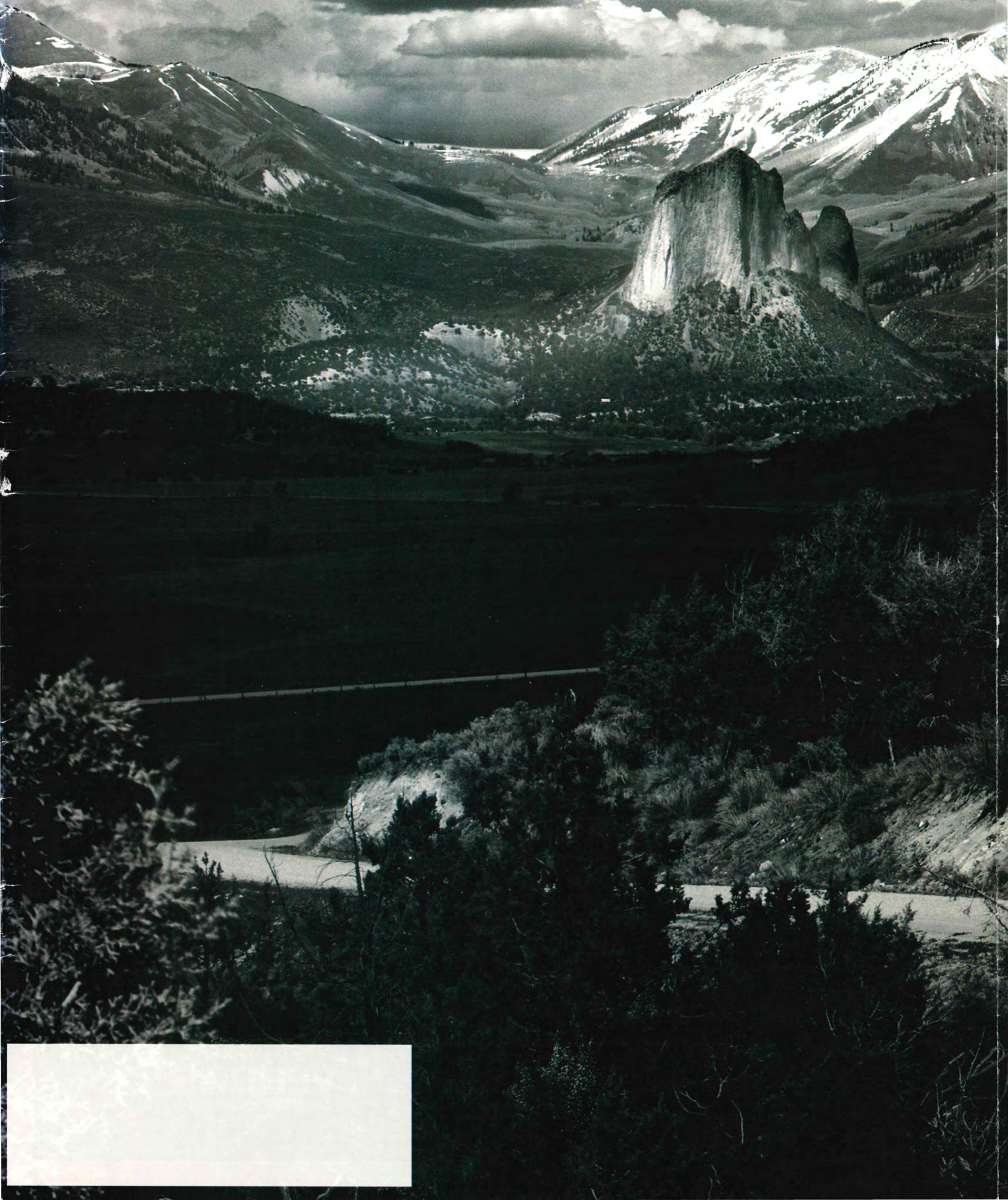


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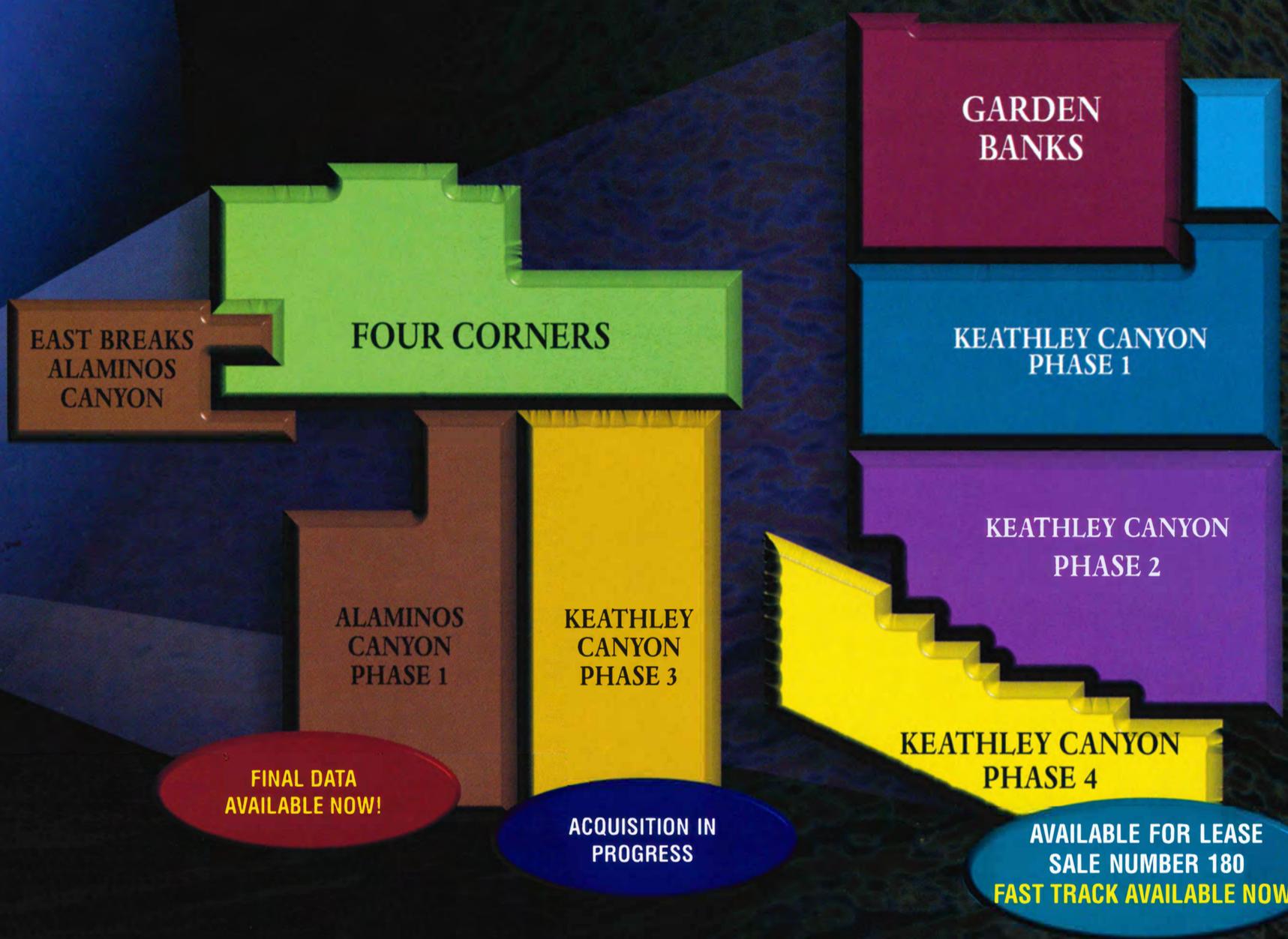


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On the cover: National Park Service Artist-in-Residence David Halpern provides this month's dramatic cover, selected especially in recognition of the AAPG annual meeting in Denver. The photo is titled "Needle Rock at Hotchkiss, Colorado." Cover design by Rusty Johnson.

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Denver Metro Convention & Visitors Bureau

A dynamic downtown area and a location that sits deliciously close to the scenic Rocky Mountains make Denver an inviting destination for geologists – and just about anyone else. Denver, shown here from City Park, will be the site of AAPG's annual meeting June 3-6. A complete section of news and stories about the meeting begins on page 14 of this issue.

PRESIDENT'S COLUMN

Read Any Good Books Lately?

Continuing our conversation . . . I find that I am reluctant to read modern authors; the New York Times best seller list is unknown to me. I want to save my reading time for those authors whose talents have outlasted the centuries. Once in awhile, though, I obtain a recommendation of a "modern" book from a reader whose judgement I trust. I have found such suggestions wonderfully useful.

Perhaps you have read a book that has touched you . . . that you might care to recommend to me? Make plans to be in Denver, they have prepared a remarkable program; Schlumberger and I will buy you a coffee.

Volunteers Needed in Denver

Volunteer, both from the professional and student ranks, are needed in Denver to help work at the AAPG annual meeting.

As in past years, organizers are seeking students to help in a variety of ways, and for members to be technical session judges.

Technical Session Judges

Judges will help determine the winners of the Matson, Braunstein and SEPM, EMD and DEG best paper/best poster awards.

Volunteers will be asked to judge and evaluate one or more oral or poster sessions. They also will be invited to attend the complimentary Judges' Breakfast, and will receive a Denver logo pin and a certificate of appreciation suitable for framing.

To volunteer, or for more information, contact Sandy Hensley, AAPG convention department,

telephone – (918) 560-2641; fax – (918) 560-2684; or e-mail – shensley@aapg.org.

Students

Student volunteers are needed to help in several areas of operations, including the slide center, information center, short course administration, poster sessions and advance registration.

Students receive free registration for a half-day of work. For a full day of work they receive full registration, a free lunch and \$25. Work can be split in shifts to accommodate schedules.

To volunteer, or for more information, contact Sandra Marks at smark95@alum.mines.edu. Also, a Web site for student volunteers – with online volunteer registration – can be found at www.mines.edu/research/PTTC.

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*Downey, Kumar Testimony Makes Impact***AAPG Takes Message to Congress**

By LARRY NATION

AAPG Communications Director

As worldwide energy woes compounded, AAPG twice provided invited testimony before Congress in March, with AAPG President Marlan W. Downey telling the U.S. House Resources Committee the United States has an ample supply of natural gas – provided lawmakers take action positive for exploration.

Also testifying later in the month was Naresh Kumar, vice chair of the AAPG Committee on Resource Evaluation. Kumar testified before the Subcommittee on Energy and Mineral Resources. Kumar was invited to address the validity of the U.S. Geological Survey's resource evaluations.

Kumar told the committee that since its formation, CORE has consulted with the USGS on its 1995 National Assessment of U.S. Oil and Gas Resources, the 1999 Arctic National Wildlife Refuge 1002 Area assessment and the 2000 World Petroleum Assessment.

For all of these, Kumar told the committee that AAPG, on the recommendation of CORE, "has not endorsed specific resource numbers generated by the assessments, but has endorsed the sound scientific process used to generate the probability distributions.

"Resources assessments are a vital planning tool for policymakers and industry," Kumar said. "The agencies



Downey

that perform these assessments and track oil and gas resources and reserves need continued support. They have done a good job to date."

Kumar also took advantage of the opportunity to underscore Downey's earlier testimony concerning abundant energy resources.

David Applegate, of the American Geological Institute, accompanied Kumar in his presentation before the subcommittee, along with G. Warfield "Skip" Hobbs, president of the AAPG Division of Professional Affairs.

Applegate said Kumar answered questions from congressmen for about an hour following his testimony.

"America has to solve its gas problems all by itself, within its own boundaries, with possibly a little help from Canada."



Kumar

At one point, Rep. Barbara Cubin, (R-Wyo.), chair of the committee, made a comment on Kumar's comments on ample supply and lack of access to prospective areas, citing Downey by name and recalling the comments he made the week before.

Downey, invited on Rep. Cubin's behalf, told the committee of ample U.S. onshore and offshore natural gas resources, and the need for access to federal public lands.

Accompanied by Applegate and others, Downey told the committee of studies showing a "more than adequate" resource base to meet the projected needs. Downey, however,

also told the committee of roadblocks to access to the U.S. resources.

"Areas of highest immediate potential are in the Gulf of Mexico, the Rocky Mountain basins and the deep basins in Texas and Oklahoma. Other areas of importance include the offshore East Coast, South Florida Basin and the North Slope of Alaska.

"Unfortunately," Downey's written testimony noted, "not all of these areas are currently available for exploration and development."

While Downey's written testimony provided specifics of the natural gas

See **Testimonies**, page 6

**Take
another
look, a
deeper
look.**

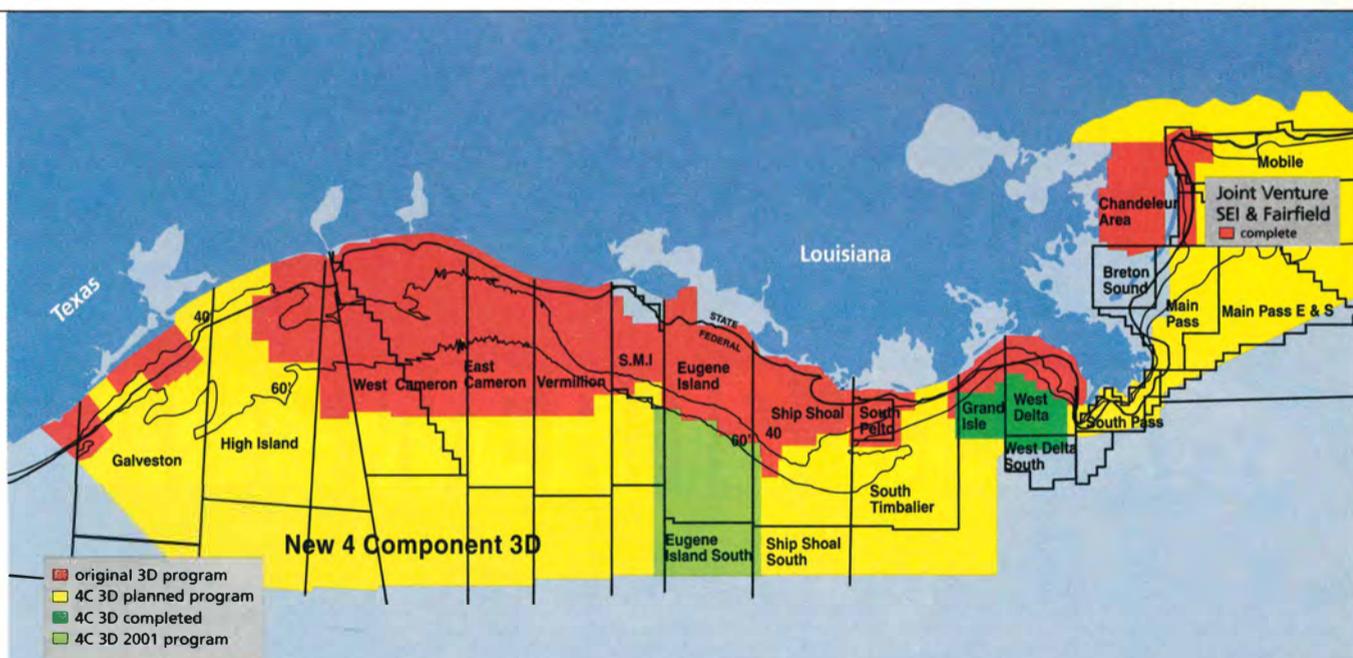


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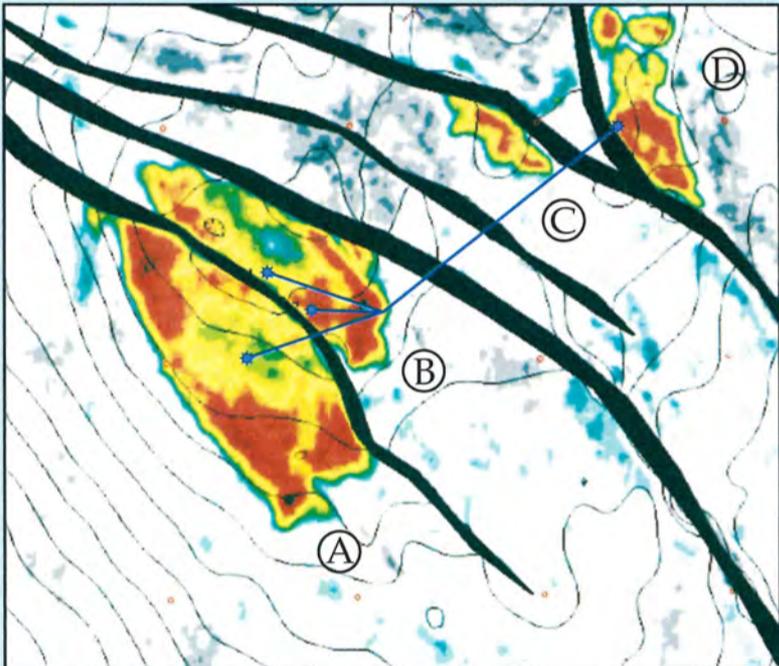
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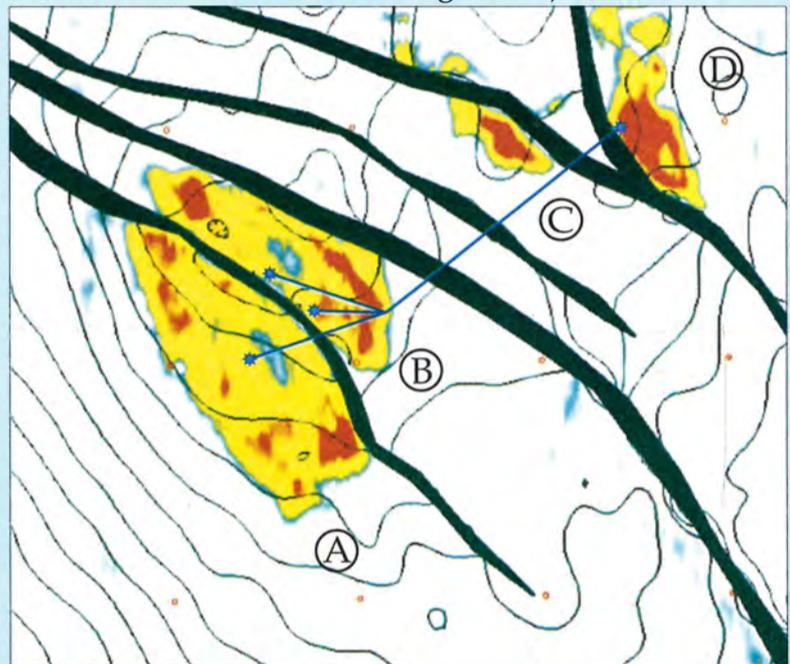
◆ As an example, let's look at a so called "depleted field" that went offline in the mid 1990's. ◆

CONVENTIONAL 3-D AMPLITUDE EXTRACTION MAP
(Reds and yellows indicate strong amplitude values.)



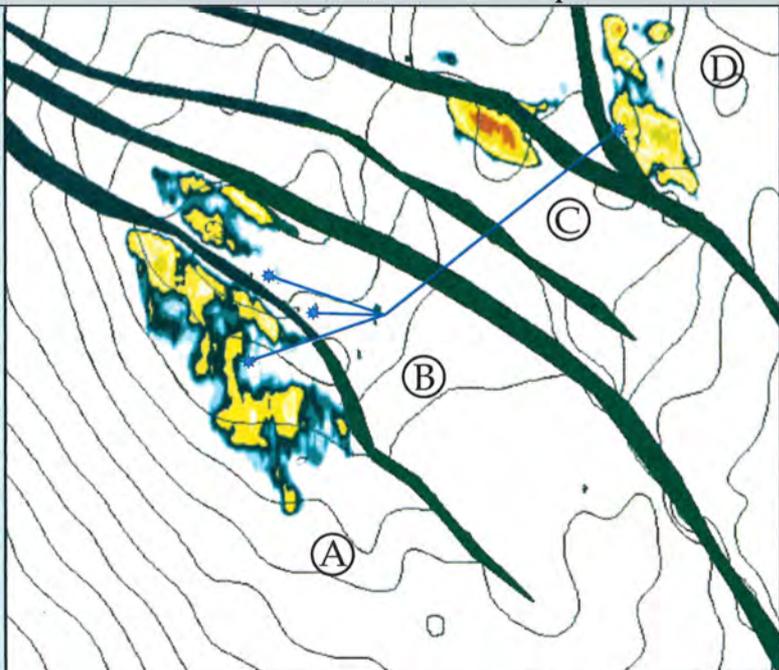
Shows strong amplitudes related to a depleted area around abandoned wells in fault blocks A, B and D.

3-D AVO STRENGTH EXTRACTION MAP
(Reds and yellows indicate amplitudes increasing with increasing offset.)



Shows a positive AVO response related to the depleted areas. (Beware of hydrocarbon indicators such as AVO and bright spot technology as they cannot differentiate between low and high hydrocarbon saturation.)

3-D DENSITY CONTRAST EXTRACTION MAP
(Red, green and yellow indicate areas of hydrocarbon rich section. White and gray indicates depleted zone areas.)



Shows the depleted zones (white) and potential "bypassed pay" in red, green and yellow. (The Density Contrast derivative can discriminate between low and high hydrocarbon saturation.)

OBSERVATIONS / IDEAS

- 1) Notice the updip hydrocarbon potential in fault blocks A and B as seen on the 3-D Density Contrast map.
- 2) Notice the "missed opportunity" in fault block C as seen on the 3-D Density Contrast map.
- 3) Notice the bypassed pay in fault block D that was not produced completely. This is because the well was not drilled in the optimum location.
- 4) Imagine being able to generate higher yields in existing fields, reevaluate old or declining fields, optimize new fields and explore efficiently by applying this exciting new technology.
- 5) By now, you should be thinking of several areas where this technology needs to be applied.
- 6) What are you waiting for? Call Diamond now and get a competitive advantage!

Testimonies

from page 4

situation, it was his brief, opening comments spoken without notes that seemed to carry most impact with the committee, according to observers.

He told the panel that the United States needs an additional 1,000 rigs to be operating to meet future gas demand estimates, approximately doubling the present number of active rigs.

"The good thing is that we do have enormous (gas) resources undiscovered, unproduced but estimated in the U.S.," Downey told the panel. "That is the good news. The bad is that we do not get to go to Saudi Arabia or Qatar or Mexico or Venezuela for any of those supplies as can do for oil.

"America has to solve its gas problems all by itself, within its own boundaries, with possibly a little help from Canada."

In noting that it takes putting rigs to work to produce the gas needed for the future, Downey said "we have another subtlety to the problem. Shell won't help us, ExxonMobil won't help us, Arco and BP Amoco won't help us. All the majors have left the domestic onshore. The problem is going to be almost entirely with the small mom-and-pop operators, the independent producers that are drilling most of those thousands of rigs – using those thousand rigs currently."

As to the mom-and-pop operators' ability to provide the supply, Downey said "there is a world of difference in

AAPG President's D.C. Summit Set

In addition to the AAPG appearances before Congress, the association, with other scientific professional societies, is convening a one-day conference in Washington, D.C., on April 23 to discuss critical energy issues confronting the United States.

The invitation-only "AAPG President's Conference on National Issues: Summit on U.S. Energy Policy" is attracting the attention of highly placed staffers in Congress, the Executive Branch and regulatory agencies.

Carl J. Smith, of the West Virginia Geological Survey, and Lee C. Gerhard, of the Kansas Geological

Survey, are instrumental in coordinating the agenda and logistics.

Speakers and participants will include expert and knowledgeable individuals whose insights into the U.S. energy needs and resources are widely respected both inside and outside the earth science community.

The format will include pertinent talks, panel discussions, an opportunity for questions, dialogue and a wrap-up that will pull together National Energy Policy recommendations.

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how they need to operate in a tax system than the large companies. They are capital short. They need to get their money back from each well they drill before they can drill another one. Currently you have to wait seven years to recover your expenses, your general expenses, from drilling a well.

"That doesn't bother Shell or Exxon, but it does bother small companies," he continued. "And something that allows small companies to recover their cost the same year they start recovering revenue would make a world of difference.

"No less tax to the government, no greater benefit to the small company, but cash flow – little companies live on cash flow."

Rep. Cubin asked Downey about the gas potential in the OCS off the northeast U.S. coast.

"Sure," Downey replied, "there is potential because we haven't been allowed to explore there, but all you have to do is go across the state line into Canada. They are finding all sorts of gas in that same setting – and thanks to Canada, they are keeping the northeast U.S. warm with offshore Canadian gas while (the) U.S. refuses to allow it to be drilled and produced from our own offshore. I hope Canada stays friendly."

Downey's written comments said that action needs to be taken to permit expanded exploration and development of these currently restricted public lands.

"These lands were established to serve all of our nation's citizens ...," Downey said. "The best way to serve the interests of all citizens is to permit the development of vitally needed

natural gas resources on these lands, under careful registration."

Concerning taxation, the written comments stated "It will take several years to mobilize the efforts of the oil and gas companies, but Congress can assist by reviewing the 1986 Tax Reform Act and addressing repeal of the Alternative Minimum Tax and the restoration of the ability off the passive investor to expense Intangible Drilling Costs against a revenue stream."

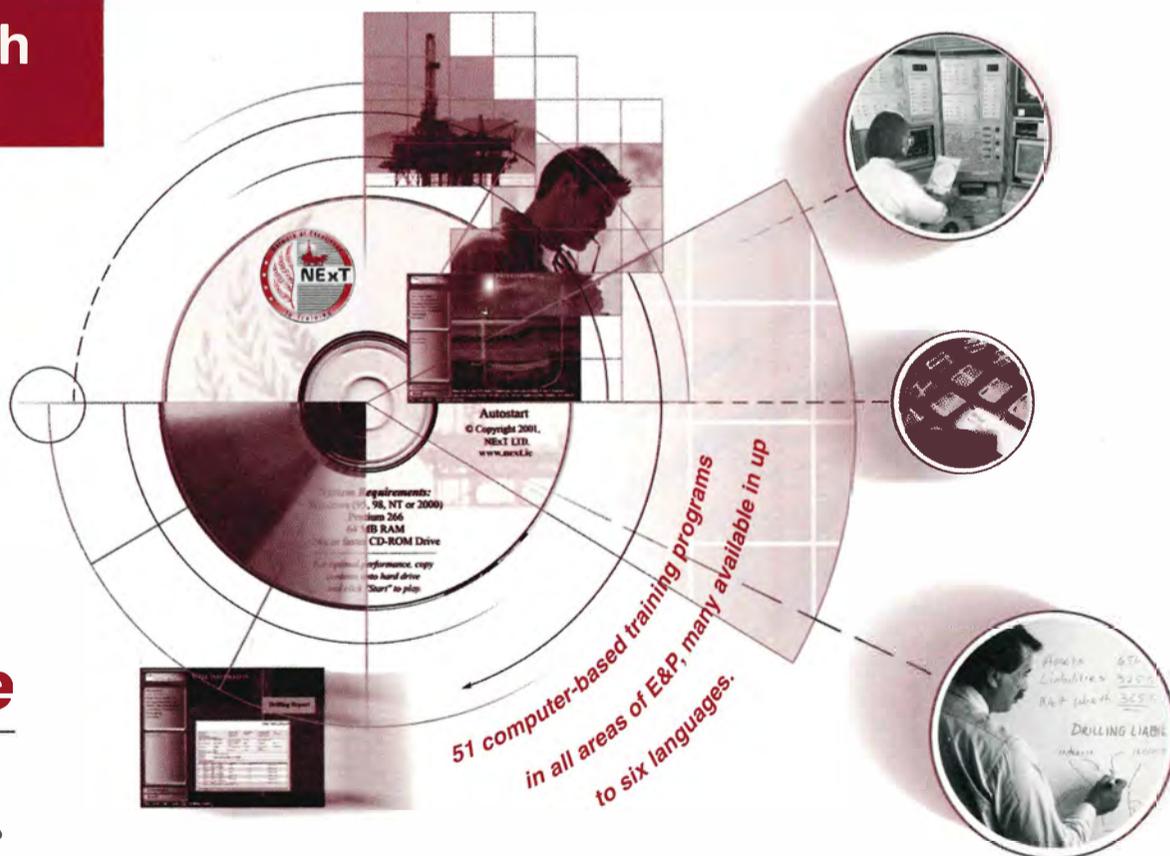
Those actions, Downey said "would go a long way in assisting small companies and independents to generate the needed capital to finance expanded exploration activities."

For full text of both Downey's and Kumar's testimony, see the AAPG Web site at <http://www.aapg.org/business/testimonies/index.shtml>. □

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Salaries Ride Oil Price Wave

By LARRY NATION

AAPG Communications Director

Riding the wave of higher energy prices, geologists are receiving healthy pay increases, according to the 2000-2001 annual EXPLORER salary survey.

Also, hiring began to accelerate in the fourth quarter of 2000 and is continuing strong into 2001, according to Mike Ayling, of MLA Resources in Tulsa. Ayling has conducted the annual survey for the EXPLORER since 1982.

An overall 7.18 percent increase in salaries were registered over the past year as stable oil prices and rapidly rising gas prices began to show up as increases in exploration budgets by year's end, Ayling said.

The subsequent demand for manpower has put a premium on the expertise of the geoscientists.

Salaries in individual experience categories rose from 5.6 to 10.2 percent.

The EXPLORER survey is based on employed, salaried geoscientists and does not include any additional benefits, such as consulting fees, retainers, overrides, automobiles or other perquisites.

Ayling said the fits and spurts of hiring and firing over the past two decades has played havoc with the demographics of the industry. For instance, Ayling noted the 6-9 year of experience category showing a loss in average pay is a statistical anomaly.

"The sampling is simply too small," Ayling said. "There just aren't many in that category, due to the layoffs and lack of hiring during those years."

Ayling's survey also found that "over two-thirds of the working geoscientists now have over 20 years experience." However, he also noted that the age grouping of 50-65 year olds "fall off the radar screen" due to the previous layoffs of the mature geologists.

Companies now are stepping up efforts to hire fresh master's graduates – and the starting salaries are showing its effect, with the pay of a geologist with two years or less experience rising over 10 percent.

On the other hand, however, "companies are finding themselves with a lot of property that needs geological work and they need it now," Ayling said. "They almost have to hire a fully qualified person to handle those responsibilities – and those geologists are going to have to come from another company, and they are going to have to pay them more than they are making."

"Significant sign-on incentives, in the form of cash payments and stock options, as well as retention bonuses are becoming quite common," he added.

Consequently, current trends found in the survey show there are new hires coming into the company with less experience but are receiving higher salaries (due to the present market atmosphere) than a geologist who has been with the firm

longer.

This makes them likely candidates for a jump to another company, which, of course, would require the company to hire a replacement.

"There is a lot of trading of people

continued on next page

2000 GEOLOGICAL SALARY SURVEY

YEARS EXPERIENCE	HIGH	AVERAGE	LOW
0-2	\$ 76,400	\$ 59,700	\$ 45,000
3-5	84,300	66,000	56,000
6-9	79,000	74,200	70,000
10-14	127,000	89,400	70,000
15-19	119,000	100,600	85,000
20+	350,000	114,100	68,000

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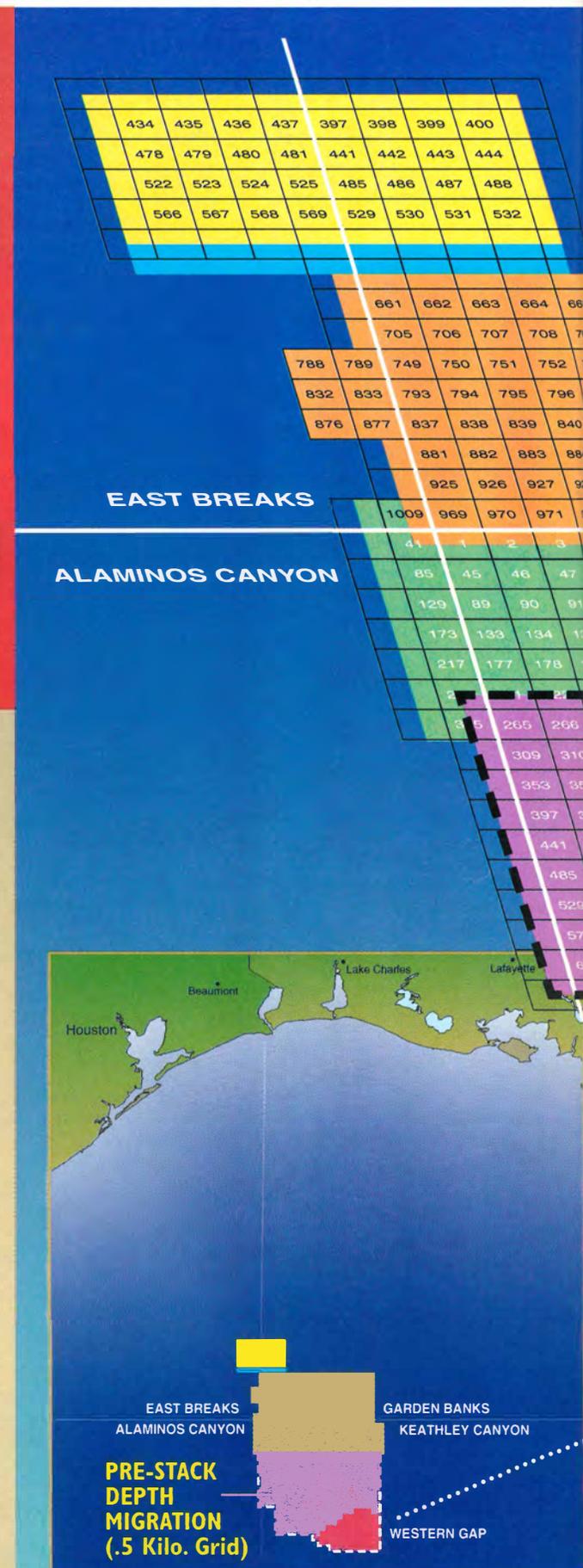
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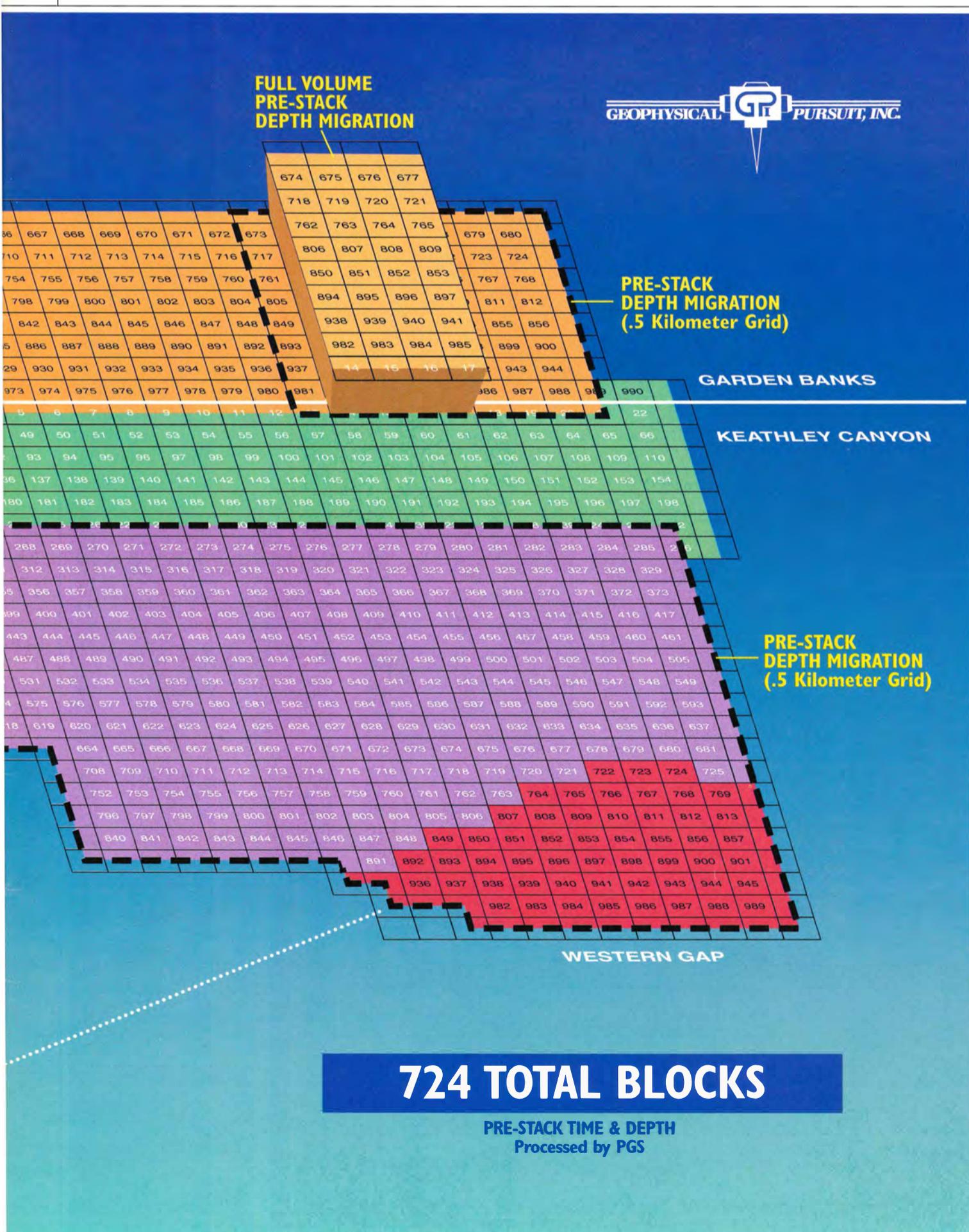


HISTORICAL AVERAGES

YEARS EXPER.	AVERAGE SALARY								
	1992	1993	1994	1995	1996	1997	1998	1999	2000
0-2	\$42,800	\$43,200	\$42,500	\$46,500	\$48,400	\$51,300	\$50,100	\$53,600	\$59,700
3-5	54,300	52,600	53,800	55,200	56,600	57,400	57,000	61,400	66,000
6-9	62,100	65,400	63,100	59,600	65,700	69,900	67,500	78,400	74,200
10-14	70,500	76,200	69,100	70,500	76,600	78,800	77,100	83,400	89,400
15-19	80,900	82,700	75,300	82,400	84,700	90,200	89,800	94,900	100,600
20+	99,500	95,900	100,700	104,700	99,800	108,500	106,200	106,600	114,100

AVERAGE SALARY BY DEGREE

YEARS EXPERIENCE	B.S.	M.S.	Ph.D.
0-2	\$ 52,000	\$ 60,100	\$ 65,000
3-5	60,000	66,100	72,000
6-9	70,000	79,000	73,500
10-14	82,000	91,000	88,700
15-19	94,000	102,700	106,000
20+	110,400	117,800	99,600



continued from previous page

going on," Ayling said. "The companies are having a hard time building and keeping a solid staff. Some of what is going on is really self-defeating."

Ayling said companies are also realizing that the dearth of mentors in companies is having an effect on productivity.

"The companies should have thought of that 10 years ago," he said.

He noted that consultants, whose remuneration is not included in the survey, are also being kept busy, to "fill in the slack" not handled by the in-house geologists.

"They are going to be more in demand," he said.

Considering the hiring and firing track record in the upstream industry over the past generation, the question is begged: How long will this present "geologist friendly" environment last?

"I don't see any end to it in the near future," Ayling said, noting the projected \$22-plus projected price for oil and rising gas prices.

Experts such as international investment banker Matthew Simmons and Federal Reserve Chairman Alan Greenspan are speaking in terms of years rather than quarters, and trillions of dollars to rebuild the U.S. energy infrastructure.

"There is even a renewed interest in the U.S., as evidenced by the Shell-Barrett bidding."

(Editor's note: Barrett, an exploration-production company with most properties in Colorado, Utah, Wyoming, Kansas, Oklahoma and the Gulf of Mexico, is involved in an attempted buyout by Shell.)

What about the geologist who is unemployed?

"That person should examine what he or she has to offer and go about seriously marketing those skills," Ayling said. "With careful, objective analysis of strengths, a person can then target those companies who can capitalize on those capabilities."

"It will take more than just applying to advertisements to find the right job."

"Technical expertise is still a requirement, with good interpretative and thought-process skills," he added. "A geoscientist must be more than a competent computer jock."

"But now, good people skills are also a necessity. Today's geologists who work in companies must be able to work in a team environment." □

*Member Part of 'Kenyan Man' Team***Skull Find Is a 'Head Scratcher'**

By DAVID BROWN
EXPLORER Correspondent

A 3.5-million-year-old skull found in eastern Africa is changing the way science views the origins of mankind.

At the same time, the discovery is also opening the door to a fresh look into the geology of a region that may have been the true cradle of humanity.

AAPG member Frank H. Brown, dean of the College of Mines & Earth Sciences at the University of Utah in Salt Lake City, began studying the geology of northern Kenya more than two decades ago.

Because of that work, he now shares center stage with one of the world's most famous fossil-hunters.

In March, noted paleontologist Maeve Leakey announced that she and a team of researchers had discovered and analyzed a 3.5-million-year-old cranium and partial jawbone from an arid region in northern Kenya.

Based on its differences from other hominid skulls, Leakey said, the fossils almost certainly represent a new genus and species in man's ancestral line. Those differences include a flat face, small teeth, a narrow nasal aperture and a small, chimpanzee-like ear canal.

Writing in the March 22 issue of the journal *Nature*, she named this being *Kenyanthropus platyops*, or flat-faced Kenyan Man.

Researchers from the National Museums of Kenya recovered the cranium in 1999 on the west side of Lake Turkana, formerly called Lake Rudolf.

Brown said the Lake Turkana area is associated with the African Rift, with the southern part of the lake "classic Rift."

"The northern two-thirds of the lake is very different," he said. "What we have is a series of faults, most of which are down on the east, so it's more of a basin-and-range structure."

Brown contrasted the arid Kenyan landscape of today with the fertile, animal-filled expanse that existed millions of years ago.

"Today it's incredibly dry," Brown said, "but when you look at the fossil record you find lots of big animals. There were elephants there, and lots of monkeys."

How About a Date?

Kenyan Man would have seen a lake, however.

