AAPG EXPLORER

JANUARY 2012

World Class

Italy's dazzling Dolomites

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AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS AN INTERNATIONAL ORGANIZATION

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AAPG EXPLORER

PRESIDENT'S COLUMN

Societal Cooperation

By PAUL WEIMER

During my travels this year I have been repeatedly asked a number of questions regarding the AAPG and its policies. Here, I address one of the more challenging and important issues – joint cooperation with other professional societies.

* * *

The rapid development of unconventional resources in North America has had many consequences. Two of them are the continued merging of disciplines, and the proliferation of technical meetings and trade shows.

Many AAPG members have told me that they feel overwhelmed by the number of conventions they need to attend to keep their skills current, and have asked that AAPG cooperate with other professional groups to hold joint meetings of various kinds. We hear the same request from most people who stand for AAPG office. This issue is also important to me personally, as I have volunteered with several professional societies during the past 25 years.

So we all agree that professional societies need to work together. In fact, we've seen many successful joint projects at the local level – one example from my neighborhood is the highly successful annual RMAG/DGS 3-D seismic symposium. But why doesn't this cooperation happen more at the national and international level?

The answer, as you might expect, is that joint programs can present some financial and organizational challenges.

1. *Different professional societies have different philosophies and emphases.* Tom Davis and I learned this in 1992 with our 3-D Seismic Atlas, published jointly by AAPG and SEG. As the late Gary Howell (former AAPG science director) pointed out, different societies have different activities with different priorities; have different internal reporting structures; and have different sets of rules and boundary conditions for how they operate. Bridging these gaps among the different societies is critical for any joint activity to succeed.


WEIMER

> "Members must drive cooperation ... leadership of societies must drive cooperation."

2. *Developing viable business models is critical to joint cooperation.* For jointly sponsored events that generate income, finding an acceptable division of risk and profit is always the challenge. One successful model is for one society to act as the operator, while other societies help in advertising events and in placing people in organizing committees.

3. *Members must drive cooperation.* For joint projects to succeed between professional societies, members must be willing to take the lead. Support staffs at different societies can help accommodate joint programs, but ultimately, members must take responsibility to bridge the gaps between societies.

4. *Leadership of societies must drive cooperation.* Leaders should understand the value of collaboration, lead by example, and inspire volunteers to take action. Leaders have espoused some joint programs that started successfully, but unfortunately, ended when subsequent leaders are no longer willing to cooperate with other groups. Keeping the long-term momentum for some programs is challenging.

5. *Finding joint overlap in the interests between group's societies.* Professional groups must find the common ground for successful collaboration. For example, with the SEG, there is probably about a 20 percent overlap in interests between the two groups, i.e. primarily seismic interpreters. Where there is technical overlap between AAPG and other societies, there usually is room for cooperation for science and conferences.

The AAPG has been doing joint projects

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Upcoming AAPG Joint Meetings

- International Petroleum Technology Conference, Bangkok, Thailand: (SPE, EAGE, SEG) February 2012.
  http://iptcnet.org/2011/
- Geosciences Technology Workshop, Bali, Indonesia: (EAGE) February 15-17.
  http://www.aapg.org/gtw/bali2012/index.cfm
- NAPE Expo, Houston: (AAPL, IPAA, SEG) February 21-24.
  http://www.napeexpo.com/
- GEO Middle East, Bahrain: (EAGE, SEG) March 4-7.
  http://www.geo2012.com/index.html
- Offshore Technology Conference, Houston: (11 other societies) May 2012.
  http://www.otcnet.org/2012/
- Arctic Technology Conference, Houston: (13 other societies) December 3-5.
  http://arctictechnologyconference.com/index.cfm
- Geo India, Greater Noida: (APG); 2013.
  http://www.geoindia2011.com/

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20 Let's make a deal: AAPG's annual Prospect and Property Expo – best known as **APPEX** – is the place to be to find international potential.

37 **Jonna Gentry**, a ninth grade earth science teacher in Colorado, is this year's winner of the AAPG Foundation Award for Excellence in the Teaching of Natural Resources in the Earth Sciences K-12 – or, simply, **Teacher of the Year**.

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Scan this for the mobile version of the current web Explorer.

ON THE COVER:

The dramatically jagged peaks of Croda da Lago and Lastoi di Formin – an example of the amazing beauty and geologic artistry found in northern Italy's Dolomite mountain groups (as is the photo of Catinaccio-Ciadenac-Rosengarten to the left). Thanks to the efforts of a team of geologists – including AAPG member Piero Gianolla – the region is now a a UNESCO World Heritage Site. See story on page 16. Photos courtesy of Piero Gianolla.

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President
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with other societies in several broad areas. Let's review our recent activities, and ponder where we might do more in the future. The first two areas represent grassroots efforts by members, and the last two represent initiatives from elected leaders.

Joint research/technical conferences: This is an area that is ripe for cooperation, and there have been notable successes in three areas.

- First, AAPG, SEG and SPE have been jointly sponsoring yearly research conferences. Each society runs its own research conference, and the two other societies help by advertising the joint program, and by having representatives serve on the technical program committee. AAPG organizes this conference as Hedberg Conference; SPE hosts an ATW; and SEG sponsors one of their workshops.
- Second, since 2000, the AAPG and SEG have been co-sponsoring one Distinguished Lecturer a year in an effort to promote the integration of geology and geophysics.
- Third, AAPG and EAGE sponsored four joint research conferences between 1994 and 2000. Following the leadership of Stuart Harker (AAPG vice president-Regions and longtime EAGE member) and John Underhill (longtime AAPG member and current EAGE president), we are re-establishing these events as technical workshops beginning in early 2013. In addition, the first joint-sponsored Geosciences Technology Workshop between AAPG and EAGE is planned for Bali in February on fractured carbonate reservoirs, co-organized by Julie Kupecz, Bob Park, and Sigit Sukmono.

Publications: AAPG has done four joint publications with the SEPM during the past 15 years, and four with the SEG. Generally, these joint publications work well where there is significant overlap in scientific content between the societies, and one society becomes the publisher/operator of the book. Considerable possibilities exist for future joint publications, as there is clearly overlap among sedimentology and stratigraphy, geophysical content, and reservoir and drilling engineering in the evolving plays globally. Again, the book editors must be the ones who encourage joint publication.

Joint offices: As AAPG expands its membership in the international regions, developing joint offices with other groups makes good business sense. For example, AAPG and SEG are planning to share offices in some international settings; AAPG personnel in the Latin American region is planning to share an office in Bogota with the Asociación Colombiana de Geólogos y Geofísicos del Petroleo, a local professional society.

Joint conventions: AAPG sponsors the Annual and International Conventions with local societies affiliated with the organization. Additionally, there are several joint conventions/trade shows in which AAPG participates (listed with sponsors and next date of conference): NAPE Expo: (AAPL, IPAA, SEG; Feb. 21-24), GEO Middle East (EAGE, SEG; March 4-7), Geo India (APG) 2013, Offshore Technology Conference (11 other societies; May 2012), Arctic Technology Conference (13 other societies; Dec. 3-5).

The 2011 International Petroleum Technology Conference (IPTC, sponsored with SPE, EAGE, SEG) is a joint convention that is held in the Middle East and Asia. The most recent conference in Bangkok, originally planned for November 2011, was postponed until February due to the regional flooding. We encourage all to attend the meeting.

Finally, the newest and hopefully the most financially successful program that we are working on is an integrated, multidisciplinary science and technology event on onshore unconventional plays. AAPG is working with several other societies to develop this conference. The idea originated primarily with Rick Fritz, while he served as the AAPG executive director, and is moving forward. This proposed annual conference has the potential to serve as a significant new source of revenue for the organization, a topic that Jim McGhay and I discussed in our October column.

Beyond these activities in progress, can the AAPG increase its number of joint programs? The answer is a resounding yes! There are some challenges, as reviewed above, but they are not insurmountable. There are myriad opportunities for future joint programs, especially in our Regions.

If you want to see more cooperation between the different societies, then become the change that you wish to see. Tell your leadership how important cooperation is to you, your budget, and your time. And champion your ideas – you can make a long-term difference in our industry.

Paul Weimer

Registration Opens for ACE

The program is ready and online registration is open for this year's AAPG Annual Convention and Exhibition, to be held April 22-25 in Long Beach, Calif.

This year's theme is "Directing the Future of E&P: Starring Creative Ideas and New Technology."

More than 1,000 technical presentations will be offered, as well as 11 short courses and 19 field trips.

Complete details can be found with the official announcement that accompanied this EXPLORER, or online at www.aapg.org/longbeach2012.

Editor's note: The 2011 top discoveries list and analysis are provided by Ken White, senior editor of the IHS International Oil Letter.

East Africa discoveries stand out

E&P Had Big Wins Despite Economy, Unrest

By KEN WHITE (Special to AAPG EXPLORER)

Without doubt 2011 has been a busy year for the oil and gas industry, with global E&P spending an all time high of U.S. $544 billion, according to at least one group of industry analysts.


WHITE

Great success was achieved with the drillbit, with unconventionals again attracting mega deals – although the "shale gale" has generated a divided audience.

All of this seems against the odds when weighed against the huge economic problems of the Eurozone and widespread unrest for which most of the year will be remembered.

Described as a revolutionary spark of civil uprisings that stretched from western Africa to Iraq, the "Arab Spring" was fed by the use of social media networks – and this revolution is not yet over. The uprising threatened oil supplies, created spikes in the oil price and brought changes in government by replacing dictators with democracy – or at least setting that goal in motion.

While established plays offshore **Brazil** and the mature area of the **North Sea** surprised with spectacular billion barrel finds (but the pace in Brazil's pre-salt has slowed down considerably as the country shifts toward appraisal and development), 2011 may be seen as a year when frontier acreage, if not stealing the limelight, certainly earned the right to share center stage.

Greenland ultimately failed to produce a commercial find for Cairn, but the company claimed two deepwater gas finds off **Sri Lanka** at its first attempt. This marked the first wells drilled in the country for 30 years and the first to discover hydrocarbons.

Tullow scored with its first well off **French Guyana** and with pay established in two turbidite fans – a find that has huge implications for the area, as it is believed to mirror the Jubilee play off **West Africa**.

However, it is **East Africa** that outshone all, with Anadarko and Eni claiming gas discoveries in two large blocks where only a handful of wells have been drilled. The companies report a recoverable gas resource of at least 52 Tcf, with plenty of upside (see related story, page 10).

Country Names	Current Operators	Basin Name	Onshore/ Offshore	HC Type	Disc Date
AUSTRALASIA					
Australia	Apache Julimar Pty Ltd	North Carnarvon Basin	Offshore	Gas,oil	Apr-11
Australia	Apache Northwest Pty Ltd	North Carnarvon Basin	Offshore	Gas,cond	Apr-11
Australia	Arrow Energy Pty Ltd	Bowen - Surat Basins	Onshore	Gas (coal-bed)	Mar-11
Australia	Beach Energy Ltd	Warburton-Cooper-Eromanga Basins	Onshore	Shale Gas	Apr-11
Australia	Buru Energy Ltd	Canning Basin	Onshore	Oil	Oct-11
Australia	Chevron Australia Pty Ltd	North Carnarvon Basin	Offshore	Gas	Oct-11
Australia	Chevron Australia Pty Ltd	North Carnarvon Basin	Offshore	Gas	Oct-11
Australia	Santos Ltd	North Carnarvon Basin	Offshore	Oil	May-11
Australia	Woodside Burrup Pty Ltd	North Carnarvon Basin	Offshore	Gas,cond	May-11
Australia	Woodside Energy Ltd	North Carnarvon Basin	Offshore	Gas	Mar-11
CIS					
Azerbaijan	Total E&P Azerbaijan	South Caspian Basin	Offshore	Gas,cond	Sep-11
Kazakhstan	Samek International LLP (SI)	Precaspian Basin	Onshore	Oil,gas	Jan-11
Kazakhstan	TethysAralGaz LLP	North Ustyurt Basin	Onshore	Oil,gas	Apr-11
Russia	Gazprom	North Sakhalin Basin	Offshore	Gas	Oct-11
Russia	Gazprom	Baykit Basin	Onshore	Gas	Feb-11
Russia	Gazprom Neft Vostok	West Siberian Basin	Onshore	Oil,gas	Jul-11
Russia	Rosneft	Nepa-Botuoba Basin	Onshore	Oil	Feb-11
Russia	Rosneft	Nepa-Botuoba Basin	Onshore	Oil	Feb-11
Russia	Rosneft	North Sakhalin Basin	Offshore	Oil,gas	Oct-11
Russia	Tomskgazprom	West Siberian Basin	Onshore	Oil,gas	Sep-11
EUROPE					
Norway	Lundin Norway AS	Barents Sea Platform	Offshore	Gas,cond	Jul-11
Norway	OMV (Norge) AS	Trondelag Platform	Offshore	Gas	Sep-11
Norway	Statoil Petroleum AS	Barents Sea Platform	Offshore	Oil,gas	Apr-11
Norway	Statoil Petroleum AS	Viking Graben Province	Offshore	Oil	May-11
Norway	Statoil Petroleum AS	Viking Graben Province	Offshore	Gas	Feb-11
Norway	Statoil Petroleum AS	Viking Graben Province	Offshore	Oil	Jun-11
Norway	Total E&P Norge AS	Barents Sea Platform	Offshore	Gas,cond	Jun-11
Norway	Total E&P Norge AS	Voring Basin	Offshore	Gas,oil	Oct-11
United Kingdom	EnCore Petroleum Ltd	Central Graben	Offshore	Oil	Jan-11
United Kingdom	EnCore Petroleum Ltd	Central Graben	Offshore	Oil,gas	Mar-11
FAR EAST					
India	Oil & Natural Gas Corp Ltd (ONGC)	Damodar Graben	Onshore	Gas (coal-bed)	Jul-11
India	Reliance Industries Ltd	Cauvery Basin	Offshore	Gas,cond	Apr-11
Indonesia	Eni Muara Bakau Ltd	Kutei Basin	Offshore	Gas	Jul-11
Indonesia	ExxonMobil (Cepu) Ltd	East Java Basin	Onshore	Oil	Apr-11
Indonesia	Genting Oil Kasuri Pte Ltd	Bintuni Basin	Onshore	Gas,cond	Feb-11
Malaysia	Petronas Carigali Sdn Bhd	Baram Delta	Offshore	Oil,gas	Jun-11
Malaysia	Petronas Carigali Sdn Bhd	Northwest Sabah Province	Offshore	Gas	May-11
Malaysia	Petronas Carigali Sdn Bhd	Northwest Sabah Province	Offshore	Gas	Mar-11
Thailand	NuCoastal (Thailand) Ltd	Gulf of Thailand Basin	Offshore	Oil	Feb-11
Thailand	Tatex Thailand	Khorat Plateau Basin	Onshore	Gas	Mar-11

