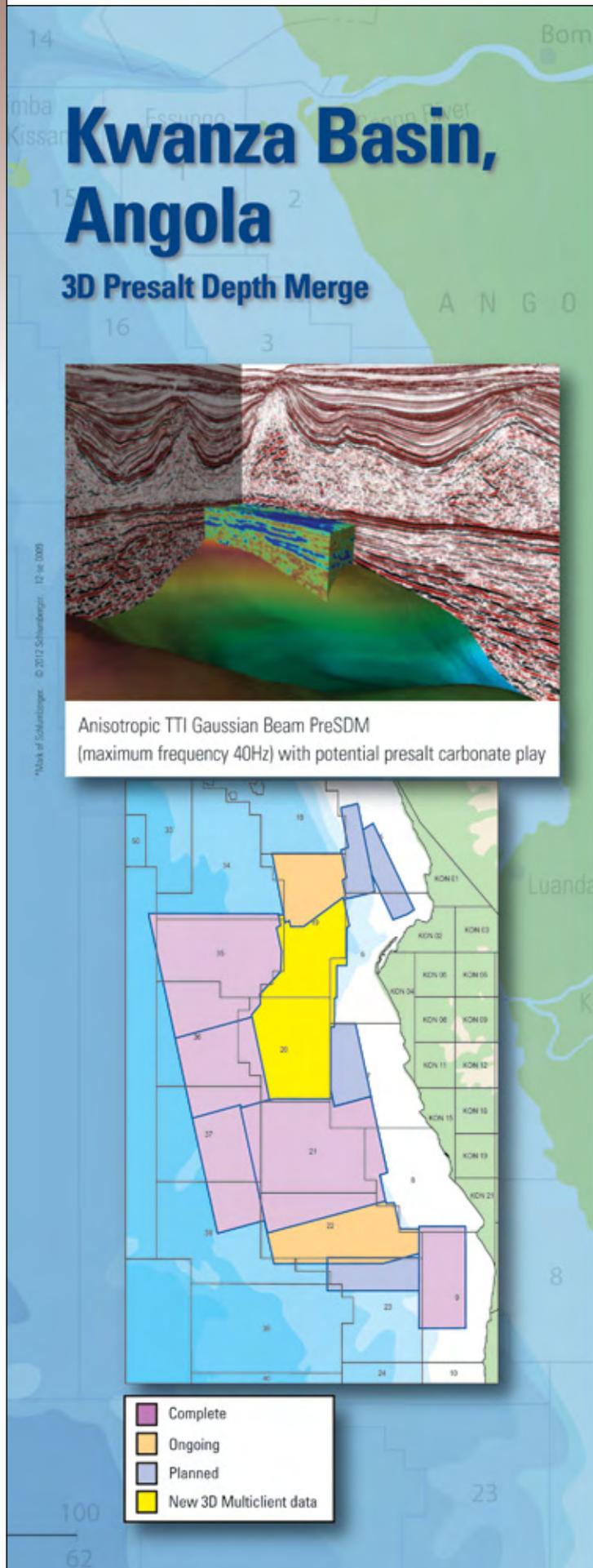
Hoyt added that the seismic program in central Santa Barbara County identified a number of large undrilled – and some drilled – new folds, or anticlines, with high structural relief, which he said they plan to drill in the next few years. Some of these folds have downdip wells productive in the Monterey as far back as the 1960s. The seismic data revealed geologic features such as four-way dip closures, hanging walls and more.

"We intend to use this tool not only in Santa Barbara County but in our other operations in California's San Joaquin Basin and in Nevada," Hoyt said.

Even with many success stories on record, land node systems technology for seismic data acquisition is in its infancy, relatively speaking, and Hollis predicted great potential.

"The possibilities it offers are amazing," Hollis said. "We're getting flooded with people interested in bids on projects, so we see good organic growth and are staffing up."

"The node system," he emphasized, "is the driver for that."



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- Storage site validation for carbon capture

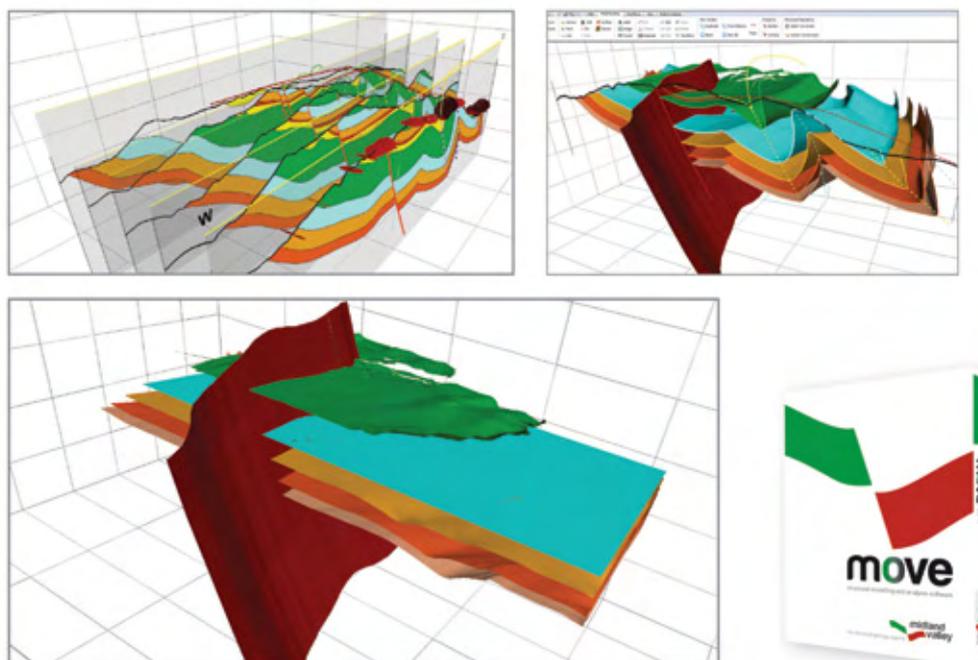


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From South Texas to the world

'... An Ambition to Do My Own Thing'

By DAVID BROWN, EXPLORER Correspondent

Some explorers find success hunting elephants.

Dan Hughes Sr. found it hunting birds. Hughes is the 2012 recipient of AAPG's Norman H. Foster Outstanding Explorer Award, presented each year to one of the Association's most distinguished and outstanding members who has "shown a consistent pattern of exploratory success."

The description fits Hughes perfectly. But start this story in 1954.

Hughes, just out of the U.S. Army, had gone to work as a geological scout for Union Producing Co. in Louisiana.

"I was sent to New Orleans," he said. "Well, New Orleans was a great place for a single guy to work but I was making \$350 a month, and I could spend that much every night."

He requested a transfer, and Union Producing found him a spot in Beeville, Texas, about 40 miles northwest of Corpus Christi.

Jump forward to today. Hughes still operates out of Beeville, with a long career of oil and gas exploration stretching well beyond South Texas, to the far reaches of the world.

"I started going overseas pretty early," he said. "A lot of the independents don't even think about going overseas, but it's lucrative, mostly because the land positions are so large."

"And you don't have to be Exxon to do it."

Among those rewarding ventures, Hughes has operated or participated in



HUGHES

"First of all, I'd say do something you really enjoy doing. Don't enter a business just because it looks like there's a lot of money in it."

exploration successes in Canada, Australia and Colombia.

More recently, he's ventured into the unconventional resource opportunities opened up by horizontal drilling and hydrofracturing.

"For our latest we got into the Barnett Shale and drilled about 20 wells. Then we got a big offer and sold out," he said.

Dan A. Hughes Co. LP also entered the Eagle Ford play in South Texas, assembling a block of about 50,000 acres, drilling a string of prolific wells and then selling the project to a publicly held company.

Match Game

But the subject was birds.

In his response to the award nominating committee, Hughes described two bird-hunting outings that led to profitable exploration.

The first contributed to the very first major find for his company.

"Back in 1967 I was an independent

here, and I got to working a goat pasture in the part of the district near north Laredo (Texas)," Hughes recalled.

He discussed a mineral lease with John Beasley, a local attorney and friend who happened to own a ranch over a low relief structure Hughes had mapped. Beasley invited him to go quail hunting at the ranch.

During that visit Beasley tossed a match into the casing of an old, abandoned well on the property. When a two-foot flame erupted, Hughes wrote, "I knew I had found a good prospect."

After putting together a leasehold, Hughes drilled the discovery well for the Las Tiendas Wilcox gas field, which eventually covered 11,000 acres.

"It's a series of sands down to around 3,500 feet," Hughes said. "It was profitable for me because it was cheap drilling."

That find put the company on its way to a number of other discoveries in Louisiana, Mississippi and Alabama, plus more success in south Texas.

"We've played nearly all the trends

down here, mostly the Cretaceous and the Wilcox," Hughes explained.

From there he moved into drilling oil wells on the shallow, promising prospects in the company's area of operations.

"It was something the majors didn't care about," he said. "We drilled around 400 wells down here. It was mostly in the Cretaceous, mostly about 2,000 feet. Those wells made 15 to 20 barrels a day."

Globe Trotting

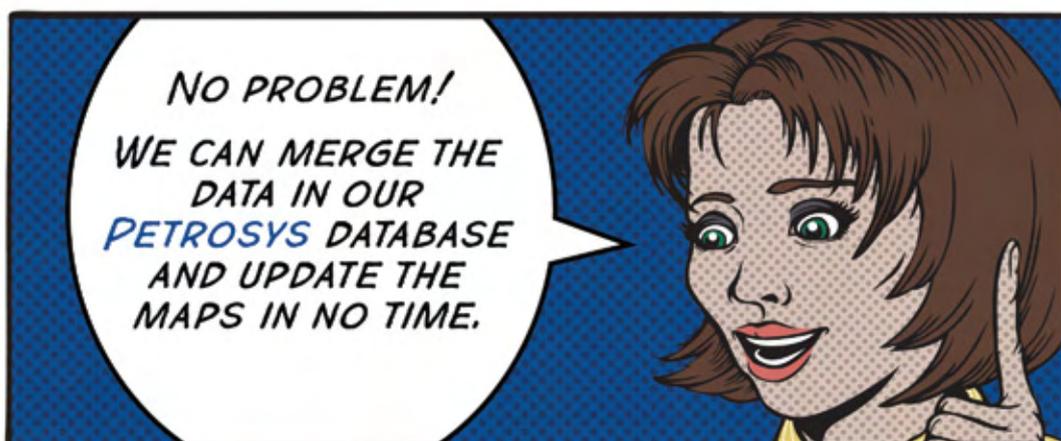
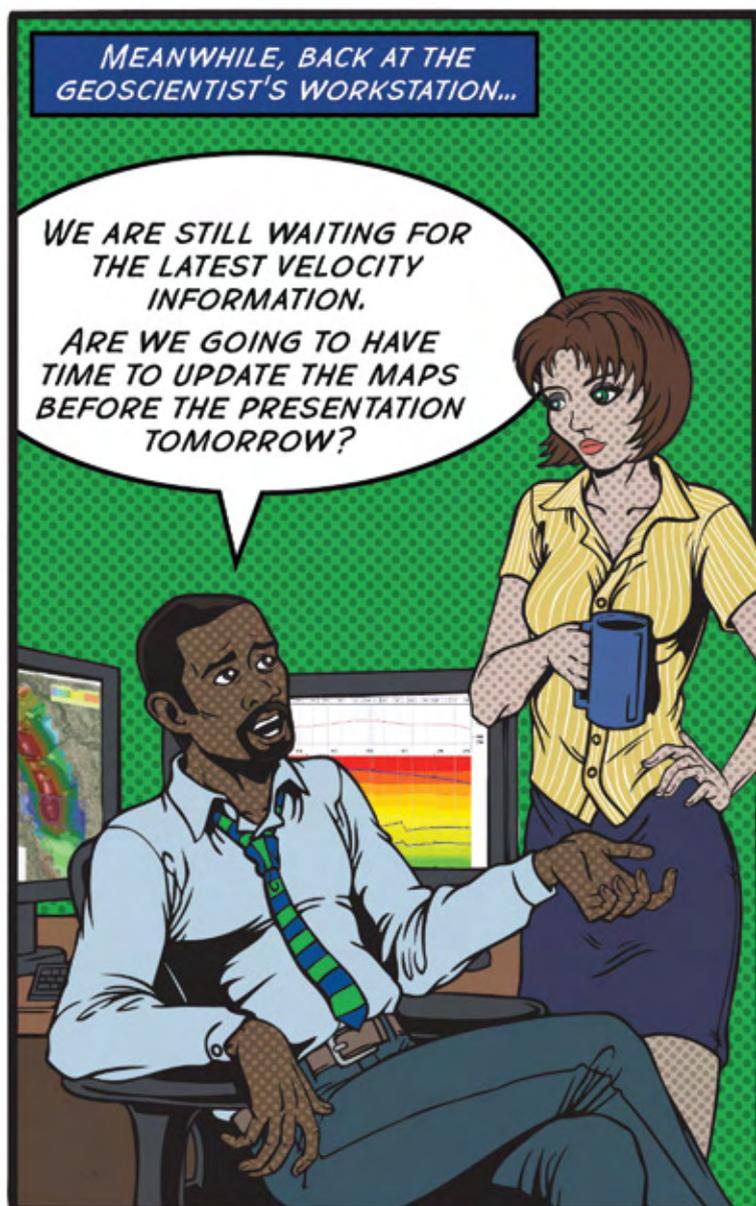
Later, an investor in New York invited him to England to shoot driven birds. Hughes said he continued going to the event annually and met a geologist from Australia who had developed several prospects. One involved a large concession north of Perth, along the pipeline that supplied the city with natural gas.

"A deal was made to farm out this permit from some small Australian operators and, after doing seismic, we began drilling a well on what I thought was one of the better prospects," Hughes recounted.

After touring an aircraft factory in Japan, Hughes caught a flight to Australia to check on progress. On that flight he saw a newspaper report about a new gas discovery in the Perth Basin.

Their drilling had opened the Woodada field, which Hughes called the first Permian Reef limestone discovery in Australia. Both

See Hughes, page 40



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Around the world with AAPG's Norman H. Foster Outstanding Explorer Award winner Dan Hughes – always doing what he loves.

Hughes
from page 38

the location and the timing were fortunate. "At that time there was only one gas field serving Perth, and it was depleting," Hughes said.

In 1996, Hughes and his company looked for exploration opportunities in South America. Several countries were evaluated for potential.

"We tried Bolivia and never could find anything good," Hughes said. "In Venezuela the terms were so tough you couldn't make any money."

In the end, the Llanos Basin in Colombia seemed to offer the best chances, with good source rocks and promising reservoir conditions.

Hughes decided 3-D seismic would help identify subtle structural closures. The large surveys led to several significant oil discoveries, and Hughes later was able to sell one of the producing concessions for a ten-figure price.

'Lucky Enough'

After earning his degree in geology at Texas A&M in 1951, Hughes had no doubt he would enter the petroleum business and eventually start his own company.

"I always had an ambition to do my own thing," he said.

First, though, he joined the U.S. Army.

Stationed at Fort Bliss near El Paso, Hughes spent his off-duty hours doing mapping in southern New Mexico. He purchased a federal lease there, then sold the prospect to a Carlsbad operator for an overriding royalty.

The operator drilled the discovery well for the Saladar Oil Field on the lease and Hughes was on his way – to the Korean conflict, where he served as an artillery officer and was awarded a Bronze Star.

Friends, associates and business connections have played major roles in Hughes' lifelong success. He said a friend from San Antonio moved to Calgary, which led Hughes to a cooperative venture with Anderson Exploration Co.

And that led to a share of the Dunvegan field in Alberta, with 1.6 trillion cubic feet of gas reserves, and several other discoveries.

"The first well they drilled hit one billion 600 thousand feet of gas," he said. "That was their discovery, not mine, but I was lucky enough to get in on it."

His personal advice to young petroleum geologists is to do what you love and to look beyond your own backyard.

"First of all, I'd say do something you really enjoy doing. Don't enter a business just because it looks like there's a lot of money in it," Hughes said.

He talked about acquiring a company airplane in 1972, which gave him a broader range of operations and the ability to be "in Houston for breakfast and in Jackson, Miss., that same afternoon."

Close examination of his successful career could indicate two other rules:

- ▶ Understand the implications of the local geology.
- ▶ Use the latest technologies in the most effective ways.

His contributions to Texas A&M have included restoring the Military Walk and endowing the Berg-Hughes Center for Petroleum and Sedimentary Systems. Hughes credited the university with developing both his petroleum geology skills and his devotion to the work.

"We happened to have some good professors who were interesting," he said. "We took a lot of field trips. I'd rather do that than play golf." 

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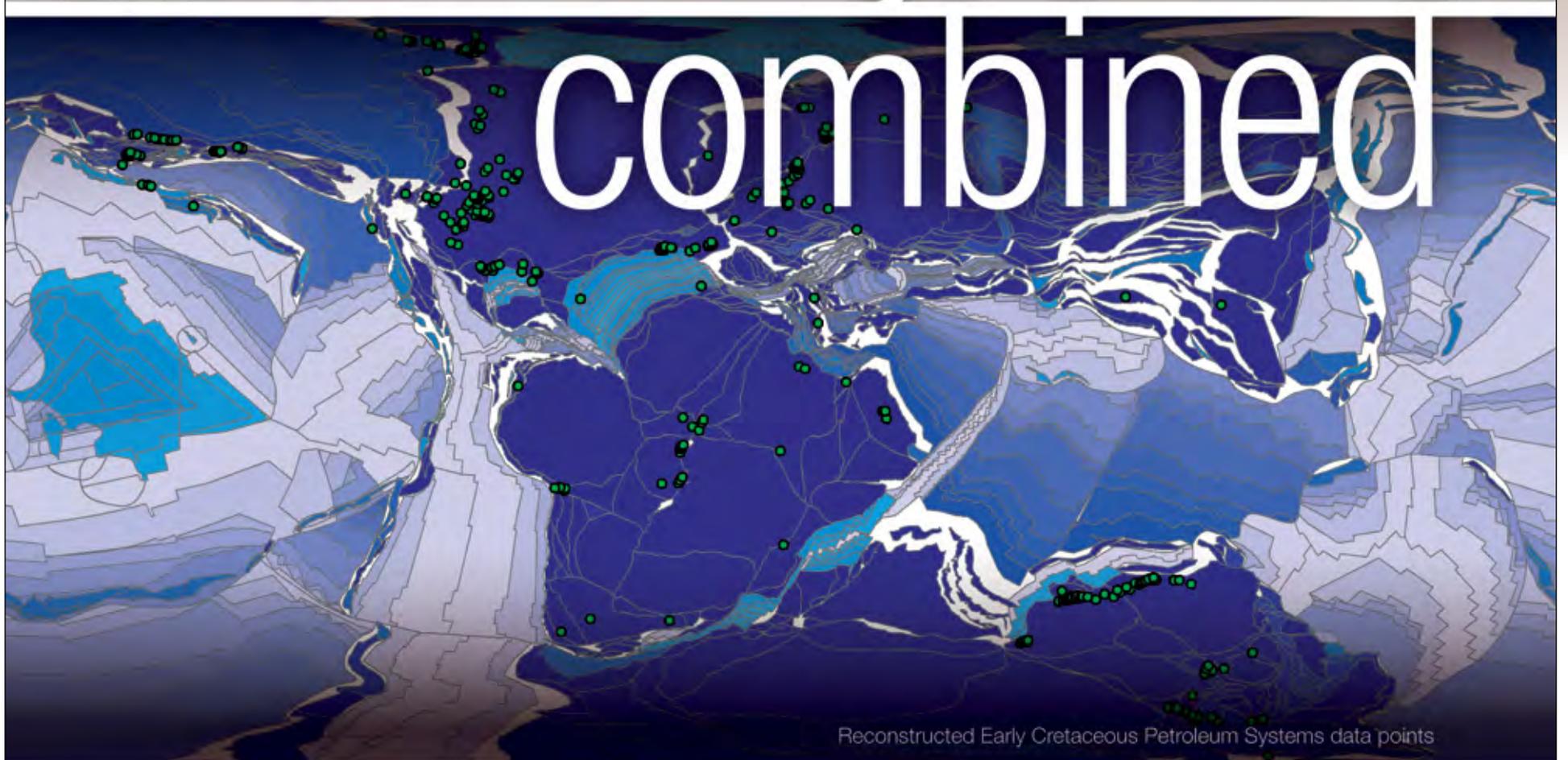
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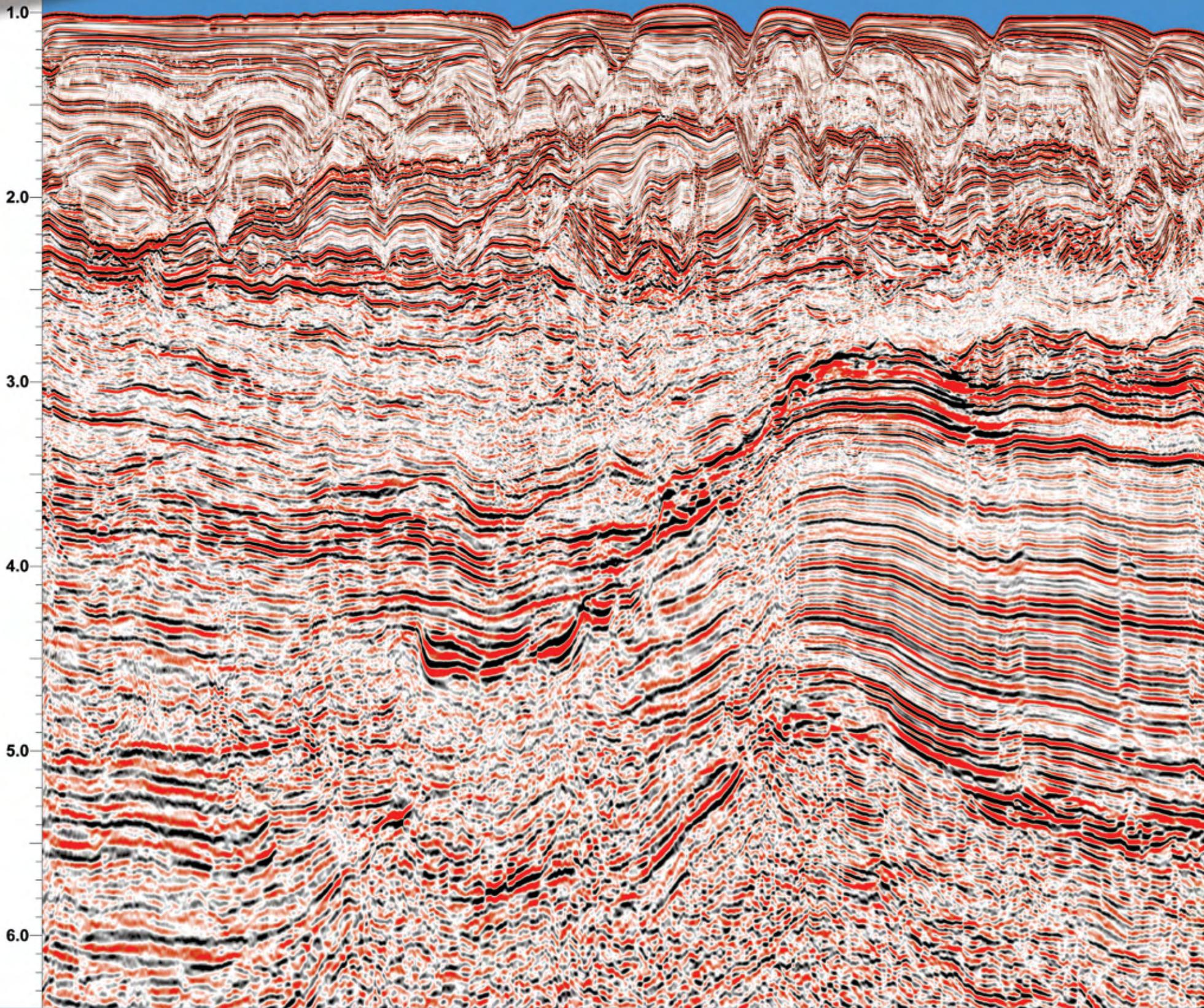
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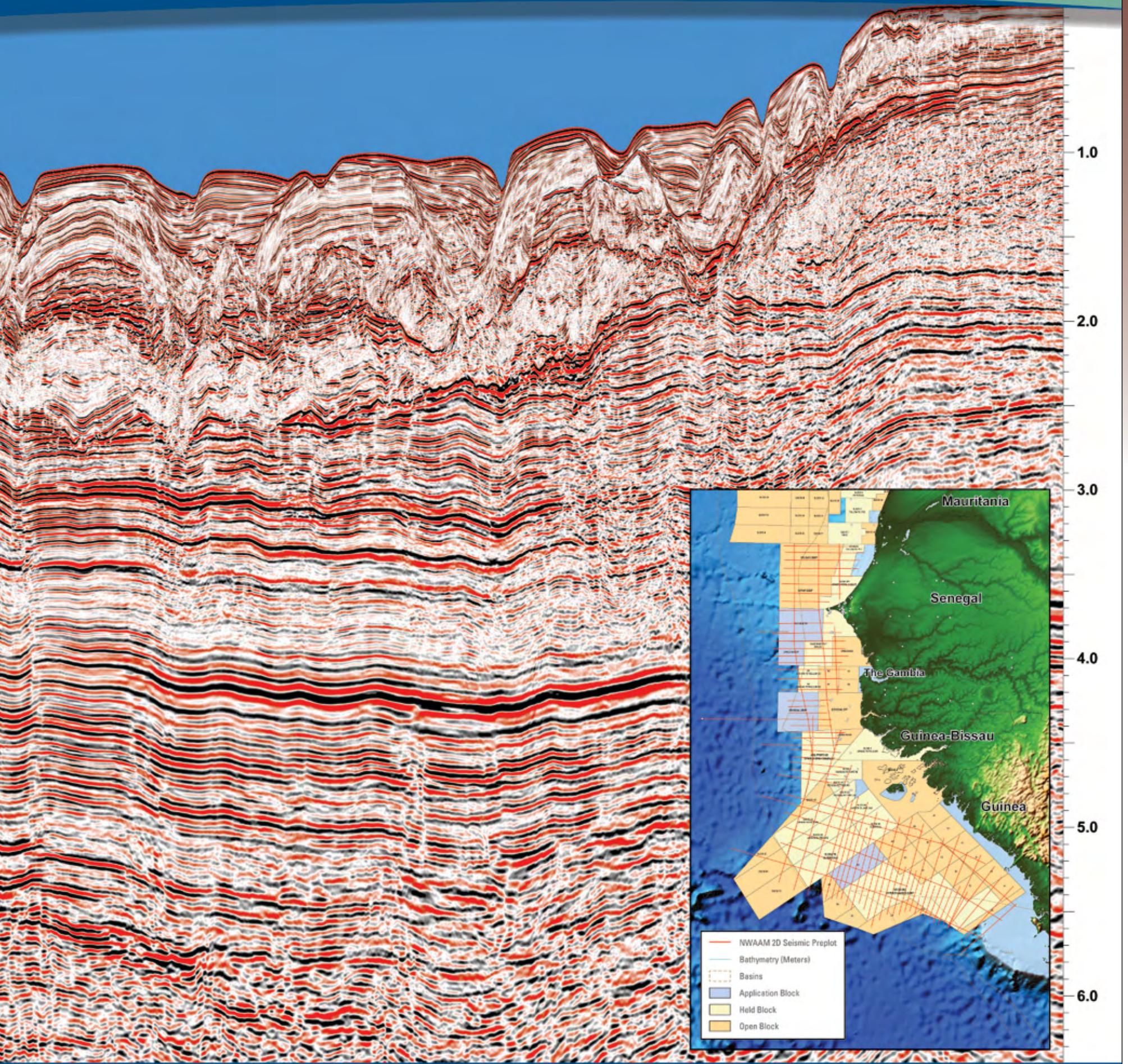
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'New Discoveries in Old Areas'