"There was a lake in the area much like there is today," Brown noted. "Shortly after that the lake disappeared and there was a river. The Omo River in fact transports a lot of ashes into the area."

About four million years ago, Brown said, there was a "huge outpouring of basalts" in the region. With eruption of the 4ma basalts, the basin that was filled by Pliocene and Pleistocene sediments is established.

"Later, with the building of Mt. Kulal southeast of the present lake, the whole topography and palaeography was being changed by the building of this volcanic structure, which was blocking the drainage out to the Indian Ocean," he said.

Dynamic changes continued to alter the landscape, producing a lake in the



Above right, AAPG member Frank Brown, with the University of Utah, kneeling between two stromatolite beds on the west side of Lake Turkana in eastern Africa, where scientists discovered a 3.5-million-year-old skull that may change completely the way science views the origins of mankind. Other scenes from what may prove to be an historic expedition are: Above left, examining some bone fragments are Louise Leakey (left), Maeve Leakey (right) and Justice Erus. Left, a scene at the Lomekwi new skull site, with Maeve (sitting), Nzuve (red hat) and Patrick Nduru Gathogo, who's examining an aerial photo.

Photos by David Brill, F.H. Brown

See **Kenyan Man**, page 12

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Kenyan Man

from page 10

area from 4.33-4 million years ago, with no lake at 4-3.55 million years and a lake again from 3.55-3.4 million years, Brown said.

Evidence of an ancient river emptying into the Indian Ocean can be seen in a submarine canyon cut into the African shelf just south of the equator in southern Somalia, he noted.

Changes that affected the area's geology play a large role in determining the age of the K. Platyops skull. According to Brown's description, the cranium fossil was found near the contact of the Nachukui formation with Miocene volcanic rocks, above the Lokochot Tuff and below the Tulu Bor Tuff.

Interpolation between the 3.57 million-year-old Lokochot and the 3.4 million-year-old Tulu Bor tuffs gives an age of 3.5 million years for the skull's location, he said.

The K. platyops skull derived from a dark mudstone, originally deposited along the northern margin of a shallow lake. Volcanic-pebble conglomerates within the mudstone show streams flowing from hills to the west.

Other specimens found in floodplain deposits of the ancient Omo River indicate that hominids occupied the floodplains of major rivers, alluvial fans and lake-margin environments from 3.5-3 million years ago, he noted.

Brown credited Ian McDougall, professor of earth sciences at Australian National University, with conducting the potassium argon and 40/39 argon dating that determined the age of volcanic layers in northern Kenya.

"We can tie these closely together, and each of these volcanic eruptions in fact has its own, distinct chemical composition," Brown explained.

He said McDougall has dated 20 levels in that part of Africa from 0.74 plus or minus 0.01 million years down to 3.96 plus or minus 0.03 million years.

"Ian's contribution to this was to date two underlying volcanic ash layers at 3.96 and 3.94 million years," he said. "Above it there's a palaeomagnetic reversal at 3.57-3.58 million years, the Gilbert-Gauss Boundary."

Marine sediments research by Peter deMenocal of the Lamont-Doherty Earth Observatory provided additional support for identifying the relevant time and geological sequences, according to Brown.

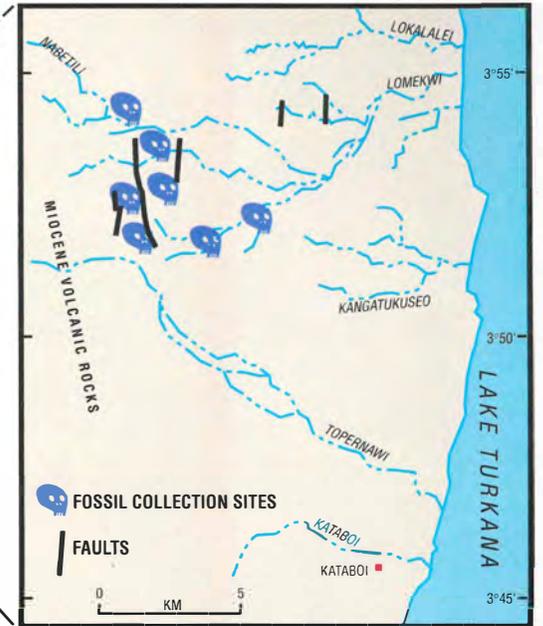
Confirmation of the fossil dating "has come from as many different directions as you can think of," he said.

Kenyan Man, Meet Lucy

Placing Kenyan Man in eastern Africa between three million and four million years ago is not only a key finding, but also one cause for the controversy over the proposed new Kenyanthropus genus designation.

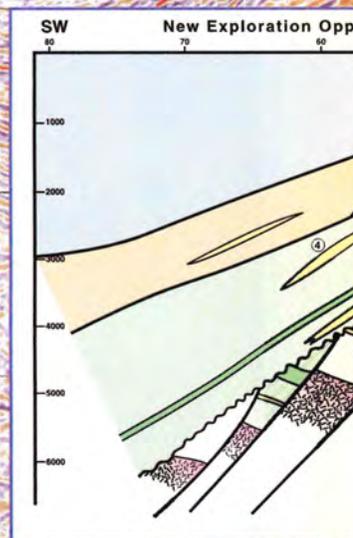
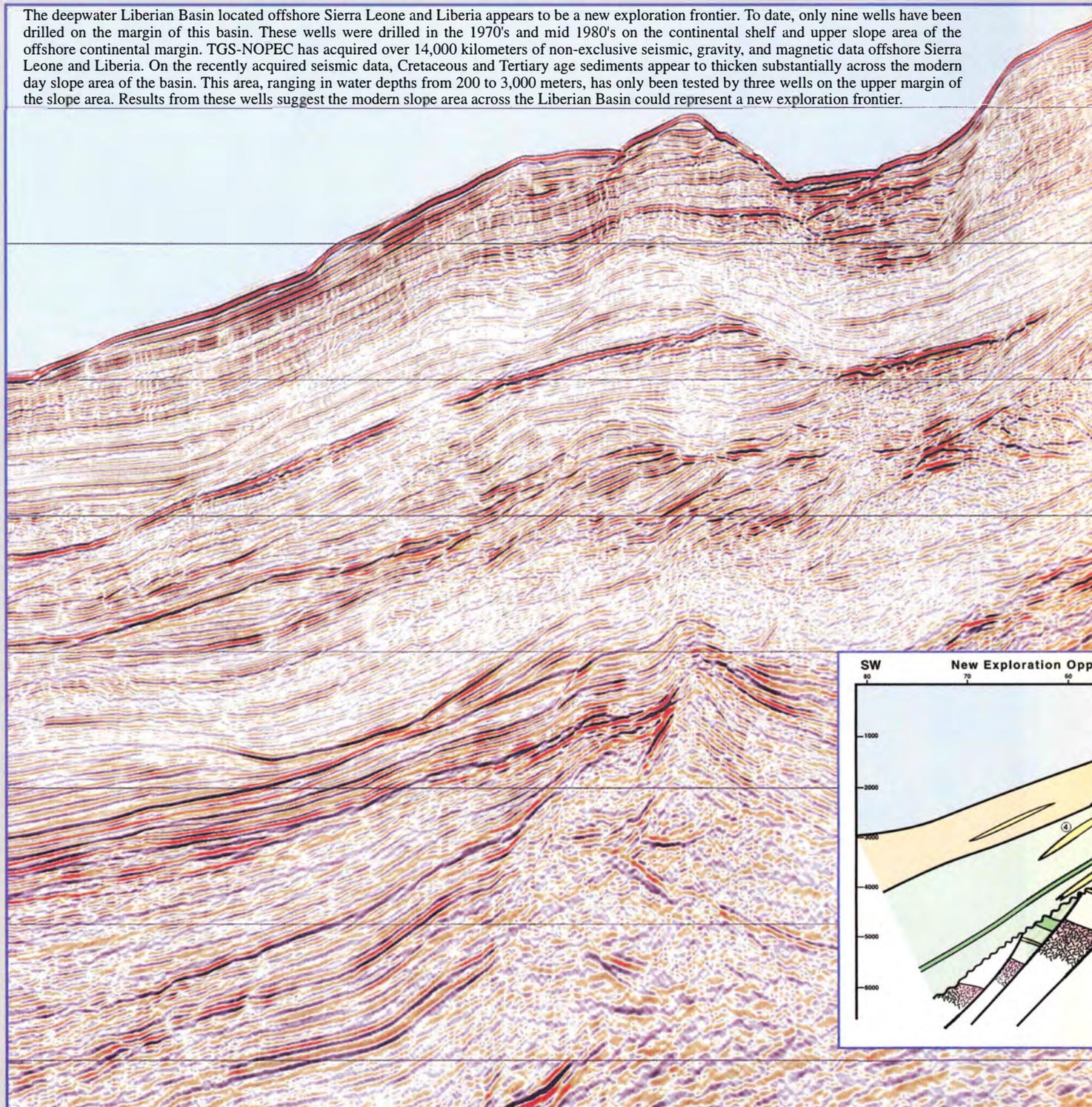
That dating means Kenyan Man lived at approximately the same time and in the same part of the world as the previously identified hominid Australopithecus afarensis, exemplified by the famous fossil, Lucy.

Scientists studying human evolution originally assumed a fairly direct line of descent, with man's more apelike ancestors moving ever closer to modern human form. A. afarensis was thought to be one stop on that train-



LOOKING FOR A NEW EXPLORATION FRONTIER OFFSHORE SIERRA LEONE AND LIBERIA

The deepwater Liberian Basin located offshore Sierra Leone and Liberia appears to be a new exploration frontier. To date, only nine wells have been drilled on the margin of this basin. These wells were drilled in the 1970's and mid 1980's on the continental shelf and upper slope area of the offshore continental margin. TGS-NOPEC has acquired over 14,000 kilometers of non-exclusive seismic, gravity, and magnetic data offshore Sierra Leone and Liberia. On the recently acquired seismic data, Cretaceous and Tertiary age sediments appear to thicken substantially across the modern day slope area of the basin. This area, ranging in water depths from 200 to 3,000 meters, has only been tested by three wells on the upper margin of the slope area. Results from these wells suggest the modern slope area across the Liberian Basin could represent a new exploration frontier.



For additional information regarding these data, please contact any TGS-NOPEC representative.

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continued on next page

See us in Denver at AAPG Booth #4098

continued from previous page

track of development.

Now it seems that numerous hominid sidetracks may have existed, with no clear line leading to Homo sapiens.

The advent of Kenyan Man as a contemporary of Lucy led one anthropologist to describe this new view of human evolution as a family tree with two trunks.

Brown said he first worked for Meave Leakey's husband, Richard Leakey, on the east side of Lake Turkana in 1980, then spent a week working with him on the west side of the lake the following year.

Richard Leakey is the son of Louis and Mary Leakey, who discovered hominid fossil evidence at the Olduvai Gorge in Tanzania in the 1930s.

In 1985, Amoco asked Brown to



return to Kenya "to explain the later geology" of the area. Amoco had been investigating Kenya's prospectivity, but later sold its interests to Shell, he said.

"We did find a good little source rock, but it probably wasn't thick enough to produce economic accumulations of petroleum," Brown recalled.

Kenya and Ethiopia are rich hunting grounds for hominid fossils partly because of past volcanism.

"In a way, the hominids get in the way of the geology, but if it wasn't for the hominids, no one would give a damn about the geology."

"Bone preserves exceptionally well in sediments that are high in calcium and fluoride. In part, the volcanics help with the preservation of the fossils," he said.

Also, in a tectonically active area, he observed, fossils are brought up and then exposed through erosion.

Geology Gets Its Due

Brown's studies of the Turkana Basin

reveal an area of sedimentation in fluvial environments interspersed with lacustrine episodes.

At the Kenyan Man discovery site, the Lokochot Tuff contains clay and volcanic eutritus, according to Brown. A volcanic pebble conglomerate overlies the tuff, followed by a quartz-rich sandstone that includes a burrowed, fine sandstone marker bed.

A dark mudstone above the sandstone contains volcanic pebbles at its base with thin pebble conglomerate lenses in its upper portion. Overlying brown mudstone is directly beneath the Tulu Bor Tuff.

In an earlier paper describing the Koobi Fora formation east of Lake Turkana, Brown described two phases of deposition that characterize the Lokochot member in an interval of about 170,000 years.

Coarse-grained detrital clastics deposited in a fluvial environment give way to finer-grained detrital and bioclastic material of a lacustrine episode.

The Tulu Bor shows well-developed, upward-fining cycles and pedogenesis of a fluvial environment, with minor lacustrine intervals of fine-grained detrital clastic and bioclastics. Deposition of the Tulu Bor member occurred over an interval of about 880,000 years.

Brown has correlated and traced the Tulu Bor Tuff to Hadan in Ethiopia, where the Lucy A. afarensis partial skeleton was discovered – another link to the coeval existence of Lucy and Kenyan Man.

Cycles of changing physical environment may have had an effect on hominid development, but the extent of that effect remains uncertain. Some recent research contradicts theories that hominids began to walk upright as broad savanna replaced forest habitat.

Leakey's researchers determined, tentatively, that the Kenyan Man locale was wetter and more vegetated than other sites that produced hominid fossils of a similar age.

AustralopithEcus – the name means "southern ape" – once stood alone as an accepted ancestor to human beings. Scientists then recognized its later species as belonging to a different genus, Paranthropus.

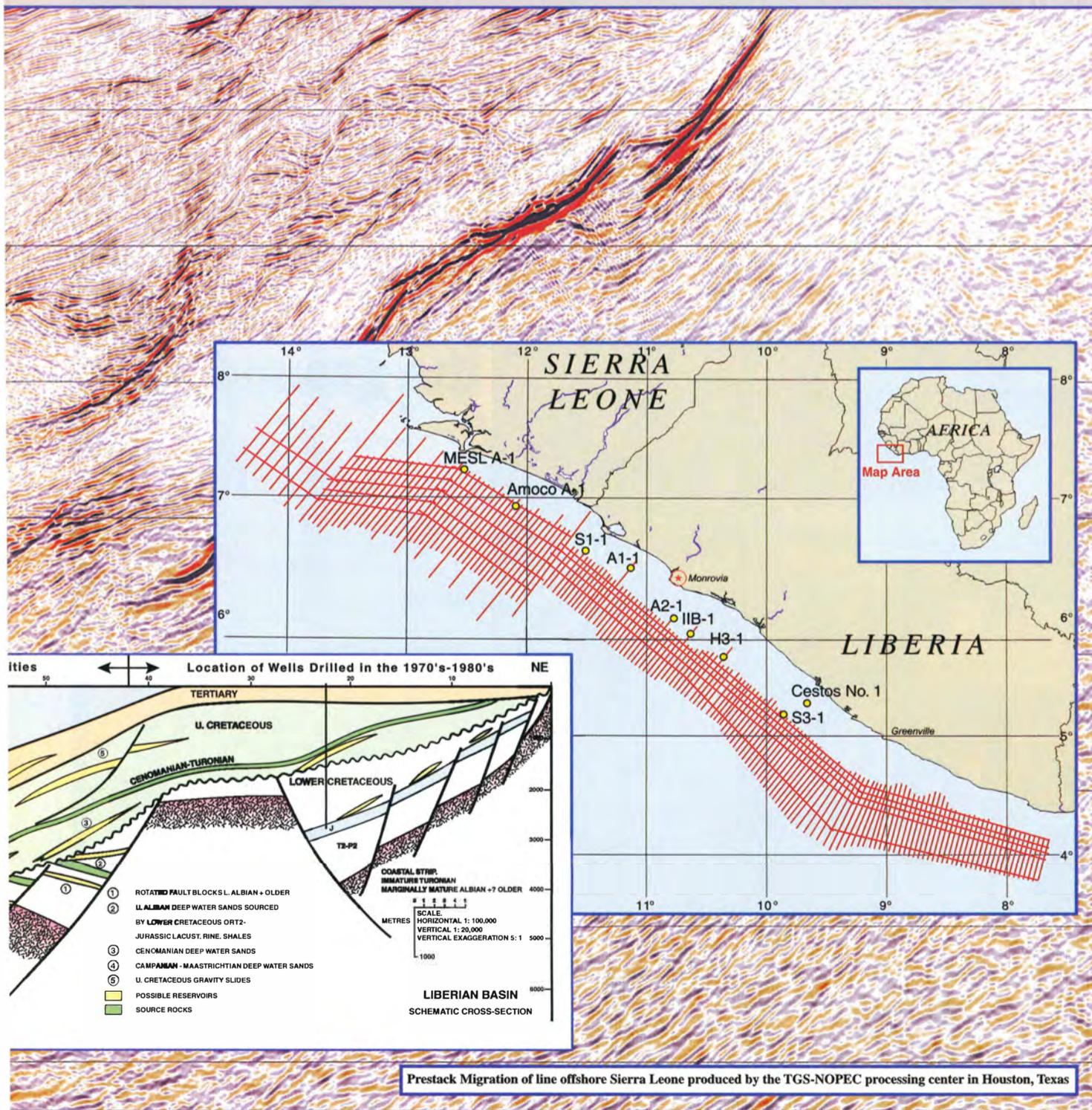
A tentative designation, Ardipithecus, added an earlier genus to the hominid line, but not all anthropologists agree with this assessment. Now Kenyanthropus has blurred the picture even more.

It's possible that Kenyan Man someday will be seen as merely an example of AustralopithEcus, known to be a very diverse genus, just as Java Man (Pithecanthropus) and Peking Man eventually were categorized as Homo erectus.

Researchers into human evolution are much closer to the beginning of the story than to the end. For Brown, the gathering of pieces for this puzzle brings new opportunity to study the geology of eastern Africa.

"In a way, the hominids get in the way of the geology," he said, "but if it wasn't for the hominids, no one would give a damn about the geology." □

EXPLORATION FRONTIER?



Annual Meeting Begins June 3

Denver Opens Its Doors for AAPG

AAPG is heading for a Rocky Mountain high via an annual meeting that celebrates the successes and triumphs of the past while taking aim at hitting greater heights in a new millennium.

The 86th AAPG annual meeting begins June 3 at the Colorado Convention Center in downtown Denver, designed around the theme "2001: An Energy Odyssey."

"The theme underscores a dynamic period for the hydrocarbon industry," said meeting general chairman Steve Sonnenberg. "Our energy journey into the 21st century begins with concerns about oil and gas supplies and includes debates regarding the environmental impact of energy exploration and development."

The convention, he continued, provides an opportunity for members "to continue your education and improve your skills."

"The technical program has been developed along themes of natural gas, petroleum systems, structures and tectonics, reservoir geology and characterization, depositional systems and stratigraphy, technology, business and global environmental issues," Sonnenberg said.

"Over 1,000 papers were accepted by the technical program committee."

Add to that the chance to view the latest in technology on the giant exhibits hall; to find out the latest exploration opportunities from around the globe in the International Pavilion; to take



Photo courtesy of Denver Metro Convention and Visitors Bureau

Colorado's beautiful and dramatic Maroon Bells, a popular site near Aspen that makes a visit to the Rocky Mountain state a must for geologists and tourists alike.

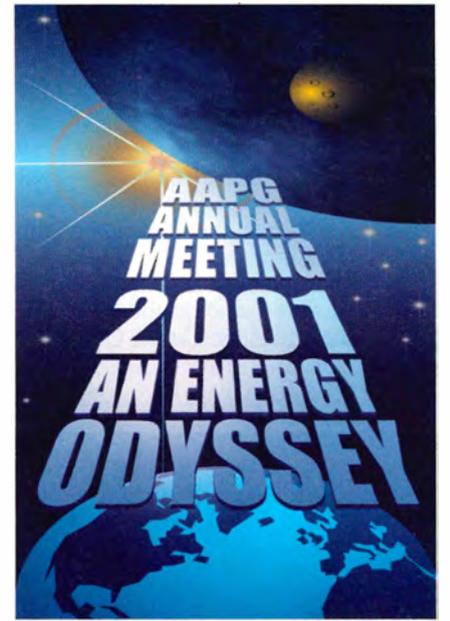
advantage of the many short courses and field trips that are being offered; the chance to network with peers and people who can make a difference in careers, and the meeting becomes a must-do opportunity.

This year's meeting also features the first-ever Eposter sessions, held Monday through Wednesday, in addition to the inaugural Michel T. Halbouty Lecture, featuring Carolyn Shoemaker's talk on "Through a Crystal

Ball." (See related story on page 40.)

Pre-meeting events – various short courses, field trips, meetings and entertainment-related activities – will be held for early arrivers. This year's "Teacher Day Program" will be held June 2-3, for example, and a Career Transition Workshop will be offered at 8 a.m. Sunday at the Marriott City Center.

But the annual meeting begins in earnest at 4 p.m. Sunday, June 3, with the opening session and awards



ceremony at the Colorado Convention Center.

That will be followed by the traditional Icebreaker reception, held in the exhibits hall, allowing participants a chance to enjoy refreshments while getting a first-look at the latest in technology.

Technical sessions begin at 8 a.m. Monday, June 4.

This meeting marks the seventh time AAPG has held its annual meeting in Denver. Previous annual meetings were held there in 1942, 1948, 1961, 1972, 1980 and 1994. □

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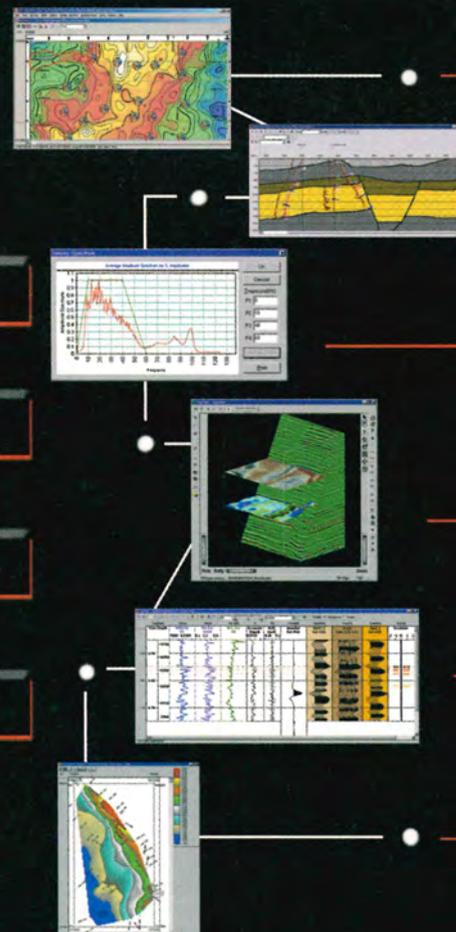
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Roots Lie in Denver

International Pavilion Coming Home

By KATHY SHIRLEY
EXPLORER Correspondent

There seems to be a unique karma surrounding this year's International Pavilion at the AAPG annual meeting – and there's a pretty good explanation why.

This year, the IP is returning to its roots.

That has organizers feeling especially excited about once again making the IP an integral part of the annual meeting experience.

It was in 1994 – the last time AAPG held its annual convention in Denver – when meeting organizers first conceived the idea of designating a special section of the exhibits hall for international delegations.

In the IP, they said, representatives would display oil and gas exploration and development opportunities in their countries.

That initial venture was very successful – officials from about 52 countries participated – and a new component of annual meetings had been born. It even became a part of the annual international meetings.

International Pavilion Committee co-chairs Susan Morrice, with S. Morrice & Associates, and Debbie Sycamore, with Aspect Resources, both in Denver, want this meeting to be another step in keeping the IP's growth steady and vital.

"We are trying to keep a high level of excitement and interest in the International Pavilion so we don't get lost in a sea of conventions," Sycamore said. "We hope the Global Forum (a post-meeting "bonus") will help attract higher level international delegates to AAPG's annual convention."

The Global Community

This year the International Pavilion will include 40 to 45 countries, some that have participated for years and some that are new.

Also, the "virtual pavilion" will be back this year – an online version of the IP that is open year-round.

(During the Denver meeting the IP will seek to highlight the phenomenal growth of global electrification from natural gas. Anyone can join ministerial officials, power producers and explorationists working together to create synergies from upstream through downstream markets.)

"The International Pavilion Committee has worked hard to make this year's pavilion the best yet," Morrice said. "We do live in a global community today, and it's important to keep the lines of communication open worldwide."

To that end, organizers are offering the new Global Forum June 6-7, after the convention officially closes. The program includes:

☐ A field trip that will showcase the vertical stream of natural gas utilization.

☐ A workshop, chaired by AAPG president Marlan Downey, that will focus on lessons learned from successes and failures in joint ventures between countries and oil companies.

"This seminar will highlight the importance of empowering people and what makes good business deals work," Sycamore said.

☐ A luncheon, which will feature a discussion on networking plus a panel discussion featuring:

✓ Don Felio, with BP Amoco, who has 20 years of international exploration

experience and is known for his skill in identifying the key elements to a long-term successful joint venture relationship between countries and companies.

✓ Tom O'Connor, a petroleum management advisor working with several foreign governments, international oil companies and contractors.

✓ Shawky Abdine, past chairman of the board and managing director of GUPCO in Egypt.

✓ Akif Narimanov, chief geologist and vice president of SOCAR in Azerbaijan.

Other invited participants will be Robbie Gries, AAPG president-elect; J.C. Whorton with Andersen; George Kronman, with Landmark and co-author of AAPG's "International Oil and Gas Ventures – A Business Perspective"; and Charles L. Clemmons, president of I.H.S. Economics and Consulting Services.

"The whole intent of the global forum is to complement the International Pavilion," Morrice said. "The forum is a nice venue to discuss how to consummate business deals and make them the best possible ventures for everyone involved."

Morrice also said the AAPG will honor Jay Gallagher, a driving force in the IP's success story who died earlier this year after a battle with cancer (see related information on page 20).

Gallagher, who was editor of the IHS International Oil Letter, worked together with Rosemary Jaworskyj of The Energists for the past seven years to ensure the International Pavilion's contributions to the annual meeting. His country contacts and her fundraising were – and continue to be – instrumental to the IP's success.

Gallagher also will be honored at the convention's opening ceremonies. ☐

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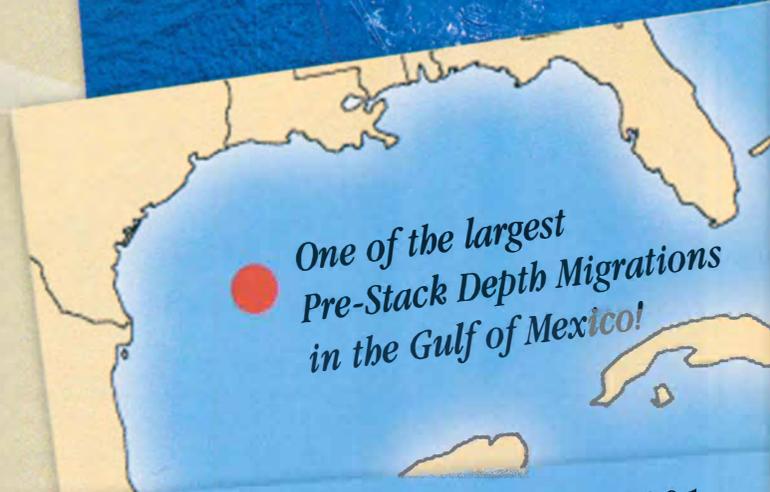
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Tobin Turns to Hollywood For Denver Slate

The Tobin Theater, a regular part of all AAPG annual meetings, has a new theme for this year's program in Denver.

The theme: Let Us Entertain You. Tobin Theater chair Steve Veal has put together a program that ranges from the critically acclaimed eight-part series "The Prize," based on Daniel Yergin's best-selling book, to such Hollywood films as "2001: A Space Odyssey," "Boomtown," "Tulsa" and the recent smash hit, "Armageddon."

"These are some terrific films," Veal said. "These movies celebrate, both directly and indirectly, a lot of what our profession is about – they're

the kind of films that we geologists can watch and be proud of what we do, and still have some fun."

Speaking of fun, Veal has even added a "Spot the Mistake" contest for two of the films. Find the most number of geological or industry-related "mistakes" in "Armageddon" or "Dante's Peak" and you'll win a prize.

Best yet: Admission is free.

The Tobin Theater will be located in Room A109/111 of the Colorado Convention Center. The schedule is:

Monday

- 9 a.m. – **The Prize** (Parts I & II)
- 11 a.m. – **The Prize** (Parts III & IV)

- 1 p.m. – **The Prize** (Parts V & VI)
- 3 p.m. – **The Prize** (Parts VII & VIII)

Tuesday

- 9 a.m. – **2001: A Space Odyssey** (In keeping with the convention's theme, of course.)
- 11 a.m. – **Boomtown** (Clark Gable and Spencer Tracy strike it rich, go broke and strike it rich again in the oil fields of the Southwest.)
- 1 p.m. – **Tulsa** (A rancher in Oklahoma battles the odds in exploring for oil on her lands. Susan Hayward and Robert Preston star.)
- 3 p.m. – **Armageddon** (A rogue asteroid threatens to destroy Earth, so deep-core driller Bruce Willis and

his team of oilfield workers are blasted into space to save the day.)

Wednesday

- 9 a.m. – **San Francisco** (The first and probably best of the earthquake disaster films – and it's a musical! With Clark Gable, Jeanette MacDonald and Spencer Tracy.)
- 11 a.m. – **Hell Fighters** (Hollywood's version of the Red Adair story, with John Wayne in the starring role.)
- 1 p.m. – **Dante's Peak** (Pierce Brosnan is an intuitive volcanologist who believes a touristy Pacific Northwest community is endangered by a local volcano.) □

Luncheons Set For Denver

Four special luncheons are planned for Denver during the annual meeting, offering speakers who will address a variety of subjects of significance for geologists and the oil industry.

All-Convention Luncheon

All eyes continue to watch the new administration in Washington, D.C., waiting for signs of President Bush's approach to America's energy situation.

The All-Convention Luncheon, set at 11:30 a.m. Monday, June 4, at the Colorado Convention Center, may shed light on the subject.

"The Global Energy Industry: A View from the New Administration" is the luncheon topic, and convention officials are finalizing plans to have a key representative of the Bush administration available for the talk.

That speaker was not yet known at press time. Keep an eye on the AAPG Web site (www.aapg.org) for the final announcement.

Tickets are \$32 each.

Division of Professional Affairs/ Energy Minerals Division

Matthew R. Simons, president of Simmons and Company International in Houston, will speak on "How We Dig Our Way Out of the Crisis."

The joint DPA/EMD luncheon will begin at 11:30 a.m. Tuesday, June 5, at the Colorado Convention Center.

Tickets are \$30 each.

SEPM Business Meeting/Luncheon

Donn S. Gorsline, the Wilford and Daris Zinsmeyer Professor Emeritus at the University of Southern California, will speak on "New Directions and New Faces: Sedimentary Geology in Transition."

The luncheon, part of SEPM's 75th Jubilee celebration, will be held from 11:30 a.m.-1:30 p.m. Tuesday, June 5, at the Hyatt Hotel.

Tickets are \$30 each.

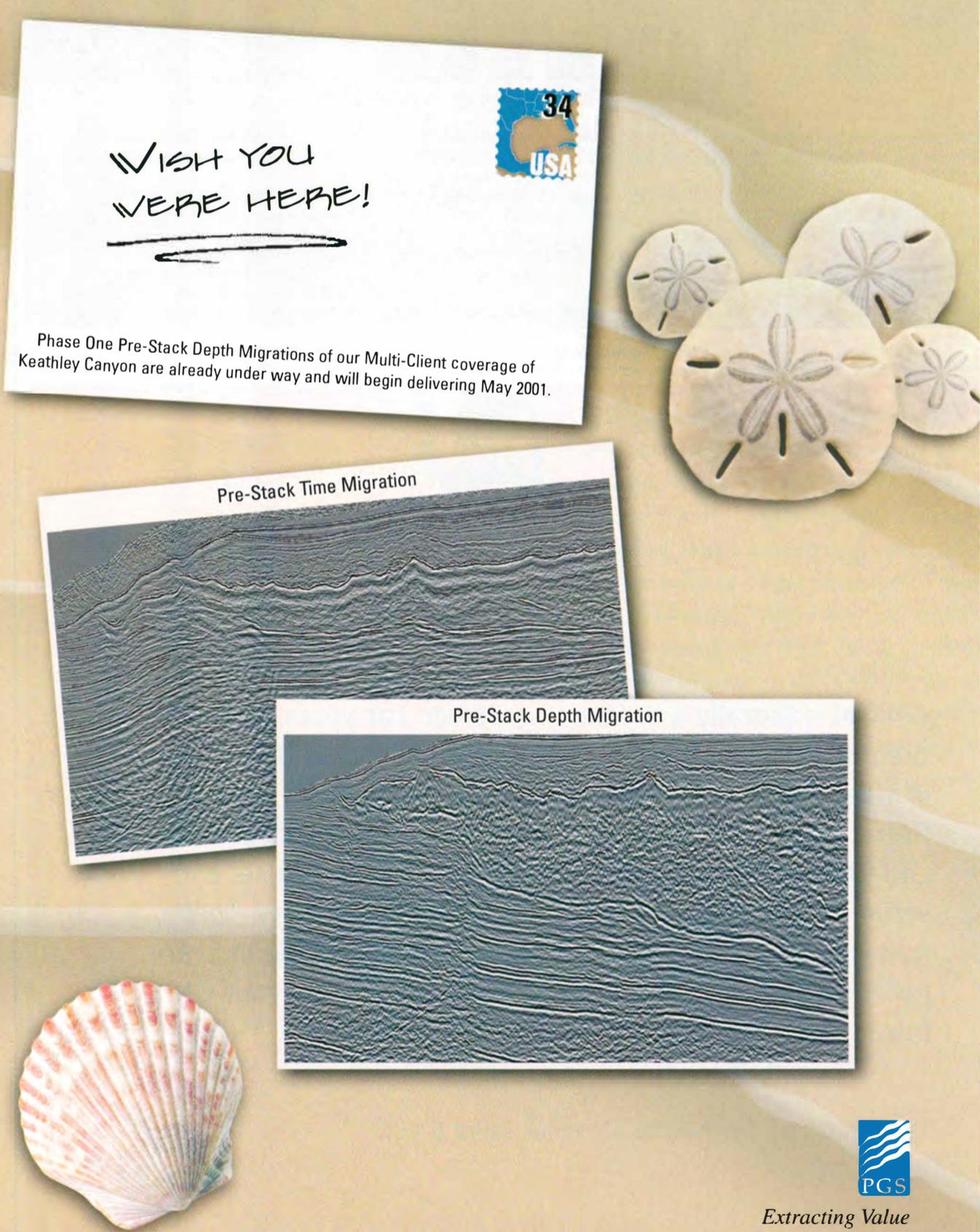
Division of Environmental Geosciences

Bernard J. Bulkin, vice president of environmental affairs for BP in London, England, will speak on "Sustainability – Making It Real."

The luncheon will begin at 11:30 a.m. on Wednesday, June 6, at the Wynkoop Brew Pub in downtown Denver.

Transportation to the site will be provided from the convention center.

Tickets are \$30 each. □



visit our website @ www.pgs.com

*Sneider Heads Award List***34 Will Be Honored in Denver**

Robert M. Sneider, of Robert M. Sneider Exploration of Houston, heads the list of those who will receive the Association's highest honors and awards during the opening session at the AAPG annual meeting in Denver.

The session, which also will include a welcome and remarks from meeting general chairman Steve Sonnenberg and AAPG president Marlan Downey, will begin at 4 p.m. Sunday, June 3, in the Ballroom of the Colorado Convention Center.

Immediately following the awards ceremony will be the Icebreaker reception in the exhibits hall.

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

This year 34 people and one institution will be recognized during the opening session. Sneider heads the list as the recipient of the Sidney Powers Memorial Award, AAPG's highest honor. (See related stories, pages 26, 28 and 31.)

In announcing the award, the AAPG Executive Committee described Sneider's long career of exploration successes, teaching and dedicated to service to AAPG as an embodiment of what the Powers Award represents.

Those to be honored along with Sneider in Denver are:

Honorary Membership Award

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Sneider



Cunningham



Gilbert



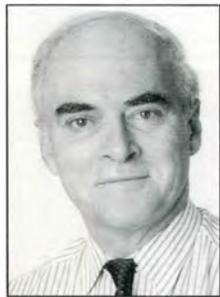
Heroy



Meissner



Pittman



Roberts



Smith



Milici



Harbaugh



Moore



Stelck

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

□ **Brenda Kay Cunningham**, staff geologist, Arco Permian, Midland, Texas.

□ **Ned (E.E.) Gilbert**, Gilbert Management Ltd., Calgary, Canada.

□ **William B. Heroy Jr.**, retired, Durham, N.C.

□ **Fred F. Meissner**, professor, Colorado School of Mines, Littleton, Colo.

□ **Lewis S. (Stan) Pittman**, the Pittman Company, Dallas; also founder of Petroleum Logistics Corp.

□ **David G. Roberts**, BP Exploration Operation Co., SunBury, Surrey, England.

□ **Carl J. Smith**, head of coal section, West Virginia Geological Survey, Morgantown, W.Va.

**Michel T. Halbouty
Human Needs Award**

Honors an individual for the outstanding application of geology to the benefit of human needs, recognizing scientific excellence.

□ **Robert C. Milici**, geologist, U.S. Geological Survey, Charlottesville, Va. Milici is being honored for his recent

See **Awards**, page 20



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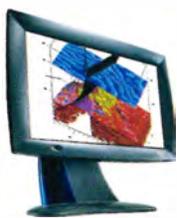
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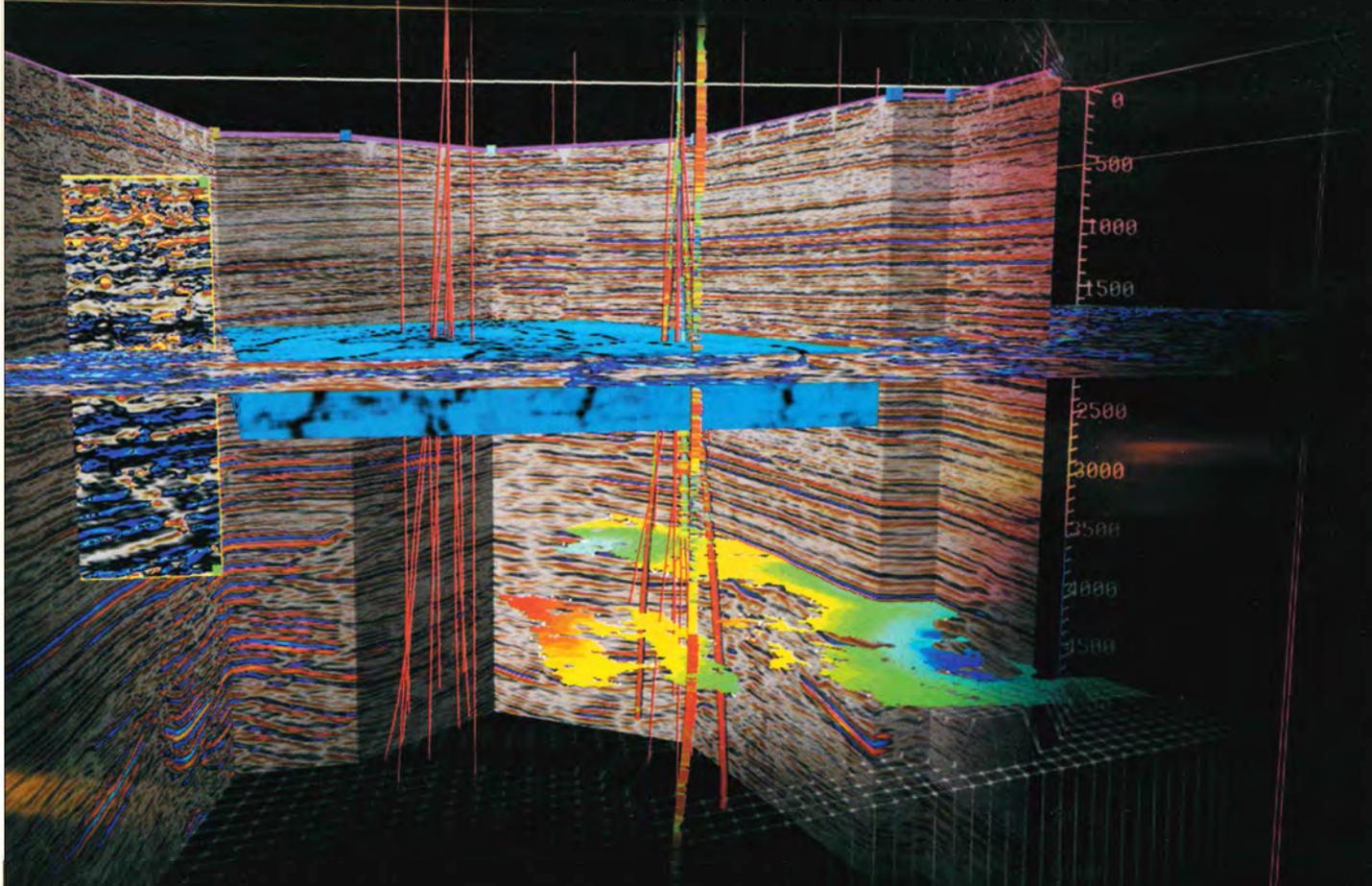


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 **MAGIC EARTH™**

Awards

from page 18

work in training geologists in India and Bangladesh, efforts that have led to increases in India's coal reserves and Bangladesh's ability to export gas, helping that country's economy as well as helping to meet India's energy needs.

Distinguished Educator Award

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

- John W. Harbaugh, advisor, Stanford University, department of geological sciences, Stanford, Calif.
- Clyde H. Moore Jr., professor, Colorado School of Mines, Lakewood, Colo.
- Charles R. Stelck, consulting geologist, Calgary, Canada.

Special Award

Presented to individuals and organizations whose area of work may not qualify for one of the existing awards, but is worthy of association recognition. This year the award goes to four people involved in innovative outreach, research and educational efforts.

- J.C. "Jay" Gallagher, Petroconsultants, Houston, honored posthumously for his efforts in development of the International Pavilion at AAPG meetings (related story, page 16), as well as providing leadership for other AAPG international activities.
- Kenneth D. Owen, consultant, Houston, and David Rice, consultant, New Harmony, Ind., for their efforts in restoring the 19th century New Harmony scientific community in Indiana.

- Richard Warren, senior staff geologist, Amerada Hess, London, who, despite suffering from a degenerative disease (neurofibromatosis) since the age of 15 has had a productive career as a geologist and as a leader in creating and leading programs to train other disabled people for work opportunities.