Brazil's Big Year

Since the announced discovery of the giant Lula Field (initially dubbed Tupi) in

See **Brazil**, page 8

Country Names	Current Operators	Basin Name	Onshore/ Offshore	HC Type	Disc Date
LATIN AMERICA					
Argentina	YPF SA	Neuquen Basin	Onshore	Shale Oil	Mar-11
Argentina	YPF SA	Neuquen Basin	Onshore	Shale Oil	Jul-11
Brazil	Petroleo Brasileiro SA (Petrobras)	Santos Basin	Offshore	Oil,gas	Nov-11
Brazil	Petroleo Brasileiro SA (Petrobras)	Espirito Santo Basin	Offshore	Oil,gas	Jun-11
Brazil	Petroleo Brasileiro SA (Petrobras)	Espirito Santo Basin	Offshore	Oil	Jun-11
Brazil	Petroleo Brasileiro SA (Petrobras)	Espirito Santo Basin	Offshore	Oil	Jun-11
Brazil	Petroleo Brasileiro SA (Petrobras)	Espirito Santo Basin	Offshore	Oil	Jun-11
Brazil	Repsol Sinopec Brasil SA	Campos Basin	Offshore	Oil,gas	Jun-11
Brazil	Statoil do Brasil Ltda	Campos Basin	Offshore	Oil	Apr-11
French Guiana	Hardman Petroleum France SAS	Foz do Amazonas Basin	Offshore	Oil	Sep-11
MIDDLE EAST					
Iran	National Iranian Oil Co (NIOC)	Zagros Province	Onshore	Gas,cond	May-11
Iraq	DNO Iraq AS	North Iraq Zagros Fold Belt	Onshore	Oil	Jan-11
Iraq	DNO Iraq AS	North Iraq Zagros Fold Belt	Onshore	Gas	Jun-11
Iraq	General Exploration Partners Inc	North Iraq Zagros Fold Belt	Onshore	Oil	Apr-11
Iraq	HKN Energy Ltd	North Iraq Zagros Fold Belt	Onshore	Oil,gas	Jun-11
Iraq	Niko Resources Ltd	North Iraq Zagros Fold Belt	Onshore	Oil,gas	Jul-11
Iraq	Reliance	North Iraq Zagros Fold Belt	Onshore	Oil	Feb-11
Iraq	WesternZagros Resources Ltd	North Iraq Zagros Fold Belt	Onshore	Oil,gas	May-11
Syria	Syrian Petroleum Co	Palmyra Zone	Onshore	Oil,gas	Apr-11
UAE - Abu Dhabi	Abu Dhabi National Oil Co (ADNOC)	South Gulf Salt Sub-basin	Onshore	Oil	Sep-11
NORTH AMERICA					
United States	Buccaneer Alaska LLC	Cook Inlet Tertiary Province	Onshore	Gas,cond	May-11
United States	Chevron USA Inc	Sigsbee Sub-basin	Offshore	Oil	Aug-11
United States	Noble Energy Inc	Sigsbee Sub-basin	Offshore	Oil	May-11
SAHARAN AFRICA					
Algeria	E.ON Ruhrgas E&P	Berkine Basin	Onshore	Oil,gas	Oct-11
Egypt	BP Egypt Oil Co	Nile Delta Basin	Offshore	Gas	Feb-11
Egypt	International Egyptian Oil Co	Levantine Basin	Offshore	Gas	Jul-11
Egypt	PetroShahd Co	Northern Egypt Basin	Onshore	Oil	Apr-11
Egypt	PetroShahd Co	Northern Egypt Basin	Onshore	Oil	Mar-11
Egypt	RWE Dea Egypt	Nile Delta Basin	Offshore	Gas	Jan-11
Egypt	RWE Dea Egypt	Nile Delta Bsasin	Offshore	Gas	Apr-11
Liberia	Anadarko Liberia Co	Sierra Leone-Liberia Basin	Offshore	Oil	Nov-11
Mauritania	Dana Petroleum (E&P) Ltd	Senegal (M.S.G.B.C.) Basin	Offshore	Gas	Jan-11
Mauritania	TOTAL SA	Taoudeni Basin	Onshore	Gas	Feb-11
SUB-SAHARAN AFRICA					
Angola	Eni Angola Exploration BV	Lower Congo Basin - Congo Fan	Offshore	Gas,cond	Aug-11
Angola	Eni Angola Exploration BV	Lower Congo Basin - Congo Fan	Offshore	Oil,gas	Feb-11
Ghana	Amerada Hess Ghana Ltd	Tano Basin	Offshore	Oil,gas,cond	Apr-11
Ghana	Eni Ghana	Tano Basin	Offshore	Gas,cond,oil	Jul-11
Ghana	Kosmos Energy Ghana HC	Tano Basin	Offshore	Oil,gas,cond	Feb-11
Ghana	Kosmos Energy Ghana HC	Tano Basin	Offshore	Oil	Aug-11
Mozambique	Anadarko Mozambique Area 1 Ltd	Ruvuma Basin	Offshore	Gas	Oct-11
Mozambique	Anadarko Mozambique Area 1 Ltd	Ruvuma Basin	Offshore	Gas	Feb-11
Mozambique	Eni East Africa SpA	Ruvuma Basin	Offshore	Gas	Oct-11
Uganda	Tullow Uganda Ltd	Albertine Graben	Onshore	Oil,gas	May-11

Brazil

from page 6

2007 in the deepwater subsalt environs offshore Brazil, this entire region has become increasingly alluring to the oil companies.

Drilled to a depth of 17,000 feet beneath 7,000 feet of water in the Santos Basin, Lula was estimated from the get-go to hold eight million barrels of recoverable reserves in the high pressured, high temperature environment beneath a massive salt sheet.

Other major discoveries followed, and billions of barrels have been estimated to await the drill bit in this subsalt region, positioning Brazil to become one of the world's top energy producers.

The populace in general has been supportive of the oil and gas industry, recognizing the economic benefits provided by oil and gas revenue.

Yet risk is indigenous to this type drilling – and even the best-laid plans can go awry.

In November, a well being drilled by Chevron Corp. at the Frade Field off the coast of Rio de Janeiro began leaking oil into the Atlantic Ocean. All told, about 3,000 barrels max leaked into the ocean water prior to containment.

Surging well pressure reportedly triggered the short-lived problem, and the oil released originated from production shallower than the subsalt.

Compared to the almost five-million barrel spill attributed to the infamous Macondo well debacle in the Gulf of Mexico, the Frade leak might be referred to by some as a drop.

But to many others, it was a drop too many.

Brazil's regulatory powers-that-be came down hard and swift, halting Chevron from drilling in Brazil – at least for now.

At press time, it was announced that the Brazilian authorities are suing Chevron and rig-owner Transocean for $11 billion and requesting that both companies suspend activities in the country.

Perhaps cooler heads will soon prevail, and the rush-to-judgment will prove to be ill conceived.

Brazil is eager to have its deepwater subsalt hydrocarbon accumulations developed, and the risks and costs to do so are far too great for state-owned Petrobras to go it alone. The resources

See **Developments**, page 14

Investments in rank wildcats pay off

Deep Waters Off Mozambique Yield Big Gas Finds

By LOUISE S. DURHAM, EXPLORER Correspondent

Offshore Area 1 of the deepwater Rovuma Basin off the coast of Mozambique in southeast Africa is proving to be a bonanza for Anadarko Petroleum Corp.

The area garnered considerable attention of the industry and others early on, particularly when the company announced the Tubarao prospect discovery well last February.

The well reached TD at approximately 13,900 feet in 2,950 feet of water about 18 miles off the Mozambique coast. It encountered more than 110 net feet of natural gas pay and no water in a high-quality Eocene-age reservoir.


DANIELS

> New seismic data sets have been analyzed, and rig commitments are in place for continued appraisal work.

The reservoir is separate and distinct from hydrocarbon accumulations in the company's three earlier discoveries in this region.

"This (Tubarao) is our fourth significant discovery in the offshore Rovuma Basin and further strengthens our confidence in our geologic and geophysical models of the basin," Anadarko senior vice president-worldwide exploration and AAPG member Bob Daniels said in a company press release.

Worth the Effort

When Anadarko signed the original license in December 2006 for deepwater acreage, the basin was very under-explored, according to an earlier report by AAPG member and former Anadarko staff member Carol Law. She noted there was only one well in all of northern Mozambique, and it was onshore.

Law added that this was rank wildcat area with little 2-D seismic data. The available seismic revealed the presence of a significant Tertiary basin with what was basically a well-developed fold and thrust belt structural setting.

This apparently was sufficient to convince Anadarko to invest some serious greenbacks and work-power.

It's no doubt been worth it.

In early October the company stated that cumulative results of exploration and appraisal successes offshore Mozambique served to increase the resource potential in the Offshore Area 1. Anadarko has five junior partners in the project.

The appraisal section of the Camarao prospect exploration well, which was announced at that time, tapped into about 240 net feet of natural gas pay in what was referred to as "excellent quality reservoir," and confirmed static pressure connectivity with the earlier announced Windjammer and Lagosta discoveries.

The Camarao well hit more than the expected pay dirt given that it discovered about 140 net feet of natural gas pay in shallower Miocene and Oligocene sand bodies not seen in prior wells.

"The results of our activity to date provide high confidence that the Windjammer, Barquentine, Lagosta and Camarao complex holds at least 10 Tcf of recoverable natural gas resources," Daniels said.

"We are optimistic that our current resource estimates will increase," he added, "as we still have significant exploration and appraisal work ahead of us."

Full Speed Ahead

This was a prophetic statement.

On Nov. 28 the company announced that its successful Barquentine-3 appraisal well hit more than 662 net feet of natural gas pay in two high-quality Oligocene-age fan systems.

As a result, the estimated recoverable resource jumped from 10 Tcf to a range of 15 to 30-plus Tcf of natural gas, with an estimated 30 to 50-plus Tcf of natural gas in place.

Barquentine-3 marked the sixth successful penetration in the complex to the north-northeast of the Tubarao prospect. The complex includes the Windjammer, Lagosta, Barquentine and Camarao discoveries.

"The results of Barquentine-3 indicate

See **Mozambique**, page 14

All 50 states participating

U.S. Geothermal Database Being Created

By LOUISE S. DURHAM, EXPLORER Correspondent

Geothermal energy, for many years, has proven to be an economical energy source – in select places.

A prime example is Klamath Falls, Ore., where geothermal has long been used to heat many commercial buildings, schools and more. The hot water resource even keeps the sidewalks toasty-warm to prevent snow accumulation.


JOHN

Near-surface hot rocks and sufficient water are the keys to make it happen. In fact, hot subsurface rocks along with other geological factors in many tectonically active areas in the western United States – where geysers, hot springs, volcanoes and such are not uncommon – make geothermal energy economically available in certain locales.

Still, interest in this particular alternative energy source has waxed and waned over the years, pretty much in tandem with oil and gas price movements.

The U.S. Department of Energy (DOE) has funded a number of geothermal research programs, including some field demos.

Currently, the Arizona Geological Survey is managing a DOE-backed three-year research program; all 50 states are participating. The $21 million program is in its second year.

Geopressured basins of the United States (modified from Wallace, 1982).

The objective is to compile a National Geothermal Data System (NGDS) containing vast amounts of data. These data would be available to all those interested in developing geothermal energy resources given the declining fossil fuel reserves and increasing demand worldwide, according to AAPG member Chacko John, Louisiana Geological Survey (LGS) director and state geologist, professor-research Louisiana State University.

A Gulf Coast Context

The LGS, along with other groups, has long investigated geothermal energy along the Gulf Coast with its considerable geopressure-geothermal resource.

This is a different breed of cat from geothermal that predominates in the western United States, in that it entails large zones of hot, highly pressurized fluids in deep strata.

"The northern Gulf of Mexico geopressured-geothermal resource has been estimated by various researchers to contain from 150 to 5,000 Tcf of recoverable methane and up to 11,000 quads of thermal energy in sandstone pore fluids to a depth of 22,500 feet," John said. "This is equivalent to many times more than the presently known conventional methane resources in the United States."

John emphasized the geopressured-geothermal resource contains:

- Chemical energy in the form of methane dissolved in pressurized brine.
- Thermal energy consisting of hot brines at high temperature (225 degrees-plus F), which could be used for secondary hydrocarbon recovery or electricity generation.
- Mechanical energy generated through high brine flow rates (20,000-plus barrels per day), which could be utilized to drive turbines to generate electricity.

See **Geothermal**, page 14

Mozambique
from page 10

that we continue to encounter very thick sands with high quality rock throughout these massive, connected reservoirs," noted Anadarko president and chief operating officer Al Walker.

"Recoverable resources of this size and quality are perfectly suited for a large-scale LNG development, which is currently being designed to consist of at least two trains with the flexibility to expand to six trains."

It's full speed ahead for activity in the area.

New seismic data sets have been analyzed, and rig commitments are in place for continued appraisal work. In addition, the partnership will accelerate exploration activity, including the testing of an increasing number of high potential prospects in other segments of Offshore Area 1.

Eni is tasting success in the Rovuma Basin as well.

Also in the deep offshore Area 4 of Rovuma Basin of Mozambique, Eni announced in late October a gas discovery in the Mamba South area in 1,585 meters of water, estimating up to 22.5 trillion cubic feet of gas from both Oligocene and the deeper Eocene pays.

Anadarko operates the 2.6-million acre Offshore Area 1, with a 36.5 percent working interest. It said in mid-December a sale of a portion is being considered to raise cash for the LNG project and other cash obligations.

Geothermal
from page 12

Time for a New Look?

The DOE conducted a geopressured-geothermal research program in the northern Gulf Coast from 1975 to 1992 to gather reliable geological, engineering, environmental and economic information about this resource to ascertain its viability for development.

LGS participated in the program, which included industry, universities and national laboratories.

Four wells were drilled and tested, and the oil and gas industry donated another 12 wells, which also were tested.

John, in noting how much valuable information came out of this program, said the time is right to revisit some of the results given the current interest in alternative energy resources. (He and LGS colleagues had presented a poster session summarizing the program at the 2006 GCAGS meeting in Lafayette, La.)

The program participants identified geopressured and geothermal fairways in Louisiana and Texas. They demonstrated that:

- High brine flow rates of 20,000 to 40,000 barrels per day are possible for long periods of time.
- Used brine could be re-injected into sands below fresh-water aquifers without contamination.
- Inhibitors controlled corrosion and scaling.
- A hybrid power system generated electricity using both separated methane and geothermal heat.

Profitable commercial development of geopressure-geothermal was not feasible at that time, but the world's energy picture today is far more favorable for unconventional, alternative energy source development, he noted.

Indeed, information derived from the early DOE-sponsored program played a key role in laying the foundation for current interest and activity.

A favorable aspect of the Gulf Coast is that the many existing deep depleted and/or dry wells in the northern Gulf of Mexico basin can be used to extract gas from brine, thereby saving well drilling costs.

John pointed out that geothermal has myriad potential applications other than generating electricity. These include enhanced oil recovery, aquaculture, greenhouses/agriculture and hybrid power systems, among others.

Developments
from page 8

and expertise of international oil companies are essential.

Developments of Note

Other events of note that help provide perspective of the industry's fortunes in 2011 include:

- Unconventionals endured a mixed year – particularly in Europe, where **France** ordered that all permits granted for shale gas exploration be cancelled.
- In the **United Kingdom**, Cuadrilla Resources suspended hydraulic fracturing operations at its Preese Hall 1 well after it reportedly coincided with a seismic event.
- For shale gas, the driving force in Europe remains **Poland** and countries to the east, like **Ukraine** and **Austria**.
- In **Latin America**, YPF stunned the industry by claiming to have established the existence of 927 MMb of unconventional oil in the Vaca Muerta formation in **Argentina**'s Loma La Lata Norte area.
- Shale plays in the **United States** continue to attract entrants, and one of the biggest deals saw BHP Billiton acquire Petrohawk Energy for U.S. $15.1 billion.
- In **China**, both shale and CBM continue to climb as pilots are converted to development stage. Still the big question is will "green policy" kill off the pace of development.

(Editor's note: EXPLORER correspondent Louise S. Durham contributed to this report.)

Photos courtesy of Piero Gianolla

UNESCO Designation Celebrates Dolomites' Heritage

By DAVID BROWN, EXPLORER Correspondent

A UNESCO World Heritage Site (WHS) designation identifies, celebrates and helps to protect the most precious places on planet Earth.

Thanks to a dedicated team of geologists and other experts, the majestic Dolomites in Italy are included on that list.

GIANOLLA

The nine Dolomite mountain groups span 350,900 acres (142,000 hectares) with 220,000 acres (89,000 hectares) of border areas, for a total 570,900 acres (231,000 hectares). They extend over five northern Italian provinces: Trento, Bolzano, Belluno, Pordenone and Udine.

