HGS Bulletin
Houston Geological Society
Volume 47 Number 9
May 2005

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GOLD!
NATURAL TREASURE, CULTURAL OBSESSION
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HGS Guest Night - Saturday, June 11, 2005

Houston Museum of Natural Science 6:30p.m.–10:30p.m.

Lessons from Sumatra: Reducing Earthquake and Tsunami Risk Worldwide

Dr. David Applegate, USGS senior science advisor

The Bulletin
Houston Geological Society

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In Every Issue

about the cover: Gold crystals on display at the Houston Museum of Natural Science exhibit Gold! Natural Treasure, National Obsession through August 7, 2005. *Cover photo by Jeffrey Scovil.*

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Technical Meetings

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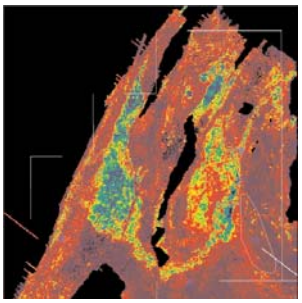

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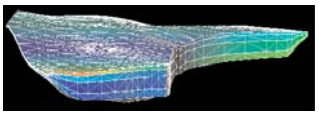

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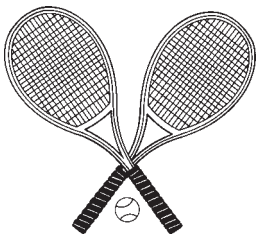

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President's Letter

by Steve Levine

Support of Our Geoscience Professors

I have been very fortunate to visit with many outstanding university professors as a recruiter for the last 14 years. So many of these professors were likely the brightest in their university classes and could have easily chosen industry positions. We are fortunate that they elected to pursue education and research over industry.

Teaching at any level is hard work—just look at the turnover rate among the teachers in our K-12 classes. Amplify this hardship with the expectations of the universities and you might expect high turnover rates and quick burnout, but not so. Why not? Perhaps it is the desire to become world-class experts in their chosen discipline, a satisfaction in lecturing or simply a preference to stay in a college atmosphere and location. Whatever the case, we know it certainly was not for the money, and we should be thankful for those that have made a sacrifice to stay with teaching or to migrate toward teaching from industry. It takes an enormous amount of energy and fortitude to instruct at the university level. Pressures for teaching faculty are everywhere—annually adjusted budgets, department head changes, competition from other departments for funding and prized students, college deans from different education/industry backgrounds, tenure pressures, too few undergraduate students, too many undergraduate students, not enough funds for graduate students, inadequate facilities, insufficient supplies, too few scholarships, under-achieving students, research funding campaigning, daily lecture preparation, test preparation, grading, field trip coordination, summer camp, weather, student safety, etc.

Are there any ways that the HGS can work more effectively with the universities and community colleges for the betterment of the faculty and students?

Despite all of these deterrents, practically every college professor I have met has remained upbeat, positive and enthusiastic. It is as though no matter how much the outside forces try to beat them down they retain that enduring spirit to convey the passion for the science to their students. That same passion drove them into teaching in the first place. Their resilience and perseverance are most commendable.

Are there any ways that the HGS can work more effectively with the universities and community colleges for the betterment of the faculty and students? Yes, I believe we can. We can increase our visibility by linking guest lecturers from our membership to the universities, invite more of their members to HGS technical talks and social events, and visit university AAPG student chapter meetings.

Some HGS members have actually made significant linkages to the students and faculty. HGS members Michael Deal and Martha Lou Broussard have been instrumental in the success of the Student Expo. The AAPG has been a major supporter of recruiting students through the AAPG/SEG Student Expo programs. The next Student Expo is scheduled for October 6–8 in Houston at the Westin Galleria. Interested companies may sponsor events that include field trips, meals or coffee breaks.

Upcoming AAPG "Town Hall" Meeting in Houston

The AAPG will conduct a Town Hall meeting on Wednesday, May 18 at 6:00 p.m. at the Marriott Houston Westchase (formerly the Adam's Mark). This is a free reception for all AAPG and HGS members and guests (with complimentary wine, beer, soft drinks and hors d'oeuvres). A short presentation by AAPG leaders including President Pat Gratton, President-elect Pete Rose and Executive Director Rick Fritz will be followed by an open discussion and Q&A. Please RSVP by May 10 to jscott@aapg.org or 800-364-2274 ext. 409.

President's Letter *continued on page 7*

President's Letter continued from page 5

The Leaders Among Us

An impressive list of local HGS and AAPG members are serving on executive boards and national committees. I would like to recognize them for their enormous contributions to our profession.

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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, Freehand, Canvas or CorelDraw. Files should be saved and submitted in .eps (Adobe Illustrator) format. Send them as separate attachments via email or on a diskette 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.

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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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We also offer a Banner ad across the top of our monthly Newsletters sent to registered users of the Website. Job postings are free to any registered user of the Website, but they must be geoscience jobs of interest to our members. Current HGS members may post their resumes at no charge. If you have a product or service available at no charge, you can post it in the Business Directory at no charge. Geo-related Business Cards and job openings may be posted directly by any registered user and members may post their own resumes. They will be activated as soon as practical.

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Editor's Letter

by ***Arthur E. Berman, editor@hgs.org***

The Oil Boom, 1973–1986: A Simple Story?

After 23 years of contentious public debate, the United States Senate rather quietly approved a measure on March 16, 2005 that could open the Arctic National Wildlife Refuge (ANWR) to petroleum exploration.

I received only one e-mail message from Environmental Defense (formerly the Environmental Defense Fund) in the past month and it did not mention ANWR. I didn't get any mail about ANWR, in fact, from any of the environmental organizations that I support, or from groups who favor drilling there.

It seemed peculiar to me that, after so many years of strong opinions on both sides about opening the Arctic to further exploration, news of the Senate's action scarcely held the interest of the American public for more than one day.

Possible opening of ANWR was quickly smothered by news of a special session of the Congress to intervene in the case of Terri Schiavo, a Florida woman who sustained severe brain damage after heart failure 15 years ago. At this writing Terri Shiavo has died, but the case continues to dominate the news.

There are other things I have noticed about oil and public perception that seem unusual.

Gasoline reached $2.00 per gallon in March and I haven't heard any complaints about oil company conspiracies to gouge consumers. One lead article in the *Houston Chronicle* business section explained that Coca-Cola costs $3.20 per gallon, Windex costs $17.01 per gallon, and a cup of Starbuck's Chantico coffee costs $56.53 per gallon (Cook, 2005). The point of the article is that gasoline is actually a pretty good deal at $2.00 per gallon!

I have thought for years that ANWR would be the strongest and, perhaps, last stand by the environmental community against petroleum exploration. Its 19.6 million acres are so remote that potentially giant oil accumulations may not be economically feasible even if there were no environmental objections to drilling (Berman, 2004a). Evidence for large reserves in ANWR is not strong and, over the past decade, many oil companies have abandoned efforts to open the refuge to exploration based on internal reserve and cost-benefit studies.

It will take about 10 years after a discovery is made in ANWR before any oil arrives at United States refineries. Even the most optimistic supporters of opening ANWR to drilling concede that ANWR's oil will do little to alter the nation's dependence on foreign sources of petroleum. While ANWR may supply as much as a million barrels per day to the United States, this is only 5% of our current consumption.

...as the price of oil fell from over $60 per barrel in 1981 to $20 per barrel in 1986, Saudi production dropped from over 10 million barrels per day to less than 4 million barrels per day. That correlation defies the law of supply and demand.

The Senate vote does not mean that ANWR is open for petroleum exploration. Democrats, including Senate Democratic Leader Harry Reid (D-Nev.), have promised to oppose the bill (Kiely, 2005). The vote on the measure was close, 51 to 49. The bill opens only 1.5 million acres along the coastal plain (Section 1002, Figure 1) of ANWR's almost 20 million acres. The vote does, however, represent a breakthrough for the oil industry, which has been trying since 1987 to gain access to the refuge's coastal plain. This is the first time that the Senate, the House and the president agree on what should be done with ANWR.

Please God, Just Grant Me One More Boom

In 2005, we are in the midst of an oil boom. On the day that the Senate voted on ANWR, the price of oil reached $56.46, the highest level since this price cycle began in 2001 and about the same level in constant dollars as in 1984. For some of us, it is the second period of high oil prices in our lives. The last time was between 1973 and 1986.

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Editor's Letter

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We have all seen signs and bumper stickers that refer to that period: Please God, just grant me one more boom and I promise not to piss it away!

How will we manage that?

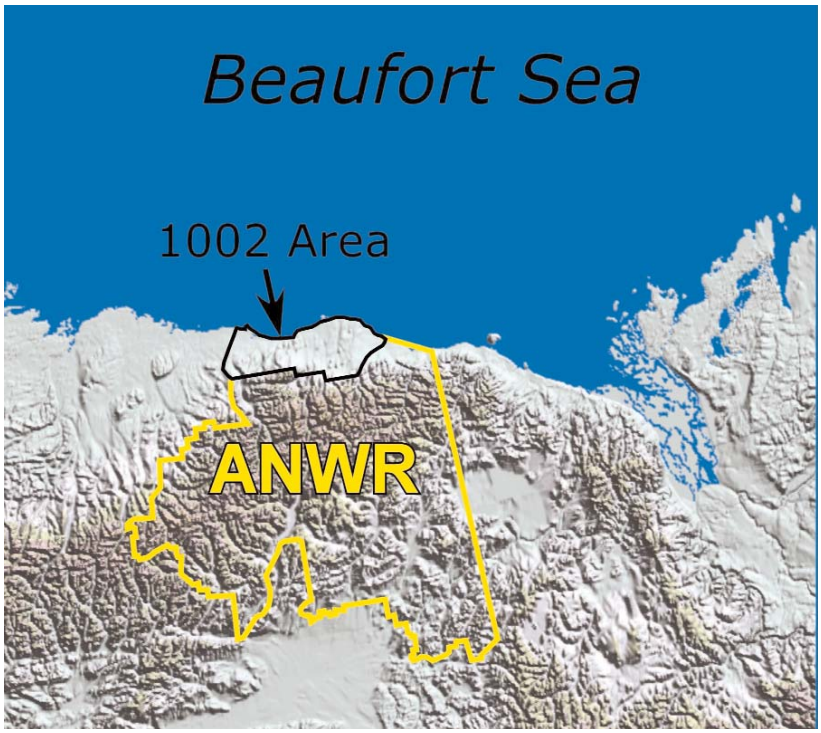

Figure 1. Alaska National Wildlife Refuge (ANWR) location map.

My own recollection of the 1970s and 1980s is not so clear. I remember high oil prices and a few years when there seemed to be few limits to where a geologist in the oil business might go in the course of a career. I also recall many difficult years of low oil prices and layoffs in an oil industry that seemed caught in an agonizing struggle with death.

In the early 1970s, I lived in a rural part of western Colorado. While I remember the Organization of Petroleum Exporting Countries' (OPEC) oil embargo, it did not make a strong impression on me, probably because I wasn't affected by shortages in the same way that many urban Americans were.

When I entered the Colorado School of Mines in 1974, admission into the geology program was, fortunately for me, hardly competitive. I was completely unconscious of the petroleum industry. It was only during my last semester, when I decided that I should interview for a job that I became aware that something was happening in the oil business.

Things changed soon after I went to work for Amoco in 1978. Oil prices climbed to $60 per barrel in 1981 (constant 2000 dollars throughout this article), the highest level since 1871 (Lynch, 2002). Geologists, geophysicists and petroleum engineers were among the most demanded professions in the world. There was abundant investment money available for drilling and everyone, it seemed, wanted to be in the oil business. Every Monday, offices resonated with news of who had resigned to take a job with another company at a great increase in salary and other compensation including an interest in what was discovered.

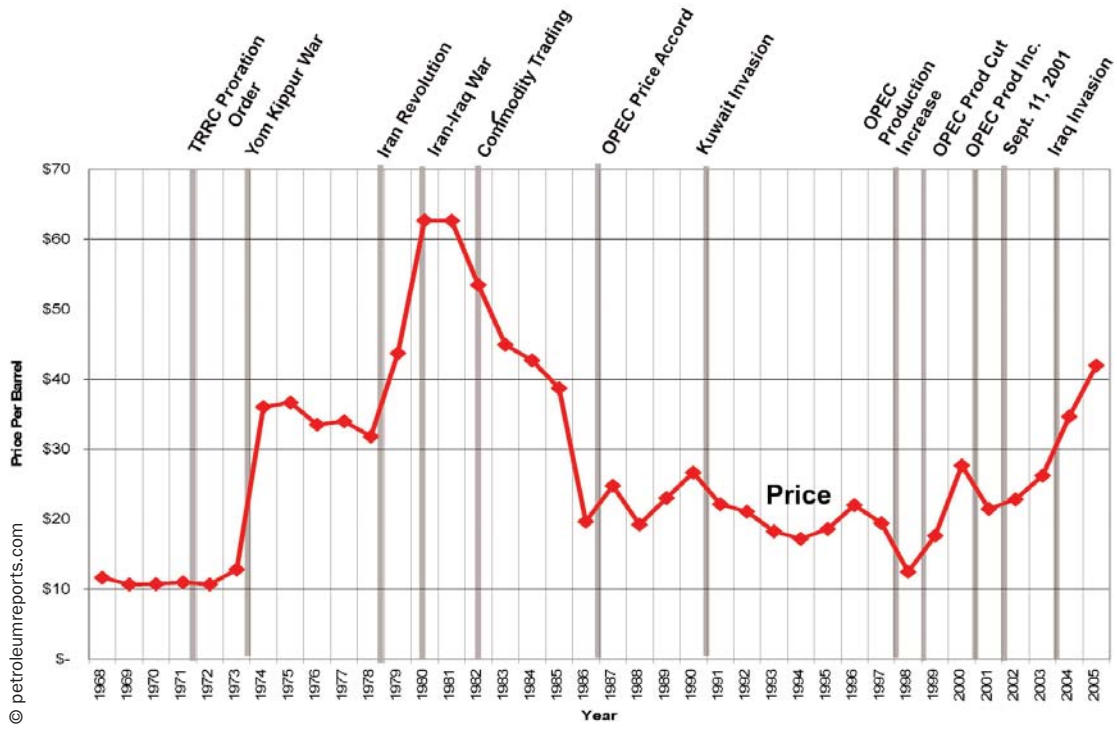

Figure 2. U.S Refinery Cost per Barrel of Oil in 2000 Adjusted Dollars. Source U.S. Energy Information Administration, http//www.eia.doe.gov

Oil prices collapsed in 1986, beginning a period of contraction in the industry that continues today. For the next 15 years oil prices fluctuated between pre-1973 embargo levels of about $12/barrel and post-Iran revolution levels

of about $28/barrel (Figure 2). Employment prospects in the oil business were at times somewhat improved and, at others, somewhat diminished but, on balance, they were poor. Today, employment in the oil and gas industry is approximately one third of the peak level in 1982, with nearly 1 million jobs lost (Kim and Tinker, 2004). Most university students stopped entering petroleum fields during this time as oil companies acquired a deserved reputation as uncertain and ruthless employers.

The 1973–1986 Oil Boom: A Simple Story of Supply Interruption

Supply interruptions and price manipulation by OPEC explained price fluctuations in the 1970s and 1980s. Between 1973 and 1998, the constant dollar price of oil in the United States ranged from between $10.67 and $62.71 per barrel (Figure 2). These price excursions produced both the greatest oil boom and oil bust of the 20th century, with the greatest range in oil price occurring in just a 5-year period, from 1981 to 1986.

During the period 1968–1973, the price of a barrel of oil had been stable at about $12 per barrel (Figure 2). On October 6, 1973, Israel was attacked by Syria and Egypt in a conflict called the Yom Kippur War. OPEC declared an oil embargo on countries such as the United States that had supported Israel. Almost immediately there were gasoline and refined petroleum shortages in the United States and elsewhere. The price of a barrel of oil jumped to nearly $30 per barrel, where it remained for the next 5 years.

Oil prices were next affected by an Islamic revolution in Iran that began in 1978, and later, in 1980, when Iran and Iraq began a military conflict that continued until 1988. By 1980 the price of a barrel of oil exceeded $60.

Over the next 5 years Saudi Arabia publicly sought to persuade OPEC that sustained high oil prices might encourage systemic changes in consumption, such as alternative fuel use and energy conservation, that would deprive OPEC nations of significant value for their oil resources. OPEC reached an agreement in October 1986 to control production and to achieve a target oil price in the $20 per barrel range. Oil fell to under $20 per barrel in that year and again in 1988.

Oil prices remained generally in the range between $20 and $26 per barrel until 1998, when prices dropped to $12.48 per barrel, the lowest price since before the Yom Kippur War and OPEC oil embargo. This drop was attributed to economic recession throughout the Asia-Pacific region that lowered oil demand in a previously growing sector for petroleum consumption.

OPEC reached a new agreement to cut production in November 1997 and, by 2000, oil had again climbed to over $27 per barrel. The September 11 attacks on New York and Washington, D.C. caused crude oil prices to decline to $21.50 per barrel. Prices have been rising since 2001 and are currently at the highest level since 1983–1984.

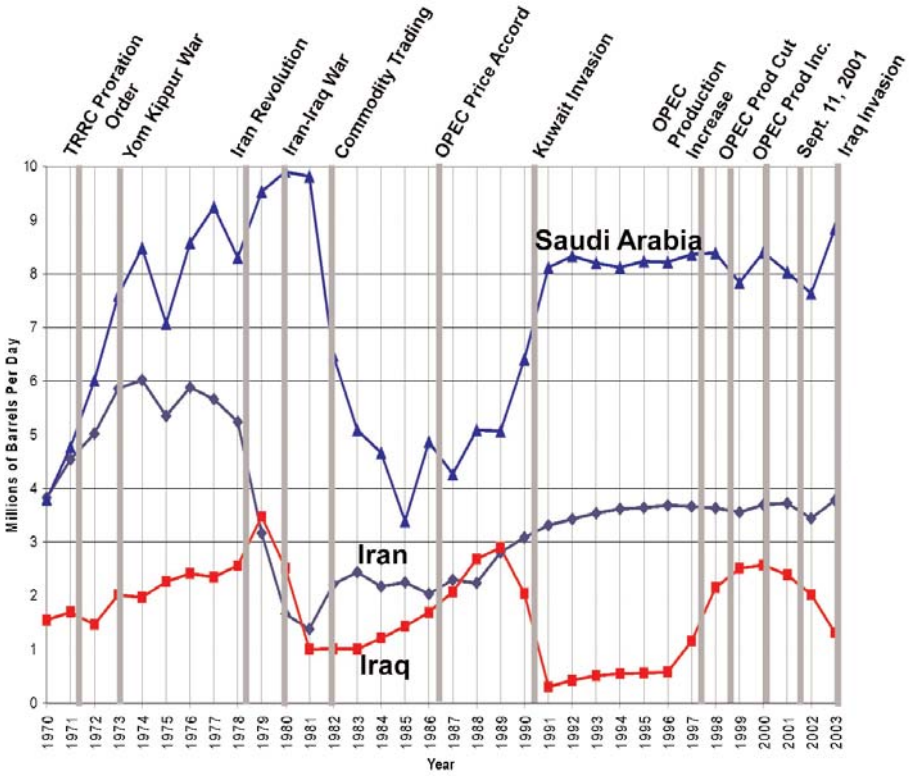

Figure 3. Oil Production by Iran, Iraq and Saudi Arabia, 1970-2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

The chronology just presented makes a convincing case for the prevailing interpretation that cycles of oil prices since 1973 resulted largely from events and decisions external to the world's available oil supply. While generally true, at least from a high-level perspective, there are important trends that a simple supply-demand interpretation does not explain. The world economy became increasingly interconnected during the period just described. World oil production began to decline in many traditional producing basins and countries in the same several decades and will most likely reach a global peak in the next several years.

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Problems with the Story: OPEC Never Controlled the Price of Oil

The simple story of supply interruption and price manipulation breaks down upon analysis of the data.

OPEC was never able to control oil prices by regulating its oil production. OPEC succeeded in manipulating prices during the Yom Kippur War but not by limiting production. Its intent was not to raise prices for the benefit of its members but to hurt supporters of Israel by refusing to make petroleum deliveries. Price escalation was not its objective, though it may have been anticipated.

OPEC never succeeded in controlling the price of oil because it never followed a unified strategy or plan. OPEC is not an effective entity but a confederation of independent producing countries that have never acted in concert for any reason or based on any agreement after the Yom Kippur War embargo.

Figures 3 and 4 demonstrate that OPEC's only consistent behavior is for Saudi Arabia to compensate production tendencies by Iran, Iraq or both. While all OPEC member nations are important suppliers of petroleum, only Saudi Arabia, Iran and Iraq have significantly modulated their production over the past several decades. Figure 5 shows that most OPEC countries have maintained relatively consistent oil production over time.