Public Service Award

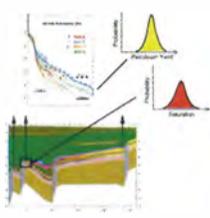
Presented to recognize contributions of AAPG members in public affairs – and intended to encourage such activities.

See **Awards**, page 22

IFP R&D in Exploration and Reservoir Engineering

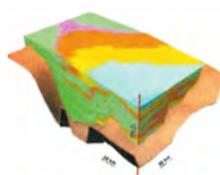
Numerous R&D consortia are opened to industrial sponsors.

QUBS
Quantification of Uncertainties in Basin Simulation



• johannes.wendebourg@ifp.fr •

DIONISOS II
3D Multilithological Stratigraphic Modelling at Exploration and Appraisal Scales from Seismic and Well Log Constraints



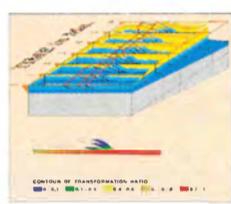
• didier.granjeon@ifp.fr •

KIM
Kinematic Inversion Methods Velocity Model Determination by Reflection Tomography



• andreas.ehinger@ifp.fr •

THRUSTPACK II
Structural and Petroleum Modelling in Fold and Thrust Areas



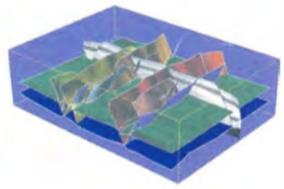
• william.sassi@ifp.fr •

SUBTRAP II
Sub-Thrust Reservoir Appraisal



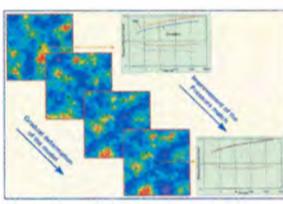
• francois.roure@ifp.fr •

FACET 4D
Fault Analysis: Constraints from Analogue Experiments Analysed in 4D



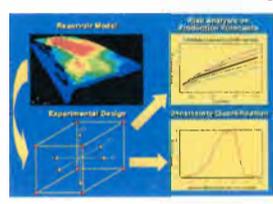
• j-marc.daniel@ifp.fr •

CONDOR
Geostatistical Description of Reservoirs Conditioned to Production Data



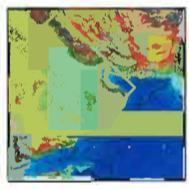
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COUGAR
Characterization of Uncertainty in Geoscience and Reservoir Modelling



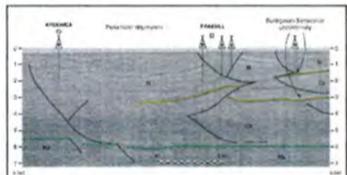
• emmanuel.manceau@ifp.fr •

MEC
Middle East Cretaceous Sequence Stratigraphy Study



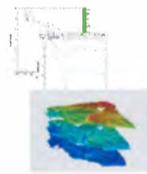
• frans.van-buchem@ifp.fr •

ALPAGA
Sandstone Reservoirs and Gas-condensate Plays in Orogenic and Accretionary Wedges



• francois.roure@ifp.fr •

BERKINE
Modelling the Petroleum System of the Berkine and Illizi Basins, Algeria



• johannes.wendebourg@ifp.fr •

PAB
Stratigraphic Architecture of Turbiditic Fans in the PAB Sandstone Outcrops (Maastrichtian, southern Pakistan)



• remi.eschard@ifp.fr •

TURBIDITES
3D Turbiditic Reservoir Models in the Annot Sandstone Outcrops (Southern Alps, France)



• philippe.joseph@ifp.fr •

TRIAS
Regional Study of Triassic Reservoirs, Algeria



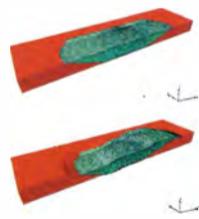
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DEVONIAN ALGERIA
Regional Study of Devonian Reservoirs, Algeria



• remi.eschard@ifp.fr •

CERES 3D
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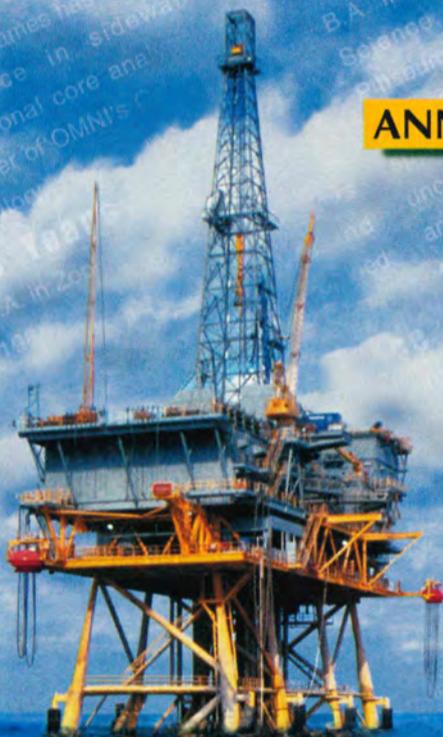


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Awards

from page 20

□ **Patty E. Holyfield**, consultant and acting co-director, Ellison Miles Geotechnical Institute, Southlake, Texas, honored for the development and teaching of the "Rocks in Your Head" workshops to more than 1,300 geoscience teachers – which has impacted about 60,000 students per year.

□ **H. Leighton Steward**, chairman of the board, LL&E, New Orleans, honored for his efforts as an environmental activist.

□ **John S. Wold**, founder of Wold Oil and Gas Co., Casper, Wyo., honored for his service as the first professional geologist ever to serve in the U.S. Congress as a Wyoming representative, and for his efforts in Wyoming state government, recreation and conservation.

Distinguished Service Award

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

□ **Elizabeth B. Campen**, Campen Consultants Inc., Billings, Mont.

□ **Chuck Caughey**, Gulf Indonesia, Singapore, Republic of Singapore.

□ **Ian D. Collins**, Genting Oil & Gas, Kuala Lumpur, Malaysia.

□ **Robert L. Countryman**, consultant,

See **Awards**, page 24

Denver Short Course Renamed

The title of short course #3 in the convention announcement was incorrect. It should read "Petroleum System Approach to Exploration and Development."

The course, sponsored by RMAG and AAPG, will emphasize the petroleum system concept and application in exploration and development, focusing on several examples.

It will be held Saturday, June 2.

The coordinators are Debra Higley and Michele Bishop, and speakers will include Les Magoon III, Michael Lewan, Ron Noble, Janet Pitman, Thomas Ahlbrandt, Dave Cox, Susan Landon, Doug Waples and Daniel Jarvie.

Additional information on this or any annual meeting short courses can be found online at www.aapg.org.

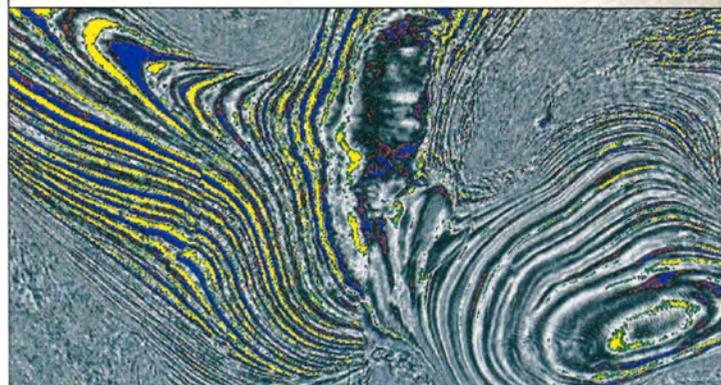
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Awards

from page 22

□ Ben D. Hare, Vastar Resources Inc., Houston.

□ Jean R. Lemmon, consultant, Tulsa.

□ Tom Mairs, consulting geologist, Dallas.

□ Wolfgang E. Schollberger, technology vice president, BP Amoco, London, England.

Journalism Award

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

This year's award goes to the Mountain Press Publishing Co., located in Missoula, Mont., in recognition of its role in production of AAPG's popular Roadside Geology Series.

J.C. "Cam" Sproule Memorial Award

Presented for best paper published by AAPG or by an affiliated society, division or Section in 1999, by a member 35 years of age or younger.

□ A.D. "Tony" Reynolds, BP Amoco, Houston, for "Dimensions of Paralic Sandstone Bodies," AAPG BULLETIN, Vol. 83, No. 2, February 1999, p. 211-229.

Robert H. Dott Sr. Memorial Award

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

□ Richard Schatzinger and John F. Jordan, editors of Memoir 71, *Reservoir Characterization - Recent Advances*.

Wallace E. Pratt Memorial Award

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

□ Robert G. Loucks, Bureau of Economic Geology, Austin, Texas, for "Paleocave Carbonate Reservoirs: Origins, Burial - Depth Modifications, Spatial Complexity, and Reservoir Implications," AAPG BULLETIN, Vol. 83, No. 11, November 1999, p. 1,795-1,834.

George C. Matson Memorial Award

Presented to honor and reward the best oral presentation at the AAPG annual meeting in New Orleans.

□ Wafik Beydoun, with Elf Exploration Angola, Rossy Cedex, France, for the paper "Exploration Challenges Into Angolan Deep Water to Ultra Deep Waters."

Co-authors are Jean-Jacques Biteau and Philippe Legrand, also with Elf Exploration Angola, Rossy Cedex.

Jules Braunstein Memorial Award

Presented to honor and reward the best poster presentation at the AAPG annual meeting in New Orleans.

□ Joseph R. Straccia and Brad E. Prather, both with Shell International Petroleum, Rijswijk, Netherlands, for "Stratigraphic Traps in Deepwater Turbidite Reservoirs at the Base of Depositional Slope." □

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A Multi-Disciplinary Disciple Sneider: A Star on the Team

By KATHY SHIRLEY
EXPLORER Correspondent

Houston geologist Robert Sneider and British poet John Donne share a basic philosophy: No man is an island entire of itself. It's the people that make a difference along the way.

Looking back over his long and successful career as a geologist and oil finder, AAPG's 2001 Sidney Powers Medalist is acutely aware of – and thankful for – the many mentors and colleagues who have influenced him throughout his journey.

Amazingly, Sneider didn't even know what geology was really all about when he switched majors from engineering his junior year in college, on the basis of a mineralogy class he crashed with his roommate.

Still, he has had a profound impact on his profession.

"I was born and raised in a seaside resort in New Jersey," Sneider said. "We had plenty of sand, but no rocks. I had no clue what geologists did, but I saw the excitement and enthusiasm of the students and instructors in that mineralogy class and I guess I was infected – It was so different from my engineering studies."

There were just 12 undergraduate and graduate students in the geology department and six full time professors, he added – "an enormous contrast from the engineering school where there were hundreds of students and very little one-on-one instruction.

"I decided geology was for me."

Learning From the Masters

Indeed, from that inauspicious beginning Bob Sneider has become a leader in his field – and it would be difficult to find anyone with more enthusiasm and love for his life's work.

For his contributions to geology he is receiving AAPG's highest honor, the Sidney Powers Memorial Award, taking his place among the ranks of legendary geologists who have elevated and enhanced the profession.

Of course, jumping majors was not an easy decision. In the late 1940s money was hard to find, and Sneider was attending Rutgers University on an engineering scholarship. When he changed majors he knew he would have to get a job to help support himself.

And that turned out to be one of his first lucky breaks.

"My mineralogy professor and one of my first mentors, John Prucha, arranged for me to work with Dr. Benjamin Leonard at the U.S. Geological Survey at Princeton University, which is just a few miles from Rutgers," Sneider said. "That job allowed me to get first hand knowledge of geology and to learn from men working in the science."

But most importantly, those two early mentors displayed a passion for geology that was "infectious," Sneider said, "and I caught the bug."

"They were my models for how dedicated earth scientists apply theory to the search for mineral wealth," he added. "They instilled in me a great desire to learn about the earth – without my even realizing it."

'The Turning Point'

Following graduation from Rutgers, Sneider served in the U.S. Army in Korea as a front line combat engineering officer. When he returned home in 1953 he headed for the University of

Wisconsin to pursue his Ph.D. in economic geology and mining engineering with the hope of working in mineral exploration.

How did a New Jersey boy wind up in Wisconsin?

Once again, Sneider thanks John Prucha, who had graduated from the University of Wisconsin and encouraged Sneider to continue his studies there.

It was uncommon in the 1950s for geology students to pursue a Ph.D. – and most who did went into teaching. Sneider, however, knew he wanted to work in industry.

"All the professors I had that were the

most knowledgeable on applying the theory we learned had worked in industry prior to teaching," he recalled. "That applied learning was far more interesting to me than the pure academics."

In 1956 Sneider completed his degree and was ready to take on the world. There was just one problem: The mining business was at an all time low and jobs were scarce.

"I did have a job offer in South Africa," he said, "but I had just married

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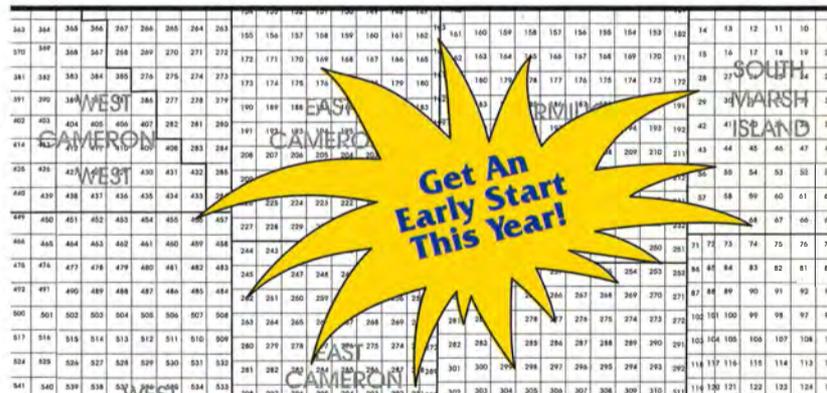
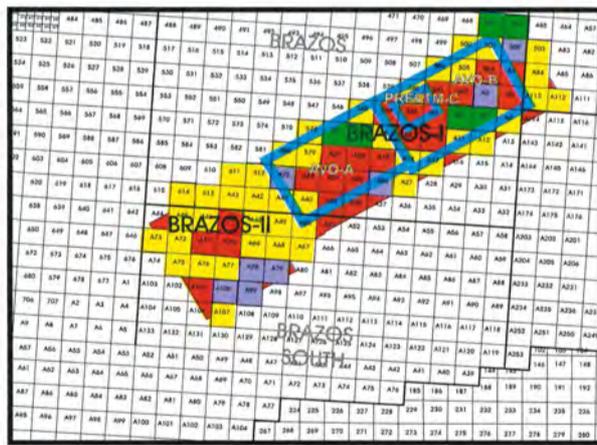


Sneider

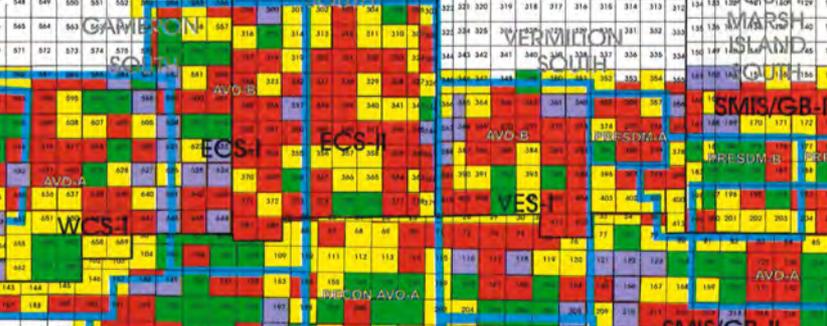
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Ramona and I couldn't envision dragging her off to Africa. Naturally I was very disappointed."

But once again fate, luck or whatever you want to call it intervened.

"A classmate of mine, Ray Murray, had gone to work for Shell Development in Houston the year before and he called to tell me his boss Gus Archie was coming to Madison to recruit for the company," Sneider said. "I figured, why not? If nothing else I would get a free dinner."

Meeting Archie, he said, proved to be "the turning point of my professional life – it brought me to the petroleum industry and was the beginning of one of the most important relationships in my career. Gus Archie was my friend and

mentor throughout my 17 years with Shell."

As a result of Archie's profound influence on his life, Sneider has a strong sense of responsibility to mentor young geologists.

"I am always aware of my duty to give back to my profession and work very hard to be a mentor to younger geologists.

"When word got out I would receive the Sidney Powers Memorial Award I got calls and notes of congratulations from many people, but the ones that touched me the most were from people who mentioned how I had helped them with a problem along the way.

"I know how much I owe Archie and others for my success, and I definitely want to give something back."

Indeed, several years ago Sneider established the Gus Archie Fund within the AAPG Foundation, which provides

"Today that's called a multi-discipline team approach, back then it was just called good old common sense."

four grants annually to graduate students in petrophysics and development geology.

Sneider challenges all practicing geologists to reach out to younger geologists.

"Today everybody is working hard on short deadlines and technology has isolated us," he said, "but we must remember we can learn invaluable lessons from other people – and the industry will benefit greatly from the sharing of experience."

Ahead of His Time

Another of Sneider's lifelong philosophies is an outgrowth of the strong mentors he was blessed with as a young professional: Years before "multi-disciplinary teams" became an industry catch phrase, Sneider was already a passionate advocate of the concept.

"In the military I was involved with my first multi-disciplinary team," he said. "Our combat engineering company was made up of soldiers with a variety of skills, so we could do a lot of different things, from building bridges and roads to laying minefields to blowing up bridges and roads. I saw the value of that team approach all those years ago, and it was an important lesson in my life."

In his first assignment with Shell – as a development geologist in the huge Elk City Field in the Anadarko Basin – Sneider was allowed to recruit from both the company's geology and engineering departments to help develop the reservoir characterization models and a development program.

"Also, in the early years I worked on offshore lease sales," he continued. "People from geology, geophysics, petrophysics and engineering had a very short time to come up with bid prices, recovery factors and other information for a sale, so we had to work together. That experience reinforced the importance of crossing professional boundaries.

"Today that's called a multi-discipline team approach," he smiled. "Back then it was just called good old common sense."

"It's easy to look back today and see that the team approach was sensible, but it wasn't that simple," Sneider continued. "When we went across organizational lines many managers got very uncomfortable.

"I am gratified to note that many companies today see the importance of bringing people from different disciplines together to solve problems."

Hanging On To Success

When Sneider and Larry Meckel left Shell in 1974 to form Sneider and Meckel Associates, their idea was to form a small multidisciplinary group to explore for hydrocarbons and offer consulting services. The two had reached a point in their careers where they were either going to have to make the jump to management positions within Shell or look for other opportunities.

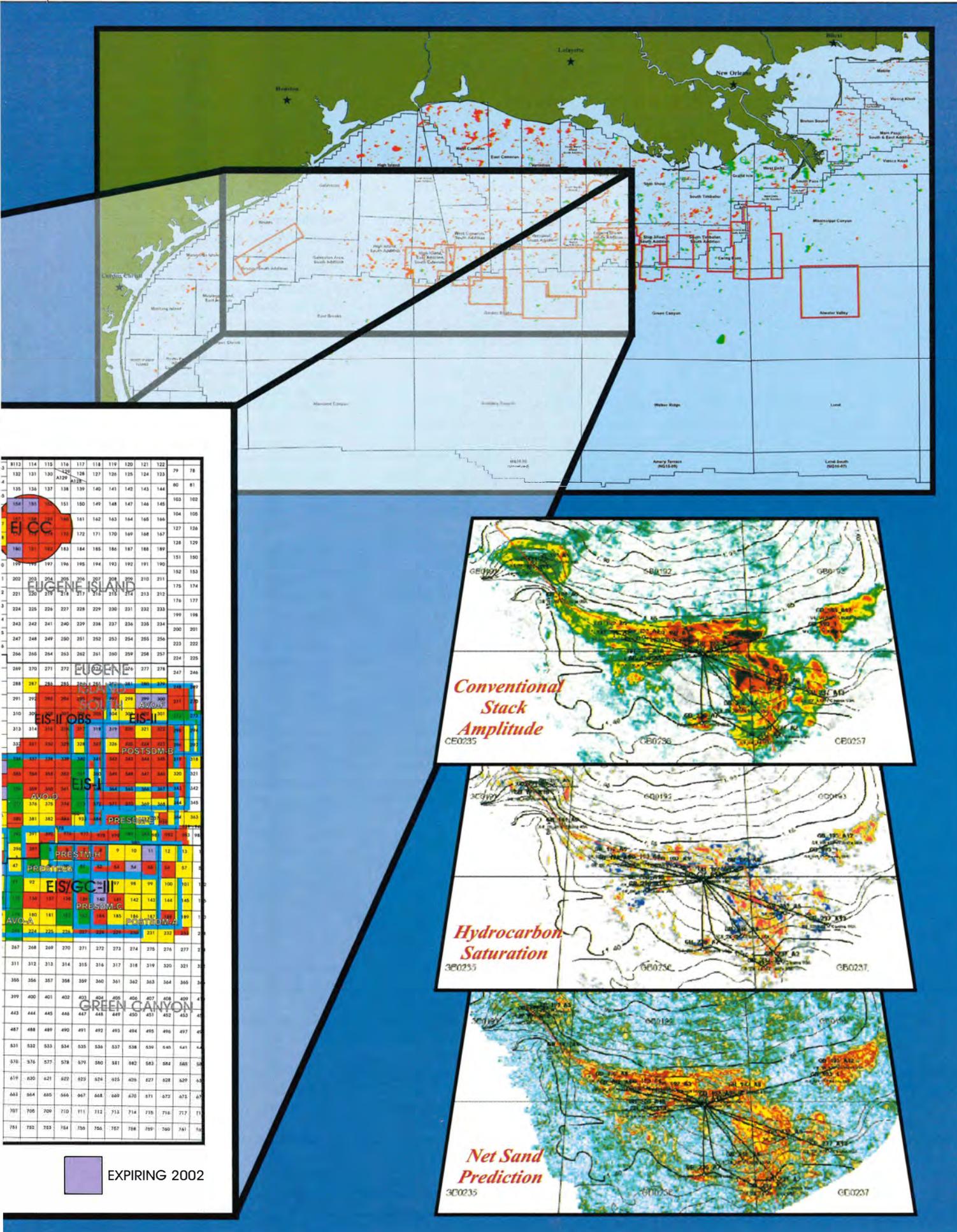
"We weren't really interested in managing people," Sneider said. "We both wanted to continue technical work."

Again, fate smiled. Not long after setting up their new firm the Arab oil embargo hit the world, creating instant jobs for geologists. Plus, the two didn't count on the enormous number of ex-Shell alumni in the industry who would offer work.

"The 'Shell mafia,' as we call it, is still strong," he said, "even to this day. We all keep up communication, and that networking really benefited Larry and I early in our business."

Through the 1970s Sneider and Meckel Associates was involved in projects that resulted in the discovery of over a dozen new fields, including the giant Elmsworth deep basin gas area of western Canada in conjunction with

See **Sneider**, page 30



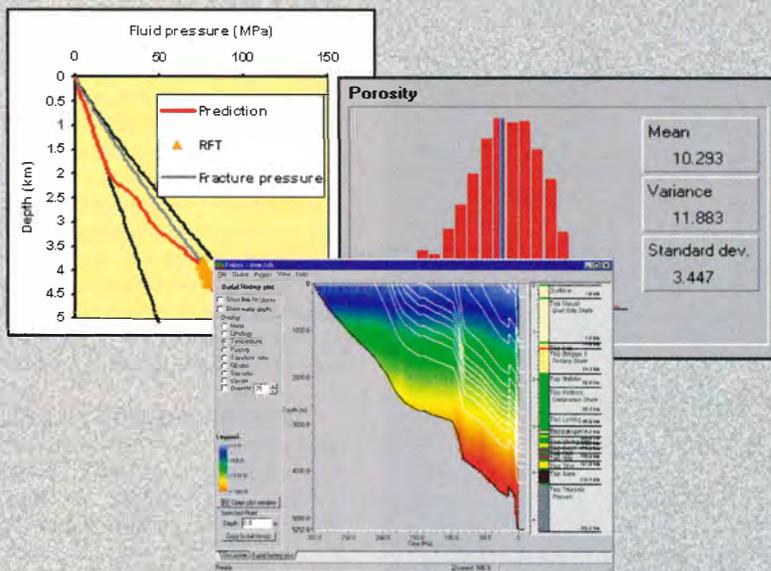
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The Sneider Focus

He Knows What He's Looking For

By LOUISE S. DURHAM
EXPLORER Correspondent

The key to finding new oil in old places, according to Powers Award medalist Robert Sneider, is to apply new exploration and production technology together with established oil field practices.

Not someone to just talk the talk, he walks the walk - with some impressive results.

During the industry downturn in the 1980s, Sneider's teams of geoscientists and engineers redirected their hunt for hydrocarbons to focus on a property acquisition approach rather than exploration.

They began by scanning more than 350 fields, looking for acquisition possibilities principally in the West Texas-New Mexico Permian Basin and the Texas-Louisiana Gulf of Mexico (GOM) basin from onshore to shallow water of less than 200 feet.

The search focused on fields with certain general characteristics:

- ✓ Might be a waterflood candidate.
- ✓ Waterfloods in place but yielding poor results with existing well spacing.
- ✓ Unrecognized pay in low resistivity reservoir rocks.
- ✓ Unrecognized reservoir compartments due to structural and/or stratigraphic changes.
- ✓ Unrecognized field extensions that might be defined by new 2-D or 3-D surveys.

When all was said and done, the program resulted in the purchase of 46 mature fields with over 625 million barrels of oil equivalent (BOE) proved and probable reserves added at a cost of \$2.69/BOE. The properties were acquired from major oil companies in competitive bid sales.

"We used either geologic criteria or production comparisons with analog fields to identify potential acquisition candidate fields," Sneider said.

"We looked for economically-marginal or near-marginal fields with heterogeneous reservoirs that are evaluated to be more homogeneous and correlatable by the operator than they really are," he added. "And we looked for those with multiple stacked reservoir units that have thin, continuous fluid flow barriers that are often below well log resolution."

Sneider Says

Sneider recommends specific steps to identify acquisition candidates quickly, define the potential opportunities and zero in on a bid.

✓ First, search in reservoir systems that appear to be more massive and homogeneous than they actually are. Depositional environments with thin, vertical and horizontal flow barriers - tidal flats, tidal bars, mud-rich deltas and turbidites, and the like - are included.

Undrained or poorly-drained pay intervals are identified by comparing completion intervals with the actual

reservoir compartments. Real or potential "thief zones" are pegged, and measures are taken to eliminate them.

✓ Second, identify potential reserves.

The search team organizes the geoscience and engineering data to quickly estimate original-oil-in-place, percent recovery and remaining reserves. Workovers, recompletions, infill locations and hidden, or subtle, pays such as the often-deceptive low resistivity-low contrast zones are identified.

✓ Team members then determine the value of reprocessing existing 2-D seismic data, acquiring new 2-D and 3-D seismic and applying sequence stratigraphy.

A two-pronged economic analysis follows.

First, there are recovery cost estimates for missed low-risk and high-risk reserves. Known potential obligations must be analyzed, including environmental liabilities, platforms, active and inactive wellbores, flow lines, facility consolidation and anticipated maintenance.

An economic analysis of the property based on cash flow projection and rate of return is a must-do before assimilating and submitting a final offer for a candidate field. The analysis includes cost estimates to recover missed low-risk and high-risk reserves, the cost to upgrade existing facilities, and known and potential liabilities, including abandonment costs.

Once the Sneider company purchases a field, a workover/completion program is implemented to increase cash flow and reserves. The technical ideas for increasing reserves are tested with maybe two infill or replacement wells, and key intervals are cored and tested to evaluate new reserves opportunities identified in detailed field studies.

The drillbit rules: If the new wells are not successful, the field is sold.

In the 46 fields acquired, those producing by primary recovery with no supplemental recovery potential harbor reserves additions mainly in:

- Field extensions identified by improved reservoir characterization using geologic studies and new 2-D and 3-D seismic data (44 percent).
- Infill wells (29 percent).
- Bypassed pays (21 percent).
- Workovers (6 percent).

In the 14 primary recovery fields with supplemental recovery potential, the increased reserves breakdown was:

- Waterflood installation - 40 percent.
- Field extensions - 24 percent.
- Infill wells for the waterflood, bypassed pays/recompletions and workovers - 36 percent.

For fields with existing waterflood operations, most of the performance improvement and additional reserves are from infill wells (45 percent) and flood pattern modification (19 percent). □

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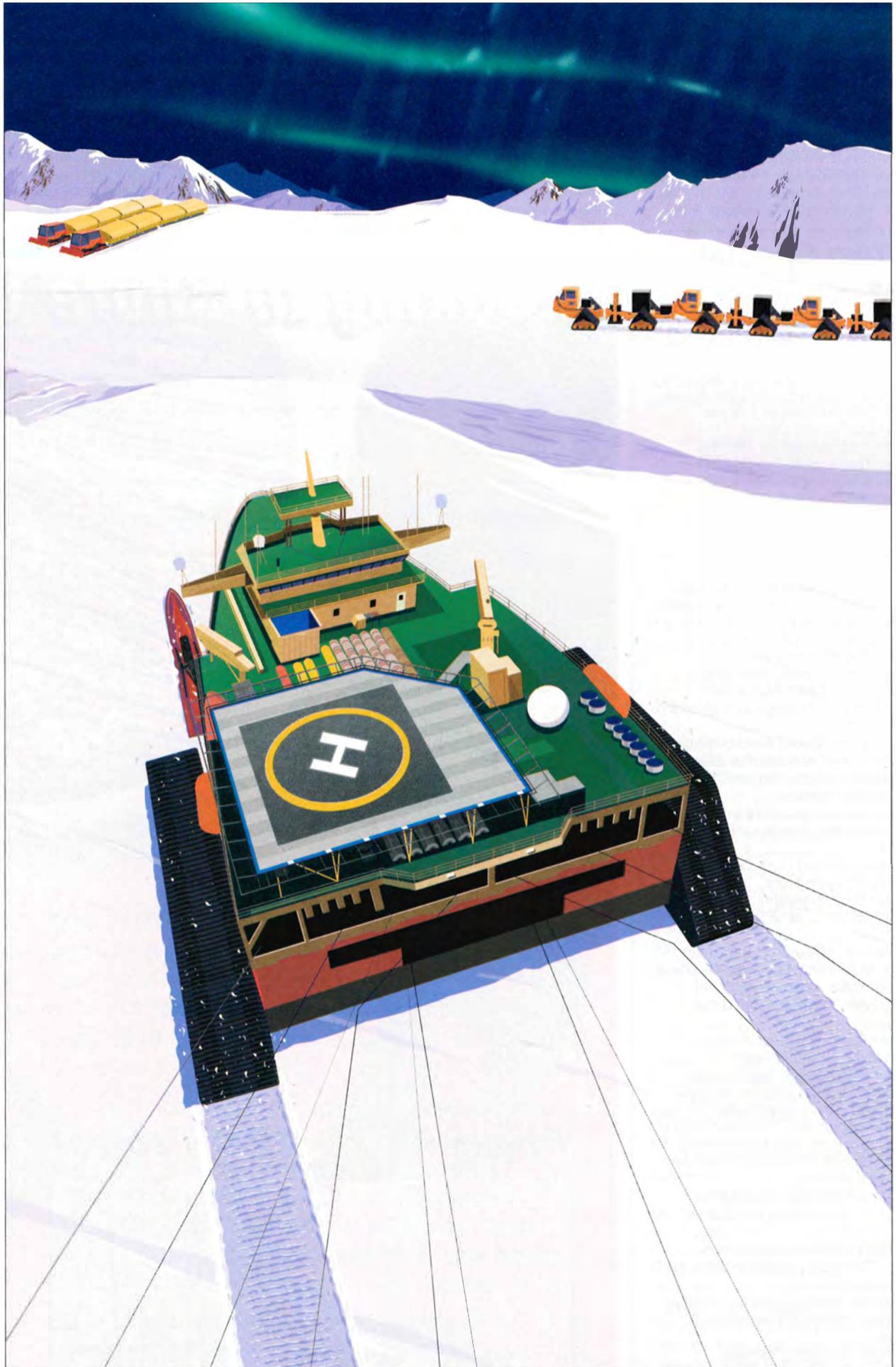
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Sneider

from page 27

Canadian Hunter Exploration.

In 1981 Sneider founded Robert M. Sneider Exploration. Looking back, Sneider said the industry downturn of the 1980s actually provided another opportunity.

"We had put together a talented team of people to do exploration work," he said. "We didn't want to lose these people during the downturn, so we went back to my roots and started acquiring marginal producing properties and increasing production through better reservoir recovery methods and application of reservoir characterization.

"Our acquisition program was more successful than our exploration efforts because we viewed acquisitions like

"Our acquisition program was more successful than our exploration efforts ... we viewed acquisitions like explorers."

explorers," he continued. "We worked trends. We knew which fields were good and why they were good. We learned which companies did things well and they became our analogs.

"Today it seems like we were pretty smart, but in reality all we were trying to do was hang on to our talented group of professionals."

Words of Wisdom

Sneider's enthusiasm for his profession spilled over into this private life as well. He and his wife, Ramona,

have three children and all of them have been involved in the petroleum industry.

"In the early days of my Shell years we moved around a lot," Sneider said. "I know some children from other families dreaded the moves, but we tried to make it an exciting adventure. We would highlight the things we would see and do in the new place. We went on lots of family field trips. Also, many exciting people visited our home, so the children were exposed to that excitement and knowledge."

His son, John, is a geologist and partner in Robert M. Sneider

Exploration.

Sneider acknowledges the importance of AAPG to his career.

"The people you meet through AAPG are important contacts and sources of knowledge," he said. "One of the first talks I ever heard was by Michel T. Halbouty at a Houston Geological Society luncheon. He was an inspiration, and through the years I have been enriched by the professionals I have had the good fortune to meet through AAPG.

"Also, AAPG has been my source of continuing education from the beginning," Sneider added, "and that was doubly important since I came from a mining background and knew virtually nothing about the petroleum business when I went to work at Shell.

"My commitment to learning through

continued on next page

Two Special 'Management' Sessions Slated

Two special "management" sessions will be held in Denver during the annual meeting, both in Ballroom 1 of the Colorado Convention Center.

The first, scheduled for Monday morning, June 4, and chaired by John R.V. Brooks and AAPG president Marlan Downy, is on "The Executive Perspective of the Energy Odyssey of the 21st Century," and will focus on the "merger mania" that has become so prominent in the energy industry.

The speakers, all of whom are high-level executives, geoscientists and AAPG members, will first present their views and then participate in a panel discussion.

Scheduled speakers are:

- ☐ Stephen Cassiani, executive vice president, ExxonMobil Exploration.
- ☐ Ian Vann, technology vice president, BP.
- ☐ Andrew W. Wood, head of global exploration, Shell International E&P BV.
- ☐ Kenneth Crouch, Senior vice president, Kerr-McGee.
- ☐ Dodd DeCamp, senior vice president-worldwide exploration, Phillips Petroleum.
- ☐ William Herbert Hunt, advisor to management, Petro-Hunt.
- ☐ John Seitz, president and chief operating officer, Anadarko Petroleum.

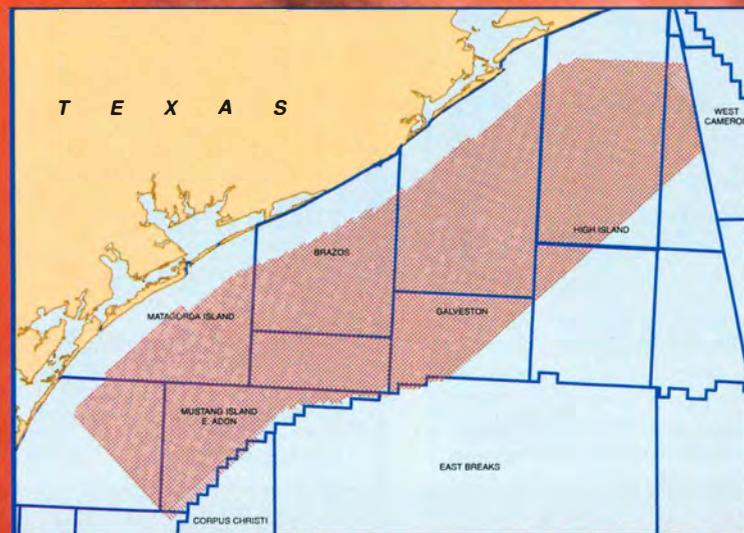
The second session, set Monday afternoon and chaired by Pinar O. Yilmaz and Randi S. Martinsen, is on "Late Breaking E&P Activities Around the World."

Speakers and their topics are:

- ☐ Gavin M. Graham, Shell EP International Petroleum Technology – Developments in the Caspian Region.
- ☐ George Eynon, Cambridge Energy Research Associates – Canada's Role in the North American Gas Marketplace.
- ☐ Ian Cross, IHS Energy – The latest E&P activities in Asia.
- ☐ Carlos A. Dengo, ExxonMobil Exploration – Revitalizing the Gulf of Mexico.
- ☐ Mahmoud Abdul-Baqi, Saudi Aramco – Technology Challenges in E&P in the Middle East.
- ☐ Ganesh Thakur, Chevron Petroleum Technology – Heavy Oil Recovery in Venezuela.
- ☐ Dirceu Abrahao, Petrobras Exploration – The Business Side of E&P Activities in Offshore Brazil Basins.
- ☐ Mary Feeley and Frank Goulding, ExxonMobil Exploration – Integrated Play Element Analysis at Deepwater Niger Delta.
- ☐ Lans Taylor and Francois Gauthier, Anadarko Petroleum – North Africa: Structural Trends in Algeria.
- ☐ Dave Roberts, senior advisor, BP – Latest E&P Activities in Europe.

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Criteria Applied to Rejuvenate Field

Sneider's System Found 'G' Spots

One of the many success stories to come from the Bob Sneider program is, not surprisingly, in coastal Louisiana – the locus of innumerable prolifically-productive old fields that take on new life with the right kind of attention.

Identified by search group only as the "G" field, the property was discovered by a major company in the late 1930s and had given up 170 million BOE prior to the teams' evaluation.

The production mechanism is solution gas drive with limited water support, and the field had produced from hydro pressured reservoirs

deposited in a river-dominated delta complex. Early wells drilled to deeper geopressured sands encountered thick sands with ample condensate and gas shows, but completion attempts failed.

At the time of the acquisition, field-wide production was marginally economic.

Numerous opportunities were determined both before and after the purchase. Infill wells in undrained or poorly-drained compartments, workovers and recompletions – particularly low resistivity pay zones – and new field extensions together

accounted for increased reserves.

New wells identified at least five reservoirs in the geopressured section down to 17,000 feet.

Only a year after the company staked its claim, recompletions and workovers of shut-in wells kicked daily production totals up from the paltry initial amount of 1,100 BOE/day to 4,000 BOE/day.

Reservoir zones in the extensively-produced hydro pressured section were vertically isolated by thin shale laminations and beds, and wells were recompleted through the whole pay interval, producing at or near

discovery pressure and rate in some instances.

Particularly intriguing to many E&P professionals are "wet" zones that are, in fact, low resistivity pays.

"The 'X' sands added about 1,000 barrels a day in just one well from a low resistivity zone," Sneider said. "The conventional pay went to water 11 years earlier in the 9,500 ft. 'X' sands in this interval.

"We drilled and cored a new well, and the high resistivity zone that had gone to water began producing," he added, "suggesting it had previously coned water."

The original pay zone gave up about 300,000 barrels of oil before watering out again, and the low resistivity interval is still producing without significant water.

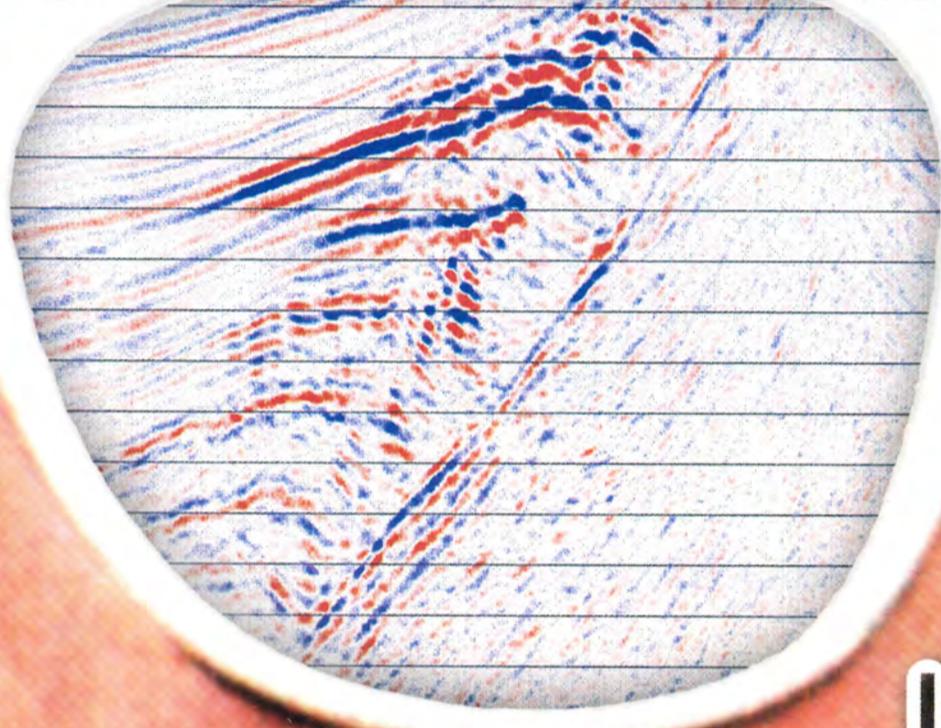
Development of the low resistivity pay added 14 million barrels of proved oil reserves, and newly-identified low resistivity pays in several intervals doubled the proved reserves in the field.

Numerous deep opportunities in the field have been identified using a new 3-D seismic survey run in 1994-1995.

"We expect development over the next few years to increase production to over 11,000 BOE per day," Sneider said. "This will be through field extensions and in newly-defined prospects in the deeper geopressured reservoirs."

– LOUISE S. DURHAM

Prospects Before the Texas Lease Sale?