Discovery Forum Has Oil Emphasis

By LOUISE S. DURHAM, EXPLORER Correspondent

It's back, for a fifth time – and organizers say it's bigger and better than ever.

Enlightening forums and panels defined by specific themes are highlights at every AAPG Annual Convention and Exhibition, and this year's event in Long Beach, Calif., is expected to keep the streak alive.

Leading the way is this year's edition of the Discovery

Thinking forum, which premiered in 2008 and just keeps going, always drawing a big audience.

"We'll do these forums as long as people keep showing up," AAPG Honorary Member and DPA president-elect Charles Sternbach quipped. He is Discovery Thinking forum co-chairman along with fellow AAPG Honorary Member Ed Dolly.

"We're hopeful that will take us at least to 2017, which is the AAPG Centennial," Sternbach said.

"Discovery Thinking originally started as a 100th anniversary initiative recognizing '100 who have made a difference,'" he said. "As the forums progressed, we included the personal issues and expanded the time slots to let people bring in a lot of technical information."

"You hear about the personal side of the discovery and also see the data."



STERNBACH

AAPG's fifth Discovery Thinking Forum, a presentation of the AAPG 100th Anniversary Committee's program recognizing "100 Who Made a Difference," will be offered from 1:15-5 p.m. Monday, April 23, at the AAPG Annual Convention and Exhibition in Long Beach, Calif.

This year's theme is "New Discoveries in Old Areas." The session, comprising talks from the Pacific, Rocky Mountain and West Texas areas, will include:

▶ Robert Bridges, with Vintage Production California, talking about

The presentations of the "why and how" of selected discoveries have been recorded since the original forum in 2008. It's intended that there will be a fairly robust legacy of recorded talks on the *Search and Discovery* area of the AAPG website.

This can be quite an amazing resource.

"Taking notes in an audience is not as good as when I'm home and comfortable and my mind is focused," Sternbach emphasized. "I can go through the talk on demand, hear it, stop it, study it.

"Information on demand is a great way to learn a subject," he asserted. "The web links will enable students and seasoned professionals alike to enjoy the stories, to learn from them and make new discoveries on their own."

"If a picture is worth a thousand words, then a video is worth a million," he said.

"That phrase encapsulates the power of the

Rediscovering California: The Gunslinger Discovery, New Concepts for Mature Producing Areas, at 1:20-2 p.m. His co-authors are Ingvar Alarik, Kurt Johnson, Kurt Neher and Robert Stupp

▶ Tony Reid, with Occidental of Elk Hills, discussing **Rediscovering California: The Monterey Formation in the San Joaquin Basin**, from 2-2:40 p.m. His co-authors are Steve Schulz, Ingvar Alarik and Kurt Neher.

▶ James C. Henry, with Henry Resources, discussing **The Wolfberry – How it Started**, from 3-3:40 p.m.

▶ Orion Skinner, with Whiting Petroleum Corp., discussing **Discovery of Pronghorn and Lewis and Clark Fields: Sweet-Spots Within the Bakken Petroleum System Producing From the Sanish/Pronghorn Member NOT the Middle Bakken or Three Forks!** from 3:40-4:20 p.m. (See related story on page 46.) His co-authors are Lyn Canter, Mark D. Sonnenfeld and Mark Williams.

▶ Edward J. LoCricchio, with Cordillera Energy Partners, discussing **Granite Wash Play Overview, Anadarko Basin**, from 4:20-5 p.m.

Discovery Thinking legacy on the AAPG website."

Focusing On Oil

There's excitement aplenty over the program for this year's forum.

"We think these are basically exciting discoveries in mature or old areas; none of them are frontier basins," Sternbach emphasized. "These are 'mature areas,' yet these are new and exciting discoveries."

He noted that each of the speakers and their associates overcame great challenges in both business and geological aspects of the profession. Topics to be discussed will include philosophy of exploration, stories from remarkable careers, professional insights and colorful anecdotes, lessons learned on the path to success.

"What's new and different this year is

the emphasis on oil," he noted. "These plays are part of what's fueling this amazing transformation from being an oil importer to having excess oil."

With so much buzz about the "changing of the guard" as seasoned veterans retire from the profession, the forums have an important role to play.

"As technology advances and a new wave of young geoscientists enter our profession, we see continued interest in forums such as this to discuss both the personal side of success and what has been called the art of exploration," Sternbach commented.

Expect this event to be exceedingly dynamic at AAPG's 2017 centennial get-together.

"From the get-go, we knew we had to begin with the end in mind," Sternbach said. "We knew that 2017 would have to be big." 

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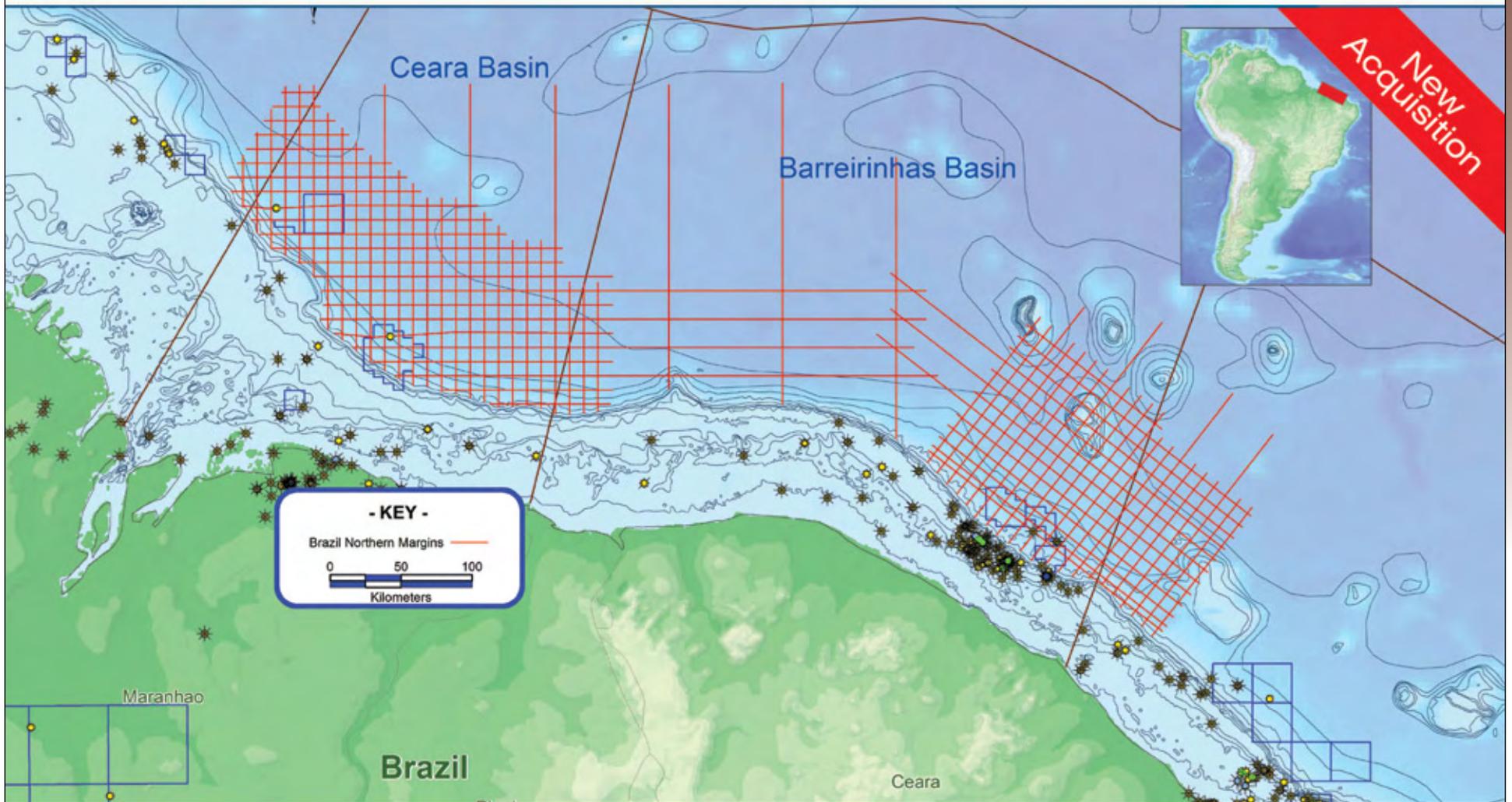
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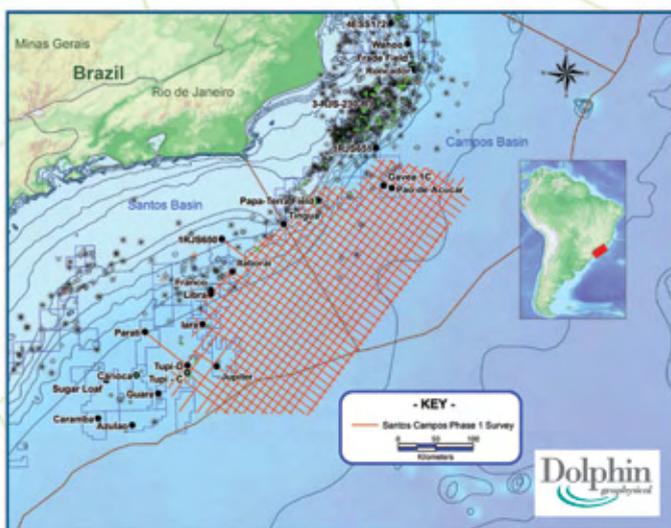
New Multi-Client Acquisition, Santos Campos, Northern Equatorial Margins



Northern Margins - Spectrum Multi-Client coverage

Spectrum has recently completed acquisition of a new 2D Multi-Client seismic survey in the Northern Equatorial Margins Offshore Brazil. Phase 1 of the program is 12,000 kilometers of high-quality seismic data from the Barreirinhas and Ceara basins with additional regional tie lines. The program provides oil companies with a competitive advantage in the upcoming Licensing Round 11. First data will be available in April.

In addition, Spectrum and Dolphin Geophysical are set to commence an extensive, long-offset 2D Multi-Client survey over the Santos/Campos basins. These Multi-Client surveys will be acquired by Dolphin Geophysical and processed by Spectrum with the aim to better define the exploration prospectivity. The data will be available ahead of the expected pre-salt bid round anticipated in the 2012-2013 timeframe.

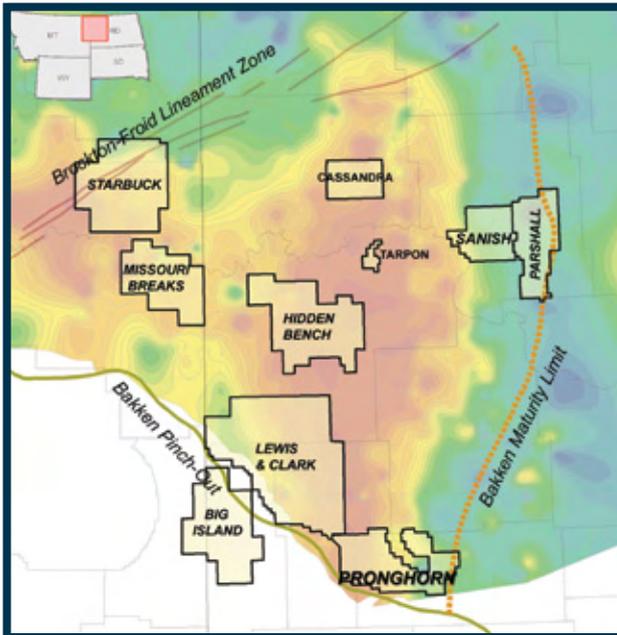


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The regional Hydrogen Index (HI) of the upper Bakken Shale, based on public domain data accessible from the U.S. Geological Survey, supplemented by in-house data. Hot colors are low HI values indicative of greater levels of thermal maturity; cooler colors are higher HI values indicative of lower thermal maturity. Named project areas highlight Whiting's Williston acreage holdings; the productive Pronghorn zone is the southern-most entity on the map.

NOT Middle Bakken or Three Forks!

Rocks Led the Way to Sweet Pronghorn Spots

By LOUISIE S. DURHAM, EXPLORER Correspondent

It's a jubilant occasion, indeed, when one discovers a new sweet spot in a known play area. A key to success: Keep an open mind. "The discovery of various Bakken petroleum system sweet spots over the last 10 years typically advanced through application of preceding paradigms to new areas," said AAPG member Orion Skinner, senior explorationist at veteran

Bakken shale player Whiting Petroleum Corp. in Denver. "By contrast, each new sweet spot represents a distinct combination of multiple play factors including source rock quality, maturity, reservoir quality, pressures, to name a few," Skinner noted. "Remaining open minded to a variety of sweet spot factors is fundamental to tight oil resource play exploration."

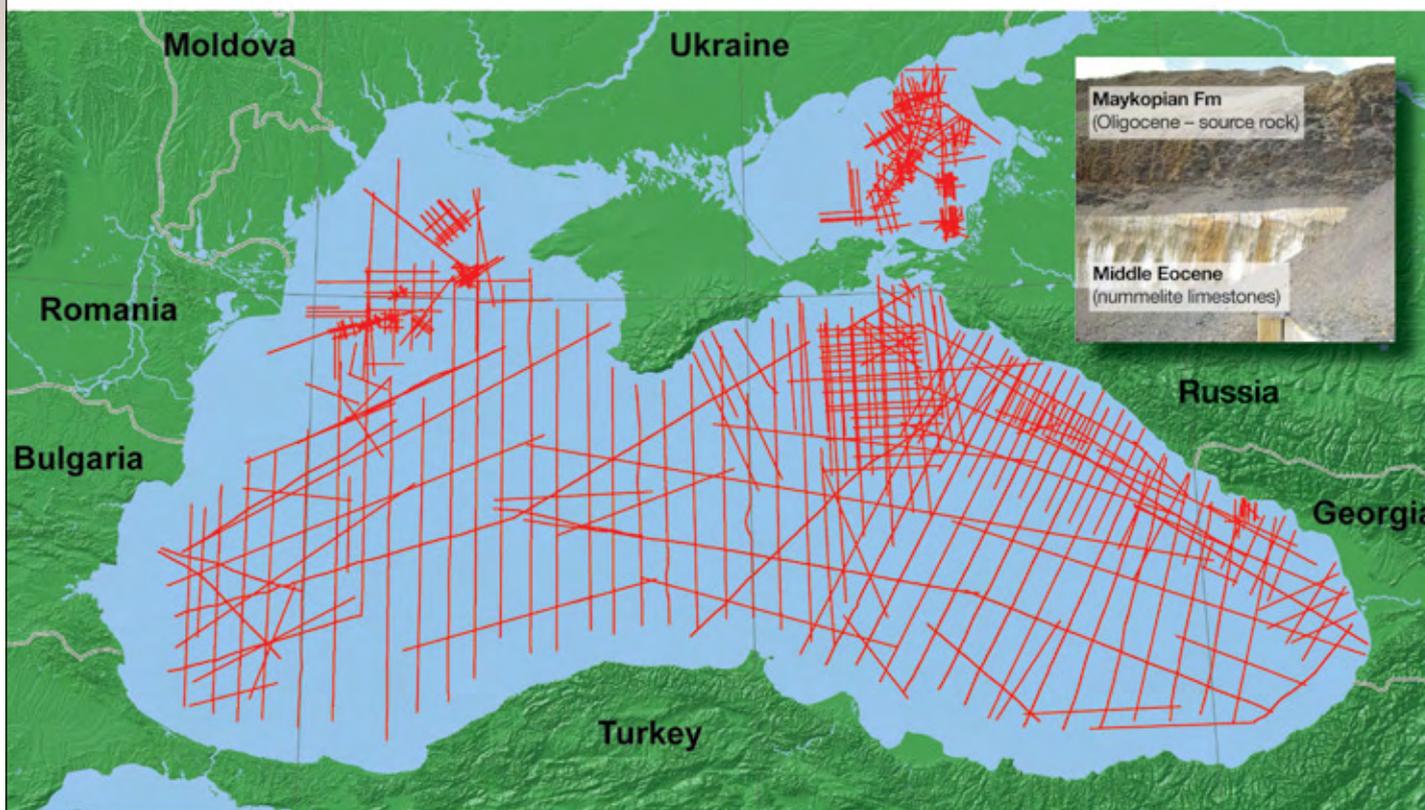
The team members at Whiting practice what they preach. A striking example of this approach to business is their discovery of the highly productive Pronghorn zone that lies beneath the lower Bakken shale and overlies the Three Forks formation in the Williston Basin in North Dakota. "It's an extra unit that was predicted by good core work and sequence stratigraphy," said AAPG member Lyn Canter, technical adviser at Whiting, now the dominant producer in the Pronghorn interval in Stark and Billings counties. "We recognized this new zone and got about a year's jump on everybody else and got our lease position put together," Canter said.

AAPG member Orion Skinner will present the paper "Discovery of Pronghorn and Lewis and Clark Fields: Sweet Spots Within The Bakken Petroleum System Producing From the Sanish-Pronghorn Member – NOT the Middle Bakken or Three Forks!" as part of the Discovery Thinking Forum at the AAPG Annual Convention and Exhibition in Long Beach, Calif. The Discovery Thinking session will be held from 1:15-5:05 p.m. Monday, April 23. Skinner's paper is slated to begin at 3:40 p.m. Skinner is senior explorationist for Whiting Petroleum Corp., Denver.