AAPG member Piero Gianolla, who has spent years studying the Dolomites, served as scientific coordinator for the official "Working Group" that supported the WHS nomination.

He is a professor at the Earth Sciences Department of The Univerity of Ferrara, Italty, where he teaches mapping geology and basin analysis.

Gianolla's research includes sequence stratigraphy and paleoclimatological and sedimentological investigation of carbonate platforms and mixed basins. Importantly, he leads field trips for geologists to the Dolomites.

The first suggestion to nominate the Dolomites for inclusion in the UNESCO World Heritage List was made in 1992 by noted Italian mountaineer Reinhold Messner and the Mountain Wilderness group he helped found in 1987.

It took another 10 years for the campaign to gather enough political support to get off the ground, Gianolla said. A final push in 2004 was supported by the direct participation of the five provinces.

Extraordinary in a Global Context

From the Declaration of Outstanding Universal Value, World Heritage Committee, Seville 26.06.2009:

"The nine components of The Dolomites World Heritage property protect a series of highly distinctive mountain landscapes that are of exceptional natural beauty. Their dramatic vertical and pale colored peaks in a variety of distinctive sculptural forms is extraordinary in a global context.

"This property also contains an internationally important combination of earth science values.

"The quantity and concentration of highly varied limestone formations is extraordinary in a global context, whilst the superbly exposed geology provides an insight into the recovery of marine life in the Triassic period, after the greatest extinction event recorded in the history of life on Earth.

"The sublime, monumental and colorful landscapes of the Dolomites have also long attracted hosts of travelers and a history of scientific and artistic interpretations of its values."

"I started my collaboration with the Working Group more or less at the beginning of 2005," he recalled.

"They asked me to investigate the potential of the geological aspects in respect to the nomination, and to help the group establish coherent boundaries between the serial property," he added.

In the initial nomination to the UNESCO World Heritage Committee in 2005-07, "I understood that the geology and the landscape beauty were the strongest arguments," Gianolla explained.

"My work was therefore to define what geological aspects of the Dolomites had a global relevance," he said. "So I started an accurate comparative analysis with other localities in the world."

Stating the Case

Gianolla found the Dolomites had a unique geological heritage, as shown by several features of outstanding value, including:

- The Triassic reefs.
- The preserved relationship of the carbonate platforms with basins.
- The record of the recovery of life – and bio-constructors – after the Permian-Triassic mass extinction.
- The relations between carbonate platforms and active volcanism.

"Also, the importance of the Dolomites for earth sciences development was evident," he noted.

The Dolomites heritage site, made up of nine different core areas, shows a practically continuous sequence of Upper Palaeozoic and Mesozoic rocks that documents 200 million years of Earth history in a small and easily accessible area, Gianolla said.

"In particular, the continental successions of the Permian and most of all the marine successions of the Triassic are a worldwide reference area for researchers and specialists," he noted.

Significant intervals of the Triassic have been historically defined in these areas, for example: the Ladinian (term deriving from Ladinia), the Fassanian (from the Val di Fassa) and the Cordevolian (from the Cordevole Valley).

Gianolla said the sites give the perception of geological and biological evolution in time together with a unique preservation of the original palaeo-environments, spectacularly exposed and preserving their original relationships and geometries.

"This allows an immersive experience unrivaled by any other place," he said. "Its fossil 'cliffs,' with atolls older than 200 million years, are famous throughout the world, so perfectly are they preserved in their entire structure and beauty.

"Within the various areas that form this site, there are also a great number of fossiliferous sites of world-class importance for bio-chronostratigraphy and for palaeoecology studies," he said.

The Dolomites are an area of reference at worldwide level for the Triassic period because of the high sedimentation rates and the enormous variety of depositional facies and environments.

"The abundant documentation in fossils makes this site one of the world reference areas for the biostratigraphy of the Triassic Tethys and testifies, in an outstanding way, to the biological recovery after the most severe extinction in the Earth's history at the end of the Permian Epoch," Gianolla noted.

Finally, the Dolomites are the type area of the mineral dolomite, first described in the 18th century, whose occurrence is still enigmatic.

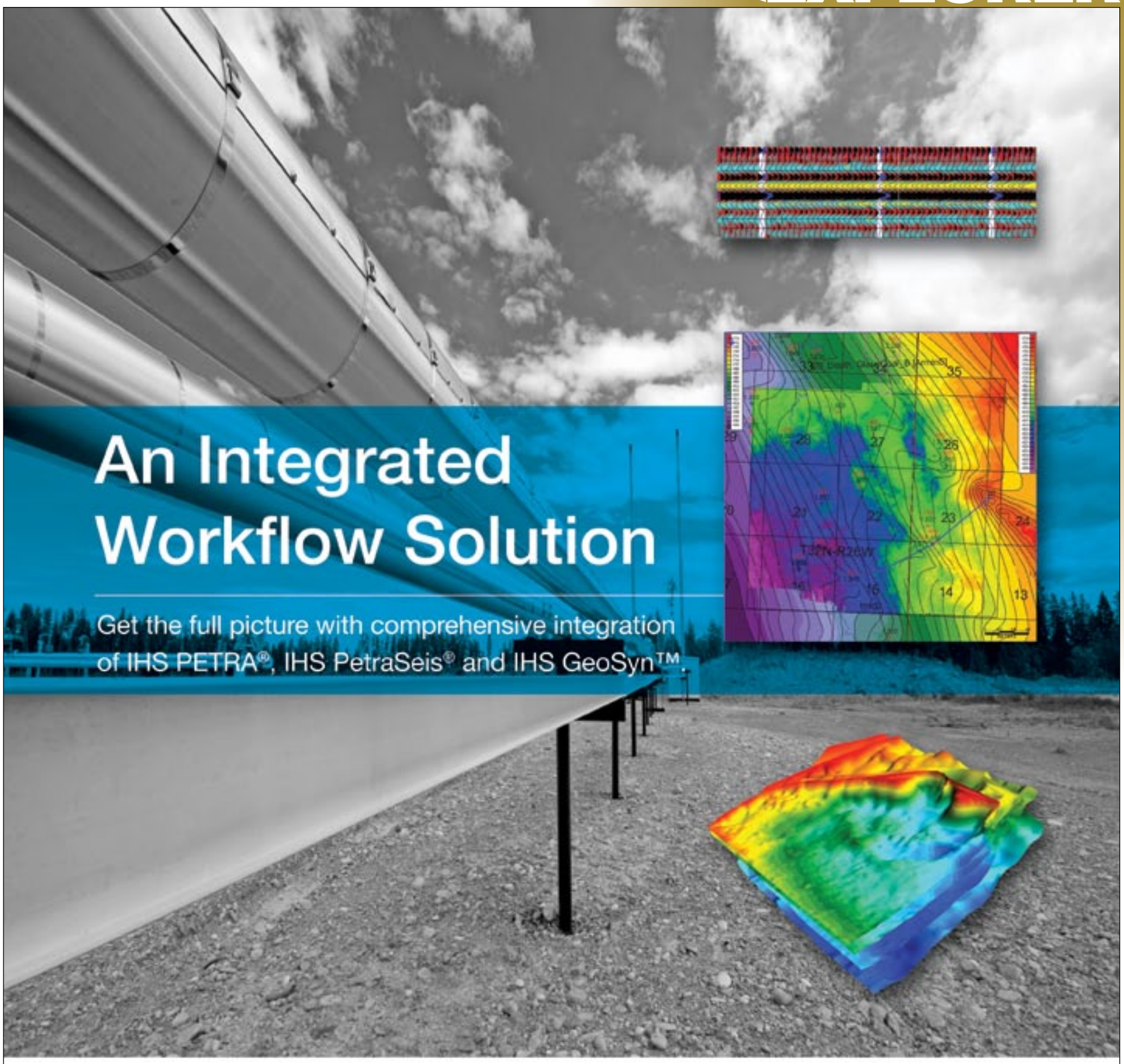
"The excellent outcrops," Gianolla said, "provide a huge natural laboratory for the solution of the 'dolomite problem.'"

Raising Awareness

After the first WHS nomination moved to a new cycle of evaluation in 2007, the Working Group was asked to review the nomination only for geological and landscape criteria, Gianolla said.

See **Dolomites**, page 18

Italy's awe-inspiring Dolomite mountain groups, extending over five northern Italian provinces, are widely regarded as being among the world's most attractive mountain landscapes.



When these three solutions seamlessly connect, geological and seismic workflows are streamlined with easy-to-interpret data and modeling tools. This integrated bundle allows you to access, view and manipulate information within the same project; create multidimensional seismic models and synthetics; improve workflow collaboration; and deliver comprehensive proposals for new prospects. Get to the field faster with seismic, well, production, log and economic data at your fingertips.

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Italy's Lago di Misurina – a treasure in the Dolomites, and the source of a writer's quest.

Postcard Perfect

By DAVID BROWN, EXPLORER Correspondent

It started with an old black-and-white postcard.

In a used bookstore in Texas I found a trove of old travel postcards, all of them 60 or 70 years old.

The one that caught my eye showed a mountain lake surrounded by majestic peaks, with a towering mass of rock in the background.

The place name said Lago di Misurina.

With the mental note "Must go there someday," I bought the card and took it home.

After investigating, I found that the lake was in Italy, not in the French Alps as I'd thought. So when I attended a conference in Milan years later, I rented a car and drove to Misurina.

That trip took me northeast through Trento and Bolzano, along a road near the Austrian border, and then south to Cortina d'Ampezzo.

I was in the land of the Dolomites, one of the world's most picturesque mountain areas. The mountains' stark beauty, combined with a charming Alpine setting, really isn't like anything else, anywhere.

After a half-day visiting and hiking around Lago di Misurina, I took a photo from the exact perspective of the postcard, toward the Grand Hotel Misurina and the Sorapiss peaks.

The Dolomites are advertised as one of the most scenic, stunning and beautiful mountain settings on the planet, so you could describe them this way:

Exactly as advertised.

Dolomites

from page 16

"This is why I became the scientific coordinator of the project," he said, "and, of course, responsible for the geology and cartography.

"The problems were mainly in management," he added. "The Dolomite mountain groups included in the proposal are in one of the most populated areas of the Alps – and one of the most important tourist areas of the world."

In addition, the Dolomites are in five provinces and three regions where residents speak four different and official languages – Italian, German, Friulan and Ladin.

"You cannot imagine the complexity in terms of organization," Gianolla said. "Anyway, with the Working Group we made a fantastic, hard effort. And at the end we reached the goal."

On June 26, 2009, in Seville, Spain, the Dolomites were officially added to the World Heritage List (see box, page 16).

Specifically, the committee found the Dolomites an outstanding example of WHS Criterion, which includes the world's best areas representing major stages of earth history, including the record of life, significant on-going geological processes in the development of landforms, and significant geomorphic or physiographic features.

After the WHS designation was announced, Gianolla began giving seminars and workshops to raise awareness about the Dolomites in local communities.

"In particular, I have tried to make known the importance of geological heritage to the general public and to local administrators," he explained.

"I also have organized specific workshops and field trips in the Dolomites, to present the geo-heritage to the Italian and international scientific community," he said. Together with the architect Cesare Micheletti, responsible for describing the landscape values presented in the nomination, and Mario Panizza, responsible for the geomorphological aspect of the nomination, he also has published brochures and other educational materials about the Dolomites.

"I have dedicated a lot of time to this project because I think it is an opportunity for the local people to understand the importance of the territory where they live," Gianolla said, and added:

"In general, I think what we did is important because we have helped protect for future generations a unique geological landscape, and one of the most beautiful mountain areas of the planet."

Editor's note: Martin Riddle, an AAPG member, is technical manager at Envol Limited in London, England. He also is a member of the APPEX technical committee.

Preparations Begin for London's APPEX

Current and future trends in international exploration, new oil and gas hot-spots and the chance to network with industry leaders from around the world will be offered at APPEX, AAPG's annual Prospect and Property Expo, March 6-8 in London, England.

Online registration is open at www.appexlondon.com.

APPEX is designed to give principals, senior managers, business developers and new venture managers a chance to network and do business with NOCs, governments and other global deal-makers and decision makers.

This year's program also includes a comprehensive speakers program, offering experts who will talk about current realities and future trends facing international exploration. Topics will include:

- The Future is Bright – Is It Really Unconventional?
- Where Is Money Available for Upstream O&G – And for What?
- The Future of Oil Shale vs. Shale Gas.

There also will be talks and forums that specifically target plays, prospects and the potential of Europe (general), the North Sea, India, Malaysia, Western Australia, Southeast Asia, Southeast Africa, the Falklands, Newfoundland, Iceland and South America.

This year's event will be held at London's Business Design Centre.

Dealmakers Define Global Marketplace

By MARTIN RIDDLE, EXPLORER Correspondent

AAPG's annual Prospect and Property Expo – best known simply as APPEX – has enjoyed a decade of success, but some North American companies still may be wondering: "Does APPEX matter to me and my company?"

According to organizers, it should if you want to stay one step ahead of the competition – because even if you're successful at home, what happens when the market matures and becomes crowded?

Whether frontier areas or near field exploration, conventional or unconventional, onshore or offshore, the international arena has huge potential and elbow room. The risks might be higher, but so is the potential for success, as proved many times before by U.S. exploration worldwide.

Indeed, U.S. oil and gas companies of all sizes are continuing to be very successful internationally, and a cursory glance around just the coastline of Africa ably demonstrates this:

- For offshore Ghana, the game-making Jubilee oil discovery by Kosmos is well-known and has drawn the rest of the world into the prolific offshore West African Cretaceous play.
- To the south, off Gabon, Harvest Natural Resources' recent oil discovery unlocked a complex Atlantic pre-salt play with new seismic processing technologies.
- Anadarko's large multiple Mozambique gas discoveries have triggered the surge of interest in the whole underexplored East African Margin (see related story, page 10).

These are just a few examples of success in the international arena.

So how can APPEX matter to your company?

The AAPG through APPEX offers an effective way of engaging with the right international A&D decision-makers from around the world, including many national oil companies that are part of the International Pavilion. Global opportunities are showcased in the exhibition and the prospect forums, complemented by topical themed and regional presentations by specially invited speakers, to help understand where in the world you can target basins and plays.

The APPEX program has been uniquely designed as an international dealmakers' event and networking opportunity. The speaker program includes both global and finance forums, with all keynote talks followed by shorter Prospect Forum speaker slots, reserved for registered exhibitors to pitch their international deals.

For those who are ahead of the herd and wanting to see what is going on in the international E&P area and network with key upstream players, APPEX is a "must attend" event.

For more information, go to www.appexlondon.com.