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TGS-NOPEC Geophysical Company has recently processed approximately 22,000 miles of 2D data on the offshore Texas shelf. This phase 48 project includes a 1x1 mile grid of seismic data and a regional AVO Project.

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For additional information on this project, please contact your marketing representative at 713-860-2100. For information on other TGS products please visit our website at www.tgsnopec.com.

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G E O P H Y S I C A L C O M P A N Y

continued from previous page

AAPG continues today."

He doesn't just learn; he teaches, too.

AAPG has provided a forum for Sneider to give back to the industry, and he has taught many courses for AAPG and served multiple stints as a distinguished lecturer.

"The courses I have taught have in large part been my way of paying back the men who have helped me so much through my life," he said. "People ask me why I tell people how I find hydrocarbons. I tell them I think it's important to pass along that knowledge for the greater good of society."

Reflecting on his career, Sneider has four pieces of advice for young petroleum geologists:

- Learn the fundamentals.
- Expose yourself to people who have been successful at finding hydrocarbons.
- Spend time continuing to educate yourself.
- Give back to the industry that gives you so much.

"I agree with Michel T. Halbouty's remarks in the December 2000 EXPLORER special issue ("A Century"), when he said, 'The heritage left us by the early petroleum geologists have been ignored and practically forgotten. Those geologists should be remembered not only for their achievements, but also for having been well-rounded, true geologists who applied all facets of our science to their endeavors.

Their methods and contributions should be dusted off and restudied, and once again used as guideposts for our future thinking." □

*Grand Canyon Provides a 'High'***Something New Learned Every Trip**

"We are now ready to start on our way down the Great Unknown ... We are three quarters of a mile in the depths of the earth, and the great river shrinks into insignificance as it dashes its angry waves against the walls and cliffs that rise to the world above; the waves are but puny ripples, and we but pygmies, running up and down the sands or lost among the boulders ..."

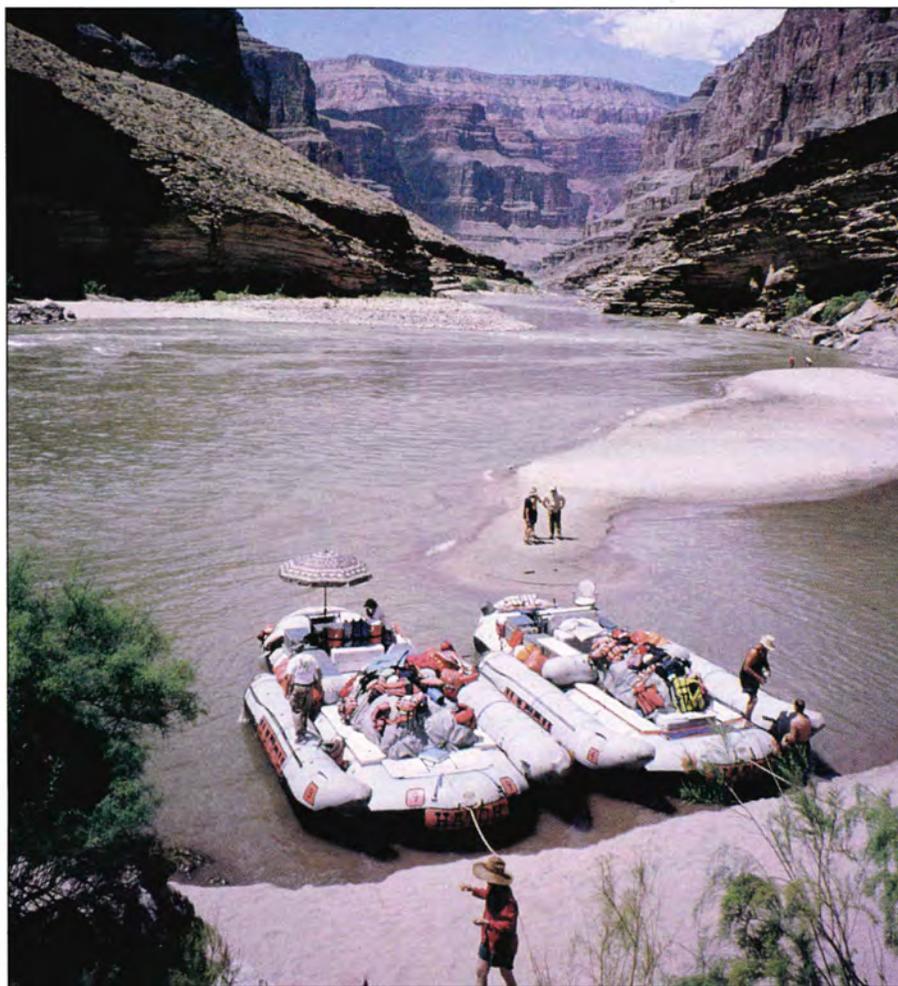
We have an unknown distance yet to run, and an unknown river to explore. What falls there are, we know not; what rocks beset the channel, we know not; what walls rise over the river, we know not. Ah well! We may conjecture many things. The men talk cheerfully as ever; jests are bandied about freely this morning; but to me the cheer is somber and the jests are ghastly."

John Wesley Powell
Near the confluence of the
Little Colorado River
August 13, 1869

By LOUISE S. DURHAM
EXPLORER Correspondent

Steve Sonnenberg has a superlative idea for unwinding after completing his stint as general chairman of the AAPG annual get-together in Denver: Spend eight-plus days rafting down the Colorado River through the Grand Canyon.

That's the plan, and he'll have plenty of company.



Photos by John Warme

Lunch on a Colorado River beach: The food's good, but man, what a view.

Sonnenberg and colleague John Warme, professor of geology and geological engineering at Colorado School of Mines, will be leading 28 adventurous souls on a post-convention AAPG field trip that will trace much of the route of the legendary John Wesley Powell expedition of 1869, through the Marble Canyon and Grand Canyon of the Colorado River.

This is excursion number 29 for Warme, who made his first trek along this route exactly 100 years after Powell, in 1969.

The group will begin its tour in the Triassic-age rocks and work down through the geologic section to the Pre-Cambrian igneous and metamorphic basement rocks and sedimentary series.

The trip-leading duo is enthusiastic about bringing together participants at all knowledge levels

"We emphasize the geology, biology and archeology of the canyon," said Sonnenberg, who will be making his tenth foray into the Canyon. "We study such things as the riparian community along the river, and look at evidence of the Anasazi dwellings as they occur in the area."

Because the area's world-class geology is laid out in a continuous exposure, it's relatively easy even for the novices to grasp the scientific aspect of what they're seeing.

See **Grand Canyon**, page 34

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Participants in the Colorado River-Grand Canyon Geotour are treated to a plethora of visual treats, from local residents (left) to the glory of a majestic sunrise.

Grand Canyon

from page 32

And for the trained geologist, the two leaders like to take it as far as they can, getting into the details of the geology.

"We look at depositional systems represented by formations, and look at the important boundaries," Warne said. "The big thing now is sequence stratigraphy, so we look at these things from a certain standpoint: Where are the sequence boundaries? What do they look like? How do you identify them? Are they obvious or subtle?"

"It's a renewal for me each time I go," he said. "I always discover new things either on my own or from other people – even the boatmen."

"I've even had some people tell me later that the trip actually altered their lives – always for the better."

The Great Outdoors

These tours are much more hands-on than merely discussing and ogling the geology while rafting along the river. Hiking trips into the side canyons enable the participants to get a true feel for the enormity and variety of the surroundings. These canyons tend to look the same from the river, but each has its own character – vegetation, color, hues, shadows, waterfalls.

Over the course of the 188-mile trip, experienced boatmen will drive the motorized boats about 25 miles/day, on average. Come nightfall, they "lay anchor" right at a beach, where the moon and stars provide the "roof" for the overnight quarters.

The rocky beaches that proliferate in the lower canyon occur at the side canyon mouths where debris is carried out by flash floods. The river narrows as the process forces it to the canyon's other side.

Daytime temperatures hover around 100 degrees in the summertime, and Warne likens these beach environs to the California and Nevada deserts – a marked contrast to the pinion and ponderosa forests that proliferate on the canyon rim, about 5,000 feet higher.

But don't compare the outdoor overnights to roughing it on some of the old college field trips.

The boatmen and their assistants, called swappers, set up a kitchen

continued on next page

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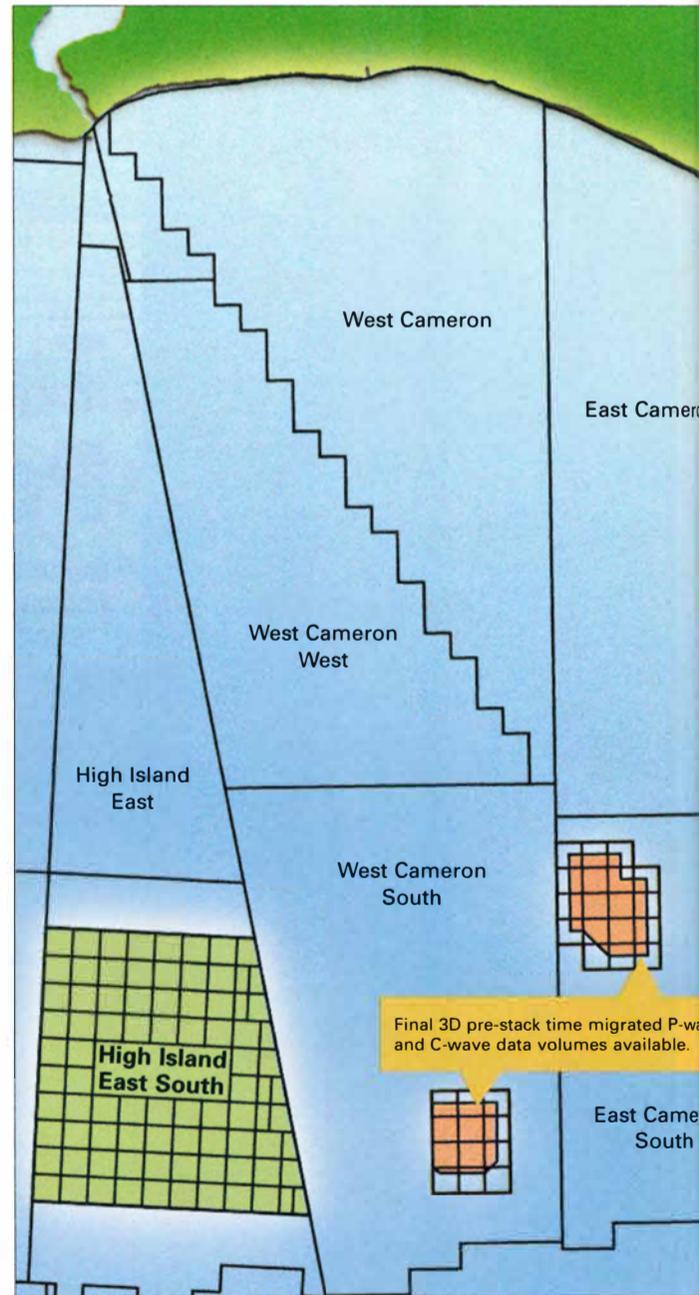


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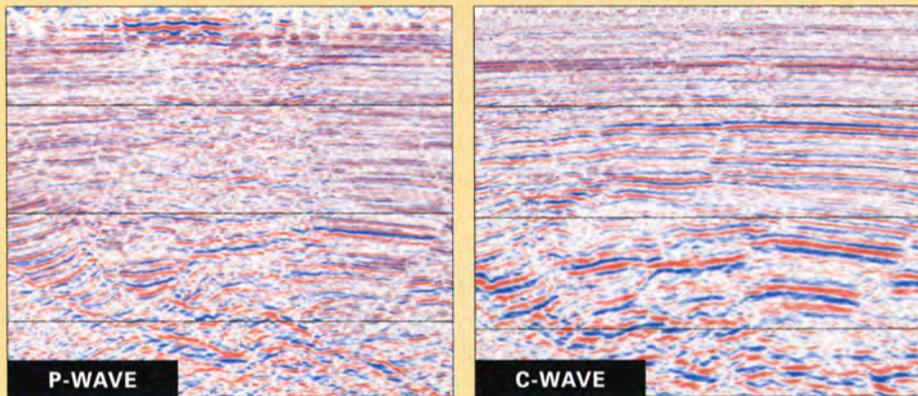


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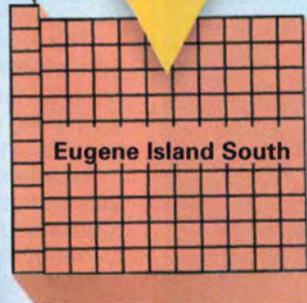
About that river: View downstream across Hance Rapid (left) and into the entrance to the Inner Gorge, where tilted Precambrian sedimentary series is cut by horizontal Paleozoic formations up to the rim (in distance). Right, the Lava Falls rapid.

4C DATA VOLUMES DELIVERED IN DECEMBER 1999!



Using an orthogonal shooting design, PGS shot and processed 4C data over the West Cameron South and East Cameron South areas. The ability to clearly image through gas clouds is evident in this comparison of conventional P-wave imaging and PGS' converted-wave imaging. Further information on the benefits realized from these data can be found in SEG 2000 presentations MC 1.7 and MC 1.8.

ACQUISITION UNDERWAY



continued from previous page

each evening and cook up some gourmet-type cuisine. Think late-afternoon hors d'oeuvres, followed by dinners of steak, shrimp, stir-fry and south-of-the-border repasts – complete with margaritas.

There are no four-posters, but you can stretch out on a comfy sleeping pad – which will be much appreciated after certain days on the River.

Thrill Ride

On average, there's about one rapid per mile of river. While most of these are mild, the trip leaders say about 25 are the kind where the boat travelers want to hang on, about 8-10 are "significant", and maybe five get "pretty serious."

After some initial apprehension on the part of some members of the party, things loosen up and the crowd begins anticipating the next "big one."

Warne emphasized he's done little of his own research in the Grand Canyon, but he currently has a master's degree-candidate student, Jill Savage, conducting a research project there. The effort is focused on the big landslide deposits in the Surprise Valley, which may be an old course of the Colorado River.

Surprise Valley is an incised valley system that lies parallel to the Colorado River and over a mountain range. It's between Thunder Spring, which runs into a big creek on the downstream side, and Duttons Spring, which feeds Deer Creek, probably the largest waterfall in the canyon.

Landsliding is the major process that widens the Grand Canyon, and the landslides in the Surprise Valley come from a series of big listric faults. The valley is filled with rotated landslide blocks, and Warne said they are attempting to work out the geomorphologic history.

A series of landslides dammed the river, pushing it to the side, and once the dam was overtopped, the river cut through. Savage hopes to document where the course of the river was and how far it was pushed aside.

"We're also studying fresher landslides downstream from these that could be reactivated, creating a hazard," Warne said. "The two areas almost touch."

Studies like this are invaluable as a means to help define the history of the Colorado River and the Canyon's origins, which is a subject of continuing controversy among the experts – and the spark that ignites endless discussions for those who float by. □

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*Public Lands Forum Has Varied Viewpoints***Spotlight Shines on Access Debate**

By KATHY SHIRLEY

EXPLORER Correspondent

Rolling blackouts. Astronomical gas bills. Dramatically higher gasoline costs.

In the United States, a country where the population has long taken for granted the availability of abundant energy at reasonable prices, the last few months have been something of a culture shock.

Of course, all kinds of different issues have arisen from the energy situation of 2000-2001, but one of the most important debates certain to get

"Public Lands Access," the first-ever joint DPA, EMD and DEG forum will be held Monday, June 4, from 3-5 p.m. during the AAPG annual meeting in Room C201/205/207 of the Colorado Convention Center.

its fair share of attention is access to public lands for energy resource development.

AAPG will address this important issue during the annual meeting in Denver. Public lands access will be the topic of the first joint DPA, EMD

and DEG forum set for Monday, June 4 from 3-5 p.m.

Lee Gerhard, principal geologist of the Kansas Geological Survey, will chair the forum. Speakers will include:

□ Jeffrey Eppink, vice president of Advanced Resources International, a consulting firm in Arlington, Va., that conducts resource assessment analyses.

□ Victor J. Yannacone Jr., a trial lawyer and environmental attorney in New York who was one of the founders of the American environmental movement.

□ Rocky Smith with Colorado Wild.

□ Diemer True, a partner in True Oil Co., Casper, Wyo., and vice chairman of the Independent Petroleum Association of America.

Gerhard said the forum panel represents four different points of view that should give convention delegates insight into the positions of varying slices of the population.

The forum will tackle issues surrounding supplying the nation with required resources, and the environmental and esthetic impacts of resource development.

One important issue that will be addressed is the national mandate to produce more natural gas while restricting access to a major portion of the resource base and how a resolution of this issue could be part of a national energy supply policy.

Gerhard was instrumental in choosing this volatile topic for the joint forum.

"This is a national issue that's come to the forefront in the midst of the most hotly contested election in our country's history and during some very interesting times in the oil patch," he said. "A 1999 report by the National Petroleum Council, which is an advisory body to the Department of Energy, indicates that vast amounts of potential natural gas resources are locked up on public lands that are not currently accessible.

"In an era when the demand for natural gas is skyrocketing due to environmental considerations, it's ironic that important new gas supplies are inaccessible because of environmental issues."

'Not a Binary Decision'

Jeff Eppink has quite a bit of experience in the whole issue of access to public lands for resource development.

Eppink was responsible for researching the public lands access portion of the NPC's 1999 study on natural gas, and he said there are about 137 trillion cubic feet of potential natural gas reserves in restricted areas today. Also, last fall his company examined the oil and gas resources associated with roadless areas the Clinton administration proposed.

The study indicated that about 80 percent of the natural gas resources on these lands could be captured by exempting or adjusting just five percent of the roadless lands.

He presented those findings to administration officials, but the roadless rule was passed in January. Currently Eppink and his firm are involved in resource assessments and access to those resources in a follow-up to the NPC 1999 study.

"I think the nation owes it to itself to make decisions based on the best information available and not in a vacuum," Eppink said. "The public needs to know the impact of access restrictions on resource development – and then if the nation determines to keep those resources inaccessible, at least the decision was based on information about how that decision will impact the marketplace.

"The nation owes it to itself to

continued on next page

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New Ideas for New Frontiers

continued from previous page

assess what resources are on restricted lands before a decision is made," he continued. "Then, if the ultimate decision is to deny access to these lands, to be aware that there is a supply consequence to that decision."

Eppink said that "we are witnessing the constraints of supply in the United States as evidenced by high prices of natural gas these last few months."

"Part of that is a legacy of the steep downturn in the energy industry in 1998 and 1999," he said, "but even though drilling has dramatically increased in the last year and a half or so we are not seeing a significant production response with respect to natural gas. Part of the reason for this situation is that we are probably focused on regions that can't make a significant impact."

"For example, the shallow Gulf of Mexico is experiencing declining production despite the industry's efforts. So, the implication is that the industry needs access to richer resources that can make an impact on the supply picture – and those regions tend to be the Rocky Mountains, the Eastern Gulf of Mexico and the Arctic National Wildlife Refuge."

Eppink pointed out that access is a broad term that can mean many things.

"When I say access I'm not just talking about physically being able to lease lands, but also issues of how restrictive leasing stipulations should be with respect to conducting operations on those lands," he said. "I do think access is needed, but the nation will have to debate what level that access should achieve."

"It's not a binary decision – should there be access or should there not be access."

The energy industry has made mistakes in its approach to this issue.

"In the past the public's reaction to the industry's position is in a binary sense," he said. "From the general public's perspective, when the industry says 'we would like access,' the implication is that companies want to drill in Yellowstone. Of course, that's not true, but the industry needs to do a better job of communicating its position."

In general, the oil industry is seeking access and fewer restrictions on federal lands that are already multi-use lands. Eppink believes that more access to these multi-use lands can help the industry bring to market "the 30 trillion cubic feet of natural gas the nation's going to need in 2010."

'Just Stop the Waste'

Rocky Smith with Colorado Wild takes a different view.

"I have been very active in the no new roads issue for years, and it pains me to see President Bush address the energy shortage by only focusing on the need for increased supply with apparently no thought to conservation," Smith said.

"The waste of energy in this country is astounding," he added. "I drive a car that gets 35 miles to the gallon and still gives me the level of safety I need, but the average car on the road today is not economical. Everyday I am passed by these huge sport utility vehicles that in the best of circumstances get less than 20 miles to the gallon – and the average person doesn't need that kind of automobile."

He said the forestry service can't manage the road system under its

See **Public Lands**, next page



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Public Lands

from previous page

auspices today, much less adding more roads. The forestry service has jurisdiction over a road system six or seven times the size of the interstate highway system.

"There ought to be some areas of this country where we don't have heavy influence from humans," Smith said. "If you don't think the influence of humans is tremendous, in 1970 it was discovered that there was traces of DDT at the North Pole.

"There are wildlife species that need freedom from frequent human disturbances," he continued. "A good example is wolverines, which have almost disappeared from Colorado.

Also, grizzly bears need space. When there is a conflict between a bear and humans it's always the bear that loses."

Smith also said that roads are "pathways for all sorts of things like weeds, disease and wildlife species that wouldn't ordinarily migrate into the backcountry.

"One of the biggest issues here in Colorado is competition for food sources with the lynx, which is on the threatened species list," he said. "The lynx has big feet and is able to live in the backcountry. Small footed carnivorous animals like coyote, fox and bobcats don't typically venture far back in the backcountry in winter – but when roads are cut it gives those animals access, and they compete for food with the lynx."

Smith said we need a national commitment to conserving energy and

eliminating the waste.

"I'm not talking about going back to a primitive lifestyle," he said. "Just stop the waste and use energy sensibly.

"Until we make this kind of commitment it's difficult to get behind opening up additional public lands to development," he said.

"What are we leaving our children and grandchildren in 30 to 70 years?"

'Reasonable Access'

Add next to the mix Diemer True, also a resident of the Rocky Mountains, who has yet another view.

"If we're going to have a reasonable domestic source of energy, that's going to require reasonable access to develop resources on public lands," True said. He cited "a number of studies" that

show the amount of leasing done on public lands has dropped about 60 percent over the preceding 10 years. The NPC gas study indicates that access to a substantial amount of the natural gas resources of the United States is currently unavailable or severely limited.

"There is so much misunderstanding in the general population about this issue," he said. "We are not going to conserve our way out of this supply shortage. The fact is the public has demonstrated they like their SUVs and air conditioning in the summer."

True agreed with Eppink that much of the access issue is centered on multi-use lands, not national parks and wilderness areas. One example he cited is the Powder River Basin, where operators have been developing an enormous coalbed methane resource.

Companies are currently shipping about 500 million cubic feet of natural gas a day from this coalbed methane play – about half of what the industry could be producing if a moratorium on applications for permit to drill had not been imposed by the Bureau of Land Management.

In addition, True said that in the court of public opinion the petroleum industry isn't recognized for the advancements made in mitigating the environmental impact of operations.

"The industry hasn't done a very good job of promoting the significant improvements in the area of environmental protection," he said. "It's now part of the industry culture to take great care in minimizing environmental impact, but we are losing in the court of public opinion – and public policy will follow public opinion.

"We're not going to convince the public that we can have responsible access to public lands until they are satisfied that we will be responsible," he said, "but our detractors never acknowledge that."

He added that higher energy prices will have an impact on public opinion, but the misconception that price hikes are the fault of price gouging oil companies persists.

"If that kind of rhetoric takes hold we will see re-regulation of the industry, and then we will become an industry that doesn't react to the market and increase supply, but an industry that hunkers down and takes the bunker mentality," he said.

"The question is, how high will prices have to go before the public changes its view on access to public lands?"

'Find a Common Ground'

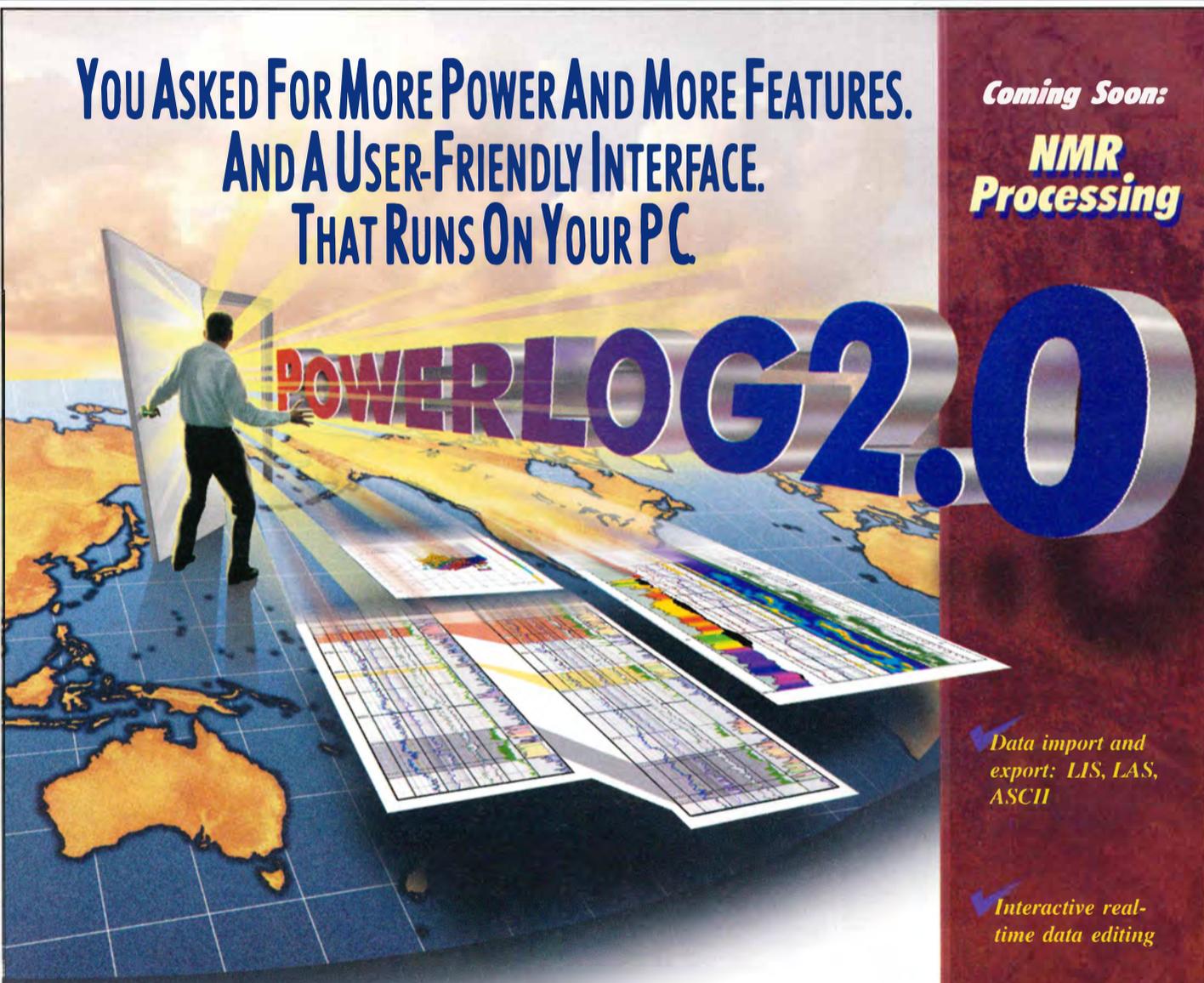
Victor Yannacone, a founder of the Environmental Defense Fund and counsel for Vietnam veterans in the agent orange case, said he has been an advocate for ecologically sophisticated, environmentally responsible, socially relevant, economically rational and politically feasible land use legislation and natural resource regulation since the 1960s.

He hasn't seen much success. "The future of industrial civilization depends on managing the limited amount of prime agricultural soil and resources we must take from the earth to sustain human civilization," Yannacone said.

"Unless the broad spectrum of geoscience knowledge and the record of geologic history as expressed as arable land and habitable landforms

continued on next page

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and the rich varied resources that we take from the earth to create the artifacts of our uniquely human civilization are managed wisely with a view toward continued evolution of civilization through succeeding generations, our human civilization today will suffer the same fate as Mesopotamia, Egypt and other barren lands of the earth that were once fertile centers of human activity," he said.

According to Yannacone, the recovery of mineral resources such as oil and natural gas from environmentally sensitive areas like the oceans and seas must be accommodated – but E&P companies must recognize the fragile environment in which they operate.

"There is no room for carelessness or cavalier disregard for the rights of generations to come," he said.

"The same is true for mining on land," he continued. "Landforms exist because of geologic processes that have occurred over time far longer than human existence. This timeline must be respected. These minerals exist to support our civilization and nourish our culture, but the minerals must be taken carefully and their real value to society recognized.

"The principle problem that earth scientists throughout the world face is a lack of public awareness and political concern for the earth as a dynamic general business," he added. "The education of our children in public schools throughout the world and the education of adults via the media is substantially lacking in good science and good government. The political process, which Aristotle called the highest expression of human activity, has been debased by short-term considerations to such an extent that good people who have the potential for becoming great leaders and statesmen shun the political process.

"Earth scientists have to recognize that they must become part of the political process if there is ever to be a credible scientific basis for popular legislation."

Yannacone sees the issue of public access to federal lands – and other environmental issues – populated by extremism on both sides.

"Now that I'm older and wiser," he added, "I think we must work together to find a common ground."

* * *

Gerhard believes that "we have for the first time in our industry achieved a point of departure, where people have to make a decision as to what level of environmental preservation, aesthetics and recreation they need as compared to energy they want for the style they want."

He said we have the resource base, but we have to determine whether we have the political will to access that resource base.

"I think it's an absolutely engaging topic, and the American people should be engaged in the debate," Gerhard said.

"I think this forum is an opportunity to get the public involved so they can make up their minds based on real information," he added. "We can offer scientific information." □

Schedule of Key Meeting Events

Saturday

7:30 a.m.–5 p.m. – Registration
8 a.m.–4:50 p.m. – SEPM Diamond Jubilee Symposium

Sunday

7:30 a.m.–8 p.m. – Registration
8 a.m.–12:20 p.m. – SEPM Diamond Jubilee Symposium
4–5 p.m. – Opening Session and Awards Ceremony
5–8 p.m. – Exhibits; Icebreaker Reception

Monday

7:30 a.m.–5:30 p.m. – Registration
8 a.m.–noon – Oral Sessions
8:30 a.m.–12:30 p.m. – Poster Sessions
8:30 a.m.–5:30 p.m. – Exhibits

11:30 a.m.–1:30 p.m. – All-Convention Luncheon
1:25–5 p.m. – Oral Sessions
1:30–5:30 p.m. – Poster Sessions
5:30–7:30 p.m. – All-Alumni Cocktail Party
6:00–9:00 p.m. – Student Meeting and Reception

Tuesday

7:30 a.m.–6:00 p.m. – Registration
8:00 a.m.–noon – Oral Sessions
8:30 a.m.–12:30 p.m. – Poster Sessions
8:30 a.m.–6:00 p.m. – Exhibits
11:30 a.m.–1:30 p.m. – Division of Professional Affairs/Energy Minerals Division Luncheon
11:30 a.m.–1:30 p.m. – SEPM Business Meeting/Luncheon

Wednesday

7:30 a.m.–noon – Registration
8 a.m.–noon – Oral Sessions
8:30 a.m.–noon – Poster Sessions
8:30 a.m.–noon – Exhibits
11:30 a.m.–1:30 p.m. – Division of Environmental Geosciences Luncheon
1:25 p.m.–5 p.m. – Oral Sessions

1:25–5 p.m. – Oral Sessions
1:30–5:30 p.m. – Poster Sessions
4:30–6 p.m. – Mini-Breaker Reception
6:30–8:30 p.m. – SEPM President's Reception and Awards Ceremony
7–10 p.m. – "Ocean Journey," social activity at "Colorado's world-class aquarium."

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She's Looking Out for Us



Shoemaker

By DAVID BROWN
EXPLORER Correspondent
Carolyn Shoemaker built a successful career as a mother, wife and homemaker. Then, when her children were grown, she decided to start a new career after age 50.

And she became one of the leading scientists in her field.

Today, Shoemaker is an internationally known astronomer, the discoverer of 32 comets and more than 800 asteroids.

She is on the staff of Lowell Observatory in Flagstaff, Ariz., and a volunteer in astrogeologic studies with the U.S. Geological Survey.

She may be best known as co-discoverer of the Shoemaker-Levy 9 comet, which struck Jupiter in July 1994, but her work ranges from meteorite studies to investigation of ancient impact structures.

Shoemaker will present the inaugural Michel T. Halbouty Lecture on June 4 at the 2001 AAPG annual meeting in Denver. In her presentation, "Through a Crystal Ball," she'll examine a subject of potentially Earth-shattering importance.

"There was a time (when) people here on Earth thought the planets were surrounded by crystal balls and nothing could penetrate that," she said.

"It doesn't take a crystal ball to tell us we're going to be hit by a comet or an asteroid of varying (possible) size."

That's a likelihood – but not a prediction of catastrophe, she quickly added.

"A lot of people say 'Impact! We're going to be destroyed!' – à la the impact at the Cretaceous boundary," she said. "But those don't happen very often."

When astronomers detect and track objects in space today, they can predict the odds of an Earth collision using powerful computer models. The occasional report of impending doom should be dismissed as heaven-high hype, according to Shoemaker.

"Thanks to some sophisticated computer technology, we can say, 'Yes, it's possible that this certain object of a certain size will impact the Earth at some time,'" she noted.

"The trouble is, everyone who spots one of these things reports it to the Minor Planet Center in Cambridge, Mass. They put these on the Web, and when the media get a hold of something without time for confirmation, they run away with it."

Lead times for predicting a possible Earth strike should provide plenty of opportunity to do more than duck. She said the length of time between a first warning and an actual impact would be "desirably, 50 years, but 20 years isn't bad."

Astronomers work in a timeframe of 100 years or more in tracing near-Earth orbit (NEO) objects, she noted. According to NASA, the chance of any presently known NEO hitting Earth in the next 100 years is negligible.

Chapter Two

Shoemaker was married to famed geologist and AAPG member Eugene Shoemaker, who founded the USGS astrogeology center in Flagstaff. Her husband died in an automobile accident in July 1997. Shoemaker herself was injured in the crash, which occurred during the couple's annual trip to study impact craters in Australia.

Over a 13-year period, the two had

studied more than 20 impact structures there, mapping them, doing magnetic and gravimetric surveys, searching for impact glass and meteorites – doing whatever had not already been done by the Australians.

By the end of that period, other impact structures, some subsurface, were being found in the course of drilling for oil. Among those were the Tookoonooka and Tidibilly craters.

Her career in astronomy began in 1980, after she asked her husband to suggest a pastime.

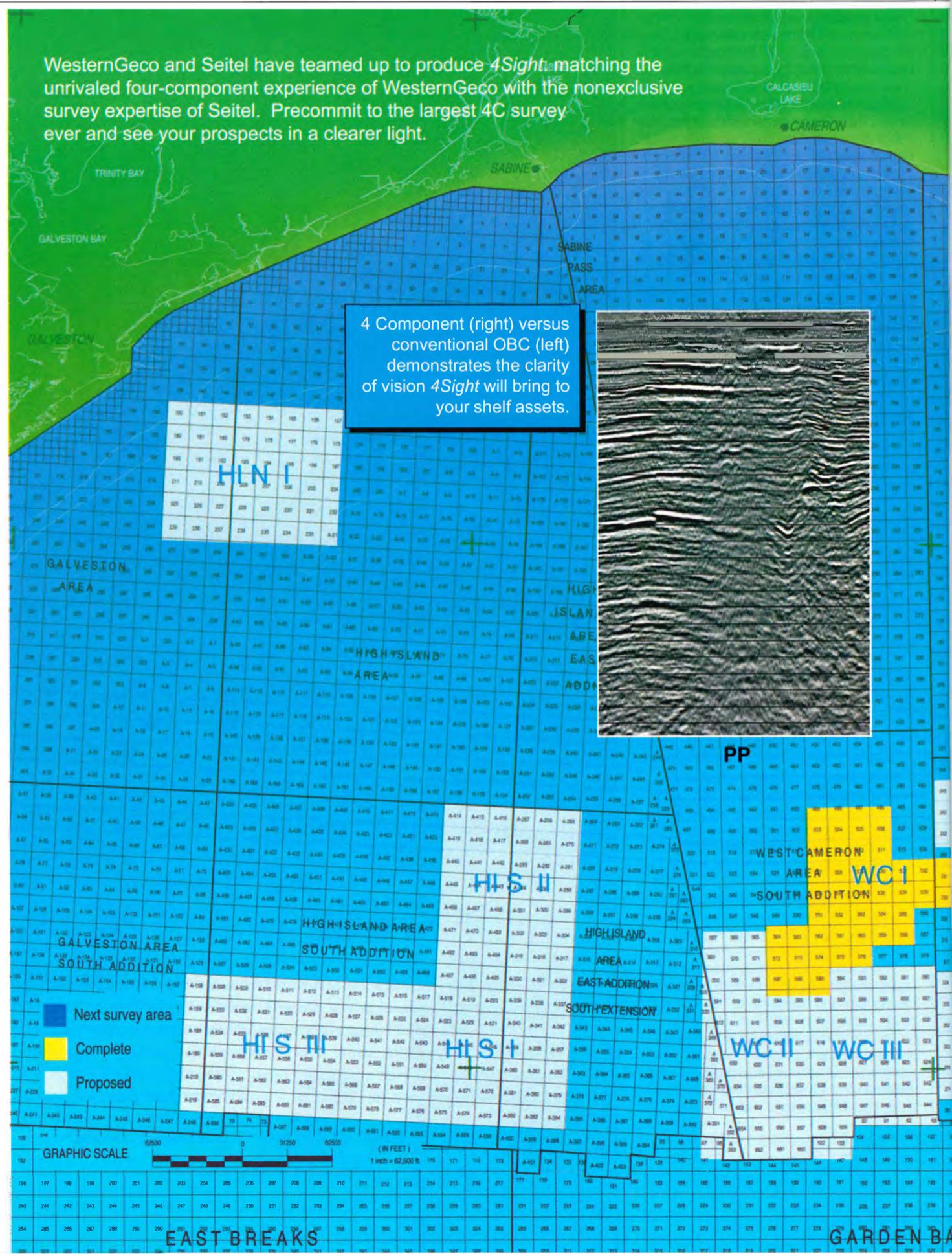
"It was not until our children left, the three of them, that I turned to my

husband, Gene, and said, 'Do you have anything that would interest me the same way geology interests you?' That's like, 48 hours a day," she recalled.

As it happened, he was looking for help in a search for objects in space that might intercept Earth's orbit, "especially things that could have a chance to hit Earth."

Shoemaker majored in history and political science at Chico State College in California, where she was a cum laude graduate in 1949 and received a

continued on next page



Special Forums Set in Denver

Carolyn Shoemaker's lecture, "Through a Crystal Ball," is one of four special forums planned for the AAPG annual meeting in Denver.

Shoemaker's talk will be the inaugural lecture in the newly established Michel T. Halbouty Lecture series, an annual event made possible through a gift from Halbouty to the AAPG Foundation.

Her lecture will be presented at 5:10 p.m. Monday, June 4, in Ballroom 1 of the Colorado Convention Center.

Other forums planned for the annual meeting are:

☐ **History of Petroleum Geology:**

Petroleum-Geology History in Selected States, moderated by Gerald Friedman, will be held from 1-3 p.m. Sunday, June 3.

Four states seen through the eyes of state geological surveys – Oklahoma, Kansas, New York and California – will be examined as examples of the history of petroleum geology.

☐ **Public Lands Access**, chaired by Lee Gerhard, will be held from 3-5 p.m. Monday, June 4, in Room C201/205/207 of the Colorado Convention Center.

This is the first joint DPA, EMD

and DEG forum. (See related story on page 36.)

☐ **Applied Sustainability Forum: Integration of Metrics and Applications**, a DEG forum chaired by Earl Beaver and Beth Beloff, will be held at 8 a.m. Wednesday, June 6, in Room C102/104/106 of the Colorado Convention Center.

The forum will focus on presenting innovative, state-of-the-art sustainability tools and the application of these into business decisions.

continued from previous page

master's degree in 1950.

Faced with the possibility of entering a completely different field 30 years later... she jumped at it.

And she jumped into her new career, as well. She became a research assistant at the California Institute of Technology and then a research professor of astronomy at Northern Arizona University, where she earned a doctorate in science in 1990.

With Eugene Shoemaker, she has been honored with numerous medals and awards for science and research during the past 14 years. In 1996, she became a Fellow of the American Academy of Arts and Sciences and received NASA's Exceptional Scientific Achievement Medal.

She has found or co-discovered more comets than any other living astronomer. Of the more than 800 asteroids she has discovered, more than 300 are officially designated with numbers.

Shoemaker also developed new stereoscopic techniques for scanning films at the Palomar Observatory in California. Those techniques more than doubled the potential rate of sky coverage of the observatory's 46cm Schmidt camera.

Craters – and Oil Potential

Despite recent knee-replacement surgery, her work goes on at a fast pace. She continues to hunt for comets with associate David Levy, the Canadian-born astronomer, journalist and lecturer, who also lives in Arizona.

"It's still the old-fashioned technique of photography," she said, "but we can look close to the sun to avoid the other sky surveys."

In addition to staking out their own expanse of sky, the near-sun approach gives them a decided advantage in comet gazing: That's where comets glow most brightly, Shoemaker noted.

Another continuing project is finishing her husband's papers and research reports. That involves working through "a big backlog of Australian crater work," gathered by them during their 13 years of field trips, she said.

She thinks the cratering work will interest petroleum geologists, since impact craters indicate a possible oil reservoir. About 25 percent of the Earth's impact craters are associated with economic resources of some kind.

"Quite a number of the craters have been discovered in Australia and also in the United States that are subsurface and are oil bearing," she said. "When there is an impact, the area beneath the impact is full of brecciated, broken-up rock, and it's a good, good reservoir."

Most impact craters share similarities, according to Shoemaker. Large structures typically have a central uplift or peak, and may show several ring depressions, what she called a "rock into mudpuddle" spreading pattern.

Yet the craters are different enough to reward individual examination.

"Each structure we've studied has something new to offer," she said.

Catch a Falling Star?

