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In Every Issue

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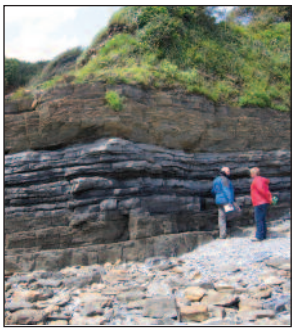

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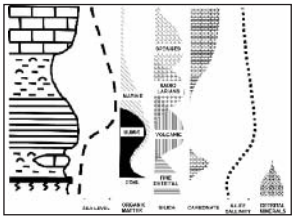

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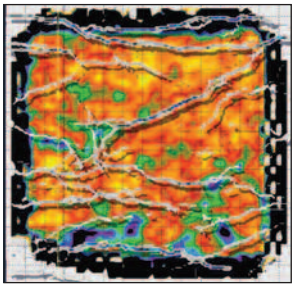

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About the Cover: India: Surface geology and free air gravity—showing basins and oil and gas fields. *Courtesy of Al Danforth*

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FIELD SEMINARS

Modern Terrigenous Clastic Depositional Systems
April 5-12, 2009 / Begins in Columbia and ends in Charleston, SC
Leader: Walter J. Sexton, Athena Technologies, Inc.; Columbia, SC

Clastic Reservoir Facies and Sequence Stratigraphic Analysis of Alluvial Plain, Shoreface, Deltaic, and Shelf Depositional Systems
April 18-24, 2009 / Begins and ends in Salt Lake City, UT
Leader: Thomas A. Ryer, The ARIES Group, LLC, Katy, TX

Submarine Canyons, Channels, Fans and Deep-Water Sequence Stratigraphy
April 19-22, 2009 / La Jolla, San Diego County, CA
Leader: John E. Warme, Colorado School of Mines, Golden, CO

SHORT COURSES

Seismic Interpretation in Fold- and Thrust-Belts Using Fault-Related Folding Techniques
March 23-26, 2009 / Houston, TX
Instructor: John H. Shaw, Harvard University, Cambridge, MA

Principles of Reservoir Characterization
April 2-3, 2009 / Houston, TX
Instructor: Jeffrey Yarus, Landmark Graphics Corp., Houston, TX

Petroleum Exploration in Fold and Thrust Belts: Principles and Practices
April 15-16, 2009 / Houston, TX
Instructor: Peter B. Jones, International Tectonic Consultants Ltd., Calgary, AB, Canada

Basic Well Log Analysis
April 20-23, 2009 / Austin, TX
Instructors: George B. Asquith, Texas Tech University, Lubbock, TX;
Daniel A. Krygowski, The Discovery Group, Denver, CO

Practical Salt Tectonics
April 22-24, 2009 / Austin, TX
Instructor: Mark G. Rowan, Consultant, Boulder, CO

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Cyclicity and Long-Term Demand

Cyclicity is not only a concept in coastal sedimentary deposits or long-term climate change; it appears once again in a dramatic fashion in the pricing of oil and gas. Fortunately for us, that means the current downturn should be temporary. The basic economics of our industry have not changed. In the long run, there will continue to be a growing demand for the products of the petroleum industry, both in the form of fuels and feedstock for the production of plastics and chemicals. ExxonMobil has projected a 1.2% annual growth in energy demand, even assuming improved efficiency, which becomes a 35% growth in demand from 2005 to 2030, with a concomitant rise of 30% in carbon emissions.

Some of that energy will be obtained from wind, water, and nuclear sources, but oil and gas will still be the dominant source, barring unforeseen developments. In lesser developed countries such as China and India, energy consumption for transportation is expected to grow substantially.

"*From 2005 to 2030, demand in developed countries is expected to be relatively stable, as increases in the number of vehicles are offset by significant efficiency improvements,*" ExxonMobil said. "*In contrast, demand in developing countries is likely to more than double as economies grow and rising prosperity enables a dramatic increase in personal vehicles.*"

The long-term growth of oil and gas use will also result in the long-term growth of carbon emissions, and it is in our best interests, as geoscientists and stewards of our earth, to be sure that the industry addresses both of these factors. Carbon sequestration can be a benefit to our industry by using CO_2 flooding for secondary and tertiary recovery. A holistic point of view can produce innovative new ways to produce oil and gas from existing fields, and improve the reputation of the energy industry in the process.

A holistic point of view can produce innovative new ways to produce oil and gas from existing fields, and improve the reputation of the energy industry in the process.

Over the next few years many experienced geoscientists will choose to retire. If prices remain at their current low levels, the process will be quicker, although some will continue to work as consultants or independents. Others will leave the business entirely. For those who remain, there will once again be a need to maintain and update skills and contacts throughout the industry. Fortunately there is now a generation of young geoscientists who are rapidly gaining experience and have the technological skills to use and develop new tools and ideas.

The Houston Geological Society plays a substantial supporting role in providing access to new technology and new ideas, and venues to develop contacts (otherwise known as friends) throughout your career. I am grateful to have gotten to know so many interesting and knowledgeable geoscientists through the volunteer work I have done with HGS, and I recommend it to you if you haven't tried it yet. It's fun and a great way to meet people and make friends who share your interests, and who (almost incidentally) become a great network of professional contacts.

January is going to be a busy month. The lucky folks who chose to go on the HGS Trans-Pecos field trip will be gone the first week. At the General Dinner Meeting, Dr. Bilal Haq, originator of the Haq sea-level curves, will present insights into the nature, amplitude and causes of sea-level changes. At the International Explorationist's Dinner, our own Al Danforth will discuss emerging plays and new petroleum systems in India. The North American group will hear Dr. Shirley Dutton talk about predicting Wilcox Sandstone reservoir quality with depth. The Environmental & Engineering group will hear about nuclear power in space, and attendees at the General Luncheon will hear about prediction of reservoir quality in gas shales using seismic data from David Paddock.

From the President *continued on page 17*

Michael Forlenza, PG
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Sustainability: What is it and Why Should I Care?

Corporations, organizations, and governments are rushing headlong towards adopting sustainability policies and implementing sustainable practices. Sustainability has become one of the hallmarks of corporate and government responsibility, and no one wants to be left behind.

Wal-Mart states, "we see environmental sustainability as one of the most important opportunities for both the future of our business and the future of our world." Dow Chemical Company commits " to elevate our understanding of our impact on global ecosystems and work toward the most efficient and effective use of the planet's precious resources." The City of Houston's Mayor Bill White says that "We're committed to making changes and institutionalizing best sustainability practices in the way we manage our city. It will improve our quality of life, protect the environment, save us money, and it's simply the right thing to do."

These are lofty goals and ideals, but just what is sustainability and why is it important?

Merriam-Webster's dictionary defines sustainability as: "of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged." Sustainability or sustainable development marries two important themes: environmental protection and economic development that is ecologically viable now and in the long run. Common use of the term "sustainability" began with the 1987 publication of the World Commission on Environment and Development report, *Our Common Future.* Also known as the Brundtland Report, this document defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This concept of sustainability, adopted by the United States Environmental Protection Agency, encompasses ideas, aspirations, and values that continue to inspire public and private organizations to become better stewards of the environment and that promote positive economic growth and social objectives.

The principles of sustainability can stimulate technological innovation, advance competitiveness, and improve our quality of life. The implementation of sustainable practices acknowledges that resources are finite. There is only so much fresh water, clean air, oil and gas, or landfill space. While the limits on many these resources may seem very distant, those limits do exist. Sustainability embodies the concepts of design with nature and "carrying capacity."

We do not inherit the Earth from our Ancestors, we borrow it from our Children.
Native American Proverb

Many of the concepts of sustainability may seem to run counter to the American way of life. America, the greatest consuming nation in the history of the earth, has always been about ready access to resources and disposability. Critics will say that America has earned the right to unchecked consumption and waste generation through our prosperity. But sustainability is all about leaving a resource intact while using it wisely. Landowners often refer to this as "stewardship."

The whaling industry in the 19th Century was not sustainable. As whales were hunted to near extinction, American ships were forced to sail from New England to the far side of the world to find their vanishing prey. The end for whaling was in sight due to overexploitation well before the petroleum age, ushered in by Colonel Edwin Drake's well in Pennsylvania, put an end to large-scale whale oil use. More than one hundred years later, the populations of some whale species such as the Atlantic Northern Right whale remain critically endangered as a result of the reckless pursuit of these animals.

How does sustainability relate to geology? Much of the work conducted by professional geologists is associated with the

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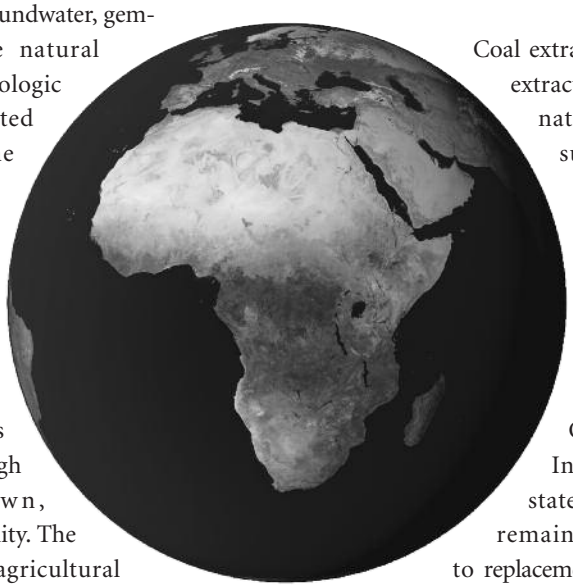
exploration, extraction, and use of natural resources. These resources may be oil and gas, coal, groundwater, gemstones, or metals. Most of these natural resources have finite limits. On a geologic time scale, gold will still be deposited in deep hydrothermal veins, but the total amount of gold available for extraction has not changed in human history.



In general groundwater is a renewable resource as a part of the water cycle. However, groundwater withdrawals at rates greater than sustainable levels leads to degradation of aquifers through excessive water-level drawdown, subsidence, and diminished water quality. The rates of groundwater pumping for agricultural purposes from the prolific Ogallala aquifer that underlies parts of eight states from Texas to South Dakota is not sustainable. Groundwater within the Ogallala aquifer is largely relict water, or paleowater, from the Pleistocene. The rate of withdrawal over the last 50 years has far outstripped the small amount of natural recharge. Groundwater levels in the Ogallala aquifer have declined more than 200 feet in some areas.

Coal extraction is not sustainable. Coal that is extracted and burned is not replenished in nature. However, coal may seem to be sustainable because the volume of known coal resources is so vast that the available supply is forecasted to be sufficient for 155 years according to widely accepted information from the World Coal Institute.

Is oil and gas extraction sustainable? Certainly reservoirs can be depleted. Industry advocates and planners will state that the supply of oil and gas has remained steady over many decades due to replacement of the extracted volumes with fresh discoveries. However, in the broadest view of the management and use of natural resources, oil extraction is not sustainable.

For many centuries, economic growth has been coupled with environmental degradation. As **From the Editor** *continued on page 11*

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nations moved up the ladder of development, consumption increased and negative environmental affects accelerated. Lands were often clear cut of forests for fuel and for building materials. The burgeoning industrial revolution saw streams and rivers used as sewers and the air become dark with soot. Resources were wasted and the environment was degraded. Only after the wealthy nations reached a certain level of affluence did the citizen's demand environmental accountability and charged their governments with the responsibility of ensuring clean water and clean air.

Now the developing world is approaching the same environmental cross road. Unchecked smokestack discharge in the former Soviet states created wastelands in eastern Europe. Factories in China have poisoned rivers used as drinking water supplies sickening thousands. Slash and burn farming in the rainforests of Brazil and Indonesian has decimated biodiversity in these formerly pristine areas.

People in poor nations, who aspire to reach the same level of prosperity that Americans enjoy, will say that environmental degradation is the cost of progress. Americans and people in other first world or developed nations consume at a rate 32 times greater than people in developing nations according to Jared Diamond in an Op-Ed column published in the *New York Times* in January 2008. Jared Diamond is a professor of geography at the University of California, Los Angeles and the author of *Collapse* and *Guns, Germs and Steel*. "The average rates at which people consume resources like oil and metals, and produce wastes like plastics and greenhouse gases, are about 32 times higher in North America, Western Europe, Japan and Australia than they are in the developing world," writes Dr. Diamond. "That factor of 32 has big consequences."

Experts project that the earth's current population of 6.5 billion will increase to around nine billion by the middle of the century before leveling off. This jump in population will represent a huge challenge in the coming decades not due to the increase number of people but due to the potential rise in consumption.

The estimated one billion people that live in developed countries have a relative per capita consumption rate of 32 compared to most of the rest of the 5.5 billion people who have consumption rates closer to one. The growing awareness of this disparity by the people of the third world is leading to resentment and increasing discontent. Dr. Diamond writes that when the people in the third world "believe their chances of catching up to be hopeless, they sometimes get frustrated and angry, and some become terrorists, or tolerate or support terrorists." He notes that in this globalized

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world, the oceans that once protected the United States are no longer a great barrier.