Oudinot Wins Eastern Levorsen

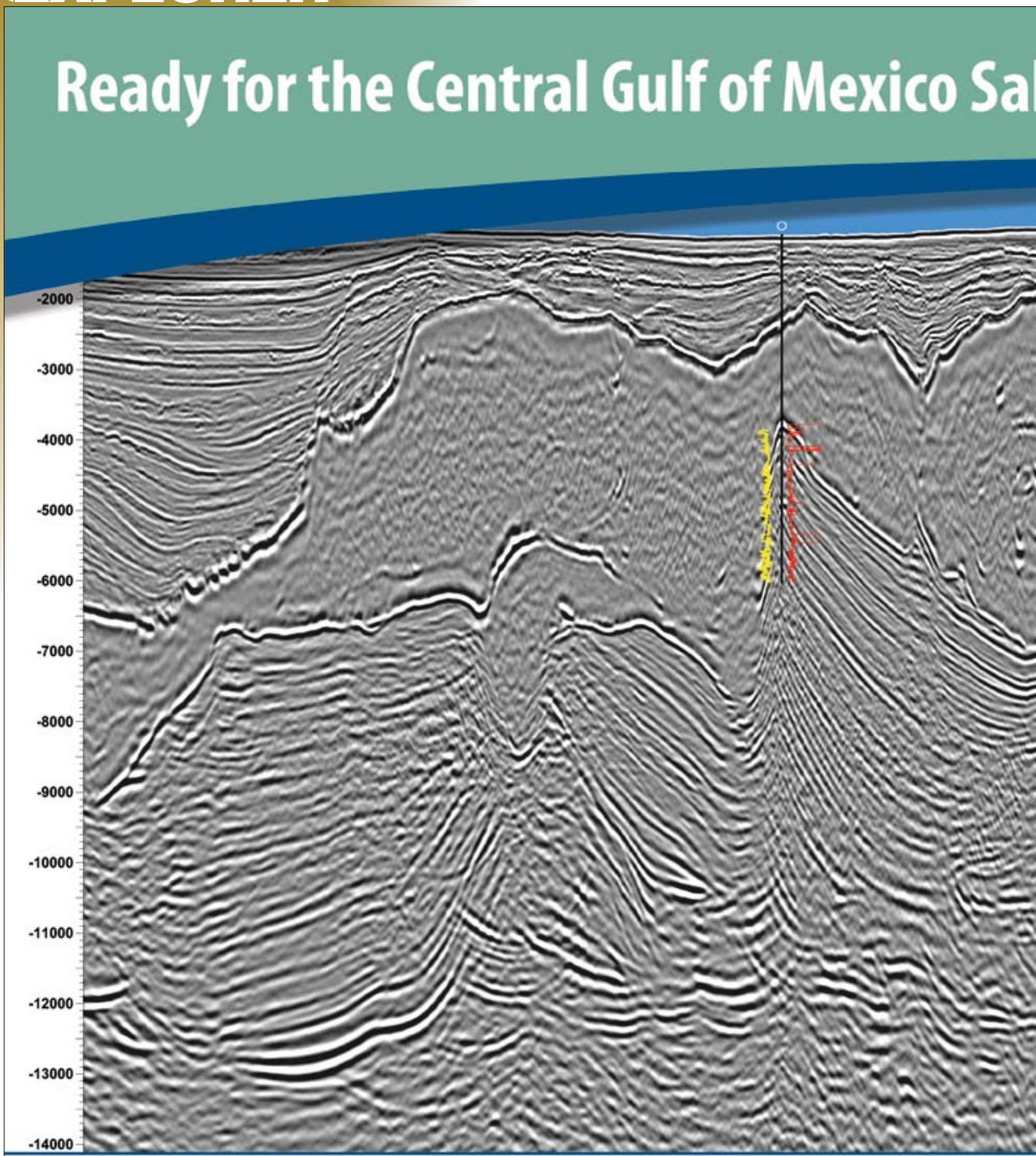
Anne Oudinot has won the A.I. Levorsen Award for presenting the best paper at the recent Eastern Section annual meeting.

Oudinot is a senior consultant with Advanced Resources International. Her paper was "Enhanced Gas Recovery and CO_2 Storage in Coal Bed Methane Reservoirs: Optimized Injected Gas Composition for Mature Basins of Various Coal Rank."

Her co-authors were Karine Schepers, Advanced Resources International, Arlington, Va., and Nino Ripepi, Virginia Center for Coal and Energy Research, Virginia Tech, Blacksburg, Va.

The next Eastern Section annual meeting will be held Sept. 22-26 in Cleveland, Ohio.

Ready for the Central Gulf of Mexico Sal



To help you get ready, TGS offers high quality geophysical and geological data as follows:

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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.

Location of the Auk and Fulmar fields, in North Sea block 30/16.

HISTORICALHIGHLIGHTS

Insistence Proved 'Unwanted' Block a Winner

By J. MYLES BOWEN

After World War II – possibly as part of the Marshall Plan – Shell was obliged to give an American company a half interest in the acreage it held in Netherlands.

Shell held most of the country's acreage, and a jointly owned company was set up with Esso, a forerunner of ExxonMobil, which was the Nederlandse Aardolie Maatschapij – better known as NAM, which operated a few small oilfields in Netherlands.

In 1960 NAM found the giant 100 TCF Groningen gas field, a discovery that helped wean Western Europe from coal.

When offshore acreage became available Shell and Esso decided to continue with the 50/50 joint venture in both the Dutch and UK sectors, with Shell being appointed operator.

Come the UK Third Round of North Sea block offerings, toward the end of 1969, the Shell/Esso partnership had to reach agreement about which blocks to include in their application. We agreed on a dozen or so, including block 211/29 – which, at the last moment, Shell discovered was outside the area designated in the Shell/Esso North Sea agreement.

The agreement had to be hastily amended. That block, in the East Shetland Basin, now contains the Brent Field, the largest oilfield in the UK sector.

Shell also wanted to apply for block 30/16, but our partners were not interested.

One of our seismic interpreters, Bill Wheatley, came to me and urged me to try to get the block restored to our application list. In those days the final decisions were made by the most senior managers involved – who knew little about the local geology. However, my manager – George Williams, also a geologist, who is now 95 and still going strong – managed to persuade the Esso chief in New York to include the block, as long as it was in the lowest category at the bottom of the list.

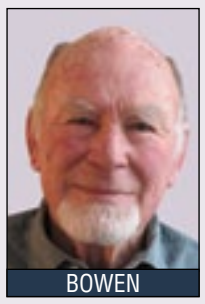
The prospect Wheatley saw was a huge fault block sealed by a major fault on the west and adjacent to the Kimmeridge oil kitchen down dip to the north and east. (Shell had known about source rocks and maturity well before 1969.) The reservoir was to be the Permian Rotliegend sandstone at the fairly shallow depth of 7,800 feet, and should have been of passable quality.

Anyway, we were allocated Block 30/16, no one else having applied.

To Test or Not To Test

One favorable feature of the block (which did not occur to us at the time) was that it lay far enough south to allow our small semi-submersible rig "Staflo" to drill there during the winter. Many more

See **30/16**, page 26



BOWEN

J. Myles Bowen is the 2011 recipient of AAPG's Pioneer Award. He was involved in various discoveries around the world, most notably Brent, Nelson and several other major North Sea finds. As a young man in Borneo in 1957 he was the first to climb King Edward's Peak (13,480 feet) on Mount Kinabalu via what became known as Bowen's Route. He now lives in retirement in Devon, England, with his wife, Margaret.

The way he was: J. Myles Bowen, an AAPG Pioneer Award recipient, stands in front of the flare at the Nelson Field, a major discovery.

30/16
from page 24

interesting locations further north had to be ruled out for insurance reasons.

So, in 1971 we came to spud well 30/16-1.

The main Rotliegend objective contained only dead oil, but we had encountered live oil shows while drilling through a thin, unexpected Permian Zechstein carbonate section.

"Not worth testing," said the petroleum engineers, who then ordered a helicopter to take out the necessary bits for abandonment.

But Rico Kempter, the area geologist responsible, strongly disagreed. He had read about a new Schlumberger tool called "Tricore," which allegedly would cut triangular slices out of the sides of the hole.

Kempter rang Schlumberger in Aberdeen, Scotland, and found that they had the tool but had never used it.

Anyway, somehow he got it on to the helicopter and we ran it over the Zechstein section. It worked superbly, and the vuggy dolomite samples recovered were streaming live oil!

The well was tested at 5,900 B/D of 37 degrees API oil on a restricted choke, with an extremely high productivity index.

What's In a Name?

The 30/16-1 was our first commercial discovery, and when we realized that I sat down with George Williams to choose a name.

The southern North Sea gas fields were mostly named after marine features (banks, shoals, deeps, etc.) but there were few such named features in the northern area other than Sea Area Forties, which BP already had appropriated. On the Norwegian side Phillips was using Norwegian fish names, so being a bit of an ornithologist I suggested North Sea birds in alphabetic order – hence, its name became Auk.

We announced our discovery and I received a call from the Texan manager of one of our competitors – obviously not an ornithologist – who asked me "What is this name Auk?"

So I couldn't resist replying, as a leg-pull, "Field A – UK, of course."

He then observed that if we were lucky enough to find six fields we might have a problem. I replied that we would be delighted to deal with that when the time came.

We did have a problem with the next discovery, as proper North Sea birds beginning with B were in short supply, so I offered my boss Barnacle (a goose) or Brent (also a goose) – and I guess you know which one he chose.

Auk, originally estimated at some 35 mbbl of recoverable oil, was a bit pathetic compared with BP's giant Forties discovery, but with Brent, we got back on equal terms. Auk eventually produced some 90 mbbl.

All's Well That Ends Well

A few years on and once more, for the same reason, we needed a southerly location – and about the only one we had was, surprise-surprise, again in block 30/16, this time a Jurassic prospect down dip from Auk.

There was a reasonably-sized closed structure but we had grave doubts as to the presence of reservoir, which we thought might have a maximum thickness of about 120 feet, if we were very lucky.

Again our partners were not fully convinced, but we had no option.

One old east-west seismic line showed a horizontal event across the structure. Could it be an oil-water contact?

No way, we all thought, as to be one would require a massively thick reservoir.

Which, of course, is what we found, against all expectations, in our seventh oil discovery, the 545-million-barrel Fulmar Field in 1975.

The line with the horizontal event disappeared, as did the event when it was reprocessed. Shell denies that it ever existed – but it did, and it tied in about 100 feet below the actual OWC suggesting the reservoir may have leaked.

Undoubtedly Bill Wheatley's effort to secure North Sea Block 30/16 in 1969 paid good dividends!

Editor's note: Erin Riley Camp is the AAPG Government Affairs intern at the American Geological Institute.

WASHINGTONWATCH

Casing Gets Early Blame in Fracturing Studies

By ERIN RILEY CAMP

A wise adage states that anything worth having is not easily obtainable – and it just so happens that the most promising source of cleaner, domestic, cost-effective energy of the near future also is incredibly controversial.

Shale gas, due to extensive resource availability and low fuel prices, is expected to provide the United States with 46 percent of its domestic energy needs by 2035, according to the Energy Information Administration.

Additionally, a 2009 Department of Energy report estimates the United States has over 900 trillion cubic feet of technically recoverable shale gas resources, which could provide up to a century of energy for the nation.

CAMP

Federal agencies, academic institutions and private research firms all are taking the initiative to fund studies on various hydraulic fracturing topics.

Concerns have been raised, however, regarding the production of shale gas using hydraulic fracturing that include: potential groundwater contamination, induced seismicity, "fugitive" air emissions, composition and treatment of produced waters, water use, soil erosion and state versus federal regulation.

Given the urgent need for this cheap, local fuel, it is imperative that the risks are properly investigated using quality science in order to develop best practices, improve technology and write effective policy so public health and the environment are not compromised and this energy opportunity is not overlooked.

* * *

In the United States, federal agencies, academic institutions and private research firms all are taking the initiative to fund studies on various hydraulic fracturing topics. Below are a few scientific studies already completed or currently in the works, along with what they already have found or what questions they hope to answer.

▸ Last May, Secretary of Energy Stephen Chu organized a Subcommittee on Shale Gas Production to identify ways that hydraulic fracturing can be executed safely without environmental or health impacts. The subcommittee, composed of seven experts from industry, environmental groups and state regulatory agencies, compiled a list of 20 recommendations in its first 90-day report, released in August.

The report's take-away message is that fracturing itself does not cause gas leakage into groundwater sources; rather, insufficient well casings and other human errors cause the problem.

▸ The Environmental Protection Agency, under the direction of Congress, has begun a review according to its "Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources." The study will be conducted by EPA scientists who have consulted with experts in the field, hosted technical workshops and facilitated public meetings with stakeholders.

Initial results will be released at the end of 2012, and the final report is expected in 2014.

▸ The University of Texas at Austin released in early November preliminary results from its study on the use of hydraulic fracturing in the Barnett, Marcellus, and Haynesville shale plays (see October EXPLORER). Like the Secretary of Energy's Shale Gas Subcommittee, UT has found no direct link from fracturing to drinking water contamination. Accidents have instead been linked to above-ground spills, mishandlings and poor cementation of well casings.

The university's final report, which is addressing groundwater contamination, fugitive air emissions, regulation and public perceptions, will be released in early 2012.

UT also intends to conduct two additional projects that will tackle more specific hydraulic fracturing issues.

▸ A Duke University study published in May (Methane Contamination of Drinking Water Accompanying Gas-Well Drilling and Hydraulic Fracturing) found gas signatures in groundwater that matched those of deep shale methane where fracturing is taking place. While the researchers believe the seepage is a result of poor casings and not migrating cracks in the rock, they advocate

See **Washington**, page 31

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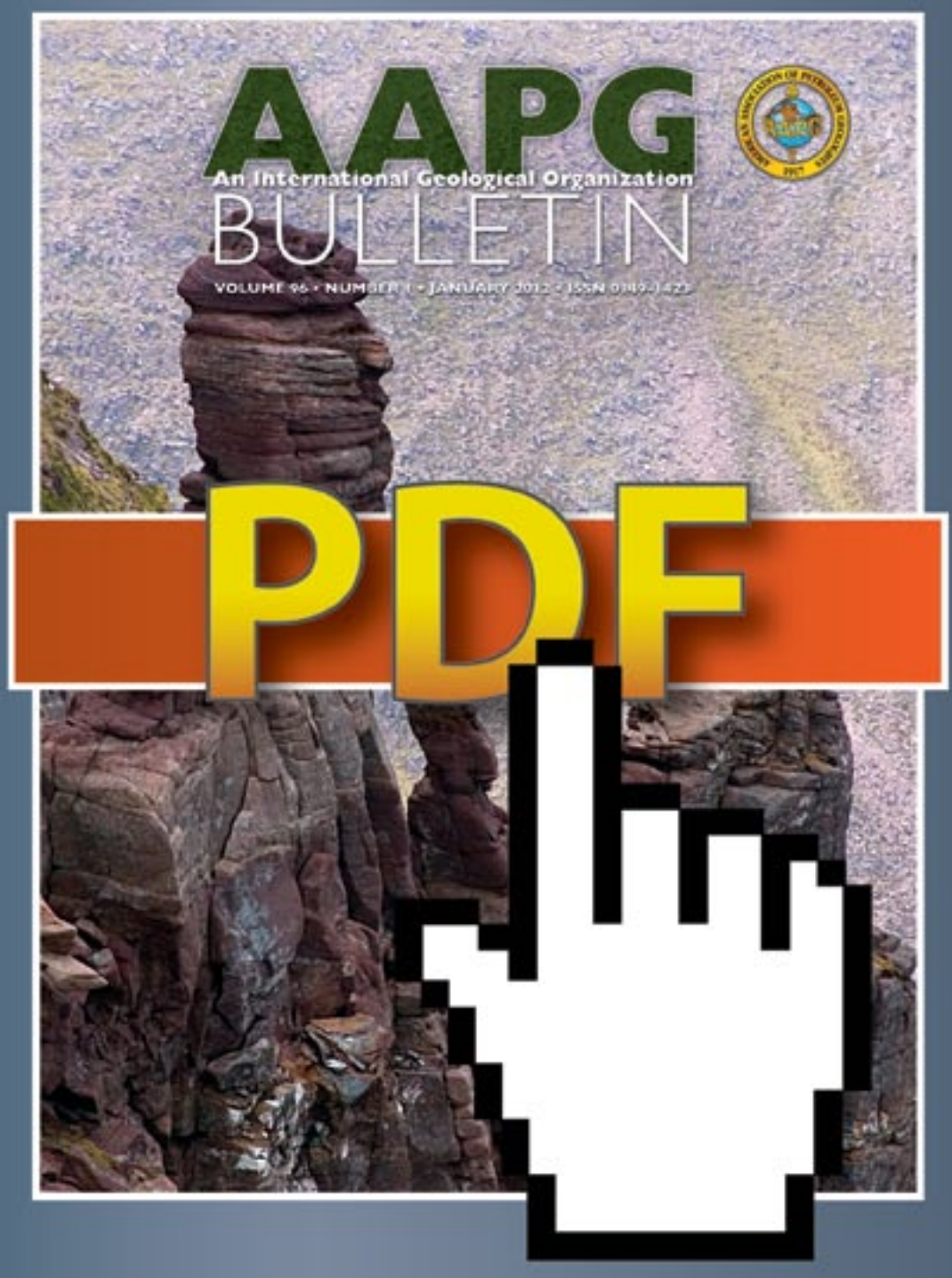

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Article highlights include:

Dealing with an active groundwater system

Mark Person, David Butler, Carl W. Gable, Tomas Villamil, David Wavrek, and Daniel Schelling

Muddy successions are typically interpreted using sequence stratigraphy. Early bioturbation homogenizes mud, and early chemical diagenesis causes cementation. The nature of deeper burial diagenesis is pre-conditioned by depositional and early diagenetic characteristics of the mud.