Advances in space exploration are bringing new mysteries for Shoemaker to ponder. During the past year, she observed the results of NASA's Near Earth Asteroid Rendezvous mission.

NASA named the mission's space probe NEAR Shoemaker in honor of Eugene Shoemaker, who had long

See **Shoemaker**, page 43

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'Monsters' Were in Colorado

Ridge Trippers Can See Evidence

By DIANE FREEMAN
EXPLORER Correspondent

Some 150 million years ago herds of dinosaurs – Stegosaurus, Diplodocus, Apatosaurus, Allosaurs and Camarassaurus – once roamed the edge of an ancient seaway running through Colorado before the Rocky Mountains formed.

These dinosaur tracks can still be viewed just outside Denver at the popular Dinosaur Ridge site in Morrison, Colo, where more than 300 footprints of plant-eating and meat-eating dinosaurs are located.

Visitors from all over the world come to get an intimate look at the bones and tracks of dinosaurs – so many, in fact, that Dinosaur Ridge is about to get even bigger.

The site has drafted a five-year master plan to enhance the site for visitors at a cost of about \$6 million, says the president of the Friends of Dinosaur Ridge, a volunteer organization that supports the site.

Those plans call for a new two-story visitors center along with a closed entrance, seating and canopies next to interpretive sites and other improvements to preserve the facility.

Joseph Tempel, president of the Friends of Dinosaur Ridge, a volunteer group that supports the site, shared those plans recently in a talk to the Rocky Mountain Association of Geologists in Denver. RMAG has helped fund the master plan, and

Dinosaur Ridge will be the destination of not one but two field trips during the AAPG annual meeting in Denver.

The first, "A Geological Reconnaissance of Dinosaur Ridge and Vicinity," will be held Sunday, June 3, from 8 a.m.-4 p.m., led by AAPG members (and Friends of Dinosaur Ridge directors) Norb Cygan, Bob Reynolds and Duff Kerr. The \$70 cost includes transportation, drinks, lunch and a guidebook.

several of its members volunteer their time at the center, providing tours and other assistance.

Tempel, who heads up the Colorado Department of Transportation's modal programs, plans to retire from his day job this spring and devote his entire time to helping run Dinosaur Ridge.

The site draws thousands of visitors each year to examine dinosaur bones, tracks and other fossils. Visitors can examine trace fossils and sedimentary structures including dinosaur tracks, plant impressions and ripple marks – and then learn how these clues help scientists interpret paleoenvironments.

The Friends of Dinosaur Ridge is dedicated to preserving these resources and educating the public about them.

A second trip, geared for spouses and children, will be held from 10 a.m.-2:30 p.m. Monday, June 4. The cost is \$35 for adults and \$15 for children under the age of 10, and includes transportation, drinks and a guidebook.

The Dinosaur Ridge trips are part of a field trip program planned for Denver that features more than 15 treks to a variety of locales. See the meeting announcement or contact the AAPG convention department for more information.

"I'm passionate about it," Tempel said.

Hands-On Involvement

Last year, some 70,000 people toured the site – many from outside the United States, according to Tempel. The Ridge also provided 15,000 tours to school children last year.

Of the 20 directors on the board of Friends of Dinosaur Ridge, seven are AAPG members – and 35 of the 125 guides at the site are AAPG members, officials said.

The Ridge was first discovered in 1877 by a clergyman and teacher who were taking geological sections and measurements on the banks of Bear Creek near the town of Morrison. The excavations that followed yielded the first major dinosaur discoveries in

the western United States.

Dinosaur Ridge is part of the Dakota Hogback, which parallels the mountain front west of Denver. Exposures of Cretaceous Dakota sandstone on the east side and of the Jurassic Morrison Formation on the west side are easily accessible from the road, making the area an outdoor showcase for geologic and paleontologic principles.

At the dinosaur bone viewing ramp, disarticulated bones of Sauropod and other dinosaurs are scattered in the sandstone. Although bones of dead animals usually deteriorate, these were washed into a river and buried so they have survived.

Although the fossilization process typically includes infilling of porous bone with various minerals, most of the Dinosaur Ridge specimens retain original bone material. Visitors can actually touch the bones.

Improvements Coming

Part of the site's future, however, depends on road development in the area.

"We need land, access and water with the new visitors center," Tempel said.

The facility already has 15 interpretive sites for visitors; its

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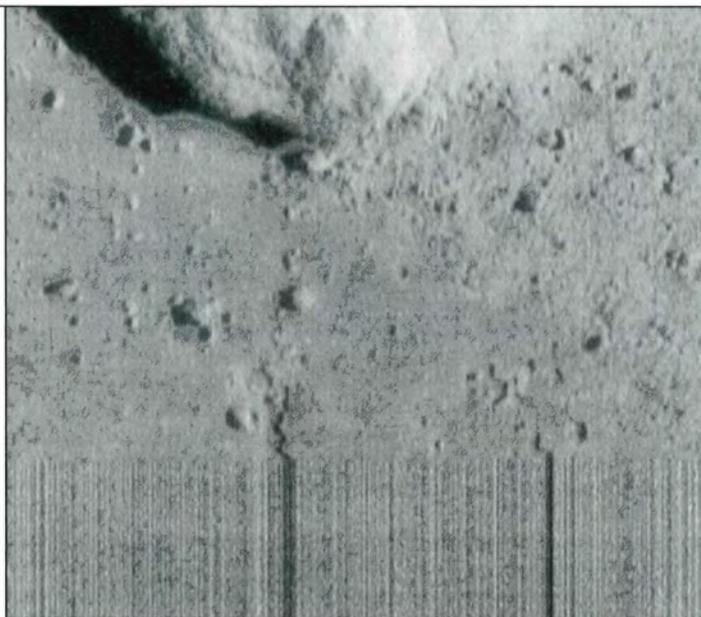
from page 41

spoken of the importance of a mission to an asteroid.

For one year, the probe orbited the asteroid Eros, 196 million miles from Earth, sending back about 160,000 images.

At the end of the mission, NASA officials decided to try a chancy maneuver – setting down NEAR Shoemaker on the surface of the 21-mile-long asteroid.

"I actually went back to the Advanced Physics Lab to see it go down," Shoemaker said. "I can tell you that the feeling of elation was just enormous."



The last image of asteroid 433 Eros received from NEAR Shoemaker was taken from a range of 394 feet and measures 20 feet across. The streaky lines at the bottom indicate loss of signal as the spacecraft touched down on the asteroid during transmission of the image.

While the controlled crash-landing of the NEAR Shoemaker craft made headlines, asteroid specialists puzzled over the information provided by the probe's abundant images. Shoemaker found that the data led to more questions than answers.

"One of the things that amazed us is that Eros had so many boulders of all sizes on the surface," she said. "Eros doesn't have much gravity, so what are all the boulders doing there?"

By her own description, Shoemaker also continues to work with the USGS as an "emeritus volunteer," mainly in impact crater studies. She feels she has no time to waste in her delayed second career.

"I don't have time to retire," she said. "I have too much to do, and not enough time." □

continued from previous page

"hallway of dinosaurs" will be expanded in the new visitors center.

Children particularly are fascinated by Dinosaur Ridge, since they are able to actually touch the resources there – unlike other facilities where attractions are placed behind glass, he said.

"They're up to 150 million years old. You're able to touch time," he said. "That's what we think is the beauty of the ridge."

Recently, the Friends of Dinosaur Ridge constructed a viewing tower with photovoltaic light so visitors can see the sites at night as well as in the daytime.

"People come out during snow storms and on rainy days and see the track sites," he said.

Under the master plan, a major road leading into the site will eventually be closed and a gate and kiosk will be placed at the entrance. "A bus will take people up and down the road, or they can walk," Tempel said.

Bicyclists will continue to be able to pedal up and down the road.

The road will be narrowed to allow the construction of a pedestrian path next to the interpretive signs. Seating areas also will be installed near the interpretive stops.

However, the closing of this road is several years away because it depends on the construction of an interchange to be built on a state highway.

Meanwhile, more overlook areas are slated to be built for visitors to offer a more intimate experience with the fossils, he said.

The new visitors center is currently being designed and could be shaped in a signature fashion that may include some of the form of a Stegosaurus, Tempel said.

The new visitor center will cover 20,000 square feet on two floors and include a gift store, a video viewing room, exhibit room and office space. The second floor eventually will house a café, additional retail space and storage space.

The current visitor center only covers 1,200 square feet, he said.

The Friends of Dinosaur Ridge are negotiating with a neighboring family to obtain the 5.25 acres needed for the proposed visitors center location. The center is expected to cost about \$3 million of the \$6 million needed for the improvements to the facility.

A barn located on the site will be renovated soon, Tempel added, to provide more office space for staff. □

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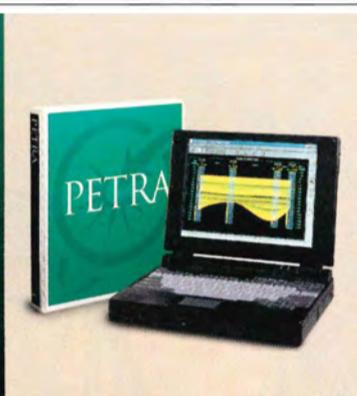
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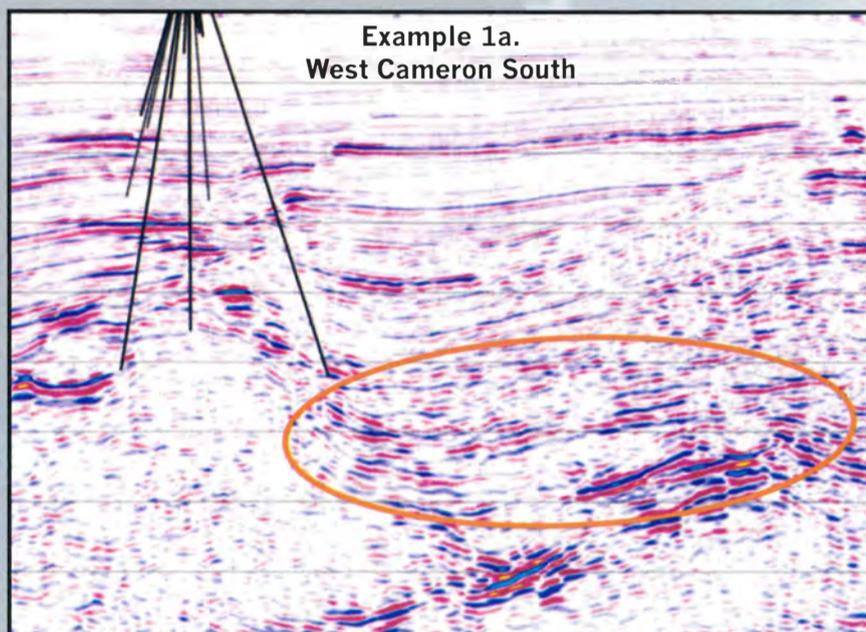
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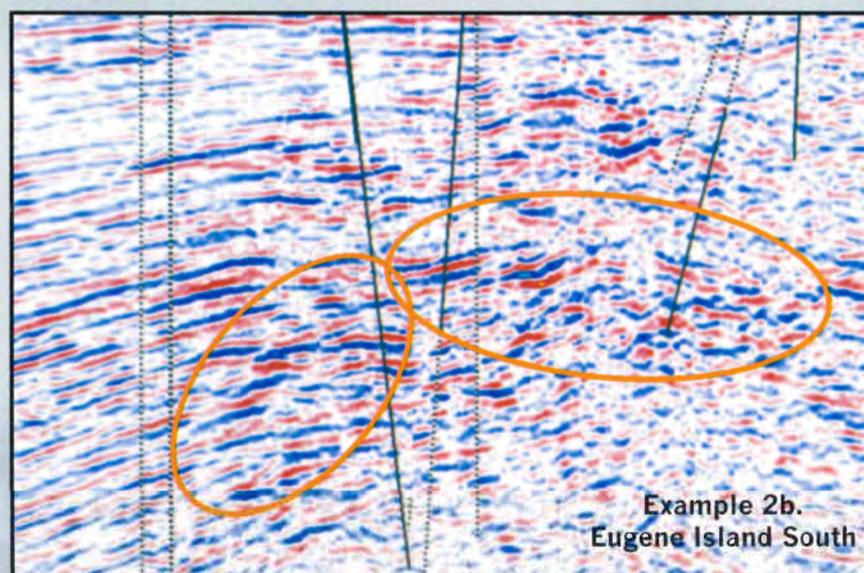
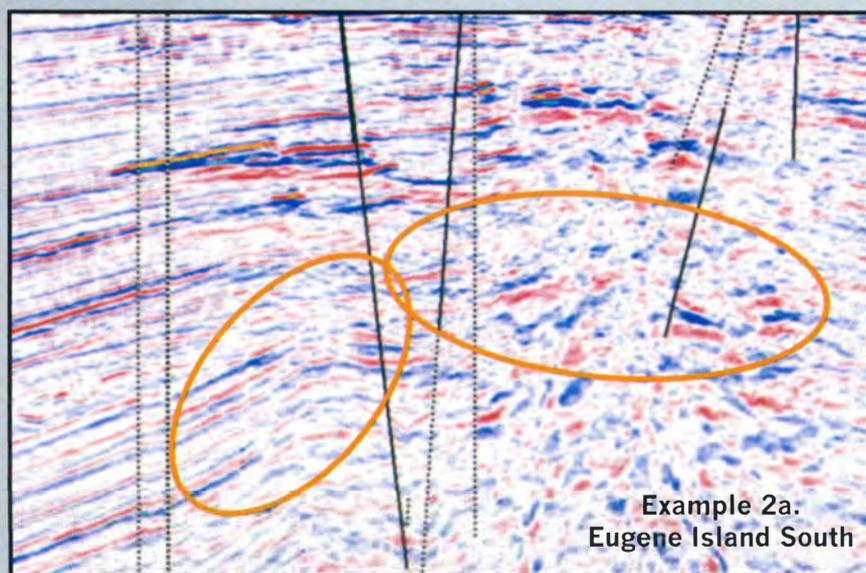
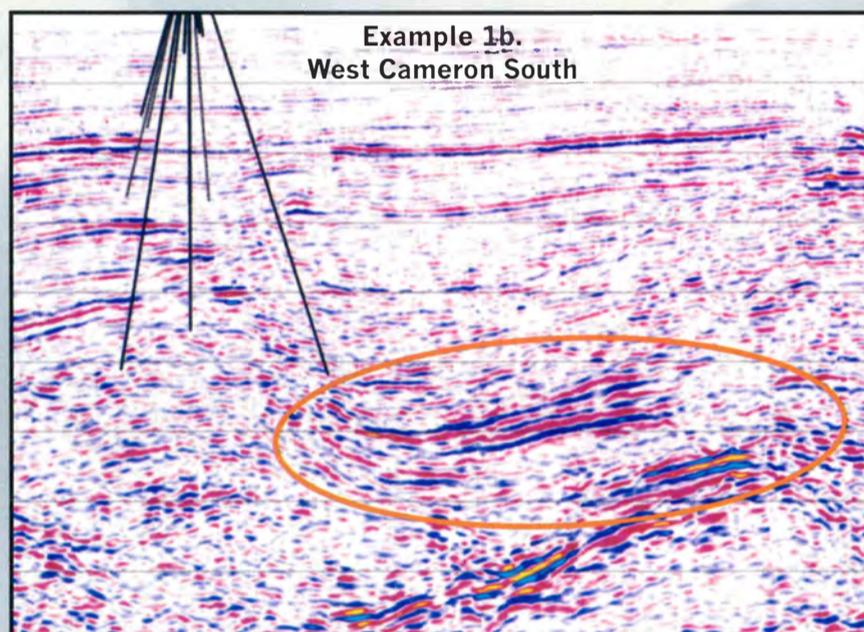
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3-D Conventional Amplitude Stack.



3-D Converted Wave (V_s) Stack.



These two examples identify new potential prospects in older areas deemed to be opportunity poor. It's like wearing night-vision glasses to see what others cannot!

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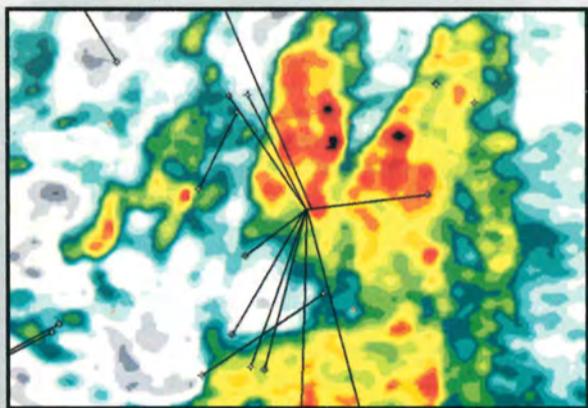
To Discuss These Money and Time Saving

Announce Two More Technologies!

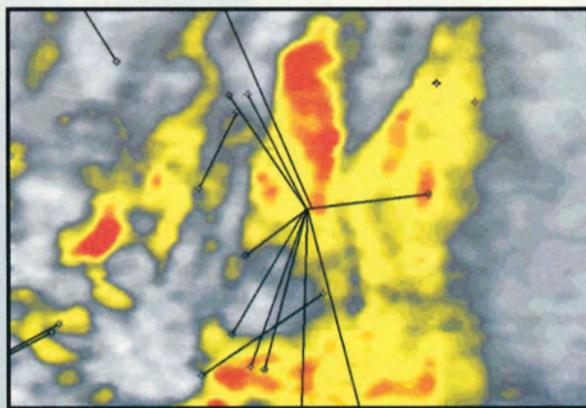
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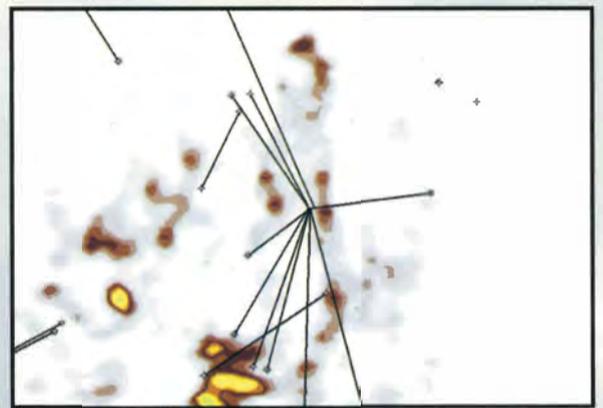
Example 1. Depleted/Non-Producing Field.



Conventional Amplitude Extraction.



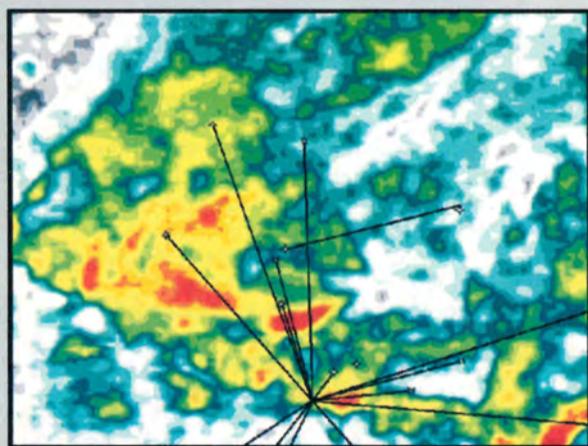
3-D AVO Strength.



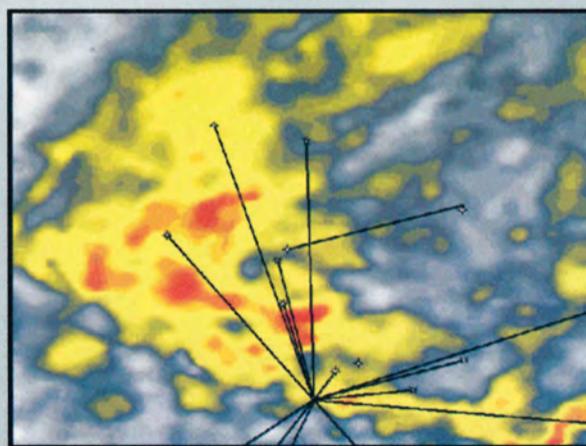
3-D Density Anomaly.

Notice this Older Non-Producing Field that went offline in the 1980's leaving behind residual gas. It still produces **(1) a strong Amplitude** and **(2) a strong AVO**, but because the hydrocarbons have already been extracted, there is **No Density Anomaly**, indicating a depleted reservoir! Wouldn't you like to know this for lease sale, farm-in, or field-development purposes?

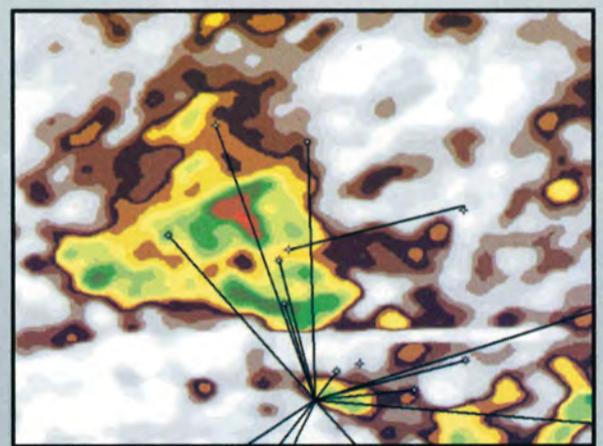
Example 2. Producing Field.



Conventional Amplitude Extraction.



3-D AVO Strength.



3-D Density Anomaly.

Notice this Producing Field shows **(1) a strong Amplitude**, **(2) a strong positive AVO**, and **(3) a Strong Density Anomaly!** The brown area represents the depleted zone, with the red, green, and yellow areas representing the remaining hydrocarbons. This reservoir monitoring tool can significantly expedite field development.

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That's the Question

Climate Is Changing – But Why?

By LOUISE S. DURHAM
EXPLORER Correspondent

When it comes to stirring up passionate feelings, romance can't hold a candle to the ongoing saga of global warming.

Not surprisingly, the climate controversy is once again a front-page news item, now that the new man in the White House has nullified the preceding administration's agreement to the 1997 Kyoto accords.

Under the pact, the United States would bear the brunt of reducing the

Kevin Trenberth's paper, "Global Warming is Happening," will be the lead-off talk in DEG's technical session on "Approaches to Reducing Greenhouse Gas Emissions," which will be presented Tuesday morning, June 5, during the AAPG annual meeting in Denver.

Trenberth's paper will begin at 8:05 a.m.

The session features seven papers, ending with a 10:20 a.m. paper by R. Repetto on "The Clean Development Mechanism: Institutional Breakthrough or Institutional Nightmare?"

world's future carbon dioxide emissions (CO₂) – a costly undertaking that is perhaps less popular today than ever, given the somewhat spooked national

economy.

Opinions vary as to whether such emissions actually impact climate change.

There are basically two camps in

the longtime, intense global warming debate – those who say human activity is responsible for the earth's warming and those who decry this notion, saying the natural systems at work are much too vast to be influenced by human activity.

Intensifying the debate are those who charge that much of the verbal wrangling over the human contribution to global warming often is based on emotion rather than fact.

However, since the issue catapulted to prominence in the late 1980s, there has been a concerted effort to scientifically and methodically evaluate what actually is happening with the world climate – and to what extent human beings figure in the big picture.

Pointing a Finger

The Intergovernmental Panel on Climate Change (IPCC) has emerged as the international voice on the science of global warming.

The IPCC is a United Nations organization with a mandate to provide policy makers with an objective assessment of the scientific, technical and socio-economic information available about climate change, its environmental and socio-economic impacts and possible response options.

"Each report by the IPCC reviews all the published literature over the previous five years or so," said Kevin Trenberth at the National Center for Atmospheric Research. "It assesses the state of knowledge, while attempting to reconcile disparate claims, resolve discrepancies and highlight uncertainties."

"The strength is that the result is a consensus report that isn't necessarily the latest or the greatest," he said, "but it does sort out what can be reliably stated."

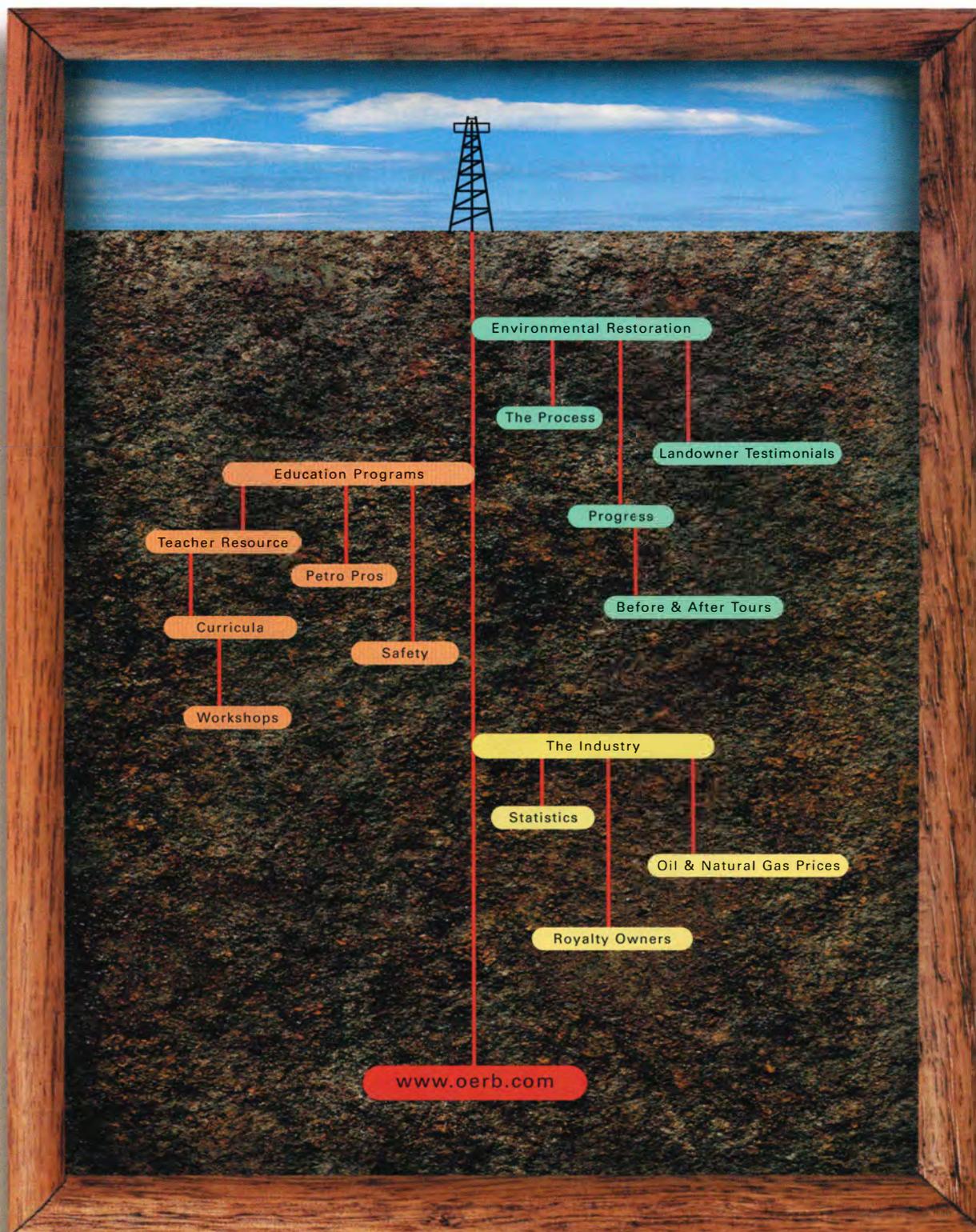
The latest IPCC report (2001) reaffirms earlier conclusions the organization reported: The world's climate is changing, and the blame rests principally on humans who are altering the composition of the atmosphere by deforestation and the use of fossil fuels.

The changes can be slowed but not stopped, the report says, because of the long life of several greenhouse gases (>100 years for CO₂). It purports that all the climate change the planet is already committed to has yet to manifest itself because of the slow response of the oceans to warming.

Furthermore, major climate changes are projected under all likely future scenarios, with change rates much greater than occur naturally, thereby making them very disruptive in all likelihood.

Human Touch

Natural climate changes are an age-old, ongoing phenomenon. For those who believe human-modification of the environment alters the climate, the impact of fossil fuel combustion ranks pretty much at the top of the culprit list. It's blamed for polluting the atmosphere and altering the balance of radiation on the earth



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See **Warming**, page 48

Greenhouse Fight Options Explored

Is There Anything We Can Do?

By LOUISE S. DURHAM
EXPLORER Correspondent

It sounds improbable today, but early (1970s) concern about the impact of human activity on the global climate system centered on the prospect of global cooling caused by man-made particles, or aerosols, reflecting away incoming solar radiation.

Attention soon shifted to the possibility of global warming via the ability of so-called "greenhouse" gases, principally carbon dioxide (CO_2), water vapor and methane, to absorb the infrared radiation the earth transmits to space in order to balance the incoming radiation from the sun.

The issue of global warming soon took on a life of its own.

Over the years, the controversial matter has evolved from one focused primarily on scientific concerns to one currently focused on the selection of mitigation and carbon removal options.

Indeed, the United Nations Intergovernmental Panel on Climate Change (IPCC) – the international voice on the science of global warming – has shifted its emphasis toward the assessment of potential damages from warming and to selection of appropriate policies and technologies to reduce or capture emissions.

Numerous technology options exist to reduce greenhouse gas emissions and to capture and dispose of carbon from the atmosphere and from emission sources. Factors to be considered when selecting mitigation and disposal options include the availability of the particular option, the volume of emissions that can be reduced or offset, the cost and other technical, social and political factors.

"Energy efficiency and expanded use of natural gas appear to hold considerable promise as nearer-term solutions," said John Shinn, project technical manager global change at Chevron Research & Technology Co. "Disposal of CO_2 in underground formations appears promising as a medium-term option.

"Besides adopting technology options within specific businesses, the international process offers other promising response options that expand the possible choices to reduce emissions, such as trading and international project activities."

Wanted: Proven Technologies

Given the international demand to reduce the growth of greenhouse gases, the oil and gas industry is diligently assessing how best to approach this potentially costly and complex issue.

The International Petroleum Industry Environmental Conservation Association (IPIECA) held a workshop in 1999, where experts from technology assessment and technology development groups met to examine both the process and outputs of mitigation technology assessment programs already conducted.

They concluded no one technology appears capable to provide the entire solution for reducing greenhouse gas emissions, but rather the evolution of multiple technologies over time is the way to go.

General guidelines were developed for effective assessment of technology options. These include:

- How soon the option will be available.

AAPG's Division of Environmental Geosciences is offering a technical session on "Approaches to Reducing Greenhouse Gas Emissions," which will be presented Tuesday morning, June 5, during the annual meeting in Denver.

John Shinn's paper, "Global Warming and the Oil Industry – A Viable Path Forward?" will be presented at 8:45 a.m.

The session features seven papers, ending with a 10:20 a.m. paper by R. Repetto on "The Clean Development Mechanism: Institutional Breakthrough or Institutional Nightmare?"

- The impact from a given technology.
- Cost.
- Certainty.
- Political and social acceptability.

Existing short- to medium-term greenhouse gas mitigation options can be grouped in a few general categories:

- Energy efficiency.

- Reduced venting and flaring.
- Remote natural gas utilization: e.g. LNG, GTL (gas-to-liquids).
- Fuel switching.
- Methane Capture.
- Land use change: e.g. reforestation, soil management for carbon uptake/reduced carbon release.

Abatement options available today that are applicable worldwide can be as simple as pipeline repair or the controlled ignition of large methane sources.

See **Industry**, page 49



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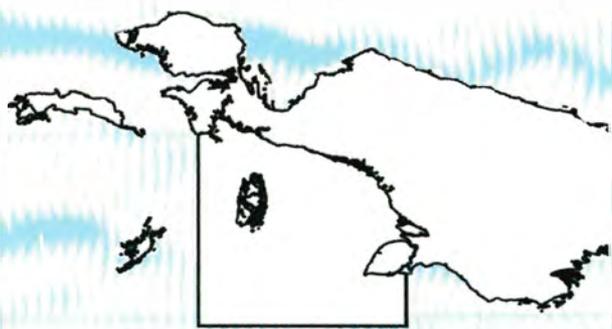
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Warming from page 46

via both visible particulate pollution (aerosols) and gases that alter the makeup of the atmosphere.

"The latter are referred to as greenhouse gases because they are relatively transparent to incoming solar radiation, while they absorb and re-emit outgoing infrared radiation," Trenberth said, "creating a blanketing effect which results in warming."

"Global warming and associated climate change are expected as a result."

Human activities, such as biomass burning, agriculture, fossil fuel use and others, also are blamed for the increase in atmospheric concentration of several other greenhouse gases, e.g. methane, nitrous oxide, chlorofluorocarbons (CFCs) and the like.

Analyses of surface temperature observations show there has been a global mean warming of about 0.7°C over the past 100 years. The warmest year on record was 1998, and the last 10 years are the warmest decade.

Because of land/ocean contrasts and physical obstacles such as mountain ranges, along with other factors, extensive regions of both above- and below-normal temperatures occur in disparate places at any time.

Emerging Signs

Trenberth noted that changes in climate variability and extremes are beginning to emerge.

Radiation from the sun is the energy source that drives the climate. Roughly 31 percent is scattered or reflected back into space by clouds and the small airborne particles known as aerosols, or by the earth's surface. To balance the incoming energy, the earth has to radiate the same amount of energy back into space on average.

Water vapor, CO₂ and other minor gases in the atmosphere absorb some of the thermal radiation leaving the surface and emit radiation from higher and colder levels out into space. This blanketing is the natural greenhouse effect, with water vapor contributing about 60 percent of the effect and CO₂ accounting for about 26 percent.

While clouds have a blanketing effect similar to that of greenhouse gases, they act to cool the surface because they are bright reflectors of solar radiation.

Trenberth said the amount of CO₂ in the atmosphere has increased by about 31 percent since the industrial revolution began 250 years ago, primarily because of fossil fuel combustion and the removal of forests. Without controls, future projections indicate the rate of increase could accelerate, he added, and concentrations could double from pre-industrial values in the next 50 to 100 years.

It's been reported that even full implementation of the Kyoto Protocol would only slow the time of doubling of CO₂ concentrations in the atmosphere from pre-industrial amounts by maybe 15 years unless sizeable further emissions reductions were to occur at some time in the future. Changes occurring in the

oceans would continue.

Because certain aerosols scatter some solar radiation back to space, thereby cooling the earth's surface, they directly influence climate. As opposed to aerosols generated by natural causes, man-made aerosol particle formation occurs mainly through sulfur dioxide injection into the atmosphere, which contributes to acid rain.

Whereas such aerosols originate near the surface, for the most part, they can be washed out of the atmosphere by rain. Because they typically stay in the atmosphere for only a few days and tend to concentrate near their sources, such as industrial regions, they can help to mask any global warming triggered by greenhouse gases.

Stormy Weather

Increases in greenhouse gases in the atmosphere are reported to not only increase surface temperatures but also to augment the hydrological cycle because much of the heating at the surface goes into evaporating surface moisture.

"Global temperature increases signify the water-holding capacity of the atmosphere increases," Trenberth said, "and together with enhanced evaporation, this means that the actual atmospheric moisture should increase, which is observed to be happening in many places."

"Because water vapor is a powerful greenhouse gas, this provides a strong positive feedback."

He noted it leads to the expectation of intensified rainfall or snowfall events, such that when it rains it pours harder than it would have under similar circumstances just a couple of decades ago.

"This also provides fuel for storms," he said, "which further enhances rainfall and snowfall intensity, increasing the risk of flooding."

Precipitation in the United States has trended upwards by about 10 percent over the last century, and increased heat for drying means naturally-occurring droughts likely will be intensified. They will come on quicker, plants will wilt sooner and the droughts may become more widespread and last longer with global warming. Once the land is dry, all the solar radiation goes into raising temperatures, Trenberth said, bringing on sweltering heat waves.

Clearly, it's not enough to consider only temperatures when studying the effects of global warming. One must also take into account the air conditioning effects of moisture, along with another part of the picture – warm regions are often separate from wet regions.

Although some changes arising from global warming are benign or even beneficial, weather extremes, such as floods, can have significant economic impact.

The IPCC estimates that restoring vegetation to its natural state would reduce CO₂ by only 5-10 percent in 2100, so there is a strong case to be made for slowing the projected rates of climate change from human influences.

Increased use of renewable resources – such as solar power – and increased energy efficiency are seen as key steps to aid in diminishing the rate of climate change Trenberth said – and, subsequently, achieving a more sustainable world. ■

Industry from page 47

"The availability of existing proven technologies appears to be a key issue in the choice of options in the near-term," Shinn said. "The challenge is to provide the added incentive for these activities to permit them to compete effectively for investment money, and the value of carbon credits could provide such an incentive."

Three Broad Options

Shinn noted there are three broad options for mid- to longer-term gas mitigation.

However, two of these options – energy production from non-carbon sources (renewables) and the use of non-hydrocarbon fuels (e.g. hydrogen) – call for profound change in the global energy system. Implementation could take decades.

The other option is sequestration, or the removal of CO₂ from combustion products or from the atmosphere. Shinn ticked off several advantages of sequestration as a medium- to long-term carbon management approach:

- ☐ Allows continued use of a valuable, low-cost hydrocarbon resource.
- ☐ Political and commercial value to producer nations and carbon businesses.
- ☐ Allows time for renewables cost reductions and breakthroughs.
- ☐ Potential co-location of disposal and production sites.

Beyond the technical options, the international process is creating additional response flexibility.

The Kyoto Protocol, if adopted, would allow governments and businesses options to participate in emissions-reducing activity beyond the confines of their national or business activity.

Even if the Protocol is not ultimately adopted, as suggested by the recent Bush administration positioning, it is expected that many of these flexible options developed in the Protocol framework could be retained in some form in future measures.

Clean Development Mechanism

The Kyoto approaches involve two activity categories – trading and projects.

The Emissions Trading category allows governments or businesses to purchase excess emissions reductions from those who are able to reduce emissions below their Kyoto objectives. This provides incentives for those entities having low-cost emissions reduction opportunities to reduce below their targets.

The "projects" approach involves participation in emission-reducing activities outside one's own borders in order to receive part of the value of the reduction toward one's own reduction obligations.

There are two types of project activity:

- ✓ Projects in countries having commitments to reduce (Joint Implementation).
- ✓ Projects in developing countries with no Kyoto Protocol reduction commitments (Clean Development Mechanism, or CDM).

Chevron and partners are in the advanced planning stage of a project that may qualify for CDM, known as the West African Gas Pipeline project. The project would utilize otherwise wasted natural gas to provide cleaner energy

for development in Western Africa.

Natural gas is flared in the oil-producing regions of Nigeria, and the Chevron program would capture and transport the now-wasted gas to Ghana, Togo and Benin, where it would replace higher emission fuels used in power generation.

Other benefits expected to accrue include improved air quality and health, a more rapid development of electricity and, eventually, increased use of natural gas for home heating and cooking.

"We believe this is the kind of project that should qualify for greenhouse gas credits," Shinn said. "The added value of the credits could help ensure that more projects of this type are selected, allowing companies to play a more active role in reducing greenhouse gas emissions." ☐

Mentor Program Needs More Mentors

In the last few months AAPG has seen a tremendous increase in the number of students requesting mentors – so much that the Mentor Committee urgently needs individuals willing to serve as mentors.

The AAPG mentoring program was launched in 1999, according to Bob Shoup, vice chair of the committee.

As a mentor, a geologist can make a big difference in the career of a young geoscientist. Mentors are asked to work with a student to find a mutually agreeable arrangement.

Some mentors meet with their protégé' year round, occasionally having them in the office or taking

them out to lunch or dinner. Others sponsor them for membership in their local society, and take them to the society functions. Still others communicate almost wholly by e-mail.

"As you can see," Shoup said, "the program is quite flexible."

There were 62 protégé pairings made in 2000 and there have been 90 students in 26 states requesting mentors in the first three months of 2001.

To sign up to be a mentor, send an e-mail to Vickie Beighle at AAPG (vbeighle@aapg.org). Or, if you prefer, give her a call at 1-888-945-2274 x 615.

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BUSINESS SIDE OF GEOLOGY

Estimate Should Be Big, Not Little

By PETER R. ROSE

When you come up with an estimated P1 value for a prospect parameter, such as net rock volume, porosity or initial production rate, are you thinking about the top of the predictive range or the bottom?

Is your P1 estimate a big number or a little one?

Obviously, if several partners in a joint venture are using such conventions differently, severe misunderstandings are likely to occur!

Today, most E&P companies have

It dawned on us that statistics could help, so we started to assign probabilities to our geotechnical estimates ...

adopted the convention whereby P1 refers to the top of the parameter's range, i.e., P1 is a big number, whereas P99 is a small one. But it hasn't always been so. Here's the background:

About 30 years ago, prospectors and engineers began to deal with the substantial uncertainties that attend most of the geotechnical parameters affecting prospect profitability.

Instead of single "best-guess"

(deterministic) estimates, a few brave souls began to set predictive ranges, between a low-side forecast (= "minimum") and a high-side forecast (= "maximum").

At first, we didn't worry too much about whether a "min" was an absolute minimum, or a reasonable low-side guess, or something in-between. We didn't try to express our confidence in such estimates as probabilities.

Then it dawned on us that statistics could help here, so we started to assign probabilities (= confidence) to our geotechnical estimates. Now we could begin to measure our predicting abilities, by comparing estimates against actual outcomes.