Many ambitious people in developing countries are so eager to increase their standard of living that they leave their country rather that to wait for increased prosperity at home. The destination for these tens of millions of immigrants is the United States, Western Europe, Japan, or Australia.

Governments of developing countries make an increase in living standards a primary goal of national policy. Among the developing countries that are seeking to increase per capita consumption rates China stands out. China has the world's fastest growing economy with four times the population of the United States population. China's growth is stressing the world's supply of resources as it competes for energy and materials. However, per capita consumption rates in China are still about 11 times below the United States. If per capita consumption rates in China were to rise the same level as the United States, that would roughly double world consumption rates, notes Dr. Diamond. Oil consumption would increase by 106 percent and world metal consumption by 94 percent. If India, as well as China, were to catch up, world consumption rates would triple. If the whole developing world were suddenly to catch up, world consumption rates would increase elevenfold. This would be as if the world population had surged to 72 billion people.

The promise that developing countries can enjoy a first world lifestyle if they will only adopt good policies — for example, instituting democratic and honest governments and enabling a free-market economy — is impossible, a cruel hoax. The consumption rate would simply be too great and unsustainable. The only approach that China and other developing countries will accept is to aim to make consumption rates and living standards more equal around the world with all countries converging on consumption rates considerably below the current highest levels.

This is where Americans and most of the developed countries will object. Wealthy nations are not going to sacrifice their living standards for the benefit of people in the rest of the world. Nevertheless, whether we get there willingly or not, we shall soon have lower consumption rates. This is the essence of sustainability, using less but maintaining our lifestyle.

Sustainability aims to decouple living standards from consumption rates and generation of waste. Much American consumption is inefficient and contributes little or nothing to the quality of life. For example, per capita oil **From the Editor** continued on page 15

Daisetta Sinkhole Field Trip

Sponsored by

Texas Section of Association of Environmental and Engineering Geologists
and
Houston Geological Society

January 17, 2009

Daisetta, located 60 miles northeast of Houston, is situated on the Hull Salt Dome. In 1969, 1981, and again in May 2008, sinkholes formed in the area. By the evening of the day after the 2008 sinkhole formed, its growth had stabilized, but officials still saw it as a potential risk to the safety of city residents. With dimensions of 600×525 feet and a maximum depth of 150 feet, this sinkhole has been the subject of extensive research since May.

Seize this opportunity to see the now famous Daisetta Sinkhole and learn more about the potential mechanics of formation from leading geologic experts.

9:00 AM Registration at Hull-Daisetta High School Auditorium, 117 N. Main, Daisetta

Introduction to the Daisetta Sinkhole

9:30	Richard Howe and Dr. Carl Norman
9:50	Mark Kasmarek - USGS
10:10	Dr. Roy Dokka, LSU (GPS)
10:30	Dr. Carlos Aiken & Dr. John Oldow, UT Dallas (land-based LIDAR)
10:50	Break
11:10	Jeff Paine - BEG (gravity survey)
11:30	Robert Traylor, TCEQ, Ground water protection
12:00	Catered lunch

View sinkhole

1:00 After an introduction to the Daisetta Sinkhole, a walking and vehicle tour will follow. We will walk and carpool to the various sites and view the sinkhole, the two wells that blew out during the formation of the sinkhole, and other sinkholes in the area as time and access may allow.
An AEG Texas section meeting will be held after the field trip

The Fine Print: Be prepared to walk approximately one-mile.
PDH's earned: 6 hours

HGS & AEG Member Fee: $40 per person
(Family members receive member rate as well.)
Non-Member Fee: $60 per person
Students: $20 – SPONSORS WELCOME!!
Registration Fee includes: Lunch and presentation materials.

Hotel: Best Western in Dayton. Book by January 14th for $89.00 rate. Ask for AEG block of rooms.
http://book.bestwestern.com/bestwestern/productInfo.do?propertyCode=44549
Register: Online at www.hgs.org or send registration form and check payable to HGS to Richard Howe, 1778 W. Sam Houston Pkwy N, Houston, TX 77043.

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consumption in Western Europe is about half the rate in the United States. Yet Western Europe's standard of living is as high or higher by any reasonable criterion, including life expectancy, health, infant mortality, access to medical care, financial security after retirement, vacation time, quality of public schools, and support for the arts.

Many aspects of our consumption are wasteful and unsustainable. Most of the world's fisheries are still operated non-sustainably, and many have already collapsed or fallen to critically low yields — even though we know how to manage them in such a way as to preserve the environment and the fish supply. Sustainable practices, taking advantage of latest remote sensing technology, modeling, and understanding of marine ecosystems, could extract fish from the oceans at maximum historical rates and carry on indefinitely.

The same is true of forests: we already know how to harvest timber sustainably. Wise stewardship of forests worldwide could extract enough lumber to meet the world's wood and paper needs. Yet most forests are managed non-sustainably leading to decreasing yields.

Current trends indicate that, within a generation, Americans will be consuming less than they do now. And per capita consumption rates in many developing countries will one day be more nearly equal to the industrialized world. "These are desirable trends, not horrible prospects," writes Jared Diamond

Fortunately, the awareness of the need to moderate consumption and a movement towards sustainability and wise stewardship has increased greatly in the United States in recent years. Most large corporations including the major oil and gas companies have developed sustainability policies. Fortune 500 companies describe their sustainability policies and progress in their annual reports.

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There will also be a field trip to the Daisetta Sinkhole site, and a new Continuing Education course on risk analysis in prospects with direct hydrocarbon indicators. This is the first time this course has been offered by HGS and I think it will be a great addition.

It is not too soon to start thinking (and registering) for the Mudstones (Applied Geoscience) conference, to be held February 9 and 10th. This conference was very successful last year, and organizer Frank Walles has done it again. Four half-day sessions will focus on the Haynesville/Bossier and other Gulf Coast Shale systems with 12 expert speakers. Register now to be sure you get a seat! ■

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Even organizations that would seem immune to environmental concerns have embraced sustainability. This year the United States Army issued its first *Sustainability Report* using the reporting framework established by the Global Reporting Initiative. The Global Reporting Initiative is a multinational group based in Amsterdam that provides guidance to organizations seeking to analyze and publicly report their environmental practices. The report states in its introduction, "the Army is at the very early stages of its sustainability journey."

Given the potential for cost savings and the tactical allure of energy independence, the Army says that sustainability is now integral to securing its overall mission. The Army allocated $1.5 billion to its environmental programs in 2007. According to Tad Davis, deputy assistant secretary in the Army's Environment, Safety and Occupational Health division, the Army, starting in 2008, has dedicated $63 billion to ensure that every new Army building will at least meet the Leadership in Energy and Environmental Design (LEED) silver standard.

Sustainability is more than placing an aluminum can in the recycling bin once in a while. Sustainability involves an integrated approach to way we act, the way we manage resources, and the way we care for the planet. There is a Chinese proverb that says the two best times to plant a tree are twenty years ago and today. Our sustainable future starts today. ■

Letter to the Editor

Mr. Forlenza:

I read with interest your write up on the Galveston seawall. As a retired geologist and a native Houstonian, I've spent much time in Galveston and its beaches. I learned some things in your article that I had not known, and intend to keep the article in my files.

One thing not mentioned is that the seawall was extended during my lifetime. I can't remember the year, but it was probably after WWII. I do remember driving off the seawall end down a ramp to the sand beach before the wall was extended. I hope you uncovered some information about the extension.

Thanks for writing about the seawall.

Matt Daura, retired Transco geologist

Monday, January 12, 2009

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $28 Preregistered members; $35 non-members & walk-ups

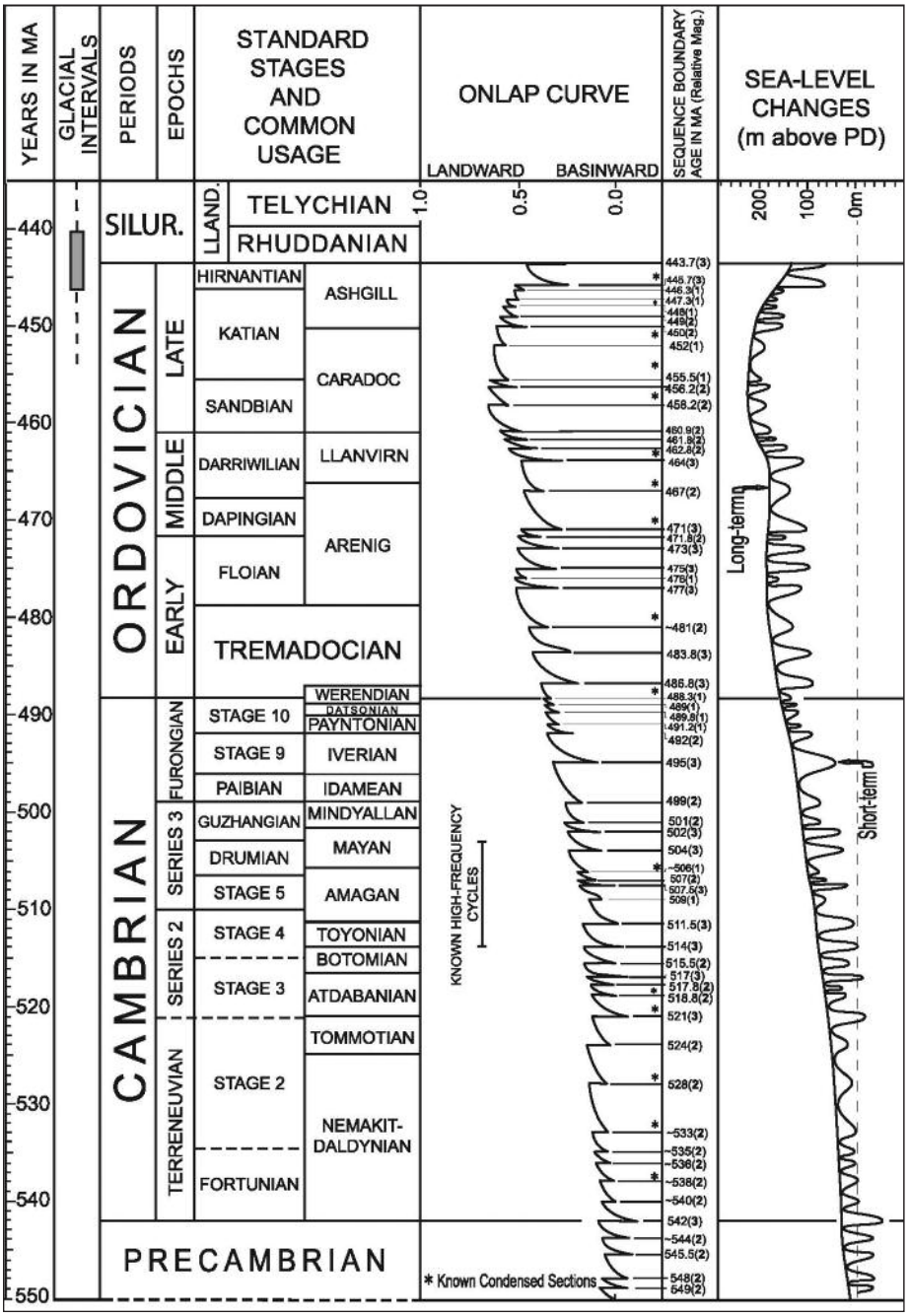
To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

HGS General Dinner Meeting

Dr. Bilal Haq
Director for Marine Geosciences Programs at National Science Foundation (NSF)

A Chronology of Paleozoic Sea-Level Changes

A global synthesis of Paleozoic sequence-stratigraphic data has led to new insights into the nature, amplitude, and causes of base-level changes for this era. A "modal mean" Paleozoic sea-level curve is proposed based on "reference districts" from around the world, corroborated with data from ancillary sections. Estimating the amplitude of sea-level changes in the Paleozoic involves two separate measures: 1) long-term envelope of the sea-level changes driven by long-term tectonic processes, and 2) shorter-term third- and higher-order eustatic sea-level changes driven by glacial and other, unknown, processes that can be widely documented.



Cambrian-Ordovician sea-level changes. The time scale and standard and regional stages are modeled.

Accurate estimates of the magnitude of sea-level changes from stratigraphy remain a challenge.

For the long-term envelope, a consideration of the global continental flooding estimates with epeirogenic corrections, stacked regional sea-level data, and modeling results for mean age of the oceanic crust seem to yield consistent results. For the shorter-term eustatic changes, sea-level rise and fall estimates from "reference districts" for various time slices is considered the best approach. Reference districts are localities where tectonic quiescence prevailed and thus the "modal mean" signal is more likely to be preserved.