This Was No Accident

Whiting drilled the discovery well in the Pronghorn zone in the first half of 2010 and has drilled more than 30 wells in the field to date. The horizontal wells have a measured depth of approximately 20,000 feet, and some IPs have tallied as much as 3,100 bopd with very little water. The main Pronghorn pay facies is burrowed detrital dolomitic siltstone with finer grained rippled interbeds, according to AAPG member Mark Sonnenfeld, vice president geoscience at Whiting. At first glance, Whiting's high profile operating presence and expertise in the basin – particularly in the Middle Bakken interval at the giant Sanish and Parshall fields in Mountrail County, N.D. – might suggest that the Pronghorn discovery was a lucky break. *Au contraire.* Pronghorn was no accident. "Detailed core and detailed log evaluation across the basin identified

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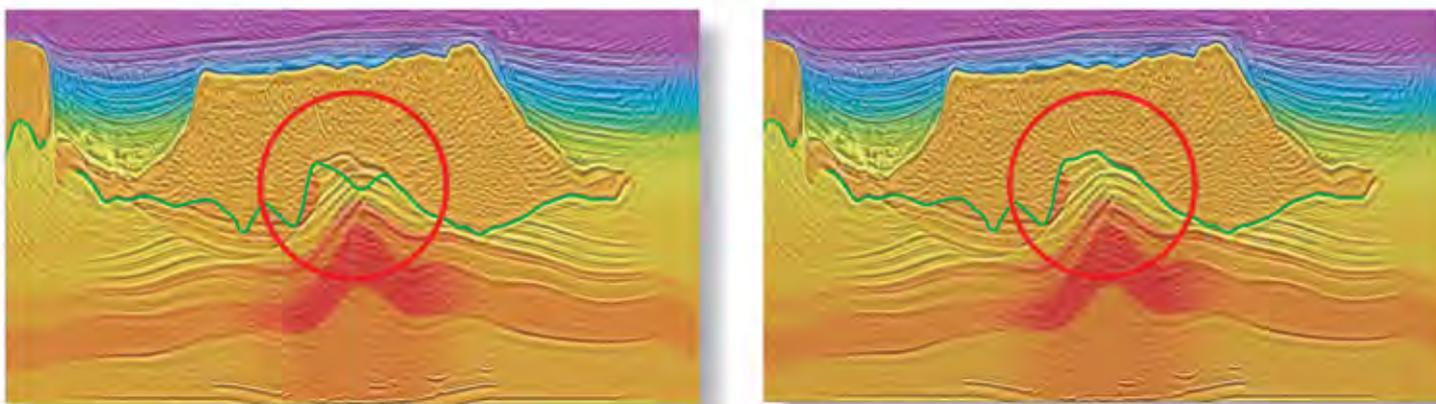
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See Sweet Spot, page 48

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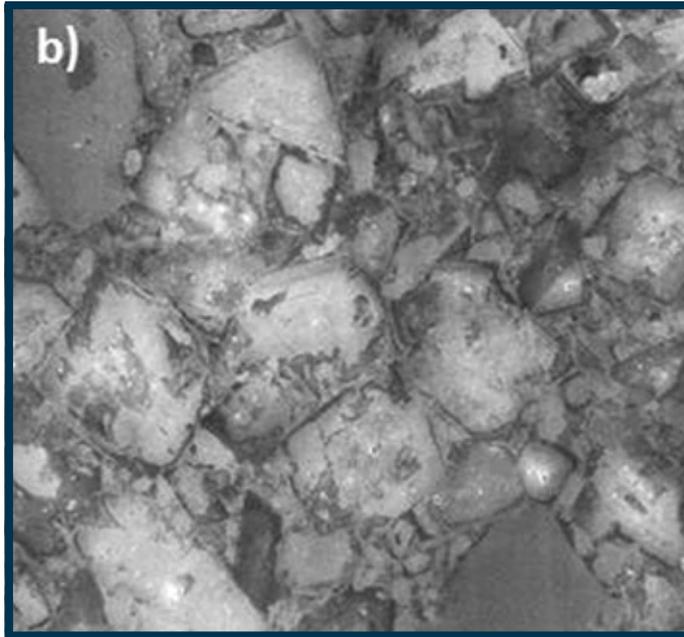


Photo a: A slabbed core photo (three inches across) showing the main Pronghorn pay facies as burrowed detrital dolomitic siltstone with finer grained rippled interbeds (light colored beds).

Photo b: The SEM image of the main pay facies shows common zoned dolomite grains with rounded detrital dolomite cores. Dark gray grains are quartz.

Graphic and photos courtesy of Whiting Petroleum Corp.

Sweet Spot from page 46

this extra package of rock that ultimately became this Pronghorn zone, which is not present at Sanish-Parshall," Canter said.

"My view is it's the very close team interaction and the integration between core work and the logs at a very detailed level," Sonnenfeld emphasized. "That's what really unlocked this.

"We ran across a core that was very obviously different than anything we had seen," he said. "In trying to understand it and map it out, this area fell out of that effort.

"One of the elements of this story we're trying to get across is that this was not an accidental discovery at all," he noted. "It was very much something we converged on through our mapping, integrated with core data.

"For us, informally, the moral of this story is geology matters," Sonnenfeld emphasized.

Similar, But Different

Canter noted they have studied nearly every Bakken-Three Forks core available in the basin.

"We go to the North Dakota Geological Survey in Grand Forks twice a year deliberately to see newly released cores," she said. "We had evaluated more than 150 cores when we came across this new information, so we were able to recognize that it was different, because we had the context to put it into and to understand what it meant in terms of a new play.

"We have a dynamic look into the Bakken because of our dedication to evaluating as much rock data as possible," Canter said. "Our focus is a basin-scope effort and not just small project areas."

Whiting has an in-house laboratory that includes a large core layout area where the drilling engineers can visit to see the rock they're drilling through, which accelerates the learning curve to get the horizontal drilled quickly and in the right zone, according to Canter.

The non-accidental nature of the Pronghorn discovery is highlighted when you consider that a lot of other plays have progressed by searching for a look-alike from a previous play.

"This works to some extent, but there are always important differences when you find the next one," Skinner said. "This play is not at all a look-alike of any other Bakken system accumulations, so to some extent it's a first principles discovery, other than we are operating within the petroleum system of Bakken shales.

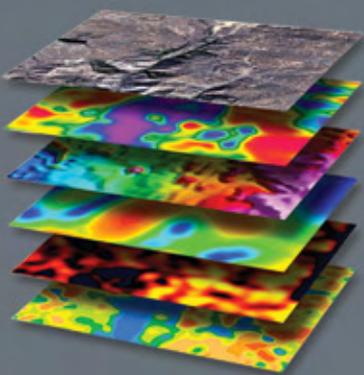
"The reservoir of the Pronghorn is different, and that's what sets it apart from the Middle Bakken fields and the Three Forks fields," he said. "It has similar source rocks, but it's a different strategic interval."

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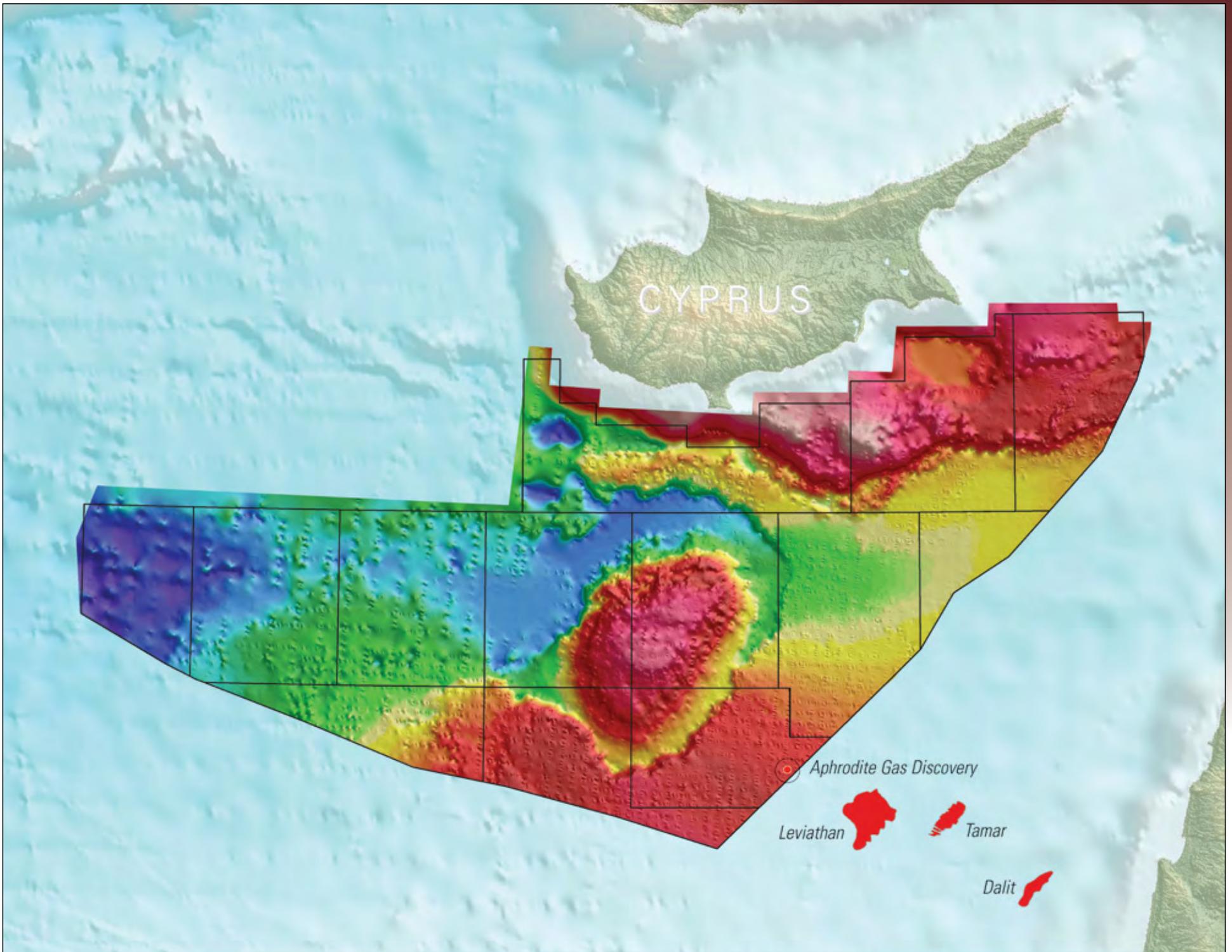
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Conventional tools, unconventional application

Combo Seismic Approach Defines Fractures

By LOUISE S. DURHAM, EXPLORER Correspondent

Formation fractures, whether natural or hydraulically induced, are a must-have for the most economic production from unconventional resource plays, with their characteristically tight reservoir rocks where excessively low indigenous permeability and porosity impede hydrocarbon flow.

Unfortunately, there's seldom anything simple about these fractures, with their highly variable features.

Making sense of them is the challenge confronting the geoscientists in their quest to identify the superior drill spots



ABELE

The tools are available, and the technique is not overly time consuming or expensive.

for optimal production.

To understand and delineate fracture trends, the industry regularly employs

varying seismic techniques, including the processing of seismic attributes, i.e. geometric attributes, definition of

azimuthal variation of amplitude and microseismic surveys, among others.

The approach frequently used, in an effort to conserve time and capital, entails reliance on a singular seismic technology.

Yet a combination of certain seismic techniques ordinarily can deliver the most bang for the buck.

The combo approach and its advantages were presented in the Ziad Beydoun Memorial Award for best poster at the AAPG 2011 International Conference and Exhibition in Milan.

Dubbed "Fracture Detection Interpretation Beyond Conventional Seismic Approaches," the presentation focused on a study done by AAPG members Stan Abele, vice president of geoscience technology at IHS-owned Seismic Micro-Technology at the time and currently employed at LMKR, and geophysicist Rocky Roden, who consults for IHS.

"Spectral decomposition analysis can be used to determine the optimal frequency bands that define fracture lineations," Abele said. "These optimally defined frequency volumes can then be processed for geometric seismic attributes to significantly improve the interpretation of fracture trends and increase understanding of the reservoir."

"Interpreting the optimal frequency band for seismic attribute processing requires a systematic methodology of frequency analysis and amplitude normalization," he noted.

"Combining spectral decomposition and geometric seismic attributes has shown to not only improve fracture identification," he said, "but also more clearly define stratigraphic variations in most geologic settings."

Abele elaborated on the terminology:

► **Spectral decomposition** is an imaging tool that breaks down the seismic signal into its component frequencies.

Several frequency windows may highlight different aspects of the geology when used as input into the calculation of geometric attributes for fracture analysis.

► **Geometric attributes** respond to changes in reservoir structure and stratigraphy.

The Dip of Maximum Similarity and the Instantaneous Dip are two of the most popular attributes used for discontinuity mapping, especially mapping faults in 3-D. They may be the most valuable attributes for structural mapping for many interpreters, according to Abele and Roden.

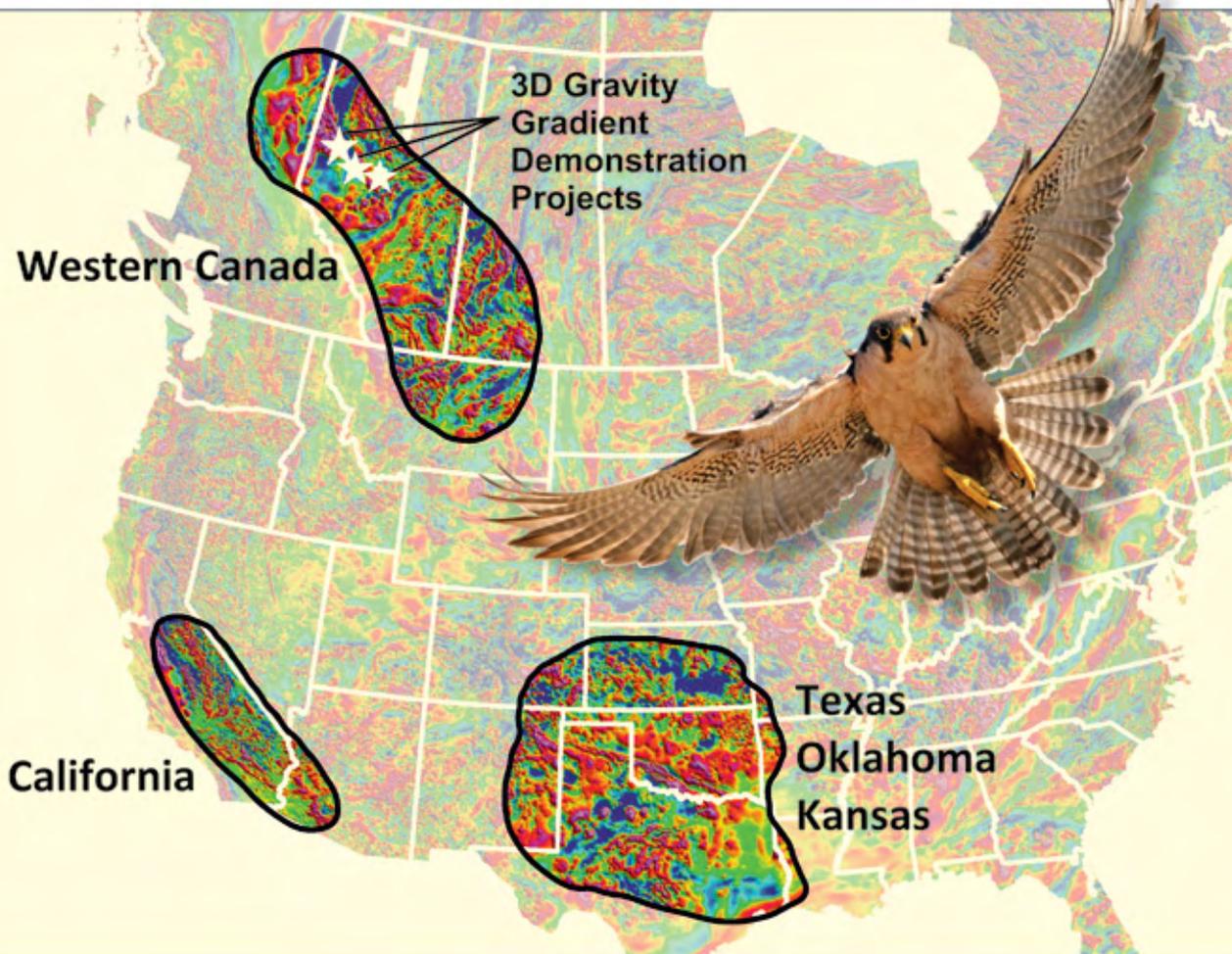
Maximizing Data's Value

The presentation at the Milan meeting was based on a study utilizing five square miles of recently acquired pre-stack time-migrated 3-D seismic data provided by Global Geophysical Services from the south Texas Eagle Ford shale resource play, where the production is enhanced through the drilling and fracture treatment of horizontal wells.

Well and microseismic data were provided by Tulsa-based Petrohawk Energy Corp.

See **Fractures**, page 54

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Need for geoscientists growing

Work Force Shifts Create Manpower Needs

By LOUISE S. DURHAM, EXPLORER Correspondent

The slow, steady march toward a potentially much-reduced professional work force in the geosciences is a situation receiving considerable attention these days.

The most senior geoscientists are beginning to retire, yet there is no substantial influx of recent graduates – and not many folks occupy the so-called middle level of the work force.

“Geoscientists are needed to address societal needs more than ever, in the areas of energy, water, natural hazards, natural resources, climate, the environment,



MOSHER

geological engineering and public policy,” said AAPG member Sharon Mosher, dean of the Jackson School of Geosciences and

The folly of using field work as a lure for students today becomes even more apparent when considering the bulk of the professional jobs they ultimately will take on, for the most part, require staying indoors in front of a computer.

Farish chair and professor at the University of Texas at Austin.

“The pipeline is not prepared to

meet the predicted future demand for a robust geoscience work force, so a multi-dimensional, sustained effort to increase the number of students embarking on a geoscience career is critical,” Mosher emphasized.

The American Geological Institute has published a series of work force reports for the United States highlighting the problems.

It’s not an encouraging scenario.

For example, the AGI concluded:

▶ The number of geoscience degrees granted has stayed relatively flat for the last decade.

▶ The percentage of students taking earth science classes in middle school has dropped since the 1990s (always less than 15 percent), while remaining relatively flat at less than 20 percent in high school.

On the other side of the equation, the number of geoscience-related jobs has increased by almost 30 percent during the last decade.

So the need for geoscientists continues to rise, while a large demographic is preparing to walk out the door.

AAPG member Sharon Mosher, dean of the Jackson School of Geosciences and Farish chair and professor at the University of Texas at Austin, will talk about “Building a Diverse and Sustainable Geoscience Work Force” at the upcoming AAPG Annual Convention and Exhibition in Long Beach, Calif.

Mosher is one of two speakers set for the jointly held luncheon of the Division of Professional Affairs and the AAPG Professional Women in Earth Sciences, which will be held at 11:30 a.m. Tuesday, April 24, in the Long Beach Convention Center.

Mosher is founder and past chair of GeoScienceWorld, an international journal aggregation for geoscientists, and is currently president-elect of the American Geosciences Institute.

Also speaking at the luncheon will be Sally Benson, director of the Global Climate and Energy Project at Stanford University, whose talk is “Following Your Convictions: Even When the Going Gets Tough.”

Re-Defining the Situation

Mosher has spent much of her career addressing the myriad issues entailed in building a diverse and sustainable geoscience work force. She emphasized that such an effort requires a multi-faceted approach and that, collectively, individual efforts make the most impact.

“One of the hardest things (to overcome) is the perception that people have of the earth sciences,” she said. “With kids in classes, it’s the old ‘rocks for jocks syndrome,’ that it’s not a ‘real’ science.

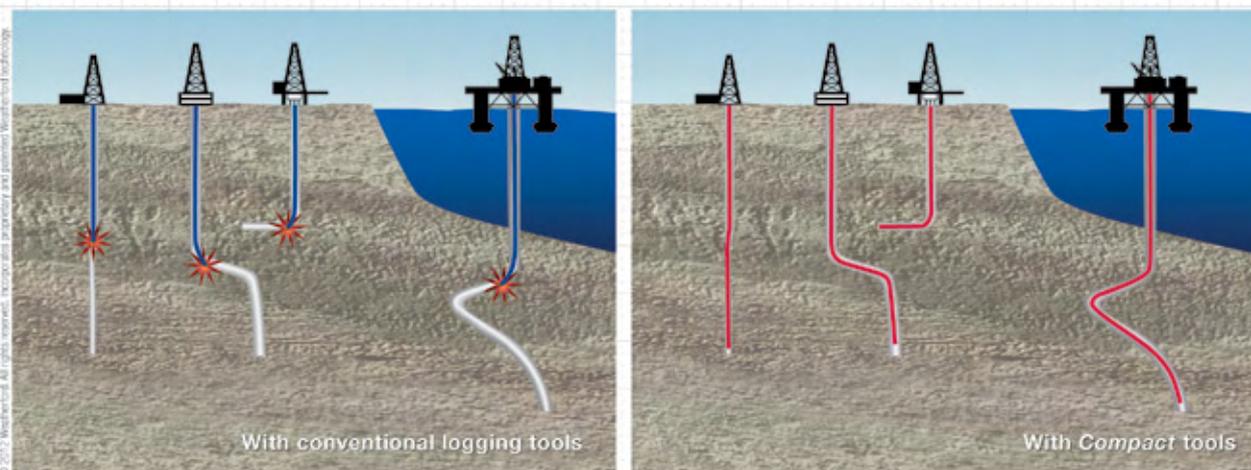
“A lot of times in middle and high schools, it’s relegated to being something that kids include in their curriculum because they’re not very good at science,” Mosher noted. “Yet geoscience requires you to really understand chemistry, physics, biology, computer science and math.

“It integrates those different fields, so you have to be good in those to be successful,” she added.

See Mosher, page 54

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Fractures
from page 50

"When we got these data, it seemed like a natural place to apply this 'unconventional' seismic technique," Abele said. "The Eagle Ford has enough complexity in the fracturing to where it's the natural area to apply this kind of project."

"Understanding the existing fault and fracture patterns in the Eagle Ford is critical to optimizing well locations, well plans and fracture treatment design," he continued.

"Detailed analysis of seismic data is essential in deriving maximum structural information to assist in economic development of the

hydrocarbons in place.

"Microseismic data acquired during fracture treatments support the predicted orientation of faulting and variations in fracture patterns," he noted.

Roden emphasized that even though their effort entailed an unconventional seismic approach, it is not new or groundbreaking. The tools are available, and the technique is not overly time consuming or expensive.

The kicker is that it can maximize the value you derive from your data.

And it doesn't require the expertise of a geophysicist dedicated solely to this type seismic application. In fact, Abele noted that it can be a part of the ordinary geoscience work environment and likely be informative to less experienced interpreters, while reminding others that it may be worth taking that extra step to

produce more analysis.

He summarized conclusions from the study:

- ▶ Geometric seismic attributes can provide enhanced detail that is useful for structural interpretation and fault/fracture detection.

- ▶ Spectral decomposition is used to determine which frequency band provides the highest resolution results for the target zone.

- ▶ Calculating geometric attributes on the frequency band volume which provides the highest resolution enhances results and understanding of fine-detail geological properties.

- ▶ Viewing results from multiple frequency bands may contribute additional insight into the overall structural nature of the reservoir. 

Mosher
from page 52

She cautions that what once attracted so many professionals to the profession is no longer relevant.

"There's still a tendency to emphasize field work and travel, but many students now don't find this attractive," Mosher noted. "They want families and a stable home life and don't want to travel."

"Additionally, most first generation college students equate field work to manual labor and aren't interested," she noted, "plus they may be reluctant to leave their community."

The folly of using field work as a lure for students today becomes even more apparent when considering the bulk of the professional jobs they ultimately will take on, for the most part, require staying indoors in front of a computer.

"We need to encourage the students who are good in math and other core sciences by showing them the technical aspect of our field," she said, "and how these subjects are used to solve real world problems."

Effective marketing is essential to expose more potential students to the upside of the geosciences.

"In many cases, this requires changing the negative perception of our science and career and salary opportunities," she said, "as well as changing our perception of what is appealing as a career or what interests and skills match most geoscience careers."

Where Are the Teachers?

While there's hand-wringing aplenty about the low number of students available to eventually fill professional positions, there's a problem here that's not often highlighted.

To have students, you must have teachers.

Mosher commented there are very few geoscience teachers because of the many industry career opportunities in the geosciences and the relatively few high school geoscience-teaching jobs.

Few states require or even teach geosciences courses at the high school level.

"We need to help train teachers in the other sciences to teach geosciences," Mosher said. "Experience shows that for professional development programs to be successful, teachers need repetition, so follow-up refresher workshops/programs must be a part of this effort."

The Jackson School of Geosciences is actively working to resolve some of the future work force issues via specific programs it has in place.

One of these is the successful GeoForce program for under-represented students in inner-city Houston and southwest Texas.