Four approaches compared

Gang Luo, Maria A. Nikolinakou, Peter B. Flemings, and Michael R. Hudec

Several approaches to geomechanical modeling of stresses adjacent to salt bodies are compared that provide insights and give geoscientists a basis for evaluating and comparing stress predictions.

A non-matrix kerogen pore system

Christopher J. Modica and Scott G. Lapierre

The kerogen porosity model in this paper is a relatively simple approach to the prediction of hydrocarbon storage capacity in source rocks as a function of thermal maturity. The formation of relevant pore space is attributed to the thermal decomposition of labile kerogen during catagenesis.

Deformation bands and well performance

J. P. Brandenburg, Faruk Omer Alpak, John G. Solum, and Steve J. Naruk

Laterally extensive deformation bands, subseismic zones of deformation without a defined slip surface, affect well performance. Where deformation bands are known to occur from core in a folded reservoir, finite strains can be used to estimate their lateral and volumetric extents.

The January Geophysical Corner was edited by Bob A. Hardage, senior research scientist at the Bureau of Economic Geology, the University of Texas at Austin. This month's column, part three of a three-part series comparing structural and amplitude curvatures, deals with volumetric estimates of seismic reflector convergence and rotation.

GEOPHYSICAL CORNER

The Final Touch: Attributes Prove Their Worth

By SATINDER CHOPRA and KURT J. MARFURT

Seismic stratigraphy requires interpreters to analyze the geometrical configurations and termination patterns of seismic reflection events.

Maps of distinct families of these reflection behaviors usually can be interpreted to determine where distinct depositional processes occur across the mapped area. Reflection patterns such as toplap, onlap, downlap and erosional truncation are used as architectural elements to reconstruct the depositional environments imaged by seismic data.

Using such seismic-depositional environment maps – together with well control and modern and paleo analogues – allows interpreters to produce probability maps of "most-likely" lithofacies.


CHOPRA

Although coherence and curvature are excellent for delineating some seismic stratigraphic features, they have limited value in imaging classic seismic stratigraphy features such as onlap, progradation and erosional truncation.


MARFURT

Here we examine how newer volumetric attributes facilitate seismic stratigraphic analysis of large 3-D seismic volumes.

Reflection Convergence

Changes in reflector dip, reflection terminations, erosional unconformities and angular unconformities are relatively easy to recognize by visual inspection of vertical seismic sections.

To translate visual recognition of these features to a numerical-recognition process, a first step is to compute volumetric estimates of vector dip at each data sample.

Next, the mean and standard deviations of these vector dips are calculated in small windows about each data sample. Conformable reflections will have small standard deviations of their reflection dips, while non-parallel events such as angular unconformities will have high standard deviation.

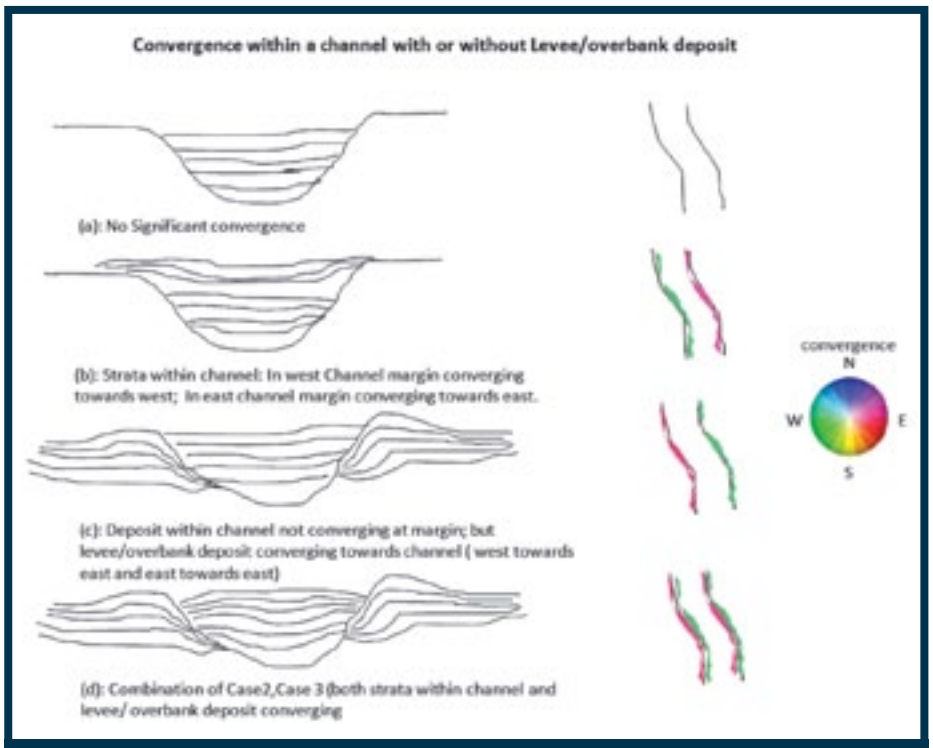

Figure 1 – Cartoons demonstrating convergence within a channel, with and without associated levee/overbank deposits. (a) Strata within the channel show no significant convergence; (b) strata within the channel converge toward both west and east channel margins. (c) Strata within the channel do not converge at the margins, but levee/overbank deposits do. (d) A combination of cases (b) and (c), where strata within the channel and levee/overbank deposits both converge at the channel margins. Azimuths of reflection convergence are defined by the color wheel. Interpretation courtesy of AAPG member Supratik Sarkar, University of Oklahoma.

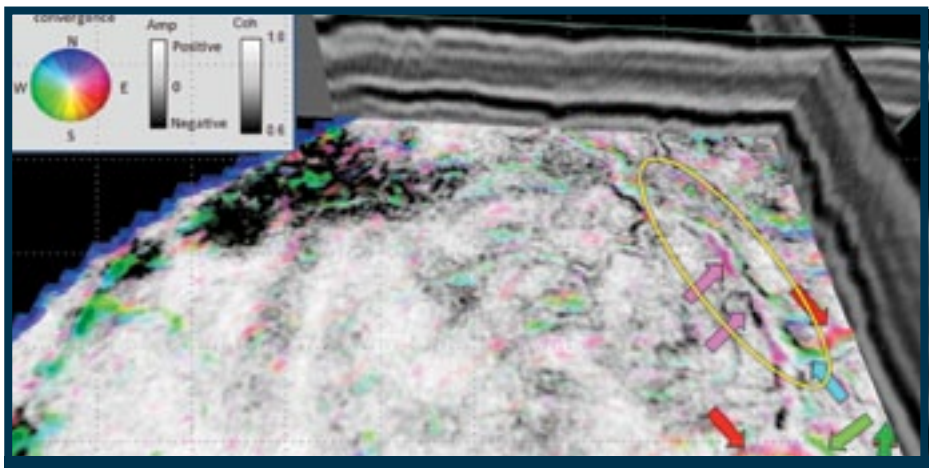

Figure 2 – Three-D chair view with a coherence time slice across a channel system as the horizontal section. This slice is co-rendered with reflector-convergence azimuth defined by the 2-D color wheel at the upper left. In view of the scenarios discussed in figure 1, we interpret the zone within the yellow dotted ellipse to be a levee/overbank deposit converging toward channel margin.

Reflection Rotation

Compressive deformation and wrench faulting cause fault blocks to rotate. The extent of rotation depends on the size of the block, the lithology and the stress levels.

As individual fault blocks undergo rotation, higher stresses and fracturing may occur at block edges. Natural fractures are partially controlled by such fault-block rotation and partially depend on how individual fault segments intersect.

Fault-block rotation also can control depositional processes by providing increased accommodation space in subsiding areas and enhancing erosional processes in uplifted areas.

In view of the importance of fault block rotation, interpreters need a seismic attribute that allows the rotation of fault blocks to be better analyzed.

In 2000, Barnes computed a vertical derivative of apparent dip along a user-defined azimuth, and used that calculation to define whether reflections diverged or converged. In this methodology, converging reflections show a decreasing change in dip while divergent reflections show increasing change in dip.

Marfurt and Rich (2010) built upon this method and generated 3-D estimates of reflector-convergence azimuths and magnitudes.

In order to represent the vector nature of reflector convergence in different azimuthal directions, they employed a 2-D color wheel to indicate reflector dip and azimuth.

Examples

In figure 1, we show the behavior of reflection convergence for a channel with and without levee/overbank deposits for four scenarios:

- Deposition within the channel that shows no significant convergence.

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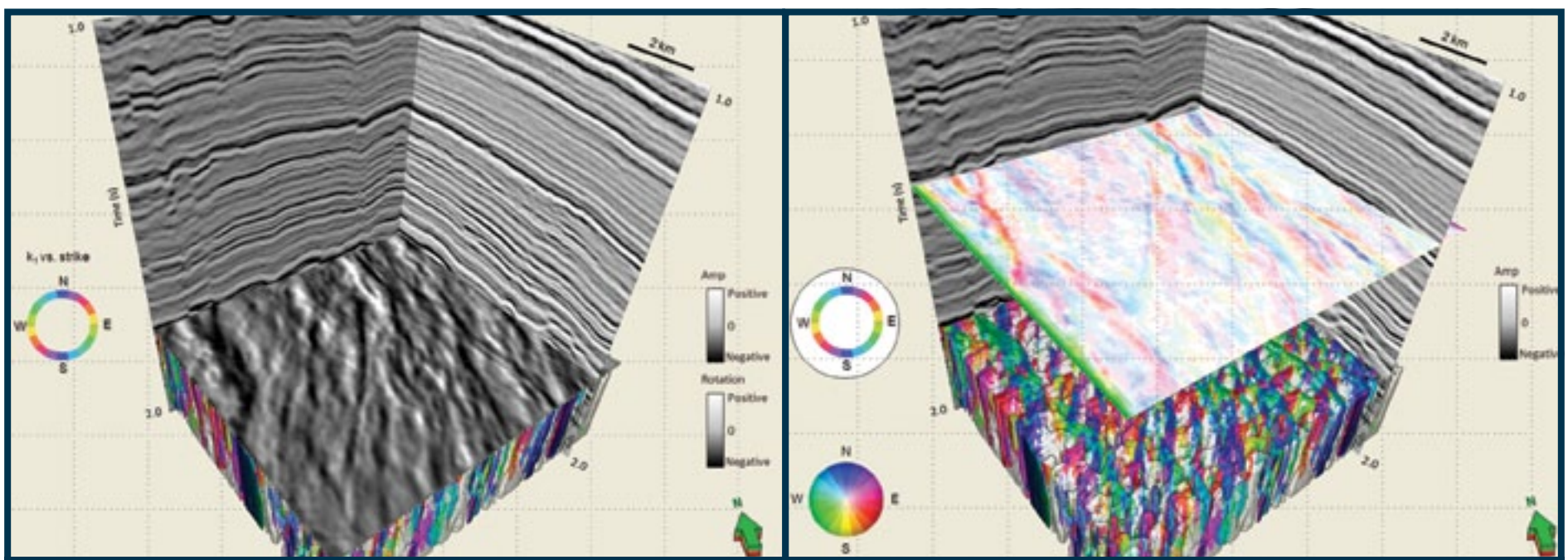

Figure 3 (left) – Time slice at t=1.710 seconds through a volume of reflector rotation. Horst and graben blocks show considerable contrast and can be interpreted as separate units.
Figure 4 (right) – Time slice at t=1.330 seconds through a reflector-convergence volume. Blue indicates reflectors pinching out to the north, red to the southeast and cyan to the northwest. Below the time slice we show the most-positive principal curvature lineaments displayed in 3-D with more-planar features rendered transparent.

Continued from previous page

- Deposition within the channel such that the west channel margin converges toward the west and the east channel margin converges toward the east.
- Deposited sediments within the channel that do not converge at the margins, and levee/overbank deposits that converge toward the channel (west deposits converge toward the east and vice-versa).
- Strata within the channel and levee/overbank deposits that converge to the channel margins.

We carried out the computation of both reflector convergence and reflection rotation for a suite of 3-D seismic volumes from Alberta, Canada. Figure 2 shows a 3-D chair view of a coherence time slice spanning a channel system, co-rendered with reflector-convergence attributes.

Using the scenarios presented in figure 1, our interpretation of the zone within the yellow dotted ellipse is that levee/overbank deposits converge toward the channel margin to the northeast (magenta) and southwest (green).

In figure 3 we show a time slice through a reflector-rotation volume. Notice the horst and graben features show considerable contrast and can be interpreted as distinct geologic regimes.

An equivalent display is shown in figure 4, with a time slice through a reflector-convergence attribute. In this case, the thickening and thinning of reflectors appear to be controlled by rotated fault blocks.

Conclusions

Application of two attributes, namely reflector convergence and reflector rotation, are shown for two different 3-D seismic volumes. These attributes provide complementary information to that provided by amplitude, coherence and curvature attributes.

Reflector-convergence measures the magnitude and direction of thickening and thinning of reflections.

Reflector rotation about faults is demonstrated to be valuable for mapping wrench faults.

We thank Arcis Corporation for permission to show the data examples, as well as for the permission to publish this work.

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

Satinder Chopra, an award-winning geoscientist who has contributed numerous papers to Geophysical Corner over the past several years, will be the column's new editor.

He replaces Bob Hardage, who has been the Geophysical Corner editor since January 2006. Hardage, a senior research scientist at the Bureau of Economic Geology in Austin, Texas, is beginning his term as president of the Society of Exploration Geophysicists.

Chopra, an AAPG Distinguished Lecturer and winner of the 2010 AAPG George C. Matson Award for his paper, "Delineating Stratigraphic Features Via Cross-Plotting of Seismic Discontinuity Attributes and Their Volume Visualization," is chief geophysicist (reservoir), at Arcis Corporation, Calgary, Canada.

In the last 27 years he has worked in regular seismic processing and interactive interpretation, but has spent more time in special processing of seismic data involving seismic attributes including coherence, curvature and texture attributes, seismic inversion, AVO, VSP processing and frequency enhancement of seismic data.

He has published seven books and more than 220 papers and abstracts.

He is the past chief editor of the CSEG RECORDER, a past member of the SEG's Leading Edge editorial board and the ex-chairman of the SEG Publications Committee.

In addition to AAPG, he is a member of SEG, CSEG, CSPG, CHOA (Canadian Heavy Oil Association), EAGE, APEGGA (Association of Professional Engineers, Geologists and Geophysicists of Alberta) and TBPG (Texas Board of Professional Geoscientists).

Washington
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for additional studies on the matter.

The study confirmed that distance from drill wells does have an effect on leak accidents, but there is no evidence of hydraulic fracturing fluid contamination in groundwater sources.

Duke also recently published a study that proposes seven safeguards to minimize negative impacts from hydraulic fracturing, including baseline data, safety requirements, mandated disclosure of chemical data and regulatory programs.