Nevertheless, accurate estimates of the magnitude of sea-level changes from

continued on page 21

HGS General Dinner continued from page 18

stratigraphy remain a challenge. As for the causes of short-term sea-level changes, nearly 38% of the Paleozoic experienced some or significant glaciation and thus a glacio-eustatic cause can be invoked for those intervals. For the remaining time, when there is no known evidence of ice accumulation, the trigger for sea-level changes is as yet unknown and remains one of the major mysteries of the earth sciences. ■

Biographical Sketch

Dr. Bilal Haq has served as the director for Marine Geosciences Programs at National Science Foundation (NSF) since 1988. He received his PhD and DSc degrees in marine geology from the University of Stockholm in Sweden. Before coming to the NSF, he carried out research at Woods Hole Oceanographic Institution in Massachusetts and Exxon Research Labs in Houston, Texas in several fields of geosciences. He has participated in four ocean drilling expeditions in the Pacific, Indian, and Southern Oceans, the latter two as co-chief scientist. He has been an American Association of Petroleum Geologists distinguished lecturer and a recipient of the Francis Shepard medal for "excellence in marine geology." He also received the NSF's Antarctic medal and was elected a fellow by the American Association for the Advancement of Science in the year 2000. In 2004, he was awarded American Geophysical Union's Ocean Sciences award for "outstanding and sustained contributions" to marine sciences. He has published extensively on a wide variety of topics, including sequence stratigraphy and global sea-level changes of the past, paleoclimatology, paleobiogeography, paleoceanography, natural gas hydrates, and global warming and its impacts on maritime economies. Dr. Haq has also held assignments with the World Bank and the White House in Washington DC.

Crozon Fieldtrip

Monday, January 19, 2009

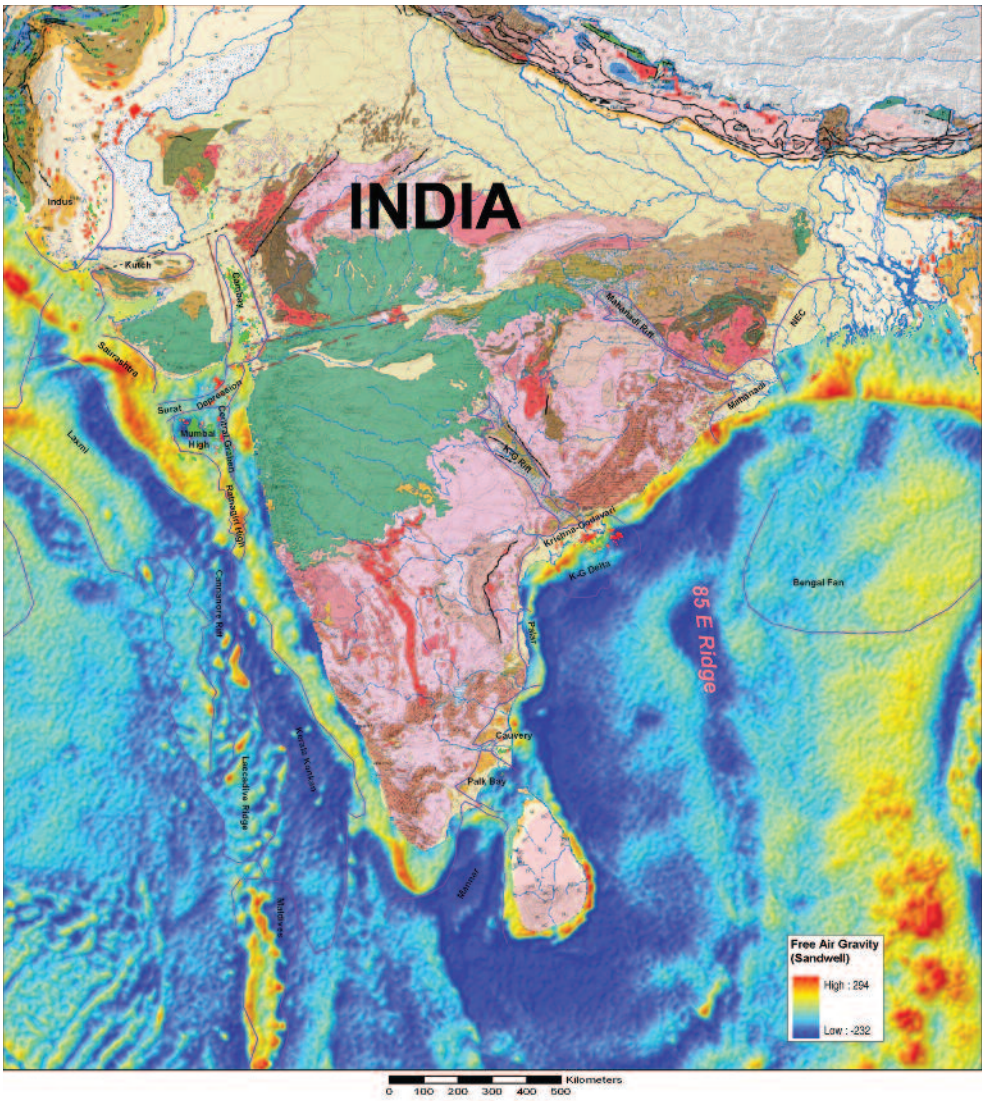
Westchase Hilton • 9999 Westheimer
Social Hour 5:30-6:30 p.m. • Dinner 6:30-7:30 p.m.
Cost: $28 pre-registered members; $35 for non-members & walk-ups; Emeritus/Life/Honorary: $14; Students: FREE

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

Al Danforth, *Independent Geological Consultant, Geological Advisor to GX Technology, Houston, TX*
Steven G. Henry, *Rift Institute for Teaching and Training, Las Cruces, NM and*
Sujata Venkatraman, *GX Technology, ION Geophysical, Houston, TX*

India—Historical and Emerging Plays, Identifying New Petroleum Systems Using Regional PSDM Seismic Data

This presentation provides an overview of the historic producing provinces of India. The discussion will include examples of recent emerging plays together with some new play ideas for India's offshore areas based on the results of a campaign of regional pre-stacked depth migrated (PSDM) seismic acquired in 2006-2007 by ION-GX Technology.



India: Surface geology and free air gravity—showing basins and oil and gas fields.

The history of oil and gas discoveries in India dates back to 1867 in the Assam Basin onshore and to the 1974 discovery of the giant Bombay (Mumbai) High field off the west coast. Earliest east coast discoveries were in 1979-1980 in the Krishna-Godavari (K-G) Basin near the coast and expanding to the offshore in the 1990s. Since then, gas was found along the east coast in a few fields in the Mahanadi Basin in 2003, but the big east coast gas reserves were discovered in the new offshore K-G fields. These discoveries now total over 30 trillion cubic feet of gas and promise to provide a sorely needed source of fuel to meet India's rapidly growing energy consumption. Most recently, discoveries in the Cretaceous beneath the K-G Tertiary gas field, in the deep water of the Cauvery Basin, and in the Kutch Basin on the west coast, suggest additional new potential.

Two examples of new plays will be presented that have greatly increased India's exploration

HGS International Dinner *continued on page 25*

HGS International Dinner continued from page 23

potential. The first, on the east coast, is the 85E Ridge. The 85E Ridge was previously thought to be a hot spot track and is now interpreted to be a continental fragment supporting a very large (50 by 100 kilometer) carbonate platform underlain by potential Jurassic through Cretaceous source rocks. The second example is a large deep (15 to 20 kilometer) coastal graben that likely contains Albian-Aptian source rocks in the active oil generation window beneath the Deccan Traps on the west coast.

Understanding the new play ideas relies on data from India's conjugate margins in Africa and Antarctica.

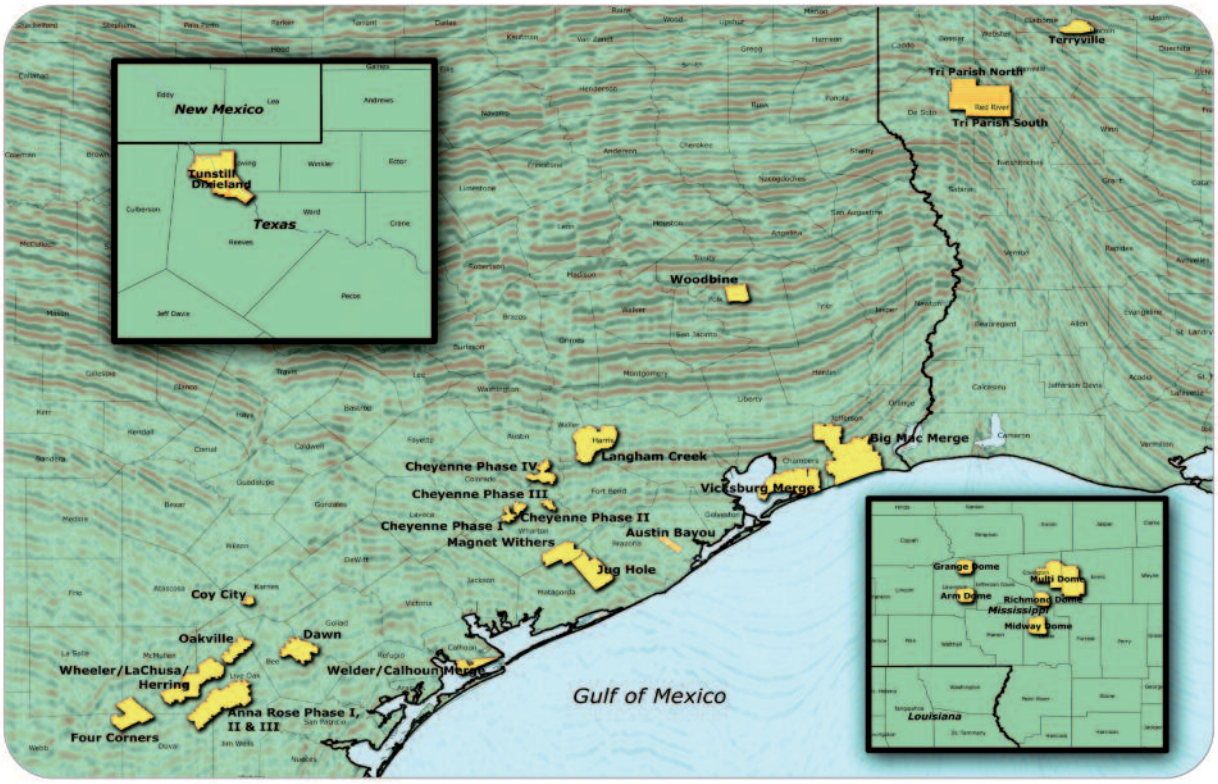
Understanding the new play ideas relies on data from India's conjugate margins in Africa and Antarctica, and on analogs to the formation of Indian continental margins that formed during the breakup of Gondwana. ■

Biographical Sketch

Al Danforth is a regional geologist providing exploration consulting to large and small companies in Houston, Texas. Retired after 30 years of new venture exploration in the international arena for Texaco and Chevron, he is knowledgeable in all aspects of the business of exploration and experienced in many of the producing and frontier areas of the world. Focused on the regional geology of Africa and its conjugate margins, especially the historic and emerging plays of West Africa, his specialty is understanding petroleum systems in deltas, rift basins, and salt tectonics provinces.

Mr. Danforth is active in the International Explorationists Group of the Houston Geological Society and he is also organizer of an annual conference on Africa E&P convened jointly with the Petroleum Exploration Society of Great Britain (PESGB). The two-day conference, which alternates between London and Houston, will next be held in London September 9-10, 2009.

Currently, he is principal geological advisor to ION-GX Technology on the design and interpretation of regional seismic surveys around Africa and its conjugate margins in the South Atlantic and Indian Ocean.



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Tuesday, January 20, 2009

Crowne Plaza Hotel - Greenspoint (former Sofitel)
425 North Sam Houston Pkwy E

Social 11:15 AM, Luncheon 11:30 AM

Cost: $31 pre-registered members; $35 for non-members & walk-ups; Emeritus/Life/Honorary: $14; Students: FREE

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

Shirley P. Dutton
Bureau of Economic Geology, Jackson School of Geosciences, The University of Texas at Austin

Reservoir Quality and Pore-Type Evolution in Tertiary Wilcox Sandstones of the Northern Texas Gulf of Mexico Coast During Burial

As the search for gas in the Gulf of Mexico focuses increasingly on reservoirs at depths more than 4.5 kilometers (14,750 feet), the most critical yet unknown risk factor is reservoir quality. Petrographic analysis of Wilcox sandstones on the upper Texas coastal plain provides insight into the evolution of porosity and permeability during burial that is useful in the exploration for deep reservoirs both onshore and in the Gulf of Mexico.

Average permeability decreases from 976 millidarcies at a depth of 1,300 feet to 0.2 millidarcies at a depth of 14,750 feet.