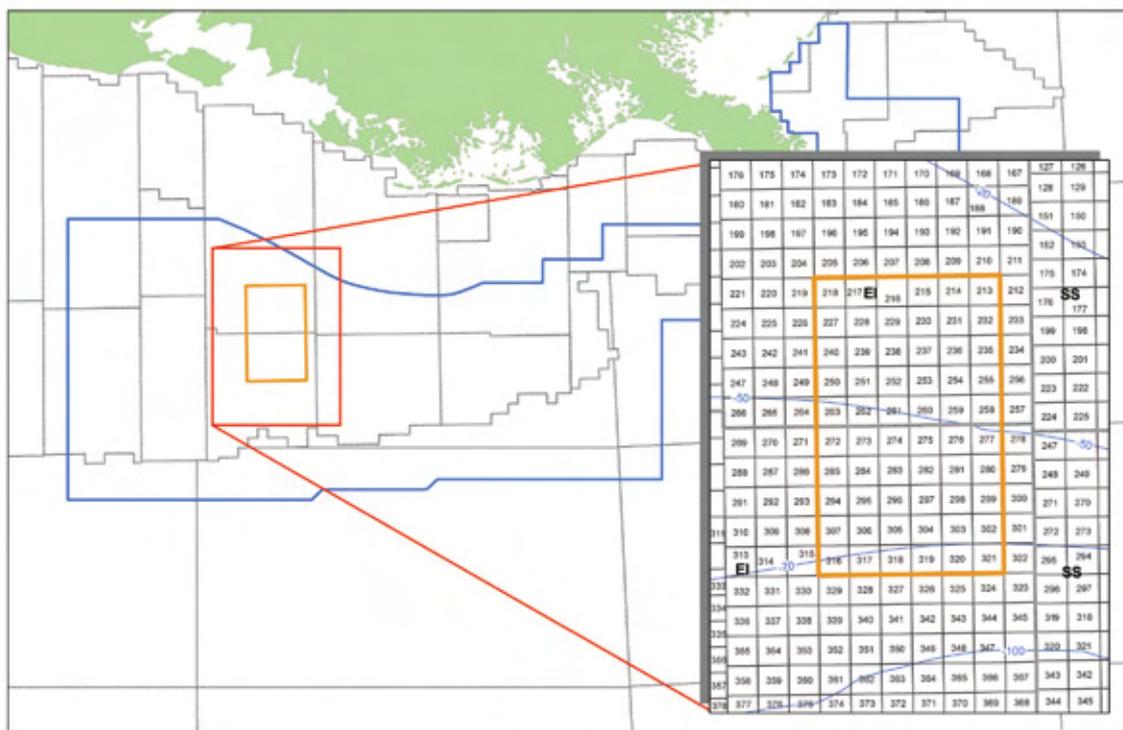
GeoForce is a four-year summer program that takes the students on geology field trips to various parts of the United States. These include trips to the Grand Canyon, Mount St. Helens and certain Texas locales, among others.

Students must perform well during the regular school year, as well as pass a test each summer focused on what they learned.

The program is supported in part by the AAPG Foundation (see November 2010 EXPLORER).

"The success rate in terms of these kids graduating high school as well as going into college has been amazing," Mosher said. "The number going into science, technology and math is amazing as well." 

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WASHINGTON WATCH

Hydraulic Fracturing Spawns New Regs

By AARON RODRIGUEZ

Shale gas production is booming throughout the United States and the world due to the success of the cutting edge – and in some corners, controversial – drilling technique known as hydraulic fracturing.

The concept of the technique used in hydraulic fracturing has been around for nearly a century, but the technology for effective implementation was developed in the 1990s.

Years of federal and private funding of research and development into hydraulic fracturing technology produced a viable technique to effectively fracture rock – primarily shale formations – to allow trapped natural gas to flow more freely to the wellhead.

Hydraulic fracturing techniques have been a tremendous success in the United States and have contributed a boon to domestic U.S. production. Previously unattainable natural gas reserves trapped in impermeable shale formations are now contributing to reduced dependence on imported petroleum products.

Hydraulic fracturing is used in 17 states, with the first being implemented in Texas in 1998.

By 2009, the amount of natural gas produced from hydraulic fracturing was 10 times production in 2000.

In 2008, residents of Pavillion, Wyo., worried that their drinking water had been contaminated from the fluids used in hydraulic fracturing. Their concerns spawned an Environmental Protection Agency (EPA) investigation into the source of the drinking water contamination.

Halfway across the United States, in Pennsylvania, additional claims of drinking water contamination from the practice of hydraulic fracturing have been made.

The public concern over hydraulic fracturing has driven the Obama administration to request a \$13 million increase in the proposed budget for fiscal year 2013 for a joint assessment between the U.S. Geological Survey, Environmental Protection Agency and Department of Energy of the environmental impacts associated with hydraulic fracturing.

An Intense Debate

Some of the richest shale gas reserves are found in the Marcellus Shale formation in the northeastern United States, which encompasses a densely populated portion. Hydraulic fracturing of the Marcellus Shale is prevalent in Pennsylvania, Ohio and West Virginia.

New York, which holds some of the largest quantities of Marcellus Shale natural gas, maintains a drilling moratorium.

The hydraulic fracturing debate is exceedingly intense in New York, however, because eight million residents in New York City and millions elsewhere in New York and New Jersey draw their drinking water supply from the largest unfiltered watershed in the United States. This watershed consists of the Catskill/Delaware Watersheds and the Croton Watershed – both located in southeastern

New York in the heart of the Marcellus Shale.

New York Gov. Andrew Cuomo has said he would like to remove the moratorium because he believes with proper oversight, hydraulic fracturing will not contaminate drinking water supplies.

Thus New York faces an intense quandary – how to reap the economic benefits of oil and gas production while calming concerns of contaminating a voluminous, inexpensive and pristine drinking water supply for the largest U.S. population center.

New York is in the process of re-evaluating its regulatory and oversight system. Currently, the state does not have enough employees to effectively enforce the regulatory and oversight system to deal with what could be a rapid increase in hydraulic fracturing if the ban is lifted.

The state can look at what other states are doing and what role the federal government might play.

States with lots of hydraulic fracturing have a wide range of regulations.

At the federal level, the EPA is investigating concerns about air and water quality covered by public law and considering revising rules for hydraulic fracturing.

The Bureau of Land Management (BLM) has prepared draft rules for hydraulic fracturing on public lands. There is growing debate about differences in rules and regulations – and about how regulations should be implemented to be effective and efficient.

Legislative Action

A comparison of state and federal regulations for chemical disclosure, storage and disposal of waste, casing integrity, water source and testing of nearby water sources is provided in on the next page. Federal agencies – especially the EPA and BLM – are developing plans for oversight, investigation and regulation, with the EPA planning a release this year of a study investigating the potential impacts of hydraulic fracturing on drinking water resources.

In addition, the EPA currently is evaluating the storage and disposal of waste from hydraulic fracturing – but at this point formal regulation lies with the state or other local government entities.

The BLM released a draft of regulations in early February to apply to hydraulic fracturing on federal lands for public comment. The National Ground Water Association (NGWA) recently released a set of recommendations of regulations regarding water use and water quality related to hydraulic fracturing.

Two congressional bills, the Responsibility and Awareness of Chemicals Act of 2011 (H.R. 1084) introduced by U.S. Rep. Diana DeGette (D-Colorado) and the FRAC Act (S.587) introduced by U.S. Sen. Robert Casey (D-Pennsylvania), are included in the comparison although they address only the issue of chemical disclosure.

Support for the legislation comes primarily from members from states where citizens are concerned about water contamination from hydraulic fracturing. These measures have little chance of passage in 2012, but it is likely Congress will continue to debate oversight

Continued on next page

Storing Waste (Flowback Water)	
Colorado	Tank (pitless drilling) for existing operations within 300 feet of public water supply, and new operations within 301-500 feet. Synthetic liner farther from water supply.
Louisiana	Natural, soil mixture and synthetic for produced water pits must be "equivalent of three continuous feet of recompacted or natural clay," with hydraulic conductivity not > 1 x 10 ⁷ cm/sec."
North Dakota	Lined and "sufficiently impermeable to provide adequate temporary containment of the oil, water or fluids."
New York	No pits allowed; water-tight steel tanks required.
Ohio	Pits must be "liquid tight."
Pennsylvania	"Synthetic flexible liner with a coefficient of permeability of no greater than 1 x 10 ⁷ cm/sec."
Texas	No liner requirement unless Railroad Commission requires.
West Virginia	Impervious liner required if soil does not prevent seepage, leakage, overflows.
Wyoming	Tanks required for non-Resource Conservation Recovery Act exempt wastes and where groundwater is less than 20 feet below surface. Synthetic lining for exempt wastes. 328 Liner or tank required for flowback water.
BLM	Storage of all recovered fluids must be in either tanks or lined pits. Authorized officer can require additional protection of wildlife or other resources.
NGWA	Best management practices or appropriate regulations to address surface spills and waste management related to hydraulic fracturing.
EPA	In some cases, operators use surface storage tanks and pits to temporarily store hydraulic fracturing fluids for re-use or until arrangements are made for disposal. States, tribes and some local governments have primary responsibility for adopting and implementing programs to ensure proper management of these wastes. EPA currently is evaluating industry practices and state requirements, and is considering the need for technical guidance on the design, operation, maintenance and closure of pits under the Resource Conservation and Recovery Act (RCRA) in order to minimize potential environmental impacts.

Well Integrity

Casing Depth (Below Lowest Fresh Water)	
Colorado	50 feet casing must be set in a manner sufficient to protect all fresh water and to ensure against blowouts or uncontrolled flows; individual casing program adopted for each well.
Louisiana	Casing lengths and strengths differ depending on "total depth of contact"; standard lengths and strengths only apply "where no danger of pollution of fresh water sources exists." Below 9,000 feet, more than 1,800 feet of casing required and test pressure at least 1,000 lbs. per square inch.
North Dakota	At sufficient depths to adequately protect and isolate all formations containing water, oil, or gas or any combination of these.
New York	75 feet or into bedrock, whichever is deeper (100 feet primary and principal aquifers).
Ohio	50 feet, no agency specific review if at least 500 feet between highest perforated portion of casing and lowest groundwater.
Pennsylvania	50 feet or into consolidated rock, whichever deeper; if encounters additional freshwater, centralizers required.
Texas	Set and cement sufficient surface casing to protect all usable-quality water strata.
West Virginia	30 feet below the deepest fresh water horizon (that being the deepest horizon that will replenish itself and from which fresh water or usable water for household, domestic, industrial, agricultural or public use may be economically and feasibly recovered).
Wyoming	Below all known or reasonably estimated utilizable groundwater (use may be economically and feasibly recovered).
Casing Strength (Of Surface and Other Casings)	
Colorado	Protect any potential oil or gas bearing horizons penetrated during drilling from infiltration of injurious waters from other sources, and to prevent the migration of oil, gas or water from one horizon to another, that may result in the degradation of ground water.
Louisiana	Casing lengths and strengths differ depending on "total depth of contact"; standard lengths and strengths only apply "where no danger of pollution of fresh water sources exists." Below 9,000 feet, more than 1,800 feet of casing required and test pressure at least 1,000 lbs. per square inch.
North Dakota	New or reconditioned pipe that has been previously tested to one thousand pounds per square inch (6,900 kilopascals).
New York	Surface casing: mill test of at least 1,000 psi.*
Ohio	Steel production casing.
Pennsylvania	Internal pressure rating 20 percent greater than anticipated maximum pressure.
Texas	Steel casing that has been hydrostatically pressure tested with an applied pressure at least equal to the maximum pressure to which the pipe will be subjected in the well; mill test for new casing. "Good and sufficient wrought iron or steel casing."
West Virginia	No casing strength required.
Wyoming	Search did not locate statute, regulation or policy addressing this issue.
General Casing Statement	
BLM	Prior to the well stimulation, the operator must perform a successful mechanical integrity test (MIT) of the casing. 1) If well stimulation through the casing is proposed, the casing must be tested to not less than the maximum anticipated treating pressure. 2) The MIT will be considered successful if the pressure applied holds for 30 minutes with no more than 10 percent pressure loss.
NGWA	Proper construction and regular maintenance of oil or gas production wells to prevent the migration of natural and injected fluids that could endanger current or future drinking water sources.

*Mill Test - Certifies that the produced cement meets the requirements of the applicable ASTM and AASHTO cement standards.

Continued from previous page

and regulations of hydraulic fracturing.

Trends of Note

The compilation of hydraulic fracturing guidelines into a single table yields some interesting trends. With regards to storing waste, the states with water contamination concerns (i.e., Colorado, Pennsylvania and Wyoming) have stricter guidelines than states without water contamination concerns.

The regulations for the disposal of hydraulic fracturing flowback fluids are similar for the different states and federal agencies:

► The BLM draft proposes the strictest regulations regarding a water source for hydraulic fracturing injection while the regulations for the states are less strict and

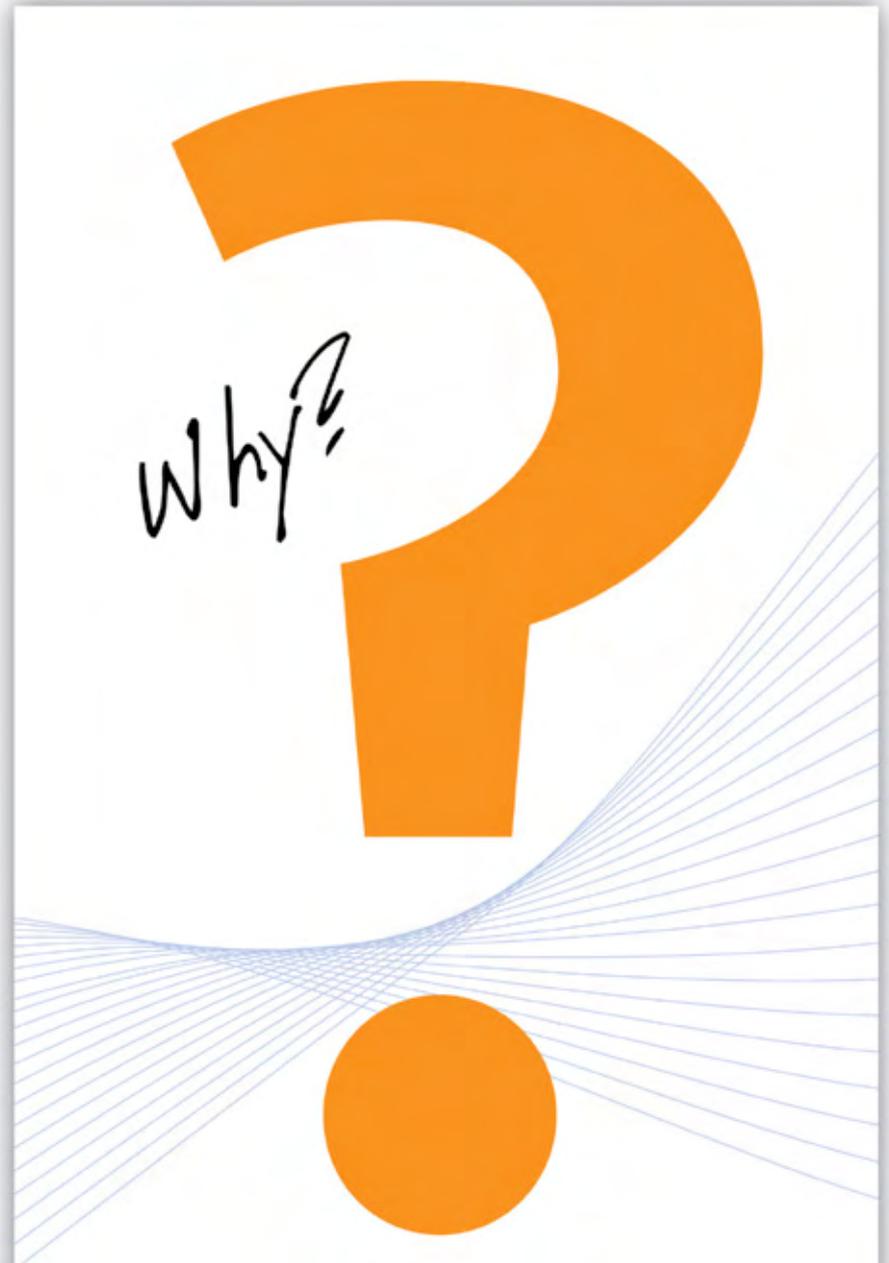
similar to each other.

► NGWA recommended stricter regulations for the testing of drinking water sources compared to most states.

► Everyone calls for the disclosure of the chemicals involved in hydraulic fracturing, but they all allow proprietary chemicals to remain secret, except for a medical emergency. Time will tell if the chemical producers will be forced to disclose all of their ingredients.

An often-overlooked yet significant factor in the regulation of hydraulic fracturing is the geology of the subsurface in which the fracturing is occurring.

Next month: A look at the role of geology in hydraulic fracturing, and the impacts that the differing geologic structure and hydrologic environment have on regulations for major shale gas producing plays across the United States. [E](#)



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Historical Highlights is an ongoing EXPLORER series that celebrates the "eureka" moments of petroleum geology, the rise of key concepts, the discoveries that made a difference, the perseverance and ingenuity of our colleagues – and/or their luck! – through stories that emphasize the anecdotes, the good yarns and the human interest side of our E&P profession. If you have such a story – and who doesn't? – and you'd like to share it with your fellow AAPG members, contact Hans Krause at historical.highlights@yahoo.com.



The way it was in 1905 at the Los Angeles City oil field, facing east from First Street and Belmont Avenue.

HISTORICAL HIGHLIGHTS

Wildcattin' Piano Teacher Became Oil Queen

By JESSICA MOORE

Tenacity and a keen business mind were traits contributing to the success of one of California's most prosperous oilmen of the early 1900s – except this particular oilman was a woman.

Kentucky-native Emma A. McCutcheon Summers (1858-1941) was born the



MOORE

same year that the transatlantic cable was laid and Minnesota became a state – just three years prior to the onset of the American Civil War – and lived during a historical time of great change.

In fact, she would be making history herself. Summers was a pioneer in many ways.

She graduated from the New England Conservatory of Music – one of the first conservatories to grant admission to African Americans and to women – during a period when female college enrollment accounted for just 20 percent of university attendance. Years later, Summers eventually settled across the country in Los Angeles, during the "Panic of 1893," when growing railway towns in the West took in migrating populations.

Once there, Summers saved the money she earned from teaching piano lessons and began to invest in real estate – a strategy that would put her on the path to changing the course of Los Angeles, which was just a sleepy seaside village in the early 1890s.



Photo courtesy of Petroleum History Resources

Emma Summers – California's Oil Queen.

A Leap of Faith

Thanks to the unsuccessful efforts of Charles A. Canfield in gold and silver prospecting, Canfield met Edward Doheny in California. Although unable to pan out a jackpot in minerals, Canfield and Doheny had the observation prowess to notice something that others may have found un-notable: Tar on the wheels of a cart.

Tar from the same seeps that indigenous people utilized to waterproof their canoes. Tar that had trapped animals in the famous La Brea tar pits for thousands of years.

Sparked by that observation, in 1892 Canfield and Doheny discovered the Los Angeles field, drilling 140 meters (460 feet) with the sharpened end of a eucalyptus tree near present day Dodger Stadium.

In comes Emma Summers.

Living near the stirring discovery of Canfield and Doheny, Summers jumped on the preverbal "bandwagon" with her real estate knowledge and invested US \$700 (the approximate equivalent of \$17,000 today) for half interest in a well just a few blocks from Doheny's producer.

Unfortunately, the casing collapsed and tools were lost – but her tenacity prevailed, and she borrowed another \$1,800 to continue drilling the well, personally monitoring the progress of the

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well night after night.

Her perseverance paid off and the well finally came in.

Summers pressed on drilling well after well, at one point finding herself \$10,000 in debt (a whopping \$241,400 in today's dollars). She hired her own workmen, purchased her own drilling tools and supplies, supervised the daily work and well development, and did her own accounting.

And in order to retain her workers and be able to pay them, Summers also worked nights teaching piano.

Summers' blind leap of faith paid off, and with the population of Los Angeles doubling in size between 1890 and 1900 her oil business logically flourished. She had seen her way to drilling 14 producing wells – producing 50,000 barrels each month – and earning her the title "Oil Queen of California."

Initially selling her oil through local brokers, she eventually, bravely, took on the markets herself. In addition to managing her supplies, 40 horses, 10 wagons and a blacksmith shop, Summers sold her crude to large local electric utility companies, commuter railroads, a local trolley system and various other industrial concerns.

When the price of oil peaked around \$1.80 a barrel, she controlled about half of the wells on the central portion of the field.

A City 'Built on Oil'

Emma Summers was a lady to be reckoned with in the rough world of the Los Angeles oil patch, emerging from an unlikely start as a refined southern lady educated in music.

Owing to the insight of early pioneers, including Summers, some argue that "the great city of L.A. was built on oil – not gold or the entertainment industry. The discovery of the oilfields in Los Angeles was the single most important moment in the history of petroleum in California."

Or, in the words of the San Francisco Call on July 21, 1901, she was:

"A woman with a genius for affairs – it may sound paradoxical, but the fact exists. If Mrs. Emma A. Summers were less than a genius she could not, as she does today, control the Los Angeles oil markets."

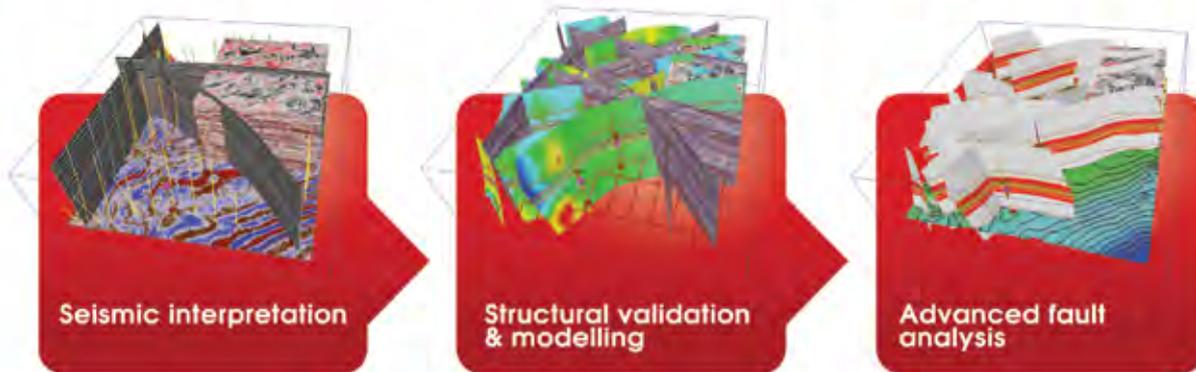
Editor's note: Jessica Moore is a geologist with Chevron in Bakersfield, Calif., who has worked basins around the world, including offshore Angola, Sumatra, across Utah, Argentina, Italy, Wyoming, the Central Caspian and San Joaquin Valley. She also is co-chair of the AAPG Professional Women in Earth Sciences Committee (PROWESS) and a member of the Executive Committee for the American Geosciences Institute.

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Wipeout Zones – Blame the Rocks

By BOB HARDAGE

A hydrocarbon exploration application that has caused multicomponent seismic data to be acquired across several offshore areas is the ability of S-wave modes to image geology inside broad, thick intervals of gas-charged sediment where P-P seismic data show no usable reflections.

The term "P-wave wipeout zone" is often used to describe this imaging problem.

An example of P-P and converted-shear (P-SV) imaging across an area of shallow, gas-charged sediments of the Gulf of Mexico is displayed as figure 1.

Visual inspection of these images shows the P-P mode provides poor, limited information about geological structure, depositional sequences and sedimentary facies inside the image space dominated by gas-charged sediment (CDP coordinates 10,000 to 10,150).

Conventional seismic stratigraphy (P-P mode only) would have little success in analyzing geological conditions within this poor-quality P-P image area.

In contrast, the P-SV mode (figure 1b) provides an image that is sufficient for structural mapping, as well as for analyzing seismic sequences and seismic facies.

Both of these interpretation options are obvious advantages of elastic wavefield stratigraphy over conventional seismic stratigraphy in areas having gas-charged sediment.