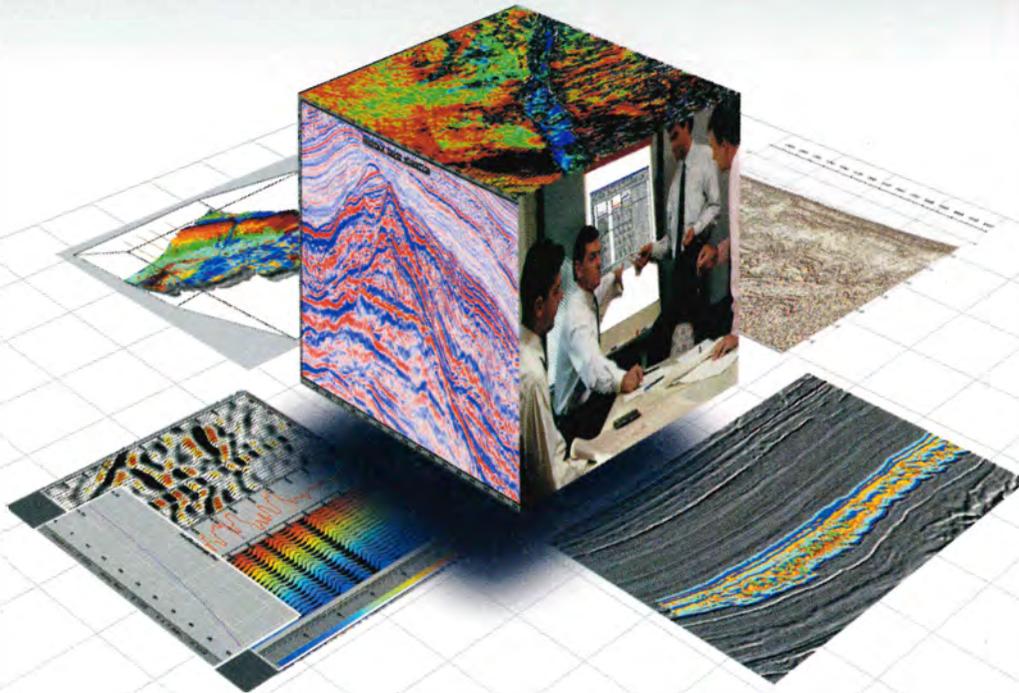
We also began using cumulative probability distributions, rather than the frequency (probability density) form of display, because of their superior analytical capabilities. The cumulative probability form naturally encouraged us to talk about probability of a given outcome, *or more* (as well as the alternative, *or less*).

A few groups tried to set predictive ranges corresponding to one standard deviation – the central 68 percent of the distribution. This made the statisticians happy, but left

continued on next page

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NASDAQ: PGE0

'Surgical Theater' Probes Prospect Evaluation

A hands-on approach to learning about prospect evaluation will be one of the many short courses scheduled in June at the AAPG annual meeting in Denver.

"Prospect Evaluation 'Surgical Theater' and Workshop," a pre-meeting course slated June 2-3, will be taught by the current EXPLORER's "Business Side of Geology" columnist Peter R. Rose, along with Gary P. Citron and Jeffrey Brown, both with Rose and Associates in Austin, Texas.

The course, designed for geologists, geophysicists, engineers and managers, will give attendees a chance to observe and participate as multidisciplinary evaluation teams review and risk several case studies from the Rocky Mountains and offshore Gulf of Mexico.

Topics to be covered include:

- Probabilities and distributions.
- Dealing with uncertainty.
- Estimating prospect reserves.
- Expected value, geological chance factors, chance of success.
- Understanding cash flow models.

The course is limited to 60 participants, and full-time student AAPG members are eligible for first-come, first-served slots.

"Prospect Evaluation" is one of nearly 20 short courses planned for both before and after the annual meeting. For a complete listing of courses, and for more information on this and all offerings, refer to the AAPG Web site at www.aapg.org.

continued from previous page

practical geoscientists and engineers frustrated, because this required them to sense and express values corresponding to 16 and 84 percent, which proved pretty awkward. Some tried to use 90 percent of the distribution, between P5 and P95.

Eventually, however, most companies agreed that the use of the upper and lower 10 percent seemed to be practical, and acceptable to most technical estimators, so the most common convention today is a predictive range of 80 percent.

* * *

The final question concerned whether to use the "greater than" or "less than" convention: Should P1 refer to a large value (or more) for which there was only a 1 percent chance of occurrence?

Or, was P1 a very small outcome (or less), for which there was only a one percent chance?

Statisticians seem to prefer the "equal to or less than" convention, arguing that it is faithful to statistical notation, and that some folks find it easier to associate large probabilities with large values, and small probabilities with small values. However, it is not incorrect to apply cumulative probabilities using the "equal to or greater than" format.

Most companies today have adopted the "more than" usage, so P1 is a very big outcome, whereas P99 is a very small result.

There are four compelling reasons why companies prefer the "more than" convention:

☐ "Proved" or "booked" reserves, as used by petroleum engineers, expresses high confidence (= "reasonable certainty") in some specified conservative reserves amount, *or more*. So the *exploration* expression of reserves would be compatible with the *engineering* expression.

☐ Explorationists, being keenly aware that companies and clients are particularly interested in the "up-side" potential of prospects, naturally focus on large-reserves outcomes, so the "or more" convention is more natural and appropriate.

☐ It eliminates the disturbing possibility that statistically naive decision makers may be seduced into believing that, given a discovery, there is a 90 percent probability of finding the high-side (P90 case) outcome or more, rather than only a 10 percent chance.

☐ Commercial truncation of the reserves distribution is directly expressed as the proportion of the distribution that is of commercial size or larger, rather than as the more cumbersome (1-Pc) expression required by the "less than" convention.

So, it's best for P1 to refer to a big outcome, not a little one – but it's always a good idea to verify the other outfit's usage before you start reviewing their prospect!

(Peter R. Rose is managing partner of Rose & Associates in Austin, Texas.)

Don't Risk It; Read This Book

A new book by the EXPLORER "Business Side of Geologist" columnist Peter R. Rose has been released by AAPG that offers practical insights into the business of exploration drilling.

Risk Analysis and Management of Petroleum Exploration Ventures is a comprehensive, fully integrated, state-of-the-art treatise covering the objective evaluation of exploratory drilling ventures and key concepts for efficient, profitable management of such projects.

The book sets forth sound, tested principles and procedures, with simple and effective explanations of the underlying concepts. It emphasizes the integration of essential exploration topics, including:

- ✓ Statistics.
- ✓ Dealing with uncertainty.
- ✓ Estimating prospect reserves and chance of success.
- ✓ Economic measures.
- ✓ Evaluating exploration plays.
- ✓ Management of E&P business ventures.
- ✓ Effective practices for conduct of risk analysis.

Rose, a petroleum geologist with more than 40 years of experience, is internationally recognized as a leading proponent of systematic, probabilistic risk analysis. Since 1990, Rose and his associates have presented various aspects of E&P risk analysis to more than 8,000 professional geoscientists and

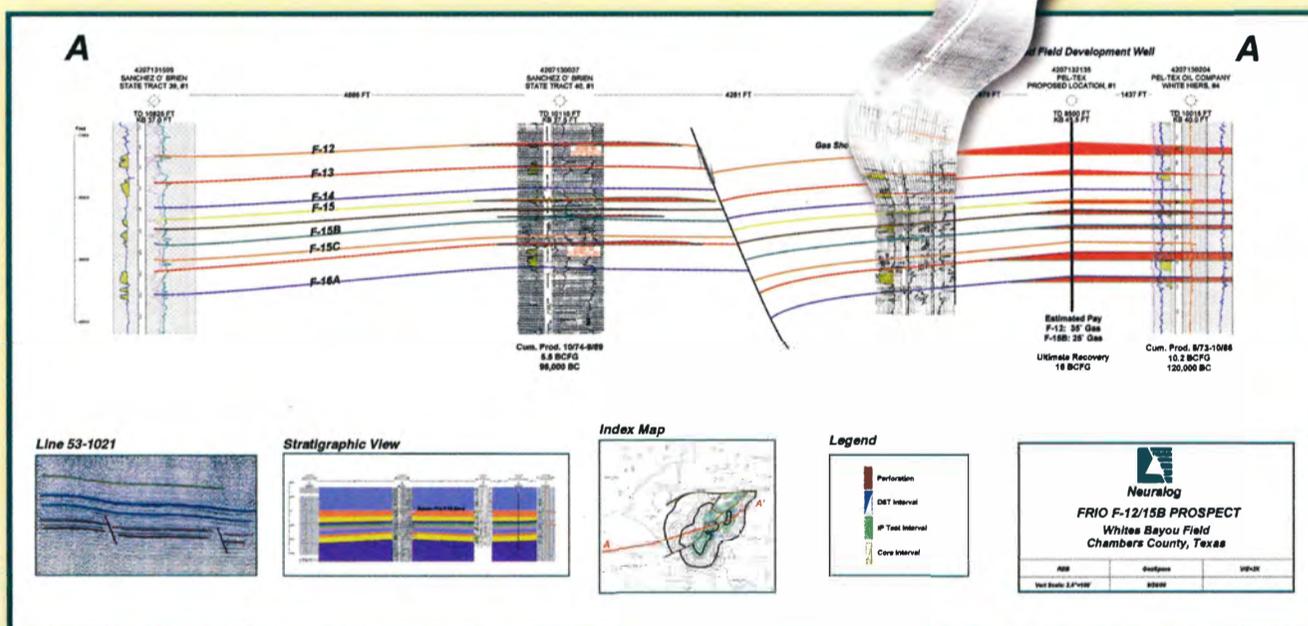
engineers from more than 60 oil and gas corporations and national oil companies around the world.

Rose has been a convener and participant in most of the significant research conferences on E&P risk analysis since 1990 and has published widely on the subject.

The book will be offered through June 30 at the pre-publication sale prices of \$35 for hard bound and \$20 for soft bound. After June 30 the prices will be \$45 for hard bound and \$25 for soft bound.

To order, call 1-800-364-2274 (U.S. or Canada) or 1 918-584-2555 (other); or visit the online bookstore at <http://bookstore.aapg.org>. ☐

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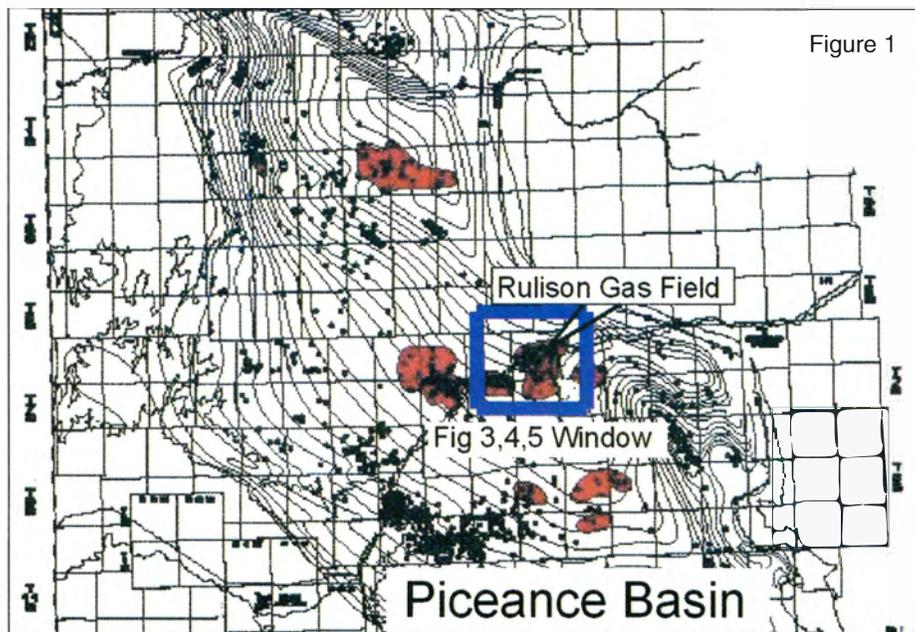


Figure 1

GEOPHYSICAL CORNER

Finding Faults In a Gas Play

(The Geophysical Corner is a regular column in the EXPLORER, edited by R. Randy Ray. This month's column is titled "Aeromagnetic Imaging of Faults in a Basin-Centered Gas Play.")

By WILLIAM C. PEARSON

Recent technologic advances in aeromagnetic acquisition, processing, imaging and interpretation provide effective methods for locating faults in

sedimentary basins.

Mapping regional fault patterns within a basin are critical to finding new fields and extending existing fields in basin-centered gas plays. Deeper and older structures are often reactivated with later stage compression and wrench faulting to produce enhanced porosity and permeability in tight sands.

In some instances a pattern of open fractures or intersecting fault trends causes good gas reservoirs. In other instances wrench faults are mineralized and act as seals to adjacent gas pressure compartments.

A consortium of the public-supported Gas Research Institute (GRI) and private exploration companies teamed up to sponsor a study on tight gas sand production enhancement in the Piceance Basin of northwest Colorado. The study combined Landsat imagery, aeromagnetic surveying, 3-D seismic surveying and drilling to determine a method for locating areas of high gas deliverability.

The results of a study in the Rulison gas field indicate that the best estimated ultimate recovery wells are located in a wedge of tight sandstones sourced from underlying coal beds, and sealed laterally by faults seen on both 3-D seismic and aeromagnetic data.

Rulison Field Producing Formation

Gas production in the Rulison Field, near the town of Rifle (Figure 1), has been studied extensively by GRI (1997). In the study Landsat imagery, drilling information, a 3-D seismic survey and a high-resolution aeromagnetic (HRAM) survey complete

continued on next page

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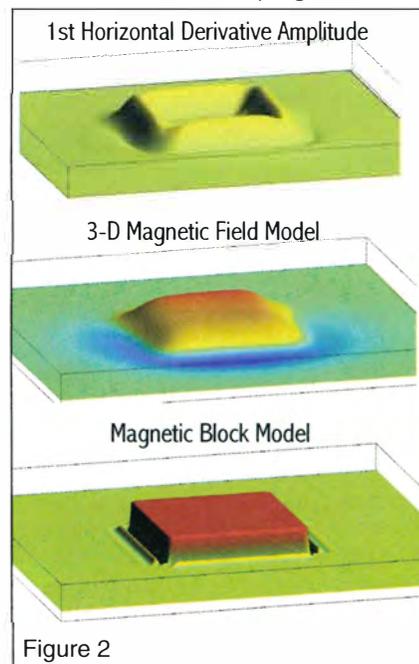


Figure 2

Figures courtesy of William C. Pearson

Figure 1 (top) – The Rulison Gas Field, located in Colorado's Piceance Basin.

Figure 2 – 3-D magnetic block model with computed field and shaded image of first horizontal derivative amplitude. The peaks of the horizontal derivative amplitude overlie the linear block boundaries (faults).

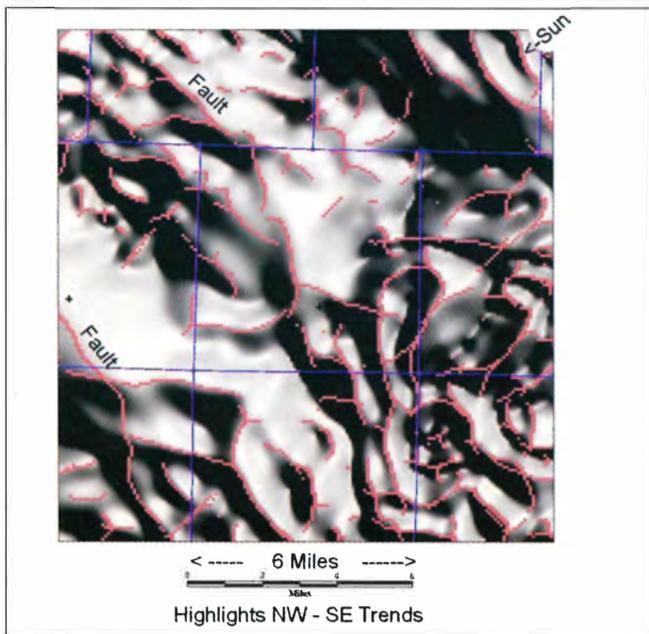
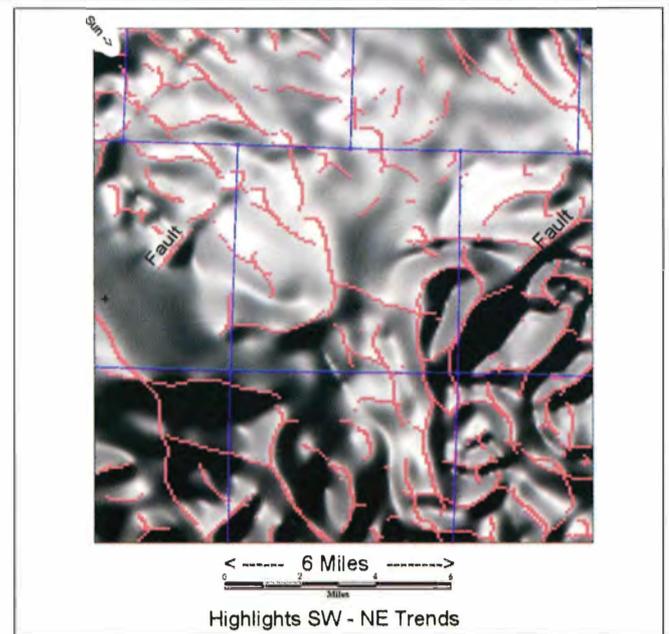


Figure 3 (left) – Shaded-relief image of horizontal derivative amplitude of the 5,000-6,000-foot depth-sliced, reduced-to-pole magnetic intensity. The sun in the northeast illuminates several northwest fault trends. Orange lines are AUTOFAULT picks of faults within Rulison Gas Field. Figure 4 (right) – Another view of the same shaded-relief image of the same horizontal derivative amplitude, this time with the sun in the northwest illuminating weak northeast trends. Again, orange lines are AUTOFAULT picks.



continued from previous page

a picture of a basin-centered, tight gas sand reservoir.

Gas production in the field is from a tight sand in the Williams Fork Formation of the Upper Cretaceous Mesa Verde Group. Individual wells vary from non-commercial to over 3 Bcf estimated ultimate recovery within a distance of a half mile or less.

The more economic wells are on a structural flexure defined by well tops and 3-D seismic data. However, bounding faults to the west, east and south as defined by seismic and magnetic data produce an important seal to the reservoir.

Three-D seismic is relatively effective at locating velocity minima and anisotropic velocity anomalies that correspond to the best wells, but its use is restricted in the Piceance due to limited surface access and cost considerations. Aeromagnetic surveying is unencumbered by surface restrictions, is very fast to acquire and is inexpensive compared to seismic, leasing and drilling.

Improved Magnetic Techniques

Current aeromagnetic technology is a much-improved tool as compared to the ground and airborne magnetic surveys of 10 or more years ago.

The GPS satellite navigation allows flight lines to be positioned and located within a few meters of desired location, providing for improved flight line leveling and interpolating onto map grids. HRAM surveys are optimally flown with closer spaced lines – in this case, a 250m by 1,000m array of lines.

Recently developed processing techniques remove noise due to surface sources such as wells, pipelines and towns, thus providing a much cleaner signal.

Computer filtering, imaging and interpreting tools are important upgrades to the old familiar contouring and hand interpreting techniques.

Magnetic Block Model

Intrasedimentary magnetic fault anomalies in the Piceance are pre-amplified on the profiles and interpolated from the 250m spaced decultured profile data onto a 100m grid. The total magnetic intensity grid is then filtered by a sequence of steps including a reduction-to-pole filter, Wiener pseudo depth matched filter (focusing on the 5,000 to 6,000 foot depth range), and horizontal derivative filter.

Figure 2 (page 52) illustrates the

See **Aeromagnetics**, next page

discover us

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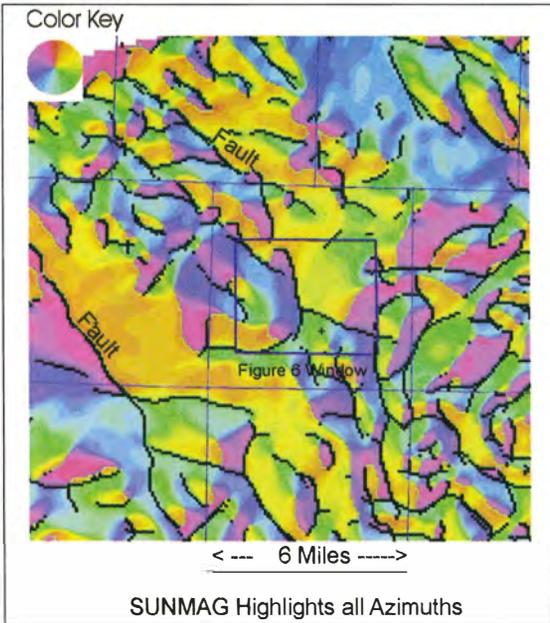
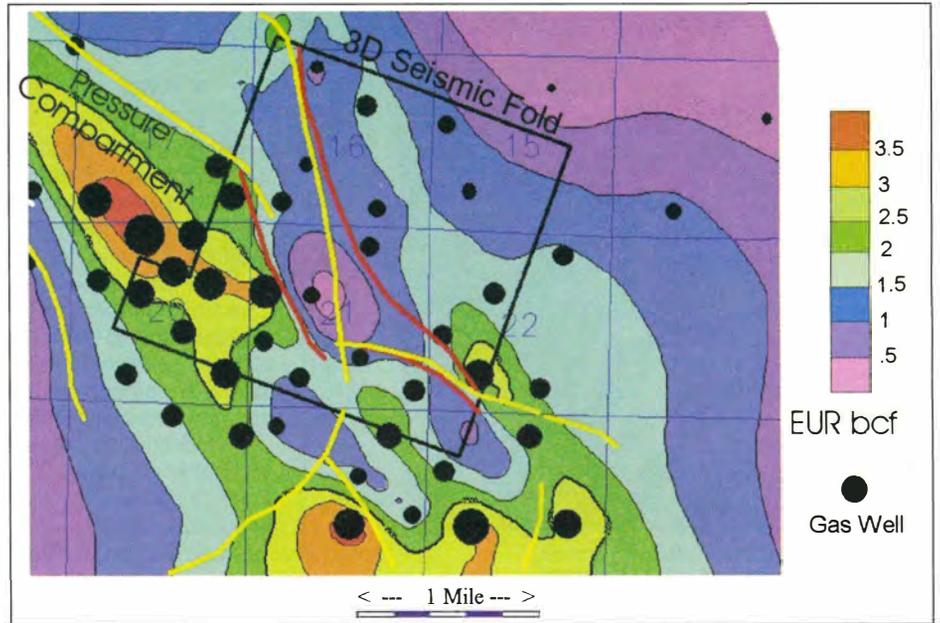


Figure 5 (left) – SUNMAG image with block AUTOFAULT lines shows faults identified by 5,000-6,000-foot depth-sliced, filtered reduced-to-pole magnetic field. Color key in upper left corner shows direction of dip for each color. Rectangular window shows location of Figure 6 (right), which is a contoured estimated ultimate recovery from wells in the Rulison Gas Field (GRI, 1997). Interpreted faults from 3-D seismic (red) and from aeromagnetic survey (yellow) produce lateral seals to the tight gas sand compartments within the field. The footprint of the full-fold 3-D seismic survey is outlined in black.



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Aeromagnetics from previous page

nature of magnetic lineaments mapped by the first horizontal derivative conversion. The figure displays a synthetic block model, its magnetic field model and a shaded relief image of the first horizontal derivative amplitude. The magnetic anomaly has its steepest gradient (dip) over the bounding faults of the body.

Nearly linear intrasedimentary faults or lateral termination of slightly magnetic sands produce correspondingly linear observed magnetic gradients that can be imaged in the same manner.

Figure 3 (page 53) is a northeast sun shaded relief image of the horizontal derivative grid over the Rulison Gas Field. Townships are overlaid in blue for location and scale.

Actual subsurface fault/lineament locations are at linear trends, where lighter slopes facing the northeast sun turn to dark away from the sun toward the southwest. The line of change from light to dark is highlighted in pink, and is the fault/lineament location.

Figure 4 (page 53) demonstrates a northwest sun angle for the same area, highlighting anomaly trends that are much weaker in a northeast orientation. Real time sun angle rotation on the computer screen is very helpful for detecting lineaments of a preferred orientation.

Highlighting All Dip Directions

A new method of lineament detection uses the full horizontal gradient, including both amplitude and azimuth.

Figure 5 (above) shows a color SUNMAG image showing all dip directions as a unique color, with the color key superimposed in the top left corner of the figure. SUNMAG imaging delineates lineaments of all orientations simultaneously – and, in fact, picks up more subtle faults than the gray single-direction sun shadowgraphs, because the horizontal gradient direction is a more sensitive indicator of fault anomalies than the gradient amplitude alone.

The computer automatically detects faults with an AUTOFAULT algorithm based upon a neural network technique for detecting discontinuities in the horizontal gradient azimuth and amplitude data.

The AUTOFAULT computer fault picks are superimposed as black lines on the figure 5 SUNMAG image to

continued on next page

Students, Jobs Have Spring Break Flirt

Ninety-one geoscience students from 29 universities took advantage of AAPG's first Spring Student Expo to meet with industry representatives, showcase their work and to explore the possibilities of intern and full-time employment.

The Expo was held over spring break weekend at the University of Oklahoma, hosted by the OU School of Geology and Geophysics, the Sarkeys Energy Center and the Oklahoma Geological Survey.

Thirty-two student posters were presented, with those judged as the top three winning cash prizes.

"The quality of the posters spoke

volumes about the high caliber of the students who made the trek from as far away as North Carolina and Oregon," said AAPG Secretary Charles "Chuck" Noll.

Poster awards went to John Layman and Wayne Ahr, of Texas A&M, first place; Carrie Maher, of the University of Alabama, second place; and Galen Miller and Kevin Smart, of OU, for third place.

Steve Tavernier, of the University of Tennessee, told AAPG Student Affairs coordinator Kerri Donathan how the Expo "was a great opportunity for good students from less-recruited universities to get exposed to

industry representatives."

Donna Willette, of Colorado School of Mines said "the chance to meet and discuss research projects with students from around the region was an outstanding opportunity."

Meeting with the students were representatives from nine companies with 22 industry guests.

Expo organizer Roger Slatt, who's also head of the OU School of Geology and Geophysics, said he was "thrilled" with the student attendance. He did comment, however, that "although the student attendance was great, company attendance could have been much

better. Sixty invitations were sent and nine companies participated.

"Thus, because of the ratio of students to companies, many students who traveled long distances were only able to interview a few companies," he continued. "Companies who are continually stating that they are concerned about insufficient numbers of potential new hires into the industry, or those who want to make a amore lasting presence on campus, missed a great opportunity."

The Spring Expo was a follow-up to the fall Expo held at Rice University which drew 140 students. □

continued from previous page

highlight dip compartments between faults.

Integrated Fault Interpretation

Integrating the magnetic fault picks (yellow) and 3-D seismic fault picks (red) with color contoured, estimated ultimate recovery from wells produces a good picture of why the better wells line up in a north-northwest direction (figure 6, GRI, 1997). The warmer colors correspond to wells with more than 3.5 Bcf per well estimated ultimate recovery.

The best wells in sections 17 and 20 lie between northwest trending sealing faults.

Within the 3-D seismic survey area, faults identified at the Mesa Verde level correlate locally with interpreted regional magnetic faults. The magnetically defined delineate pressure compartment boundaries within the field and extend beyond the 3-D seismic survey.

A comprehensive integration of well results, 3-D seismic and aeromagnetic imaging provides a model for locating lead areas in the greater Piceance Basin similar to the Rulison Field.

Although the aeromagnetic imaging has much coarser spatial resolution than 3-D seismic data, it is relatively inexpensive to use over a broad area of reconnaissance exploration prior to exploratory drilling and detailed 3-D seismic surveying.

Conclusion

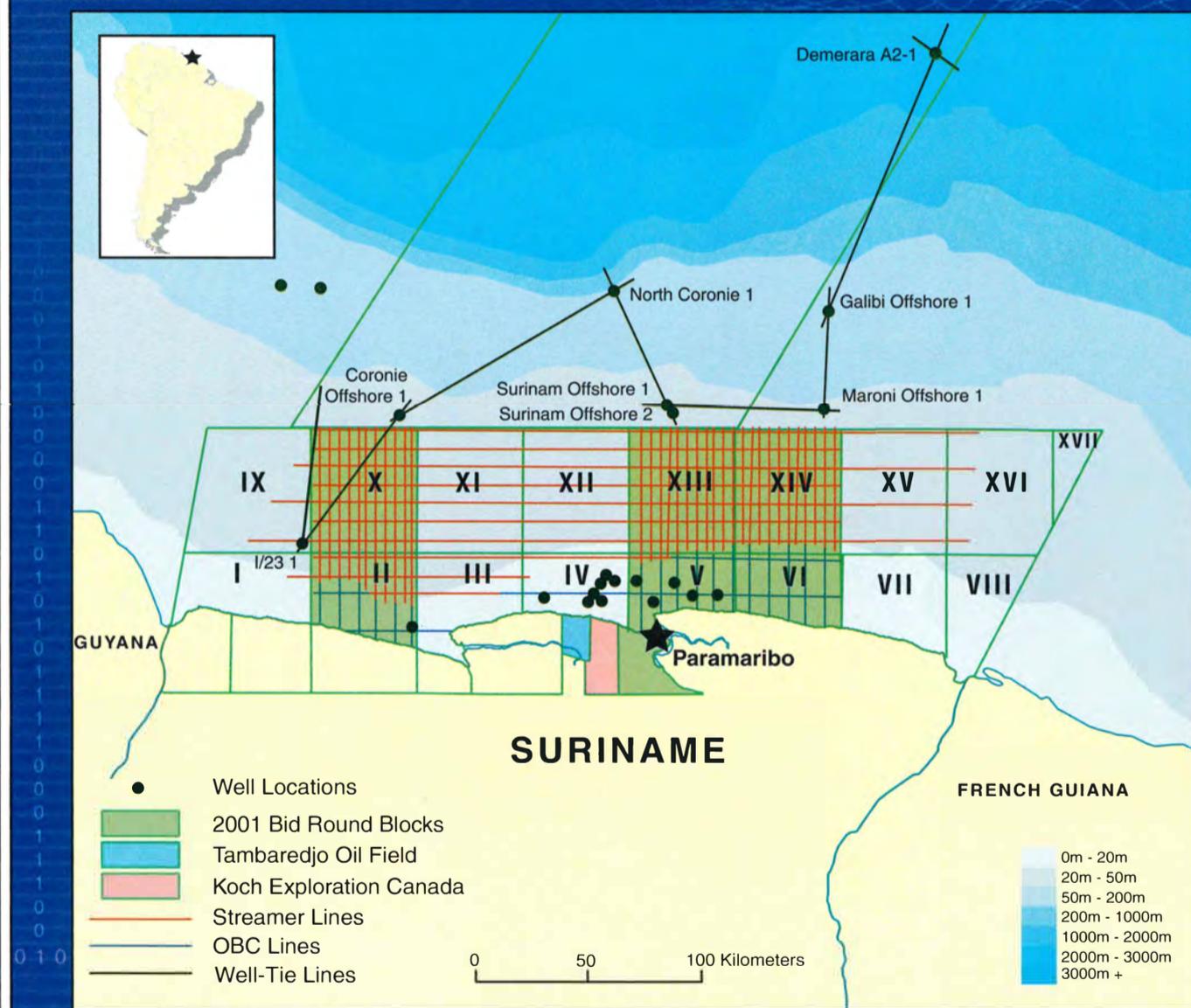
Recognizing regional fault patterns in prospective basin-centered gas plays is a critical element based on known analog fields. Seismically interpreted faults and magnetically imaged faults in Wyoming's Green River Basin have confirmed that sealing faults bound the recently developed, 1 TCF Jonah gas field.

The similarity to the observed pattern of bounding faults around the better producing wells in the Rulison gas field point to a picture of compartmentalization of tight gas reservoirs.

An exploration strategy based upon this model can be applied to other gas and oil plays in the Rocky Mountains and Canada as well as to many basins around the world.

(Editor's note: Bill Pearson is a geophysical consultant and potential field expert in Denver. For the past seven years he has co-chaired the annual Denver 3-D Seismic Symposium and is currently chairman of the Society of Exploration Geophysicists Scholarship Committee.) □

Offshore Suriname 2D Multiclient Seismic Survey



WesternGeco and Staatsolie Maatschappij Suriname N.V., the state oil company of Suriname, are pleased to offer approximately 5,100 km of new seismic data over offshore areas of the upcoming competitive bidding round to be announced at the AAPG convention in Denver, Colorado, June 3-6, 2001.

Sample data will be available for viewing at the WesternGeco and Staatsolie booths.

For more information contact:

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*House to Consider Wide Range of Issues***Delegates Will Face Busy Agenda**

By **LOWELL K. LISCHER**
Chairman, House of Delegates

In recent years, the House of Delegates has had very busy meetings. This year's meeting in Denver on June 3 will be no exception.

This is what is already planned for the meeting.

□ There are seven standing committees and three ad hoc committees who will be reporting to the delegates.

□ The Constitution & Bylaws

Why is the function of the House of Delegates important to you, the members? Because it is YOUR Association!

Committee will be presenting one constitutional amendment, eight bylaws amendments and one resolution for consideration by the delegates. These cover a wide range of issues, including:

✓ Matters concerning the cooperative effort of the Executive Committee, Advisory Council and House of Delegates.

✓ Limitations for holding multiple key elected offices in AAPG.

✓ Modification of the method of submitting amendments for consideration.

✓ Simple matters of cleaning up language within the Bylaws.

(The specifics of all of these issues were addressed in the insert in the April issue of the EXPLORER.)

□ The Rules and Procedures Committee also will present a report addressing 10 recommendations for change or modification of the House Rules and Procedures, including a method of disaffiliation of affiliated societies which, for whatever reason, may cease to exist or disband – and the issue of committee member retention.

□ The Resolutions Committee will present a report to consider both the India Association of Petroleum Geologists and Japanese Association of Petroleum Technology as affiliated societies of the AAPG.

□ The Future of Earth Scientists Committee will present a report pertaining to the future of the committee in an effort to dovetail its own efforts with those of other AAPG standing committees.

□ The Nominations and Elections Committee has come up with an excellent slate of candidates for consideration for chairman-elect and secretary/editor for the House in 2001-2002. The Newsletter Committee will report not only on this year's issues of *The Delegates' Voice*, but the establishment of the HOD Forum on the AAPG Web site (www.aapg.org/house_of_delegates/hodforum/) and the important communications roles each of these serves for the House.

□ While the Honors and Awards Committee continues to deliberate at this time, it is anticipated they will have recommended one or more outstanding delegates for recognition either at the AAPG awards ceremony or during the House meeting. It is anticipated that the Credentials Committee also will provide the Delegates with information relative to how well we are doing at getting and maintaining delegate representation from the U.S. Sections as well as the newly formed International Regions.

□ The Ad Hoc House Operating Efficiency Committee has come up with a litany of procedural changes last year to enhance the efficiency of the House of Delegates. Several of these past recommendations are being considered for minor modifications, and it is anticipated this year's committee members will have recommendations of their own.

□ At last year's meeting in New Orleans, a resolution from the floor established an ad hoc committee to consider regular audits of AAPG finances, as well as staff review. The Ad Hoc Independent Audit Committee will be making its report.

As chairman of this year's House of Delegates, I would be remiss if I did not mention the tremendous amount of cooperation there has been among

continued on next page

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AAPG Members Targeted

'Classic' Scam Game Rolls Again

By LARRY NATION

AAPG Communications Director

A classic scam that has been around for years – with some variations in its wording – is again making the rounds among AAPG members.

The EXPLORER has received several inquiries from members concerning the obtaining of addresses – as well as reports of members receiving these scam letters and e-mails.

According to the U.S. Secret Service, the perpetrators of Advance Fee Fraud (AFF), which is what AAPG members are experiencing, are often very creative and innovative.

AFF is known internationally as the "4-1-9" fraud, named after the section of the Nigerian penal code that addresses fraud schemes.

The e-mail/letter that members have received, almost always a request for a person's bank account number where millions of dollars can be "stored," actually is just setting the stage for the scam's real purpose; it is simply the opening round of a two-layered scheme.

The primary reason for the account request is to signal those involved that they have hooked another victim.

The scam e-mail or letter, while appearing transparent and even ridiculous to most, unfortunately is growing in its effectiveness, according to the Secret Service. The Financial Crimes Division of the Secret Service reports approximately 100 telephone calls from victims/potential victims and 300-500 pieces of related

correspondence daily.

Indications are that AFF grosses hundreds of millions of dollars annually, and the losses are continuing to escalate. In all likelihood, there are victims who do not report their losses to authorities due to either fear or embarrassment, authorities said.

The Sting

In response to this growing epidemic, the U.S. Secret Service established "Operation 4-1-9," designed to target Nigerian Advance Fee Fraud on an international basis.

Secret Service agents have been assigned on a temporary basis to the American Embassy in Lagos, Nigeria, to address the problem in that arena. Agents have established liaison with Nigerian officials, briefed other embassies on the widespread problem and have assisted in the extrication of U.S. citizens in distress.

According to authorities, the criminals obtain the names of potential victims from a variety of sources, including trade journals, professional directories, newspapers and commercial libraries. They do not target a single company, but rather

send out mailings en masse.

The most prevalent and successful cases of Advance Fee Fraud involve the fund transfer scam. In this scheme, a company or individual will typically receive an unsolicited correspondence from a Nigerian claiming to be a senior civil servant.

In the letter, the Nigerian will inform the recipient that he is seeking a reputable foreign company or individual into whose account he can deposit funds ranging from \$10-\$60 million that the Nigerian government

See **Scam**, page 65

continued from previous page

the Executive Committee, the Advisory Council and House of Delegates leadership. While the deliberations of the House will be thorough and lengthy, the assistance of the Executive Committee and Advisory Council has gone a long way to making the House's meeting easier and keeping it on task.

I want to encourage all members to read the insert in the last month's EXPLORER. Let your delegates know how you feel about these issues, or seek their clarification on them. If you don't know who your delegates are, check in the front of the AAPG BULLETIN or check it out under the House of Delegates area of the AAPG Web site. And while you are on the Web site, visit the HOD Forum. By early May, all of the reports by all of the committees will be available for your viewing on the Forum.

Why is the function of the House of Delegates important to you, the members? Because it is YOUR Association!

The function of the House is to deal with the legislative function of the Association. Each year your delegates give of their own time at the annual meeting to represent your interests. Many of them serve on various House committees involving even more time and effort.

It is imperative that you, the members, make yourselves an active part of the AAPG legislative process. And along the way, if you get a chance, thank your delegates. They do a great job to strive to make sure our Association is truly representative of all

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Check Our Site

If You Didn't Know It, It's News to You

By JANET BRISTER
Web Site Editor

When is a rerun not a rerun?
When you're seeing it for the first time!

That's one way of announcing why we've made an important addition to the AAPG Web site: A new "News in Review" section has been added to the Daily News area.

True, we'd like to think that everyone of our Web visitors click on

the AAPG Web site each and every day to get the latest industry, professional and association news.

However, we also know how busy you are; some of you tell us that often you can't find the time to go online with AAPG until the end of the week.

Sound familiar? Well, from now on, even once-a-week visitors will be able to find the stories and news items that were listed on the site and which may end up having a big impact in your professional life.

In "News in Review" you will find the last five business days news of stories of interest to explorationists that were posted in the Daily News, compiled Monday through Friday mornings by the EXPLORER staff.

Yes, we know: Some of these links may have expired by the time you visit the site – but most of them will be active, allowing you to catch up on what you may have missed – or return to something you read.

"News in Review." It's not old news – it's a reminder of news that may matter to you.

* * *

So, how has your Web browsing experience been within AAPG's Web site?

We want to know – really. And for many of you, you're about to get a chance to deliver the message in person.

If you are attending the annual meeting in Denver, you are invited to come by our booth within the AAPG Service Center and visit with staff.

Next door will be AAPG/Datapages, where you'll be able to ask your questions regarding the AAPG's geoscience electronic data.

Tip of the Month: Tired of all the unsolicited junk e-mail? Just what is myth and what is fact within the virus alerts, stories and chain e-mails that many receive daily?

Do you ever forward these things or wish someone would stop sending them to you?

Well, you can break the chain through a Web site of the same name. At www.breakthechain.org, you'll find if the virus alert is something to be concerned with or just ignored. You can check out the truth to the stories and even share some of your own.

You can even learn e-mail etiquette and gather some other e-mail tips.

* * *

You'll note a very new addition to our Web site and to AAPG's offerings: APPEX, which stands for the AAPG Property and Prospect Expo that is planned for the end of August.

Online forms are provided for to facilitate registration for exhibitors, sponsors and attendees.

Agendas, conference schedules, speakers and additional details will be added to this site as they become available.

So check AAPG's site – and check it often!

Good browsing! □

The "Daily News" part of the AAPG Web site provides items of interest to members – and now, daily news stories are archived in weekly segments.

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AAPG Annual Convention (3-6 June, Denver, Colorado), Booth 1119
EAGE Conference & Technical Exhibition (11-16 June, Amsterdam, the Netherlands), Booth 105

Online Journal Adds New Titles, Site Search

The following articles have been posted to Search & Discovery (<http://www.searchanddiscovery.net>), a free Internet journal dedicated to the upstream petroleum industry, published by AAPG/Datapages.

Also new this month, Search and Discovery now features a site search for rapid retrieval of items of interest.

The newly posted articles are:

☐ "Analog Models of Restraining Steps in Strike-Slip Fault Systems," by Ken McClay and Massimo Bonora (adapted from the AAPG BULLETIN).

☐ "Basin Evolution in Western Newfoundland: New Insights from Hydrocarbon Exploration," by Mark Cooper, John Weissenberger, Ian Knight, et al. (adapted from the AAPG BULLETIN).

☐ "Geochemical Characterization of Natural Gas: A Physical Multivariable Approach and its Applications in Maturity and Migration Estimates," by Alain Prinzhofer, Marcio Rocha Mello and Tikae Takaki (adapted from the AAPG BULLETIN).

☐ "Why Light Hydrocarbons Do Not Form a Gas Phase After Diffusing Through Seals," by Alton Brown (adapted from the

AAPG BULLETIN).

☐ Selections from the AAPG EXPLORER's Geophysical Corner, include:

✓ "Exaggeration of Medium-Sized Prospects by 2-D Seismic Bright Spots (When Is a Discovery Not So Great?)," by Les Denham and Dave Agarwal.

✓ "Understanding the Fresnel Zone," by R.E. Sheriff.

✓ "Synthetic Seismograms in Exploration," by Thomas E. Ewing.

✓ "Revisiting the Grand Canyon - Through the Eyes of Seismic Sequence Stratigraphy," by Ward Abbott

Authors should send manuscript or inquiries to editor@searchanddiscovery.net.