Wilcox sandstones are mainly lithic arkoses and feldspathic litharenites that have an average composition of Q59F22R19 (quartz-feldspar-rock fragment). Provenance did not change significantly during Wilcox deposition in this area, nor does average sandstone composition vary among lower, middle, and upper Wilcox sandstones. However, lowstand slope-fan deposits contain more rock fragments (mainly metamorphic and volcanic) than do deposits from highstand or transgressive systems tracts. Wilcox sandstones deposited in deepwater environments in the Gulf of Mexico are likely to contain more rock fragments than do their linked highstand equivalents.

With increasing burial depth, total volume of porosity decreases and the proportion of different pore types changes. Average core-analysis porosity declines from 35% at a depth of 0.4 kilometers (1,300 feet) to 10.7% at a depth of 4.5 kilometers (14,750 feet). Pores types change from a mix of primary, secondary, and micropores ($P_{35}S_{38}M_{27}$) at shallower depths to predominantly secondary pores and micropores in deeper sandstones ($P_7S_{35}M_{58}$). At a burial depth of 3.5 kilometers (11,500 feet), most primary pores have been lost by physical compaction or occluded by quartz cementation, and secondary pores generated by feldspar dissolution compose the majority of macropores. Average permeability decreases from 976 millidarcies at a depth of 0.4 kilometers (1,300 feet) to 0.2 millidarcies at a depth of 4.5 kilometers (14,750 feet). Because most deep sandstones are dominated by secondary pores and micropores, the porosity-permeability transforms for deep and ultradeep sandstones will have lower slopes than those for shallower sandstones. ■

Biographical Sketch

Shirley P. Dutton is a Senior Research Scientist at the Bureau of Economic Geology, The University of Texas at Austin. Her technical expertise is in clastic sedimentology and reservoir characterization, and her main area of research is sandstone diagenesis. She received a bachelor's degree from the University of Rochester and Masters and PhD degrees from The University of Texas at Austin, all in geology. Dr. Dutton has been with the Bureau since 1977. She is currently the principal investigator of the Bureau's Deep Shelf Gas project which is focused on structural/stratigraphic architecture and reservoir quality of deep Gulf of Mexico reservoirs.

Tuesday, January 20, 2009

Black Lab Pub, Churchill Room • 4100 Montrose Blvd.

Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 non-members & walk-ups

The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476 (include your name, e-mail address, meeting you are attending, phone number and membership ID#).

HGS Environmental & Engineering Dinner Meeting

Michael D. Campbell, P.G.
P.H.M.D. Campbell and Associates, L.P.

Nuclear Power in Space Exploration and on Earth: An Overview

When Apollo 11 touched down at Tranquility Base on July 20, 1969, the goal of a lunar landing envisioned by President John F. Kennedy in 1961 was realized. The achievement of this goal depended on the development of technologies to turn this vision into reality. One technology that was critical to this achievement was the harnessing of nuclear power systems for spacecraft. Currently, nuclear power provides power for satellite systems and deep-space exploratory missions. In the future, nuclear power will provide propulsion for spacecraft and drive planet-based power systems.

Since the time of the "space race" with the Soviets, forward-looking analysis suggested that space exploration will one day exploit extraterrestrial natural resources.

The development of space-based nuclear power technology has run parallel to an evolving rationale regarding the need to explore our own solar system and beyond. Since the time of the "space race" with the Soviets, forward-looking analysis suggested that space exploration will one day exploit extraterrestrial natural resources. These natural resources could enable further exploration and provide new sources of materials that are subject to dwindling supplies and increasing prices on Earth. Mining for increasingly valuable commodities such as thorium and samarium is envisaged on the Moon and on selected asteroids as a demonstration of technology at scales never before imagined.

In addition, the discovery of helium-3 on the Moon may provide an abundant power source for lunar facilities or for Earth through the use of nuclear fusion technologies. However, that resource will remain on the shelf until the technological challenges of fusion power are overcome. Some day, helium-3 may even be stockpiled on the Moon until it is needed. Clearly, that nuclear power will provide the means necessary to realize the more ambitious goals of space development.

Technological advances in other areas will provide enhanced environmental safeguards in the use of nuclear power and innovative means to deliver space-derived materials to the Earth's surface such as a space elevator. These advances could include a space 'gravity tractor' to nudge errant asteroids and other bodies out of orbits that would collide with the Earth. Nuclear systems will enable humankind to expand beyond the boundaries of Earth, provide new frontiers for exploration, protect the Earth, and renew critical natural resources. ■

Biographical Sketch

Michael Campbell holds a bachelor's degree in geology and hydrogeology from The Ohio State University (1966) and an MA in geology from Rice University (1976). He has worked for American companies overseas in Australia, Southeast Asia, and Africa on natural resource development and environmental projects. In the United States, Mr. Campbell has been involved in a range of mining and associated environmental projects related to exploration for uranium and precious metals.

Over the past 40 years, he also authored a number of Environmental Protection Agency-sponsored guidance documents and associated reports involving groundwater resource development, contamination assessment and abatement, and uranium exploration and development. He has worked for several national consulting and engineering companies including Law Engineering, ENSR Consulting and Engineering, and DuPont Environmental.

Mr. Campbell has produced three technical books and many papers and reports in addition to serving on a number of editorial boards of major technical journals. He is a Fellow of the Geological Society of America, serves as Chairman of the Uranium Committee of the Energy Minerals Division of the American Association of Petroleum Geologists, and was appointed a member of the AAPG's Astrogeology Committee. He is also Chairman of a number of committees in other groups such as the AIPG in Texas and the AEG in Texas.

January 2009

Sunday	Monday	Tuesday	Wednesday
	Reservations: The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476. **Reservations for HGS meetings must be made or cancelled by the date shown on the HGS Website calendar, normally that is 24 hours before hand or on the last business day before the event.** If you make your reservation on the Website or by email, an email confirmation will be sent to you. If you do not receive a confirmation, check with the Webmaster@hgs.org. Once the meals are ordered and name tags and lists are prepared, no more reservations can be added even if they are sent. **No shows will be billed.**		**Members Pre-registered Prices:** General Dinner Meeting . . . . . .$28 Nonmembers walk-ups. . . . . $35 Env. & Eng. . . . . .$25 Luncheon Meeting . . . . . .$30 Nonmembers walk-ups. . . . . $35 International Explorationists . . . . . .$28 North American Expl. . . . . .$28 Emerging Technology $25
4	5	6 **GSH Technical Luncheon** *"Seismic Attributes for Stratigraphic Feature Characterization," Satinder Chopra, Omni Palace*	7 **SIPES Luncheon Joint Meeting with SPEE** *"The New SEC Guidelines," Dr. John Lee, Petroleum Club* Page 41
11	12 **HGS General Dinner Meeting** *"A Chronology of Paleozoic Sea-Level Changes," Dr. Bilal Haq, Westchase Hilton,* Page 18 **SIPES Continuing Education Seminar** *Marathon Oil Conference Center*	13	14
18	19 **HGS International Explorationists Dinner Meeting** *"India—Historical and Emerging Plays, Identifying New Petroleum Systems Using Regional PSDM Seismic Data," Al Danforth, Westchase Hilton,* Page 23	**HGS Continuing Education** *"Risk Analysis of Seismic Amplitude-Bearing Prospects"* 20 **HGS Northsider's Luncheon** *"Reservoir Quality and Pore-Type Evolution in Tertiary Wilcox,"* Page 27 **HGS E&E Dinner Meeting** *"Nuclear Power in Space Exploration and on Earth: An Overview,"* Page 28	21
25 **NOW you can make your reservations on-line at www.hgs.org**	26 **HGS North American Dinner Meeting** *"Eustasy and Shale Predictability," Steve Schutter, Westchase Hilton,* Page 33	27 **Texas Ground Water Association Annual Convention and Trade Show** *Galveston, Texas*	28 **HGS General Luncheon Meeting** *"Seismic Reservoir Characterization of a Gas Shale Utilizing Azimuthal Data Processing, Pre-Stack Seismic Inversion and Ant Tracking," David Paddock, Petroleum Club of Houston,* Page 35

GeoEvents

Thursday	Friday	Saturday
1 **HGS Trans-Pecos Field Trip**	2	3
8	9	10
15	16	17 **HGS/AEG Daisetta Sinkhole Seminar and Field Trip** *Daisetta, Texas* Page 14
22	23	24
29 **HPAC** *"Let's Have Lunch and Play Bingo"* Page 56	30	31

Upcoming GeoEvents

February 5 – 6
2009 NAPE Expo
Houston, Texas

February 9 – 13
AAPG 6th Annual Winter Education Conference
Norris Conference Center, Houston Texas, Page 46

Monday, February 16
HPAC Event
Game Day
Junior League of Houston

February 19
SIPES Luncheon
Casing Drilling Reduces Formation Damage, Enhances Production
Bob Tessari, Turnkey E&P, Inc.

March 19, 2009
SIPES Regular Lunch Meeting
Guest Speaker Dan Smith (Sandlewood O&G)
"Send in the Clowns"

Friday, March 27th, 2009
15th Annual 3-D Seismic Symposium
Denver, CO (Marriott Hotel-Downtown) www.rmag.org

March 29 - April 2, 2009
22nd Annual Symposium on the Application of Geophysics to Engineering and Environmental Problems (SAGEEP 2009)
www.eegs.org Fort Worth, Texas.

Saturday, April 4
HGS Guest Night
In Search of the First Americans: Recent Discoveries and the Role of Geology in the Pursuit of the Past
Michael R. Waters, PhD, Departments of Anthropology and Geography
Texas A&M University
Downtown Aquarium

Monday, January 26, 2009

Westchase Hilton • 9999 Westheimer
Social Hour 5:30-6:30 p.m. • Dinner 6:30-7:30 p.m.
Cost: $28 pre-registered members; $35 for non-members & walk-ups; Emeritus/Life/Honorary: $14; Students: FREE

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

HGS North American Dinner Meeting

Steve Schutter
Murphy International E&P

Eustasy and Shale Predictability

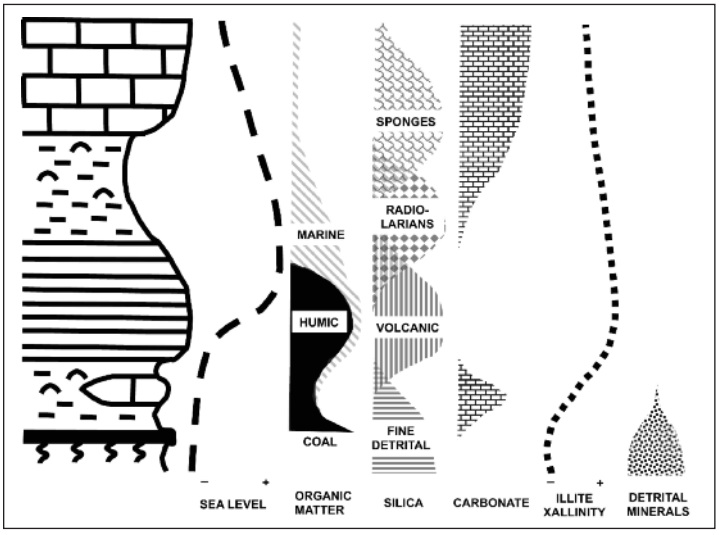
In the last few years interest in hydrocarbon-bearing shales has exploded, particularly in North American Paleozoic basinal shales. Since this interest has been driven by technological improvements in drilling and completion, most of the new knowledge has focused on the engineering characteristics of the shales. Much less attention has been given to geological models of shale deposition that could be applied to exploration and development. Better geologic models could provide a context for understanding the engineering parameters of the shales.

Where some basinal shales may grade laterally into deltaic siliciclastics, these shales are commonly related to carbonates. In both cases, eustasy strongly influences the distribution and characteristics of the shales. For instance, eustasy may affect the nature and quantity of organic material. The most condensed sections may have the highest overall organic content, but the organic material is more likely to be refractory. Changes in sea level can also affect other shale components such as phosphate and silica (both organic and inorganic). Clay mineralogy may also be strongly influenced both by changing sources of detrital material and by the quality and quantity of "mixed-layer" clays.

Lowstands may permit more porous facies to be deposited within the basinal facies; conversely, extreme condensation may lead to the appearance of "unconformities." All of these characteristics may impact the source rock quality of the shales as well as their hydrocarbon content and production capacities. A good eustatic model, coupled with an understanding of shale deposition, should permit the development of valid exploratory concepts.

Fortunately, shales provide a wealth of information, provided they are studied in an integrated manner. Petrographic and paleoecologic information can be gathered not only from the shales themselves but also from the contiguous coarser siliciclastics and carbonates. Depositional patterns on adjacent shelves can be extrapolated into the basins, resulting in a more well defined recognition of facies within the shales. However, within basinal shales, the critical units for interpretation may be well below the resolution of well cuttings or even electric logs. Calibration of facies from cores or outcrops may be essential to understanding the shales. Highly-fractured zones or zones with higher hydrocarbon capacity may be relatively thin, but like high-flow zones in carbonates and coarser siliciclastics, these can dominate the production characteristics of the unit.