The strongest evidence of OPEC's inability to control oil price is found in the price decline of crude oil from its high point in 1981 to its collapse in 1986. The return of oil prices to the $20 per barrel range is generally credited to the OPEC Price Accord of October 1986. Casual examination of Figures 3 and 4 shows that

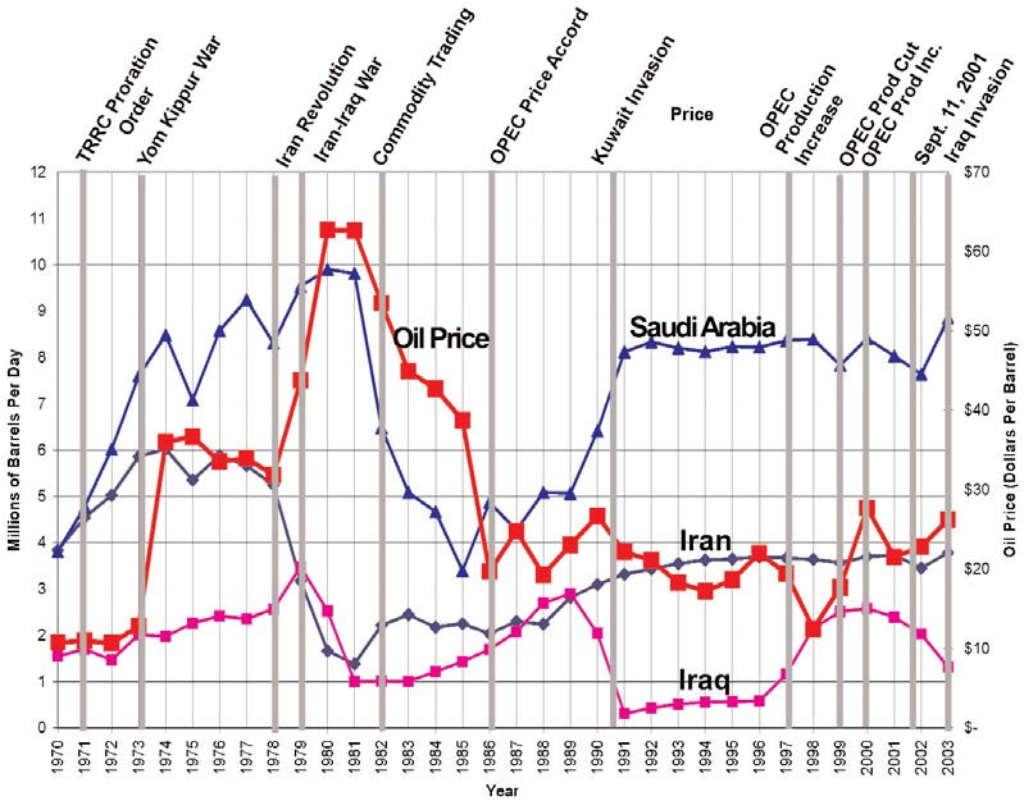

Figure 4. U.S. Oil Price and Production by Iran, Iraq and Saudi Arabia, 1970-2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

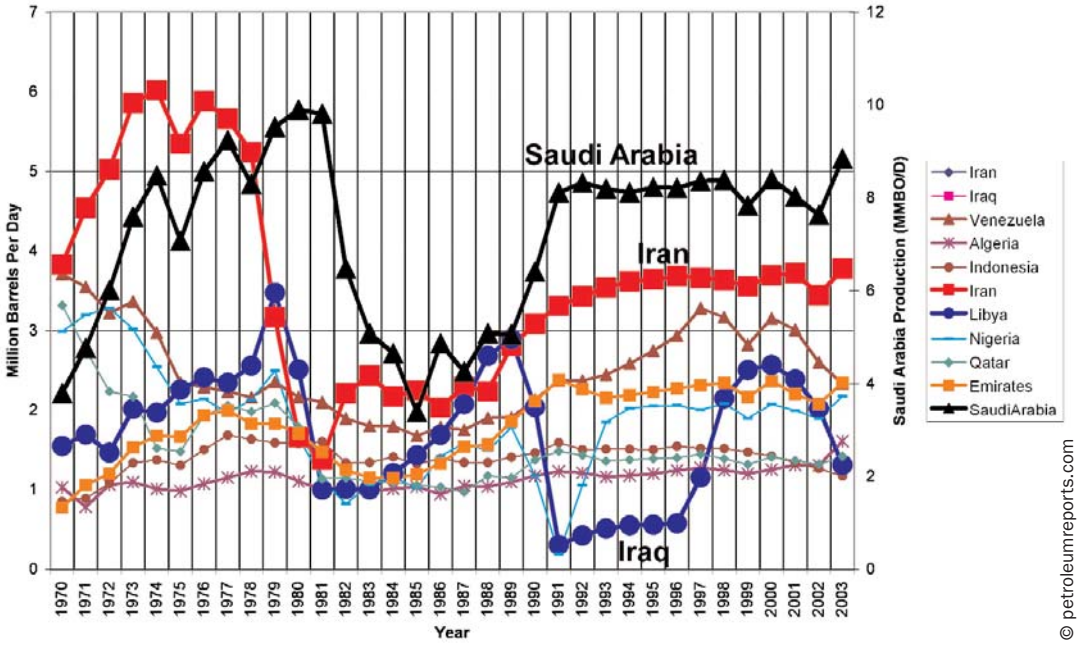

Figure 5. Total OPEC Production, 1970-2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

the OPEC meeting and agreement occurred after oil prices had returned to this level.

Closer examination of the same figures reveals what initially is the most perplexing aspect of the oil price history during the 30 years following the OPEC embargo. OPEC production, and most especially Saudi production, exactly parallels the decline in oil price. That is, as the price of oil fell from over $60 per barrel in 1981 to $20 per barrel in 1986, Saudi production dropped from over 10 million barrels per day to less than 4 million barrels per day. That correlation defies the law of supply and demand. Logically, a 6 million barrel per day decrease in Saudi production, barring other OPEC increases (Figure 6 shows this did not occur), should have driven $60 oil even higher, not lower!

A Clue and Brief Excursion from the Story

There is an event indicated on most figures in this article that I have not yet mentioned: the Texas Railroad Commission (TRRC) Proration Order of March, 1971. I take this brief excursion from the story about OPEC and the oil boom to a time before the Yom Kippur War because it gives a clue to what lies behind some of the confusion I have begun to reveal.

The East Texas Field was discovered in January 1931 in Rusk County, Texas. By July of that year the field was producing an average of 900,000 barrels per day, roughly half of all the production in the United States at that time. Production from the East Texas Field alone had driven the price of oil from $1 per barrel to 13 cents per barrel (Smith, 1999). On August 17, 1931, the Texas Rangers and Texas National Guard were ordered to seize and shut in the field by Governor Ross Sterling. In November 1931, the Texas State Legislature directed the Texas Railroad Commission to regulate Texas oil field production in order to control "economic waste".

For 40 years, the Texas Railroad Commission, with the agreement of petroleum regulatory agencies in Louisiana and Oklahoma, effectively controlled the price of world oil. This was accomplished by proration orders that set allowable rates for production throughout the most prolific petroleum producing region in the United States.

In March 1971, the Texas Railroad Commission set proration at 100 percent and ended regulation of production rates (the East Texas Field was still limited to an 86% allowable for a few years longer). This meant that Texas, Louisiana and Oklahoma producers were no longer limited in the amount of oil that they could produce. "It meant that the power to control crude oil prices shifted from the United States (Texas, Oklahoma and Louisiana) to OPEC." (Williams, 2005).

Why would the TRRC yield the power to control world oil prices to OPEC? The simple answer is that this was never an issue or part of the decision to end allowable rates in the United States.

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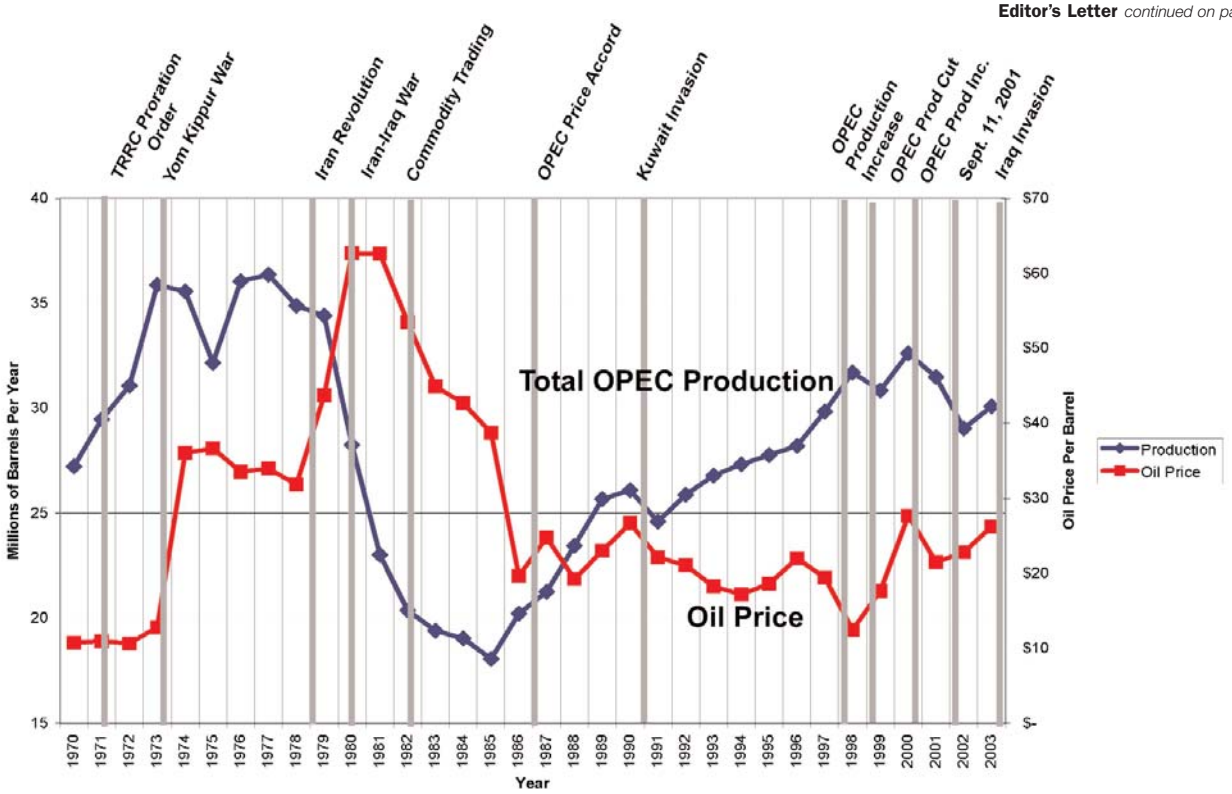

Figure 6. Total OPEC Production.

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Problems with the Story: Production and Demand in the United States

The United States is the third largest petroleum producer in the world. It is easy to lose sight of that because we are so dependent on other countries to satisfy our consumption needs of about 20 million barrels per day. Today, the United States produces almost 9 million barrels of oil per day, which is about as much as Saudi Arabia, and more than Iran, Iraq and Venezuela combined. In 1971, when the Texas Railroad Commission abandoned allowable rates in the United States, this country accounted for nearly 25% of world production.

Figure 7 shows U.S.production from 1954 to the present. The TRRC proration order of March 1971 corresponds to the approximate peak of oil production in the United States of 11.7 million barrels per day. Figure 8 shows U. S. crude oil imports. The TRRC decision in 1971 occurred when the import of foreign oil into the United States accelerated.

These two figures reveal the obvious cause for the abandonment of allowable rates in the United States: The country needed all the oil it could produce and would soon also need all the oil it could import. There was simply no longer a reason to limit production.

Inflation and Price Controls in the United States

It is reasonable and logical that the coincidence of declining production and increasing demand for petroleum would have produced economic consequences for the United States in the form of inflation and recession. The OPEC oil embargo of 1973 greatly compounded an already precarious situation.

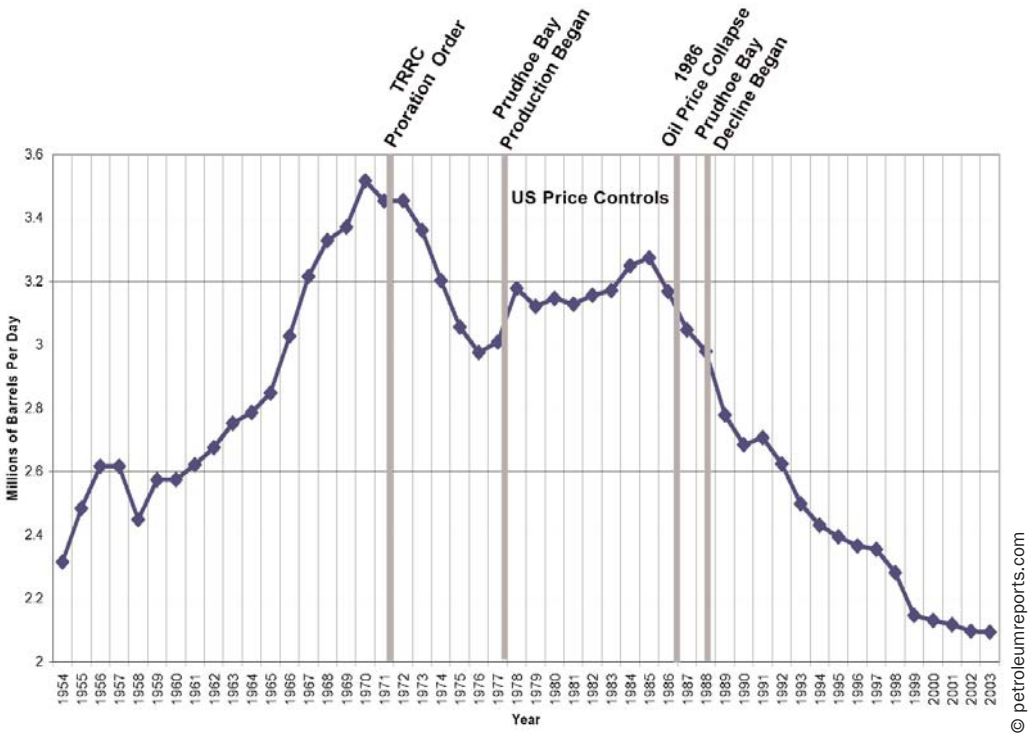

Figure 7. U.S. Crude Production, 1954–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

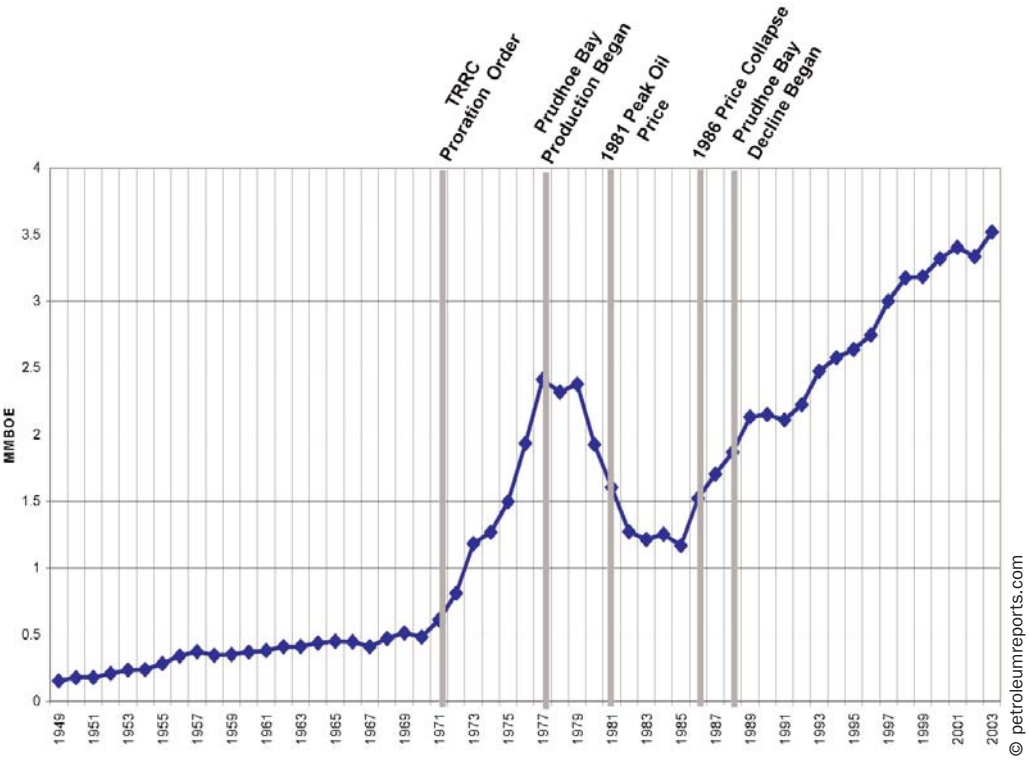

Figure 8. U.S. Crude Oil Imports, 1949–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

Figure 9 shows U.S. oil demand along with inflation rate. Among the many revealing aspects of this graph, the U.S. demand for crude oil was strongly affected by price increases associated with the oil shocks of 1973-1981. During 1970-1973 and 1975-1978, demand was growing by an average annual rate of almost 900,000 barrels per day. The intervening Yom Kippur War and OPEC oil embargo had the effect of temporarily slowing United States demand for oil. Oil shock was not simply reaction to higher oil prices and gasoline shortages but was also an economic reaction to skyrocketing inflation, which increased from 3% in 1971 to 12% in 1974. Falling inflation from 1974 to 1976 saw a corresponding rise in demand.

An additional complication arose from price controls that the United States imposed on crude oil between 1974 and 1984. The price for domestic and imported oil in the United States is shown in Figure 10. U.S. price controls inflated the cost of imported oil about 150% compared with the cost of domestic oil, on average, during the years they were in place. The intent was to limit the impact of the OPEC embargo on the American economy. In the near-term, price controls did little to limit inflation or recession. Price controls made imported oil even more expensive than the oil shocks had already accomplished and put added pressure on dwindling domestic reserves. So-called "windfall profit" taxes on domestic producers meant that these reserves were expended without gain to American companies.

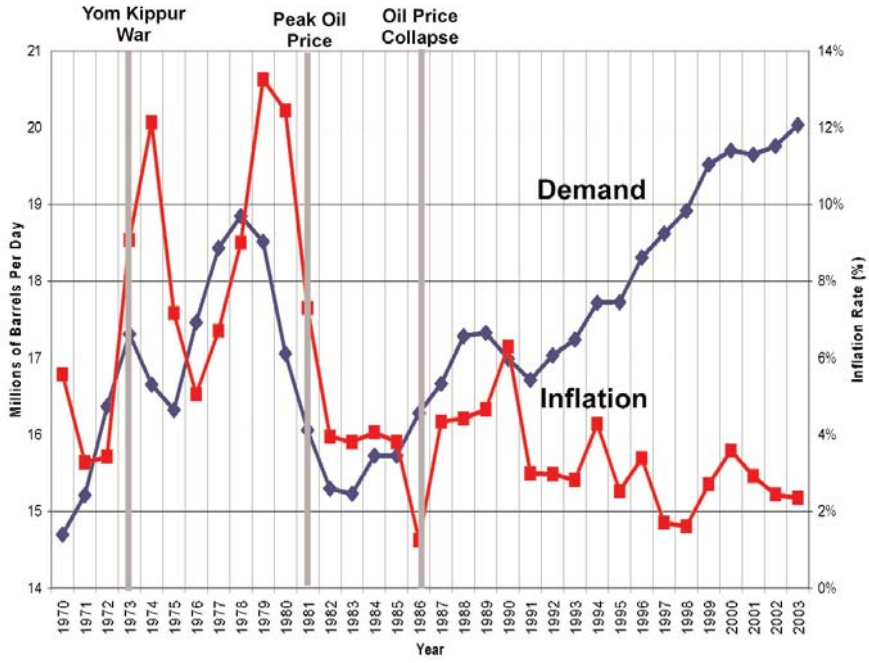

Figure 9. U.S. Oil Demand and Inflation Rate, 1954–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

High oil prices compounded by government tariffs on imported oil decreased economic productivity and resulted in inflation. The American public apparently did not believe experts who warned of dwindling world oil supplies and consumer spending increased at the expense of savings further contributing to inflation. The U.S. Federal Reserve Board restricted the money supply in reponse to record inflation in 1979-1980. This resulted in rapid decrease in inflation, economic recession and diminished demand for oil until oil prices collapsed in 1986.

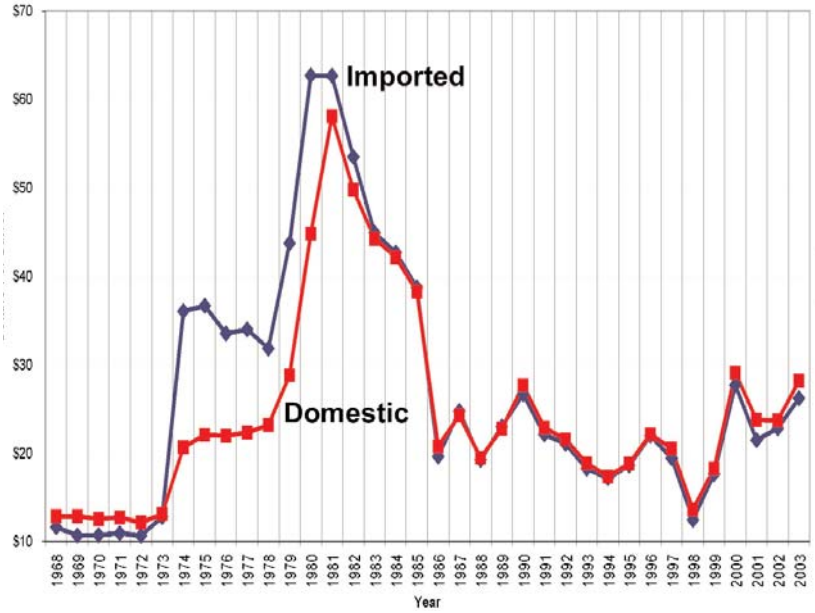

Figure 10. Effect of Price Controls on United States Oil Prices. Source U.S. Energy Information Administration, http//www.eia.doe.gov

Problems with the Story: World Demand

A critical element ignored by the simple story of supply interruption and OPEC price manipulation is world demand. World demand had quietly grown and become a significant factor in oil price before the Yom Kippur War.

