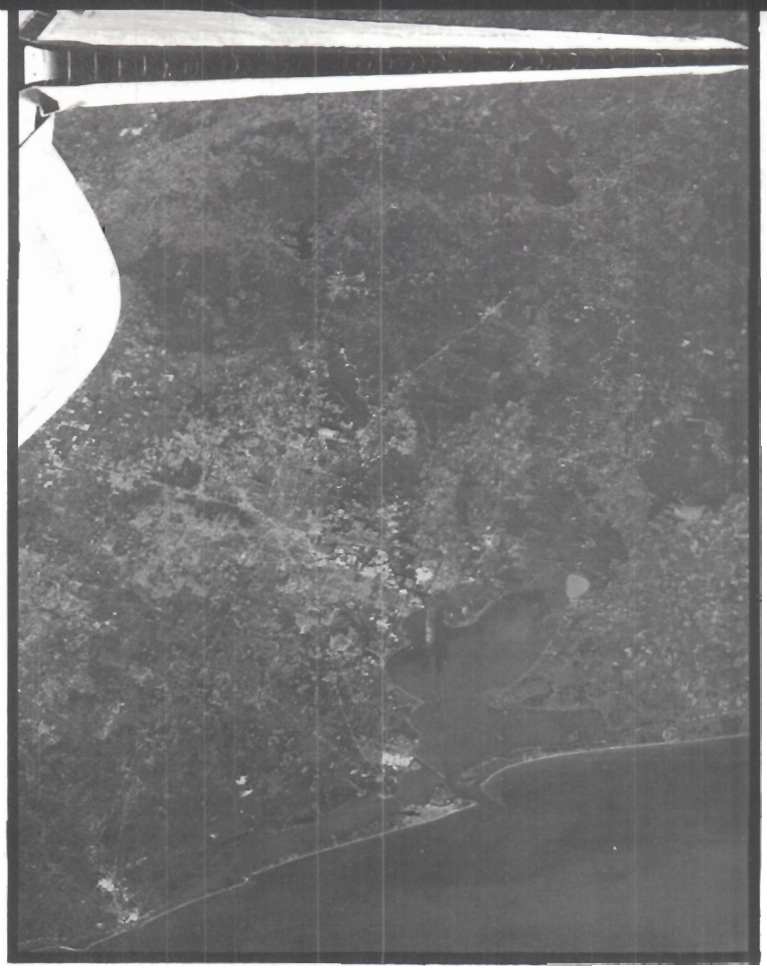
April, 1990

BULLETIN

HOUSTON GEOLOGICAL SOCIETY

Volume 32

Number 8



NOMINEES FOR HGS OFFICES See page 27

EUROPE BECKONS! See page 34

IN THIS ISSUE...

PLUS MORE!

(For April Events, see page 1 and Geoevents section, page 33)

HGS APRIL EVENTS

MEETINGS

APRIL 9, 1990 (Dinner Meeting)
"Reservoir Architectural Styles and Recovery Response"
Noel Tyler (see page 10)
Westin Oaks Hotel, 5011 Westheimer
Social Period 5:30 p.m., Dinner and Meeting 6:00 p.m.
Reservations made by name only, telephone **785-6402.** Must be **made** or **cancelled** by **noon Friday, April 6.**

APRIL 11, 1990 (Business Meeting)
HGS ENVIRONMENTAL/ENGINEERING GEOLOGISTS
"Petrochemical Systems, Inc.: Superfund Site: RI/FS"
Lana Spencer, LAN
Charlie's Hamburger Joint, 2222 Ella Blvd.
6:00 p.m. (Buy your own dinner)

APRIL 18, 1990 (Dinner Meeting)
HGS INTERNATIONAL EXPLORATIONISTS
"Divergent Margin Basins"
John D. Edwards (see page 13)
Westin Oaks Hotel, 5011 Westheimer
Social Period 5:30 p.m., Dinner and Meeting 6:30 p.m.
Reservations by advance ticket purchase only (see page 13). Purchase tickets by **Monday, April 16, 1990.**