Most of the examples presented in this talk will apply directly to Paleozoic black shales that are the focus of much current exploration effort. Application of the same interpretation principles to Mesozoic and Cenozoic black shales needs to be investigated. ■



Distribution of significant inputs during sea-level rise and early highstand, based on a platform-to-basin section distant from large-scale siliciclastic influx. The ruled lithology is fissile black shale.

Biographical Sketch

Steve Schutter received his graduate degrees in geology from the University of Iowa where his studies involved the depositional environments of Ordovician and Pennsylvanian shales. At Exxon Production Research, Mr. Schutter worked on Paleozoic eustasy and the stratigraphic expression of salt tectonics and on several regional studies. This was followed by work for Subsurface Consultants; he is now at Murphy International E&P. Mr. Schutter has published papers on Paleozoic eustasy and the depositional environments of shales and on hydrocarbons associated with igneous rocks.

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www.internationalpavilion.com

Wednesday, January 28, 2009

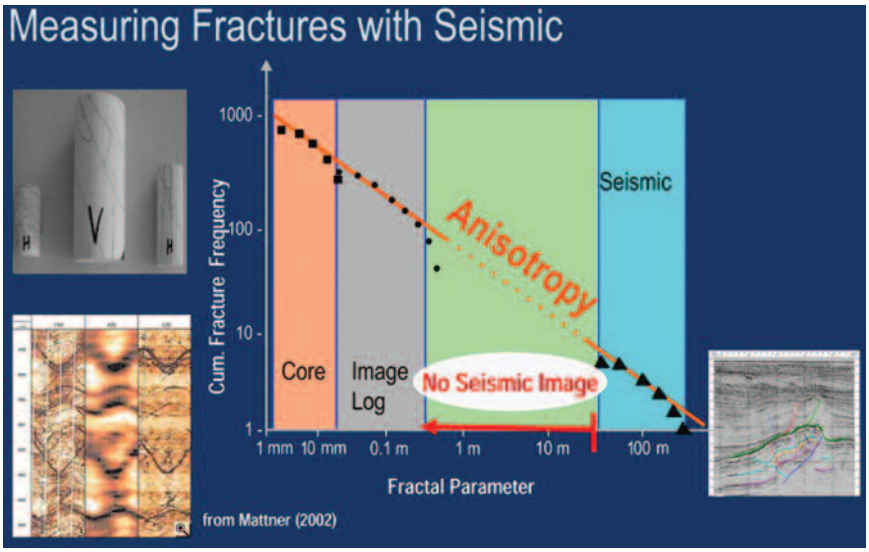
Petroleum Club • 800 Bell (downtown)
Social 11:15 AM, Luncheon 11:30 AM

Cost: $30 pre-registered members; $35 for non-members & walk-ups; Emeritus/Life/Honorary: $15; Students: FREE

To guarantee a seat, you must pre-register on the HGS website (www.hgs.org) and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

David Paddock*, Christian Stolte, Lei Zhang, Javaid Durrani
Schlumberger Data & Consulting Services, Houston
John Young
WesternGeco, Denver
Thomas Hay
Schlumberger Data & Consulting Services, Denver

Seismic Reservoir Characterization of a Gas Shale Utilizing Azimuthal Data Processing, Pre-Stack Seismic Inversion and Ant Tracking



Prospective hydrocarbon-bearing zones in gas shales are characterized by primary gas storage entrapped in the sediment matrix with some additional gas in the open fractures. This gas is economically recovered by horizontal drilling and fracturing. Mineralization of faults is a reservoir risk. Faults also represent significant completion risk, as fracture completion jobs often are "captured" by nearby faults.

A wide azimuth 3D survey was acquired of the studied shale to highlight areas exhibiting seismic velocity anisotropy for detection of open fractures. Simultaneous prestack inversion of the seismic data to Poisson's ratio targets matrix-stored gas. Seismic processing for the detection of horizontal anisotropy targets the gas stored in fractures. Reservoir risk related to fault mineralization is addressed through a detailed imaging of the fault planes and the detection of anomalously low anisotropy along and adjacent to faults.

Integration of anisotropic data processing with pre-stack seismic inversion and Ant Tracking provides a superior tool to explore for gas in gas shale.

Prospective zones for gas production are identified by areas of anomalously low Poisson's ratio away from faults, with (in this particular shale) high velocity anisotropy. This study documents the results of an integrated workflow of data processing, pre-stack seismic inversion and Ant Tracking to successfully characterize faults and fractures and to identify sweet spots in the gas shale.

During data processing, azimuthal anisotropy analysis was conducted to determine the dominant direction of Vfast and Vslow. In general, there is good agreement between the azimuthal seismic data processing velocity analysis and Ant Tracking results.

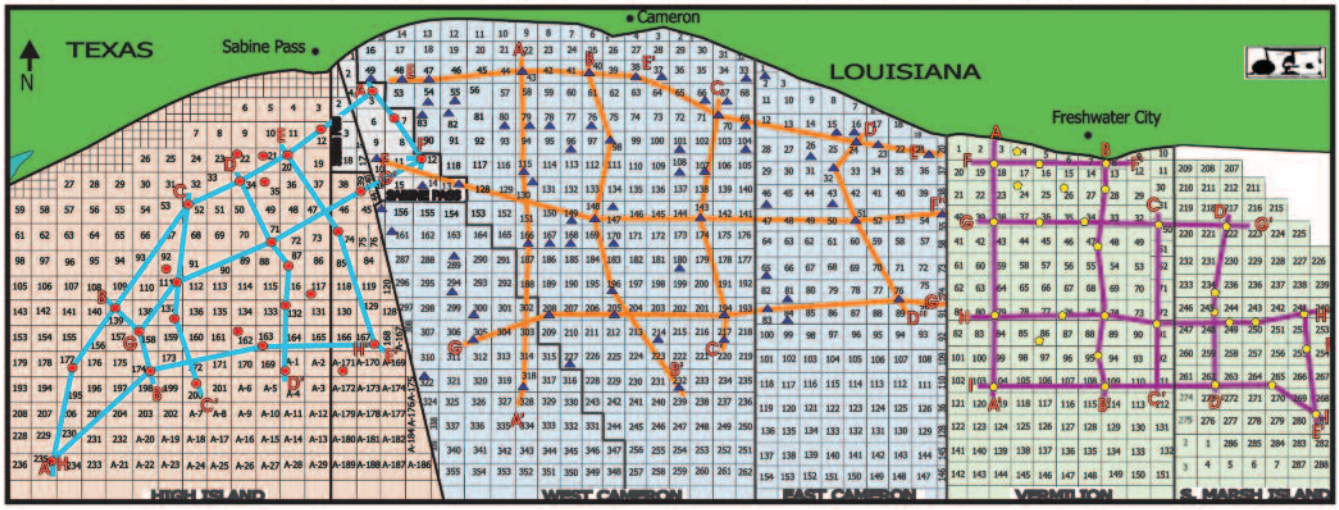
Simultaneous amplitude versus offset (AVO) inversion was done on prestack data to invert for acoustic impedance (AI) and Poisson's ratio. Areas of low Poisson's ratio away from faults are thought to be promising hydrocarbon leads or prospects.

Delineation of Matrix Storage of Gas

Simultaneous prestack inversion of the seismic data for Poisson's ratio proved to be effective in delineating areas of low Poisson's ratio that are thought to indicate the primary, more siliceous, relatively more porous, gas-charged sweet spots.

Because the studied gas shale is thought to produce primarily from the sediment matrix **HGS General Luncheon** *continued on page 37*

"DEEP TO MEDIUM GAS" INDIVIDUAL PROJECTS FOR THE 2008 / 2009 LEASE SALE



Project Cost:

$7,900 High Island-Sabine Pass (30 wells)
$14,900 West-East Cameron (74 wells)
$7,900 Vermilion-S. Marsh Island (30 wells)
$7,900 Eugene Island (30 wells)
$7,900 Ship Shoal (30 wells)
$7,900 S.Timbalier-South Pelto (35 wells)

Digital well-logs:

$900 High Island-Sabine Pass (30 logs)
$1,800 West-East Cameron (74 logs)
$900 Vermilion-S. Marsh Island (30 logs)
$900 Eugene Island (30 logs)
$900 Ship Shoal (30 wells)
$900 S. Timbalier - S. Pelto (30 wells)

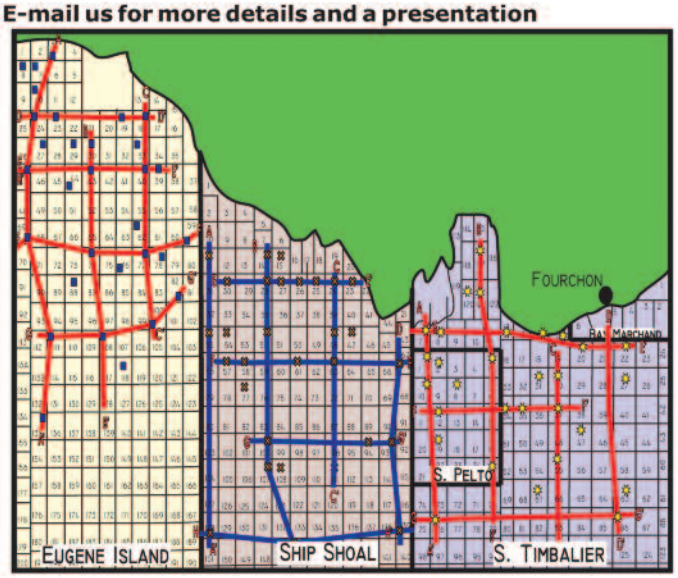
PROJECT DELIVERABLES

1. Single well plots for each well with mapable Genetic Sequences correlated with marker species, paleowater depth, well log and FAIRFIELD INDUSTRIES INC., Extracted 3-D PSTM seismic panels (one mile in length).
2. Biostratigraphic and Sequence Stratigraphic table/well, with marker species, paleowater depth, and age dated MFS (Seals).
3. Cross Sections (Dip and Strike) age dated MFS and well logs.
4. Deliverables in two types of formats:
   a. Hard copy binder (11"x 17") printed on premium paper and includes written report, single plots, etc.
   b. Report and raw data is delivered in digital format.

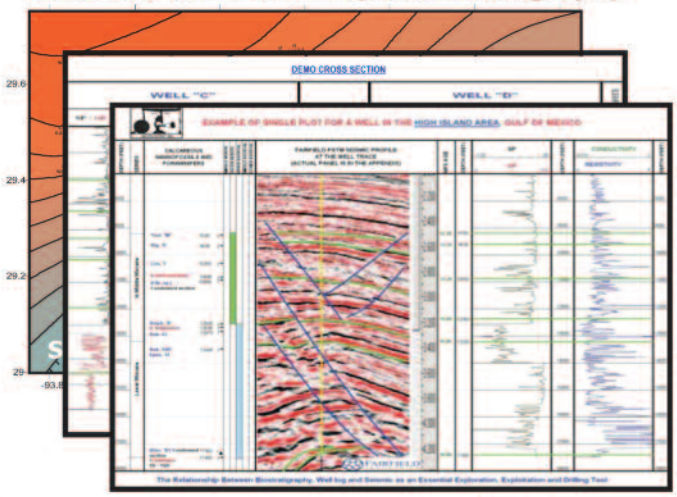
PROJECT BENEFITS

- Show the relationship between Genetic Sequences (in time), seals, potential reservoir sands, paleowater depth, especially in the Miocene section.
- 7 to 12 Genetic Sequences associated with producing and potential deep gas targets.
- Identify MFS (seals) on well-logs and 3-D seismic to provide local and regional timelines.
- Use point of intersection of MFS and log to construct, isopach, sand %, structural and biofacies maps.
- Identify the type of reservoir sands in each Sequence, play concepts and facies' relationships within each Sequence.
- Correlate MFS with continuous reflectors on seismic panels in a 360 degree arc from each project well with the corresponding regional FAIRFIELD data set.