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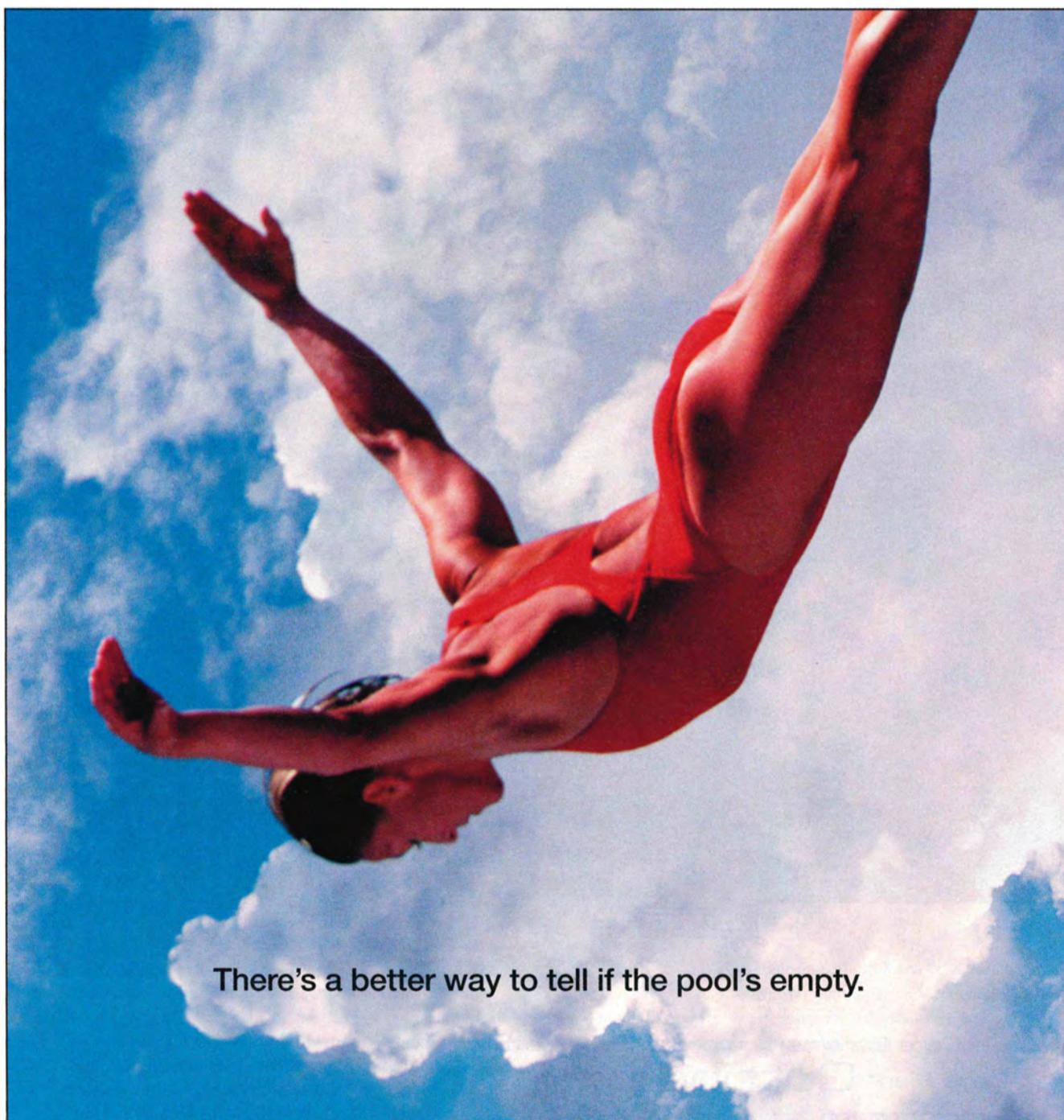
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(Editor's note: "In Memory" listings are based on information received from the AAPG membership department. Age at time of death, when known, is listed. When the member's date of death is unavailable, the person's membership classification and anniversary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



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PROFESSIONAL NEWS BRIEFS

Mike Izuchukwu Akaegbobi is on a sabbatical appointment to the corporate department of petroleum engineering for seismic interpretation and reservoir modeling, Shell Oil, Port Harcourt, Nigeria. Previously lecturer, department of geology, University of Ibadan, Ibadan, Nigeria.

W. Owen BeMent, to geological advisor, Shell Deepwater Services, Houston. Previously geological advisor, SepTAR, Shell International E&P B.V., Rijswijk, Netherlands.

Robert D. Cowdery has received honorary membership of the Society of Independent Professional Earth Scientists (SIPES), the society's

highest award. Cowdery, a past AAPG president, is an independent in Wichita.

Eric W. Cummins, to senior exploration geologist, David H. Arrington Oil & Gas, Midland, Texas. Previously geologist, Yates Petroleum, Artesia, N.M.

Arlen L. Edgar has received the SIPES Outstanding Service Award. He is an independent in Midland, Texas.

Doug Elrod has been elected chairman of the board of the International Association of Geophysical Contractors. He is

director of corporate strategy for Indigo Pool, Houston.

Russell Alan Falquet, to research specialist, Mars Exploration Rover Project, Center for Radiophysics and Space Research, Cornell University, Ithaca, N.Y. Previously senior geoscientist, R. Alan Falquet & Associates, Granville, Ohio.

Gerard C. (Neil) Gaynor, to vice president, DeGolyer and MacNaughton, Houston. Previously geologist, DeGolyer and MacNaughton, Dallas.

Mark J. Gresko, to geological and geophysical manager, Santa Fe

Energy Resources, China Ltd. (subsidiary of Devon Energy), Shekou, Shenzhen, People's Republic of China. Previously chief geophysicist, Santa Fe Energy Resources, Jabung Ltd., Jakarta, Indonesia.

Lewis Land, to hydrogeologist-groundwater branch, North Carolina Division of Water Resources, Raleigh, N.C. Previously graduate student, University of North Carolina, Chapel Hill, N.C.

James C. Manatt Jr., to president, New Mexico State University Board of Regents, Las Cruces, N.M. He is chief executive officer and co-founder, Providence Technologies, Roswell, N.M.

Jennifer Ackerman Melster, to geologist, Apache Canada, Calgary, Canada. Previously geologist, Phillips Petroleum, Calgary, Canada.

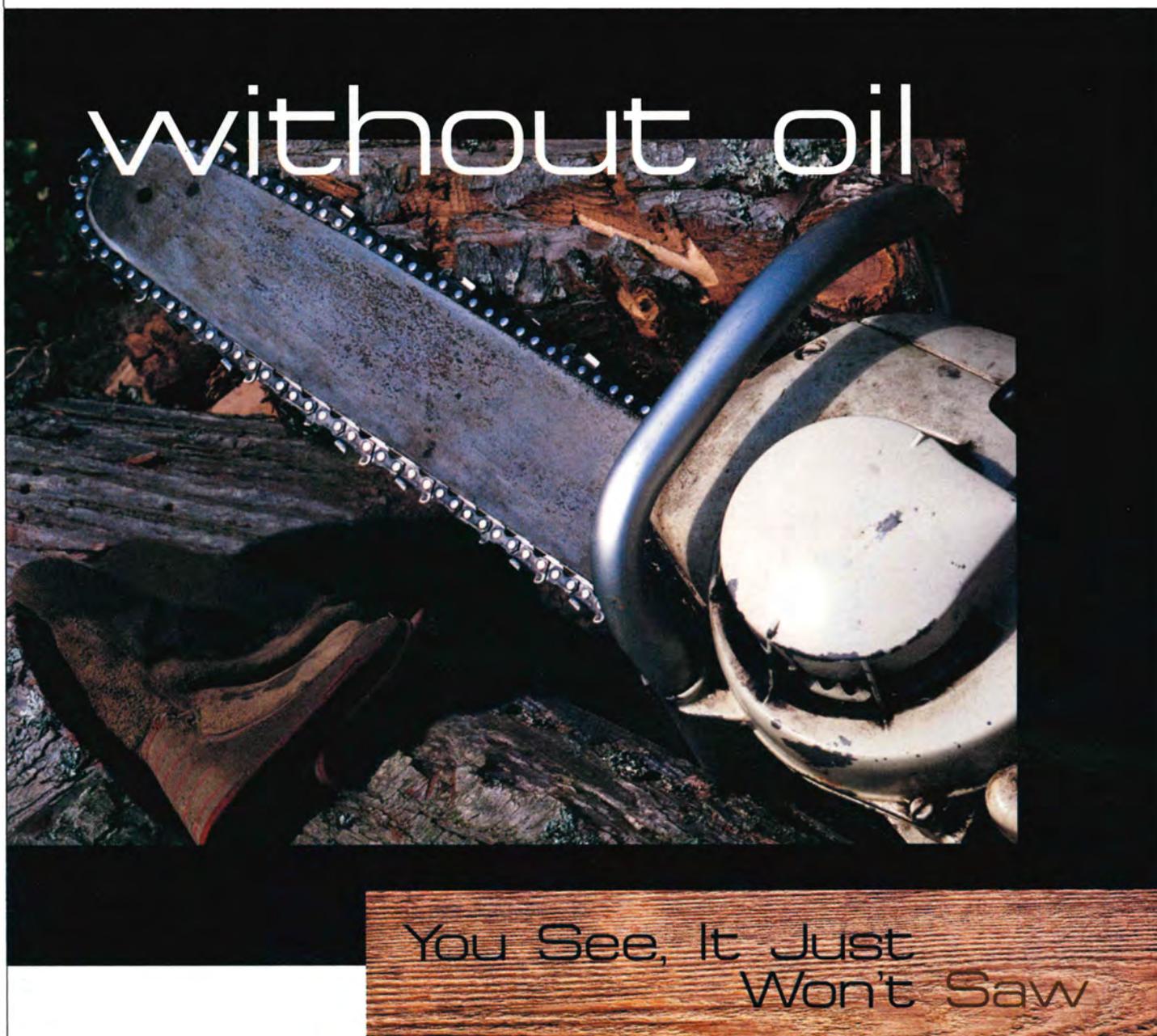
Robert J. Menzie Jr., to corporate environment professional, Marathon Oil, Houston. Previously advanced HES professional, Marathon Oil, Anchorage, Alaska.

Mark B. Miller, to vice president-operations, southeastern United States and Puerto Rico, Remedial Solutions, Chattanooga, Tenn. Previously project manager, Remedial Solutions, Chattanooga.

Jay Bee Monroe, to senior geophysicist, Marathon Oil, Houston. Previously advanced geophysicist, Marathon Oil, Oklahoma City.

Roger Murray, to senior staff explorationist, Texas Star Oil & Gas,

continued on next page



Hardage Paper Wins SW Levorsen

Robert A. Hardage, with the Bureau of Economic Geology in Austin, Texas, has won the A.I. Levorsen Award for giving the top paper of this year's Southwest Section meeting, held in March in Dallas.

Hardage's paper was "3-D Seismic Evidence of the Effects of Carbonate Karst Collapse on Overlying Clastic Stratigraphy and Reservoir Compartmentalization."

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continued from previous page

Houston. Previously senior staff geophysicist, E&P Solutions, Houston.

D. Lan Nguyen, to technical director, deputy chief executive officer, Mosaic Oil, Sydney, Australia. Previously technical and development manager, Mosaic Oil, Sydney.

Chris Oglesby, to senior geologist, Cairn Energy India, Chennai (Madras), India. Previously consulting petroleum geologist, Repsol-YPF-Maxus, Jakarta, Indonesia.

Darrell L. Potter, to environmental project manager/contract employee, BP Amoco, Livonia, Mich. Previously project manager/Shell, Handex Environmental, Wixom, Mich.

Deborah K. Sacrey, of Houston, has been installed as president of the Society of Independent Professional Earth Scientists (SIPES), Dallas. Other AAPG members who will serve as SIPES officers for 2001-2002 are **Marion E. Spitler**, Dallas, vice president; **Robert C. Leibrock**, Midland, Texas, vice president of natural resources; and **Peter G. Gray**, Lafayette, La., secretary. Newly elected board members include **Tony R. Stuart**, Hattiesburg, Miss.; **Paul W. Britt**, Houston, and **Mark E. Dunham**, Marshall, Texas. Serving as president of the SIPES Foundation is **Scott A. Wainwright**, New Orleans.

Kevin Schepel, to vice president-worldwide exploitation, Pioneer Natural Resources, Dallas. Previously worldwide exploitation manager, Pioneer Natural Resources, Dallas.

Allan C. Smith, to senior geologist and Houston representative, Computational Geology, Houston. Previously team leader, Baker Atlas GEOScience, Houston.

Paul Taylor, to petroleum geochemist, Robertson Research International, Llandudno, North Wales, UK. Previously geochemist, Unocal Deepwater USA, Sugar Land, Texas.

Conrad Todd, to exploration manager, Lundin Oil, Kuala Lumpur, Malaysia. Previously new ventures manager, Lasmo, Jakarta, Indonesia.

James W. Turner, to advising geologist, Unocal Thailand, Bangkok, Thailand. Previously senior geologist, Unocal Thailand, Bangkok.

Joseph W. Versfelt, to senior geologist, South Atlantic margins group, Alberta Energy, Houston. Previously staff geologist, CMS Oil and Gas, Houston.

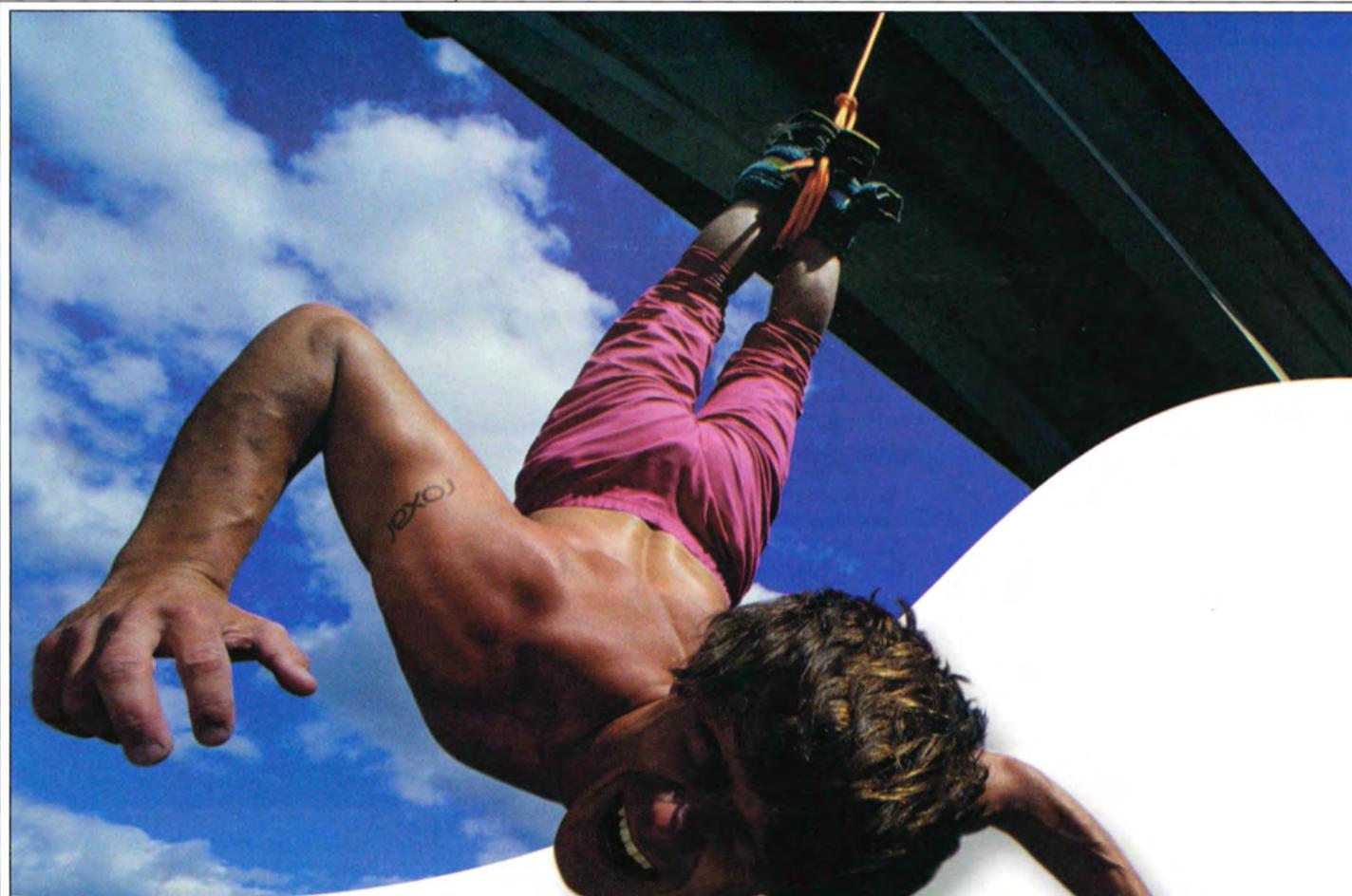
Charles L. Vorce, to geological advisor, Devon Energy, Houston. Previously geoscientist, BTA Oil Producers, Houston.

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

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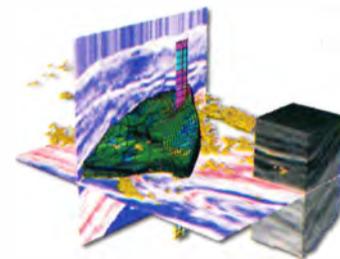
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INTERNATIONAL BULLETIN BOARD

(Editor's note: This column is devoted to international items of note to the AAPG.)

News items, press releases and other information should be submitted to the EXPLORER/International Bulletin Board, P.O. Box 979, Tulsa, Okla. 74101; telephone – 918-560-2616; fax – 918-560-2685; or e-mail – vstefan@aapg.org.

This month's column was written by Peter Lloyd, regional president of the AAPG Asia-Pacific Region.)

AAPG in the Asia-Pacific

AAPG in mid-1999 launched an initiative to "regionalize" its international efforts – a move designed to ensure overseas membership with better representation and a wider range of member services.

Last year's Bali 2000 international meeting and exhibition, with 1,900 attendees, demonstrated the technical prowess that this region shares with the rest of the organization – and was a springboard to several initiatives on which we have started work.

In the vast Asia-Pacific Region we have now set up a regional infrastructure with a steering committee and a representative in almost every country – from New Zealand to Pakistan and from Australia to East Siberia. We now have over 1,000 active members, and 13 members elected to the House of Delegates.

All 13, or their alternates, managed to attend the AAPG annual meeting in New Orleans last year – think of the air miles!

The Asia-Pacific Region also gained a vote on the AAPG Advisory Council.

The goals for the Asia-Pacific Region are five-fold:

□ To assure maximum exposure to AAPG's Distinguished Lecturer program.

In the last two years we hosted Ron Nelson (fractured reservoirs), Ken McClay (rift basins) and Henry Posamentier (sequence stratigraphic applications). In 2000-2001, we have lecture tours by Paul Crevello ("Carbonate Reservoir Simulation Models" and "Turbidite and Deep-Water Depositional Systems"), as well as Stan Paxton, who will be speaking on "Defining Sweet Spots in Sedimentary Basins."

We also are hosting a grand "presidential tour"; Robbie Gries will spend seven weeks visiting the complete region during her tenure, presenting her ideas on "Thinking Outside the Box, Innovative Exploration Plays."

□ To set up Student Chapters, bringing "new blood" into the Association.

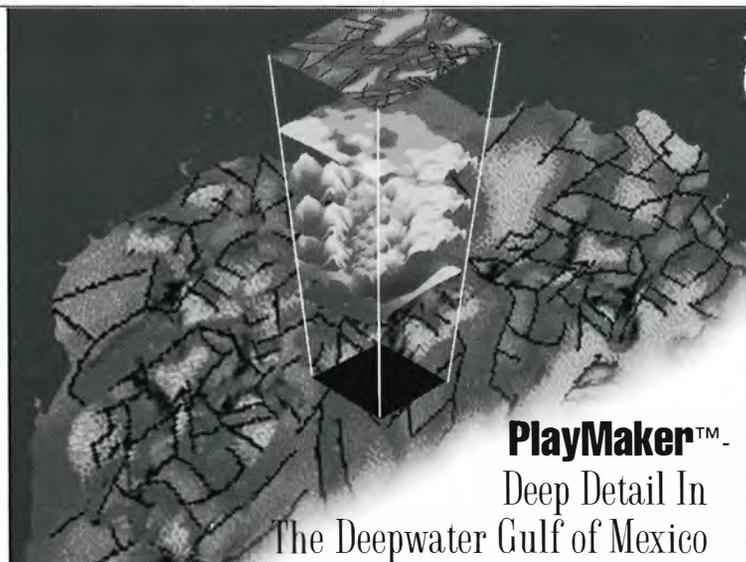
During 2000 we added six new chapters in the region; one in Kuala Lumpur and five in Indonesia, sponsored by the Ex-Presidents' Spouses, Gulf Canada, Schlumberger and Christiane Lloyd.

We also are encouraging students to apply for the Grants-in-Aid program to help support their field work, and we are distributing collections of the BULLETIN,

continued on next page

Country Contacts – Asia/Pacific Region

- | | |
|--|---|
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| * Richard Lorentz, Singapore (regional vice president), SEAPEX
(Ralgeol@aol.com) | |
| Joe Lambiase, Brunei
(lambiase@ubd.edu.bn) | * Member of the Regional Steering Committee |



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going back over many years, which have been donated by retiring members to these faculties.

Note that for US\$ 260 you can sponsor your own Chapter (one professor and 10 students)! And by volunteering as a "Visiting Geologist" you can come and lecture at these and other universities across the region.

To involve AAPG as a co-sponsor of conventions and workshops.

Bali 2000 was a great example of this initiative, demonstrating how we can cooperate with other international organizations, like the SEG (Society Exploration Geophysicists), SPE (Society of Petroleum Engineers) and the SPWLA (Society of Professional Well Log Analysts). We hope to maintain this close level of inter-society cooperation in future conferences and workshops planned for the area.

The next joint meeting will be on "Deep Water Sedimentation of Southeast Asia," May 14-16, in Jakarta, hosted by FOSI (Forum for Indonesia's Sedimentologists).

To bring technical courses developed by the AAPG's education department out to the Asia-Pacific.

This technology transfer will encourage professional development, and the flow of ideas into and across the region will stand us all in good stead as we look to the future.

This year we also plan to source courses within Asia-Pacific, leveraging off the expertise we have in organizations and institutes such as NCPGG (Australia's National Center for Petroleum Geology and Geophysics) and NEX (Network for Excellence in Training).

To assure that innovation, and professional and technical achievements in the international sphere are recognized and honored by the AAPG awards committees.

Chuck Caughey and Ian Collins will receive Distinguished Service Awards at this year's AAPG annual meeting in Denver.

It is only through volunteer efforts that our various societies and initiatives will prosper, and we need to formally recognize those who have contributed so much over the years.

* * *

Finally, I hope that all those members in the region who have not been mentioned in this article (directly or otherwise), or who are not currently active in their local societies, will feel

moved to volunteer their services and energies to AAPG.

Paying your subscription gets you the BULLETIN and the EXPLORER – and giving some quality time to push these and other initiatives assures even greater personal and professional satisfaction and reward.

And without sounding too much like one of those soppy, drippy, tear-flowing winners on Oscar night, we'd like to extend our thanks and appreciation to all those in AAPG headquarters in Tulsa, plus the International Liaison, Distinguished Lecturer and Membership committees; the Executive Committee; the HOD executives; and the Advisory Council.

Their support for the regionalization process will help expand the ideas, drive and vision of AAPG around the globe. □

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ANNOUNCEMENT

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APPEX

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The American Association of Petroleum Geologists is proud to announce a new venture for the presentation of prospects and properties in the fall of 2001—the **AAPG Prospect & Property Exposition (APPEX)**. Co-conveners for this new annual event are the Society of Independent Professional Earth Scientists and the Houston Geological Society. A primary sponsor for this exposition is PLS, a subsidiary of Torch Energy Advisors.

APPEX will showcase both domestic and international opportunities. The Expo is scheduled for **August 28-29, 2001**, at the Adam's Mark Hotel, Houston, Texas, located just east of the intersection of Westheimer and Beltway 8. This hotel is ideally suited for this event with room for nearly 300 booths. As an integral part of this event, PLS and Torch Energy Advisors will host a **DealMakers conference** to be held on **August 27 & 28** and will feature presentations on industry activity, exploration, acquisitions and source and capital.

To exhibit at or attend **APPEX**, please complete the form on back and return to AAPG. Please note that **AAPG, SIPES** and **HGS** members who are consultants or in a small company (five or fewer employees), can receive a discount of \$100 per booth and \$50 per viewer pass.

If you are interested in becoming a sponsor of **APPEX**, please check the sponsorship box or call Michelle Mayfield Gentzen at 888-945-2274 x618, mmayfiel@aapg.org.

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MEETINGS OF NOTE

Editor's note: Meetings listed here are sponsored by AAPG or an affiliated group.

2001 U.S. Meetings

June 2-3, SEPM, 75th anniversary mid-year meeting, Denver.

June 3-6, AAPG annual meeting, Denver.

June 16-20, SPWLAs, annual meeting, Houston.

Sept. 9-14, SEG, annual meeting, San Antonio.

June 20-23, History of the Oil Industry-Symposium and field trips, co-sponsored by AAPG, Oil City, Pa.

Sept. 22-25, Eastern Section, AAPG, annual Section meeting, Kalamazoo, Mich.

Sept. 23-26, The Society for Organic Petrology, 18th annual meeting, Houston.

Sept. 30-Oct. 2, Mid-Continent, AAPG, annual Section meeting, Amarillo, Texas.

Sept. 30-Oct. 3, Society of Petroleum Engineers, annual meeting, New Orleans.

Oct. 17-19, Gulf Coast Section of Geological Societies, AAPG, annual Section meeting, Shreveport, La.

Oct. 31-Nov. 4, AAPG Foundation Trustee Associates, annual meeting, Tucson, Ariz.

Nov. 5-8, GSA, annual meeting, Boston.

2001 International Meetings

June 11-15, European Association of Geoscientists and Engineers, annual meeting, Amsterdam, The Netherlands.

June 18-22, Canadian Society of Petroleum Geologists, annual meeting, Calgary, Alberta, Canada.

* July 15-18, VNIGRI/AAPG International Regional Conference, St. Petersburg, Russia.

Sept. 4-7, Offshore Northwest Europe, annual meeting, Aberdeen, Scotland.

Sept. 6-12, International Association for Mathematical Geology, Cancun, Mexico.

October, AMGP/AAPG International Conference, Veracruz, Mexico.

**EDUCATION
CALENDAR****2001 SCHOOLS,****SHORT COURSES**

Reservoir Characterization: Principle Methods and Case Studies
May 7-8, Dallas

High-Resolution Well-Log Sequence Stratigraphy
May 14-18, Denver

How to Evaluate Carbonate Reservoirs from Well Logs
June 2-3, Denver
(with AAPG annual meeting)

* Deep Water Sands, Integrated Stratigraphic Analysis
June 2-3, Denver
(with AAPG annual meeting)

* Prospect Evaluation "Surgical Theater" and Workshop
June 2-3, Denver
(with AAPG annual meeting)

E&P Methods and Technologies
June 7-9, Denver
(with AAPG annual meeting)

Applied Subsurface Mapping
July 9-13, Dallas

* Overpressure in Petroleum Systems in Deep Water Plays
July 14-15, St. Petersburg, Russia
(with AAPG regional international meeting : Register through AAPG convention department)

Well Log Analysis and Formation Evaluation
Aug. 7-10, Austin, Texas

Probability and Statistics for Exploration and Exploitation
Aug. 20-22, Dallas

Introduction to the Petroleum Geology of Deep-Water Clastic Depositional Systems
Sept. 8-9, San Antonio
(with SEG annual meeting)

Quantification of Risk – Petroleum Exploration and Production
Oct. 8-11, Houston

Terrigenous Clastic Depositional Systems and Sequences – Applications to Reservoir Prediction, Delineation and Characterization
Oct. 16-17, Shreveport, La.
(with GCAGS Section meeting)

Practical Salt Tectonics
Oct. 29-31, Houston

* Advanced Risk Analysis for the Energy Industry
Nov. 12-13, Houston

2001 FIELD SEMINARS**Carbonates**

Sequence Stratigraphy and Reservoir Distribution in a Modern Carbonate Platform, Bahamas
June 25-30
Begins, ends in Miami, Fla.

Arid Coastline Depositional Environments
Nov. 4-9
Begins, ends in Abu Dhabi, U.A.E

Clastics – Ancient

Wave-Dominated Shoreline Deposits, Book Cliffs, Utah: Depositional Models for Hydrocarbon Exploration
May 14-22; Aug. 20-28
Begins, ends in Grand Junction, Colo.

* Cretaceous Outcrops of the Western Interior, Ferron Sandstone, Fall River Formation and the Muddy Sandstone – Utah, Wyoming and South Dakota

continued on next page

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Scam from page 57

overpaid on some procurement contract.

The sender declares that he is a senior civil servant in one of the Nigerian Ministries, usually the Nigerian National Petroleum Corporation (NNPC). The letters refer to investigations of previous contracts awarded by prior regimes, alleging that many contracts were over-invoiced.

Rather than return the money to the government, they desire to transfer the money to a foreign account. The sums to be transferred average between \$10 to \$60 million, and the recipient is usually offered a commission up to 30 percent for assisting in the transfer.

Initially, the intended victim is instructed to provide company letterheads and pro forma invoicing that will be used to show completion of the contract. One of the reasons is to use the victim's letterhead to forge letters of recommendation to other victim companies and to seek a travel visa from the American Embassy in Lagos.

The victim also is told that the

completed contracts will be submitted for approval to the Central Bank of Nigeria. Upon approval, the funds will be remitted to an account supplied by the intended victim.

Dangerous Liaisons

The criminal's goal is to delude the target into thinking that they are being drawn into a very lucrative, albeit questionable, arrangement. The intended victim must be reassured and confident of the potential success of the deal. He will become the primary supporter of the scheme and willingly contribute a large amount of money when the deal is threatened.

The term "when" is used because the con-within-the-con in the scheme will be threatened in order to persuade the victim to provide a large sum of money to save the venture.

Victims are almost always requested to travel to Nigeria or a border country to complete a transaction. Individuals are often told that a visa will not be necessary to enter the country. The Nigerian con artists may then bribe airport officials to pass the victims through Nigeria Immigration and Customs.

Because it is a serious offense in Nigeria to enter without a valid visa, the victim's illegal entry may be used by the fraudsters as leverage to coerce the victims into releasing funds.

Violence and threats of physical harm may be employed to further pressure victims. In June 1995, an American was murdered in Lagos while pursuing a 4-1-9 scam, and numerous other foreign nationals have been reported as missing.

Several reasons have been

submitted why the scheme has undergone a dramatic increase in recent years, and the explanations are as diverse as the types of schemes. The Nigerian government blames the growing problem on mass unemployment, extended family systems, a get-rich-quick syndrome and, especially, the greed of foreigners.

If you have been victimized by one of these schemes, forward appropriate written documentation to the U.S. Secret Service, Financial Crimes Division, 950 H Street, NW, Washington, D.C. 20001; or telephone (202) 406-5850.

If you have received a letter, but have not lost any monies to this scheme, the Secret Service asks to receive a fax copy of that letter or e-mail to (202) 406-5031. □

continued from previous page

June 7-14
Begins in Wyoming
Ends in South Dakota
(following AAPG annual meeting)

Clastics – Modern

Modern Clastic Depositional Environments
May 18-24; Sept. 12-18
Begins in Columbia, S.C.
Ends in Charleston, S.C.

Modern Deltas

Sept. 10-14
Begins in Baton Rouge, La.
Ends in New Orleans

Sequence Stratigraphy

Sequence Stratigraphic Influence on Sandstone Reservoir Characteristics of Cretaceous Foreland Basin Deposits
June 24-29
Begins in Rock Springs, Wyo.
Ends in Steamboat Springs, Colo.

Sequence Stratigraphy Field Seminar: Sequences and Facies on an Active Margin
Oct. 14-19
Begins, ends in La Jolla, Calif.

Tectonics and Sedimentation

Grand Canyon Geology via the Colorado River, Arizona
(An AAPG Geotour)
June 10-18
Begins in Marble Canyon, Ariz.
Ends in Marble Canyon; South Rim, Ariz.; or Las Vegas, Nev.
(following AAPG annual meeting)

Utah-Nevada Overthrust Belt and Eastern Great Basin Tectonics
June 18-22
Begins in Salt Lake City
Ends in Las Vegas, Nev.

E&P in Thrusted Terrains, Practical Applications of Structure and Stratigraphy in the Montana/Alberta Thrust
Aug. 5-10
Begins in Great Falls, Mont.
Ends in Calgary, Canada

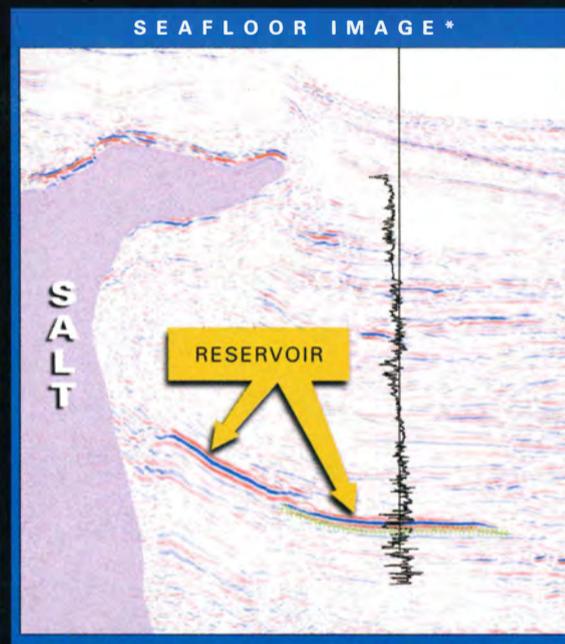
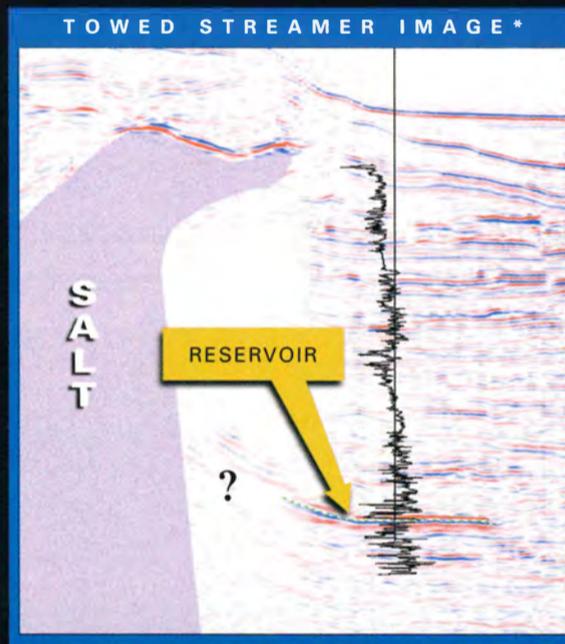
Submarine Fan and Canyon Reservoirs, California
Sept. 17-21
Begins, ends in San Francisco

* New AAPG course or field seminar.

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AAPG Education Summer 2001 Offerings

Abnormal formation Pressures in Petroleum Systems: Perspectives from East and West

Instructors: V.I. Slavin, R. E. Swarbrick

Short course designed to offer participants a) insights into abnormally pressured petroleum systems with reference to classic worldwide examples; b) an understanding of the origin and distribution of abnormally high pressures; c) knowledge of methods available for pore pressure detection/prediction; d) and an appreciation of the potential effects of abnormal pressure on the petroleum system (seal, reservoir, migration and maturation). The course will be taught from the perspective of drilling operations, exploration and production of petroleum reserves. An objective of AAPG in offering this course at St. Petersburg is to compare and contrast how the petroleum industry in Russia and the West deals with abnormal high formation pressures.

July 14-15 at the AAPG Regional Meeting, St. Petersburg, Russia.

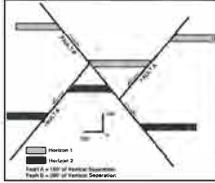
Applied Subsurface Mapping

Instructor: Joseph L. Brewton

This school is a complete and thorough exposition of subsurface petroleum geologic methods. The textbook, Applied Subsurface Geological Mapping by Daniel J. Tearpock and Richard E. Bischke is included as the course notes.

July 9-13

See Education Catalog page 3 for details.



Well Log Analysis and Formation Evaluation

Instructors: George B. Asquith;
Daniel Krygowski

"How to" approach to basic open hole well log analysis. Explains different jargon from 50-year history of well logging. How to determine best log suites to use is discussed. Calculation of well logs are done in practical exercises. Logging research and the future of well logging is discussed.

August 7-10

See Education Catalog page 4 for details.

For complete details contact:

AAPG Education Department,
P.O. Box 979,
Tulsa, OK 74101-0979 USA

Phone: 918-560-2650
Fax: 918-560-2678
E-Mail: educate@aapg.org

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DIVISION OF PROFESSIONAL AFFAIRS PROGRAM 2001 AAPG ANNUAL MEETING June 3rd-6th

The DPA will sponsor a number of technical and social events during the 2001 AAPG Annual Meeting to be held in Denver June 3rd-6th. The variety of topics is broad enough to have something of interest for all Association members.

Short Courses

• Production Decline Analysis and Economics for Geologists

Instructors: Robert Thompson and John Wright (*Thompson-Wright Associates*)
A hands on course which will provide a good foundation in this subject.

• Office 2000 for the Geoscience Professional

Instructor: Peter Varney.

Co-sponsored by the PTTC, this course enhances computer skills with Office 2000.

Oral Technical Program

• Marketing in the 21st Century in the Oil and Gas Exploration Business

The emphasis is on modern marketing techniques

• The Executive Perspective of the Energy Odyssey of the 21st Century

Co-Sponsored with AAPG, this invited session will feature a panel of industry executives focusing on "merger mania" that has become so prominent in our industry.

Forum

• Public Lands Access

This will be an all Division Forum co-sponsored by the Division of Environmental Sciences and the Energy Minerals Division. This panel discussion on public lands access policy is a timely and increasingly important issue to the petroleum industry and is currently in the forefront of public debate. Four panelists will present differing views on land use issues. It should be a lively debate, with time for audience participation. Please make plans to attend on Monday afternoon.

DPA/ EMD Luncheon

• "How Can We Dig Ourselves Out of the Energy Crisis?"

The speaker will be Matthew Simmons. Mr. Simmons has spoken and written widely on energy issues and this should be an interesting and insightful talk.

Career Transition Workshop

• Co-sponsored with AAPG and the SIPES Foundation, this one-day program is designed to provide some basis information for geologists considering moving into consulting or independent professional geological practice. It is free and a convention registration fee is not required. However, please indicate on the convention registration form that you plan to attend and forward it to the AAPG.

And don't forget—

Awards Banquet

• DPA Awards Banquet to be held on Saturday evening at the top of the Rockies Club.

Business Meeting

• DPA Business Meeting will held at the top of the Rockies Club on Tuesday at five. The meeting will be brief following by a social time. Come and meet your fellow DPA members and officers and get the inside dope on DPA activities.

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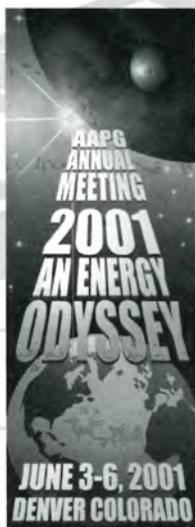
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For more information, contact:

Edgar L. Berg, Chairman, Prospect & Property Marketplace
phone 303-436-1930, fax 303-322-2288, e-mail ebergsekr@aol.com

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CAREER TRANSITION WORKSHOP

Presented by The American Association of Petroleum Geologists, The
Division of Professional Affairs and The SIPES Foundation in
conjunction with the 2001 Annual Meeting

Sunday, June 3rd at 8:30 AM — Marriott City Center

The Workshop is **FREE**

A convention registration fee is not required. Please indicate on the Convention registration form that you are attending the Workshop and forward it to the AAPG.

TOPICS PRESENTED

- ♣ What Type of Work To Do
- ♣ How to be a Geological Consultant
- ♣ Setting Up an Office and Obtaining Data, Generating, Assembling and Selling Promoted Prospects-What a deal Screener Expects to See
- ♣ Legal Contracts, Expert Testimony, Role of Geologist in Commissions and Regulatory Agencies and Types of Mineral Ownership
- ♣ Book Keeping and Tax Information for the Self Employed Geologist
- ♣ Computer Applications for the Independent Geologist

This one-day program is designed to address some of the issues that face the geoscience professional. Though it is primarily for members who are entering, considering entering, consulting or independent geological practice, information will be presented that can be useful for anyone in helping to establish and maintain a successful consulting practice.

The emphasis will be on the opportunity to interact and discuss topic with a group of experts experienced in this spectrum of topics. The presenters will be Robert Pledger, Tom Fails, Steve Sonnenberg, Deborah Sacrey, two local attorneys and a local accountant.

The attendees will be provided a workbook containing the presentations.

The Program will be completed approximately two hours prior to the Ice Breaker Reception.

MEMBERSHIP AND CERTIFICATION

The following candidates have submitted applications for membership in the Association and, below, certification by the Division of Professional Affairs. This does not constitute election, but places the names before the membership at large. Any information bearing on the qualifications of these candidates should be sent promptly to the Executive Committee, P.O. Box 979, Tulsa, Okla. 74101. (Names of sponsors are placed in parentheses. Reinstatements indicated do not require sponsors.)