- Resources for the Future, an independent, non-partisan research organization, received a grant to investigate its study, titled "Managing the Risks of Shale Gas: Identifying a Pathway Toward Responsible Development."

The 18-month review will survey experts and the public, analyze risk drivers, assess federal and state regulations and make recommendations to reduce risks.

* * *

Internationally, hydraulic fracturing for shale gas already has been banned in France, Australia's New South Wales province and in the Karoo region of South Africa. The United Kingdom and New Zealand are continuing the practice but taking careful steps along the way.

With clear, thorough scientific research, implementation of best practices and effective communication to the public, the United States can lead by example during this controversial time.

Editor's note: Cook is past president of AAPG's Europe Region.

Europe regulations

CCS in the Spotlight

By DAVE COOK

In Europe, carbon capture and storage (CCS) projects are being suspended or deferred and there seems to be a general lack of support by governments for these projects.

A significant problem is the difficulty of predicting the future price of carbon: Companies need a commercial incentive to pursue CCS projects. The price of carbon or the penalties associated with emission of CO_2 have to be such that it makes good commercial sense.


COOK

Without confidence in the future price of carbon or carbon taxes, companies will be unwilling to invest in this technology.

* * *

Fortunately, on the geotechnical side, understanding of CCS technology is growing. The Geological Society of London (GSL)-AAPG conference held in late November in London on Carbon Capture and Storage represented the first of a series of conferences that AAPG will hold with the GSL on this topic. Jon Gluyas, conference chair and professor of CCS at Durham University, organized a comprehensive and fascinating program of speakers for an international group of geoscientists and engineers from academia, industry and government surveys and regulatory bodies.

The proceedings concentrated on the two most important geotechnical criteria affecting the commercial viability of CCS projects – capacity and containment. The determination of parameters such as pore volume, permeability and connectivity of potential host formations were reviewed, and the nature of pre-existing pore fluids and the potential for long-term injection at the volumes required by individual projects were discussed.

Presentations described the physical nature of CO_2 when injected, the chemical and physical interactions that take place in the reservoir and the ultimate nature of the CO_2 as it resides in the reservoir over the long term. Vital to the evaluation of risk is a good understanding of trap integrity. The properties of faults and lithological seals and how they may change as a result of injection were reviewed and case studies of projects in the United States and Australia were presented.

The conference provided strong evidence that the geotechnical issues associated with CCS are well understood and that it should be possible to collect and analyze enough data in order to assess the geological risk associated with CCS projects.

A joint AAPG-GSL conference on CCS is under discussion for November, to be held in the United States

* * *

The next task we face is educating governments, regulatory bodies and the general public.

Governments and the general public will have to be satisfied that the injected CO_2 will remain in its host formation and will not escape and cause underground or surface environmental problems. Careful public education and consultation will be vital.

Governments and the public also are becoming concerned about the potential environmental impact of injecting materials into the subsurface. Industry has not done a good job in educating people about the risks associated with CCS. European Union regulations state that CO_2 needs to be stored "permanently," but what do they mean by "permanently?" This must be clarified.

Perhaps more of the regulatory environment will become clear before the next conference, which will be held in the United States next year.

UPCOMING EDUCATION SCHEDULE

LAST CHANCE

E-Symposium: Eagle Ford Shale Prospecting with 3D Seismic Data within a Tectonic and Depositional System Framework.
Online
January 20, 2012
2:00 p.m., CST

Winter Education Conference
Houston, Texas
February 13-17, 2012
Earlybird discount expires January 9th!

SHORT COURSES

Basic Well Log Analysis
Austin, Texas
March 26-30, 2012

Practical Salt Tectonics
Austin, Texas
March 28-30, 2012

Shale Gas Reservoir Assessment
Long Beach, CA (with AAPG Annual Convention)
April 21-22, 2012

FIELD SEMINARS

Field Safety Course for Field Trip Leaders
Houston, Texas
March 28-29, 2012

Deep-Water Siliciclastic Reservoirs
Northern California
April 27-May 2, 2012

Clastic Reservoir Facies and Sequence Stratigraphic Analysis of Alluvial-Plain, Shoreface, Deltaic, and Shelf Depositional Systems
Utah
April 28-May 4, 2012

E-SYMPOSIA

Seismic Reservoir Characterization of U.S. Shales: An Update
Online
February 9, 2012
2:00 p.m., CST

Registration and Information:

AAPG GEOSCIENCE EDUCATION

Toll-free (U.S. and Canada) (888) 338.3387, or (918) 560.2650 • Fax: (918) 560.2678 • email: educate@aapg.org
Download a registration form at http://www.aapg.org/education/index.cfm

FOUNDATION UPDATE

Programs expanded

Foundation Milestones

By NATALIE ADAMS, AAPG Foundation Manager

For the past 20 years, the AAPG Foundation has continued to be an active and often dynamic factor in Association activities.

Some of the historical landmarks include:

- In 1991, the Foundation Trustees expressed a desire to support the AAPG Distinguished Lecture and Visiting Petroleum Geologists programs; corporate support was received for the Treatise Fund; and additional solicitations were made for AAPG's 75th anniversary of the Association.
- Don O'Nesky was appointed the Foundation's deputy executive director in March 1992, and the main focus turned toward increasing the operating fund through fund raising, with the Association approached for financial assistance; the AAPG Executive Committee voted to contribute to the Foundation's Operating Fund 85 percent of the proceeds received from the Offshore Technology Conference for the period 1993-97, a move that could be ratified on an annual basis by succeeding Executive Committees.
- The first AAPG Foundation Chairman's Reception was hosted at the 1994 Houston annual convention.
- Lyle Baie was appointed Foundation executive director in May 1996; the University Subscription program was born when Datapages went to CD-ROM. Trustee Associates could now purchase the new CD-ROM library and donate to university libraries for $10,000.
- A voluntary contribution was added to AAPG dues statements ($1 per year of membership) in 1997. In the same year, O'Nesky became the new executive director and the L. Austin Weeks Undergraduate Grant program was initiated. A $1 million gift from L. Austin Weeks meant that now an annual grant for $1,000 would be given to each chapter, with $500 of the $1,000 going directly to the student and $500 to the geology department.

Some very significant funds were established soon thereafter. The Halbouty Named Grant was created, and Daniel Busch provided $25,000 to the AAPG Foundation in the form of a gift annuity to establish the Daniel A. Busch Library Fund.

- The late 1990s were a time of recognition for AAPG donors. The Founder's Award (now renamed the Chairman's Award) was established to recognize Foundation donors, and the first honoree was Michel T. Halbouty in 1999; the Trustee Affiliates were created for spouses of deceased Trustee Associates, and the name was soon changed to Honorary Trustee Associates; the Teacher of the Year Award was established, and L. Austin Weeks was voted the second recipient of the Chairman's Award.
- Rick Fritz was ratified as Foundation executive director and Don O'Nesky became deputy executive director in 1999.
- Carolyn Shoemaker gave the first Michel T. Halbouty lecture at the 2001 AAPG Annual Convention and Exhibition in Denver; that same year James E. Wilson

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A Geologist's Passion

By LARRY NATION, AAPG Communications Director

June McFarland Chronos was a geologist who loved her job – editing the AAPG BULLETIN, the publication she revered and felt an abiding respect.


CHRONOS

Chronos retired in 1989 after 41 years on the AAPG staff, having worked closely with over a thousand geologists on the various scientific papers over her loyal career.

After graduating with a degree in geology from the University of Oklahoma, she came to work as editorial secretary, also serving as AAPG's first librarian before being named managing editor of the BULLETIN in 1981, when the AAPG science director was Ted Beaumont, who now is AAPG president-elect.

"She was a tireless worker. She wanted the BULLETIN to be perfect, error free, which is impossible," Beaumont said. "She always felt personally responsible for every typo."

Last November, eight years after her death in 2003, she was still giving to the profession – through a contribution from her remaining estate.

The AAPG Foundation received a check with a note from an executor that noted that Chronos' estate passed to her surviving sister, Virginia McFarland, who recently died. With no remaining heirs, a portion of the remaining trust estate was willed – as Chronos directed – to the AAPG Foundation.

The check was for over $70,000.

Of course, it was dedicated to the AAPG BULLETIN fund.

"June's spirit lives on through the BULLETIN," Beaumont said. "Much of the BULLETIN's reputation for quality that it still enjoys is due to June's dedication."

June would have been happy.

Continued from previous page

was approved for the Chairman's Award.

- More funds were established as the years went by, such as the Chairman's Named Grant, the Named Public Service Endowment, the E.F. Reid Scouting Endowment Fund, the Special Publications Fund and the Holland Professorship Fund, as more individuals came to value the services that the Foundation provides to the community.
- Trustee Associate Membership steadily climbed since its inception. The entry fee went from $7,500 to $10,000 to $12,500, and is presently at $15,000. Membership is now 275.
- A multi-year capital campaign began in 2005 under the leadership of Jack C. Threet and Larry Funkhouser, co-chairs of the Financial Campaign committee. The goal began at $25 million and was increased to $35 million in 2008. (Both gentlemen were later named recipients of the Weeks Medal.)
- In 2008, Marta Weeks-Wulf became the first recipient of the Weeks Medal for her significant contributions to the Foundation. T. Boone Pickens receiveed the Weeks Medal the following year for the same reason. Together, these two individuals gave nearly $20 million to the Foundation.
- The establishment of a Canadian AAPG Foundation office was approved in 2008. That project is still in process. Also that year, the Legacy Society concept was introduced to recognize those who have expressed an interest in leaving a bequest to the AAPG Foundation.
- Following the resignation of Rick Fritz from the Association and the Foundation in 2011, David Curtiss was hired as the new executive director and David Lange assumed the new title of deputy executive director.

Finally, the Foundation Trustees are grateful for those who have served and continue to serve in various capacities. New campaigns will commence, new funds will open and more students and geologists will reap the harvest, as evidenced in the more than 30 existing programs maintained by the Foundation.

SPOTLIGHTON

'The best … are those who see the most rocks'

Educator Seeks to Nurture Creativity

By BARRY FRIEDMAN, EXPLORER Correspondent

For Andrew Hurst, the love of teaching begins in the most unlikeliest of places for a geology professor: the first year large-hall lecture classes.

There, he says, the challenge is not just to introduce or even challenge his students to the wonders of geology, but to do something more: Make it matter.

"Teaching basic geology to 150 or so students in a class that included psychologists, biologists, chemists and all manner of youngsters who had no intention of ever looking seriously at rocks was both humbling and uplifting," Hurst said. "It was a wonderful opportunity to infect their lives with geology."

But by all accounts, he's not only done just that, he's done it well. Hurst is a 2011 Grover E. Murray Memorial Distinguished Educator Award recipient (along with Imperial College's Howard D. Johnson), presented "in recognition of distinguished and outstanding contributions to geological education."

Hurst, though, is somewhat surprised he's getting the AAPG award, as he feels his specialties are perhaps not always on the lips of too many in the geological community.

He puts it this way:

"I sit on the lunatic fringe of geology, having worked with clay mineralogy, probe permeametry and sand injectites, amongst other interests."

HURST

> "If one cannot inspire students about a science as wonderful as geology, what a failure that would be."

'A Personal Dare'

Still, while Hurst may march to the beat of a different geologic drummer, he can still play with the organized band.

When he returns from the fringe, Hurst, the director of the MSc Petroleum Geoscience Program at the University of Aberdeen in Scotland, does what pillars in the profession do: He writes (so far he's co-authored more than 130 papers and co-edited three major special publications).

Additionally, through his current work as AAPG chief editor and coordinator of the 100th anniversary volume, "Outcrops That Have Changed the Way We Practice Petroleum Geology," he has been instrumental in changing the way geologists practice and record their profession.

He also is the founding editor of the *Petroleum Geosciences*, the executive editor of *Sedimentary Geology*, an adviser to exploHUB and, most recently, the founder and chairman of Fabric of the Land, a yearly exhibit that aims to bridge the gap between science and art (see exclusive EXPLORER stories on the event online at www.aapg.org/explorer).

Hurst sees all his work as a challenge, yes, but teaching as something of a personal dare.

"If one cannot inspire students about a science as wonderful as geology," he said, "what a failure that would be."

For him, receiving this award, as it was when he received the AAPG Distinguished Service Award in 2007, is a way to say thank you to his contemporaries.

"To receive the Grover E. Murray Award is a huge and surprising honor for one who has a substantial debt to many ever-supportive and patient academic colleagues," he said. "To receive any award is flattering, and to receive this award for doing a job that I love is great.

"I believe that the award gives credit to my colleagues and the University of Aberdeen."

A Historical Foundation

In fact, Aberdeen has the advantage of a large local population of professional geoscientists in the oil industry – and one of the reasons, along with a committed faculty, like Hurst, that the University of Aberdeen is considered by many to be one of the premier geology schools in the world.

According to AAPG President Paul Weimer, himself a professor at the University of Colorado, "When I think of the top applied geology departments in the world, the University of Aberdeen is in the top five."

Hurst is touched by his friend's recognition, but not surprised.

"I sometimes joke that Aberdeen has been teaching petroleum geology since 1495," he says, citing the long association between Aberdeen, specifically, and Scotland, generally, with the discipline.

"I believe that there is no better place in the world to be an academic petroleum geologist."

He points to the school's more than 60 graduate and 100 post-graduate students in any given year.

"Although this gives us a rather applied slant, my colleagues and I firmly believe that

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Gentry Wins 2012 TOTY


GENTRY

Jonna Gentry, a ninth grade earth science teacher at Green Mountain High School in Lakewood, Colo., has been named the 2012 AAPG Earth Science Teacher of the Year.

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

Gentry teaches earth science at both the regular and honors level at her school, as well as a section of "Beginning Robotics," which she said allows her to also see the world from an engineer's perspective.

"Being recognized for the time and energy that teaching requires is a great honor," Gentry said. "This award is an encouragement that my hard work and passion for my career have been well worth the time."

Gentry, nominated for TOTY by the Rocky Mountain Association of Geologists, received a bachelor of science degree in physical science with a double minor in chemistry and biochemistry from Colorado State University. For the past several years she has served as a volunteer and on the board of directors for the Friends of Dinosaur Ridge in Morrison, Colo.

Gentry will receive an all-expense paid trip to the AAPG Annual Convention and Exhibition in Long Beach on April 22-25, where she will be presented with her award at the All-Convention Luncheon.

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

MEMBERSHIP&CERTIFICATION

Membership, Certification Applicant List Online

Applicant information for those seeking AAPG membership and DPA certification is now found only online – easily accessible via the AAPG website – in an effort to shorten the application process time.

To see the list of applicants (and their sponsors), simply look for the "Applicant" button on the right side of our home page at www.aapg.org.

Click on the button and you'll go to information for each applicant.

Continued from previous page

the best (applied) geologists are those who see the most rocks," he said, "and that to be a good applied geologist one needs a broad fundamental geological training."

But even a school such as Aberdeen is not immune to the realities of a literal and figurative changing geologic landscape.

"Investment in science education," he said, "is under pressure both because less rather than more government funding is likely and student numbers are rising, thus necessitating changes in practice and innovation."

As such, he says, his department has forged and is seeking strategic alliances with academic partners from emerging, developing nations and industry partners.

Hurst knows there must be a balance between the new reality in the classroom and the timeless integrity of the material.

"Today's students tend to be tangled up in the 'virtual world' and pass through secondary education being taught how to do well in exams rather than receiving education," he said. "I believe that geologists who cannot make fundamental observations of rocks will struggle to make observations on seismic, well log and any other data."

Industry professionals and professors, too, must change the way they approach these students.

"With respect to the future of our profession, I am concerned that the oil industry and academia put insufficient emphasis on the role of young professionals in wealth creation," Hurst said. "The opportunity exists to hire new graduates and to focus their skills and energy on developing concepts, identifying and challenging dogma, shifting paradigms and thereby making opportunities for wealth creation.