Figure 11 shows that world oil demand had an identical pattern to the U.S. demand shown in Figure 9. Figure 12 shows the same demand data expanded for clarity. In the period prior to the OPEC oil embargo and in the 5 years following, world demand grew 138% overall and 15% per year. After the demand decline because of oil shocks, world **Editor's Letter** *continued on page 16*

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demand returned and grew 136% between 1983 and 2003 (7% per year). Over the period of the chart, 1970–2003, world demand increased 170% or 5% per year.

Growing world and U.S. oil demand along with United States production decline prepared the ground for the oil price excursions of the 1970s and 1980s that have otherwise been blamed on supply interruption and OPEC price manipulation.

Problems with the Story: Spot and Commodity Markets

I have mentioned, but not yet explained, the illogical correspondence of falling oil prices and falling OPEC production between 1981 and 1986. With the foundation of world supply and demand laid, we can now proceed to understand that highly anomalous relationship.

Figure 13 shows the relationship between OPEC and non-OPEC oil production. In 1978 non-OPEC production exceeded OPEC production and continues this pattern to the present. Throughout much of the 20th century oil prices were dictated by long-term contracts, which made sense when oil prices were fairly stable.

By the late 1970s, non-OPEC countries, notably China, Mexico, the United Kingdom and, later, Norway, had begun producing significant volumes of oil (Figure 14). In 1982, these countries began selling their petroleum on the "spot market," meaning that they sold oil on short-term and variable contracts that fluctuated with oil prices. While OPEC customers were locked into long-term contracts at $40 to $60 per barrel, non-OPEC producers were offering their oil at significantly lower prices.

This explains the 1981–1986 price decline. Saudi production dropped not by design, but because other suppliers were selling their oil for less. Buyers favored cheaper oil and chose not to buy oil from OPEC. OPEC sales plummeted and oil prices converged on spot market rates. This drove the oil price decline and OPEC production decline in during 1981–1986 and continues to undermine already ineffective efforts by OPEC to manipulate world oil prices.

Problems with the Story: Asia and Iraq

The story is almost complete except for a few minor details, namely Asia and Iraq.

The lowest level in oil prices for the last 30 years was $12 per barrel in 1998 (Figure 2). The generally accepted interpretation of

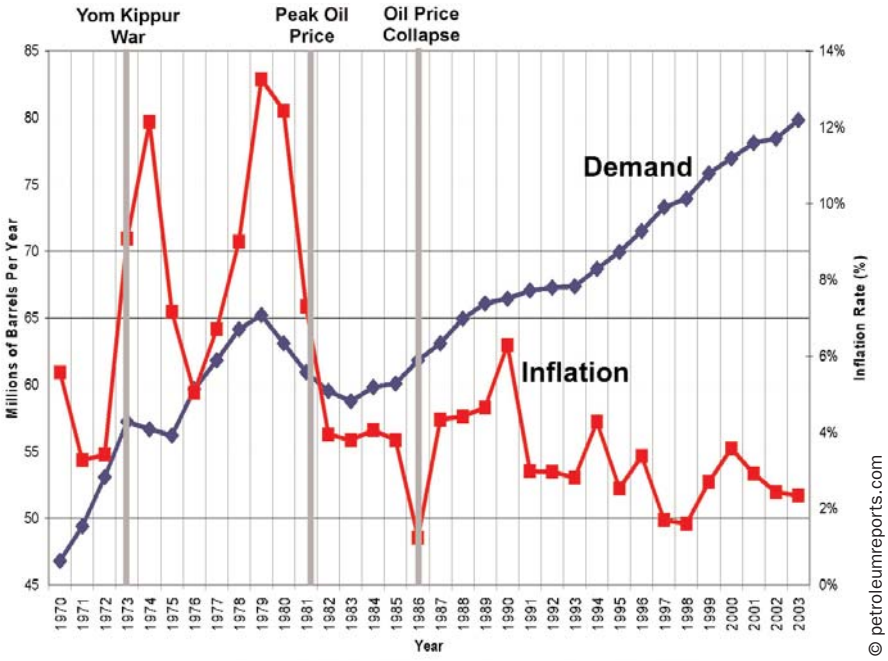

Figure 11. World Oil Demand (Consumption) 1970-–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

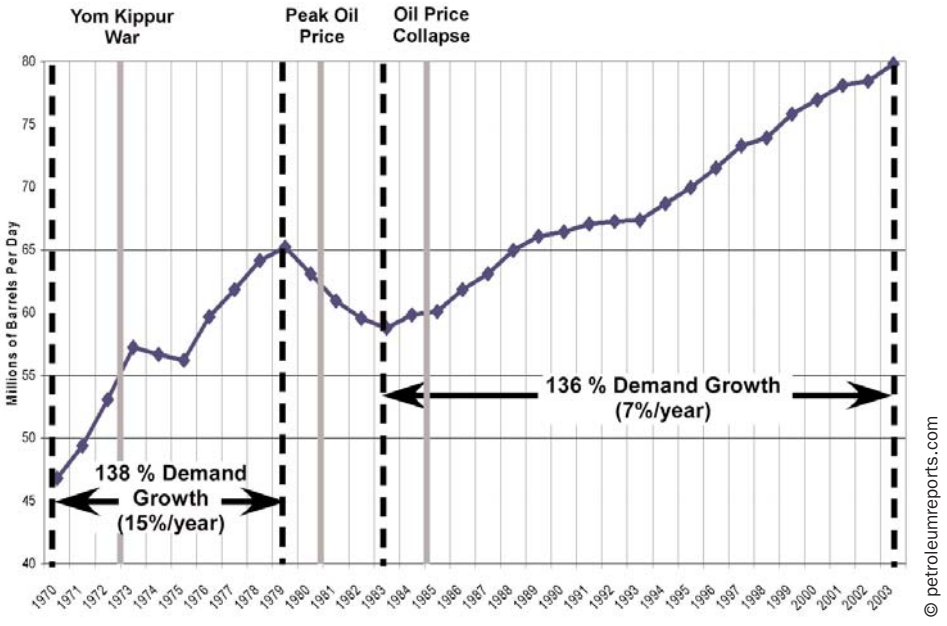

Figure 12. World Oil Demand (Consumption) 1970–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

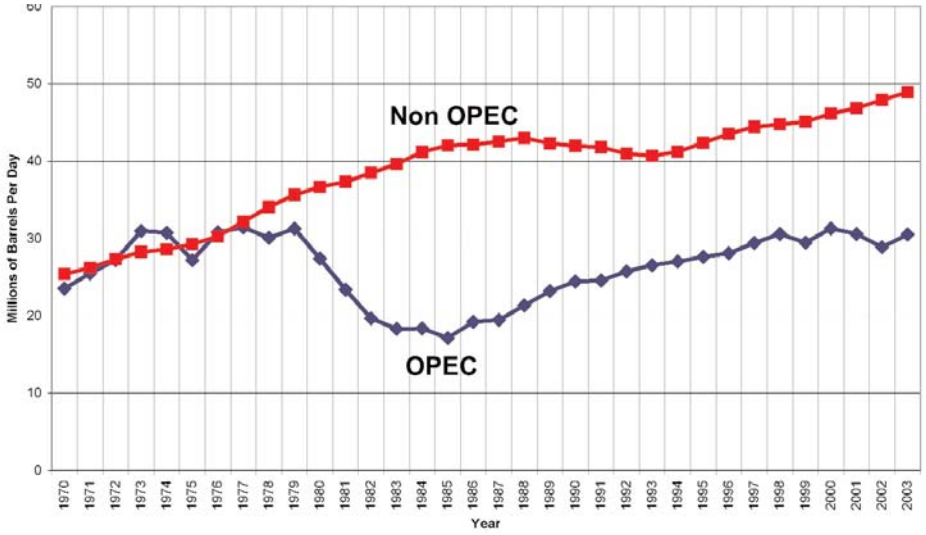

Figure 13. OPEC vs. Non-OPEC Oil Production 1970–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

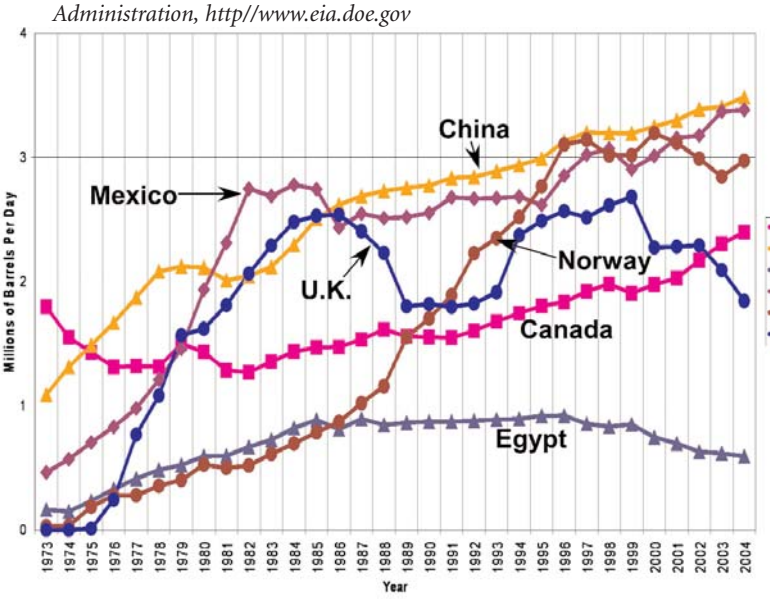

Figure 14. OPEC vs. Non-OPEC Oil Production 1970–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

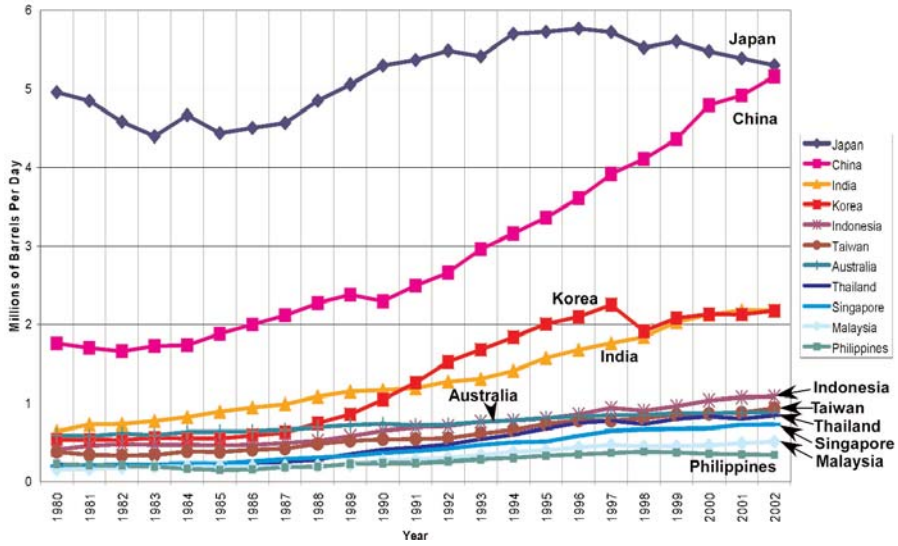

Figure 15. Asia Oil Demand (Consumption) 1970–2003. Source U.S. Energy Information Administration, http//www.eia.doe.gov

this anomaly is that economic recession in the Asia-Pacific region dampened oil demand and caused the price of world oil to drop.

Figure 15 shows oil demand by country for all Asia-Pacific nations from 1980 to 2002. There is clearly no evidence of meaningful decrease in oil demand, except a few hundred thousand barrels per day by Korea in 1997–1998 and a slight long-term decrease in Japan's demand. These amounts are trivial in the scheme of world oil consumption and are more than compensated for in the Asian region alone by China's demand growth.

Figures 4 and 5 provide some explanation for the anomalous low price of oil in 1998. Following the Persian Gulf War in 1990, there was widespread destruction of oil field infrastructure in Iraq along with severe United Nations (U.N.) economic sanctions prohibiting the foreign export of petroleum. In 1996, the U.N. initiated the oil-for-food program in Iraq that allowed that country to sell oil on the international market. Iraqi production increased from nearly zero in 1996 to over 2 million barrels per day in 1998, contributing to the mentioned drop in oil prices in that year.

A Complex Story Made Simpler

The simple story of supply interruption and price manipulation only explains part of the oil price excursions of the last three decades of the 20th century. Figure 16 simplifies and summarizes key factors controlling oil price cycles, 1973-2000. A fundamental truth missing from the simple explanation is that worldwide demand growth was a significant factor before the oil shocks of the 1970s. The coincidence of declining production and increased demand in the United States is also important. The rise of non-OPEC oil producers and innovative marketing strategies using the spot market and, by 1985, the commodity futures market, are critical elements to understanding oil price cycles both then and now.

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There is growing awareness in recent years that the world is fundamentally different from previous decades in many ways including oil supply. We live in a realized global economy that unquestionably had its origin before the oil shocks of the 1970s. Our perception and model of that period was provincial in the U.S. and elsewhere. The distorted perspective that the world was a supplier and that the United States and a few select industrialized nations were, in effect, the only consumers led to the simplistic and incomplete explanation of oil price cycles in the late 20th century. We can no longer deny the inter-connectedness of the world economy and the increasing oil demand and economic power of countries such as China and India, to name only two.

Neither can we ignore that long-time oil giants such as Saudi Arabia and other OPEC nations are either in decline or will soon be. Battle lines are being drawn for the remaining oil supply in the world. This, in part, explains the increased military and economic presence of the United States in the Middle East. China is spreading its economic influence everywhere. Iran is deliberating with Venezuela, China and others to secure resources outside of its own boundaries. As oil becomes scarcer, more of the world's political events will be about petroleum, if they are not already.

Concerns that a reversal in China's vital economic growth will depress oil prices are, I believe, not consistent with demand data from the past 30 years. Predictions of $100 per barrel oil are, likewise, not realistic or supported by data. Fears that high oil prices will cause recession appear groundless. Wars and other political events will always threaten the global supply of oil, although I believe that an integrated global economy will largely mitigate supply interruptions that 30 years ago may might have had more general and damaging effects.

I am not certain that this analysis will be useful to those who hope to benefit from the present oil price increase. Generally once everyone knows about a trend, it is too late to fully benefit because cost has also increased. I return to the advice and wisdom of Jim Vanderbeek (Berman, 2004b): If you want to take advantage of the current cycle of oil prices or cycles yet to come, individuals and oil companies must focus on being prepared to drill regardless of what the predictors anticipate.

Opportunity lies in complexity, whether the price of oil is up or down. Companies must discard their superstitious fear of making the same mistakes that were made in the early 1980s when they grew too fast and drilled too many high-risk prospects. Oil companies must return to exploration and stop managing their businesses like a retail enterprise where oil is another commodity like laundry detergent.

ANWR will soon be open for exploration after an anticlimactic bill passed by Congress with little fanfare or notice last month. News of Terri Schiavo has been replaced by news of Pope John Paul's death. Something will displace his news in a few days. People are paying $2 per gallon for gasoline without invoking oil company conspiracy theories. They know that no new refineries have been built in this country in 20 years. People are awakening to energy as central to a better life and not a bad thing. Something is happening that is somehow different but in continuity with what we experienced during the last oil boom. ■

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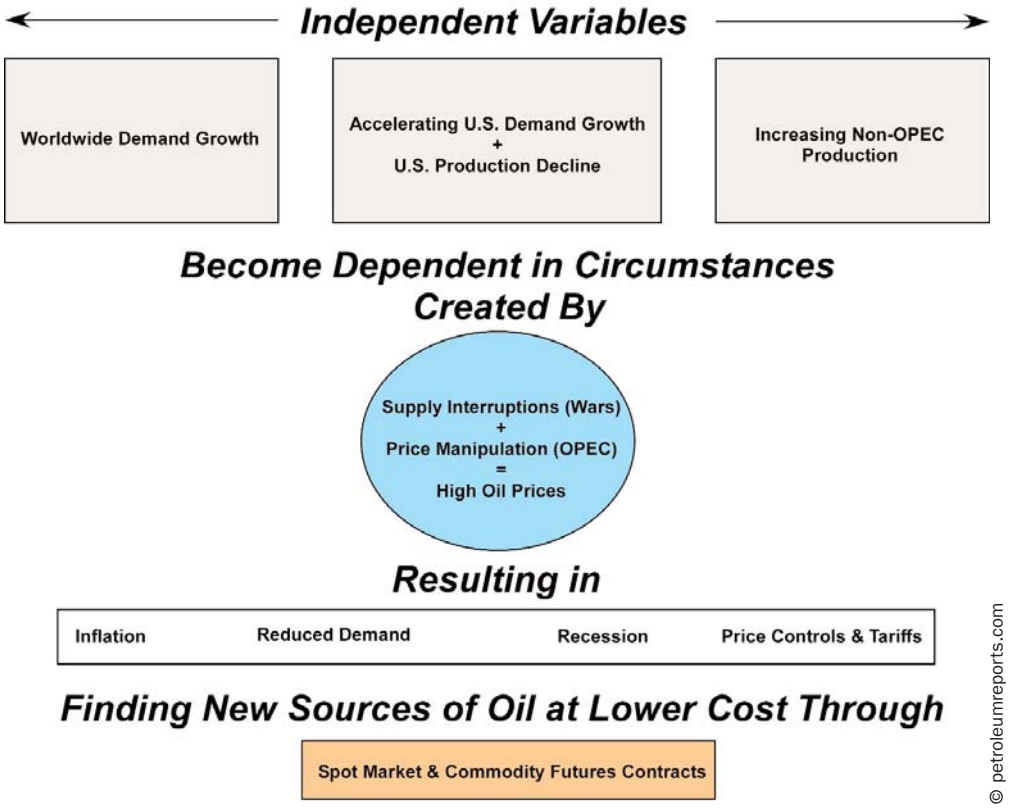

Figure 16. Summary Diagram of Key Factors in Oil Price Cycles, 1973–2001.

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Letters to the Editor

March 6, 2005
DearArt,

RE: Professional Registration of Geologists is Costly and a Waste of Your Time and Money

I would like for the fine geologists of North Dakota to consider not supporting any form of registration of geologists. The reasons I have are based on my personal experience and on my opinions after reading transcripts from hundreds of registration boards' meetings, from state boards in California to Washington to organizational pep-rallies in New York State (NY has no licensing). At the very least I would like to introduce my comments and experience in a Letter to the Editor of your organization. Others may share my opinion or may wish to add to or to debate the matter.

These boards are supposed to protect the public, so they say; it all sounds so nice. Protection requires penalties. The penalties, when there are any, are for not placing a rubber stamp imprint (professional seal) on all documents. Or for running an ad for geologic services (as a professional) after the geologists' dues were late in payment. One geologist wouldn't stamp a document claiming his opinion could be challenged; he was held accountable saying that even without the stamp/his official seal that his opinion was certified. It was his opinion that if he didn't place his seal on the report it was ok. Guess again.

Recently, in 2004, and I couldn't believe it, in Texas alone, 6500 geologists paid $200 per year each (that's $1,300,000 per year, actual dollars may be closer to $1,100,000 according to a critical and friendly colleague) to be qualified as a professional. This money goes/"went" to pay the salaries of managers and office staff and for facilities for the administration of registration in Austin, Texas. To me, that's a total waste of money and the money comes from earnings which these geologists would have used to support real professional activities, for instance the dues of local professional societies, such as your own in North Dakota and ours in Houston, Dallas, Midland and anywhere in Texas. That money would have paid for 60 to 100 geologists' tuition at state and private schools.

Registration is restrictive. Even reciprocal registration (from one state to another state) requires an examination–based registration or license (not a grandfathered license) and fees of $300 per year or more for each state and each specialty. For instance in my line of work I must specialize as a geologist, a geophysicist and as well an engineer because the analysis and recommendations crosses-over into these professions. The 21st Century is a century ready for multi-disciplinary professionals, not isolated polarized restrictions on work practices. The fine institution of Penn State recognizes this by awarding a special preference to interdisciplinary studies in the earth sciences and engineering.

The director of the Texas board is bragging that he had a great year! What made it great? He stole $1,300,000 from good-hearted geologists; that's what made it great.

The strongest argument I have heard in favor of registration by applicants is that they may, in the future, need to move to a new career (away from mining and petroleum) and may need to be registered to pursue it. This is a fear. This is also nonsense because there are very few jobs in the environmental area and all are very low-paying jobs for publicly involved geologists. The owners of the environmental services companies do quite well, though.

None of the state registration boards require any form of professional liability insurance or even have it recognized as "in the public's best interest." The fact is most professional geologists don't know why they would need liability insurance. Well, duh.

The AAPG has a DPA division and there is the AIPG. Both these groups are charged with identifying and confirming the education and experience of its members. Every country I have worked in has its own professional group that confirms our members' credentials.