For Active Membership

California

Williams, Jefferson B., Supersonic Geophysical, Los Angeles (D.D. Clarke, R.R. Smart, H. Worries)

Colorado

Knoll, Blake Alan, Knoll Exploration, Ignacio (J.A. Campbell, T.A.L. Casey, W.W. Bayne); **Stands-Over-Bull, Russell E.**, Barrett Resources, Denver (J.B. Curtis, R.J. Weimer, W.B. Hanson)

Louisiana

Schutjens, Peter Maarten, Shell Deepwater Services, New Orleans (B. van Hoorn, P.J. Nederlof, R. Franssen)

Nevada

Leedom, Stephen H., U.S. Department of Energy, Las Vegas (Reinstate)

New York

Tanguay, Lillian Hess, Long Island University, Brookville (G.M. Friedman, K.M. Wolgemuth, S.A. Epstein)

Ohio

Henthorne, Jason Fitzgerald, Petro Evaluation Services, Wooster (J.G. Henthorne, J.J. Hanlon, S.I. Root)

Texas

Crews, Jennifer Rae, Texaco E&P, Houston (P. Weimer, A.R. Thomas, R.J. Alexander); **Emerick, John A.**, ExxonMobil Exploration, Houston (Reinstate); **Ervin, Sheryl Denise**, Texaco, Midland (E.L. Stoudt, R.N. Goon, R.H. Arnold); **Melear, James Carl**, Railroad Commission of Texas, Austin (M. Allen, J.H. Hamilton, Z.L. George); **Stevens,**

John W., Kelman Seismic Processing, Houston (P.A. Fender, S.L. Davidson, L.B. Thompson)

Canada

Gillen, Kevin Paul, Vox Terrae, Calgary (P.B. Jones, C.F. Lamb, I.E. Hutcheon); **Hodder, Jody**, Husky Energy, Calgary (H.A. Wishart, P.G. Pilch, M.E. Enachescu); **Stinson, Patrick**, Talisman Energy, Calgary (R.T. Dick, G.M. Say, P.B.V. Quartero); **Wrathall, Brett Calvin**, Husky Energy, Calgary (H.A. Wishart, P.G. Pilch, M.E. Enachescu)

Egypt

Younes, Mohamed Abdel-Aziz, Alexandria University, Alexandria (H.M. Holail, A.N. Shahin, T.F. El-Azhary)

Indonesia

Tambunan, Bahal Raja, Vico Indonesia, Jakarta (N. Syarifuddin, H. Alam, Safarudin)

Nigeria

Akande, Samuel Olusegun, University of Ilorin, Ilorin (A. Adesida, S.P. Braide, A.O. Akinpelu)

Norway

Hunsdale, Robert, Phillips Petroleum Norway, Tananger (R.J. Hofer, R.J. Bowe, T.R. Jensen)

Tanzania

Lezzar, Kiram Eddine, Syracuse University, Syracuse (C.A. Scholz, B.J. Katz, J.E. Robinson)

Certification

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

Certification – Petroleum Geologist Louisiana

Moreland, Daniel Scott, Nelson Energy, Shreveport (W.R. Downs, M.E. Dunham, D.L. Billingsley)

Oklahoma

Newman, Gary James, Gary J. Newman, Edmond (G.W. Troutman, M.H. Vaughn, M.R. Root)

Texas

Blass, Jeff Len, Denbury Resources, Plano (C.P. Doubek, T.V. Moreland, W.D. Barber); **Engelhardt-Moore, Nancy**, consultant, Houston (R. Pledger, T. Russell, M. Deming); **Fisk, James D.**, Tri-Ex Petroleum, Amarillo (Reinstatement); **Rowland, Bret**, PGS Reservoir U.S., Houston (Reinstatement); **Short, Dale Mark**, Midway Exploration, Tyler (A.K. Jasper, R.L. Adams, J. Bedford); **Wilson, Gaylon Ernest**, LMG Operating/EVSeis, Graham (D.K. Stivers, R.L. Harding, J. Jones)

Canada

Hewitt, Martin Douglas, Pan Canadian Petroleum, Calgary (P.J.F. Gratton, J.M. Party, J.R. Hogg)

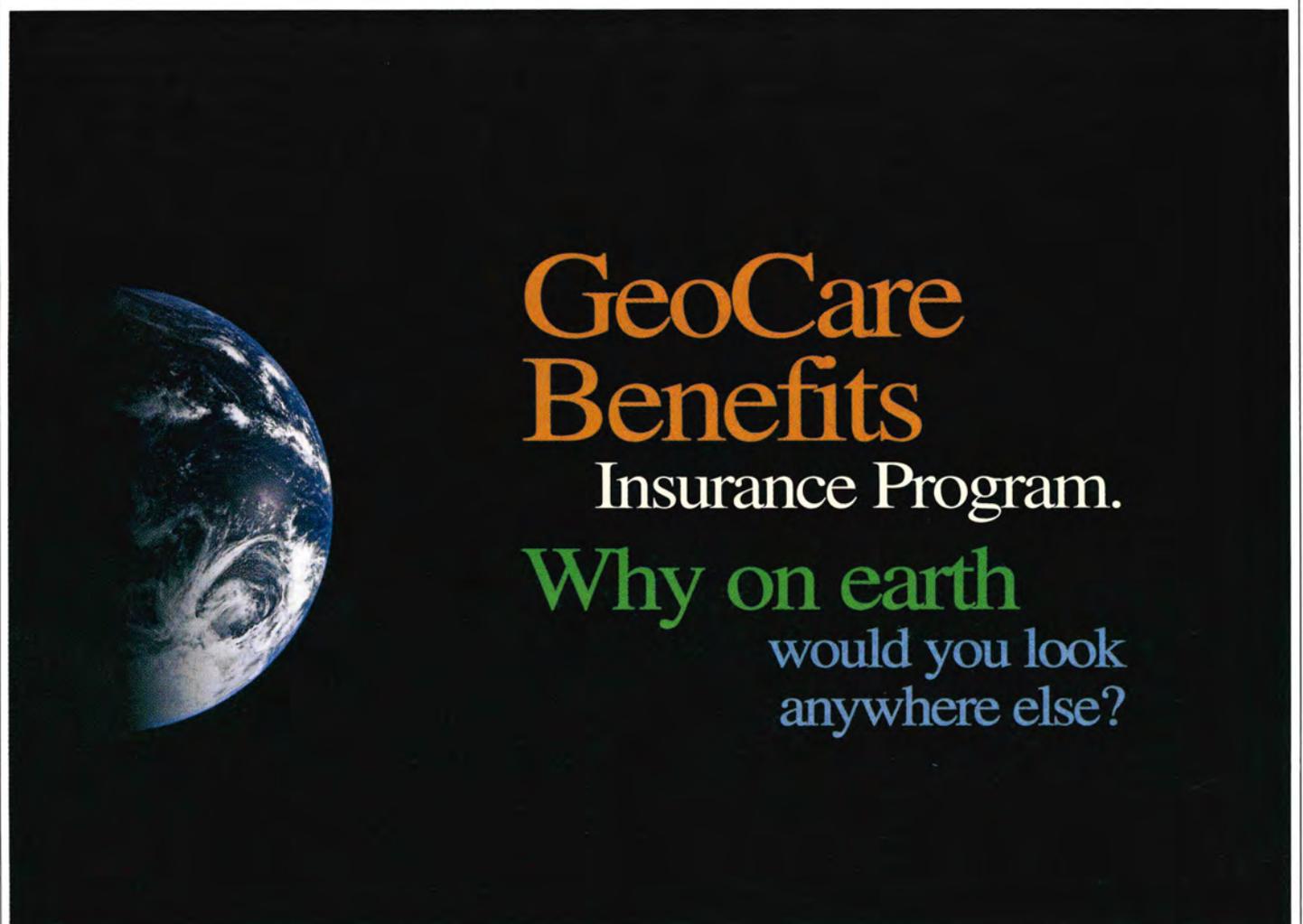
Pakistan

Waghorn, David Brice, Premier Oil, Islamabad (S. O'Connor, J.M. Beggs, R.A. Cook)

Certification – Petroleum Geophysicist

Texas

Sheppard, Frank C. III, Stone Energy, Houston (J. Hastings, P. Duncan, G. Knapp)



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READERS' FORUM

An Experienced View

In urging that exploration in the Alaskan National Wildlife Refuge (ANWR) must not begin ("Don't Drill ANWR," Readers' Forum, March EXPLORER) the writer cites his experience resumé. He has been a member of AAPG since 1985 (16 years) and served as a geophysicist with "years" in oil exploration and the last five years in earthquake analyses.

The writer states that geologists must lead in intelligent policy making; apply the best ideas, technology and effort to locate and produce the oil and gas on which we all depend; apply innovative and comprehensive conservation measures to extend the life of our reserves; recognize that alternative energy sources will be developed; and examine the "big picture" and the consequences of our decisions on the global quality of life.

He concludes that because of the consequences of exploration in ANWR would have on global quality of life, AAPG must not allow itself to be an instrument of the oil industry's traditional economics.

Having been a member of AAPG since 1940 and an active exploration and development geologist in the United States west of the Mississippi, Canada and the Far East, I agree with the writer's statement but strongly disagree with his conclusion.

Since the beginning of the petroleum revolution in 1901 at Spindletop, our quality of life has

Editor's note: 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.

changed dramatically and for the better, I believe. Other countries have matched us while some are striving to – notably the Far East, including China.

Worldwide demand has reached 76 million barrels per day and growing. Reserves will be depleted. We must conserve. We must encourage seeking new energy sources. But during the transition period we will continue to need oil and gas for the foreseeable future. Finding it domestically will be good for our balance of trade. While seeking new reserves we must strike a balance between protecting the environment and developing reserves. We cannot survive on environment alone.

Alaska has about 375 million acres, ANWR about 19 million acres and the coastal plain about 1.5 million acres. The coastal plain is not what we in the lower 48 visualize. It is a low relief mostly barren snow covered plain sloping toward the Beaufort Sea. Caribou forage in the area only about two months each year.

In 1980 Congress set aside a small 2,000-acre sliver of land for study to determine if oil potential could be developed safely. The EIA report in 1987 said it could. In May

2000 the Energy Information Administration indicated the area could contain between 10 and 16 billion barrels of oil recoverable over 30 years.

If oil were developed in this 2000-acre sliver, development would be from just a few pads utilizing modern methods of technology and extended reach, directionally drilled wells. It can be done safely and efficiently with little or no permanent damage to the environment – as has been demonstrated at Prudhoe Bay. There, 12 billion barrels of oil has been produced since coming on stream in 1977; its peak production reached two million bopd and has declined to about 980,000 bopd in 2001.

Caribou have tripled from 6,000 in 1978 to 21,000 in 2000.

The time to open up this small area in ANWR is now! With declining Prudhoe production, space will be available in the existing pipeline and infrastructure while still efficiently operated and maintained.

Bill Kennett
Santa Barbara, Calif.

Another Point of View

I applaud the March letter arguing against drilling in the Arctic

National Wildlife Refuge, and I thank the EXPLORER for publishing this alternative viewpoint.

I can add little to those comments, other than to reiterate the statistic that improving the gasoline mileage of the nation's new vehicles by just three miles per gallon would save more petroleum than the ANWR is expected to produce.

We need a two-pronged energy policy – not one seeking solely increased production, but one that actively pursues energy conservation.

Paul Waton
St. Petersburg, Fla.

Sale On Hold

I read your article "The Rocks Are Everywhere/ Trenton-Black River Play Expands" (March EXPLORER) with great interest. Ceja Corp. (my employer) is very active in the play with a large lease position and several hundred miles of 2-D seismic in New York. We plan to drill our first Trenton test this fall.

The state of New York has been planning its lease sale since January; however, internal conflict on land use has caused the lease sale to be put on hold. I can only hope that those who oppose the rational development of natural resources in New York have their own personal supply of energy for

continued on next page

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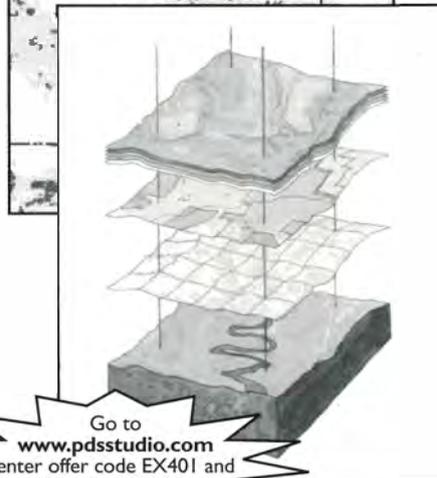
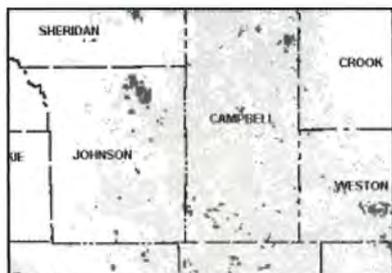
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the coming blackouts this summer and high energy bills next winter.

It is time for the general public to support our industry and recognize that the standard of living in the United States was built upon and is maintained by hydrocarbons.

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Charles Wickstrom
Tulsa

Vision and Courage

I would like to commend Doc Weathers, Division of Environmental Geosciences president, for his thoughtful comments about the DEG role as the environmental arm of the AAPG (March EXPLORER). I would also like to commend William Sarni (December EXPLORER) for the summary of Kyoto Protocol issues and proactive risk management through CO₂ trading implemented by global energy leaders such as Shell and BP.

Some environmental topics are embraced openly and championed by the AAPG. Others are more difficult, such as global warming, because "if" the climate models are right, the petroleum industry will need to use the same ingenuity that it uses to find oil to remedy the problem.

It takes a visionary leader, such as Doc Weathers, who can see the value of discourse encouraged in DEG Forums at the annual meeting and through *Environmental Science*, the DEG journal. It takes courage for an AAPG member, such as Bill Sarni, to be neutral when writing about a topic that is difficult for many members to acknowledge with fairness and validity.

Susan Chandler Kiser
Grand Junction, Colo.

Money-Driven Environmentalists?

Regarding "Environmental Evolution" (February EXPLORER): I read this with interest because Lee Gerhard and Bill Lawson are very bright people for whom I have a great deal of respect.

With that said, the article was very kind with respect with today's environmentalism.

The organized environmental movement has nothing to do with the environment and everything to do with money. It is driven by money hungry environmental lawyers who take advantage of our system and a few, as Gerhard said, "schooled, but

poorly educated" people; I kindly call them environmental zealots. Their actions do nothing for the environment and everything to get rich people to contribute and moreover cause legal actions against the government where the public pays their legal fees.

They (also) encourage foreign oil and gas exploration without the environmental safeguards we have here in the United States, and they encourage the shipping of oil that has a much higher risk of spills than drilling and production domestically.

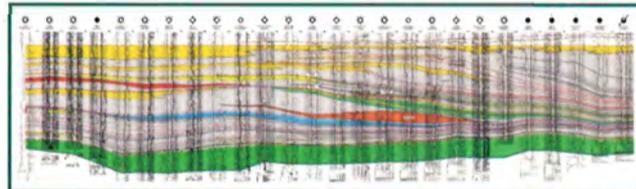
Your article made many good points about the evolution of public standards, and I look forward to the final article by these outstanding people.

Tom Williams
Houston

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Environmental Seminar Is A Scottish Success

Michael "Doc" Weathers
DEG President

DEG co-sponsored a highly successful environmental seminar on March 6th held at the Aberdeen Exhibition and Conference Centre (AECC) in Aberdeen, Scotland. The seminar was titled *Impact on the Environment of Offshore Oil and Gas Operations* and was co-sponsored by the DEG, the Petroleum Exploration Society of Great Britain (PESGB), and the Institute of Petroleum (IP). The planning, organizing, and promotion were done jointly by the DEG, PESGB, and the IP. Steven Veal, the DEG International Programs Coordinator, represented and actively led DEG in this effort.

Through a series of talks, environmental experts addressed the range of impacts of the UK offshore oil and gas industry on the flora and fauna of the marine environment and demonstrate the extent to which the industry has succeeded in tackling them:

- Impact of off shore oil and gas industry on marine mammals;
- Environmental challenges for deep water exploration and production;
- Fishing gear interaction with cuttings piles after decommissioning;
- Understanding man-made noise and its effects, recent measurements and their interpretation;
- Impact of discharges to sea from oil and gas operations on the benthos;
- Support process for environmental decision making;
- Energy and emissions calculations in offshore decommissioning;
- Considerations in developing



Steve Veal (left), DEG International Programs Coordinator, and Doc Weathers (right) DEG President, representing AAPG-DEG in Aberdeen, Scotland.

- high H₂S fields; and
- Carbon dioxide sequestration.

Due to the success of this meeting, PESGB and DEG plan to have similar future environmental meetings or seminars in the European Region...possibly every year or two; this will facilitate DEG's desired higher level of involvement in the international arena. The seminar was a clear success, with 96 registrants in attendance, considering the seminar was put together a few months. In addition to establishing important connections, DEG made a \$2,400 profit for the Division.



PESGB



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New DEG Officers Announced

Congratulations to the newly elected DEG officers. The new slate is as follows:

President-Elect: Bob Menzie

Vice President: John Lopez

Secretary/Treasurer: Bill Sarni

Beginning July 1, 2001, Bob Menzie will serve a 1-year term as President-Elect, followed by a 1-year term as President. John Lopez will serve a 1-year term as Vice President. Bill Sarni will serve a 2-year term as Secretary/Treasurer. In addition, the proposed amendment to the DEG Bylaws was approved to include another year of service on the DEG Executive Committee for the immediate DEG Past-President.

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New Administration Signals Political Climate Change

By Janet S. Roemmel

The new Bush-Cheney administration, including Department of Interior (DOI) Secretary Gale Norton and the US Environmental Protection Agency (EPA) Administrator Christine Todd Whitman, has made several environmental announcements and proposals. A clear indication of a major change in political climate has been signaled to the oil and gas and extractive minerals industries since January as evidenced by the following:

- Rejection of requirements to reduce carbon dioxide emissions;
- Proposed drilling in Alaska's Arctic National Wildlife Refuge (ANWR);
- Proposed alternative gas pipeline from ANWR;
- Abandonment of the *Kyoto Protocol* on global warming;
- Possible revisions to US policy on Renewable Energy;
- Rescinding energy efficiency standards;
- Allowing higher levels of arsenic in drinking water;
- Aggressive development of US federal lands by modifying Forest Service management plans to allow drilling in roadless areas,

and fast tracking decisions on designations of wilderness study areas so that those areas that are do not make the cut can be opened for development; Advocating nuclear energy as an environmentally sound energy alternative; Elimination of rules that require federal agencies to assess if companies seeking government contracts are habitual violators of labor, environmental, or other laws; and Proposed significant budget cuts for the US EPA, the US DOI, the US Forest Service, and US Department of Energy.

Reasons given for the new policies include a lack of a compelling scientific evidence for global warming, the ability to drill in sensitive areas without environmental degradation, expected developments in market-based incentives to deal with global climate change, high costs of implementation of programs and the detrimental effect to the US economy, unfairness to the US if developing nations are exempt from environmental standards, and the growing national energy crisis. □

DEG Information Available Online

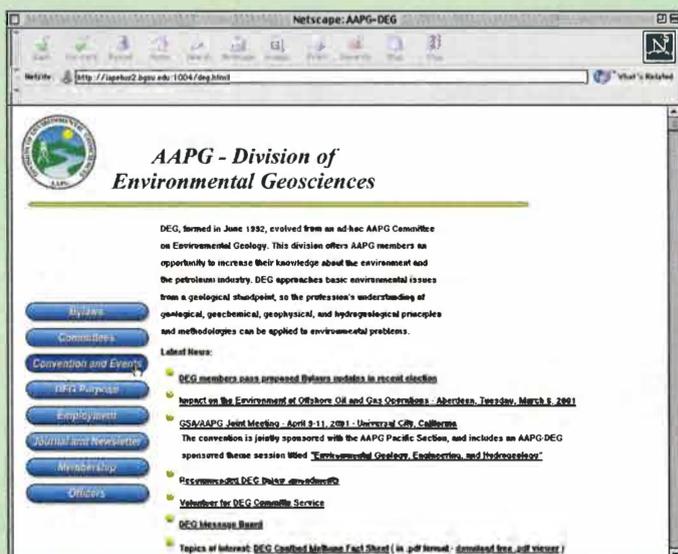
Link to the DEG Website through www.aapg.org for:

Website Features:

- DEG Annual Meeting Program, June 3 to 6, 2001 in Denver
- Abstracts for the Aberdeen Seminar on March 6, 2001
- Coalbed Methane Factsheet
- Contacts Information for Officers, Committees, Advisory Board

Coming soon, factsheets on petroleum-related environmental issues of international interest, such as:

- ISO 14,001 – basic facts of new international standards for environmental management systems;
- Well Abandonment – important for any oil producing region with any significant historical production;
- NOW – non hazardous oil-field waste;
- and Western U.S. Air Quality issues – relevance to international operations, too.



A listing of DEG officers is on the AAPG Web site at www.aapg.org.

Use the link there to get to the DEG Web site.

Produced by the AAPG Division of Environmental Geosciences

EMD

from page 78

As a compression-liquefied motor fuel it burns cleaner than gasoline, but requires a large volume of onboard storage due to its low fuel-density. This factor limits the range of vehicles dedicated to its use.

Coalbed Methane represents a source of near-term to medium-term input into America's energy supply similar to coal. Much of the resource base is now on production or soon will be and we will be burning this fuel for decades to come, but it is an incremental extension of the natural gas supply with finite dimensions.

The likely impact on our long-term energy supply is moderate.

Gas Hydrates are the thousand pound gorilla of methane sources, but we haven't figured how to cage that beast and put it to work. The resources are huge, exceeding all other sources of methane many times over.

This resource begs for research funding but, for now, appears to be only a long-term possible component of our energy supply for planning purposes.

The conceivable impact on our long-term energy supply is huge.

Gas Shales are an unconventional source of natural gas obtained through conventional oil and gas industry methods (i.e., you drill for it). The per well reserves are low and production term is protracted, but the environmental consequences of production are minimal.

The likely impact on our long-term energy supply is small.

Table 2: Deduced Energy Priorities For U.S. Governmental Action

1. **Maximize nuclear generation of electricity.**
Through incentives and disincentives, urge that all new electrical generation capacity should be nuclear. Pass facilitative federal laws to:
 - ✓ Immediately designate a federal spent nuclear fuel storage facility at Yucca Mountain, Nevada.
 - ✓ Mandate national rules for safe transport of spent fuels superceding state's rights of passage.
 - ✓ Implement a plan for ultimate safe spent fuel disposal (such as incorporating wastes into glazed ceramic blocks to bury in the deep ocean trenches, or other).
2. **Provide incentives for end-use conversion from coal and hydrocarbon fuels to electricity, wherever possible.**
Significantly raise taxes on use of hydrocarbons as fuels, except where no viable option exists (aircraft, farming, long-range commercial transport, etc.)
3. **Provide incentives for greater efficiency of usage where hydrocarbon fuels must be used.**
4. **Dramatically increase funding (at the state and national level) for energy research into gas hydrates, clean coal technology, more efficient energy technologies, and safer, standardized nuclear system and plant designs.**
This is where the tax money from item number 2 should be spent.

Biomass is the process of collecting biogenic methane from sanitary landfills. It is a relatively small resource, but is cheap and usually convenient to develop.

The likely impact on our long-term energy supply is negligible.

Geothermal and Hydropower energy is limited in distribution and in scope of usage to electrical generation. Like hydropower, geothermal energy is where you find it.

Their main detractors are various environmental affects, its transmission losses from electrical resistance and its limited growth potential.

The likely impact on our energy supply is small, but these tend to be enduring sources.

Oil Shales and Tar Sands could become a part of the energy supply, but only when oil prices rise and remain in the \$40 to \$50/bbl range.

Recovery of this resource is a dirty operation whether mined or burned in situ. The wisest use of this resource is as feedstock for petrochemicals and plastics, rather than as an energy source.

The likely impact on our energy supply in the foreseeable future is small.

Uranium is the most compact fuel we have, and but for its radioactive and security hazards it would be a prime candidate to fuel transportation. Limited to electrical generation for these reasons, it is also the single best answer in that realm.

Use of uranium as a fuel has the

smallest overall environmental footprint of any energy source. Done properly, with wise planning and an enlightened environmental oversight, uranium energy can be absolutely clean.

Our indigenous supply is significant into the long-term, and is supported further by the fact that the world's largest producer and the world's largest reserves are both in the nations of long-standing, stable friends (Canada and Australia, respectively).

These observations can be reduced to a table (Table 1, page 78) correlating energy sources with uses. One deduction from this tabulation (and the observations above) is that with expanded use of nuclear power, there is at least one form of energy that we can use freely and without guilt: electricity.

We can transform these points into energy priorities by applying three simple principles:

- ☐ That indigenous energy is better than imported energy.
- ☐ That we should minimize use of energy from sources that pollute.
- ☐ That we must maximize efficiencies.

The most obvious deductions are stated in Table 2.

It is a certainty that we can solve our national energy problems, and that we can lead the way for the rest of the world to solve our worldwide energy problems. We have the brains, the tools and the freedom to solve these issues in the short-term.

The only question is whether we have the collective will and political clarity of thought to make the decisions that must be made.

Energy is the lifeblood of our culture – and our greatest vulnerability. Our future depends absolutely on our government's ability to set a wise energy policy and then make it happen. ☐

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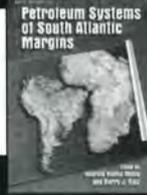
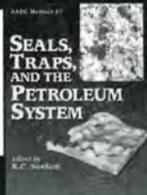
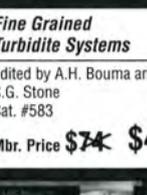
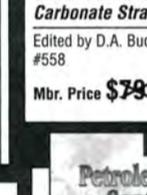
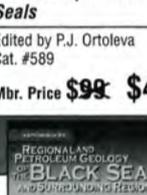
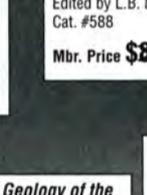
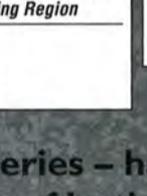
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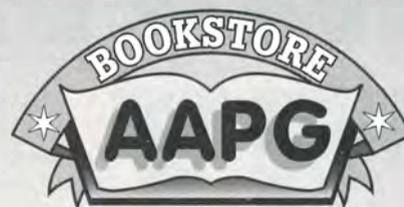
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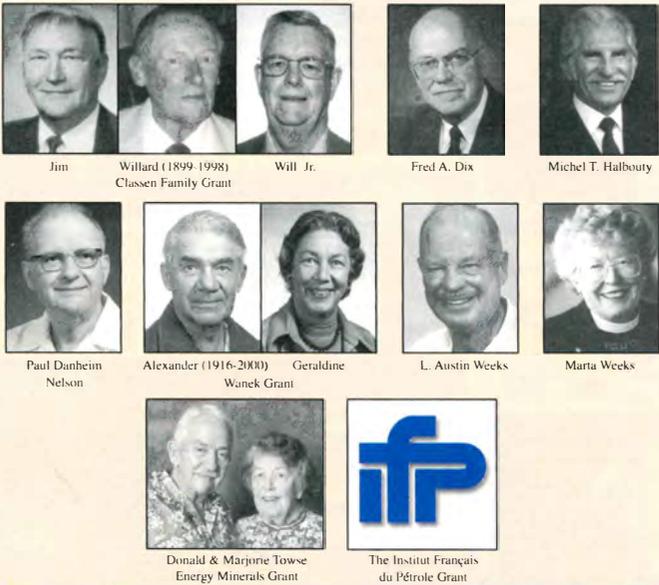
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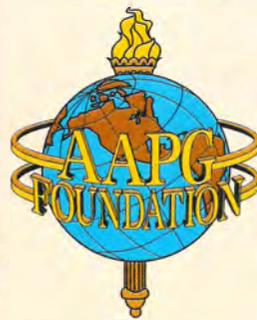


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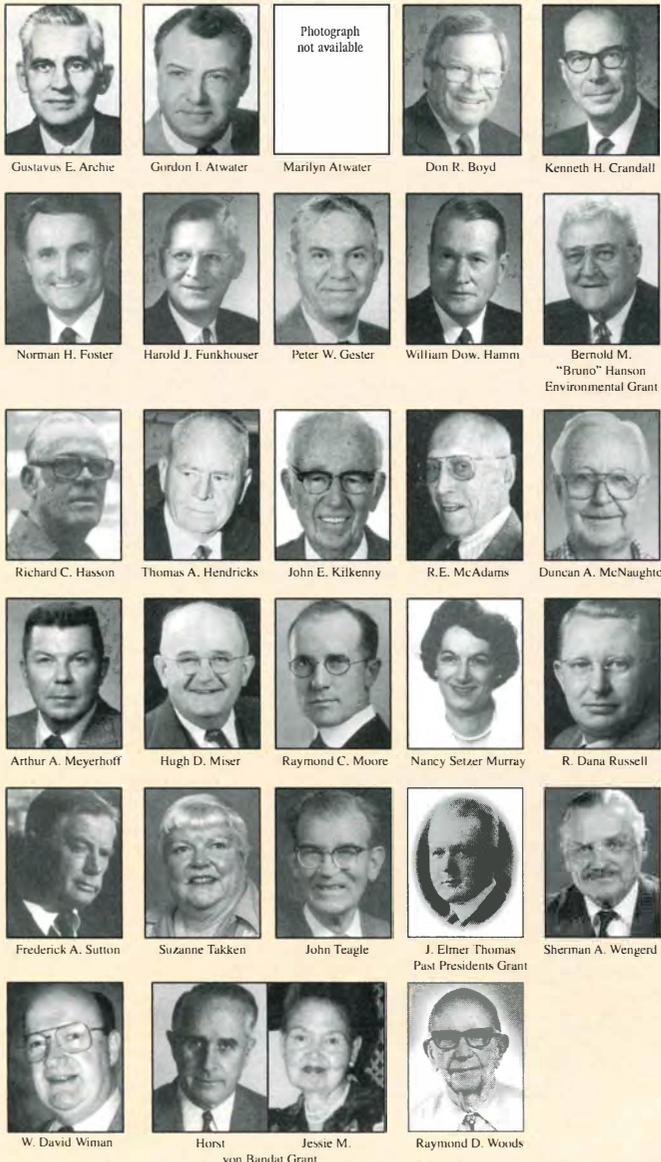


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- **Icebreaker:** 6:00 – 9:00 p.m., Sunday, Sept. 9, Radisson Hotel, Casper. Cash bar and hors d'oeuvres. Two complimentary drink tickets included with registration. \$5 fee for non-registered guests (no drink tickets included).
- **Technical Program:** Monday, Sept. 10 - Tuesday, Sept. 11, Radisson Hotel, Casper.
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MEETING INFORMATION:

Fred Crockett U.S. BLM 2987 Prospector Dr. Casper, WY 82604 307.261.7633 fred_crockett@blm.gov *or* Mary England PO Box 545 Casper, WY 82602 307.237.0027 wyogeo@trib.com

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AAPG OUTREACH DIRECTOR

The American Association of Petroleum Geologists is reorganizing its Directorate to put more emphasis on outreach to our membership. Our two major outreach departments are Education and Convention. In that regard, we will be hiring a Director of Outreach with responsibility for the Convention and Education departments.

This individual should have a strong working knowledge of Petroleum Geology with broad industry experience of 15 years plus, with an advanced geoscience degree and an up-to-date technical background. The Outreach Directorate reaches over 20,000 geoscientists per year: the Convention Department has outreach to over 8,000 geoscientists and the Education Department to over 12,000 geoscientists.

Major responsibilities will be overall management of conventions, conferences, training and lecture programs. The Director will also direct international development in the outreach endeavors and promote programs with the six international regions. Long Distance education will be a function of this Directorate.

It is anticipated the position will be filled by early June, 2001.

Applications

To apply, please send a letter of interest and current resume to:

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- Maintain collaborative relationships with representatives of other national and international geoscience societies and organizations and actively pursue joint ventures that enhance the financial and scholarly status of the Society;
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The new director will work at the GSA headquarters in Boulder, Colorado, and will hold a position with competitive compensation and benefits.

The deadline for applications or nominations is **June 15, 2001.**

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- Commitment to geoscience research, public outreach and education programs, and scholarly publishing.
- Familiarity with marketing and public relations.
- Demonstrated familiarity with the geoscience community and GSA programs.

Submit a resume, the names and addresses of three references, and a letter describing your interest in the position to:

Executive Director Search Committee
The Geological Society of America
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DIRECTOR'S CORNER

Keeping Our Eyes on the Road

By RICK FRITZ

Often in life, taking a new road and trying something new can be exciting.

For example, when I was 14, since we lived in the country, I was expected to drive at an early age in order to help with chores. I, of course, had no opposition to this concept. So on one dusty day on a country gravel road in Osage County, Oklahoma, my dad introduced me to driving in our Chevy pickup.

Noticing that I was having trouble reaching the accelerator, he asked me to lean forward so he could slide something behind me for support.

Now I know that he fully expected me to keep my eyes on the road – but as a new driver not used to the basic responsibilities of driving, I also was interested in his adjustment. I turned to watch him.

Unfortunately, there are often interesting intersections of circumstances in space and time, and at the same moment we reached a sharp turn in the road. That sharp turn was designed to go around a rather large pond.

We both looked up at the same time and I remember we shouted a chorus of "Whoa no!!" At least, that was what it sounded like, although it was a rather drawn out and unearthly sound.

At that moment I slammed on the brake – except that it was not the brake.

AAPG, in conjunction with the SIPES and the Houston Geological Society, is planning its first annual property and prospect exposition.

It's amazing the acceleration that can be generated by an old 350 Chevy engine.

We jumped the ditch near the road, leapt across a short pasture and flew over a large four foot-deep bar ditch that drained into the pond. We landed in a pile of rock and debris and finally came to rest as the dust settled around us.

This was my first driving experience.

We are now embarking on a new experience for AAPG, although nothing that is quite so rocky.

AAPG, in conjunction with the SIPES and the Houston Geological Society, is planning its first annual property and prospect exposition. It is being called the AAPG Prospect and Property Expo (APPEX), and will be held in Houston Aug. 28-29.

To help ensure the success of the meeting AAPG has purchased PLS' DealMakers Expo from Torch Energy Advisors.

After the annual meeting this June in Denver, AAPG is moving its Property & Prospect Marketplace from our annual meeting to an annual exposition showcase in Houston. This will allow us to expand our Expo and build on the base provided by PLS.

This new Expo will concentrate on both domestic and international prospects and properties, and it will provide AAPG, HGS and SIPES members the opportunity to customize a show to their needs.

In addition, AAPG, HGS and SIPES members will receive discounts for both booth and registration fees.

PLS and Torch Energy Advisors will host a conference starting on the days before the show that will feature presentations on industry activity, exploration, acquisitions, and source and capital.

It is rare that an Association such as AAPG can plan a new project that can significantly effect its bottom line. Reducing expenses across the board,

such as we did last year, can have a significant impact. But at some point expenses cannot be reduced without significantly decreasing services.

AAPG needs other sources of revenue in order to continue to expand member services.

After my dad and I recovered our breath, he gave me a "look" and stepped outside to survey the damage. I stayed put.

Fortunately, there was no apparent damage, so he returned to the passenger side and sat down.

In a weak voice I said "Dad, don't you want to drive now?"

He thought for a second and replied, "No son, you've done all the damage you can possibly do. Let's get back on the road."

This is an exciting new road for AAPG, and as always we will need the help of our members. We plan to keep our eyes on the road and make APPEX a great success.



Nuclear Power for Electricity Should Be Priority

Energy Options/Impact Explored

Author's note: I would like to use this article to share some observations on the integrable capacities of the various energy minerals to contribute to our nation's energy future. Because they represent the political foundation upon which policy must be developed, I propose to frame these comments on the issues of reserves, supply, environmental impact and scope of use.

For this article, short-term, medium-term and long-term mean approximately 0-10 years, 10-30 years and 30+ years, respectively. From the observations made, I will also attempt to propose some priorities for development of a national energy policy.

In a capitalistic democracy, it is always preferred to implement policy through economic incentives or disincentives rather than through governmental fiat. To this end, the concluding recommendations are stated in tax credit or taxation form.

By RON GRUBBS
EMD President

There has been much talk about the need for a national energy policy in the last few months, as well as speculation of what a policy should include – and there will be a lot more talk before anything constructive comes out of Congress.

The current electrical shortage in California is yet another reminder that we need to get our house in order as regards energy. We owe it to our children, our families and our nation to tell the energy story as we know it – to everyone who will listen.

This, then, is an attempt to compact observations of 25 years of work in the

Table 1: Suitability of Energy Sources to Energy Uses

Energy Source	Electricity Generation	Transportation	Home Heat/AC	Industrial Heat
Coal	Good, but dirty	Somewhat suitable as electricity	Somewhat suitable as electricity	Good, but dirty
Methane	Good	Somewhat suitable	Best, requires supplemental electricity	Good
Oil	Good	Best	Good, requires supplemental electricity	Good
Geothermal	Good	Somewhat suitable	Suitable where available or as electricity	Suitable where available or as electricity
Hydropower	Good	Somewhat suitable as electricity	Somewhat suitable as electricity	Somewhat suitable as electricity
Uranium	Best	Somewhat suitable as electricity	Somewhat suitable as electricity	Somewhat suitable as electricity

supply side of all of the energy minerals into a few paragraphs and to draw a few deductions as to what we ought to do about our national energy problem.

Coal represents our strongest position with regard to indigenous reserves, but it is shackled by problems with its distribution, transportation, environmental consequences and the narrowness of its utility.

Like the liquid hydrocarbons, its combustion releases CO₂, airborne particulates and, in some cases, worse pollutants. Additionally, because its use frequently requires large quantities to be transported long distances and because it produces large quantities of ash, it is accompanied by secondary and tertiary

sources of pollution. These factors lead one to classify coal as the dirtiest of available fuels.

Historically, coal has been used as a fuel for transportation, but in modern American terms it is relegated to use as an electrical generation boiler fuel and for metallurgical purposes. Unless major compensating technologies are produced by research in the near-term, coal should be viewed as a near-term and medium-term contributor to the nation's energy future.

Given the sizeable number of Americans involved in coal mining, the political consequences of a decline in coal mining are seminal and should be considered in all planning.

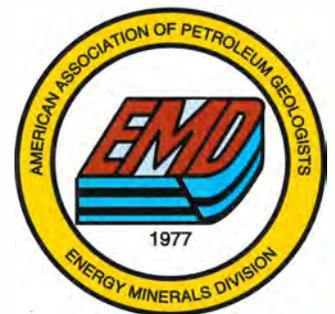
The most promising eventuality in advancing coal technology is microbial mining, wherein microbes would be used,

in situ, to convert coal into methane. Use of such a technology may leave some deposits unminable, which leads to additional policy questions.

The likely impact of coal on our long-term energy supply is moderate to small, and it will be a product of compromises among concern for the environment, availability and price of other fuels, and political convenience.

Alternative Natural Gas (methane) sources include microbial mining of coal, coalbed methane, gas hydrates, gas shales and biomass. These sources share usage characteristics, but differ somewhat in various aspects of their production.

Methane, whether derived from conventional or alternative sources, has fewer problems than coal and its supply is perhaps huge, but it is not completely environmentally clean when used as industrial fuel, home heating fuel or as a boiler fuel for electrical generation. Its probable best use is for home heating or as a process feed.



See EMD, page 71



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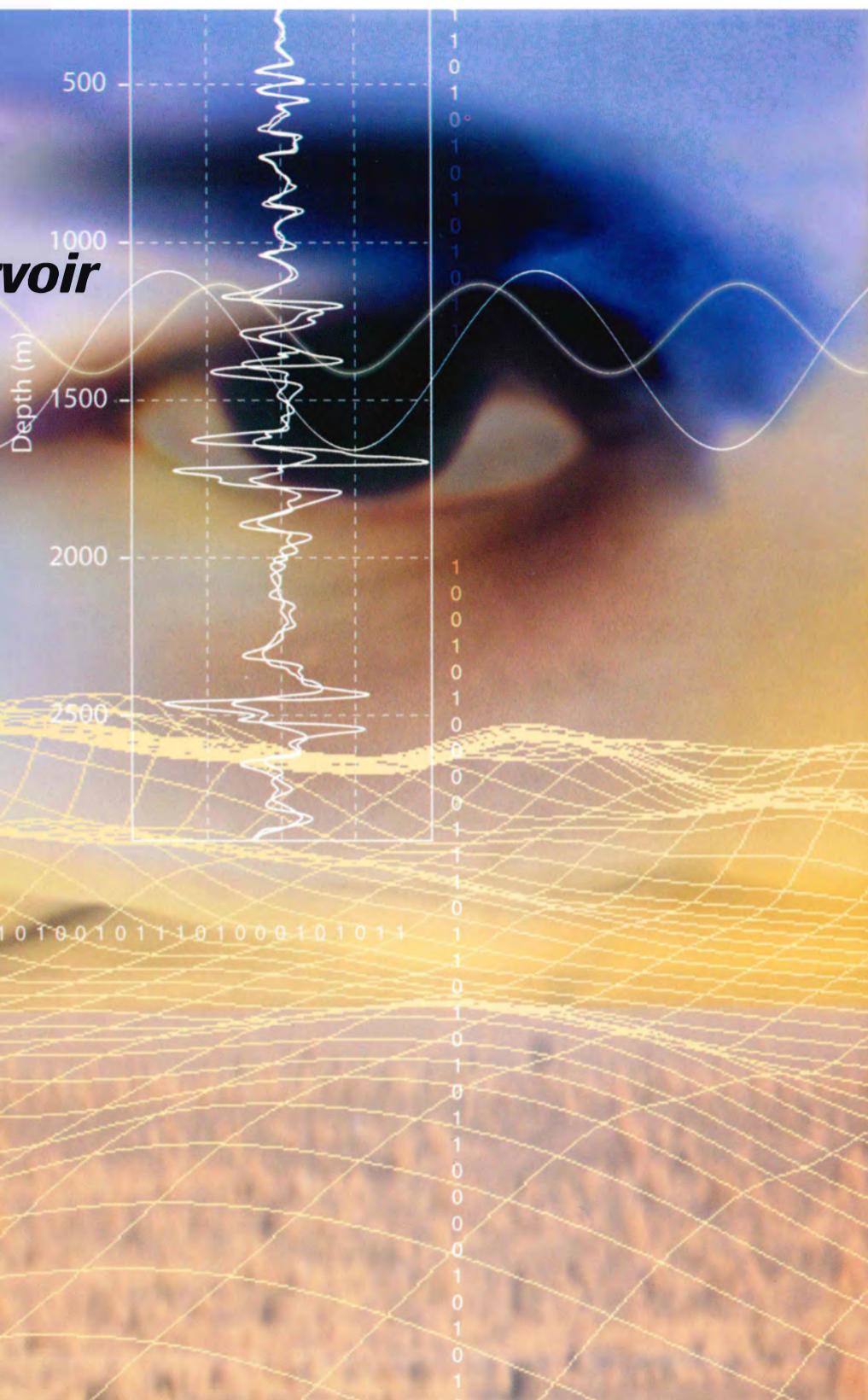
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