E-mail us for more details and a presentation



Integrating Biostratigraphy, Well-Logs, Seismic Profiles and Sequence Stratigraphy



Please Contact us at:
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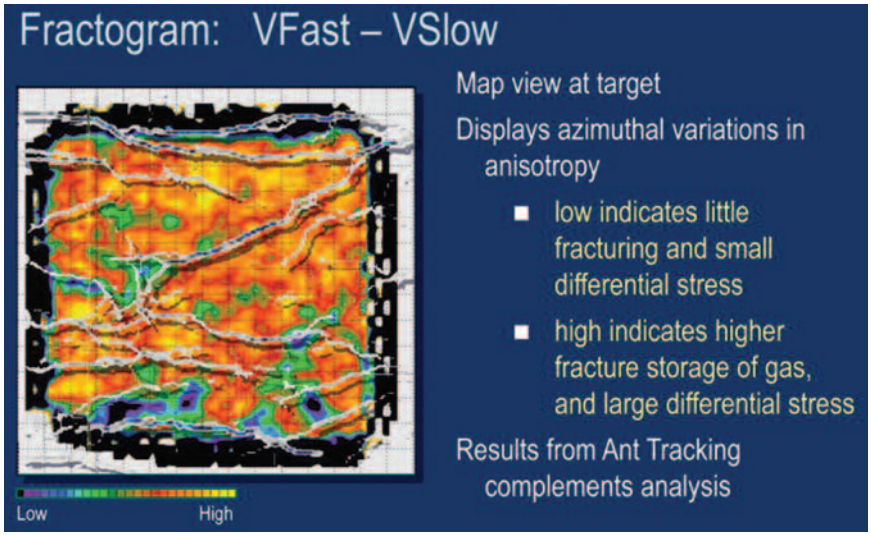
HGS General Luncheon continued from page 35

rather than open fractures, the inversion was run on a full-azimuth basis. In a shale where open fractures are more important, we would recommend running the inversion twice, once on the fast-direction data (as determined by the azimuthal anisotropic data processing) and separately on the slow-direction data. The fastdirection would give a good measure of the matrix-only effects of lithology, porosity, and charge. The slow direction would provide, by comparison, a measure of the effects of gas-charged open fractures.



Delineation of Gas-Charged Open Fractures

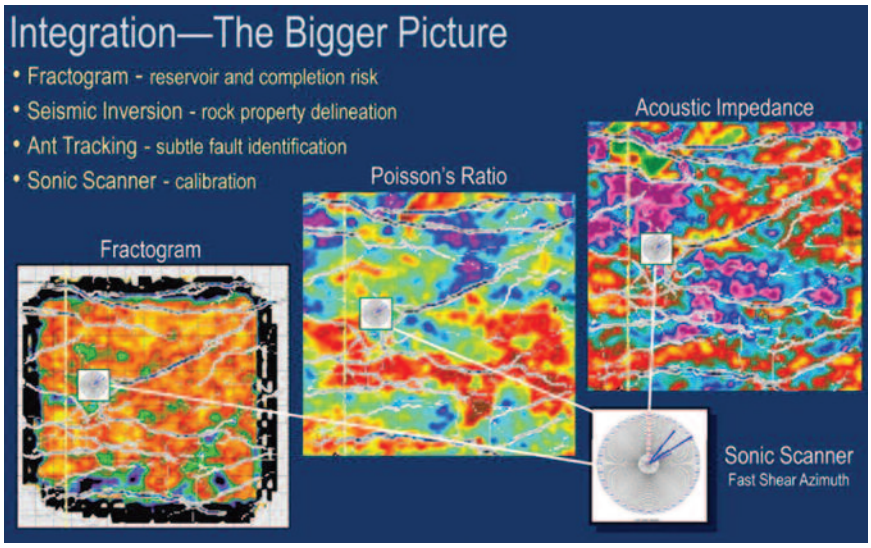
Azimuthal velocity analysis for anisotropy was used to delineate areas of open fracturing and stored stress. Comparisons of well productivity with rock physics seismic attributes have revealed that wells drilled into areas of high anisotropy in this particular shale have anomalously long-lived production, presumably from more effective fracture completions.

Detailed Imaging of Faulting

Ant Tracking reduces the risk of drilling near faults (a reservoir risk due to expected mineralization) by providing a high resolution image of fractures and faults beyond what can be interpreted from conventional seismic data. Faults were expected to be mineralized, with some mineralization extending out into the surrounding shales. **HGS General Luncheon** *continued on page 39*

HGS General Luncheon continued from page 37

Integration with the anisotropic analysis confirmed this for most faults. Some faults, however, lacked the diagnostic low anisotropy expected with mineralization.



Conclusions

Integration of anisotropic data processing with pre-stack seismic inversion and Ant Tracking provides a superior tool to explore for gas in gas shale. The integration of Poisson's ratio, fractogram, azimuthal anisotropic analysis, and Ant Tracking from surface seismic data provides actionable information for leasing and well placement, including the delineation of areas with enhanced porosity and charge, areas with open fractures, and areas with faulting, revealing likely sweet spots as well as areas to be avoided in drilling. ■

Biographical Sketch

David Paddock is Reservoir Characterization Team Leader and Principal Geophysicist for Schlumberger DCS Reservoir Seismic Services for the United States. Since September 2000, Mr. Paddock has been with Schlumberger Data & Consulting Services leading a wide range projects, but with a special emphasis on the onshore United States. Prior to Schlumberger, he was a geophysicist at ARCO and Vastar for 18 years, working in the greater Gulf of Mexico and Permian basins.

SOCIETY OF INDEPENDENT PROFESSIONAL EARTH SCIENTISTS

Joint Meeting With

Society of Petroleum Evaluation Engineers

Houston Chapter

DATE: Wednesday, January 7, 2009 **TIME:** 11:30 am

LOCATION: Petroleum Club **COST:** Members: $30.00
Guests & Non-members: $35.00

Note: An additional $5.00 surcharge will be added to payments of walk-ins and after deadline reservations.

SPEAKER: Dr. W. John Lee

Dr. Lee received BChE, MS, and PhD degrees in Chemical Engineering from Georgia Tech. He had 15 years of experience as a reservoir engineer with ExxonMobil, where he specialized in integrated reservoir studies of some the company's major reservoirs. He joined the Texas A&M faculty in 1977 and, while at A&M, also worked as a consultant with S.A. Holditch & Associates, specializing in reservoir engineering aspects of unconventional gas reservoirs. Since October, 2007, he has been working with the U.S. Securities and Exchange Commission on a project dealing with oil and gas reserves.

Dr. W. John Lee - L.F. Peterson Chair and Regents Professor, Harold Vance Department of Petroleum Engineering, Texas A&M University College Station, TX.

"DEVELOPMENTS IN RESERVES ESTIMATION" – John Lee, will discuss "topics of current interest in oil and gas reserves estimation."

For reservations, please go to www.sipes-houston.org or contact BK at (713) 651-1639, fax (713) 951-9659, or e-mail BKSPEE@aol.com **by noon Monday, January 5.** Cancellations must be made prior to the noon January 5th deadline. No shows will be billed. Cash and check payments are accepted. Credit cards can not be processed. Receipts provided at the door

Geology.About.com
http://geology.about.com

Michael Forlenza, *PG*

The Geology.About.com website is an approachable and light introduction to the science, lore, and cultural aspects of geology. The content is aimed at the general public of non-geologists or students, still a geologist will find some interesting browsing among the articles. The website provides an explanation of the basic concepts such as of geologic time, rocks and minerals, evolution, and plate tectonics. An introduction to geology is presented through a series of articles with titles such as: What is a Rock?, What is a Mineral?, What are Volcanoes?, or What Builds Mountains?

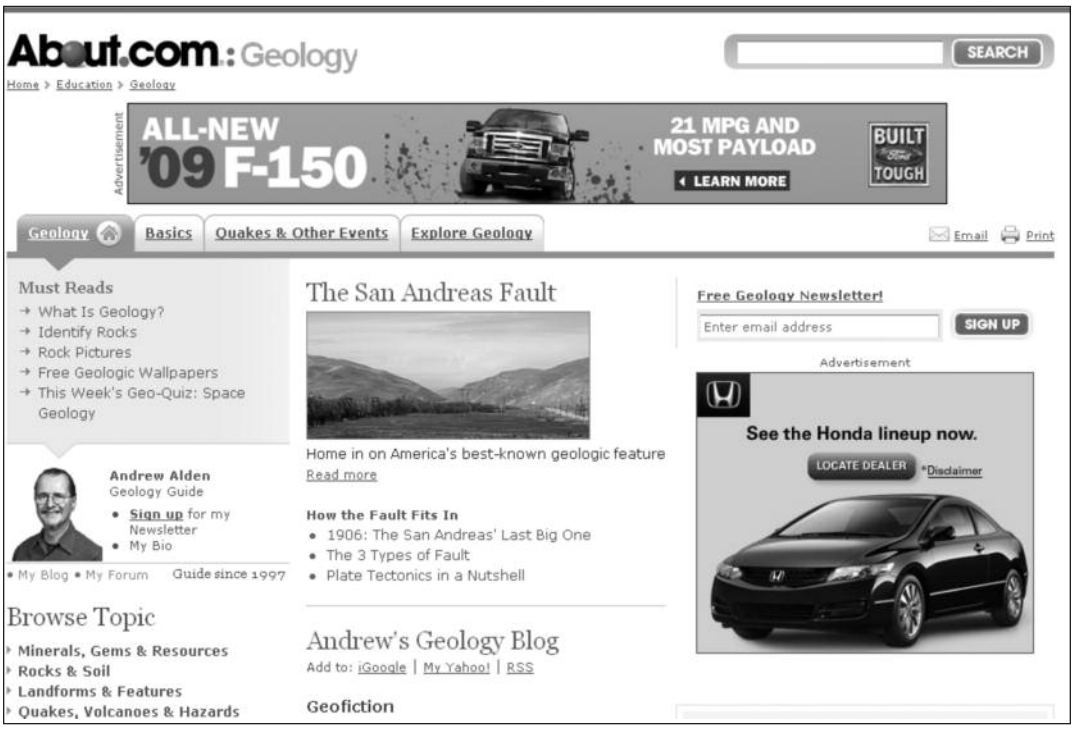
The Geology.About.com homepage has four tabs to access the four main pages of the website. These are: Geology, Basics, Quakes & Other Events, and Explore Geology. The four main pages provide lists of articles about related topics. Most of the website content is original. While the articles on a wide range of geologic related topic are interesting and well-written, there is shortage of accompanying photographs and a dearth of informative illustrations. The photograph galleries of rock and mineral hand specimens contain some interesting shots.

Geology.About.com is extensively cross linked within its content. This means that surfers will almost never come to a dead end, but may end up going around the same block a few times. While most of the links on the website are internal, there are some useful and interesting collections of links to external resources. The list of external links under Geologic Maps connect to a wide range of current and developing academic and government research projects such as the Lamont-Doherty Geological Observatory's world bathymetry and topography project, the Scripps Institute of Oceanography's marine gravity map of the world, or the University of Florida's airborne laser swath mapping (ALSM). Unfortunately, these links do not always work.

Geology.About.com is part of the much larger About.com. About.com is an online collection, or "neighborhood," of websites each based on a topic ranging from health issues, to music, to travel, to the sciences. Each of these topical websites is hosted by an an expert "guide" to provide visitors and informative experience and to share knowledge. About.com was started in 1996 and was acquired by the New York Times Company in 2005. The website records more than 60 million visitors per month.

Since 1997, the guide for the Geology.About.com website has been Andrew Alden. Mr. Alden is a "science writer, photographer, editor and blogger with a lifelong passion for rocks, minerals, fossils, and the planets they come from." He holds a bachelors degree in earth science from the University of New Hampshire and worked for the United States Geological Survey for six years.

GeologyAbout.com is a commercial website with numerous advertisements. While the banner advertisements and the animated displays are nothing new to experienced websurfers, these features are somewhat distracting compared to the more formal formats that are commonly used for academic, government, or professional society websites.