I have been a professional geologist and geophysicist for almost 40 years; I have maintained an independent practice for over 25 years. My work involves public safety and welfare. I have testified in state and federal courts and advised foreign (non-USA) ministries on matters involving best practices of geology, geophysics and damages to individuals and companies from malpractice of earth sciences and earth engineering. In every one of these cases, the individual or company team involved was more than qualified professionally, and was simply "interpreting" the geologic data improperly; this, I believe, is the very nature of earth science. It is the reason that two geologists may have quite different opinions. Geology is an experienced-based profession. The credentials of an honest geologist can be confirmed in 5 minutes with just one or two phone calls.

Sincerely and respectfully,
Ralph W. Baird

Art,

I read your report on tsunamis and found most of it to be extremely well presented and informative. However, I think the idea that this disaster could have been prevented is simplistic. Here in this very country we have literally millions of well-educated and informed people with access to alarms, email, phones and fog horns . . . building and living along the active faults in California. Our inability to predict magnitude is just as real in California as it is in the Indian ocean . . . and another disaster will occur because of our being unpre-

pared for the un-predictable magnitude . . . and for people's insistence on doing what they want to do, living where they want to in spite of the dangers.

We have been warning people of overpopulation for 45–50 years . . . and even with the devastating onslaught of AIDS, people are throwing away free condoms and refusing to limit families in spite of starvation and famine and incurable disease. The message gets to people even in Africa and Asia because the media is so much better now than 50 years ago. However, just like someone living on the San Andreas with a PhD and a Blackberry in their pocket . . . people chose to ignore the information and live with the danger.

My family evacuated from Hurricane Carla in the 60s in Texas . . . then my mom said . . . "Gee, it missed us!" Even though she saw the homes obliterated just 100 miles north of us at Port O'Conner, she chose to ride out the next one at her home on "Bay View" with three small children in the house. Her luck—the wind tore the windows out as the eye went over her home, but the water didn't rise far enough to drown them all. Duh.

Robbie Gries

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303-296-3435 Phone
303-296-3436 FAX

Declining Science Education Puts Nation at Risk—How Did it Happen?

Steve Levine's editorial (March 2005 HGS *Bulletin*) about "Declining Science Education puts Nation at Risk" raises a serious issue concerning the long-term economic viability of the USA. Moreover, let's ask: how did these problems occur in the USA, a nation which traditionally prides itself on innovative research and put people on the moon?

A lot of factors, and admittedly they are not the only ones, have contributed to the statistics Steve cited. Here are a few to consider.

1). High school counselors are ill-equipped to advise on science careers and high school teachers are either too stressed out, overloaded or perhaps even prevented by union rules to do so for the seriously interested students.

2). The politically correct movement on university campuses is, regrettably, anti-science. When I taught at Illinois, I saw it first hand.

Many student radicals of the late 1960s earned their PhDs in the humanities and accepted academic jobs. The first thing they did on achieving tenure was to take over all the committees of Colleges of Arts and Sciences and gut the undergraduate science requirement as well as anything remotely representing high standards. This happened as early as 1979. Their first step was to approve and require one course in the area of "science and society" to be taught in departments of sociology, philosophy and history to meet part of the new science requirement. If two years of science were required for graduation, the new requirement diluted general science education in universities by 25%. In some cases it was more.

Step two was to reduce the number of semesters of required science courses to as little as two, but keep the one semester "science and society" requirement. This resulted in further deterioration in academic standards and dilution of general science education.

Consequently, campus science departments became under funded because suddenly enrollments critical for formula funding plummeted.

This led to the third step, namely to eliminate or merge science departments with weak enrollments.

3). Why is the politically correct movement anti-science?

In my view, it is their perceptions that (1) science is hard, rigorous and demanding with high standards to achieve results (thus a counterpoint to socially engineered, "feel good" education), (2) science is associated with military needs and such funded research should not be allowed on campus, and (3) science has commercial applications and that is "unscholarly" and also should not be permitted on campus. Thus, science departments on campus became the "bad guys"

Yet these campus politically correct people demanded that scientists generate large overhead from research grants on contracts to fund their college activities (at Illinois, grants generated about 50% total overhead; Of this 2% was rebated to an individual scientist's academic account, 3% was allocated to augment the department's operating budget, 10% was allocated towards the originating college's operating budget (i.e., Arts and Sciences), 15% was allocated to the Campus Research Board for starter grants, and the remainder of the overhead went to the campus administration).

Thus, one finds a lot of scientifically sophisticated labs on campuses funded by government research grants, but their home science departments lack funds for basic necessities like classroom charts of the periodic table, geological maps and so on.

So, what can HGS members do?

Organize a movement of interested science alumni from their alma maters to withhold donations to alumni fund drives until their Colleges of Arts and Sciences put muscle back into their undergraduate science requirements and properly fund science departments to meet a national need. Their administration will listen and eventually respond positively (but it will take time).

Start putting pressure, with sister scientific societies, on the NSF to fund special high school summer science instructional pro-

Letters to the Editor *continued on page 25*

Go to Summer School with AAPG!!

The lazy days of summer are on the way, but don't be lazy about your education! Check out these great summer Short Courses from AAPG...

RISK ANALYSIS FOR DEVELOPMENT APPLICATIONS

Dates: June 18-19, 2005
Location: Calgary, Alberta, Canada, with the AAPG Annual Convention
Tuition: $800 (increases to $900 after 5/20/05), includes course notes and refreshments
Instructors: Gary Citron, Jim Gouveia, Rose & Associates, Houston and Calgary, respectively

There's still time to get registered in this Convention course!!

Who Should Attend

The organization of this course follows the characteristic chain of considerations that attend most Development projects through post appraisal and is thus is designed for engineers, geoscientists and planners involved with drilling, reservoir evaluation, and production management.

CHARACTERIZATION OF TIGHT GAS RESERVOIRS

Date: July 21, 2005
Location: Denver, Colorado
Tuition: $500, AAPG Members; $600, non-members (increases to $600/700 after 6/23/05), includes course notes and refreshments
Instructor: Alan Byrnes, Kansas Geological Survey, Lawrence, KS

Who Should Attend

Geologists, engineers, log analysts, and other professionals with a need to better understand and predict reservoir properties in low-permeability reservoirs and use that information in resource evaluation, reservoir characterization and management.

BASIC WELL LOG ANALYSIS

Perennial Favorite!!

Date: August 9-12, 2005
Location: Austin, Texas
Tuition: $995, AAPG members; $1,095, non-members (increases to $1095/1195 after 7/12/05); includes course notes, refreshments, and a copy of Basic Well Log Analysis by George Asquith and Daniel Krygowski, with Neil Hurley and Steve Henderson
Instructors: George B. Asquith, Texas Tech University, Lubbock, Texas; Daniel A. Krygowski, ChevronTexaco, Houston, Texas

Who Should Attend

Geologists, engineers, geophysicists, and other professionals with a need to understand the responses of common logging measurements to subsurface conditions, and become familiar with basic openhole well log interpretation techniques.

For further information, please contact the AAPG Education Department
Phone: 918-560-2650; Fax: 918-560-2678; e-mail: educate@aapg.org
Or log on to www.aapg.org/education/index.cfm

Letters to the Editor continued from page 23

grams and research and special Advanced Science Seminars for University and College undergraduates and graduate students like they did during the 1960's. That step will recruit people back to scientific careers.

Perhaps the major reason for lack of interest in careers in science by high school graduates is the premium money-making opportunities in the finance industry. My niece's fiancé graduated in economics from Harvard in 1998, went to work for a major financial institution, and has done so well he can afford to purchase an upscale New York City Condo that cost over $2 Million and cheerfully write the check to pay for it. He's not even 30. (He is extremely gifted intellectually, found a niche, mastered it quickly, became an industry-wide expert, and started making money very quickly).

CLOSING COMMENT: What will likely happen? Near term, probably very little. Then an adversary will appear and develop something that threatens the economic strength, national security, and viability of American democracy. Suddenly, we shall operate in crisis mode like we did after Sputnik in 1957 and science will be restored to a nationally prestigious, worthwhile activity with adequate funding and compensation to attract the best minds.

George Santayana said "Those who forget the past are condemned to repeat it." The statistics in Steve Levine's editorial indicate the USA is on its way to repeating a past that many HGS readers heard about from their parents or grandparents.

George D. Klein taught at the Universities of Pittsburgh, Pennsylvania, and Illinois (Champaign-Urbana). In 1993, he left Illinois to become Executive Director of the NJ Marine Sciences Consortium. In 1996, he opened a consulting firm (renamed in 1998 as: SED-STRAT Geoscience Consultants, Inc.) focusing on Petroleum Geology (domestic and international), advising on seismic and sequence stratigraphy, stratigraphic traps, play concepts clastic reservoirs and facies reservoir characterization, petroleum systems and sedimentary basin evaluation. Klein relocated to Texas in 1998.

George D. Klein, SED-STRAT Geoscience Consultants Inc., 17424 W. Grand Pkwy, Suite 127, Sugar Land, TX, 77479-2564
Phone: 281-937-9436; Fax: 281-937-9456;
e-mail: gdkgeo@earthlink.net

Monday, May 9, 2005

Westchase Hilton • 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 Nonmembers & 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 General
Dinner Meeting

by ***Cindy Yeilding***
Technology Unit Leader,
Exploration and Geoscience, BP
Houston, Texas

The May General Meeting is back to the regular dinner format with standard set-up and standard prices ($25/$30).

Is the Workstation "Killing" Geology?

What a question! Of course, the resounding answer to this question is "NO." Access to digital data, visualization tools and interpretation software provides the geoscientist with the ability to visualize, display and capture interpretations faster and more robustly than ever before. We can optimize and enhance display parameters, store and scroll through multiple datasets, transfer large volumes of data in seconds and "share" interpretations across sites in ways we could only dream of a decade ago.

what can we do to assure that we are honoring our data appropriately and accurately reflecting data and uncertainty?

But you're still reading this overview, so perhaps we have touched a sensitive element here. With the plethora of tools and views available for geoscientists, might we sometimes lose track of some of the basics? A few questions for us to explore…

- Today's mapping packages can create aesthetically pleasing, yet occasionally inaccurate, maps more quickly and than ever before—how do we test accuracy before we drill a "dumb" well?

- Are all geologic views best displayed on a 20-inch monitor? Might there be situations where the geology does not lend itself readily to only a workstation view?

- Has PowerPoint become the interpretation tool of choice—might we sometimes spend more time displaying than we do thinking/interpreting?

- Are there flaws in the philosophies such as "seismic to simulator"? Until we can "image" reservoir characteristics like grain size, pore shape and connectivity, fluid type and properties and bed length and shape, we must always remember that seismic does not reflect (no pun intended) all the characteristics of a reservoir and its producibility.

- Are we able to make robust stratigraphic interpretations in most workstation environments? All conventional software packages allow for structural interpretation, but stratigraphic interpretation can be quite tricky and require "fooling" the mapping software, or sometimes resorting to colored pencils and Mylar to capture interpretations. We spend quite a bit of time mapping horizons, but it is much more difficult to capture observations and interpretations of strata between these horizons.

So, what can we do to assure that we are honoring our data appropriately and accurately reflecting data and uncertainty? Reminding ourselves of a few simple practices can make a huge difference in underpinning the highest quality integration and interpretations.

- Know your data quality: Constantly ask yourself how good is the data you are working with? In a world where "sidebars" and "headers" are often de-coupled from the digital data, it is vital to understand the acquisition and processing of all seismic data and understand the quality and condition of all well (log, biostratigraphic, pressure) data. Making confidence maps of interpretations (overlays) and maps of data quality can be extremely enlightening.

- Don't be afraid of paper, pencils. A wall papered with regional seismic lines can create an invigorating work environment. Posting values may make a map messy but provide more confidence in interpretations and lead you to alternatives.

- Ask for ideas, ask for help. Learn from the experience around you. Explore the analogies; capture the experiences of your colleagues. Ask for peer assistance and challenge.

- Develop multiple models: It is critical that colleagues and stakeholders understand the

HGS General Dinner *continued on page 29*

ANNOUNCEMENT AND CALL FOR PAPERS

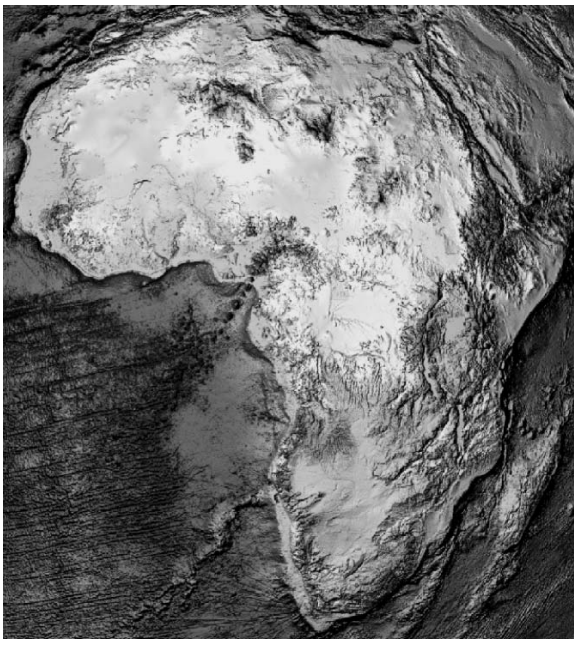
The 4th HGS/PESGB International Conference on African E&P

Path to Discovery

Marriott Houston Westchase • 2900 Briarpark Drive, Houston

7–8 September 2005

This annual conference, which alternates between London and Houston, has become established as the primary technical E&P conference on Africa. Scheduled for 7–8 September 2005 in Houston, there will be a two-day program of talks along with poster presentations and exhibits from sponsoring companies. The conference covers all aspects of African E&P, with particular emphasis on new ideas for exploration, the geology of the continent, application of emerging technologies and case histories of discoveries.



The conference series, organised jointly by members of the International Explorationists Group of the Houston Geological Society (HGS) and the Petroleum Exploration Society of Great Britain (PESGB), will convene this year at the Marriott Houston Westchase (formerly Adam's Mark), which provides a spacious venue for posters and sponsors' exhibits in addition to an excellent facility for the two-day program of talks. The Marriott will also offer substantial discount for hotel rooms as the conference Headquarters Hotel.

FINAL DEADLINE FOR ABSTRACTS is May 31.

Send abstracts for oral or poster presentation to the Technical Program Committee by email to africa05@sbcglobal.net.
Abstracts can be up to one page in length; an extended abstract can also be submitted.

Several abstracts and inquiries from sponsors have already been received.

Special thanks are due Exploration Consultants Limited (ECL) for their continuing support by committing to prepare the CD of the 2005 conference proceedings.

Details of the program, registration and hotel rooms will be maintained at the HGS website www.HGS.org in the Event Calendar for 7–8 September 2005.

Committee:
Houston: Al Danforth, Steve Henry and Ian Poyntz
London: Ray Bate, Duncan MacGregor, Mike Lakin and Val Clure

HGS General Dinner continued from page 25

realistic range of possibilities; the challenge is to explain the possibilities without creating confusion and instilling a lack of confidence.

- Good geology: Most importantly, always return to first principles of geoscience and challenge how well the interpretations fit. Keep training up to date, and keep some of those classic texts nearby. Don't overlook the training needs for new employees and for experienced geos as well. An occasional trip to the outcrop will keep geologists humble, invigorated and open-minded to new ideas as well.

Digital data and software/hardware available today are more powerful and provocative than ever before. By combining the best-quality data (or understanding of the data quality and its limitations) and the best knowledge, we can do better geoscience than ever. ■

Biographical Sketch

Cindy Yeilding earned her MSc in 1984 from the University of North Carolina, Chapel Hill after receiving a BS in geology from SMU. She has worked as an exploration, production, appraisal and well site operations geoscientist and is currently the Global Geoscience Technology Manager for BP. She has developed and led short courses and field seminars, and in 2002–2003 she served as an AAPG Distinguished Lecturer. She has also chaired numerous AAPG sessions, presented over 20 AAPG/SPE/GCSSEPM talks and participated in Hedberg conferences. Her primary research has been in salt sediment interactions and her recent focus has been in exploration of deepwater clastic deposystems, with development, access and testing of new plays.

Monday, May 16, 2004

Westchase Hilton • 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 Nonmembers & 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#).

International Explorationists Dinner Meeting

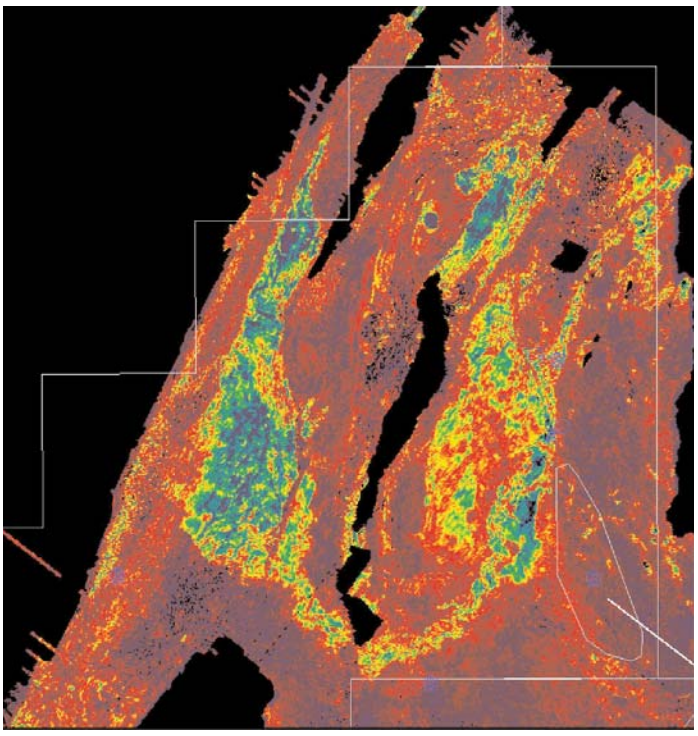
by ***Colin J. Grant***
Shell Malaysia-EP

Sequence Boundary Mapping and Palaeogeographic Reconstruction: The Keys to Understanding Deepwater Fan Deposition across the NW Borneo Active Margin

One of the cornerstones of risk analysis for reservoir development at play level is to carry out regional sequence boundary mapping and from there establish palaeogeographic reconstructions through time that enable depositional domains to be identified and mapped. This paper will show examples of how sequence mapping and palaeogeographic reconstruction have been carried out across NW Borneo using an extensive 2D and 3D seismic dataset and well data. Now that a comprehensive regional framework has been established it becomes clear why this Neogene regressive active margin has become the hottest new deepwater oil play in SE Asia.

the key to success in many deepwater ventures is to use knowledge of the slope profile to predict where the sweet spots for sand deposition are

One of the unique features of the NW Borneo intra-plate margin is that active tectonics inboard has resulted in a relatively short distance between the coast line of Borneo and the toe-of-slope within the NW Borneo trough. During the Late Miocene in particular, uplift and erosion across the inboard shelf and mountainous hinterland regions of Sabah shed large volumes of sediment into the shallow marine domain of the NW Borneo basin. Because of limited accommodation space along a narrow shelf, sands and shales entering the margin, from river systems such as the Padas in Sabah or from shelf-edge collapse, cascaded down the slope and across the basin floor, forming a series of fan lobes that amalgamated laterally and vertically into major fan complexes. Because of a relatively steep slope profile, much of the sand component was dumped close to the toe-of-slope break, where turbidity flows decelerate because of a rapid change in slope gradient on the order of 4–10° across the NW Borneo margin. Today these deep marine fans have been folded and thrusted within the NW Borneo active margin fold belt. Deformation within this fold belt commenced about 9.5 Ma.



Maximum amplitude extraction in a gated 50-ms window, 80-ms below top Pink Fan Marker, extracted from an absolute AvO difference volume. The picture shows the +ve AvO anomaly associated with the Middle Pink Fan channel belt and terminal lobe, North Block SBG, NW Sabah.

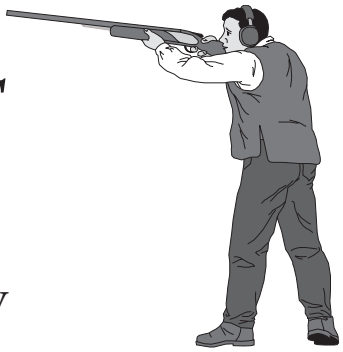
This case study highlights the role sequence mapping and palaeogeographic reconstruction can play in helping to predict reservoir development in untested deepwater plays. Through the integration of regional geological studies with palaeogeographic indicators determined from spec 2D seismic and wildcat well data, it is possible to reconstruct the slope profile across a margin through time. I proposed that the key to success in many deepwater ventures is to use knowledge of the slope profile to predict where the sweet spots for sand deposition are, before committing millions of dollars on signature bonuses and wells. ■

HGS International Dinner *continued on page 33*

22nd Annual HGS SKEET SHOOT

Saturday, June 18, 2005

Greater Houston Gun Club
6702 McHard Road, Missouri City



This tournament is a 50 target event. Shells are provided, however, ***you must bring eye and ear protection.*** Greater Houston Gun Club and National Skeet Shooting Association safety rules will be in effect. Winning shooters will be determined by the Lewis class system. Door prizes will be awarded by blind drawing after the conclusion of shooting. All competitors are automatically entered into the door prize drawing, but you must be present at the time of the drawing to win.

BBQ lunch will be provided from 11:30 a.m. until 1:30 p.m. Refreshments will be available throughout the day.

IMPORTANT!!