A simple Earth model consisting of a shale layer atop a sand layer can be used to evaluate P-P and P-SV reflectivity behaviors

associated with P-wave wipeout zones. Two pore-fluid situations are defined on table 1 below:

Continued on next page



HARDAGE

Table 1	Shale (100% brine)	Shale (20% gas)	Sand (100% brine)	Sand (20% gas)
V_P	3534 m/s	3188 m/s	3500 m/s	3370 m/s
V_S	1990 m/s	1994 m/s	1827 m/s	1847 m/s
ρ_b	2.45 gm/cm ³	2.44 gm/cm ³	2.21 gm/cm ³	2.16 gm/cm ³

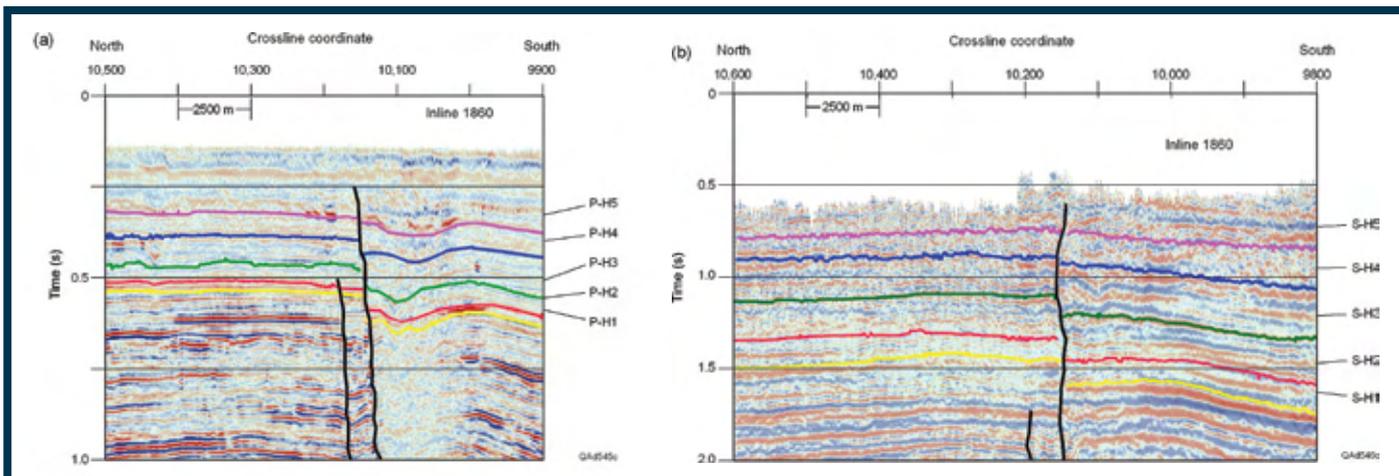


Figure 1 – (a) P-P image and (b) P-SV image across shallow, gas-charged sediments in the Gulf of Mexico. P-P horizons P-H1 through P-H5 are interpreted to be depth equivalent to P-SV horizons S-H1 through S-H5. The P-SV data image stratigraphy inside the P-wave wipeout zone extending from CDP coordinates 10,000 to 10,150.



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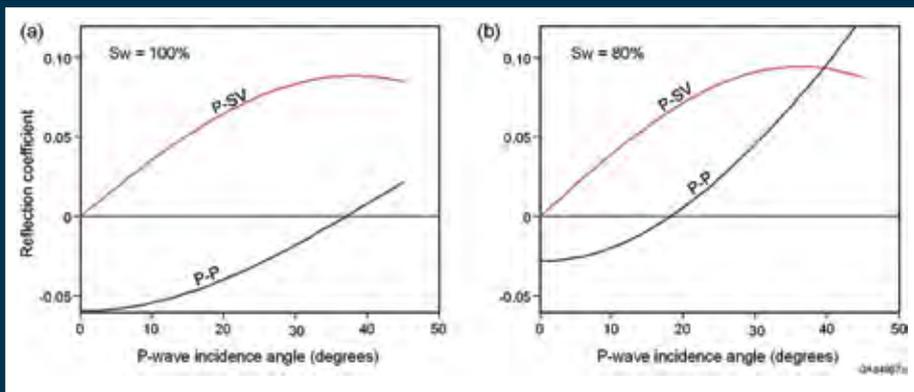


Figure 2 – P-P and P-SV reflectivities for (a) brine-filled and (b) gas-charged sediments.

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- ▶ A condition where both layers have 100-percent brine saturation.
 - ▶ A second condition where both layers have a mixed pore fluid of 80 percent brine and 20 percent gas.
- P-P and P-SV reflectivity curves for these two pore-fluid conditions are shown as figure 2.

When pore fluid is 100 percent brine, P-P and P-SV reflectivities have opposite algebraic signs but approximately the same average magnitude (about 5 percent) for incidence angles ranging from 0 to 25 degrees (panel a). When pore fluid changes to 20 percent gas (panel b), P-SV reflectivity is unchanged, but P-P reflectivity decreases in magnitude and undergoes a phase reversal at an incident angle of approximately 18 degrees.

The gas-charged sediment, thus, does not affect P-SV imaging – but P-P

imaging is seriously degraded. The negative reflectivity for incident angles between 0 and 18 degrees essentially cancel the positive reflectivities for incident angles greater than 18 degrees, resulting in “wipeout” P-wave reflections. The effect would be similar to that exhibited by the data on figure 1.

Conclusion: There is logical rock physics evidence why P-wave wipeout zones occur in strata having low gas saturation and why S-mode data are insensitive to low gas saturation.

(Editor's note: Bob A. Hardage is senior research scientist at the Bureau of Economic Geology, the University of Texas at Austin. He was the past editor of Geophysical Corner, and is currently serving as president of SEG.)

DL Speakers on Tour in April

Four AAPG Distinguished Lecturers will be presenting talks in April, including the spring tour of AAPG Elected Editor Stephen Laubach. Those speaking this month are:

- ▶ **Stephen Laubach**, geologist with the Bureau of Economic Geology in Austin, Texas. His lecture is titled “Structural Diagenesis, Resource Plays, The Highlands of Scotland and Curriculum Development.” Laubach will be on tour April 2-13, and dates are still being added to his western North America itinerary. At press time his stops included:
 - ✓ April 9 – Salt Lake City (Utah Geological Association).
 - ✓ April 10 – Calgary, Canada (Canadian Society of Petroleum Geologists).
 - ✓ April 11 – Billings, Mont. (Montana Geological Society).
 - ✓ April 12 – Saskatoon, Canada (University of Saskatchewan).

- ▶ **Dale A. Leckie**, chief geologist at Nexen Inc., in Calgary, Canada, and this year's Haas-Pratt Lecturer, who offers two talks: “Anatomy of an Unconformity and Its Earliest Overlying Fill – The Basinwide Sub-Cretaceous unconformity of Western Canada” and “A Multidisciplinary Approach to Understanding the Geology of the Athabasca Oil Sands.” His stops are:



- ✓ April 9 – University of Minnesota.
- ✓ April 10 – Bowling Green State University.
- ✓ April 12 – Pittsburgh Association of Petroleum Geologists.
- ✓ April 13 – University of Iowa.



- ▶ **Quinn R. Passey**, senior formation evaluation consultant for ExxonMobil Upstream Research, Houston. His international lecture is “My Source Rock is Now My Shale-Gas Reservoir – Geological and Petrophysical Characterization of Organic-Rich Rocks,” and his European tour started in March. Remaining lecture dates are:
 - ✓ April 2 – RWE Dea and University of Hamburg, Germany.
 - ✓ April 3 – Geneva University, Geneva, Switzerland.
 - ✓ April 4 – ENI offices, Milan, Italy.



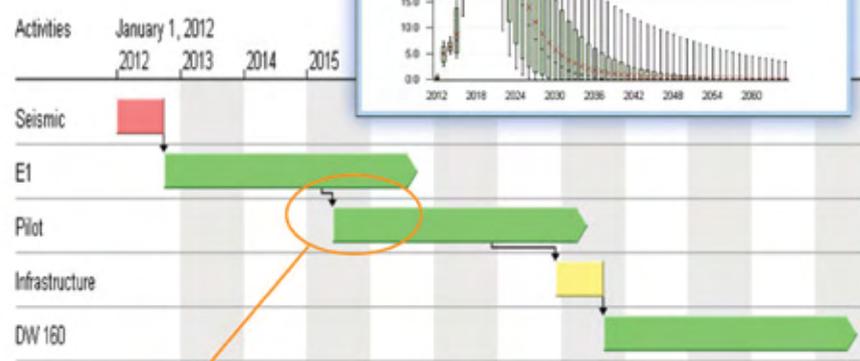
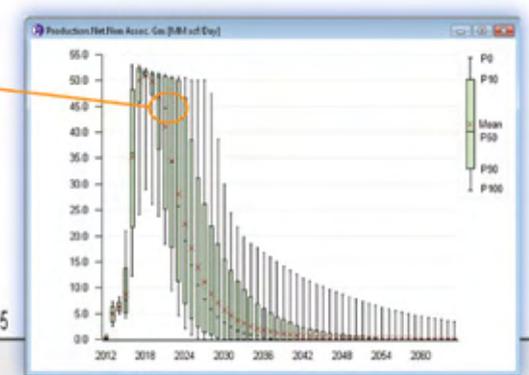
- ▶ **W.C. “Rusty” Riese**, AAPG's Ethics Lecturer, will present his talk, “Oil Spills, Ethics and Society: How They Intersect and Where the Responsibilities Reside” on Tuesday, April 24, at the AAPG Annual Convention and Exhibition in Long Beach, Calif. Riese's talk will begin at 5:10 p.m. in room 102 of the Long Beach Convention Center.

Detailed information of the speakers and their talks available at www.aapg.org/education/dist_lect.

Considering a shale oil or shale gas resource play? Do Activity-Based Value Assessment

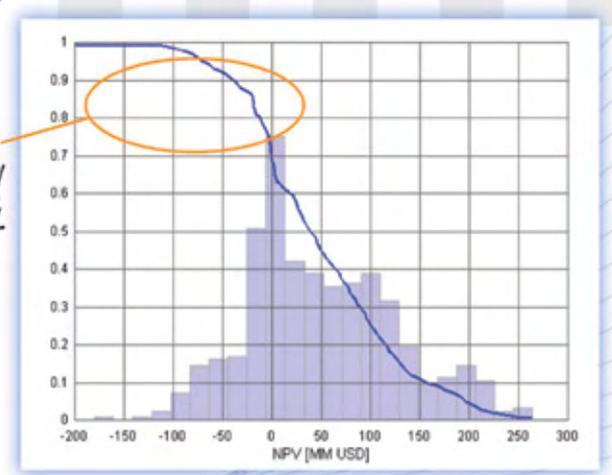
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Geologist Thanks Teacher by Inspiring Teachers

By BARRY FRIEDMAN, EXPLORER Correspondent

“Women don’t do geology – and you’re in a wheelchair.”

Jill Stevens heard that.

Jill Stevens, this year’s AAPG Harrison Schmitt Award winner, heard that during her first day of college orientation.

Good thing she didn’t listen, because eventually she was graduated from that college, Queensland, with First Class Honors (Palynology). She then chose a job with Esso Australia in Sydney, where she’s been for more than 30 years.

The AAPG Harrison Schmitt Award is a “special” honor – in fact, it originally was called the “Special Award” because it was presented to recognize outstanding accomplishments that don’t qualify for specific AAPG award categories.

And make no mistake, Jill Stevens is a special geologist – but she’s not receiving this award simply for the quality of her professional work, but rather for her efforts to ensure the quality of future geologists.

Stevens is being honored for her work with Australia’s Teacher Earth Science Education Program (TESEP), an organization she started to help teachers teach geology.

And she did it as a volunteer.

In many ways, then, this award is icing on a cake she never thought she’d taste.

“Receiving the Harrison Schmitt Award for 2012 is a humbling experience,” she said. “It’s been a long journey, and I’m pleased to formally recognize and thank



STEVENS

“When I became a paraplegic in my middle school years, this wonderful teacher, among others, brought in reading and tutored me during my rehabilitation.”

the important people in my life who have helped make this possible.”

And one of those people (we’ll get to him in a moment) is the man who said those hurtful words so many years ago.

To underscore her point about the friends, family members and co-workers who have helped her, Stevens didn’t even

want this article written about her. She has an uncanny, sometimes maddening way of deflecting credit.

Ultimately, though, she agreed to the interview, but only if we promised future stories on the organizations and people with whom she works.

So be it.

Teach the Teachers

In 2006, Stevens, who also is a member of Petroleum Exploration Society of Australia, recognized there was a lack of opportunity in school geoscience programs across Australia, so she decided to organize an “Education Forum” at the AAPG International Conference and Exhibition held that year in Perth.

There, it was decided (under her leadership) the best way to improve geoscience education was to “teach the teachers,” which became the TESEP objective.

Admittedly, it was tough digging at first. There were funding setbacks and doubt among corporate partners as to the program’s efficacy – but eventually it started taking shape.

“It was great,” she says now, “to see photos of happy teachers on the first workshop and field trip visiting an open cut coal mine in central Queensland.”

Through the years, Stevens has been directly and indirectly responsible for more than 60 one-day workshops – and provided materials to more 1,000 teachers across Australia.

That translates to contributing to the educational needs of more than 300,000 students.

“To cope with the daunting task of taking geoscience secondary school education

Harrison Schmitt – A ‘Special’ Award

AAPG’s Harrison Schmitt Awards are given when, in the Executive Committee’s judgment, people are deserving of recognition for an outstanding accomplishment that does not otherwise qualify for an Association award.

The honor originally was called the AAPG Special Award, but that was changed in 2011 in honor of the award’s first recipient, AAPG Honorary Member Harrison “Jack” Schmitt, famed NASA astronaut who walked on the moon.

Other awardees have honored

contributions in technological advances (Marcel and Conrad Schlumberger), leadership (including John F. Bookout and George P. Mitchell) and scientific thought (several, including Eugene Shoemaker, Nikolai V. Lopatin, Norman H. Foster and AAPG President-Elect Ted Beaumont).

Jill Stevens is the award’s 39th recipient. Other education-focused winners have included Marsha A. Barber, Paul G. Benedum Jr., Isaac J. Crumbly, Sarah G. Stanley, Kenneth Dale Owen, David L. Rice and Marcus Milling.

Continued on next page

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Panhandle Geological Society

Continued from previous page

across Australia – a country almost as large as the USA, with fewer schools scattered over vast distances – a different approach was sought,” she said.

So, through TESEP, she made education aids – including rock and oil sample kits – free to all educators. In fact, through TESEP, teaching resource materials are available to all through its website.

“The TESEP team,” she says, “has bent over backwards to get the job done in developing, then traveling the country to give face-to-face presentations and demonstrations of activities to help teachers excite students.”

In many ways, TESEP was a way for her, personally, to say thank you.

“The journey brings me full circle,” she said, “from being hooked on geology by an inspirational high school geology teacher to having the privilege to chair a fantastic group of dedicated and talented earth and environmental science educators.”

Sowing Seeds of Success

And that journey includes more than just the normal amount of adversity and disappointment.

After all, she accomplished it all without being able to walk, having become a paraplegic after a hiking accident.

That journey, she admits, would not have been possible without her family.

“When adjusting to becoming a paraplegic, confined to a wheelchair at 15 years of age, they showed true love and guidance, teaching me to know my boundaries and be independent,” she said.

There were others, too – including her middle school geology teacher, a man by the name of Mr. Protheroe.

“When I became a paraplegic in my middle school years, this wonderful teacher, among others, brought in reading and tutored me during my rehabilitation,” she said.

He also left a tray of rocks and minerals under her hospital bed immediately after the accident.

In talking about what TESEP means to her now, Stevens says she wanted to “... sow the seeds that can spark a young individual to pursue earth and environmental science, just like me with Mr. Protheroe.”

The goal in Australia, as it is in the United States, is to bridge the gap between industry and education. To that end, beginning in 2013, all Australian states will convert to teaching the same national curriculum rather than state-based curricula with varied emphasis.

Additionally, there will be a higher earth and environmental science content in this new curriculum; and workshops will be offered to give instructors new training.

“Anecdotally, across Australia,” she said, “teachers have reported on the successes of their earth science students, and we are seeing increases in student numbers involved in secondary and tertiary science and, ultimately, working in related industries, such as the petroleum industry.”

The promise that’s out there, she says, is that “... this program for teachers has the potential to be applied in other countries.”

Pay It Forward

None of that would have happened without her. And, now, as she receives this award (she insisted, yet again, that rightfully belonged to others), she sees a career and life well-lived.

“After 32 years of varied geology, working with skilled and creative geologists and having worked on several assignments

in Houston, I haven’t looked back,” she said. “Esso and ExxonMobil have given me a challenging and rewarding career.”

TESEP is how she paid it forward.

“I couldn’t have made this journey without the support of my loving husband, Stephen,” she said, “who has trailed my career through several relocations, and who has been the main home parent in our two children’s early years.”

But what of that other influence, that professor who told her on her first day of college that geology was neither conducive to women or to those confined to wheelchairs?

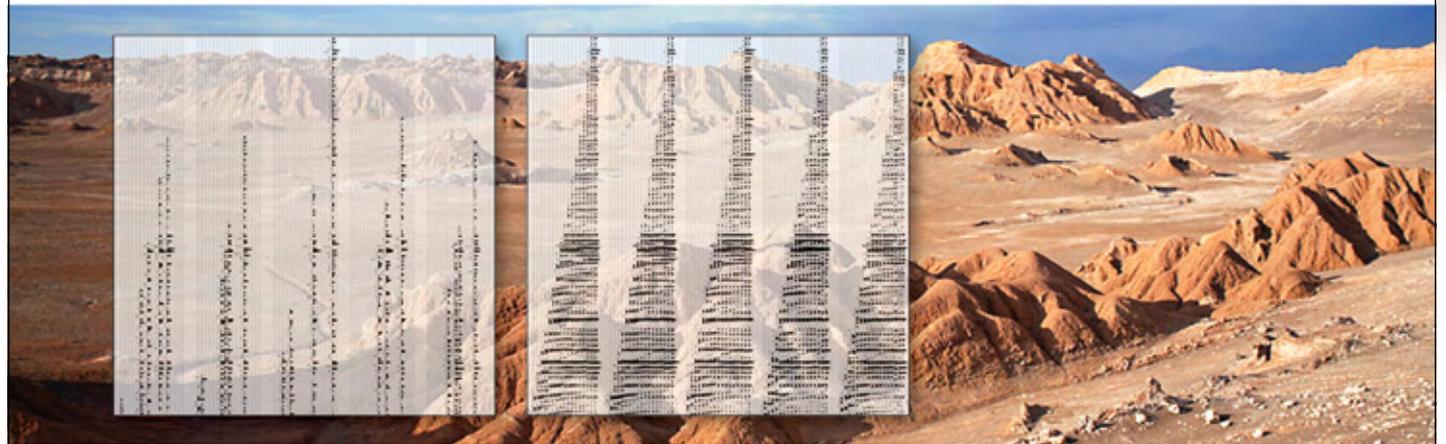
He became, in her words, “her champion ... bumping me up and down railway sleepers to see cuttings, and hauling and pushing me over muddy ditches to outcrops.”

Jill Stevens’ journey was not just a metaphor. 



A TESEP teacher teaching other teachers about earth sciences – specifically, discussing granites at Mannum, South Australia.

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Students look at rocks differently

Teacher Makes Geology Relevant

By COURTNEY CHADNEY, EXPLORER Correspondent

“I have now ruined rocks for you, haven't I?”

This is a phrase Jonna Gentry admits having to repeat often to her students in Lakewood, Colo., as they realize they will never again look at mountains, beaches or anything else geological without thinking back to lessons from their ninth grade science teacher.

That would be Gentry – and it is her gift for teaching and affecting students' lives inside and outside the classroom that has earned her this year's AAPG Teacher of the Year Award.

Gentry teaches earth science at both the regular and honors level at Green Mountain High School in Lakewood, as well as a section of “Beginning Robotics,” which she said allows her to also see the world from an engineer's perspective.

Formally, Gentry is being recognized for “Excellence in the Teaching of Natural Resources in the Earth Sciences,” an honor given annually by the AAPG Foundation.

She'll receive her award – a \$5,000 prize, half to her for her own personal use and half to Green Mountain High School for educational use under Gentry's supervision – at the All-Convention Luncheon during the AAPG Annual Convention in Long Beach, Calif.

Gentry said she always knew she wanted to be a teacher. She even recounted a time when a hometown friend told her that she had known Gentry would be a teacher since their days together in the second grade:



GENTRY

“She was the only one who made sure that everyone saw the pictures when it

“Most of my students willingly admit that earth sciences is not their favorite subject.”

was her turn to read to the class,” Gentry recalled her friend saying about her. “She

was teaching her dolls – and her younger brother – when she was only five years old.”

Most would agree that being a high school teacher is challenging enough, but adding a science class to the mix would seem to be an additional hurdle.

“Most of my students willingly admit that earth sciences is not their favorite subject,” Gentry said – but she combats that by making her class as fun and relevant to their lives outside the classroom as possible.

“I hope that my love and passion for the earth sciences will draw students in and allow them to explore an area of science that many of them seem to have decided that they do not like before they even begin the school year,” she said.

“My greatest hope,” she continued, “is that students walk out of my classroom with a new filter to view their natural world through, a new excitement about the world around them and the ability to critically consider information about the changes and challenges related to the natural world.”

Hands-On Education

Perhaps surprisingly, earth science “was not the subject that I had envisioned teaching when I set out to become an educator.

“Instead, I have found myself falling in love with the earth sciences over the past 13

Continued on next page

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Demographic

- Females in Geology
- Minorities in Geology

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Continued from previous page

years," she said.

That love now infuses her approach to education.

"I believe in having as many models as available to solidify the learning of the abstract concepts found in the earth sciences," she said.

"For example, I keep a set of rocks, minerals and oil samples for students to handle," she said. "We review the rock cycle by rolling dice and moving from station to station, which include visual cues for each concept."

And being in Colorado, teaching aids outside the classroom are available, too.

"We visit Dinosaur Ridge to see rocks in their natural state," she said, calling it an opportunity "for students to talk to experts and to see rocks in their natural state."

"It is eye-opening for many students," she said. "I have had more than one visiting student tell me that this field trip was one of the most memorable events of their freshman year in high school."

Geology is one of the specific units that Gentry teaches during the year to her earth science students.

"We begin by reviewing what they already know about rocks and minerals and the rock cycle," she said. "We continue the year discussing the stories that rocks tell us – these stories include the geologic history of an area, the current geologic phenomena of an area, the economic usage of an area and the geology of other planets."

She said the unit dealing with natural resources is "one of my favorite units to teach."

The overarching question her students are to consider is: How do we as a society make the best use of the resources we have available to us with as little disruption to the environment as possible?

"Fossil fuels such as coal, oil and natural gas are looked at in the conversation about nonrenewable resources," she said. "I begin this portion by allowing students to observe a variety of items and categorize whether any or all parts of the item came from petroleum ..."

"It is interesting to watch the reaction when they learn that a majority of the items that we use are derived in some way from petroleum," she said.

Making It Fun

Gentry believes that "as young adults enter high school, some of them have lost their ability to play."

Therefore, she has had to become good at utilizing a variety of different teaching methods to help her bring that creativity and willingness to learn out of her students.

"We often play pretend," she said, "so they get a chance to do what scientists do, which is imagine the seemingly impossible solution to a perplexing question."

Claiming herself as a bit of a devil's advocate, Gentry has found that by refusing to tell her students the so-called right answer she allows them the chance to discover it for themselves.

"I usually open the floor for students to answer each others' questions," she said of her approach. "I try to allow them as many opportunities as possible to explore their ideas and solutions before I offer mine."