APRIL 25, 1990 (Luncheon Meeting)
"Geology and the Environment as Seen From Low Earth Orbit"
Gary Kratochvil (see page 10)
Houston Club, 811 Rusk
Social Period 11:30 a.m., Lunch and Meeting 12:00 noon.
Reservations made by name only, **telephone 785-6402.** Must be **made** or **cancelled** by **noon Monday, April 23, 1990.**

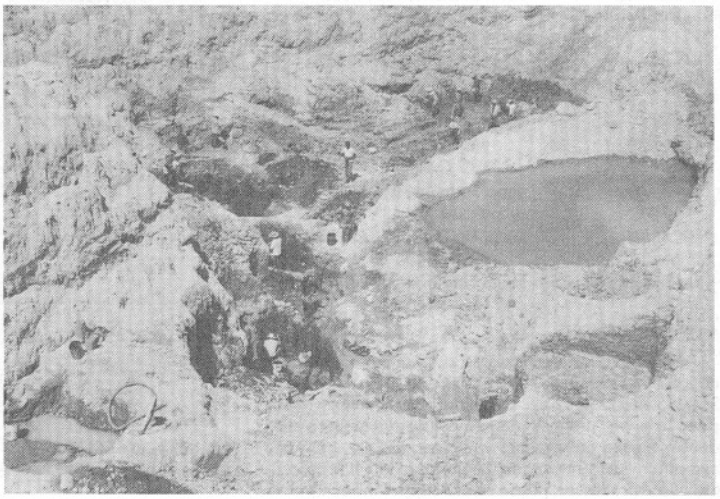
Heart Mountain, Alberta, Canada. Part of Rocky Mountain thrust.
Photo courtesy of Shafe Alexander, Amoco.

SEMINARS, COURSES, CONVENTIONS, AND ENTERTAINMENT

APRIL 7, 1990 (Field Trip)
HGS Environmental/Engineering Geologists
"West Harris County Groundwater from Inception to Disposal"
Memorial City Parking Lot
7:50 a.m. - 5:00 p.m. (see page 18)

APRIL 11, 1990 (Short Course)
"Recent Sediments of the Northwest Gulf Coast Region"
Rufus LeBlanc
Exxon Auditorium, Exxon Bldg.
800 Bell Street
8:30 a.m. - 4:30 p.m. (see page 32)

APRIL 21, 1990 (Field Trip)
"Recent Sediments of Southeast Texas"
Rufus LeBlanc
Rice Stadium
8:00 a.m. (see page 16)



Surface mining for precious opal. State of Piaui, Northeast Brazil.
Photo courtesy of Shafe Alexander, Amoco.

HOUSTON GEOLOGICAL SOCIETY

BULLETIN

Vol. 32, No. 8 April, 1990

CONTENTS

DEPARTMENTS

COLUMNS/ARTICLES

PRICE SCHEDULE— APRIL MEETINGS

(Non-members: add $2.00 to the meal price)

HGS Dinner Meeting
Westin Oaks Hotel, April 9 ..... $20.00

International Explorationists
Dinner Meeting
Westin Oaks Hotel, April 18 ..... $20.00

HGS Luncheon Meeting
Houston Club, April 25 ..... $15.00

RESERVATIONS POLICY

Reservations are made by calling the HGS office (785-6402). At the meeting, names are checked against the reservation list. Those with reservations will be sold tickets immediately. **Those without reservations will be asked to wait for available seats, and a $2 surcharge will be added to the price of the ticket. All who do not honor their reservations will be billed for the price of the meal.** If a reservation cannot be kept, please cancel or send someone in your place.

The Houston Geological Society office is located at **7171 Harwin, Suite 314, Houston, Texas 77036.** The telephone number is **(713) 785-6402.**

COLUMNS/ARTICLES

COVER PHOTO

Houston, Texas, as seen from the Space Shuttle "Atlantis" at an altitude of 270 nautical miles on October 6, 1985. The Orbiter was in a "tail down" attitude, or nose pointing away from the Earth. The vertical stabilizer and OMS pod are visible in the corner of the photograph. This photograph was taken using an Aero Linhof 4 inch × 5 inch format camera equipped with a 250 mm lens.