WE ARE LIMITED TO 160 SHOOTERS IN FOUR ROTATIONS. ENTRY FEE IS $60 PER SHOOTER FOR REGISTRATIONS RECEIVED BY FRIDAY, JUNE 10. AFTER JUNE 10, REGISTRATION WILL BE STRICTLY ON A "SPACE AVAILABLE" BASIS AND THE ENTRY FEE WILL BE $80 PER SHOOTER. REGISTER EARLY!!

For more information, contact: Tom McCarroll at 832-366-1623 ext. 205 or tmccarroll@cheypet.com.

****

HGS SKEET SHOOT REGISTRATION FORM

Name: _____ Company:_____

Email: _____ Phone:_____

Preferred shooting time: (circle one) 9:00 10:00 11:00 12:00

Indicate ammunition required: (circle one) 12 gauge 20 gauge

Please return form(s) with check for $60.00 per shooter, payable to: ***Houston Geological Society***

Mail to: ***Noirin Taber • Cheyenne Petroleum • 1221 Lamar St #1301 • Houston TX 77010***

Registration Fee: $_____ + Sponsor contribution: $_____ = Total: $_____

If you wish to shoot with a specific squad (5 shooters max.), please submit all forms together.

****

ALL SHOOTERS WILL BE REQUIRED TO SIGN A DISCLAIMER OF RESPONSIBILTY BEFORE THEY WILL BE ALLOWED TO SHOOT!

HGS International Dinner continued from page 31

Biographical Sketch: Colin J. Grant

"Born: Glasgow, Scotland at 12.10 am, July 5th, 1964 (One half of identical twins–the other is a geologist with ConocoPhillips.) Lived the life of a normal spotty Central Scotland schoolboy, who liked (in no particular order) chips, football, rugby, athletics, girls and haggis.

"Attended Glasgow University from 1981 to 85, graduating with BSc Hons 1st Class in Geology, and a passion for middle distance running.

"Conducted PhD research at the University of Liverpool from 1985 to 1988 on high-grade shear zones within the Northern Highlands of Scotland. Apart from structural mapping and microfabric analysis I began drinking whisky, the water of life. I also found my life partner, Helen. In January 1989 I joined Shell International and commenced my career as an oil field geologist. My first posting was to Benghazi, Libya where I worked on the NC153 EPSA between 1989 and early 1992. To save me from N. African–induced insanity I married Helen in March 1990. In May 1992 I joined Shell Expro in Aberdeen working as a production geologist and seismologist in the Central North Sea, where I was involved in the development of the Gannet and Guillemot oil fields. In 1996, I departed the sweet cool shores of Scotland and headed east to the balmy tropical paradise of Miri, located on the western seaboard of the island of Borneo. I worked in Miri for Shell Malaysia E&P primarily on exploration of the NW Sabah shelf and later deepwater plays. I also became Chieftain of the Scottish Community of Miri, Grand Master of the Miri Hash, and an aging triathlete.In March 2004 I transferred to Houston to work for SIEP in the cloak and veil world of new venture exploration. I now eat raw steak, wear cowboy boots and spend my weekends watching my sons playing soccer for the Albion Hurricanes."

HGS International Group Awards Best Talk and Top Student Posters for 2004–2005.

Volunteer judges evaluate each talk during the year for the HGS International Group. Awards are presented at the last meeting of the season, which is May 16 this year.

Best talk for 2004-2005

(May 2004–March 2005) goes to Lesli Wood, for her talk on "Quantitative Seismic Geomorphology of Clastic Reservoirs and Systems."

Dr. Lesli J. Wood is a Research Scientist and Lecturer at the Bureau of Economic Geology in the University of Texas Jackson School of Geosciences.

Student Poster Awards

Student poster awards are selected at the annual R.E. Sheriff Lecture, held this past November 15 at University of Houston. This year 14 volunteer judges reviewed 39 posters prepared by graduate students in the Department of Geosciences at University of Houston in three tiers:

Tier I: New graduate students (5 posters)

Tier II: Experienced masters students, new PhD students (18 posters)

Tier III: Experienced PhD students (16 posters)

Tier I: Yardenia Martinez, "Evaluating Topographic Correction Techniques for Satellite Data in Steep Slope Areas: Case Study - Iron Lake Fault, Salmon River Mountains, Central Idaho," Advisor Shuhab Khan

Tier II: Katarina Jovanovic, "Vector VSP's P and S waves separation by Antialias Discrete Radon Transform," Advisor Kurt Marfurt

Tier III: Connie VanSchuyver, "3-D Refraction Migration," Advisor Kurt Marfurt

Each student will receive a plaque, and the advisor receives a certificate commemorating the accomplishment.

Awards will be presented at the May 16 dinner meeting of the HGS International Group.

The R.E. Sheriff Lecture is an annual event jointly organized by the Department of Geosciences at the University of Houston, the University of Houston Geoscience Alumni Association, and the International Group of HGS.

Many thanks for the volunteer judges at the Sheriff Lecture and at International dinner meetings. Special recognition is due to Bonnie Milne-Andrews, who diligently organized the judging activities. ■

HGS Guest Night - Saturday, June 11, 2005

Houston Museum of Natural Science 6:30p.m.–10:30p.m.

Lessons from Sumatra: Reducing Earthquake and Tsunami Risk Worldwide

Dr. David Applegate, USGS senior science advisor

USGS science for a changing world
Earthquake Hazards Program

After this outstanding presentation, stay in your seat and see the IMAX show "Forces of Nature" free!

The Guest Night program includes a buffet dinner and social hour.
Use the HGS webpage to pay by credit card, or fax / mail this form to the HGS office.
Payment must be in advance for this sell-out event.

Adults: $30 each, HGS members: please write your member number

Name: _____ Member # _____

Name: _____

Name: _____

Students (grades 1-college) $25 each

Name: _____

Name: _____

Total amount: _____

Send check and form to: HGS Office, Guest Night 2005, 10575 Katy Freeway, Suite 290, Houston, Texas 77024
or fax this form with credit card number to 713-463-9160

Credit Card number and type: _____

_____ Expir. Date: _____

Name on Credit Card: _____

Daytime Phone number of Card Holder: _____

Billing Address for Card: _____

City, State and Zip: _____

Many thanks to our corporate sponsors

bhpbilliton Schlumberger TGS

Tuesday, May 17, 2005

The Sofitel Hotel • 425 Sam Houston Pkwy. North
Social 11:15 a.m., Luncheon 11:30 a.m.

Cost: $31 Preregistered members; $35 Nonmembers & 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 Northsiders Luncheon Meeting

by ***Larry Zarra, David Meyer, and Scott Neal***
ChevronTexaco
New Orleans, Louisiana

Wilcox Depositional Systems: Shelf to Deep Basin

The Wilcox has long been recognized as an important petroleum resource, producing from deltaic, fluvial and shallow marine sandstone reservoirs since the 1930s. Recent drilling in the Perdido Fold Belt (Alaminos Canyon OCS area) has confirmed a new exploration play in the deep basin component of the Wilcox petroleum system, with significant discoveries in distal turbidite systems.

The Wilcox Group in the Gulf of Mexico basin spans much of the Upper Paleocene and Lower Eocene. In outcrop the Wilcox is characterized by a variety of paralic and very shallow marine depositional settings, and is represented by interbedded sandstone and shale plus locally abundant lignite. Updip from the Lower Cretaceous shelf edge, relatively dense shallow subsurface well control allows documentation of fluvial, deltaic and open shelf depositional systems. Downdip from the Lower Cretaceous shelf edge the Wilcox comprises delta front, open shelf, estuarine and widespread prodelta depositional facies. Relatively sparse well control shows a mostly sand poor section for the prodelta and shelf depositional systems. Downdip from the shelf and prodelta, the next Wilcox well penetrations are 250 miles farther in the basin, in the southern Alaminos Canyon OCS area referred to as the Perdido Fold Belt (PFB) in the deepwater Gulf of Mexico.

Recently released drilling data sheds new light on play concepts and hydrocarbon potential of the Perdido Fold Belt (PFB).

Recently released drilling data sheds new light on play concepts and hydrocarbon potential of the PFB. Located in the southern Alaminos Canyon OCS area and extending into Mexican waters, the PFB consists of a series of large, northeast-southwest trending, saltcored box folds containing Middle Jurassic to Holocene clastic and carbonate sequences. Based on regional

Northsides *continued on page 38*

Northsiders continued from page 37

correlations and seismic facies analysis, the initial exploratory targets consisted of fractured Mesozoic carbonates and Lower Tertiary turbidites. Given the absence of local stratigraphic control, the presence, distribution and quality of the reservoir objectives were considered to be among the most significant risk elements for the trend. A key result of the BAHA wells (AC 600 #1 and AC 557 #1) was documenting a thick (>4000 ft) progression of Lower Tertiary sands and establishing the presence of extensive Wilcox equivalent turbidite sands located greater than 250 miles down dip from their fluvial and deltaic equivalents. Sand character and distribution interpreted from wireline logs and seismic data demonstrate a systematic progression from regional basin-floor fans to distal turbidite channel/levee systems.

Since the deep test at BAHA in 2001, six additional deep wildcats have been drilled in the Perdido Fold Belt, including announced discoveries at Trident (AC 903 #1) in 2001, Great White (AC 857) in 2002 and Tobago (AC 859) in 2004. Additional wildcat wells in the PFB include Tiger (AC 818) and Toledo (AC 951) in 2004, both with status not released, and Diamondback (AC 739, drilling).

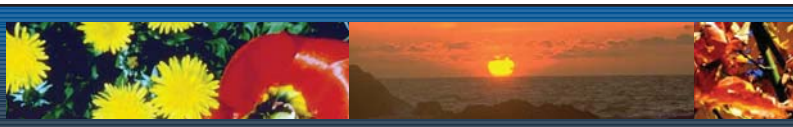
Success in the PFB also promoted extension of the Wilcox trend an additional 200 miles to the east, in Walker Ridge. Wildcat discoveries in Walker Ridge include Cascade (WR 206) in 2002, Chinook (WR 425) and St. Malo (WR 678) in 2003, and Jack (WR 759) in 2004. Additional wildcat wells in the eastern extension include Sardinia (KC 681), Hadrian (KC 919), Das Bump (WR 724) and Stones (WR 508, drilling).

With continued success and growing interest in the trend, the Perdido Fold Belt is likely to become an increasingly important exploration and development play in the deepwater Gulf of Mexico. ■

Biographical Sketch

Larry Zarra has a BA degree (1979) from Rutgers College and a MS degree (1988) from the University of Delaware, both in geology. He worked for The Academy of Natural Science in Philadelphia, the North Carolina Geological Survey and Exxon, before joining Chevron in 1991. At Exxon and Chevron, Larry focused on Texas Gulf Coast foraminiferal biostratigraphy and sequence stratigraphy. He is a member of AAPG and GCSSEPM, and has recently co-authored talks and abstracts at AAPG and the 2003 GCSEPM Research Conference. Larry is currently a stratigrapher and regional geologist for ChevronTexaco's deepwater Gulf of Mexico Exploration Team. His primary interests include integrating sequence stratigraphy, seismic geomorphology, sedimentology, image logs and cores to better understand and predict deepwater depositional processes and systems.

May 2005



Sunday	Monday	Tuesday	Wednesday
1	2	3 **HGS Executive Board Meeting**	4 **AAPG Young Professionals** Halliburton Energy Services OTC Oil Field Orientation 9 a.m. OTC See page 64
8	9 **HGS General Evening Meeting** by Cindy Yeilding *"Is the Workstation 'Killing' Geology?"* See page 27	10	11
15	16 **International Explorationists Dinner Meeting** by Colin J. Grant *"Sequence Boundary Mapping and Palaeogeographic Reconstruction: The Keys to Understanding Deepwater Fan Deposition across the NW Borneo Active Margin"* See page 31	17 **Northsiders Luncheon Meeting** *"Wilcox Depositional Systems: Shelf to Deep Basin"* See page 37 **Environmental and Engineering Dinner Meeting** *"The City of Houston's Brownfields Redevelopment Program* See page 43	18
22	23	24	25 **HGS General Luncheon Meeting** by Pat Gratton *"Barnett Shale Play: Big and Getting Bigger"* See page 49
29	30	31	**Members Pre-registered Prices:** General Dinner Meeting .....$25 Nonmembers walk-ups. ..... $33 Env. & Eng. .....$25 Luncheon Meeting .....$30 Nonmembers walk-ups. ..... $33 International Explorationists .....$25 North American Expl. .....$25 Emerging Technology $25

GeoEvents

Thursday	Friday	Saturday
5	6	7
12 **HGA Auxilliary Luncheon** See page 69	13	14
19 **SIPES Luncheon Meeting** *"Reservoir Modeling for the Rest of Us"* See page 45 **GSH Potential Fields Dinner Meeting** *"Gravity Study of a Sinkhole in the Permian Basin"* See page 46	20 **HGS Reserves Course Part III** by William M. Kazmann Petroleum Reserves—Avoiding Write-downs: Overview of Recommended Engineering Practices *8:00 a.m., Marathon Oil Corporation, Edward P. Travis Conference Center* See page 47	21 **HGS Tennis Tournament** **Houston Racquet Club** **11:15 a.m.** See page 66
26	27	28 **NOW you can make your reservations on-line at www.hgs.org**

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.**

Upcoming GeoEvents

Saturday June 11
HGS Guest Night
David Applegate, Ph.D.
Tsunamis and Earthquakes—Learning from Indonesia's Experience
6:30 p.m., HMNS
See page 57

Saturday, June 18
HGS Skeet Shoot
Greater Houston Gun Club
See page 32

June 19 –22
AAPG Annual Meeting
Calgary
See page 48

June 25
GSH/HGS Saltwater Fishing Tournament
Teakwood Marina
See page 62

Tuesday, May 17, 2005

Guadalajara Hacienda Restaurant • 9799 Katy Freeway (south side of Katy Freeway between Bunker Hill and Gessner)
Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 Nonmembers & Walk-ups

Make your reservations now on-line through the HGS website at www.hgs.org; or, by calling 713-463-9476 or by e-mail to Joan@hgs.org (include your name, meeting you are attending, phone number and membership ID#).

Environmental and Engineering Group
Dinner Meeting

by ***David A. Reel***
Federal IPA, Brownfields Program
City of Houston, Texas

The City of Houston's Brownfields Redevelopment Program

The City of Houston's Brownfields Redevelopment Program facilitates the identification, assessment, clean up and reuse of environmentally contaminated properties within Houston. Program projects result in urban revitalization by eliminating neighborhood environmental concerns; restoring contaminated land to productive use; creating new housing, commerce and green space; and generating new employment opportunities to benefit the local community. Since its inception in 1996, the Program has helped to facilitate construction of 975 housing units, create 2,564 new full time jobs, return $1.61 million in delinquent taxes and $802,000 per year in new annual taxes to the local taxing entities, and bring about reuse of 550 acres of brownfields whose redevelopment costs total over $720 million. ■

Biographical Sketch

DAVID REEL received his BA and MA in geology at the University of South Florida in Tampa, Florida. He worked as a geologist for Getty Oil Company from 1971 to 1978, as a district geologist and exploration manager for Union Texas Petroleum from 1978 to 1993, and as a petroleum and environmental consultant from 1993 to 2002. In 2003 he was employed as a geologist by the U.S. Army Corps of Engineers and was assigned to work with the City of Houston, to assist city personnel in the Brownfields Redevelopment Program.

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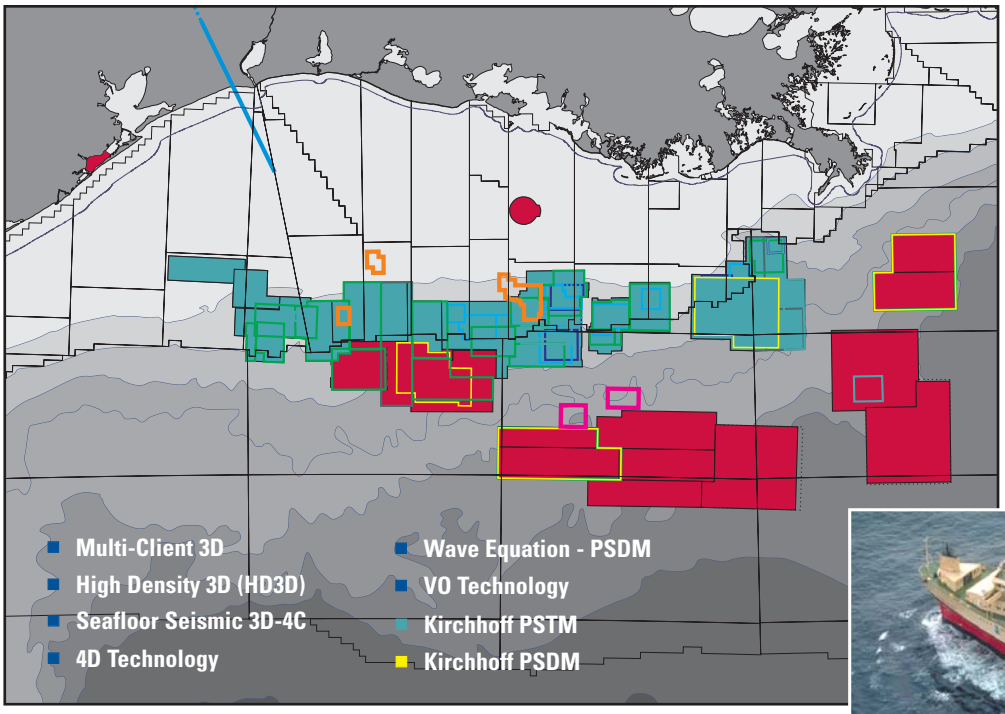

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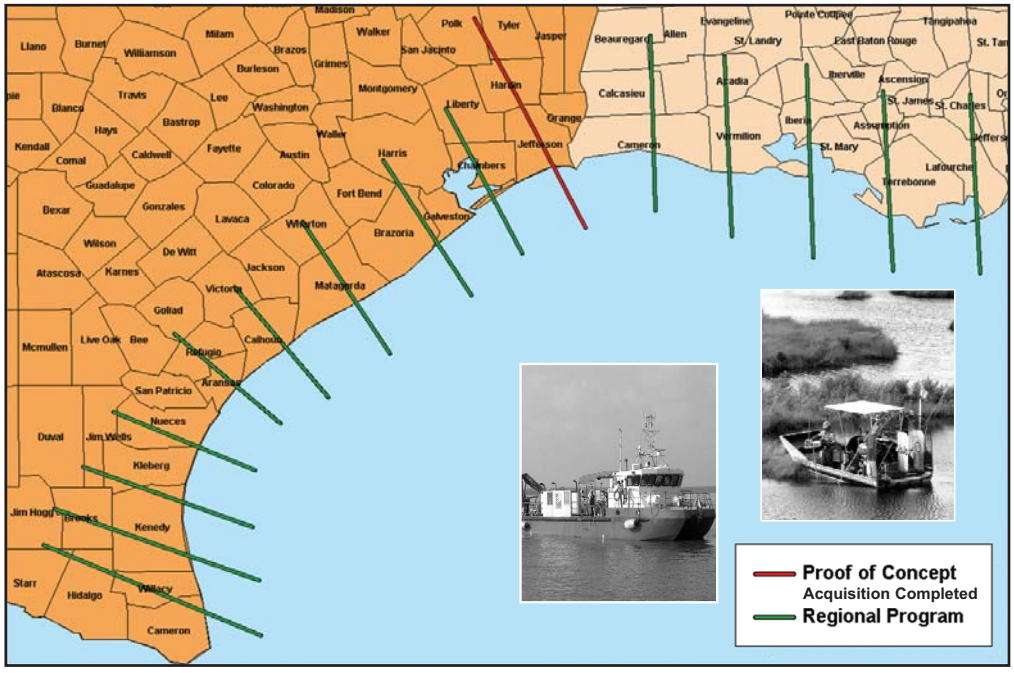


For more information contact James Bogardus at 281-679-2209 or Chuck Ward at 281-679-2220

PGS ONSHORE

738 Highway 6 South, Suite 900 ■ Houston, Tx 77079 ■ Tel: 281-589-6732 ■ Fax 281-752-2444

Thursday, May 19, 2005

Petroleum Club • 800 Bell (downtown)
Social 11:30 a.m., Lunch 11:45 a.m.

Cost: $30 for members and affiliates pre-registered by 12 noon Tuesday 19th January (No-shows will be billed.). $35 for non-members, guests, and walk-ups.