Gentry describes her classroom as organized chaos; having procedures for everything from beginning to end, but allowing class discussions to fuel the class forward and keep it constantly busy.

Gentry says her inspiration to do her best everyday derives from her belief that her

students will go on to do things she could only dream of doing.

Her proof is in the energy they bring, and the imagination they exhibit during their classroom discussions.

"I believe every student is capable of learning," she said – but that might mean something different to each student, she added, and they might achieve this learning in different ways.

"I attempt to teach every single student whether they are passing or failing the class," she said. "Some of them will not figure it out until later on in their high school career – or even as an adult."

But she truly believes each one is worth her maximum effort, because all eventually will be contributing adults to our society.

These future adults' contributions, or "creative solutions will be the necessary tools for our society to continue enjoying and improving a way of life." 

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Lecturer says conventional ideas to be challenged

Mars Explorer to Look for Organic Carbon

By BARRY FRIEDMAN, EXPLORER Correspondent

When John Grotzinger talks about thinking big, he's not just being hyperbolic.

He's not even exaggerating.

"Being an explorer means thinking out of the box," Grotzinger said, "and in our case, the search for organic carbon on Mars will challenge all of our conventional ideas."

You heard right ... Mars.

Grotzinger, who is professor of geology at California Institute of Technology, and the chief scientist for the Mars Science Laboratory, is this year's Michel T. Halbouty Lecturer at the upcoming AAPG Annual Convention and Exhibition in Long Beach, Calif. – and he is searching for carbon on another planet.

In fact, the name of the lecture that he'll be presenting in Long Beach is just that: "Mars Science Laboratory Rover Mission: The Search for Source Rocks."

And this big idea isn't confined to "just" a theoretical paper or symposium – the laboratory, a rover named "Curiosity," is hurtling toward Mars while you read this.

Out of the box enough for you?

"I feel honored to have been given this chance with AAPG," he says of the chance to be the Halbouty lecturer, "and to share what we feel should be a thrilling mission of exploration."

That thrill began last November, when



GROTZINGER

The question now, he believes, is "whether or not there was ever a biosphere – and, if so, did it preserve any evidence in the form of organic carbon?"

Curiosity was launched and began its journey to the Gale Crater on Mars. And providing there are no complications, it is expected to arrive this August.

Its mission, Grotzinger said, is to assess whether Mars had life environment able to support microbial like and, more

importantly, if rocks or soil might preserve some of that organic carbon.

"It's a different planet," he said, "with different processes and different products."

A different planet, perhaps, but Grotzinger is hoping not a different world.

John Grotzinger, professor of geology at the California Institute of Technology in Pasadena, Calif., and the chief scientist for the Mars Science Laboratory, will present the annual Michel T. Halbouty Lecture at 5:10 p.m. Monday, April 23, at the AAPG Annual Convention and Exhibition in Long Beach, Calif.

His lecture is titled "Mars Science Laboratory Rover Mission: The Search for Source Rocks."

The Halbouty lecture, supported by the AAPG Foundation's Michel T. Halbouty Lecture Fund, annually deals

with wildcat exploration in any part of the world – or, in this case, space exploration, where astrogeological knowledge would further mankind's ability to develop resources on earth and in our solar system.

The Michel T. Halbouty lecture series is in its twelfth year. Previous lecturers have been Aubrey McClendon, Guilherme Estrella, Ray L. Hunt, Kurt Randolph, Harrison H. "Jack" Schmitt, John Robbins, Brian Maxted, Bill Barrett, Peter Dea, David Rainey and Carolyn Shoemaker.

"We are confident," he said, "that the time-honored principles of geology, mapping and stratigraphy will still apply."

Mars Needs ... Exploring

The challenge, he maintains, will be to construct predictive models for exploration in such a foreign environment – and to do so using only a robot.

So far, so good.

The past decade of Mars exploration has shown the surface is covered with layers of sedimentary rocks, in some places over five kilometers thick – a fact, Grotzinger said, that debunks the biggest myth about Mars, that it's a volcanic planet.

"We also know now that water is very abundant at times in the deep geologic past, and potentially could have formed these sedimentary rocks," he said. "We see thick sequences of evaporites."

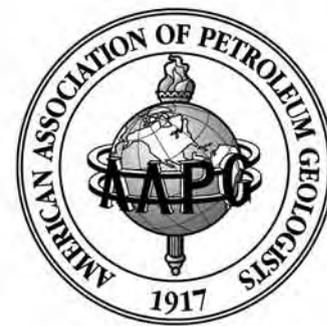
"The evidence has created a compelling case for our mission," he continued. "Curiosity's precursors, Spirit and Opportunity, have discovered a wealth of evidence pointing to early Mars as a much wetter planet, with a prolonged history of rock-water interaction" than previously thought.

The question now, he believes, is "whether or not there was ever a

Continued on next page



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Continued from previous page

biosphere – and, if so, did it preserve any evidence in the form of organic carbon?”

Grotzinger is hoping that answer will be coming.

“Specifically, Curiosity will take us to places few have ever dreamed of,” he said.

And he means that both figuratively and literally.

“Our target is a mountain of strata, over 15,000 feet high,” he said. “It may be the thickest stratigraphic section in the solar system that is continuously exposed in outcrop.”

Grotzinger reports that remote sensing data “tell us the base of the mountain contain rocks formed in water, and our prospects for discovering environments that might have been formerly habitable by microorganisms are high.”

The Billion Dollar Question

Curiosity is equipped with a set of instruments more sophisticated than any previous mission sent to space.

“If she lives long enough, we may someday make it to the top of that mountain and will have deciphered the record of the earliest history of Mars,” he said, “and whether or not this involved the preservation of organic carbon.”

The prospects are good.

“We can now map the planet globally using hyperspectral cameras that provide even more evidence of vast terrains that interacted with water.

“We think we have a good chance to discover environments that might have been habitable by microorganisms in the geologic past, provided that life ever evolved on Mars,” he said. “Habitable environments are those characterized by a source of water, energy and carbon.”

It’s tough to quantify what that would mean if it were true – but Grotzinger has a figure in mind.

“The billion dollar question, literally, is whether or not any of those environments preserve vestiges of organic carbon,” he said. “This will be a tough nut to crack, because it’s well known on Earth that during the conversion of sediment to rock that organic materials can become oxidized [and this rock is four billion years old].

“That’s why we’ll need a Mars-specific exploration model to guide our search for favorable windows of preservation.”

Touch Down

And about that guide, that exploration model ...

Maybe another billion dollar question is, what about the prospect of a manned mission to the planet?

Grotzinger is ready – both for the question and the journey.

“It’s an inevitable challenge for future exploration,” he said.

But first it’s necessary to see if it’s feasible.

“These robotic precursors are important, because they show us how to get there and what we’re up against,” he said. “Our mission carries an instrument – it’s actually operating now as the rover flies through space on its journey between Earth and Mars – that will measure the background cosmic and solar radiation that would be harmful to humans.

“We’ll measure the radiation in space, and once we land we’ll measure the same radiation on Mars where a human would be protected only by Mars’ very

thin atmosphere,” he said.

The Halbouty Lecture usually concerns matters a little closer to earth – 33,926,867.096 miles closer, to be exact.

Grotzinger, obviously, is very excited about the prospects of discussing Curiosity and Mars and the possibilities of both with those coming to Long Beach.

He also wants to express his gratitude to some of them.

“I would like to thank AAPG for this wonderful chance to give the Halbouty Lecture,” he said, adding that AAPG members helped select the landing site at Gale Crater – including Kevin Bohacs, a past AAPG Distinguished Lecturer, co-author of AAPG’s best-selling text on Field Safety and a member of the Explorers Club.

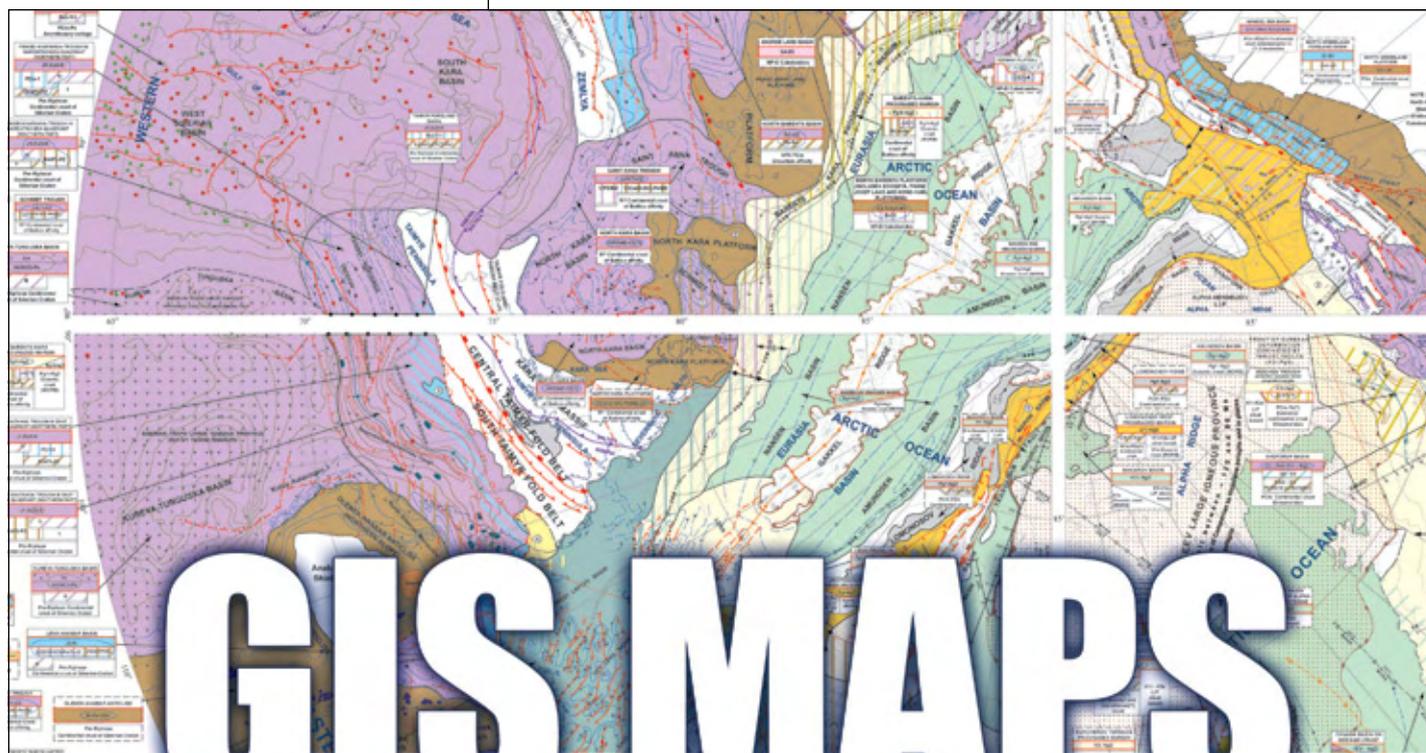
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No Kidding, Sherlockians Are About Having Fun

By BARRY FRIEDMAN, EXPLORER Correspondent

Peter Blau doesn't like Sherlock Holmes. Which is fairly significant, considering longtime AAPG member Blau is one of the country's foremost experts on the Sir Arthur Conan Doyle character. And even more significant considering how anyone who knows him *knows* that Blau is AAPG's biggest promoter of all things Sherlockian.



BLAU

"The one thing that Sherlockians should take seriously is not to take themselves seriously."



HOLMES

not characters." He makes the point that while there are Edgar Allan Poe literary groups, there are no groups for Poe's literary detective creation, C. Auguste Dupin (reportedly an inspiration for Doyle). "Sure we talk about Doyle," he said, "but mostly it's about Holmes."

"When people ask me what I like about Sherlock Holmes," Blau says, proud of his place in the world of Sherlockians, "I tend to answer 'nothing.' He was inconsiderate and rude, especially to Watson, for whom I feel a great sympathy."

Sometimes you know when an interview will be fun.

Peter Blau, in addition to being a consulting geologist, is a freelance writer and one of the guiding lights of The Red Circle, an organization based in Washington, D.C., dedicated to honoring, discussing, dissecting and generally obsessing over Sherlock Holmes and the four novels and 56 short stories in which he appeared.

Certainly, the Sherlockian world takes Blau very seriously.

Here's what the organization's website says of him:

"While Blau holds no official office in the group, you would be right in a sense if you said that he is the Red Circle."

"What I enjoy," Blau said, "very much, is the Sherlockians, who tend to be interesting as individuals."

For Blau, then, a geologist by training, it isn't the power of Holmes, the hidden mysteries in the work, the lessons we can all learn from Holmes' tenacity and thoroughness – it's something much simpler.

"The Sherlockians are about having fun."

If it's time for an AAPG Annual Convention and Exhibition, you can bet it's time to make a toast while you're there and celebrate the genius that is Sherlock Holmes.

Peter Blau, AAPG's unofficial but doggedly determined keeper of the flame for Sherlock, has been keeping the superstar detective's name alive for decades with his annual "Friends of Sherlock Holmes" event at AAPG annual meetings.

And that fun may be part of the group's DNA. For decades, AAPG Sherlockians have held their own party at every AAPG annual convention – always via Blau's organizational efforts – to toast Sherlock and tell fun stories.

"By and large," Blau said of the difference between Sherlockians and, say, other members in similar mystery clubs, is, "literary societies honor authors,

It's a night of food, drink and lots of talk about Sir Arthur Conan Doyle's great literary creation.

This year is no different. Blau will be attending ACE in Long Beach, Calif., and there will be a Sherlock Holmes celebration.

The Friends of Sherlock Holmes will meet at 7 p.m. Wednesday, April 25, at Gladstone's in Long Beach, near the convention center.

All are invited.

If this at all sounds similar to a Star Trek convention, in general, and Trekkies, in particular, Blau, too, sees the connection.

"While I've never been to a Star Trek convention," he said, "there are Sherlockians who like costume, and who are well aware that Leonard Nimoy has played both Spock and Holmes – and remember the Sherlockian episodes of Star Trek: The Next Generation?"

A Case of Identity

Blau, who has a bachelor's degree in geology and a master's in petroleum geology, says the connection between Holmes and geology is rudimentary, but strong.

"Let's see," he says, laughing, when the question is asked. "I'm not sure how important Sherlock Holmes is to geologists, but it was in the Sherlock Holmes stories

Continued on next page

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Hydraulic Fracturing

21- 23 May 2012 • Golden, Colorado

Hydraulic fracturing for both conventional and unconventional oil and gas development and production has become a hot button issue for the public and regulators in most of the United States and Canada where this technology is being used or might be used in the near future. Concern and regulation of hydraulic fracturing also is growing in other areas of the world, especially in Europe. There is a disconnect in most places between how the technology is applied and the real and perceived hazards to aquifers and surface owners (including induced-earthquake hazards) that have led to the contentious state of affairs.

This Geoscience Technology Workshop is intended to bring together technology developers and users with environmental specialists, regulators, and policy makers to find common ground and open channels of discussion and understanding. This should lead to more technology-based and less emotional development of policies and regulations on O&G activities, as well as improve the understanding by the O&G industry of how to avoid confrontation and improve hydraulic fracturing practices to eliminate any potential hazards to the public and surface owners.

Unconventional Resources

15- 17 July 2012 • Rio de Janeiro, Brazil

Although the pre-salt region of southeastern Campos Basin is the current focus of exploration in Brazil, especially by Petrobras, other areas in the country present significant play potential. The ANP (Brazilian National Agency of Petroleum, Gas and Biofuels) plans a Bid Round this year to offer operators 174 exploration blocks in sedimentary basins located in the equatorial margin. Half of the blocks are located onshore and half represent offshore opportunities. Unconventional plays should be contemplated in companies' analysis of these blocks.

In this context, AAPG Latin America Region and the Associação Brasileira de Geólogos de Petróleo (ABGP) will co-host this interdisciplinary workshop. The workshop begins with the basics of unconventional resource plays, including play evaluation. Later sessions include technical presentations and research from leading companies and universities in Latin America, North America, Europe and the Middle East. Global analogies will examine lessons learned for effective exploration and production methods used in tight gas sands, fractured carbonates, and shale oil/gas reservoirs. Presentations on the social and environmental aspects of unconventional play development, including mitigation, will round out the workshop program. Following each session, all GTW participants will participate in small group discussion and knowledge sharing. The process results in a unique exchange of ideas, experiences, and opportunities for future collaboration.

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

Continued from previous page

that we first find a detective using geology to investigate crime."

How?

Holmes would examine the soil samples on suspect's shoes to determine the location of crimes, Blau reminds you.

To illustrate, Blau alludes to a passage in "A Study in Scarlet," in which Dr. Watson first describes Holmes' knowledge of geology as "practical, but limited."

"After walks," says Watson of Holmes, "[he] ... has shown me splashes upon his trousers, and told me by their color and consistence in what part of London he had received them."

Blau says, in the crime world, this is known as the transfer principle: Every criminal brings something to the scene of the crime, and takes something away. Blau says it is exactly the method that forensic geologists use, as well.

And it seems other AAPG members are just as amused at the connection as Blau. Fellow forensic geologists and mystery writers Sarah Andrews (a former AAPG member), Ray Murray and Tommy Mahnken all have attended Red Circle meetings and AAPG conferences.

So has Sherlock-enthusiast Dean Clark, managing editor of SEG's *The Leading Edge*, who says "Peter Blau might be the best known Sherlockian in the world."

"Some years ago I read an interview with Peter in which he said that when you attend meetings of most groups, about 25 percent of the people are interesting," Clark said, "but when you attend a Holmes meeting, everybody is interesting."

His Last Bow

While Blau is an expert on Holmes, he's not an elitist. He knows for many Holmes is the guy with the deerstalker cap and calabash pipe (even though, Blau points out, those Holmes never had either – actor Basil Rathbone had them in the 14 films he did as the famed sleuth).

As for perhaps the most Pavlovian response when Holmes' name is brought up – "Elementary, my dear Watson" – well, you guessed it. Holmes never said that, either.

"Some Sherlockians seem to feel betrayed when Holmes is something other than a Victorian gentleman, but there are also plenty of people (including me) who enjoy seeing what people do to and with Sherlock Holmes," Blau said – "as long as it's done well."

"Of course, people who yearn for the older approaches to Holmes – and worship Basil Rathbone – seem to forget that in the Universal Studios films Sherlock Holmes fought Nazi spies in London and in Washington," he said.

In fact, Holmes is believed to be the most portrayed movie character in film history, with 75 actors playing the part in more than 200 films.

He then mentions 2009's "Sherlock Holmes," starring Robert Downey Jr. in the title role, and its \$500 million take at the box office.

"Lot of people must have enjoyed it," Blau said, even though he allows that some in the Red Circle were upset because, for one thing, Downey didn't shave, and Holmes almost certainly would have.

"So what?' I tell them."

(Coincidentally, the day we talked, Blau was on his way to see newly

released "Sherlock Holmes: A Game Of Shadows," saying he was looking forward to seeing Holmes on "steroids.")

There's a quaintness to Blau's affection for Holmes, an enjoyment for both the original work and the adaptations through the centuries.

"The one thing that Sherlockians should take seriously," he says, "is not to take themselves seriously."

There is, though, one bit of folly, one aspect of the Holmes' legend Blau wants to share – the character's place on the moon ... literally.

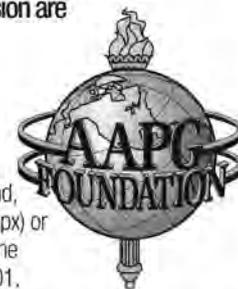
"I've not been to Sherlock Crater on the moon, of course," he laughs, "but then neither has Jack Schmitt, the astronaut who named it in honor of Sherlock Holmes."

Probably not a complete coincidence that AAPG Honorary Member Schmitt, too, is a geologist. **E**

REQUESTS FOR FOUNDATION FUNDING

If you have a funding need that matches the priorities of the AAPG Foundation, please visit foundation.aapg.org and click on the "Funding" tab for more information.

All of the AAPG Foundation's funding decisions are made by a Board of Trustees that meets three times annually to review proposals. Applications for grants to projects and programs which fulfill the AAPG Foundation mission are welcomed. Decisions are based on available funds.



TO CONTRIBUTE

If you would like to establish a fund or contribute to an existing fund, please go online (<https://www.aapg.org/eDonation/Core/eDonation.aspx>) or contact the Foundation staff by email (foundation@aapg.org), phone (888-945-2274, ext. 274) or mail to P.O. Box 979, Tulsa, OK 74101.

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- Theme 5: New Dimensions in Global Unconventional Resources



www.aapg.org/singapore2012

The field trip "Wine and Geology of the Central California Coast," will be held April 21, one day before the start of the AAPG Annual Convention and Exhibition in Long Beach, Calif. The trip is one of 19 being offered both before and after the convention. For more information on the field trip program go to aapg.org/longbeach2012/FieldTrips.cfm.

Nice way to enjoy an outcrop

Wine Matches Well With Field Trip

By DAVID BROWN, EXPLORER Correspondent

Wine pairing can be a delicate and challenging task.

True, some choices are fairly obvious. A softer Chardonnay would pair well with a porous sandstone, for instance.

A complex conglomerate would require a full-bodied red for support.

And a mafic metamorphic rock might demand the robustness of a powerful, but not overpowering, Zinfandel.

Wine will mix with California geology in the field trip "Wine and Geology of the Central California Coast," set in conjunction with the upcoming AAPG Annual Convention

and Exhibition in Long Beach, Calif.

The meeting features many outstanding field trip opportunities, from a look at the geology of the Santa Barbara Channel to heavy oil production in the San Joaquin Valley.

But none of the other field trips will include so much ... well, wine.

The outing leader is AAPG member Ed Magdaleno, a development geologist with DCOR LLC in Ventura, Calif. Participants in the pre-ACE trip will leave Long Beach early Saturday



MAGDALENO

morning for a one-day excursion to the Central Coast area around San Luis Obispo.

"On our way up we're going to stop by an outcrop of the Monterey Formation, which is a prolific source here," Magdaleno said.

For the best outcrop viewing, he has arranged beach access through private property on parts of the trip.

The route progresses up Highway 101 via Carpinteria pier, through the Gaviota Pass and into the Santa Ynez Valley, with a

first vineyard stop at the Firestone Vineyard.

After passing through more wine country, the route moves back to the coast for additional outcrop viewing. The group will have lunch at the Olde Port Inn on the Avila Beach Pier, which faces an outcrop of the Franciscan Formation complex, according to Magdaleno.

For those unfamiliar with California geology, the trip will provide an introduction to the Franciscan Assemblage, a chaotic mixture of "greywacke sandstones, limestones, altered mafic volcanic rocks – greenstones – and pillow lava outcrops, deep sea radiolarian cherts, serpentinites, shales and high-pressure metamorphic rocks," he said.

Two geologists familiar with central California join to provide background on the regional geology.

"The two gentlemen I found are both environmental geologists who work closely with all the wineries in the area," he said.

Soil composition and soil formation are essential topics in areas where vineyards flourish, and soil will be an important topic on the trip, according to Magdaleno.

"The geologists will talk about the outcrops," he said, "and geological relations to the soils."

Another Good Reason

In the afternoon participants will visit the Edna Valley, a recognized American Viticultural Area with characteristic black humus and clay-rich soils, desirable climate conditions for growing grapes – and one of California's longest growing seasons. Spanish missionaries planted the first grapes there in the early 1800s. The area is best known for its chardonnay, pinot noir and syrah.

Magdaleno said the geological commentary will include a discussion of the valley's tectonic origins, its current appearance and formation of its soil.