"It will be sad if well-meant company graduate-training programs squeeze the creative juices out of new graduates and transform them into 'loyal company employees' before their innate creative talents have been allowed to add value," he added.

Balance

And of that creativity, he talks of balance and philosophy, quoting the legendary geologist Wallace Pratt, who said, 'Where oil is first found, in the final analysis, is in the minds of men."

"In academia," Hurst said, "a better appreciation of safe and environmentally-friendly exploitation of natural resources is a priority," he said. "It is not the natural resource that is inherently 'dirty,' but rather what mankind does with them."

It is, as it always has been, about balance between and within the university and industry communities.

"Educating and researching ways in which we can balance societal needs while being sensitive stewards of the environments is vital to the health and welfare of our planet," he said.

Specifically, in education, it means teachers who give students less opportunity to "brain-dump" in essays, as he calls it, for it is difficult to use as a method for differentiating between talent and memory.

Rather, he thinks more focus should be placed on 3-D thinking and extrapolation, so that "before young geologists turn on their modeling programs, they already have conceptual mind-models in place."

Even with the obstacles, uncertainties and restraints, Hurst still thinks of the profession's "silver lining."

"Geology has such a breadth of opportunities," he said, "that I cannot imagine not having an exciting and fun time in whichever direction my career has gone or will go."

Even if it takes him deeper and deeper into the fringe.

(Next month: A look at fellow AAPG Grover E. Murray Distinguished Educator Award recipient for 2011, Howard D. Johnson.)

Letters to the editor should include your name and address and should be mailed to Readers' Forum, c/o AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101, or fax (918) 560-2636; or e-mail to forum@aapg.org. Letters may be edited or held due to space restrictions.

INMEMORIAM

Researcher, educator and AAPG Sidney Powers medalist Arnold H. Bouma died Dec. 16 in Frisco, Texas. He was 79.

A native of Groningen, Netherlands, he received his bachelor's degree from the State University in Groningen; a master's at State University at Utrecht in geology, sedimentology and paleontology in 1959; and a Ph.D. in sedimentary geology in 1961.

His doctoral dissertation, titled "Sedimentology of Some Flysch Deposits: A Graphic Approach to Facies Interpretation," was published and widely distributed in 1962 and set off numerous laboratory and field research studies – and formed the basis of what eventually came to be known in the field as "the Bouma Sequence," which has been called a "geological milestone of the 20th century."


BOUMA


FRIEDMAN


AHR

Bouma worked with the Scripps Institute of Oceanography, and in 1966 immigrated to America to take a post in oceanography at Texas A&M University, where he taught until 1975 when he joined the U.S. Geological Survey. In 1981 he joined Gulf Oil and became chief scientist and acting vice president for Gulf Research, and post-merger became senior research associate with Chevron Research.

He returned to the academic world in 1988 as a professor at Louisiana State University, retiring in 2005 to become an adjunct professor at Texas A&M.

An Honorary Member of AAPG, Bouma also was a charter member of the Division of Environmental Geosciences, a member of the Division of Professional Affairs, served on the Publications, Education and Marine Geology committees and was an AAPG Distinguished Lecturer.

* * *

Sidney Powers medalist, educator and past AAPG officer Gerald M. "Gerry" Friedman died Nov. 29 in New York City. He was 90.

Born in Berlin and moving to London in 1938, Friedman earned a doctorate of science from the University of London, master's and doctorate degrees from Columbia University, and an honorary doctorate of Natural Science from the University of Heidelberg in Germany. He initially worked as a geochemist and petrologist in the Appalachians and the Canadian Shield before going on to become a research geologist and director of sedimentology research at the Amoco Research Laboratory in Tulsa.

Friedman began teaching at Rensselaer Polytechnic Institute in 1964. He retired from RPI in 1984 and went on to join the faculty at the City University of New York, Brooklyn, where he worked with graduate students and post-doctoral researchers on carbonate deposits, regional stratigraphy and a variety of other topics. He retired from CUNY in 2004 and was Professor Emeritus, Sedimentology & Geohistory at Rensselaer Polytechnic Institute.

He authored more than 600 papers and 19 books – including the renowned Principles of Sedimentology – was active in DEG and EMD, taught AAPG continuing education courses and also served as AAPG vice president in 1984 and was active in other geologic societies as well.

In addition to being a Powers medalist, he also was honored by AAPG with

Continued on next page

DPA
from page 42

in Cleveland, Gulf Coast Section meeting in Austin, ICE in Singapore and the 2013 ACE in Pittsburgh.

* * *

HoD delegates will recall that at last year's meeting in Houston legislation regarding the addition of a certified member category was defeated when the required two-thirds delegate vote for passage was not achieved.

The HoD's Constitution and Bylaws Committee is looking into a revised "certified member class" Bylaw amendment proposal for possible consideration at the next HoD meeting in Long Beach.

* * *

Past-president DPA Paul Britt told me when I became president-elect that about 40 percent of my role would be filled by unexpected events. So far, this year's unexpected event has been the Texas Bureau of Professional Geoscientists (TBPG) proposed rule changes, announced in late September regarding mandatory licensure of geoscientists in Texas.

DPA Secretary Mark Gallagher took the lead in drafting a response to the TBPG on behalf of the DPA and AAPG. The significant negative reaction to the proposal from the geoscience community was overwhelming, and the proposed new rule changes were retracted at a meeting of the TBPG on Nov. 7 that was attended by several DPA and AAPG members (December EXPLORER).

* * *

And finally, the bottom line: Beginning with the 2012-13 fiscal year, DPA dues will increase from $40 to $50.

This dues increase, the first since 1993, was unanimously passed by the Council in order to maintain the value-adding services and benefits associated with your DPA membership.

AAPG President Paul Weimer outlined the AAPG's budget challenges in his October EXPLORER column. The DPA has the same deficit issues faced by the Association.

The status quo is not sustainable and hard decisions such as this dues increase must be taken to partially offset our annual deficit.

Please feel free to contact me on this or any other DPA-related matter that you would like to discuss.

READERS' FORUM

Anthropocene?

The term "Anthropocene" and the justification for proposing it appear to be borderline junk science, at least based on what I read in the November EXPLORER article.

Lacking is clarity about a biostratigraphic definition of the base and top of the proposed unit, or a type section, for openers.

The evidence as outlined in the EXPLORER article suggests that the likely stratigraphic outcome in the future geological record might qualify as a marker bed. Even that would pose problems, because it would be a heterogeneous marker (as compared to a volcanic ash marker).

Even continuity of such a marker would be questionable. Many of the criteria would be time transgressive.

The discussion in the article about the preservation potential of Amsterdam and New Orleans is intriguing, but it would not be time-equivalent to the sunken Manoan and Greek cities below sea level in the Mediterranean, where subsidence was caused by earthquakes. Thus the utility of the proposed term is questionable.

In short, the proposed term is an exercise in futility that does not deserve the printer's ink and digits used to produce the EXPLORER.

George Devries Klein
Houston

I read the article "Anthropocene: An Epoch Debate" with amazement and disgust.

Here we go again with political correctness gone mad. This is because the group of people who want to establish the Anthropocene as an epoch are the same people who blame human beings for all the troubles in the world. They want to set up a landmark in history to show everyone that they were right, that mankind is a detrimental force upon the world.

However, the geologic timescale was set up to demark periods of time that were punctuated by significant geological events. That's it plain and simple.

As the article explains, human beings do not create a unique signal. So the designation "Anthropocene," with all of its human impact connotations, does not have a place in the geologic realm.

Let's think rationally and get back to the science of geology!

Raphael Ketani
Sunnyside, N.Y.

Continued from previous page

Honorary Membership, the Distinguished Educator Award and the Distinguished Service Award. He also was a Trustee Associate of the AAPG Foundation.

For Friedman's eulogy see the online EXPLORER at www.aapg.org.

* * *

AAPG award winning educator Wayne Merrill Ahr, geology professor at Texas A&M University and an expert in the study of carbonate rocks, died Nov. 3. He was 72.

Ahr received the AAPG Grover E. Murray Memorial Distinguished Educator Award at the 2010 AAPG Annual Convention and Exhibition in New Orleans.

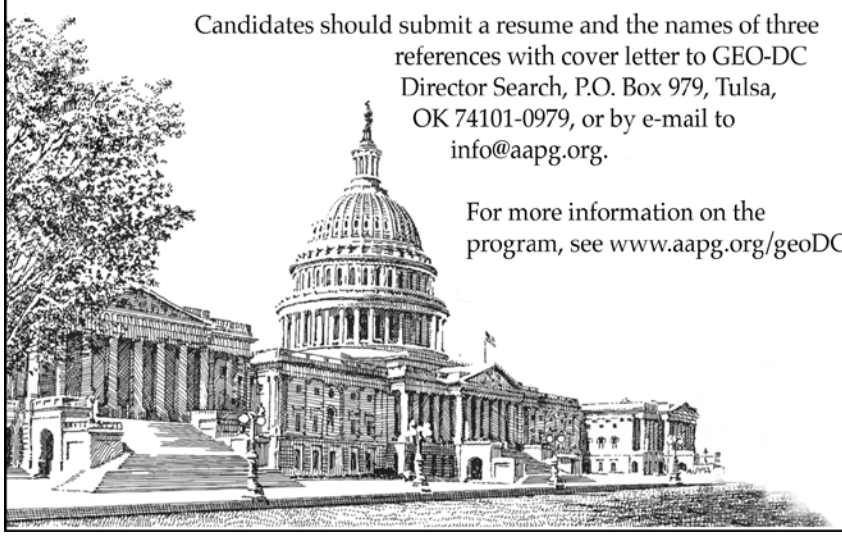
* * *

Wayne Merrill Ahr, 72
College Station, Texas
Nov. 3, 2011
* Arnold H. Bouma, 79
Frisco, Texas, Dec. 16, 2011
* Gerald Manfred Friedman, 90
Bronx, N.Y., Nov. 30, 2011
George Mitchell Furnival, 102
Calgary, Canada, July 29, 2010
Terry D. Keegan, 57
New Orleans, April 27, 2011

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

CLASSIFIED ADS

You can reach about 30,000 petroleum geologists at the lowest per-reader cost in the world with a classified ad in the EXPLORER. Ads are at the rate of $2.90 per word, minimum charge of $60. And, for an additional $50, your ad can appear on the classified section on the AAPG web site. Your ad can reach more people than ever before. Just write out your ad and send it to us. We will call you with the word count and cost. You can then arrange prepayment. Ads received by the first of the month will appear in the subsequent edition.



CLASSIFIEDADS

POSITION AVAILABLE

DIRECTOR
NEW MEXICO BUREAU OF
GEOLOGY & MINERAL RESOURCES

The New Mexico Bureau of Geology and Mineral Resources is seeking a new director and state geologist. The bureau is a research and service division of the New Mexico Institute of Mining and Technology (New Mexico Tech), located in Socorro, New Mexico. With close to 60 employees, the bureau serves as the state geological survey, with a long-standing reputation for excellence in research, service, and outreach. Our mission includes research on the geologic framework of the state, with an emphasis on applied geosciences and the state's geologic resources; and the gathering, preservation, and dissemination of geologic information to the geoscience community, state and federal agencies, and the general public. The director manages the administrative, personnel, and financial affairs of the bureau, including direct supervision of a significant portion of the professional staff, and must be proactive in seeking additional, external funding to support new and ongoing programs. As a division of the university, the bureau works in collaboration with other divisions of the university. The director reports directly to the university president. As state geologist, the director serves on several state advisory commissions. Requirements include a Ph.D. in the geosciences, ten years of professional experience, and five years of administrative experience. Anticipated appointment date: as soon as filled, but no later than September 2012. Salary: Negotiable. Full details of the position and information regarding application procedures may be found at www.geoinfo.nmt.edu/DirectorSearch and at www.nmt.edu/hr-jobs-at-nmt . For more information about the application process, contact JoAnn Salome in Human Resources at 575-835-5955 (JSalome@admin.nmt.edu). For more information about the position itself, contact L. Greer Price, search committee chair, at 575-835-5752 (gprice@gis.nmt.edu). For full consideration, application materials must be received by March 1, 2012.

* *

Petroleum Exploration Geologist
Newfield Exploration
Tulsa, OK

Seeking Geologist, responsible for conducting detailed prospect analysis and play fairway assessments within the Mid-Continent Region plus the generation and presentation of prospect ideas and leads to management. This position would be located in Tulsa, OK.

The successful applicant will generate and update maps, logs, cross-sections and corporate databases with new tops, correlations, shows and other pertinent geological data. Develop regional, multi-county stratigraphic framework and subsurface correlations.

Minimum qualifications, ten years of experience, knowledge of Mid-Continent upstream oil and gas, experience with conventional and un-conventional plays, experience doing play-fairway analysis assessments. Send resume to klefler@newfield.com.

* *

West Virginia University- Assistant Professor
Subsurface Analysis of Sedimentary Rocks

The Department of Geology and Geography at WVU seeks to hire at the Assistant Professor level a dynamic geoscientist who studies sedimentary rocks in the subsurface. Possible areas of expertise include, but are not limited to subsurface study of sequence stratigraphy, petrophysics, diagenesis of reservoirs, fracture modeling, basin analysis or geocellular modeling. This new position is part of the WVU Advanced Energy Research Initiative (http://energyresearch.wvu.edu/). A primary focus will be to develop a vigorous externally-funded research program which contributes to the WVU Advanced Energy Initiative (energyresearch.wvu.edu). The successful applicant will also teach at the undergraduate and graduate levels. We require a PhD in Geology or a related field, evidence of ability to establish a strong, externally-funded research program, and potential for/commitment to teaching excellence. We are open to candidates with diverse academic and professional backgrounds and will consider more senior applicants. The department values intellectual diversity and demonstrated ability to work with diverse students and colleagues. The July 1, 2011 edition of The Scientist (the-scientist.com) ranks West Virginia University among the top 20 places to work in academia. The Department is located in an outstanding newly-renovated facility.

Continued on next page

Jan. 19 is Deadline for ICE Abstracts

Abstracts will continue to be accepted online through Jan. 19 for this year's AAPG International Conference and Exhibition, to be held 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.

The theme is "Asia-Pacific Resources: Fueling the Future," and the conference aims to draw on the entire region and beyond for input into evaluating approaches to the core elements of petroleum provinces – from frontier basins to mature petroleum provinces.

Five themes are being offered for the technical program:

- 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.
- Student Poster Session.

More information – including detailed information on the abstract submission process – can be found online at www.aapg.opg/singapore2012.

Continued from previous page

Visit www.geo.wvu.edu/files/subsurface.pdf for a full description of the position and how to apply. Review of applications will begin Jan 31, 2012 and will continue until the position is filled. The anticipated start date is August 16, 2012. West Virginia University is an Equal Opportunity/ Affirmative Action employer and the recipient of an NSF ADVANCE award for gender equity. Women and minority candidates are encouraged to apply.

* *

California Department of Conservation
Division of Oil, Gas, and Geothermal Resources

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For application instructions please contact:

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Oil and Gas Research Center
Sultan Qaboos University
Sultanate of Oman

The Oil and Gas Research Center is seeking a Research Associate in Petroleum Geology.

Applicants should have a PhD in Geological Sciences and a record of published research. Experience using reservoir modeling software is highly desirable.

An attractive package including tax-free salary, housing allowance, and paid annual travel to the home country is offered, dependent upon qualifications.

To apply, please send a CV listing publications and contact details of personal references to ogrc@squ.edu.om.