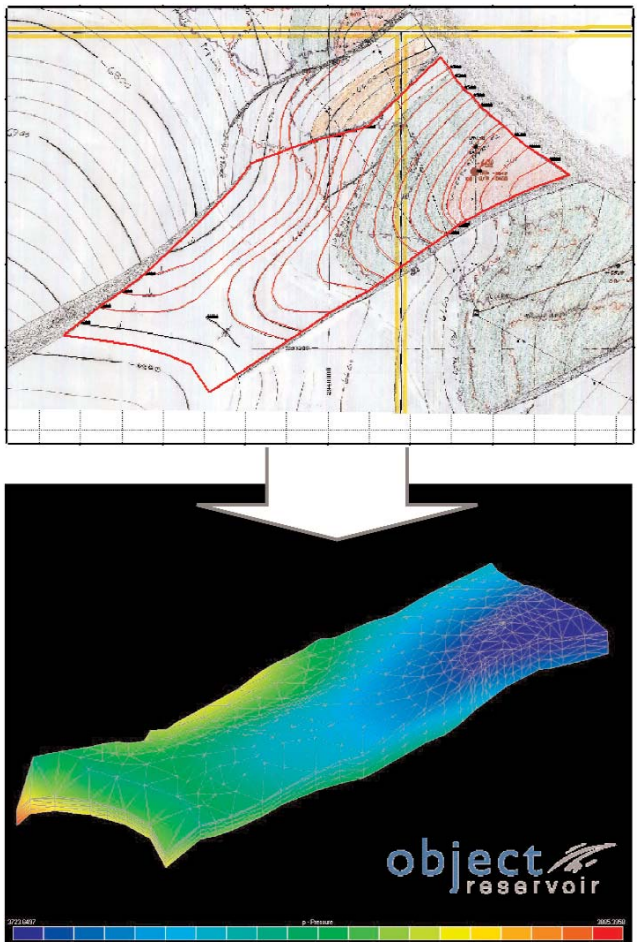
Make reservations by telephone (713-651-1639), Fax (713-951-9659), Web-site (www.sipes-houston.org), or e-mail (bkspee@aol.com) to B. K. Starbuck-Buongiorno by 12 noon Tuesday before the meeting.

SIPES
Luncheon Meeting

by ***John Mouton***
Chairman
Object Reservoir

Reservoir Modeling for the Rest of Us

Object Reservoir (OR) has developed a new finite-element based technology that makes reservoir modeling practical for exploration, not just mature production, and for small, quickly depleted single-well reservoirs, not just old mature fields with hundreds of wells. John says this is not your father's simulator: unlike the old finite-difference technology, where the reservoir is depleted before you can get any answers, OR can for example help diagnose problem wells, design completions, design or diagnose fracs, give better reserves estimates, and forecast production—from your wells or the competitor's well on the other side of the fence. OR has worked for more than 50 clients, mostly independents, and has worked on over 300 wells, offshore and deepwater GOM as well as onshore in Texas, Oklahoma, Canada and international. OR primarily works as a service company today, but is beginning limited deployment of its technology as commercial software with a handful of clients. ■



Biographical Sketch

John Mouton, Chairman of Object Reservoir, is one of two founders of the company. He was also a co-founder of Landmark Graphics Corp. John's degrees are in physics and math from UCLA, and he has served on the boards of Landmark, HyperMedia Corp., POSC (Petrotechnical Open Software Corp.) and Object Reservoir. In his career, he has worked in rocket and guided missile engineering, earthquake seismology, biomedical system design, seismic data processing research, geophysical workstation design, strategic marketing and, now, reservoir modeling. Pretty diverse, for a Cajun from Lafayette, Louisiana.

Thursday, May 19, 2005

HESS Building • 5430 Westheimer, Houston
Social 5:30 p.m.

Cost: $25
Call or email Dale Bird, by noon Tuesday, March 15, 2005
281-463-3816 or dale@birdgeo.com

GSH Potential Fields Group
Dinner Meeting

by ***E. Gerald ("Jerry") Hensel and Greg Minnery***
ChevronTexaco

Gravity Study of a Sinkhole in the Permian Basin

Microgal gravity surveys have been used in the past for cavity detection in archeological sites such as in the Great Pyramid in Egypt, in karst topography and in mining areas. In this study we are applying this technology to an area of immediate interest to the petroleum industry. Borehole collapse in several wells in a Permian Basin field has propagated upward resulting in sinkholes that can be tens of meters deep, including several that have developed at the surface. Our study well shows signs of borehole collapse, but not a surface sinkhole. Seismic data suggest that a subsurface anomaly around the well is associated with this collapse. Gravity models indicate that borehole collapse should produce measurable gravity anomalies with amplitudes up to 1.4 mGal. A high-resolution gravity survey, °Gal level, was conducted over the area of the seismic anomaly. Gravity data along two profiles over a surface sinkhole to the north of the study well shows the expected gravity low over the sinkhole. However, the gridded gravity data over the study well and seismic anomaly does not show the expected gravity low, but rather shows an anomaly that appears to be sourced by a near-surface density contrast. Subsurface collapse may have occurred followed by sedimentation filling the cavity. ■

Seismic data suggest that a subsurface anomaly around the well is associated with this collapse.

Biographical Sketch

Jerry Hensel earned his BSc in geophysics from the University of California, Riverside, and his MSc in geophysics from the University of Washington, Seattle. His career started at Chevron Overseas Petroleum in 1982 and he has been an interpreter of seismic and potential field data, as well as serving on several technical support teams. Jerry has worked in many areas of the world including Southern California basins, Mojave Desert, Eastern Washington and Eastern Oregon, Northern Alaska, Nevada, Southern Utah and Northern Arizona, Gulf Coast, Rocky Mountains, Offshore Eastern Canada, Western, Southern and Eastern Africa coastal basins, Coastal India, South China Sea, Indonesia, Brazil and Colombia. His interests include interpretation of gravity, magnetic, electrical fields data in the petroleum environment and software development, deployment and support, data base development, deployment and support for potential fields data. He is a member of the SEG and AGU.

HGS CONTINUING EDUCATION COMMITTEE PRESENTS

Part Three of the Mini-series

Petroleum Reserves — Avoiding Write-downs:
An Overview of Recommended Engineering Practices

by

William M. Kazmann and Edward P. Travis
LaRoche Petroleum Consultants, LTD

Friday, May 20, 2005 • 8 a.m. – 4 p.m.
Registration Table opens at 7:30 a.m.

Marathon Oil Corporation Conference Center
5555 San Felipe Road • Houston, TX 77056

Reserve write-downs in 2003 and 2004 have increased attention of financial analysts, investors, rating agencies, banks, the U.S. SEC and corporate boards to the process of estimating and reporting reserves. Both geologic and engineering technical errors can contribute to erroneous reserve estimates.

- Learn basic reservoir evaluation techniques from performance to volumetric analysis.
- Learn which common engineering errors contribute to the inaccuracy of reserves estimates.
- Learn the recommended engineering practices to avoid these reserve pitfalls.
- Learn the fundamentals of economic evaluations and their impact on reserve volumes.

Register at www.hgs.org or find a registration form on the HGS Website: /www.hgs.org/2005/April

Wednesday, May 25, 2005

Petroleum Club • 800 Bell (downtown)
Social 11:15 a.m., Lunch 11:45 a.m.

Cost: $30 with advance reservations, $35 for walk-ins, space available ($15 for Emeritus and Honorary).

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 General Luncheon Meeting

by ***Pat Gratton***
AAPG President

Effective March 30th, the price of the HGS General Luncheon increased to $30 and $35 ($15 for Emeritus and Honorary).

Barnett Shale Play: Big and Getting Bigger

In an area centering in Ft. Worth, Texas, measuring only 100 miles long and about 50 miles wide, is one of the great resource plays in the world. The Mississippian Barnett Shale occurs at depths ranging from less than 5,000 ft to almost 9,000 ft in this part of the Ft. Worth Basin. Producing over 1 BCFGPD from approximately 4,000 wells, the play produces about 50% of all U.S. shale gas from about 10% of all U.S. shale gas wells.

The Barnett Shale play took 20 years to develop. It owes its economic success to the persistence of Mitchell Energy (which was acquired by Devon in 2002) and the utilization of DOE dollars.

This talk will review the general economic history of the Barnett Shale play and chronicle specific exploration approaches. Key ingredients for success are compiled, and the sometimes painful and difficult learning curve in the Barnett Shale play's development will be illustrated. ■

Biographical Sketch

Patrick J.F. Gratton has been very active in a wide variety of leadership positions in professional organizations throughout his career, including HGS and SIPES, among others, and currently serves as President of the AAPG.

He received a BS (1955) and MS (1958) in geology from the University of New Mexico. He has over 40 years experience as a geologist, manager and independent oil operator and has published a number of papers on the geology and economics of oil exploration and production. Pat has specialized in geological and economic analyses throughout the southwestern United States and is widely considered an expert in the Barnett Shale.

He has been a member of the American Association of Petroleum Geologists since 1960. In 1993 AAPG/DPA awarded Gratton Life Membership for his many contributions to the Division and its members. In 1998 AAPG presented him with the Distinguished Service Award followed by Honorary Membership in 2002. Gratton was Alternate Director for Texas (1993–97) to the national Petroleum Technology Transfer Council. He was also founder and officer of the Dallas (now North Texas) Energy Council 1987–93. Gratton is a member of the Houston Geological Society, Roswell Geological Society, New Mexico Geological Society, National Petroleum Council and Society of Exploration Geophysicists (Associate) in addition to those organizations previously cited.

AAPG Town Hall Meeting

Wednesday, May 18, 2005

Free Reception for all AAPG, HGS Members and Guests

"AAPG Today and Tomorrow"

AAPG President Pat Gratton
AAPG President-Elect Pete Rose
AAPG Executive Director Rick Fritz

Marriott Houston Westchase
(formerly the Adam's Mark)
Grand Ballroom
2900 Briarpark Drive
Houston, Texas

6:00 pm - Social
6:45 pm - AAPG Presentations
7:30 pm - Open Discussion and Q & A
(Complimentary Wine, Beer, Soft Drinks & Hors d'oeuvres)

Please RSVP by May 10 to:
jscott@aapg.org • 800-364-2274 ext. 409

Membership applications will be available
to join AAPG and HGS

Volunteer of the Month: Mike Allison

Mike Allison is the HGS May Volunteer of the Month. Mike is a consulting geoscientist who has special expertise in geoscience project management, information technology and geotechnical software development related to the upstream oil and gas industry. Mike has become very active in the HGS over the past couple of years since moving to Houston from Lafayette. He is the treasurer for the very successful HGS Northsiders Group. Mike is also a member of the HGS Continuing Education Committee responsible for videotaping and producing CD-ROMs of the Reserves Series short courses. Mike has been instrumental in putting together a portable and cost-effective video production system. The cost of the equipment and production of the CD-ROMs is completely funded by outside sponsors. The proceeds from the sales of the CD-ROMs will go directly to the HGS. He has completed a CD-ROM set summarizing the first two of these short courses. Mike is currently a candidate for HGS Treasurer-elect.

Mike is currently working for Geoscience Data Management and as a geology instructor at Cy-Fair College. He has a BS in geology from the University of Miami at Coral Gables and an MS in geology from the University of Tennessee at Knoxville. Mike previously worked for Landmark Graphics Corporation as a research and development product geoscientist. Before that he worked for Chevron and Gulf Oil on a variety of assignments since 1983. ■

Continuing Education Announcement
"Petroleum Reserves - Avoiding Write-downs Part 4: An Overview of Recommended Petrophysical Practices"
is being planned for next September. Obtaining accurate net pay counts from correct petrophysical analysis is one of the basic ingredients of accurate reserve estimations. Learn about red flags and pitfalls, as well as how to avoid them. This course will review actual case histories from the real world. Watch the HGS *Bulletin* and website for the publication of the exact date and location of this course, as arrangements are finalized.

An Interview with Joel Bartsch, President of the HMNS: *Gold, Re-opening of the Weiss Energy Hall and Hall of Gems and Minerals, and Distinguished Lectures on Earthquakes and Tsunamis*

by ***Arthur E. Berman***

Gold was first discovered in the United States in 1799. The discovery was made in Cabarrus County, North Carolina by Conrad Reed, aged 12. The 17-pound rock was used as a doorstop in the Reed home until 1802, when Conrad's father John Reed took it to a Fayetteville jeweler to learn if it was worth anything.

"He asked Mr. Reed, 'What do you want for it?'" relates David Temple, Director of Volunteer Services at the Houston Museum of Natural Science. "And he thought he was asking for a lot of money and he said, 'Well, I'll take $3.50.'"

That began the first gold rush in the United States. Subsequent gold discoveries on Cherokee land in North Carolina led to the first of many broken treaties and forced relocations of native Americans. One of the most vocal opponents of the 1830 Indian Removal Act was a young legislator named David Crockett.

"Davy Crockett stood up and said that this was wrong. He was blamed as a traitor by (President) Andrew Jackson, blackballed, lost his bid for reelection, had his life destroyed and he had to start over. That's why he came to Texas and that's a pretty interesting Texas connection," says Temple.

Gold has a lot of interesting connections that can be discovered at the Houston Museum of Natural Science exhibit "Gold! Natural Treasure, Cultural Obsession" that opened in February and continues through August 7, 2005.

Joel Bartsch, President, Houston Museum of Natural Science

The Gold! Exhibit

"Gold! is the largest and most comprehensive exhibition of gold objects, natural gold specimens and gold bullion ever assembled," said Joel A. Bartsch, president of the Museum and former curator of the world-renowned Cullen Hall of Gems and Minerals. "In addition, this exhibition is exclusive to the Houston Museum of Natural Science and will not be seen anywhere else. This is a one-of-a-kind opportunity to explore the fascinating diversity and worldwide significance of this much-coveted mineral."

Twenty dollar gold coin

Gold is magic. It has been part of human history since at least the time of ancient Lydia and has exerted considerable influence on the course of history in the United States. With the power to inspire mass madness like the gold rushes of the 19th century and retain value through world turmoil, yet still be transformed into an object of pure beauty, gold is truly a mineral like no other. Beautiful, fascinating and valuable, gold has inspired millions, adorned the powerful and changed the world.

The HMNS Gold! exhibit provides visitors with the opportunity to explore the role of gold through history, art, culture, science and myth. The discovery of gold in 1848 at the Sutter Mill in California sparked the greatest gold rush of all time. Tens of thousands of gold seekers from around the globe streamed into the United States and the quest for gold was a major factor in the settlement of the American frontier.

"It's something I think that really appeals to the human soul," says Joel Bartsch. "Gold is so malleable that an ounce of gold can be spread out over 300-350 square feet. With a pound of gold, you could make a wire that stretches to

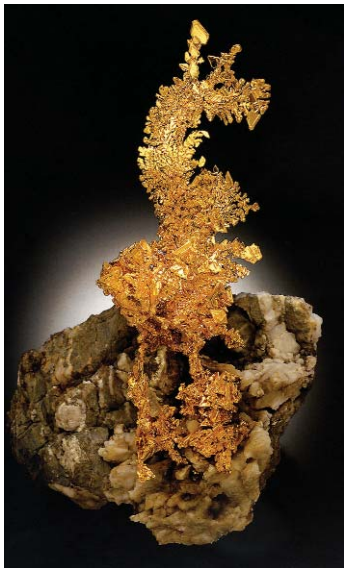
continued on page 54

An Interview with Joel Bartsch

continued from page 53

the moon and back. It made the United States of America the economic power that it is today."

"One of the central parts of this exhibition is the shipwreck of the *Central America*," says Bartsch. "When it sank, it created a major financial crisis in the United States. It lead to the Panic of 1857 because all the eastern banks were waiting for that shipment to show up to rebuild their coffers. When it sank, it caused a major financial panic in New York and along the whole eastern part of the United States."



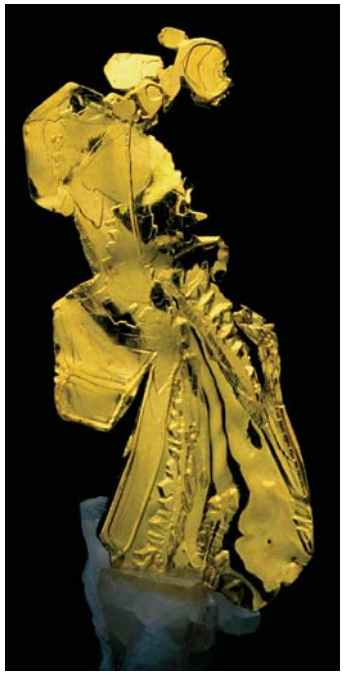
"The Dragon" crystalline gold specimen.

The Gold! exhibition is divided into eight sections, each designed to provide an in-depth exploration of the role of gold through history, art, culture, science and myth. The first area is called "Aurum Naturae," Latin for "natural gold," and includes examples of the finest natural gold specimens in the world, each of them unique. These include the famous Latrobe Nugget, the world-famous Golden Horn and the spectacular crystalline Dragon.

The "Placer Places, Lode Locations" section of the exhibit examines the different areas where gold is formed and found, from volcanic deposits to the world's largest and most surprising deposit of gold—the ocean. Here the visitor can see how gold is mined from rock and panned from rivers as well as how it is found through modern exploration techniques and see a quartz pocket lined with crystalline gold, just as it was discovered in nature.

"The Rush is On!" features the three major gold rushes of the 19th century–California, Australia and the Klondike. "Golden Ages" explores how the world's most powerful cultures have utilized and cherished gold, from ancient Egypt to pre-Columbian cultures to the Renaissance. "Troves and Treasures" immerses visitors in the mystery of the deep in search of some of the greatest treasures known to man. Here we learn about sunken Spanish galleons and see a map leading to local treasures in Texas.

"The Gold Standard" explores why and how gold became the standard medium of exchange throughout the world. A variety of coinage and gold bars from around the world, each distinctive, are exhibited to explain the various ways in which that exchange has been facilitated. "All That Glitters" reflects the popular fascination with gold, from its use in Olympic medals and Academy Award statuettes to gold records in the recording industry, and as the quintessential treasure in films like the classic "Treasure of the Sierra Madre." Here we also see the role of gold in everyday life, from its use in telephones, televisions and personal computers to satellite circuitry and astronauts' visors.



Gold crystals.

In the "Eureka!" section, we may discover the mysteries of alchemy, guess the amount of gold ore found in a boulder, see edible gold, hunt for treasure with a metal detector and pan your own gold. Kids have the opportunity to explore gold with these and many more hands-on activities in the Eureka! Xploration Station, the final section of the exhibition.

Re-opening of Weiss Energy Hall

In addition to the Gold! exhibit, there are other things happening at HMNS that will interest Houston Geological Society members. The first is the re-opening of the Weiss Energy Hall.

"The Weiss Energy Hall is reopening in May of this year, more or less to coincide with OTC (Offshore Technology Conference)," says Bartsch. "This is the third version of the hall. Up until about

1993 it was the Harry C. Weiss Hall of Petroleum Science and was basically the history of the oil patch. In 1994 we opened the second version of the Weiss Energy Hall that was basically cutting-edge exhibit technology about the science of energy. We had easily ten million people go through that hall in ten years.

"The new Hall starts out with the big bang and the formation of energy. It goes into how we believe energy and (petroleum) deposits are formed, how we look for it and how we get it out of the ground, what we do with it after that, and other sources that are non-hydrocarbon sources of energy, basically the entire world of energy from A to Z.

"The energy industry is the highest tech of all the high-tech industries and so, instead of being more of a historical display, it's now much more of a cutting-edge science display. And we are putting the finishing touches on it and getting it ready for an opening in early May."

Re-opening of Hall of Gems and Minerals

"The Hall of Gems and Minerals is definitely my baby," says Joel Bartsch. "I came back here (to the Museum) in 1991 as the curator of that collection. Houston is a town full of geologists. Everyone loves rocks. Everyone loves gems. The HMNS Board made a decision in 1985 that they were going to try to build the world's finest collection of naturally crystallized gem and mineral crystals. And we have gone a long way toward doing that. In the last 10 or 15 years we've added numerous major pieces and acquired some major private collections. From that we distilled the best of the best. What we have now is about 650 pieces on display and just about each piece is either the finest known example or in the top three to five finest known. They range from crystallized diamonds to rubies, sapphires, emeralds, tourmalines, even rare and exotic crazy stuff. We try to have the best of the best."

Distinguished Lectures on Earthquakes and Tsunamis

Beyond the Gold! exhibit and re-opening of the Weiss Energy Hall and the Hall of Gems and Minerals, the HMNS will sponsor two distinguished lectures this spring of interest to HGS members.

On May 17, 2005, Dr. Susan Hough of the United States Geological Survey, Pasadena, California will speak on "The Very Long Reach of Very Large Earthquakes." Dr. Hough's lecture will focus on how the recent earthquake in Sumatra has expanded knowledge of how and why earthquakes occur.

On June 21, Dr. Michael Wysession of Washington University will speak on "A Modern Journey to the Center of the Earth." Dr. Wysession will discuss the new understanding of the Earth's interior, from crust to core, gained from seismological imaging. He will also discuss how continents move, and have therefore shaped the entire history of the planet's surface.

HGS members who are not HMNS members can get a members' discount to these lectures by calling the Museum box office 713-639-4744 and identifying themselves as HGS members. ■

David Temple Director of Volunteer Services, Houston Museum of Natural Sciences

HGS Guest Night—Saturday, June 11 Will Discuss Tsunamis and Earthquakes, Featuring Dr. David Applegate, USGS Advisor

*by **Linda Sternbach and Bill Osten,** Guest Night co-coordinators*

On Sunday December 26, 2004, a major earthquake and tsunami struck the Indian Ocean region, causing over 235,000 deaths. The earthquake, whose epicenter was in a submarine, active subduction zone between the Indian and Burma tectonic plates, was one of 20th–21st centuries largest and most devastating, registering magnitude 9.0(m_W). The energy released from the earthquake is estimated to have been the equivalent to 475 megatons of dynamite, or 23,000 atomic bombs (http://neic.usgs.gov/neis/eq_depot/2004/eq_041226/ for more info.) The tsunami that followed flooded coastal regions of Indonesia, Malaysia, Sir Lanka, India and Thailand. The earthquake could not have been prevented, but the loss of life would have been lessened by a modern geophysical warning system such as the United States and Canada currently have in place in the Pacific Ocean.