The trip will end with a geology and enology tour through the Wolff Vineyard on Orcutt Road in San Luis Obispo, with explanations on modern, ecologically conscientious viticulture by noted vintner Jean-Pierre Wolff, Magdaleno said.

"The highlight of the day will be a wine-paired dinner served at Wolff Vineyard," he noted.

Participants will then make the possibly sleepy return trip to Long Beach, with a scheduled arrival time around 11 p.m.

The California Geological Society is leading the field trip with a sponsorship from DCOR, Magdaleno said. The group that planned the outing left him holding the goblet as leader.

"I ended up backing into this," he said. "I thought other people would be involved, and ended up being the last person standing."

"I'm also a wine connoisseur," he added, "which helps."

The explanation for combining enology with geology can be summed up in three words:

This is California.

Despite the emphasis on geological background and soil formation, Magdaleno suspects many of the registered participants have an ulterior motive for making the trip.

"I think most of the people who are going," he said, "are interested in the wine tasting."

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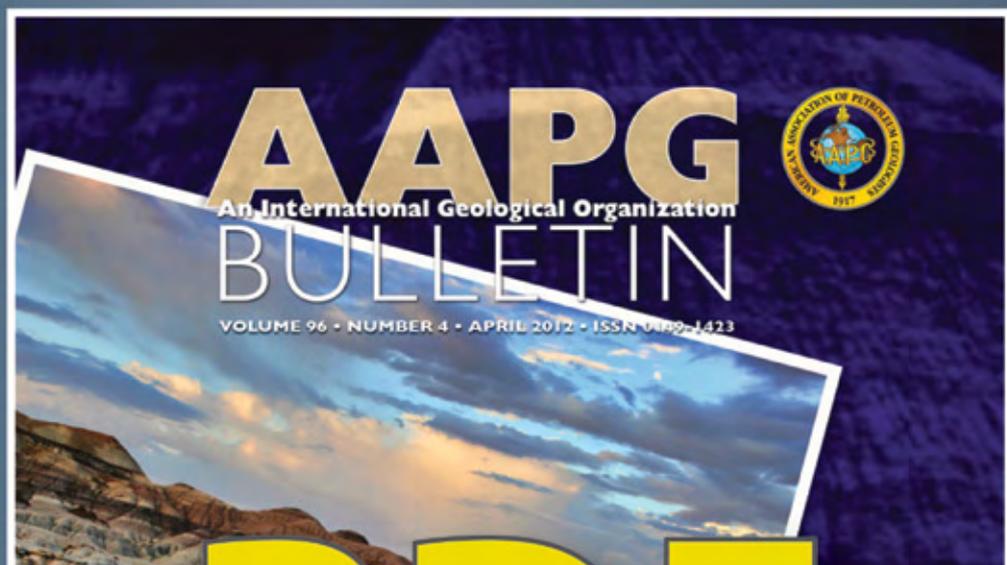
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Article highlights include:

Synsedimentary faulting

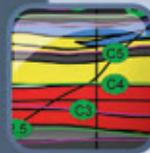
Fazli Khani and Stefan Back



There is considerable lateral variability in the style of synsedimentary normal faults and associated synkinematic strata in the western Niger Delta, Nigeria. The results of this study show that inboard deltaic faults may persist and grow irrespective of sedimentary loading.

Fluvial aggradation cycles

Aislyn M. Trendell, Stacy C. Atchley, and Lee C. Nordt



The Sonsela member of the Chinle Formation, Arizona, is an excellent subsurface fluvial analog and was evaluated using sedimentologic, stratigraphic, paleopedologic, and petrographic criteria to evaluate the spatial variability of fluvial facies, architectural elements and paleosols.

Petroleum systems of the Gaspé Peninsula

Gaëlle Grundman, Françoise Behar, Michel Malo, Françoise Bauden, and Françoise Lorant



Several petroleum source rocks and reservoirs are recognized in the Gaspé Peninsula of eastern Canada. This study evaluates the published data with respect to oil and gas prospects and to prepare geochemical input data for a further basin modeling study.

Structural and stress domains

Peter Hennings, Patricia Allwardt, Pijush Paul, Chris Zahm, Ray Reid Jr., Hugh Alley, Roland Kirschner, Bob Lee, and Elliot Hough



Data from a fractured gas field, Sumatra, Indonesia, reinforce the relationships among stress, stress variability, active faults, and permeability. The integration of these concepts can be used to assess reservoir potential and to drill wells with higher productivities.



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

Recipients Announced For Weeks Grants

By NATALIE ADAMS, AAPG Foundation Manager

Recipients of this year's L. Austin Weeks Undergraduate Grants have been announced by the AAPG Foundation, which sponsors the annual program that supports educational expenses.

This year the Weeks Grants went to a record-breaking 68 recipients, for a total of \$68,000. The list includes 37 U.S./Canadian and 31 international recipients (see accompanying list on page 73).

Each grant consists of \$1,000 per qualified AAPG Student Chapter; half of the grant (\$500) is awarded to the undergraduate student and the other half (\$500) supports the university's AAPG Student Chapter.

The program was funded for 2011-12 through a generous endowment gift from the late L. Austin Weeks.

Last year 44 grants were awarded.

The AAPG Foundation Trustees recently approved funding for several proposals, including:

► The AAPG Publications Department was awarded \$10,000 for AAPG Memoir 100 – "Tectonics and Sedimentation: Implications for Petroleum Systems."

This award was made possible through contributions to the Amoroso Special Publications Fund and the L. Austin Weeks Memorial Fund.

► A request was approved for \$15,000 to the AAPG Europe Region to help support student activities. The Region will match the funds as a condition of the award.

► Since 2008, the AAPG Foundation has been a partner with Oklahoma State University in a Geoscience and Geographic Information Systems (GIS) Consortium to create, promote and provide access to digital peer-reviewed GIS products. It is carried out through OSU's Boone Pickens School of Geology, the geography department and the AAPG GIS Publications Committee. The products have direct applications to the search for and development of petroleum and energy-related mineral resources, environmental geology and related economic issues.

With funding provided by T. Boone Pickens, the Boone Pickens Digital Geology Fund accelerates and sustains AAPG Datapages' Geographic Information Systems publishing program through the

AAPGF-OSU Geoscience GIS Consortium. Pickens' pledge gift of \$9.2 million provides \$240,000 per year for this program for 10 years, and then continual support for years to come.

Two projects totaling over \$58,000 recently were approved:

- ✓ Atlas of Shale Pits in the Devonian Mississippian Shales in Oklahoma.
- ✓ An Atlas of Modern Deltas.

The 2012 Michel T. Halbouty Fellowship recipients – \$5,000 gifts awarded to four deserving geoscience graduate students – recently were announced by Texas A&M University at College Station, Texas.

The recipients are: Aileen Gaudinez, Sally Scott, Rachel Wells and Harold Johnson, each of whom received a check and a certificate as part of their award.

The AAPG Foundation funds this award through an endowment from the

late Michel T. Halbouty.

The Foundation Trustees express their appreciation to the estate of Karl Arleth for remembering the Foundation in his bequest.

Bequests currently represent a major source of support for graduate students through the AAPG Foundation Grants-in-Aid Program as well as other AAPG Foundation programs.

Gifts may be a fixed amount, a percentage of the estate, or all or part of the estate residue – and often can be arranged with the simple addition of an amendment to your existing will.

After providing for loved ones, you may desire to support your choice of AAPG Foundation programs by designating a gift bequeathed through your will.

Bequests to the AAPG Foundation may qualify for an estate tax charitable deduction.

Clearly, the AAPG Foundation – thanks to the backing of dedicated supporters (see pages 74-75) – continues to impact the geosciences worldwide.

Please consider a gift, bequest or other form of support to the AAPG Foundation today.

Visit foundation.aapg.org for more information. 

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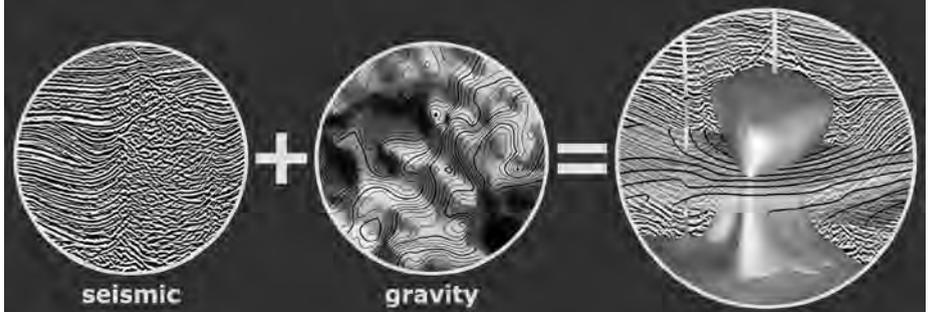
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AAPG, SEG to Open Joint Office in Dubai

BY ABDULRAHMAN S. AL-SHARHAN, HUSSAIN OTAIBI and SA'ID A. AL-HAJRI

AAPG and the Society of Exploration Geophysicists (SEG) are opening a joint office in Dubai UAE to facilitate services to members in the Middle East, India and North Africa.

The AAPG office, located in Bahrain, Manama, since 2008, is moving to Dubai.

The joint office will offer a point of collaboration for conferences, workshops, lectures and short-courses to advance the disciplines of geology and geophysics.

"The inauguration of the joint office in Dubai will create synergies to efficiently serve the professional needs of the upstream industry in the region," said Alan Wegener, AAPG's director of global development and operations.

"The impact of the efficiencies and energy created in this venture may well be felt globally," he added, "as we provide new and additional projects, products and services to the professional E&P community."

"Both AAPG and SEG see this as a long-term partnership that will benefit the entire industry," says Terrence Todd, SEG director for global relations and meetings.

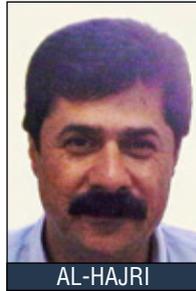
"We envision SEG Global Inc., Middle East as collaborating broadly with constituents and partner societies to deliver superior and innovative products and services that meet business needs," Todd said, "while at the same time fulfilling the overall mission of the Society."



AL-SHARHAN



OTAIBI



AL-HAJRI

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AAPG, in coordination with EAGE, SEG and affiliated societies in the Middle East, hosted in March the premier biannual earth science conference of the region – GEO 2012. The conference theme was "Shaping the Future of Geoscience in the Middle East," which was addressed extensively in the plenary session by executives from national oil companies in the region, IOCs and service companies.

The event was inaugurated by his excellency, Minister of Oil of Bahrain, which was followed by opening remarks by the presidents of AAPG (Paul Weimer), SEG and EAGE.

There were 224 papers presented in 56 sessions, covering a wide scope of interests ranging from reservoir geology all the way to geoscience education and training. The conference was accompanied by a glamorous exhibition comprising

129 international exhibitors who covered a very wide scope of petroleum and industrial services.

The conference was attended by more than 1,000 delegates and over 300 students and faculty members who came from 40-plus

countries.

The conference also boasted seven short courses and two geological field trips in Abu Dhabi and Oman.

The AAPG Middle East Region Council organized several key activities during the conference that addressed topical issues related to the geoscience community in the region.

► The Imperial Barrel Award competition was held one day before the GEO 2012 conference. Six universities from the region competed for the award, and the final results were announced in a reception attended by Middle East Council members, top executives from oil companies, universities faculties, award sponsors and oil industry professionals from the region as well as AAPG President Paul Weimer and AAPG Executive Director David Curtiss.

King Fahd University of Petroleum and Minerals from Saudi Arabia won the first place award and will represent the region

in the global IBA competition at the AAPG Annual Convention and Exhibition in Long Beach, Calif. in April. Kuwait University, and Institute of Petroleum of UAE placed second and third, respectively.

► Other meetings held during the conference were successful sessions between members of the Middle East Region Council and the visiting president and executive director of AAPG, to discuss issues of interest for promoting AAPG and geoscience in the Middle East.

► The Middle East Region Council also hosted another meeting with top executives from the region to solicit their input for a shared vision for the future geoscience in the region and the role that AAPG could play to cater for the geoscience community in the Middle East.

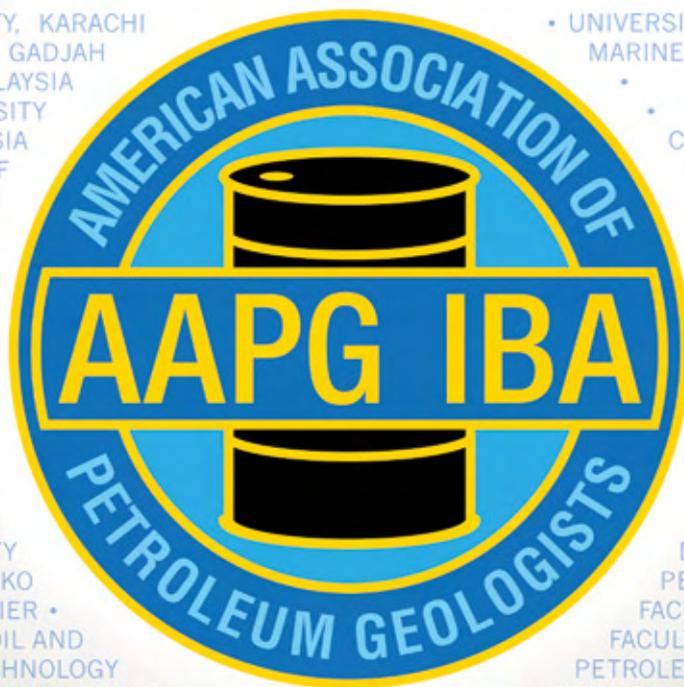
► The AAPG Middle East Council also organized a reception for its members when it announced the opening of an AAPG office in Dubai. A "Meet and Greet" was a novel idea implemented during this conference that brought together companies management officers with students and young professionals.

Subjects such as career options, future challenges for geoscience and industry trends were discussed as well.

GEO 2012 was surely the event of choice when it comes to keeping abreast of development in geoscience in the richest petroleum province of the world. ■

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September 10-17, 2012

Sedimentology and Sequence Stratigraphic Response of Paralic Deposits to Changes in Accommodation
Colorado

September 20-27, 2012

Fundamentals of Wrench Tectonics Applied to the Anatolian Plate
Turkey

September 21-27, 2012

SHORT COURSES

Application of Structural Geology in Prospecting in Thrusted and Extensional Terrain, course plus field trip
Perugia, Italy

August 27-31, 2012

Fractured Reservoirs: From Geologic Concepts to Reservoir Models, course plus field trip
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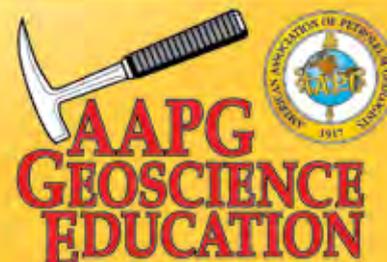
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Associates to take more active role

Fellowship Recognizes BULLETIN Editors

By STEPHEN E. LAUBACH, AAPG Elected Editor

Starting this year, former Associate Editors (AEs) together with present AEs are being asked to take a larger role in advising the Elected Editor on many policy issues through the new AAPG Charles H. Taylor Fellowship.

This effort will not overlap with those of other AAPG groups having publication responsibilities.

AAPG publications, important to the petroleum geoscience community, are an essential AAPG member service. To create and deliver the best publications in a challenging and changing publishing environment, the Elected Editor needs the advice and support of knowledgeable and dedicated volunteers, such as the AAPG Publications Committee members and the AAPG BULLETIN's Board of Associate Editors.

The Publications Committee manages the AAPG book series, where speeding book chapters to publication is a priority; AAPG will soon introduce a service for early electronic publication of book chapters. And the Publications Committee recently instituted a formal Books Editorial Board to ensure that our books have the same high-quality scientific review as the BULLETIN.

But the BULLETIN is AAPG's publication flagship, and, in many ways, journals are the most complicated challenge for society publishing, due to:

- ▶ Increasing demands on the time of potential authors.



LAUBACH

The Charles H. Taylor Fellowship mission is to help ensure that the BULLETIN remains the premier scientific journal of energy geoscience by providing advice on BULLETIN strategy.

- ▶ Shrinking library budgets.
- ▶ Numerous competing journals – some from well-heeled commercial publishers.
- ▶ All of the fast-changing opportunities of the digital age.

The BULLETIN's AEs provide editorial and technical review support, but for many tasks associated with the BULLETIN, more systematic and sustained volunteer support is needed.

The Charles H. Taylor Fellowship

The Fellowship, designated as a special committee chaired by the Elected Editor, was established by the Executive Committee at its February meeting. Comprising all former and current members of the Association's editorial boards, the Fellowship's mission is to help ensure that the BULLETIN remains the premier scientific journal of energy geoscience by providing advice on BULLETIN strategy.

The Fellowship also is a way for AAPG to

of these connotations are appropriate for members of an editorial board association.

Fellowship To-Do List

Several issues need immediate attention, and some work already is under way.

An initial priority is improving editorial board operations, identifying suitable board and reviewer performance metrics and standards, planning for turnover and broadening of the board, monitoring of BULLETIN performance (including time-to-decision and other efficiency measures), and updating our reviewer database.

AEs and newly appointed senior AEs will be asked to take on a more meaningful role in scientific editing, leading to better papers and more satisfied authors. But taking on this role will entail more thorough AE training on the BULLETIN's online manuscript-management system, Rapid Review, along with discussion of uniform reviewing and editing policy and standards.

The Fellowship will lead an improved and thorough vetting of award recommendations for papers and books for the major publication awards (these recommendations are transmitted by the Editor to the Advisory Council) and also will instigate recognition of discipline-specific notable papers in the BULLETIN, as well as recommend reviewing and editing awards.

say "thank you" to the more than 280 living former associate editors who have given their time and energy to the BULLETIN over the past several decades.

Members of the group will be recognized as AAPG Charles H. Taylor Fellows with a suitable certificate and annual meeting ribbon.

What's In a Name?

Charles Henry Taylor, the first editor for the Association, serving from 1917 through 1919, was a key figure in AAPG history. According to Wallace Pratt, E.L. DeGolyer, J.E. Thomas and Charles H. Taylor were instrumental in founding the Association.

Taylor was the older, sober organizer who gave form to the effort. His 1964 obituary called him the "father of the AAPG."

Fellowship is a term for people with a community of interest, and the term is commonly used to designate distinguished individuals in academic contexts. Both

Continued on next page

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Scan this QR code to find the AAPG Twitter feeds.

WWWUPDATE

AAPG's a-Twitter

By JANET BRISTER, AAPG Website Editor

What's the buzz? Tell me what's happenin'!

Or at least tweet it.

During the 2012 AAPG Annual Convention and Exhibition in Long Beach we would like to create a buzz on the social networks – in particular, Twitter.

To do this we need the help of all attendees.

While at the meeting please tweet about your experience using the hashtags #ace2012 and #aapg. If you'll keep your tweet to around 100 characters, then it will make it simple for us to retweet that message.



#ace2012 starts in 5 minutes."

Or ...

"In Long Beach. Lots to see @aapg #ace2012 exhibit hall. Crowd is huge. Looking for #aapg center."

Lost? In Translation

For those of you who are not veteran users of Twitter, here's what we are asking: Post a comment about your experience in your Twitter account while at the AAPG annual meeting in Long Beach. When you write your post please include these two sets of characters: #aapg #ace2012 – and try to use only about 100 characters in your post.

The hashtags create a keyword to enhance the searchability of the term.

The result will be a lot of information going out across the Internet:

- ▶ About the experience attendees are having.
- ▶ Increasing the awareness of AAPG and what it represents.
- ▶ Appealing to an audience that is using social objects as their primary source for information.

Bear in mind the confidentiality of presentations and that cell phone use is discouraged during sessions.

Some sample tweets might be:

"So excited! #aapg opening session at

Mission Possible: MI 4220

During the meeting a group of student attendees have "accepted the mission" of tweeting about their experience. So, for those of you unfamiliar with Twitter, now might be a good time to consider joining the conversation by getting an account and following the AAPG feeds.

It's always best to listen before you speak, so start slow by just creating the account, keep it private, make a few searches and start following AAPG and others of interest to you.

The AAPG Twitter feeds are easy to find through www.aapg.org/stayconnected/.

You will join the 3,874 (and growing daily) followers on the AAPG Twitter feed. In fact, we would challenge you to help us reach 4,220 Twitter followers by 04/22 – the first day of the meeting.

If you need help, come by the AAPG Center and look for the Communications/EXPLORER booth, where we'll be happy to assist you.

Good browsing!

Continued from previous page

The Fellowship will take an active role in identifying and soliciting topics for theme issues and may recommend review articles to be commissioned. The Fellowship will devise a new strategy for E&P Notes that will link this part of the BULLETIN more closely to Sections and Regions.

A major task will be helping to identify opportunities in electronic publishing and reviewing, including implementing ahead-of-print online publishing later this year.

Outreach to young industry authors also is planned.

Charles H. Taylor Fellows Annual Meeting and Dinner

A subcommittee of the editorial board concluded that the most effective way for the Fellowship to operate is through an annual face-to-face working meeting – preferably not in conjunction with other Association meetings – supplemented by subcommittee conference calls.

Videoconferencing will be provided to accommodate those who want to participate in the annual meeting but who cannot travel.

The meeting allows the Fellowship and the Publications Committee to meet jointly, permitting much-needed, in-depth study of publication issues and coordination between BULLETIN and book publishing, as well as an opportunity to train AEs in use of the Rapid Review system and to discuss

reviewing and editing policy.

The initial annual working meeting is scheduled for February 2013 in Houston. Although the Fellowship will report to the Elected Editor, with a membership of more than 280 the Fellowship will be self-governing. Arrangements will be worked out at the Houston meeting.

Much of the Fellowship work will be conducted by subcommittees.

More information and subcommittee assignments will be discussed at the Editors Appreciation Breakfast at the AAPG Annual Convention and Exhibition in Long Beach, Calif., on Monday, April 23, at 7:30 a.m. in the Regency E.

The Houston 2013 working meeting also will feature a dinner, which will be AAPG's opportunity to thank the editorial board fellowship for service. The dinner also will provide an opportunity for recipients of reviewing and editing awards and certain categories of publication award to be recognized, as well as for AEs to be thanked when their term of service ends.

Support

AAPG will fund the initial 2013 Fellowship annual meeting, although the aim is to make the operation revenue neutral.

Fellows can contribute to a soon-to-be-established AAPG fund in support of the fellowship.

The Elected Editor will match gifts, dollar-for-dollar, totaling up to \$10,000 through Dec. 31, 2013.

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• Tabernas Basin, Spain

Oct 22-26, 2012

• 5 days, \$2950.00



The American Association of Petroleum Geologists is seeking a director of its Geoscience and Energy Office in Washington, D.C. area (GEO-DC).

Applicants must have industry experience; a geoscience degree is preferred along with a strong familiarity with the geoscience community through active society participation. In addition, demonstrated

outstanding written, verbal, and management skills are required.