One of the most amusing sections on the Geology.About.com website is the Fun section on the Explore Geology page. Check out the article on Famous Stones or on Wild and Bemusing Earth Theories. This is where you can learn about "the modern Russian-Ukrainian theory of deep, abiotic petroleum origins." ■

HGS Outreach Events—Summer and Fall 2008

Martha McRae, Inda Immega, Janet Combes

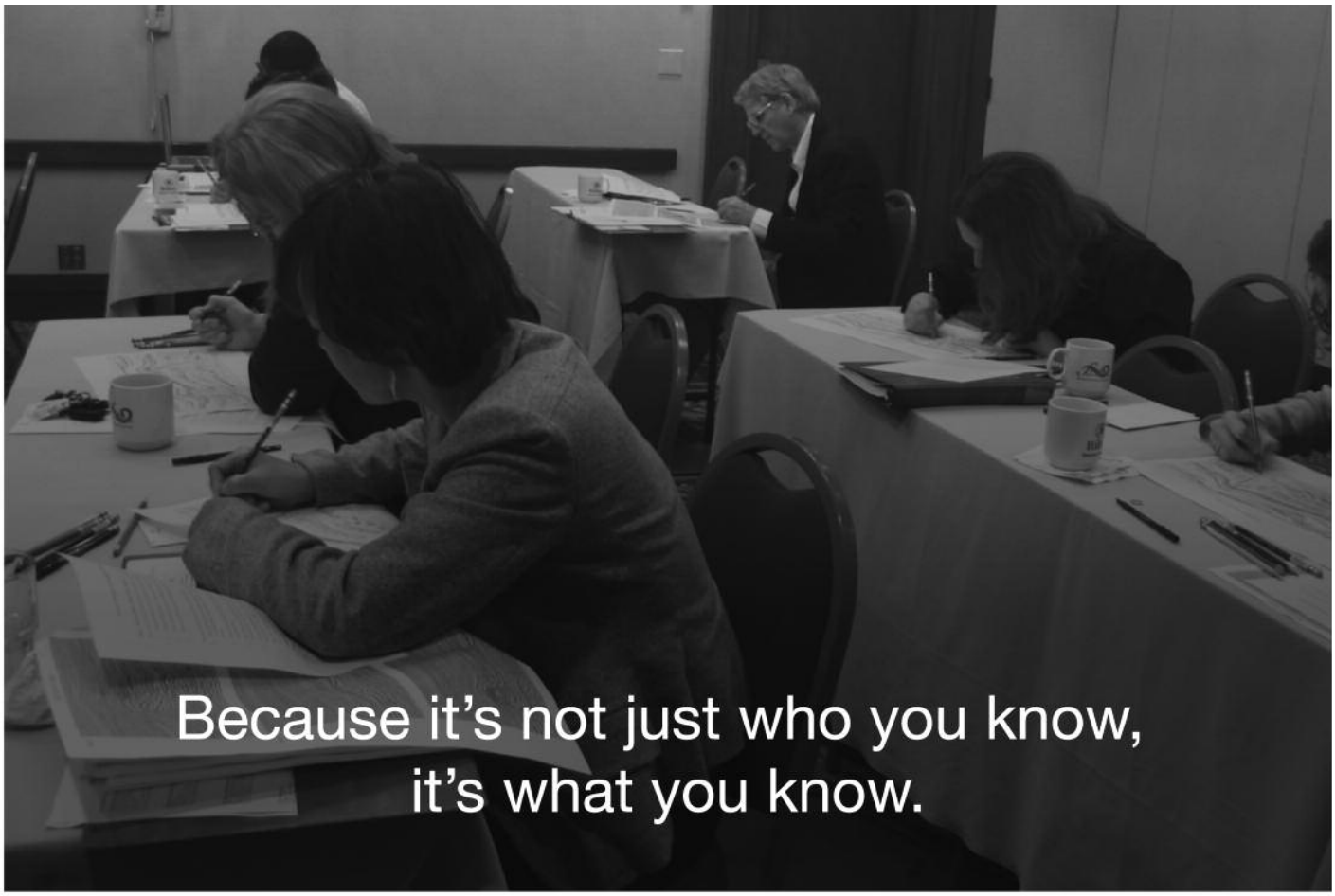
The summer months saw geology volunteers helping at the Houston Museum of Natural Science's Geopalooza exhibit. Exquisite geodes, meteorites, fantastic fossils, detailed trilobites, and fluorescent minerals renewed forgotten memories of paleontology and mineralogy classes. The kids got into the dino dig, gold panning trough, and the geode-cracking station.

The HGS Fall 2008 outreach activities started at the Houston Gem and Mineral Show on September 26-28. The HGS K-12 booth was set up and staffed by volunteers on Friday for 800 students mainly from private schools and home schooling—most of the public ISDs had to cancel due to Hurricane Ike. On Saturday and Sunday, about 300 Boy and Girl Scouts came through and the HGS staffers helped them fulfill their badge requirements. The Bureau of Economic Geology core facility in Houston provided some hands-on core samples at the booth that fascinated the kids. First time volunteers included Dot Payne, Alison Steele Mandadi, her Girl Scout daughter, and two University of Houston students—Kelly Whitley and Kate Sposato. Mike Bourque, Nancy Engelhardt-Moore, Martha McRae, the Immegas, and Janet Combes also helped staff the booth. Jen Burton organized the schedule.

Geopalooza Opening Night: Scott Singleton and the petrified wood table.

Houston Gem and Mineral Show: UH student Kelly Whitley at the HGS booth; several University of Houston geology students helped out at the HGS booth over the weekend.

HGS Outreach Events—Summer and Fall 2008 *continued on page 47*



HGS Outreach Events—Summer and Fall 2008 continued from page 45

The first weekend in October marked the start of the GCAGS/ GSA/ Tri-Societies joint convention. The traditional teacher training associated with the GCAGS convention was held on Friday, October 3, at the Region 4 Education Service Center. The HGS sponsored two short courses for K-12 teachers: "More! Rocks in Your Head" taught by Janie Schuelke (co-sponsored by the American Association of Petroleum Geologists) and Discovering Plate Boundaries taught by Dale Sawyer. Both courses provided many handouts and teaching aids and suggestions to the participants. Attendance at the short courses was down because of Ike scheduling problems, but those in attendance had very positive comments on both courses. The fully-booked HGS sponsored teacher field trip to Galveston Island, led by Alison Henning, was cancelled due to Ike (we hope to hold it in the spring).

GCAGS / HGS sponsored Teacher Training at Region 4 Education Service Center. Janet Combes at the booth and previous TESTA (Texas Earth Science Teachers Association) president Lexy Bieniek signs up for the potential spring field trip.

The GSA Minority and Women in Geoscience (MWG) Committee asked the HGS help in indentifying a school and an activity to promote geology to the students. The GSA MWG invited Cullen Middle School on a field trip to the Houston Museum of Natural Science on October 16. The Texas Alliance for Minorities in Engineering (TAME) also helped out with the event—especially Emanuel Guidry. Due to a mix-up, no docent had been scheduled for the group, but at the last minute, tireless HGS volunteers Inda and Neal Immega led the group through the Weiss Energy Hall, the Cullen Hall of Minerals, and the Paleonology Hall before the kids went to lunch and to see the "Grand Canyon" IMAX.

On Oct 11, 2008, Earth Science Week and International Year of Planet Earth celebrated a Family Energy Festival at the Houston Museum of Natural Science. We started out with a geoscience-themed **HGS Outreach Events—Summer and Fall 2008** *continued on page 49*

FIRST ANNOUNCEMENT AND CALL FOR PAPERS
THE 8TH PESGB / HGS CONFERENCE ON AFRICAN E & P

Africa: New Concepts for the Oldest Continent

QE II Conference Centre, London, 9 - 10 September 2009

Alternating between London and Houston, this annual conference has established itself as the primary technical E & P conference on Africa for Operators, Consultants, Governments and Academics.

Oral programme to include about 25 high quality presentations with an associated large poster display.

Session Themes

- New Exploration Basins in Onshore Africa and in Deepwater
- New Concepts in Established Petroleum Basins
- Old and New Petroleum Systems
- Technology Advances in Exploration and Production

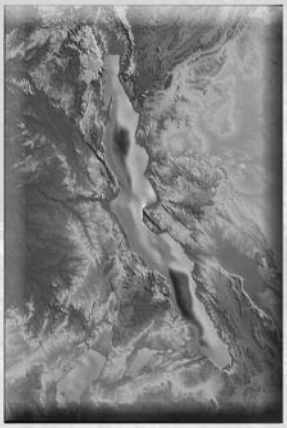


Image courtesy of Fugro NPA and Surestream Petroleum : Lake Tanganyika, Neogene rift basin exploiting Permian rift trends and PanAfrican lineaments, composite topographic and satellite gravity image

ABSTRACTS: (circa 200 words) should be sent as soon as possible and no later than 13 March 2009 for sub-Saharan Africa to Duncan MacGregor (duncan.macgregor2@ntlworld.com) and for North Africa to Richard Dixon (dixonr2@bp.com).

Sponsorship: details of sponsorship opportunities and exhibitor booths available from the PESGB office (rebecca@pesgb.org.uk).

PESGB

2009 Conference Committee: Ray Bate (Chairman), Duncan MacGregor & Richard Dixon (Technical Co-ordinators), Kevin Dale (London) and Al Danforth and Ian Poyntz (HGS, Houston).

HGS Outreach Events—Summer and Fall 2008 continued from page 47

ESW Family Energy Festival: NABGG members Shaun Washington and Amanada Mosola introduced visitors to a plethora of rocks and minerals with economic applications.

ESW Family Energy Festival: Jen Burton and Buddy Snell from the HGS award prizes — sets of ten rocks and minerals from Texas — to young participants.

cake contest open to the public that would show various features of Planet Earth. The winning cake was a smoking volcano cake made by Cake Lady Bakery of Friendswood. The second place winner was a Glacier Lake and made by Sweet Delight Wedding Cakes of Houston. Everyone enjoyed eating all of the entries following the awards ceremony. Photographs of the cakes and an accompanying article were presented in the December 2008 HGS *Bulletin.*

Activities for the day continued within the museum in the form of an Energy Passport event. We had over 50 volunteers from several local earth science societies, local schools, and the Boy Scouts set up "passport" stations with hands-on educational activities. Volunteers came from the Houston Geological Society, the Houston Museum of Natural Science, the Houston Gem and Mineral Society, the Geophysical Society of Houston, the Gulf Coast Section of SEPM, the National Association of Black Geologists and Geophysicists, and the Boy Scouts; as well as students from Sharon Choen's and Tom Miskelly's San Jacinto Community College geology classes.

These hands-on activities included topics on petrified wood, geophysics, paleontology, rocks and minerals, mapping, and careers. Rock kits and geologic maps of Texas, funded by our corporate sponsors Anadarko and Chevron, were given to participants who completed most of the passport stations. We happily had over 500 people participate in the passport activities this year with

HGS Outreach Events—Summer and Fall 2008 continued on page 51

The 59th Annual Convention of the
Gulf Coast Association of Geological Societies
and the Gulf Coast Section of SEPM
September 27-29, 2009
www.gcags2009.com

-CALL FOR PAPERS-

The Shreveport Geological Society is proud to host the 2009 Annual Meeting for the GCAGS/GCSEPM. We look forward to continuing the long tradition of presenting the best of the geosciences from the Gulf Coast. Our theme, **"A Fusion of Geology and Technology"**, recognizes the fact that we work using tried and proven geological concepts yet we are in the forefront of technical innovations. Our work is recorded for the worldwide geological community in our superior publication, the ***Transactions***. We invite you to be a part of this process by submitting an abstract for an oral or poster presentation in Shreveport for the 2009 Convention of the GCAGS.

PROPOSED TECHNICAL SESSIONS

Haynesville & Other Shale Plays-A Symposium
The Wilcox-Outcrop to the Abyss
Visualization, Geochemistry, & Interpretation of Geologic Systems
Tight Gas Sand Development
Water Resources & Environmental Geology
Old Fields-Rejuvenation & Enhancement
Salt Traps & Technology
Global Change and Coastal Subsidence-Dealing with the Inevitable?
Peak Oil & Bridges to Sustainability
Geology & Education-A Natural
Seismic Applications in the Upper Gulf Coast
Stratigraphy of the Cotton Valley & Louark Groups: Northern Gulf of Mexico

Abstracts for oral and poster presentations may be submitted beginning November 1, 2008, but no later than **February 1, 2009,** by logging onto www.gcags2009.com. First drafts of full papers from selected presenters that will be included in the 2009 *Transactions* volume must be submitted by April 1, 2009. Contact information for the technical session chairs, as well as instructions for authors for the 2009 *Transactions*, can be found at the GCAGS conventions website, www.gcags2009.com. For general questions on the technical program please contact Gary Hanson, 2009 Technical Program Chairman. He may be contacted via email at ghanson@pilot.lsu.edu.

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HGS Outreach Events—Summer and Fall 2008 continued from page 49

Dino Days: HGS volunteer Deborah DeBram and HGMS's Nancy Fischer helped visitors take a fresh look at trilobites.

around 350 of those completing most of the stations – we had more Scouts this year than in the two previous years. An AGI bookmark with a geologic timescale was handed out all day. For school teachers participating in the activities, an AGI ESW teachers kit containing lesson plans, posters, and examples of science activities to do in the classroom was well received. The arrival of Hurricane Ike in September caused cancellation of our planned ESW field trip to High Island.

The HGS Museum committee helped give an evening tour to AWG members and family and friends on October 28. "Leonardo," a sub-adult Brachylophosaurs, is the dinosaur in the "Dinosaur Mummy CSI: Cretaceous Science Investigation." That fossil and others in the exhibit generated a lot of interest and discussion.

Many volunteer geologists HGS, HGMS, and GCS-SEPM from helped out with the DinoDay event at the Houston Museum of Natural Science Nov 1st. Special exhibits of fossil bone, petrified wood, and microfossils were intermixed with various dinosaur-themed craft tables to appeal to the younger visitors. Sharon Choen brought in another contingent of San Jacinto geology students to earn extra credit while having a fun time at the museum. ■

Dino Days: Dr. Bob Bakker enthralls visitors with his sketches and tales of dinosaurs.