The Houston Geological Society is dedicating this year's Guest Night to scientific understanding and public awareness of the risks, causes and steps the United States and world governments need to take to avoid the damage that these phenomena cause. We are fortunate to have dynamic and knowledgeable USGS senior science advisor David Applegate of Reston, Virginia, to present a talk at this year's Guest Night event. Dr. Applegate's talk is titled "Lessons from Sumatra: Reducing Earthquake Risk Worldwide." HGS Guest Night will be on Saturday, June 11, starting at 6:30 p.m., at the Houston Museum of Natural Science, 1 Hermann Circle Drive.

The Guest Night event includes a buffet of Goode Company barbeque and fajitas and access to the Houston Museum of Natural Science exhibits on the first and second floors before the main talk in the IMAX theater. As a special bonus, after Dr. Applegate's talk, we will show the IMAX movie "Forces of Nature," free to Guest Night attendees. The Guest Night event has to be limited to 400 people (due to IMAX seating limits) and registration closes Monday, June 6. There will be no ticket sales at the door the night of the event. Registration forms are in this issue and can be mailed or faxed to the HGS office, or members can register and pay by credit card on the HGS website.

Earth Scientists Needed to Help Spread Public Awareness

This year's Guest Night will be a great opportunity for earth scientists of the HGS, whether working in oil and gas or environmental science, to bring their friends and family and learn about what could happen if a major earthquake or tsunami affects the coastline of the United States. Did you realize that tsunamis from earthquakes of magnitude 6 and below have caused significant destruction to the U.S. coasts of Alaska and California, and to the Canadian Newfoundland coast in just the last 30 years? Did you know that the USGS and National Oceanographic and Atmospheric Administration (NOAA) monitor an early warning system of seismic networks and buoys? Even though Houston is not in a tsunami/earthquake high-risk zone, Houston is home to a large number of geoscientists who can be involved in public awareness. One of the important goals of the USGS is to get earth scientists involved in public education, so that local groups can be ready to support safety efforts in the event of a major earthquake and/or tsunami.

Dr. David Applegate leads the Geologic Discipline's Earthquake Hazards Program of the U.S. Geological Survey, based in Reston, Virginia. He holds a BS in geology from Yale University and a PhD in geology from the Massachusetts Institute of Technology.

USGS science for a changing world
Earthquake Hazards Program

HGS Bulletin: What does your job at the USGS, involve on a daily basis and what are the big ongoing projects right now?

Dr. David Applegate: My job is to oversee USGS work on geologic hazards. I'm directly responsible for programs in earthquake hazards, global seismic monitoring and **Guest Night** *continued on page 58*

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geomagnetism and coordinate with our other geologic hazard programs that address volcanoes, landslides and coastal hazards. These programs support several hundred scientists and support staff, who are spread across the most geologically hazardous regions of the country. Since almost none of them are stationed at USGS headquarters in Reston where I am, that means a lot of travel to stay in touch with them and with our many partners. In the case of the earthquake program, about a quarter of our funding goes right out the door to support targeted research and regional seismic monitoring networks at universities and state geological surveys.

Tsunami detection station buoy.

We are currently planning a major initiative focused on catastrophic natural hazards. It will build on existing USGS capabilities and partnerships to take advantage of new technology to deliver information products that emergency managers and the public can use . . . to reduce our nation's vulnerability to earthquakes, volcanoes, landslides, tsunami floods, hurricanes and wildfires.

HGS Bulletin: Where were you, and what were you doing, when you got the news about the Sunday, December 26, Sumatra earthquake and tsunami? Were the early reports accurate about the magnitude of the disaster, or was the early information not reliable? What was your initial reaction to the news of the tsunami disaster?

Dr. Applegate: I was in Florida enjoying the Christmas holiday with my family when I received word of the earthquake and subsequently hustled back north to Washington. But I was on the sidelines—our on-call duty seismologists at the National Earthquake Information Center (NEIC) in Golden, Colorado were the ones who first received the automated alerts and cut short their Christmas celebration to get to the office (because of the International Date Line, it was still December 25th here in the U.S. but the morning of the 26th in South Asia). Many more of our seismologists headed in to the office as they realized the magnitude of what had happened and the need to analyze data from the main shock and expected aftershocks. Quite a number didn't sleep that night or, for some, the next either. For most of them, it was a repeat of the previous Christmas holiday, which was similarly hijacked when a (much smaller) earthquake occurred directly beneath the city of Bam in Iran, killing tens of thousands and turned much of that ancient Silk Road way station into rubble.

Within seven minutes after the earthquake rupture initiated off the west coast of Sumatra, data from the closest Global Seismographic Network stations (a joint effort of USGS and the National Science Foundation) began arriving at the NEIC. The data are automatically passed on to the NOAA tsunami warning centers in Alaska and Hawaii, which issued their first tsunami alert at 15 minutes after the event, estimating the magnitude to be 8.2. Without any tsunami warning system in the Indian Ocean, all that alert could say was that no tsunami was expected in the Pacific Ocean, where their (NOAA) responsibility lies. The initial magnitude estimates grew with time, because the first estimates were based on seismic waves that were generated by the initiation of the quake off Sumatra. Longer-period waves generated along the entire 1300-km long rupture took longer to analyze. It was over an hour after the event that NEIC issued an earthquake alert with a magnitude of 8.5, and it was not until news reports starting filtering out of Thailand that NOAA could confirm the existence of a tsunami. NEIC eventually raised the magnitude to 8.9 several hours later and then 9.0 the following day once Harvard seismologists had analyzed very long period seismic waves. Some seismologists argue that extremely long-period waves from a slow-rupturing part of the earthquake point to a total magnitude of 9.3, but even if it is correct, such observations were not available for previous earthquakes. So in order to compare apples-to-apples (for example, the Good Friday 1964 earthquake in Alaska), the USGS is currently staying within a magnitude of 9.0

Like many of my colleagues in the days and weeks that followed, I have been motivated by a sense of obligation to ensure that we learn everything we can from this event and apply the lessons to mitigate against future disasters, whether in South Asia, the Pacific Ring of Fire, the Caribbean or anywhere else threatened by large earthquakes and tsunami.

HGS Bulletin: How has the Sumatra earthquake realigned your efforts in geologic hazard awareness? Did the 2004 event result in a change in your daily business or approach to ongoing programs?

Dr. Applegate: On January 16, the Administration announced a $36 million proposal for improving tsunami warning systems, including funds for NOAA to deploy a greatly expanded network of deep-ocean buoys that can detect tsunami pressure waves at sea

along with funds for USGS to support increased real-time data availability and new stations for the Global Seismographic Network and a major upgrade of the NEIC systems. Both NEIC and the NOAA tsunami warning centers will move to full 24/7 operations, improving their rapid response capabilities. If Congress approves these changes, we will be able to provide notifications of global earthquakes much faster and with greater accuracy. The President's proposal will also fund USGS to implement a system that allows us to rapidly estimate the population exposed to severe shaking. Known as Prompt Assessment of Global Earthquakes for Response or PAGER for short, this system—currently in prototype form—will be a valuable tool for aid agencies and response entities that need to know how big a disaster has occurred even though communications to the affected areas may be down.

Moving beyond budgets, the Sumatra event has had a major impact on how people think about low-probability, high-consequence events. For the residents of the New Madrid Seismic Zone in the central US, the large earthquakes of 1811–1812 seem pretty remote, but when you watch footage of the destruction wrought by an earthquake that last occurred in 1833, that makes the risk much more tangible. Likewise, residents of the Pacific Northwest may have a hard time getting concerned about an earthquake that last occurred in 1700, when the Cascadia subduction zone ruptured in very similar fashion to what we saw on December 26th. The threat is much more real to them now. Tragic events such as the Sumatra earthquake are teachable moments for geoscientists to turn heightened awareness into action that can prevent future disasters. We can't stop Mother Nature from generating natural hazards. They are the way this planet does its business—but we can prevent hazards from turning into disasters.

HGS Bulletin: Given the short time periods between the Sumatra earthquake and when tsunami waves struck parts of Sumatra and Thailand, what type of warning and alert system do you think would be appropriate for this region?

Dr. Applegate: The most important component of any warning system is having a public that knows what to do when the warning is issued. Many countries have stepped forward to establish tsunami warning systems in the Indian Ocean. Public awareness is extremely high right now, but what about in 10, 50 or 100 years? Education is an ongoing challenge, particularly for such high-impact but rare events.

In the Pacific Northwest, where a similar earthquake to the Sumatra event occurred in 1700, USGS, NOAA and FEMA are working with state and local governments in Oregon, Washington and California not only to understand the hazard facing coastal communities but to educate the citizens on what to do when a major earthquake occurs. Knowing inundation patterns is key to providing people with the proper evacuation routes and safe havens. We want all schoolchildren in those communities to be as informed as the 10-year-old Scottish girl who saved over 100 lives in Phu Ket because she remembered her geography lesson on tsunami and knew that a rapidly retreating ocean was not an invitation to pick up stranded fish but to quickly head to high ground.

HGS Bulletin: Many non-scientists have commented when viewing video tape of the tsunami in various coastal areas of the Indian Ocean that it doesn't look like those waves could cause all the damage and death. There is a lot of water, but many don't understand the degree of destruction. How would you explain this?

Dr. Applegate: These are good questions! I asked Eric Geist and Bruce Jaffe, tsunami experts with the USGS Pacific Science Center, to help me out with the first two. Bruce was part of the International Tsunami Survey Team that went to Sri Lanka in January.

For starters, the most dramatic footage was likely caught by cameras that did not survive the experience. Beyond that, the destructiveness of tsunami waves can be deceiving. More than just height, the impact is due to velocity and entrained debris. When tsunami waves come close to shore, they lose much of the speed with which they cross the open ocean—speeds that rival jet airplanes—but they still produce a powerful current. Even where the wave height was not particularly high, the velocity of the current makes for a very large volume of water bearing down on the shore. Combine that with the debris picked up as the wave moves inland and the result is an extremely powerful battering effect.

HGS Bulletin: Following up on the previous question, there were many localities such as Galle, Sri Lanka where measured tsunami wave amplitudes were relatively small (< 1 m) but destruction was great. How do we understand that? Are there other ways of dissipating kinetic energy than surface wave power?

Dr. Applegate: The International Tsunami Survey Teams that deployed in early January, including USGS scientists, reported areas near the coast in Sri Lanka where foundations were all that was left of buildings destroyed by tsunami waves that were only two meters high. As I noted above, high velocity and debris picked up by the current are the culprits.

HGS Bulletin: The model for tsunami generation assumes that seafloor displacement during an earthquake displaces the water column to produce the tsunami. How much slip do we believe occurred on the fault responsible for the December 2004 tsunami? Did it cut the surface of the **Guest Night** *continued on page 60*

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seafloor? What dimensions can we attach to the rupture zone? Is the volume calculated consistent with mass balance considerations for the volumes of water involved in the tsunami?

Dr. Applegate: I asked Jim Dewey, a seismologist at the USGS National Earthquake Information Center in Golden, Colorado, to lend a hand with answering this question. Most of the tsunami originated from the southern half of the 1300-km rupture zone that produced the main shock. Based on aftershock distribution and modeling, it appears that the width of the rupture zone averages about 200 km and the average slip that occurred rapidly enough to generate a tsunami was about six meters. Nobody has been down to visit the rupture zone yet, so we do not have direct observations of a seafloor scarp, but with such a shallow earthquake, the rupture extended very close to the surface if not actually reaching it. In any case, models indicate that the sudden uplift of such a wide region was sufficient to generate the observed tsunami.

Public Awareness and the Media

HGS Bulletin: How effective is our public warning system of earthquakes and tsunamis on the west California coast and up into Alaska? Can there be a government response to warn the public in a matter of half hour, or is this out of range of detection?

Dr. Applegate: Emergency managers along the U.S. West Coast have made significant efforts to educate coastal communities about the hazards they face from tsunamis generated by distant earthquakes and, in the case of the Pacific Northwest, earthquakes generated offshore. The Pacific tsunami warning system operated by NOAA can provide ample warning to Hawaii, Alaska and the West Coast for tsunamis generated elsewhere around the Ring of Fire, but we still face a major challenge to provide the necessary warning for an event, like a major rupture of the Cascadia subduction zone, that occurs just offshore. Efforts are currently underway to enhance existing capabilities and education efforts.

HGS Bulletin: Last year you testified to the U.S. Senate Science, Technology and Space Subcommittee on behalf of the Department of Interior in strong support of legislation to reauthorize the National Earthquake Hazards Reduction Program., noting that significant progress has been made in the areas of earthquake awareness, emergency response, new building compliance and existing structure retrofitting over the twenty-five year existence of the Act. You urged Congress to continue addressing the nation's vulnerability to natural disasters, since the seismically active areas affect 150 million people in 39 states. What is your interaction with Congress after the tsunami?

Dr. Applegate: In the weeks after the earthquake, I provided a number of briefings for Senators, members of Congress and their staff, explaining the science behind earthquakes and tsunamis, the tsunami threat to the United States, and what is being done to improve the nation's tsunami warning capabilities. Most of those briefings were done jointly with NOAA. In addition, both the House Science Committee and the Senate Commerce, Science & Transportation Committee held formal hearings at which USGS Director Chip Groat testified. My job at those hearings was to assist the Director, sitting behind him and providing any supplementary materials he might need.

HGS Bulletin: How can geologists in the private sector help with public education or scientific research?

Even though the Houston Geological Society is based in a city that has a low probability of ever having a tsunami or earthquake, is there a way for geoscientists to participate in public outreach using the internet or through our Texas Universities?

Dr. Applegate: Houston may not face a big earthquake or tsunami threat, but building awareness about these hazards is just one facet of the need to improve our Nation's overall resilience to all threats. We should have an ultimate goal that home is the safest place you can be, and the first step is improved awareness. Geoscientists wherever they live can get involved in public outreach about the hazards that are faced and what can be done to mitigate them, whether catastrophic like a hurricane or more slow-moving like subsidence or swelling soils. Having spent eight years at AGI (American Geological Institute), which initiated Earth Science Week, I know that Texans and especially Houstonians have been terrific about initiating local activities during that week (the second full week in October). That's certainly one important opportunity. ■

Guest Night Speaker David Applegate is a Field Geologist at Heart

by ***Linda Sternbach***

Our HGS Guest Night speaker is a senior government scientist at the USGS, who is also a field geologist at heart. In an email interview in March, David Applegate reveals what attracted him to geology and why he jumped at the chance to lead the USGS Earthquake Hazards program in Reston, VA.

David Applegate, Guest Night speaker, co-instructing the University of Utah's field camp in the Raft River Range of Idaho in May 2002. The photo is by David Dinter. Applegate is adjunct faculty in the University of Utah Department of Geology and Geophysics.

About our speaker

Applegate leads the Geologic Discipline's Earthquake Hazards Program of the U.S. Geological Survey, based in Reston, Virginia, which provides coordination for geologic hazards across the Survey. Applegate has a BS in geology from Yale University and a PhD in geology from the Massachusetts Institute of Technology, where he did his dissertation on the tectonic evolution of the Funeral Mountains in the Death Valley region of California. He spends time as an adjunct professor at the University of Utah. He sent us the accompanying photo of himself in the field in Utah.

HGS Bulletin: What made you want to study geology/geophysics and continue to the PhD degree? Was there a significant teacher or mentor that guided you in your geological studies?

Dr. Applegate: Like many geologists of my generation, I was drawn into the science through the writings of John McPhee, who gave me a perhaps overly romantic view of field geology in the western United States and a window into the pursuit of deep time. At the end of my sophomore year, I switched to geology from being a history major, making up the prerequisites as I went. I was thoroughly hooked after spending the summer before my senior year at field camp in Idaho and Wyoming and then doing my own research in the Olympic Mountains of western Washington. I was eager to keep learning and particularly to spend time in the Basin and Range—the Death Valley region of California, as it turned out.

I owe a huge debt of gratitude to both my undergraduate advisor, Mark Brandon, and my doctoral advisor, Kip Hodges, for giving me the opportunities they did. Kip taught all his students to identify interesting problems and then assemble the tools needed to solve them, rather than becoming hidebound to one tool and then searching out problems to try it on. He encouraged us to care about writing well and to view our analytical skills broadly, both qualities that served me well when I decided to do a postdoc in the U.S. Senate as the American Geophysical Union's Congressional Science Fellow and in all my jobs since.

HGS Bulletin: What was the path that took you to your job at the USGS?

Dr. Applegate: A lot of my job is externally focused, representing USGS in a variety of settings, including the White House National Science and Technology Council's Subcommittee on Disaster Reduction, for which I serve as vice chair, the USGS's parent Department of the Interior, Congress, other Federal agencies—for example NOAA, with whom we have worked very closely on the tsunami response—and external partners. Those aspects of my job may explain the path I took to get here.

I have been on the job for just over a year, spending the previous eight years at the American Geological Institute, a non-profit federation of 43 geoscience societies, running their government affairs program and editing *Geotimes*, the newsmagazine of the earth sciences. At AGI, I worked on a wide variety of policy issues that affect the geoscience community and where the members of our member societies—

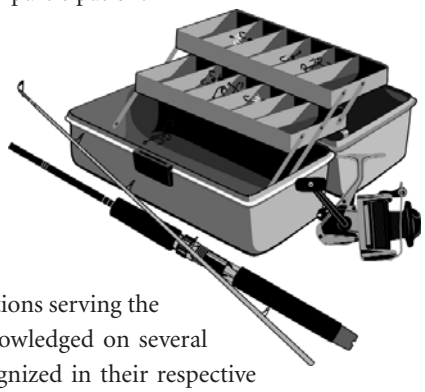
Guest Night Speaker *continued on page 63*

GET READY FOR THE 5th ANNUAL GSH/HGS SALTWATER FISHING TOURNAMENT 2005

Saturday, June 25, 2005

Teakwood Marina, Village of Tiki Island • Galveston, Texas

This year's Fishing Tournament will be held on Saturday, June 25, at the Teakwood Marina, Village of Tiki Island, Galveston, Texas. We are looking forward to a big event this summer and we encourage full family participation.



Trophies will be awarded for the heaviest individual Redfish (Non-Tagged), Speckled Trout and Flounder for the Anglers, Junior Anglers and Lady Anglers. Trophies will also be awarded for the heaviest individual Stringer: 1 Redfish, 3 Speckled Trout and 1 Flounder.

Registration fee includes: launch fee, GSH/HGS fishing cap, Fish Fry meal after weigh-in, refreshments, trophies and DOOR PRIZES.

The Geophysical Society of Houston and the Houston Geological Society are non-profit organizations serving the petroleum industry. Corporate and individual contributions are appreciated and will be acknowledged on several sponsor boards and banners at the weigh-in station and marina. All contributors will be recognized in their respective organization newsletters following the tournament. This is a great way to entertain friends, family, business associates and clients. So spread the word!

For more information, please contact:

Bobby Perez (HGS & GSH) • 281-240-1234 ext. 219 Office • 281-240-4997 Fax • 281-787-2106 Cell • 281-495-8695 Home
E-mail addresses: rdphtx@aol.com or r_perez@seismicventures.com

GSH/HGS SALTWATER TOURNAMENT

NAME: _____ COMPANY: _____

ADDRESS: _____

PHONES: (H) _____ (B) _____ (C) _____

E-MAIL ADDRESS: _____

Upon receipt of the registration form, each participant will be provided with a copy of the specific tournament itinerary and rules sheet by e-mail. Please register **EARLY.**

Please return this form with your check for $60.00 per contestant payable to:
GSH/HGS SALTWATER TOURNAMENT and Mail to:
Ms. Joan Henshaw, 10575 Katy Freeway, Suite 290 • Houston, Texas 77024

Registration Fee: $ _____ + Sponsor Contribution: $ _____ = TOTAL $ _____

DISCLAIMER:
I acknowledge that neither the Geophysical Society of Houston nor the Houston Geological Society will be held responsible for injury or accidents during this event. PRACTICE SAFETY!!!!!

Signature: _____ Date _____

HGS Guest Night Speaker continued from page 61

the largest being the American Association of Petroleum Geologists and the American Geophysical Union—had a great deal of knowledge and perspective to contribute: energy policy, environmental policy, science policy and natural hazards policy. Both of my jobs at AGI were about translating between geoscientists on the one hand and the public and policymakers on the other.

Although natural hazards policy was always an important part of my work at AGI, my interest deepened while working with Pete Folger at AGU and a wide range of other organizations like the American Red Cross, National Emergency Management Association and American Meteorological Society to establish a Senate caucus on natural hazards, co-chaired by Sen. Ted Stevens (R-AK) and former Sen. John Edwards (D-NC). The caucus was intended to sustain political interest in making the nation more resilient to natural hazards. It's easy for politicians to take credit for handing out relief after a disaster has struck, but it is harder to find ways for them to take credit for softening the blow of natural hazards through mitigation and preparedness.

When the opportunity arose to come to USGS and focus all of my energy toward reducing the impacts of natural hazards, I leapt at it.

HGS Bulletin: What has been the most memorable event of your work with the USGS?

Dr. Applegate: This past year, we have seen the reawakening of Mt. St. Helens, the long-awaited magnitude 6.0 earthquake on the Parkfield segment of the San Andreas, extensive landslides following the torrential rains in southern California and the four major hurricanes that struck the East Coast last fall. But nothing compared to what happened on December 26 off the coast of Sumatra. The weeks and months that followed have been dedicated to doing whatever we can to ensure that such a disaster will not occur again.