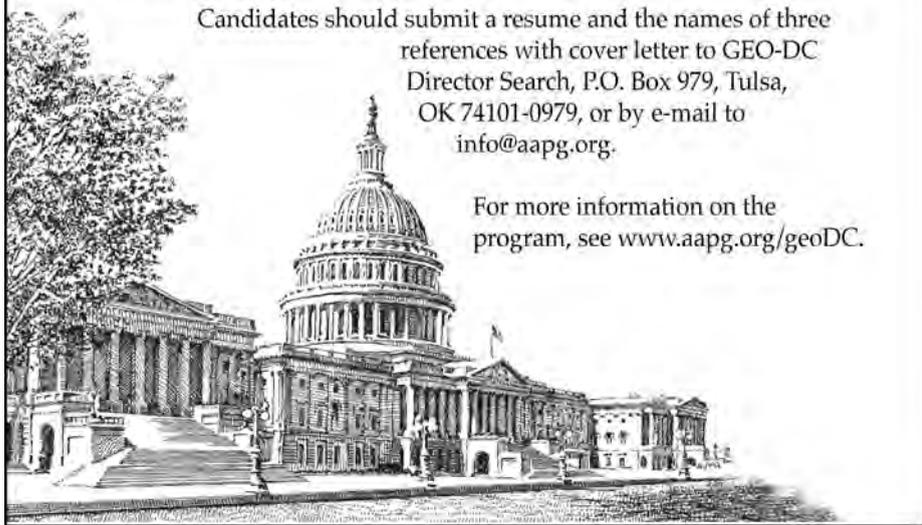
The GEO-DC office is the focus for AAPG's government affairs program, working actively with AAPG members, sister societies, Congress, and federal and international agencies to bring good science into the decision-making process of public policy.

The GEO-DC Director will monitor and analyze legislation and policy developments affecting the geosciences, and work with AAPG committees to develop congressional testimony and policy positions on national and international geoscience and energy issues. In addition, this position is responsible for key components of AAPG's development program to actively grow government and industry interest in geoscience and energy research for the benefit of AAPG members and the general public.

The office is located at the American Geological Institute in Alexandria, Virginia.

Candidates should submit a resume and the names of three references with cover letter to GEO-DC Director Search, P.O. Box 979, Tulsa, OK 74101-0979, or by e-mail to info@aapg.org.

For more information on the program, see www.aapg.org/geoDC.



PROFESSIONAL news BRIEFS

Marvin D. Brittenham has retired from Encana Oil and Gas, Denver, where he was team lead-new ventures USA. He resides in Parker, Colo., and is AAPG's current vice president-Sections.

Richard P. Crist, to vice president-business development and exploration, Gasco Energy, Denver. Previously chief operating officer and founder, White Birch Energy, Denver.

Michael Currie, to staff geophysicist-corporate technical services, Newfield Exploration, The Woodlands, Texas. Previously staff geophysicist-Gulf of Mexico and international, Newfield Exploration, Houston.

Rob Horine, to senior geophysical adviser, Forest Oil, Houston. Previously senior geophysical adviser, Hess Corp., Houston.

John M. Johnston, to executive vice president, PennEnergy Resources, Pittsburgh. Previously vice president-geoscience, EXCO Resources, Warrendale, Pa.

Alexei V. Milkov, to exploration technical manager, Sasol Petroleum International, Johannesburg, South Africa. Previously manager of exploration assurance, BP Russia, Moscow, Russia.

Steve Nath, to vice president of exploration, Kirkpatrick Oil, Oklahoma City. Previously senior geologist, SandRidge Energy, Oklahoma City.

Mark Sams, to quantitative interpretation manager, Ikon Science, Kuala Lumpur, Asia Pacific. Previously technical manager, Fugro Jason, Kuala Lumpur, Malaysia.

Sheree Thompson, to partner, Shale Shop, Houston. Previously development manager, National Petrographic Service, Houston.

Ken Whetstone, to asset team manager, Newfield Exploration, Houston. Previously vice president-exploration and development, Ironwood Oil and Gas, Houston.

Dues Accepted at ACE AAPG Center

By **VICKI BEIGHLE**, AAPG Member Services Manager

The season for paying annual AAPG membership dues has arrived – and those attending the AAPG Annual Convention and Exhibition in Long Beach, Calif., can do so quickly and easily at the AAPG Center.

The Center – comprising the AAPG Bookstore, General Store and representatives from the three AAPG divisions as well as AAPG's headquarters staff – will be located in the exhibits hall of the Long Beach Convention Center.

That includes representatives from the membership department, who will be able to provide assistance in paying dues for 2012-13.

Those NOT attending the convention can easily pay their dues as well, by logging on to the AAPG website's

Members Only section and clicking on the "Pay Dues" icon.

In addition to taking care of dues, members who visit either the AAPG Center or go online also can update their member profile and learn more about member benefits.

The annual dues statements were mailed last month to all AAPG members.

The AAPG Center itself, in keeping with Long Beach's geographic setting, will feature a Hollywood theme.

Anchoring the Center will be the AAPG Bookstore and the General Store, where everyone can purchase AAPG apparel and souvenirs – a large selection of newly designed dress shirts, golf shirts, t-shirts, hats and a wide variety of merchandise for children will be available.

DEG, EMD Candidates Announced

Officer candidates have been announced for AAPG's Division of Environmental Geosciences and Energy Minerals Division, and online voting is now open.

The voting deadline is May 15.

Those winning the president-elect races will assume their respective Division's presidency for 2013-14. Elected vice presidents serve a one-year term.

The candidates are:

Division of Environmental Geosciences President-Elect

- Nancy J. "Anne" Fix, Pacific Northwest National Laboratory, Richland, Wash.
- Douglas E. Wyatt Jr., URS Corp., Aiken, S.C.

Vice President

- John "Jack" B. Thomas, Jackrock Consulting, Fort Meyers, Fla.
- Michael S. Hagen, E Tech Environmental and Safety Solutions, Midland, Texas.

Editor-in-Chief

(two-year term)

- Kristin M. Carter, Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, Pittsburgh. (Unopposed)

Energy Minerals Division President-Elect

- Jeremy Boak, Colorado School of Mines, Golden, Colo.
- Jack C. Pashin, Geological Survey of Alabama, Tuscaloosa, Ala.

Vice President

- Richard J. Erdlac Jr., consultant, Midland, Texas.
- Robert A. Trevail, Dallas Energy, Freedom, Pa.

Secretary

(two-year term)

- Bruce Handley, consultant, Houston. (Unopposed)

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DPA
from page 83

particular interest for a meeting on the West Coast (see stories, page 44).

* * *

Our annual luncheon will be held Tuesday, April 24, in conjunction with PROWESS, and will feature two informative presentations by two respected members of the academic community – Sally Benson (Stanford University, California) and Sharon Mosher (University of Texas, Austin).

Benson, director of the Global Climate Energy Project at Stanford University, will speak on “Following your Convictions: Even When the Going Gets Tough.”

Mosher, dean of the Jackson School of Geosciences at the University of Texas at Austin, will speak on “Building a Diverse and Sustainable Geoscience Work Force (see page 52).”

Benson is a groundwater hydrologist and reservoir engineer who has conducted research to address a range of issues related to energy and the environment. She currently serves on the board of directors of the National Renewal Energy Laboratory and Climate Central.

Mosher is the founder and past chair of GeoScience World, an international journal aggregation for geoscientists. She is currently president-elect of the American Geological Institute.

* * *

Elections for open DPA Executive Committee positions are under way. Nominees are:

President Elect

- Mike Canich – Eastern Section.
- Valary Schulz – Southwest Section.

Vice President

- Chandler Wilhelm – Gulf Coast Section.
- Paul Pause – Southwest Section.

Treasurer

- Debra Osborne – Southwest Section.
- Bill Haskett – Canada Section.

* * *

DPA Councilor elections have been completed and new councilors elected for the 2012-2015 term are:

Eastern Section – Patrick M. Imbrogno; Jay G. Henthorne and Hannes E. Leetaru, alternates.

Rocky Mountain Section – Donna S. Anderson and Robert F. Garvin; Clifford C. Clark, Peggy Williams, David A. Wavrek and Jeff Brame, alternates.

Pacific Section – John T. Williams; Kurt E. Neher, alternate.

Asia-Pacific Region – Robert C. Shoup; Abul “Shams” Shamsuddin, alternate.

Canada Region – William J. Haskett; Sanjeev S. Thakur, alternate.

Europe Region – John R.V. Brooks; Iain P. Wright, alternate.

Latin America Region – Flavio J. Feijo; Hector San Martin, alternate. 

Tearpock Receives DPA Heritage Award

Since past DPA President Daniel J. Tearpock will not be able to attend the DPA awards event at the AAPG Annual Convention in Long Beach, a ceremony was held in March in Houston to present Tearpock the 2012 DPA Heritage Award.

The event was attended by the DPA leadership along with some local participants, AAPG Executive Director David Curtiss and Divisions manager Norma Newby.

The DPA Heritage Award, first bestowed in 2004, is awarded to an individual who is generally well-known for their substantial contributions to the industry.

Tearpock formed Subsurface

Consultants and Associates in 1988 after previously working with Tenneco. As chairman and CEO of SCA, Tearpock conducts a variety of consulting projects including technical studies and training for over 21,000 petroleum professionals from over 350 companies in 50 countries.

He served in several leadership capacities for DPA, including last year as division president and currently on the DPA Executive Committee. 



Daniel Tearpock, left, receives the DPA Heritage Award from division president Marty Hewitt.

OIL & GAS PROFESSIONALS



NOMAC SERVICES provides integrated directional drilling, mud logging, geosteering and geotechnical services in both conventional and horizontal applications to maximize drilling efficiencies and lower costs. Nomac Services has directional operations throughout the Anadarko Basin and Eagle Ford Shale with plans to grow operations into the Marcellus, Permian, Utica and Bakken shales. Nomac Services currently provides field geology services throughout the Anadarko Basin, Eagle Ford, Marcellus, Utica and Bakken shales.

FIELD GEOLOGIST TRAINEE

Nomac Services is accepting applications from recent college graduates for its **Field Geologist Development Program**. This one-year training program is designed to jump-start the natural gas and oil careers of individuals with undergraduate degrees in geology, science, engineering or mathematics. Field geologists are responsible for geo-steering, mud logging and other related duties. Outstanding trainees may be selected for leadership development. The program's goal is to provide professional geological field services for the most active drilling program in the nation. Trainees may be posted at field locations throughout Nomac Services' operational areas.

Nomac Services is an affiliate of Chesapeake Energy Corporation, which has been named to the **FORTUNE 100 Best Companies to Work For**® list five consecutive years and is the highest ranked energy production company on the list. Nomac offers excellent compensation and benefit packages.

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Wanted: Your Favorite Geoscience Paper

A APG will celebrate its 100th anniversary in 2017, and there are a number of projects planned to commemorate our centennial – including an initiative to develop a list of the “top 100” geoscience papers.

We are looking for papers that really made a difference in how we think, view things and do things; papers that changed paradigms. Although a number of committees have been created to solicit and review papers in different geoscience sub-disciplines, we are seeking input from our broader membership for this important project.

The papers do not have to be AAPG articles and can have been published in any geoscience journal. They

should, however, bear relevance to the petroleum geosciences.

Do you have a favorite paper, a paper that made a difference in how you think or approach problems or in your fundamental understanding of the geosciences?

If so, please send an email with your list of “papers that made a difference” to 100papers@aapg.org.

In addition to the title and organization that originally published it, please include a short summary, including what geoscience sub-discipline it is relevant to, and why it should be a “top 100” paper.

Considerations when nominating a paper include:

- ▶ The significant contribution made.
- ▶ The change it made in how we think or do geoscience.
- ▶ The paradigm it changed (if any; not all papers worthy of being nominated necessarily created a paradigm shift).
- ▶ The breadth of application of the contribution (regional or global).
- ▶ Evidence of how this contribution has made a lasting impact.

Each of the papers ultimately chosen to be in the “top 100,” along with a short summary or chart indicating why it is a “top 100” paper, will be published on a digital media and given to all 2017 – 100th anniversary ACE and ICE attendees.

IN MEMORY

- Ellis D. Cooper, 83
Tulsa, Feb. 23, 2012
- Joseph Andrew Dunwoody, 89
Bakersfield, Calif., Jan. 9, 2012
- Gene Richard George, 69
Casper, Wyo., Feb. 4, 2012
- Billy James Johnson, 78
Sugar Land, Texas, Nov. 13, 2011
- Peter Thomas Lucas, 80
Tucson, Ariz., Jan 29, 2012
- Carl Milton Padgett, 59
Houston, Aug. 5, 2011
- Nestor John Sander, 97
Modesto, Calif., Feb. 11, 2012
- James Vladimir Taranik, 71
Reno, Nev., June 21, 2011
- James Edward Werner, 84
Houston, Jan. 21, 2012
- Mark Dale Wilson, 85
Midland, Texas, Dec. 9, 2011

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

OIL AND GAS PROFESSIONALS



Chesapeake Energy Corporation is seeking talented professionals for the position listed below. Chesapeake, an Oklahoma City-based company, is the second-largest producer of natural gas, a Top 15 producer of oil and natural gas liquids and the most active driller of new wells in the U.S. Ideal candidates should be self-motivated team players and possess excellent interpersonal skills. A high degree of analytical ability and excellent oral and written communication skills are necessary for success in our fast-paced and rewarding environment.

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DIRECTOR'S CORNER

On With the Show, This is IT!

By DAVID K. CURTISS, AAPG Executive Director

*Overture, curtains, lights
This is it, the night of nights
No more rehearsing and nursing a part
We know every part by heart ...*

* * *

The Grammys and the Academy Awards all have been given, and now it's our turn on the red carpet.

Pack your bags and get ready to attend AAPG's 2012 Annual Convention and Exhibition (ACE) in Long Beach, Calif., from April 22-25.

"Directing the Future of E&P: Starring Creative Ideas and New Technologies" is the theme for this year's ACE, and we'll be joined by SEPM – the Society of Sedimentary Geology – and the AAPG Pacific Section as host.

Sincere thanks go to Kay Pitts, the 2012 ACE general chair, and the members of the Organizing Committee who have volunteered countless hours over the past several years to develop and conduct a showcase meeting for all of us.

Thanks, too, go to Alan Wegener and the AAPG convention staff who have worked closely with Kay and the committee to deliver a successful event.

The centerpiece of our annual meeting is the technical program, consisting of more than 400 talks and 700 posters developed and presented by fellow geoscientists. It's an impressive line-up of science, presented in 12 themes:

- ▶ Active oil and gas fields – development and production.
- ▶ Emerging frontiers.
- ▶ Siliciclastic reservoirs – exploration and characterization.
- ▶ Carbonates and evaporates – exploration and characterization.
- ▶ Unconventional resources.



CURTISS

The centerpiece of our annual meeting is the technical program, consisting of more than 400 talks and 700 posters developed and presented by fellow geoscientists.

- ▶ Basin analysis and petroleum systems.
- ▶ Alternative energy.
- ▶ Environmental and energy research.
- ▶ Structural geology and neotectonics.
- ▶ Geophysics and seismology.
- ▶ Geoscience principles and applications.
- ▶ AAPG and SEPM student poster sessions.

One of AAPG's principal missions is to advance the science of petroleum geology. Engaging with one another by listening to and giving technical talks is one of the primary ways that we do that. It's a process whereby we learn from each other.

The fact that we are able to do so is because you and your fellow AAPG members take the time to prepare and present these talks and posters – without your active involvement none of this happens.

* * *

In addition to the technical presentations, there are a series of forums and special sessions designed to inform, educate and spark creative thinking about how we go about finding oil and natural gas. They include the History of Petroleum Geology forum, the Michel T. Halbouty lecture (see page 24),

the Discovery Thinking forum (see page 44), the SEPM research symposium and the AAPG ethics lecture.

The luncheons present yet another opportunity for learning. AAPG welcomes J. Robinson West, the founder and chairman of PFC Energy to the All-Convention Luncheon, where he will be talking about the "Future of Deepwater after Macondo."

The Division of Professional Affairs and AAPG Professional Women in Earth Sciences have invited Sally Benson, director of Stanford University's Global Climate and Energy Project, and Sharon Mosher, dean of the Jackson School of Geosciences at the University of Texas at Austin to speak at their luncheon.

"Following your Convictions: Even When the Going Gets Tough" is the title of Ms. Benson's presentation, while Dr. Mosher will speak on "Building a Diverse and Sustainable Geoscience Workforce" (see page 52).

Hydraulic fracturing is very much in the public eye these days, and is the topic of the Division of Environmental Geosciences luncheon. As you read in the March EXPLORER, Steve Leifer, a noted expert on the issue, will address "Hydraulic fracturing: Separating Myth from Reality."

And Arizona state geologist Lee Allison and Irish journalist Ann

McElhinney will talk about the National Geothermal Data System. "Geothermal Exploration: Everything Digital, Online, and Interoperable" is the title of his talk for the Energy and Minerals Division luncheon.

The opportunities for learning don't stop here.

▶ We have 11 short courses and 19 field trips to support your professional development.

▶ Be sure to schedule ample time to visit with the companies and organizations in the exhibit hall to see the latest in data and technology.

▶ The International Pavilion will be hosting countries from around the world, showcasing E&P opportunities.

The exhibition also is a great place to meet your fellow geoscience professionals, colleagues and friends. Networking is a significant benefit of attending ACE.

And you cannot come to California without seeing a film. So we'll be screening SWITCH, featuring AAPG past president Scott Tinker as he travels the globe to better understand the realities of our energy present and our energy future. Don't miss this chance to see SWITCH.

See you in Long Beach!

* * *

*Overture, curtains, lights
This is it, you'll hit the heights
And oh what heights we'll hit
On with the show, this is it!*

– "This Is It"

by Mack David and Jerry Livingstone

DIVISIONS REPORT

DPA Has Big Plans for Long Beach

By MARTY HEWITT, DPA President

The DPA Executive Committee and councilors will convene at our annual business meeting at the Long Beach Hyatt Regency on Saturday, April 21. As well as conducting the annual business of the DPA, we will receive reports on the status of our key operating initiatives for the 2011-12 term that I have reviewed in previous EXPLORER columns:

- ▶ International presence and DPA councilor engagement.
- ▶ Membership.
- ▶ Gathering and learning.

Following the DPA annual meeting, we will hold our annual awards dinner at Sir Winston's on the Queen Mary in Long Beach Harbor. This year's dinner will recognize seven DPA members for their significant contributions to the Division.

▶ This year's recipient of the DPA Life Membership award is **Rick Ericksen** from Jackson, Miss. Life Membership is the highest and most prestigious award given by the DPA.

Rick joins the elite company of 21 fellow recipients of DPA Life Membership and is well deserving of our highest



HEWITT

DPA will be sponsoring the Discovery Thinking Forum, a luncheon and awards presentation at this year's ACE.

honor for his continuous service and leadership to the DPA.

▶ The DPA's Heritage Award has been awarded five times in the past and this year's recipient is **Dan Tearpock** of Houston.

The Heritage Award is awarded to an individual who is generally well known for their substantial contributions to the industry. These contributions can be significant discoveries, business accomplishments and/or their work in academia and publishing. Ideally, the awardee will be an

individual who has built a reputation for success within the industry, and has taken a proactive role in passing their knowledge and experiences to the next generation.

When thinking about the criteria for this award, I can't think of a more deserving candidate than Dan through his business and leadership with the DPA. (See related story, page 81.)

- ▶ We have two recipients of our Distinguished Service Award: **Paul Britt** of Houston and **Craig Reynolds** of Wichita Falls, Texas.

▶ Certificates of

Merit will be awarded to **John Brooks** of Brookwood, United Kingdom; **Dave Entzminger** of Midland, Texas; and **Deborah Sacrey** of Houston.

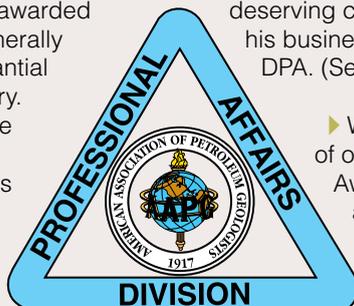
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Also in Long Beach, the DPA will be sponsoring the Discovery Thinking Forum on the afternoon of Monday April 23. These talks enable AAPG members to see and hear about discoveries from those who know them well.

In addition to learning about personal and professional challenges surmounted by the discoverers on the path to success, the format has evolved to include technical data about trends and discoveries.

This session will focus on "Exciting New Discoveries in Old Areas." This will be the fifth presentation of the AAPG 100th Anniversary Committee's program recognizing "100 who made a difference." Talks from Pacific, Rocky Mountain and West Texas will be of

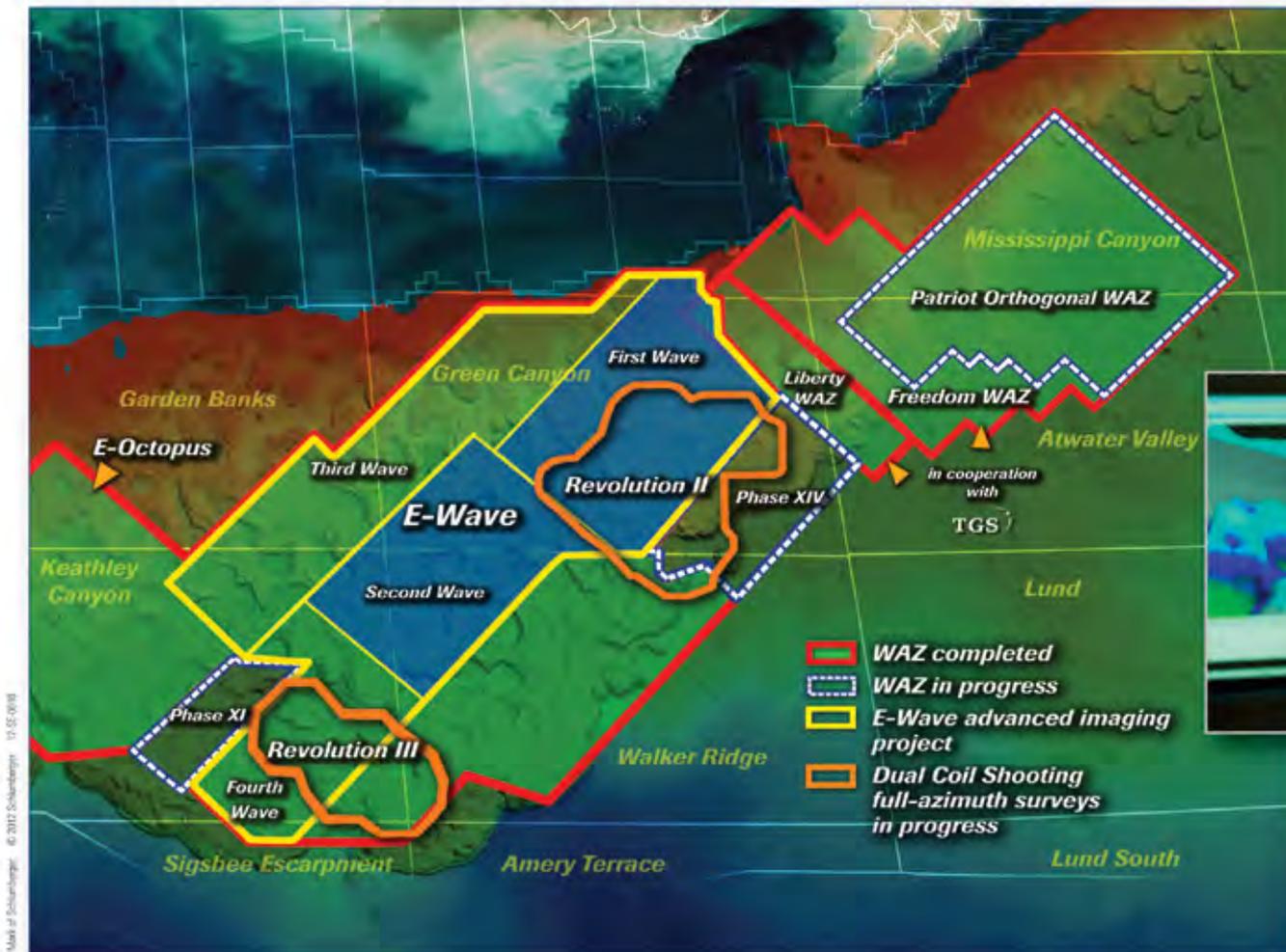
See DPA, page 81



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