UF UNIVERSITY of FLORIDA

DEPARTMENT OF GEOLOGICAL SCIENCES
UNIVERSITY OF FLORIDA

Thompson Chair of Geological Sciences

The Department of Geological Sciences, University of Florida, invites applications for the **Thompson Chair of Geological Sciences**, an endowed position at the rank of Full Professor. The successful candidate will be expected to teach at the undergraduate and graduate levels, mentor students for M.S. and Ph.D. degrees, and conduct a dynamic, externally funded research program in an area of globally significant earth science. Research interests of the successful candidate should relate to geological problems of Florida and the surrounding region, although prior experience in the region is unnecessary. Ph.D. is required. Salary will be commensurate with qualifications and experience.

For additional information or nominations please contact **Dr. Jonathan B. Martin, Thompson Chair Search Committee, Department of Geological Sciences, University of Florida, P.O. Box 112120, Gainesville, FL 32611-2120 (*jbmartin@ufl.edu*)**. Applications are currently being reviewed and to ensure complete consideration they should be received no later than January 16, 2012. **Candidates must apply online at *http://jobs.ufl.edu* (requisition #0806180).** For full consideration, the application should include: (1) cover letter, (2) curriculum vitae, (3) statement of research, teaching, vision, and goals; (4) reprints of no more than three publications, and (5) the names of three colleagues who might be contacted for letters of recommendation.

The University of Florida is an Equal Opportunity Institution. If an accommodation due to a disability is needed to apply for this position, please call (352) 392-2477 or the Florida Relay System at (800) 955-8771 (TDD). The selection process will be conducted under the provisions of Florida's "Government in the Sunshine" and Public Records laws.

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Basin Analysis Faculty Position

Rice University
Department of Earth Science

The Department of Earth Sciences at Rice University is seeking a colleague with interests in processes that regulate sediment supply and dispersal in sedimentary basins (e.g. eustasy, climate change, subsidence, and tectonics) at a range of time scales, in the evolution of 3-D structural and stratigraphic architecture in sedimentary basins, and applications to energy resources. We particularly encourage women and minority candidates to apply.

Successful candidates are expected to supervise graduate research and teach courses for undergraduate and graduate students. Details about the department and its facilities can be found at http://earthscience.rice.edu.

The appointment will be made at the assistant professor level. Applications received by February 1, 2012, will receive the fullest attention.

Please send a CV, research and teaching statements, and names of five references to:

Search Committee Chair
geol@rice.edu
Earth Science Department, MS-126
Rice University, PO Box 1892
Houston, TX 77251-1892

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FACULTY POSITION IN PETROLEUM GEOLOGY

ConocoPhillips SCHOOL OF GEOLOGY & GEOPHYSICS
The University of Oklahoma

The world's first School of Petroleum Geology was founded at the University of Oklahoma more than a century ago and the legacy continues with the Mewbourne College of Earth and Energy. Now the ConocoPhillips School of Geology and Geophysics at the University of Oklahoma invites applications for the position of Associate Professor/Professor in petroleum geology. Depending on experience and qualifications, the successful candidate may be appointed as a tenured Associate or Full Professor in an endowed Professorship or Chair in the ConocoPhillips School of Geology and Geophysics, and is expected to add significantly to the University's petroleum geology/geophysics education and research programs. Applications are being solicited from both academia and industry.

The successful candidate must have a demonstrated research record and the vision to establish and lead a strong multidisciplinary research program in petroleum geology. The position includes the opportunity to work with the Mewbourne School of Petroleum and Geological Engineering and the Oklahoma Geological Survey. The ConocoPhillips School of Geology and Geophysics possesses both state-of-the-art field and laboratory based geological and geophysical facilities and equipment, including a new field camp. A qualified applicant should have demonstrated expertise in a range of geological technologies to define and better understand geological features, concepts, and technologies related to oil and gas exploration and production, and should be an excellent educator with commitment to both undergraduate and graduate (M.S. and Ph.D.) education. A Ph.D. in geology or related field is required. Salary and benefits will be competitive and commensurate with experience and anticipated potential.

Review of candidates will begin February 1, 2012, and continue until the position is filled. The anticipated starting date is August 15, 2012. Applicants are requested to submit a vita/resume, statement of research and teaching interests, and a list of five references who can be contacted, including names, phone numbers, email, and complete mailing addresses. Applications and nominations should be addressed to Petroleum Geology Search Committee, ConocoPhillips School of Geology and Geophysics, University of Oklahoma, 100 E. Boyd Street, Rm. 710, Norman, OK, 73019-1009.

The University of Oklahoma is an Affirmative Action, Equal Opportunity Employer. Women and Minorities are encouraged to apply.

DIRECTOR'S CORNER

AAPG Leadership Begins With the EC

By DAVID K. CURTISS, AAPG Executive Director

Becoming an Active member of AAPG and contributing to the growth and success of the Association was the theme of last month's column. Our programs are the result of a collaborative partnership between member volunteers, who donate their time, effort and expertise, and AAPG staff worldwide, who offer strategic guidance and provide operational support.

But we are fundamentally a member-led organization, and this leadership begins with the AAPG Executive Committee (EC).

The EC consists of Active members who are elected to these positions by those AAPG members eligible to vote. They serve a variety of functions.


CURTISS

AAPG's future will be determined by all of us working together to create the Association we want it to be.

▸ The **president** is the chief executive officer of the Association, serving as spokesperson on all matters pertaining to the public. The president appoints the members of AAPG's committees as outlined in the Constitution and Bylaws, appoints delegates to cooperating organizations to represent AAPG and serves as chair of the EC.

▸ The **president-elect** sits on the EC for the year prior to assuming the presidency. The purpose is to orient the incumbent to the duties they will assume as president.

The president-elect also is responsible for developing and presenting the budget for the following fiscal year (their term as president).

The time commitment to serve as president actually spans six years: one year as a candidate, one year as president-elect and one year as president, followed by three years serving on the Advisory Council (we'll discuss this group in a future column).

▸ The **vice president-Sections** focuses on the Association's activities in the U.S. Sections. In addition, the VP-Sections may assist with the presentation of honors and awards at the opening session of meetings, provide committee oversight and other duties assigned by the president or EC.

The **vice president-Regions** is concerned with all of AAPG's activities in its international Regions. Similar to the VP-Sections, the VP-Regions may assist with Honors and Awards at the opening session of meetings, provide committee oversight, and other duties assigned by the president or EC.

Both vice presidents serve two-year terms, which are staggered. As a result, in the second year of their respective terms they would step in to perform the duties of the president should that person no longer be able to serve in that capacity for whatever reason.

▸ The **secretary** records the actions of the EC, keeps possession of and affixes the corporate seal, and provides policy oversight of all non-technical and non-peer reviewed publications and communications. The secretary serves a two-year term.

▸ The **treasurer** supervises the receipt and disbursement of all funds on behalf of the Association. The treasurer serves a two-year term, is an ex officio member of the Committee on Investments and prepares and submits an annual financial report.

▸ The **AAPG elected editor** supervises and has final authority of the solicitation, acceptance and rejection of all technical content submitted for publication.

The editor oversees and is responsible for the editorial content of all technical and peer-reviewed publications issued by AAPG. In addition, the editor manages the volunteer associate editors selected from the membership to accomplish these tasks.

The editor serves a three-year term.

▸ The **chair of the House of Delegates** oversees the activities of the House, which is the Association's representative and legislative body. It consists of delegates elected from affiliated societies and international regions.

The chair is elected by the delegates, serving one year as chair-elect before taking over as chair.

Candidates for office, other than the chair of the House, are nominated by AAPG members. These nominations are then reviewed and candidates selected by the Officer Candidate Nominating Committee, a subcommittee of the Advisory Council.

This committee is currently soliciting nominations for the positions of president-elect, vice president-Regions, secretary and editor.

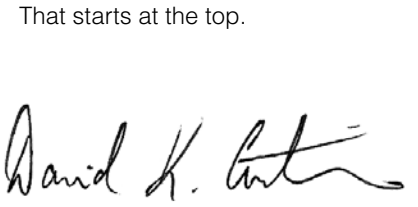
Do you know an AAPG Active member who would be a good candidate for one of these positions?

Talk to them about it and see if they would be interested in serving. Visit the AAPG website for more details, at aapg.org/business/officer_nom/index.cfm.

The deadline for submission is Feb. 1.

AAPG's future will be determined by all of us working together to create the Association we want it to be.

That starts at the top.



DIVISIONS REPORT

DPA Executives Approve Dues Increase

By MARTY HEWITT, DPA President

The DPA's Mid-Year meeting was held Nov. 5 in Plano, Texas, and was attended by 17 people, including the DPA's Executive Committee, councilors and committee chairs along with AAPG Divisions manager Norma Newby.

At the halfway point in our term, what have we achieved?

As mentioned in my last article (October EXPLORER), our Executive Committee has tried to build on three main themes for the 2011-12 term:

▸ **International presence and DPA councilor engagement**.

Growing DPA globally continues to be a challenge and will be a long-term goal for the DPA. Of course, demonstrating the value of certification is not only a challenge globally but also domestically.

President-elect Charles Sternbach is in the process of seeking nominees for vacant and expiring councilor seats in the Sections and Regions for the 2012-15 term. Open councilor vacancies are available in the Pacific, Rocky Mountain and Eastern Sections and the Canada, Europe, Asia-Pacific and Latin America Regions.

▸ **Membership**.

Membership Committee chair Rick Fritz continues to work with our councilors on enhancing the value proposition to our existing and potentially new DPA members.

Fritz, along with Sternbach, is exploring several new "revenue growth engines," such as increased DPA participation in various prospecting forums. The committee is entertaining ideas such as "Playmaker" sessions for late-breaking plays, Geo-Scout checks for geological assessment and education ideas such as webinars and professional forums.


HEWITT

At the mid-August Leadership Days in Boulder, Colo., our Young Professionals showed tremendous interest in getting engaged with the DPA. A DPA "member-in-training" concept was discussed, and a subcommittee led by DPA Treasurer Dan Billman and a team from the AAPG's Young Professionals Committee has been working on a Bylaws proposal for the Long Beach convention to adopt the member-in-training concept.

Scott Douglas, AAPG's Young Professionals representative for the Southwest Section, attended the mid-year meeting and will continue to work with Billman and his fellow committee members to finalize this proposal.

We continue to explore ways to make our membership process more efficient. Board of Certification review and approval of applications will now be completed electronically on a private AAPG intranet site rather than mailing the original applications through the postal system to a panel of five members and the DPA president. This process was causing lengthy delays in notification to these applicants.

In addition, the publication of DPA applicants in the EXPLORER will now move to the AAPG website (same as the list of membership applicants) for 30 days rather than the print for 60 days, effective immediately.

▸ **Gathering and learning**.

Paul Britt, chair of Conventions, reported on conventions and meetings that have taken place so far in the 2011-12 term. DPA events have been held at three meetings to date:

✓ At the Eastern Section meeting in September in Washington, D.C., the DPA coordinated an Energy Policy Forum, which was well attended.

✓ In October at the Mid-Continent meeting in Oklahoma City, we hosted a luncheon with guest speaker Rayola Dougher from the API.

✓ The ICE meeting in Milan was a great success. European Region Councilor John Brooks coordinated an excellent program with the former CEO of BP, Tony Hayward, as our luncheon speaker who discussed the challenges of energy security (December EXPLORER). An afternoon forum followed, with four speakers discussing a potpourri of topics from the resource endowment U.S. West Coast offshore to who owns the Arctic.

* * *

Looking forward to the ACE in Long Beach, the DPA will be co-hosting a luncheon with PROWESS, featuring two guest speakers: Sally Benson of Stanford University will be speaking on "Energy and the Environment – The Future of Energy," and Sharon Mosher from the University of Texas will be speaking on "Science and Crew Change."

President-elect Sternbach also has organized another "Discovery Thinking" Forum featuring five speakers, including several from Occidental who will discuss their recent exploration activities in the San Joaquin Valley.

DPA events also are being planned for this year's Southwest Section meeting in Fort Worth, Rocky Mountain Section meeting in Grand Junction, Eastern Section meeting

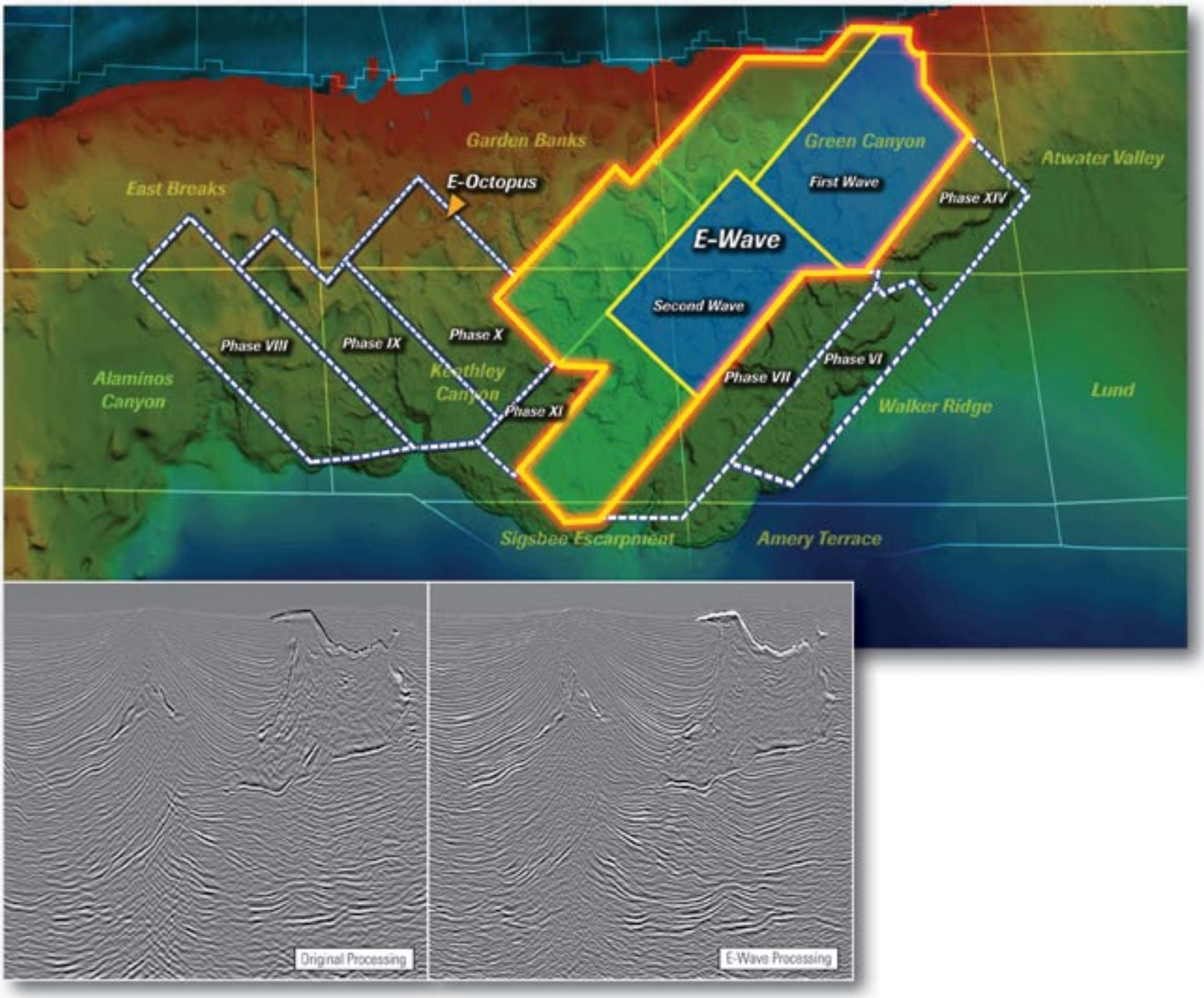
See **DPA**, page 38

Bakuriani, Georgia

Multiclient Services

E-Wave Advanced Imaging Project

First and second wave processing now available



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