HGS Bulletin: What is your impression of the TV and print/Internet media reporters relating to issues about tsunamis and earthquakes? Have you been interviewed on TV and how did you handle this? Is TV an effective medium to educate the public about geologic hazard preparedness?

Dr. Applegate: In the days following the Sumatra earthquake, I gave a wide range of print, radio and especially television interviews. Once the news networks had extensive footage from the devastated areas, they went to near-saturation coverage, and with the death tolls rising day by day, the story lasted longer than other similar stories. The media questions changed as they moved through several news cycles: first the interest was solely on understanding what had happened in South Asia, then it turned to the question of whether it could happen here, and then to the question of what the United States was planning to do in relief and response.

Overall, my impression of the media was quite positive. I felt that the reporters I spoke with were trying to get the story right. In a sense, the event itself was so sensational that they did not have to do much to sensationalize their stories. Early on, I appeared on CNN's "Crossfire," a show known for its partisan theatrics, but the questions from Robert Novak and Rev. Al Sharpton (substituting for their regular "on the left" hosts) were serious attempts to understand the situation rather than political jabs. No doubt they went right back to their usual ways with the next guest!

In February, I spoke in St. Louis at an event for local businesses as part of Missouri Earthquake Awareness Week. Over 140 people were there to hear from geologists and engineers about earthquake risk, and it was clear that an event which last occurred in 1812 (New Madrid earthquake) seemed less remote after witnessing the impact of a Sumatra earthquake that last happened in 1883!

When natural disasters strike, we have a teachable moment—our science is suddenly very real to people and seems less removed from their daily lives. Television's ability to educate is limited by the short sound bytes that make up most news coverage, but even those rules were relaxed for this event because there was time to fill. Channels like Discovery or PBS can air relevant documentaries that will capture a larger audience than they otherwise would. ■

Recommended websites

USGS Earthquake Hazards webpage http://earthquake.usgs.gov/
NOAA webpage http://www.noaa.gov/tsunamis.html
NOAA will deploy 32 new advanced technology Deep-ocean Assessment and Reporting of Tsunami, or DART, buoys for a fully operational tsunami warning system by mid-2007
USGS Coastal Marine website on tsunamis http://walrus.wr.usgs.gov/tsunami/
Statistics on the Dec 26 Sumatra quake http://neic.usgs.gov/neis/eq_depot/2004/eq_041226/
http://earthquake.usgs.gov/eqinthenews/2004/usslav/
photos of damage http://walrus.wr.usgs.gov/tsunami/srilanka05/photos.html
Alaska remembers the 1964 tsunami and earthquake http://www.noaanews.noaa.gov/stories2005/s2409.htm

AAPG Young Professionals Plan Exhibit Hall Tour at OTC

The AAPG Young Professionals group, in conjunction with the HGS NeoGeos, will host a learning tour at the 2005 Offshore Technology Conference (OTC). With the goal of providing less-experienced geoscientists an opportunity to see and learn about operational oil field services and equipment, the tour will be particularly useful for geoscience professionals with little experience in operations.

The tour will be led by representatives of Halliburton, who will answer questions and cover as many aspects of oil field operations as possible including drilling, logging and production. HES (Halliburton Energy Services) will provide visitor passes for participants.

The tour will occur the morning of Wednesday, May 4, beginning at 9 a.m. and ending at about noon so participants will have the rest of the day to revisit items of particular interest in the exhibit hall or technical sessions.

The tour is open to all energy professionals. About 50 participants are expected. More can be included if interest demands, provided everyone pre-registers, so call early if you plan to attend. For more information and to register for the tour, contact Donna Riggs at AAPG (driggs@aapg.org or 800.364.2274). Detailed information on the OTC is available at www.otcnet.org.

2004–2005 Outstanding Student Awards

These outstanding students were selected by the geology department faculty of their respective universities. The students were presented a check and a commemorative plaque at the April General Dinner Meeting.

Outstanding Student Award

Carol Groze
Lamar University

Carol Lewis Groze is currently a junior geology major at Lamar University in Beaumont, Texas. She was born and raised on a farm in northern Illinois and graduated from JD Darnall High School in Genesseo, Illinois, in 1975. She returned to college after raising two children to complete her college career. Her desire for outdoor activities ans science has always been of interest to her, resulting in choosing the field of geology.

During her time at Lamar university, she has been on the President's List twice and is a member of the Lamar University Geological Society, currently holding the position of Secretary. After receiving a Bachelor of Science degree, she intends to pursue a graduate degree. Her interests are hunting, fishing, camping and hiking.

Outstanding Student Award

Alex Simms
Rice

It is a pleasure to write this letter on behalf of Mr. Alex Simms, who is our department's nominee for the 2005 HGS Outstanding student Award. I have been fortunate to have some very good PhD students in my career. Alex stands out among all my students as the most academically qualified and creative. He came to Rice with a 4.0 undergraduate grade point average, so we had high expectations of him from the start. We were even more impressed with Alex after we came to know him and had the opportunity to observe him conducting science. He has an exceptionally inquisitive and creative mind. He is also extremely competent in the more quantitative aspects of science, a rarity in young sedimentologists these days. Since coming to Rice he has taken very demanding courses in geology, geophysics and engineering and continued to maintain a perfect grade point average. He currently holds an NSF fellowship, which is quite an honor.

Alex has now reached that stage in his career when he is moving away from course work and undertaking full-time research. Being exceptionally bright and creative, it is no surprise that he has taken on more than one research project and is managing to balance these efforts extremely well. His original research project was a coastal geology project, specifically a study of the origin of the Corpus Christi Bay/Barrier complex. The objective of this research is to understand the response of linked barrier-bay systems to past climate and sea level change. I am confident that his work will serve as a basis for predicting coastal response to future changes in the rate of sea-level rise and climate change. Thus, this research has considerable societal relevance.

Alex has already submitted three papers to peer-reviewed journals, one on the origin of Corpus Bay, one on incised valleys, and another on the origin of Mustang Island. He is currently in Australia, working with Kurt Lambeck on a geohydroidal-isostatic model for the Gulf of Mexico.

Alex is a truly outstanding student. He has a bright future ahead and is well deserving of this award.

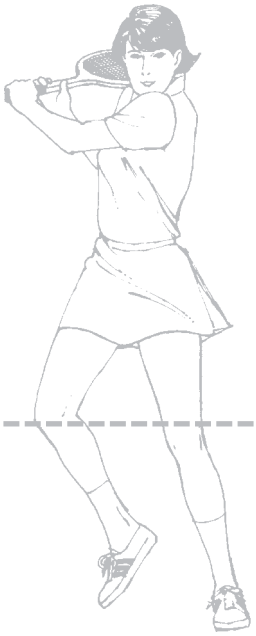
Sincerely
John B. Anderson
Maurice Ewing Professor of Oceanography

Outstanding Student Award

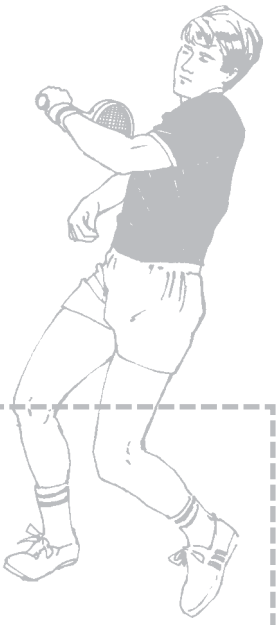
Lynn Holik
Sam Houston State University

Lynn is a senior at Sam Houston State University and will graduate in May with degrees in both geology and geography. In addition to being a full-time student, she is also a wife and mother of twin boys and works as an employee of the Harris County District Attorney's office. While attending SHSU, Lynn has been very active within the department of Geology and Geography. She has served as secretary of the Sam Houston Association of Geology Students (2001–2002) and as president of the Gamma Chapter of Gamma Theta Upsilon (2003–2005). In addition to her club activities, Lynn is a student teaching assistant for physical and historical labs and is currently working on two research projects. Her primary research is a sedimentary research project, under

Oustanding Student Award *continued on page 67*



HGS Tennis Tournament



Friday, May 20, 2005

Location: Houston Racquet Club
10709 Memorial Drive

Time: 11:45 a.m. to 5:00 p.m.

Prizes: Div. A & B Prizes

Send a check for $45.00 and entry form to: DAVIS BROS.
1221 McKinney, Suite 3100, Houston, Texas 77010
Attn: Ross Davis, Tournament Director
Call (713) 659-3131 with questions; Fax (713) 659-8070

Name: _____

Address: _____

Phone: _____ Work Phone: _____

Rank (A, A-, B): _____ E-Mail: _____

Houston's Society of Independent Professional Earth Scientists, Continuing Education Symposium

"How Small Companies Get BIG Value From 3D Seismic"

The latest Technology & Best Case histories - onshore US

The Latest on Geometric 3D Seismic Attributes	Professor Kurt Marfurt (UH)
Tying 3D Seismic to Rocks and Logs	Dr. Charlotte Sullivan (UH)
"Independent" Value of 3D Seismic	Hans Sheline (VeriNova)
Highlights from Denver 3D Seismic Symposiums	R. Randy Ray (R3 Exploration)

Also: **Seismic Contracts Overview, Core Examples, & Invited Best Case Histories**

September 13, 2005 7:45 am - 4:30 pm → Mark your Calendars!

Location: Houston Research Center of the Bureau of Economic Geology, 11611 West Little York Road (Off Hwy 290). Coffee, Snacks, and Catered Lunch Provided

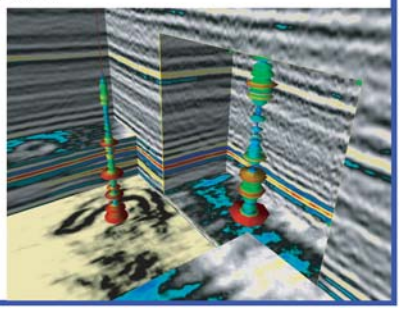
Cost: $250 (Walk-Ins); $225 Register by Sept 6; $150 by May 31 (-$25.00 Discount for **SIPES Members**)

Register NOW: Contact BK at Bkspee@aol.com (713-651-1639) with your:

Name, Company, Address, Phone, and Email.

Check for updates at: www.sipes-houston.org

Send Checks to: SIPES
1001 McKinney, Suite 801,
Houston, TX 77002



Oustanding Student Awards

continued from page 65

the direction of Dr. Chris Baldwin. A secondary project involves using the SEM to look for micro-organisms in the Jurassic Entrada and Navajo sandstones for Dr. Dennis Netoff. Lynn has received a number of honors and awards while attending SHSU, including the HGS Outstanding Student Award, the HGS Undergraduate Scholarship Award, the Cannon Geological Scholarship and the John H. Bounds Geography Scholarship. Lynn plans to join the work force following graduation. She hopes that her experiences in the work force will be as rewarding and memorable as the years she has spent at SHSU.

Outstanding Student Award

Marcy Stonecipher
Stephen F. Austin State University

Currently a senior at Stephen F. Austin State University, Marcy plans to graduate with a major in geology in May and pursue graduate studies in the fall semester. She is very active in all three departmental organizations, Geology Student Association, student chapter of American Association of Petroleum Geologists and Sigma Gamma Epsilon. Marcy currently serves as President of the Geology Student Association and as Secretary of SGE. She has been on the Dean's List for six semesters and was a Houston Geological Society Scholarship recipient during fall 2004. Marcy's hobbies include playing the guitar, camping and hiking.

Outstanding Student Award

Shannon Renee Bourque
Texas A&M University

Renee is a senior majoring in geology at Texas A&M University. She spent the summer of 2004 working in Utah at the Cleveland-Lloyd Dinosaur Quarry, and volunteering with the College of Eastern Utah's Prehistoric Museum. Renee has worked on two research projects with Dr. Philip Rabinowitz: one involving the use of GPR to locate and record dinosaur tracks in Colorado, and the second researching and cataloguing all DSDP and ODP sites containing the KT boundary. In March, she will present posters on each of the projects at the Texas Academy of Science. Renee has served as an officer in the Geology and Geophysics Society since 2003, currently as president. She is also a member of Delta Zeta, Aggie Speleological Society and the Geoscience Student Association. After graduation, Renee will enter a French Immersion program in Quebec, and then hopes to pursue a career in ground water hydrology.

Outstanding Student Award

Gabe Bever
University of Texas

Mr. Bever is a graduate student in paleontology, and his PhD supervisor is Prof. Chris Bell. Gabe Bever earned his BS in biology from Pittsburg State University in Pittsburg, KS, in 1991, and an MS in geology from Fort Hays State University in Hays, KS, in 2000. Prior to his graduate studies here at UT, he was a geology instructor at Barton County Community College (Great Bend, KS) in 1999, and Curatorial Assistant at the Sternberg Museum of Natural History in Hays, KS, from July 1999 to July 2000.

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.

Annual Dues Expire Each June 30.

Annual dues are $20.00; full-time students and emeritus members pay $10.00.

Mail this application and payment to:
Houston Geological Society
10575 Katy Freeway, Suite 290
Houston, TX 77024
Telephone: 713-463-9476 Fax: 713-463-9160

Payment method:

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

Card # _____ Expiration Date: _____

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:
❑ Active AAPG Others: _____

Professional Interest:
❑ Environmental Geology
❑ International E&P
❑ North American E&P (other than Gulf Coast)
❑ Gulf Coast E&P (onshore & offshore)

Membership Directory Preference
❑ CD Rom
❑ Printed

School _____
Degree _____ Major _____ Year _____

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 _____

rev. 5/5/2003

HGA *and* GeoWives **News**

HGA Annual Business Meeting and Luncheon

by Margaret Jones, President

HGA will complete the year on May 12 with a luncheon and musical program by The Kingsmen at the Briar Club. The chairperson is Lois Matuszak. She and her committee are planning a lovely meeting. The annual business meeting will be held at that time with the election of officers for the coming year 2005–2006. I congratulate in advance the new officers and directors on their election to these important positions. I wish a wonderful year for all of them. I hope many of the members will be there to participate in this important event.

HGA would like to invite all wives of HGS members, widows of HGS members and female geologists who are members of HGS to join the Houston Geological Auxiliary for the coming year 2005–2006. Membership forms are found in the *Bulletin*.

I would like to say thank you again to the chairpersons and committees for the September Dinner at Magic Island, the December Luncheon at the Lakeside Country Club and the Game Day on Valentine's Day at the Junior League. Also, I thank you for the Spring Style Show "Butterflies Are Free" with fashions by Harrold Powell at the Houston Racquet Club. We felt we learned the new slant on style after seeing the style show. Special thanks go to the Co-Chairs Shirley Gordon and Norma Jean Bacho and their committee.

We were saddened to lose two of our members this year: Kathryn Bennett and Nancy Remick, as well as former member Dot Cooke.

"Cinco-Mas" Bridge group will meet the second Thursday in May. Reservations can be made by calling Audrey Tompkins at 713-686-0005. Petroleum Club Ladies Bridge will meet the third Wednesday, May 18th. Those reservations can be made by calling Daisy Wood at 713-977-7319.

I can't let the year end without expressing my heartfelt appreciation to the Executive Board, Directors and chairpersons for their untiring efforts during this past year. Every member went beyond the call of duty to see that everything went smoothly.

Thanks to the following Executive Board Members:
Norma Jean Jones, President-Elect
Sally Blackhall, First Vice-President-Programs
Debra Munsell, Second Vice-President
Vicky Pickering, Third Vice-President-HGA Liaison
Edythe Bishop, Secretary
Jean Allred, Treasurer
Millie Tonn and Mary Kae Dingler, Historian/Photographer
Betty Alfred, Parliamentarian/Past President
Stephanie Levine, wife of HGS President, Steve Levine

Thanks to the Directors:
Betty Alfred, Elinor Macmillan, Geneva Quigley and Mikki Ledbetter Wunderle.

Thanks to Committee Chairpersons:
Gwinn Lewis, Yearbook
Debra Munsell, Membership
Dene Grove and Connie Griffith, Notification
Mary Harle and Janice Haye, Courtesy
Winona LaBrant Smith, Editor of the Eclectic Log
Vicky Pickering, Substitute Office Service (SOS)
Daisy Wood, Game Day
Audrey Tompkins, "Cinco-Mas" Bridge group
Daisy Wood, Petroleum Club Ladies Bridge group
A new committee, Transportation, was formed to provide transportation for our members who no longer drive and cannot attend unless some arrangement is made for them. Former President Edie Frick responded to the challenge and has done a beautiful job as chairperson in this capacity.

The 2005–2006 HGS/HGA Distinguished Service Award is presented to Shirley Gordon. We thank her for many years of service to our organizations.

I ask you to join me in welcoming Norma Jean Jones as our new President. May she have a wonderful year.

I want to let all of you know it has been an honor to be your President this year 2004–2005. This is a great organization and here's hoping it will continue for many years to come.

Best wishes to all of you for a wonderful summer.

Margaret

GeoWives Annual Business Meeting and Luncheon

by Debra Munsell, President

The GeoWives' annual luncheon and business meeting will be held on Thursday, May 19, at Cohen House, the faculty club at Rice University. Come and join us in welcoming the new 2005–2006 GeoWives officers. The Co-Chairs are Martha Lou Broussard and Anne Rogers.

We have had a very good year 2004–2005 with activities including the Social Brunch at Dene Grove's home in September, the HGS Shrimp Peel at Sam Houston Race Park in October, the METRORail train ride to downtown Houston in November, Christmas caroling at Tremont **HGA and GeoWives** *continued on page 70*

HGA and GeoWives News continued from page 69

Retirement Community in December, Pot Luck Luncheon at Dene Grove's home in January, Master Gardener program in February at Memorial Drive Presbyterian Church, a program on India in March at Lois Matuszak's home that was very educational as well as entertaining, and the annual trip to study Texas history in April with a drive to Nacogdoches. The Play Reading group enjoyed meetings this year under the leadership of Lois Matuszak.

Members give a very big thanks to all the officers and committee persons for a great year of fun, fellowship, and activities.

Thanks to the Officers:
Dene Grove, First Vice-President
Susan McKinley, Second Vice-President
Linnie Edwards, Secretary
Janet Steinmetz, Treasurer

Thanks to Committee Chairpersons:
Janet Godfrey, Notification
Lois Matuszak, Courtesy
Adrian Lewis, Yearbook

Please join us in September for the beginning of another fun-filled year 2005–2006 with our new slate of officers.

Membership forms are found in the *Bulletin.*

As a member you are invited to join

GeoWives

2005–2006 dues are $7.50

make check payable to *GeoWives* and mail to:

Dene Grove
12715 Pebblebrook
Houston, Texas 77024

Please provide the following

Name: _____

Sreet Address: _____

_____

City/State/Zip: _____

Telephone: _____

email: _____

I will help plan a GeoWives activity ☐
I will serve on a committee ☐
Notification / Phone Committee ☐
Courtesy / Hostess ☐
My home is available for a meeting ☐

You are invited to become a member of

Houston Geological Auxiliary

2005–2006 dues are $20.00

make check payable to *Houston Geological Auxiliary* and mail to: Margaret Jones • 1407 Lakecliff Dr • Houston, Texas 77077

HGA YEARBOOK INFORMATION

Last Name	First Name	Name Tag
Spouse Name	**Name Tag**	**HGS Members Company**
Home Phone ( )	**Business Phone** ( )	**Business Fax** ( )
Street Address	**City**	**Zip**
Birthday, Month, Day ONLY	**Email Address**	**Home Fax** ( )

PETROLEUM SYSTEMS OF DIVERGENT CONTINENTAL MARGIN BASINS

25TH Annual GCSSEPM Foundation
Bob F. Perkins Research Conference
December 4-7 2005, Houston Marriott Westchase

The majority of recent and projected future discoveries of giant hydrocarbon fields occur in petroleum systems associated with divergent continental margin basins. Consequently, an improved understanding of these basins is increasingly important as targets are sought in what may be the last exploration frontiers capable of holding giant reserves.

Divergent continental margin basins typically exhibit rift, rift-to-drift, and passive margin stages in their evolution; major accumulations occur in each of these stages. As the location and type of traps and petroleum systems vary with basin location and stage of evolution, an analysis of each stage provides a framework focusing on the evolution of the architectural development and stratigraphic progression that may be used as analogs and applied to other basins in similar stages of development.

Currently 51 papers have been accepted for oral presentation and 3 papers for poster-only presentation. As in the past, our registration fees will include conference CD, ice breaker, meals, and refreshments. A listing of papers and abstracts will be posted on our website.

For More Information, Check our Web Site at www.gcssepm.org or call Foundation Headquarters at 281-586-0833.

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Check Out Our Upcoming Training Schedule

June, 2005		
2-3	AVO, Rock Physics and Inversion	Houston, TX
6-7	Logbust™ Computer Application of Multiple Bischke Plot Analysis	Houston, TX
8	Maps, Positions & Grids	Houston, TX
9-10	Quick Look Mapping Techniques For Prospect Evaluation	Houston, TX
July, 2005		
11-15	Advanced Subsurface Structural Geology	Houston, TX
27-29	Basics of the Petroleum Industry	Houston, TX
August 2005		
10-11	Salt And Clastic Sediments	Houston, TX
15-19	Cased Hole and Production Log Evaluation	Houston, TX
22-26	Applied Subsurface Geological Mapping	Houston, TX

Subsurface Consultants & Associates, LLC

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