HOUSTON GEOLOGICAL SOCIETY
Explore Our Connections

Applied Geoscience Conference (AGC)

US Gulf Region Mudstones as Unconventional Shale Gas/Oil Reservoirs

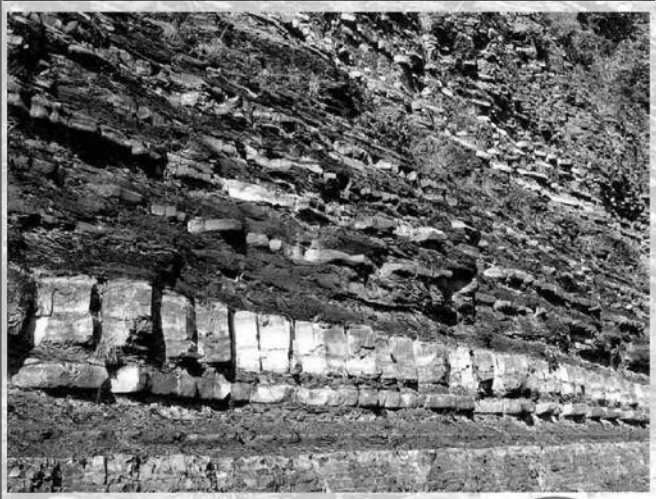
February 9-10, 2009

Hilton Houston North Greenspoint
Houston, TX

Interact and learn applied techniques from knowledgeable unconventional reservoir characterization specialists on :

RESERVOIR & SYSTEM CHARACTERIZATION FOR GULF COAST REGION SHALE GAS/OIL RESERVOIRS.

Learn about the Haynesville / Bossier target & what other productive mudstone systems may occur within the US Gulf Region



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Bruce Martin, *Geoscience Advsior*
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Attendance limited so register early!

To Register: visit www.hgs.org

Applied Geoscience Conference (AGC)

US Gulf Region Mudstones as Unconventional Shale Gas/Oil Reservoirs

The Houston Geological Society and the AAPG Energy Minerals Division (EMD) present an Applied Geoscience Conference for mudstone system characterization to improve exploitation of US Gulf Region Mudstone "Shale Gas/Oil" Reservoirs

This Applied Geoscience Conference (AGC) has four half day sessions :

Monday, February 9

AM Session:

Mudstone Characteristics leading to HC Productivity

PM Session:

Practical Applied Methods of Characterization

Tuesday, February 10

AM Session:

The Haynesville/Bossier - A major US Gulf Region Mudstone Systems under Investigation

PM Session:

Additional US Gulf Region Mudstone Systems Under Investigation

12 Credit Hour Certificate (1.2 C.E.U.) will be earned with attendance
Limited seating - so register early!

Registration Deadline of February 2, 2009

February 9-10, 2009

Hilton Houston North

To Register online: visit www.hgs.org or call (713) 463-9476

Attendance is limited - Register early to obtain a seat!

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EMD / HGS Members

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U.S. $580.00 Dec. 31,2008 - Feb. 2, 2009

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U.S. $ 600.00 by Dec. 31,2008

U.S. $630.00 Dec 31, 2008 - Feb 2, 2009

Cancellations are subject to $ 100.00 cancelation fee

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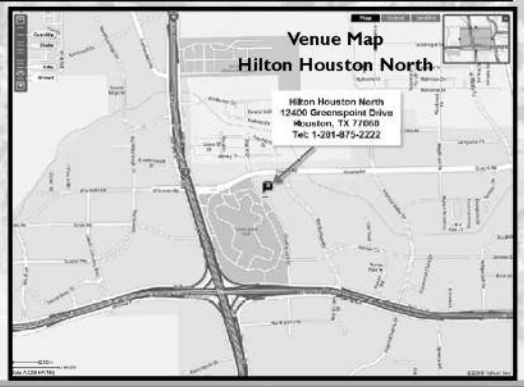

Full Color Ads Now Available!

HGS *Bulletin* Instructions to Authors

All materials are due by the 15th of the month, 6 weeks before issue publication. Abstracts should be 500 words or less; extended abstracts up to 1000 words; articles can be any length but brevity is preferred as we have a physical page limit within our current publishing contract. All submissions are subject to editorial review and revision.

Text should be submitted by email as an attached text or Word file or on a clearly labeled diskette in Word format with a hardcopy printout to the Editor.

Figures, maps, diagrams, etc., should be digital files using Adobe Illustrator, Canvas or CorelDraw. Files should be saved and submitted in .eps (Adobe Illustrator) format. Send them as separate attachments via email or CD if they are larger than 1 MEG each, accompanied by figure captions that include the file name of the desired image. DO NOT EMBED them into your text document; they must be sent as separate files from the text. DO NOT USE POWERPOINT, CLIP ART or Internet images (72-DPI resolution) as these do not have adequate resolution for the printed page and cannot be accepted. All digital files must have 300-DPI resolution or greater at the approximate size the figure will be printed.

Photographs may be digital or hard copy. Hard copies must be printed on glossy paper with the author's name, photo or figure number and caption on the back. Digital files must be submitted in .jpg or .eps format with 300-DPI or greater resolution at the printing size and be accompanied by figure captions that are linked by the file name of the image. The images should be submitted as individual email attachments (if less than 1 MB) or on CD or zip disk.

Advertising

The *Bulletin* is printed digitally using QuarkXPress. We no longer use negatives or camera-ready advertising material. Call the HGS office for availability of ad space and for digital guidelines and necessary forms or email to ads@hgs.org. Advertising is accepted on a space-available basis. **Deadline for submitting material is 6 weeks prior to the first of the month in which the ad appears.**

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9	$823	$1,387	$2,488	$4,734	$5,680					
8	$750	$1,260	$2,242	$4,307	$5,169					
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6	$590	$990	$1,782	$3,392	$4,069					$1,890
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One year	$1000.00	Free to members	$135.00	$2000.00	$2,000.00	
6 months	$525.00	Free to members	NA	$1200.00	$1,150.00	
3 months	$270.00	Free to members	NA	$650.00	$600.00	
1 month	NA	Free to members	NA	$250.00	Free	$100.00

Application to Become a Member of the Houston Geological Society

Qualifications for Active Membership

1) Have a degree in geology or an allied geoscience from an accredited college or university; or
2) Have a degree in science or engineering from an accredited college or university and have been engaged in the professional study or practice of earth science for at least five (5) years.

Qualifications for Associate Membership (including students)

1) Be involved in the application of the earth or allied sciences.
2) Be a full-time student enrolled in geology or in the related sciences.

Apply online at www.hgs.org and click on Join HGS

Annual Dues Expire Each June 30. (Late renewals – $5 re-instatement fee)
Annual dues are $24.00; full-time students and emeritus members pay $12.00.

Mail this application and payment to:
Houston Geological Society
14811 St. Mary's Lane, Suite 250 • Houston, TX 77079-2916
Telephone: 713-463-9476 Fax: 281-679-5504

Payment method:

☐ Check, ☐ VISA, ☐ MasterCard, ☐ American Express, ☐ Discover

Card # _____

Expiration Date: _____ Card I.D. _____

(Card I.D. – 3 or 4 digit number on front or back of card)

To the Executive Board: I hereby apply for ❑ Active or ❑ Associate membership in the Houston Geological Society and pledge to abide by its Constitution and Bylaws. ❑ Check here if a full-time student.

Name: _____

Address: _____

_____

Home Phone: _____ *Spouse's Name:* _____

Email: _____

Job Title: _____

Company: _____

Company Address: _____

_____

Work Phone: _____ *Fax Number:* _____

Circle Preferred Mailing Address: Home Office

Professional Affiliations: _____

❑ AAPG member No.: _____

Professional Interest:

❑ Environmental Geology ❑ North American E&P (other than Gulf Coast)

❑ International E&P ❑ Gulf Coast E&P (onshore & offshore)

School _____

Degree _____ *Major* _____ *Year* _____

_____

School _____

Degree _____ *Major* _____ *Year* _____

_____

Earth Science Work Experience _____

_____

_____

_____

Applicant's Signature _____ *Date* _____

Endorsement by HGS member (not required if active AAPG member)

Name: _____

Signature _____ *Date* _____

Membership Chairman _____ *HGS Secretary* _____

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Houston Geological Auxiliary/Houston Petroleum Auxiliary Council News

Norma Jean Jones, HGS Liaison

January 2009—how does that sound to you? It just does not seem that it was been that long ago that we reeled at the entry of the year 2000 and experienced the beginning of the 21st Century. Our computers did not all crash in the Y2K technology scare as we feared. But the time is moving way too fast now.

The HPAC held its Christmas lunch on December 5th, at Pine Forest Country Club, where all present enjoyed a delicious lunch. Valerie Koehler, owner of the Blue Willow Bookshop entertained a very enthusiastic group of HPAC members and their guests with some fantastic reviews of great books for gift-giving plus there was stirring holiday music by Mario. Kudos go to Co-Chairs, Nan Pye and Lynn Schoenberg and their committee for all of their efforts in the planning and production of such an enjoyable holiday event.

"Let's Have Lunch and Play Bingo" will be held at the home of Anne Rogers, 2001 Holcomb Boulevard, No. 4006 on Thursday, January 29th. Hostesses for this event are Daisy Wood and Anne Rogers. Sounds like a good time. Hope to see you there.

HPAC's ever popular Game Day will be held on Monday, February 16 from 10:00 a.m. to 2:30 p.m. at the Junior League of Houston. This is an event you will not want to miss. Daisy Wood chairs this event with a wonderful committee and we always have a great time.

On January 20th, the most astounding Presidential Inauguration will take place. In an overwhelming victory in November, our country elected its first African-American president. Only God knows and time will tell how much "Change" Barack Obama will bring to America. Obviously, the president has to deal with many huge issues and will need the prayers of all the people who love and are committed to our country. And, whether we voted for him or not, we all want him to be the best president ever. Because that's what the United States needs. That's what I will be praying for.

Now let's see what kind of puppy the Obamas get for those cute little girls and what Michelle will wear to the inauguration.

Happy New Year to you all. See you at something geological.

You are invited to become a member of

HGA/HPAC

2008–2009 dues are $20.00

Mail dues payment along with the completed yearbook information to Nan Pye, 18219 Longmoor, Houston, TX 77084

YEARBOOK INFORMATION

Last Name	First Name	Name Tag
Spouse Name	Name Tag	HGS Member's Company
Home Phone	Business Phone	Business Fax
Street Address	City	Zip
Email Address	Home Fax	

Please choose a committee assignment if you are interested.

☐ Fall Event	☐ Yearbook	☐ SOS	☐ Membership
☐ Christmas Event	☐ Spring Event	☐ Notification	☐ Game Day
	☐ May Luncheon	☐ Courtesy	

Professional **Directory**

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GEOSCIENCE SUBSURFACE INTERPRETATION AND MAPPING CERTIFICATION PROGRAM			
	COURSE Schedule	**SPRING**	**FALL**
WEEK 1	Structural Styles in Petroleum Exploration and Production	March 9 - 13	August 24 - 28
WEEK 2	Sequence Stratigraphy of Clastic Rock / Reservoirs: Well Logs / Core / Outcrop & Seismic	March 16 - 20	August 31 - September 4
WEEK 3	Open Hole Log Analysis (Practical Interpretation of Open Hole Logs)	March 23 - 27	September 8 - 11
WEEK 4	Overview of Seismic Exploration: Seismic Acquisition and Processing, AVO and Attributes and 2-D / 3-D Interpretation	March 30 - April 3	September 14 - 18
WEEK 5	Applied Subsurface Geological Mapping	April 6 - 9	September 21 - 25
WEEK 6	Seismic Interpretation Workshop	April 13 - 15	September 28 - 30
WEEK 6	Basic Reservoir Engineering for Non-Engineers	April 16 - 17	October 1 - 2

	PROJECT Schedule	**SPRING**	**FALL**
WEEK 7	**Phase I**: Initial Exploration - Delineate Prospects - Drill Exploration Wells	April 20 - 24	October 5 - 9
WEEK 8	**Phase II**: Assess Discovery - Refine Interpretation	April 27 - May 1	October 12 - 16
WEEK 9	**Phase III-A**: Field Development - Drill Development Wells	May 4 - 8	October 19 - 23
WEEK 10	**Phase III-A**: Field Development Continued	May 11 - 15	October 26 - 30
WEEK 11	**Phase III-B**: Explore for Additional Prospects	May 18 - 22	November 2 - 6
WEEK 12	**Phase IV**: Field Performance Analysis - Resuts of Other Exploration Prospects	May 26 - 27	November 9 - 11
WEEK 12	**Phase V**: Present Report and Project Results	May 28 - 29	November 12 - 13
WEEK 12	**Graduation Celebration**	May 29	November 13

Subsurface Consultants & Associates, LLC.

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