FUTURE HGS MEETINGS (May)

MAY 14, 1990 (Dinner Meeting)
"Paleogeographic Reconstruction - Exploration Applications"
Chris Scotese

MAY 15, 1990 (Seminar)
HGS Environmental/Engineering Geologists
"Geophysical Applications for Environmental and Engineering Site Assessments"
Tom Dobecki (see page 18)

MAY 16, 1990 (Dinner Meeting)
HGS International Meeting
"Tectonics and Paleogeographic Settings of Northeast Asian Hydrocarbon Systems"
Ken O. Stanley and Bill L. Lindemann

MAY 18, 1990
Quantitative Mapping Techniques
Daniel J. Tearpock and James Z. Harris (see page 43)

MAY 19, 1990 (Field Trip)
3-D Seismic Data Acquisition
(with Geophysical Society of Houston)
(see pages 34 and 42)

MAY 30, 1990 (Luncheon Meeting)
"Climate and Predictive Stratigraphy"
Matt Matthews

HOUSTON GEOLOGICAL SOCIETY
7171 Harwin, Suite 314 Houston, Texas 77036
(713) 785-6402

—EXECUTIVE BOARD—

President	**Richard S. (Dick) Bishop**, Exxon Prod. Research	973-3323
President-Elect	**Ronald W. (Ron) Harlan**, BHP Petroleum	780-5032
Vice President	**Cyrus (Cy) Strong**, Shell Western E&P	870-2129
Secretary	**Paul F. Hoffman**, Ladd Petroleum	622-6911
Treasurer	**Larry D. Bartell**, Bartell Exploration	277-8355
Executive Committeeman ('90)	**David C. (Dave) Callaway**, Arco Oil & Gas	584-3445
Executive Committeeman ('90)	**F. Kenneth (Ken) Aitken**, Pennzoil	546-8759
Executive Committeeman ('91)	**Richard R. (Dick) McLeod**, Independent	222-7617
Executive Committeeman ('91)	**Joseph S. (Scott) Laurent**, Preston Oil	951-9657

—COMMITTEE CHAIRMEN—

Academic Liaison	**John Chronic**, Consultant	933-0371
Advertising	**W. Don Neville**, Gulfstar Petr. Co.	655-9666
Awards and Student Loans	**Barbara P. Bentley**, Amoco Prod. Co.	556-4451
Ballot	**Nancy I. Benthien**, Marathon	629-6600
Boy Scouts	**Edward D. (Dan) Helton**, Midcon Services	963-3537
Bulletin	**George E. Kronman**, Amoco	556-4452
Computer Applications	**Kari K. Rekoske**, Elf Expl.	739-2312
Continuing Education	**John M. Biancardi**, Consultant	937-8457
Entertainment	**Robert C. Ahlborn**, Independent	376-0505
Environmental & Engineering	**Robert B. Rieser**, Groundwater Tech.	463-6151
Exhibits	**Gerald A. Cooley**, PetCons & Assoc.	665-8432
Field Trip	**Martin J. Oldani**, Sandefer Oil & Gas	651-1551
Finance	**David A. Fontaine**, Consultant	975-0202
Historical	**Gary Snyder**, GECO Geophysical	596-1871
International Explorationists	**Denise M. Stone**, Amoco	556-4207
Library	**Evelyn Wilie Moody**, Consultant	654-0072
Membership	**Bruce A. Falkenstein**, Amoco	556-2038
Nominations	**Dietmar (Deet) Schumacher**, Pennzoil	546-4028
Personnel Placement	**Steven H. Brachman**, BP Exploration	552-3850
Publications	**William A. Hill**, Arco Oil & Gas	584-6436
Publications Sales	**Thomas T. Mather**, Columbia Gas	787-3400
Public Relations	**Gerald D. Prager**, Energy Development	757-0812
Remembrances	**Renee Elosegui**, Petroleum Information	961-5660
Research	**Kathy A. McDonald**, Exxon Co. USA	591-5307
Technical Program	**Cyrus (Cy) Strong**, Shell Western E&P	870-2129
Transportation	**Gregory K. Burns**, Coastal Oil & Gas	877-7807

—SPECIAL REPRESENTATIVES—

Advisor, Museum of Natural Science	**Morgan J. Davis, Jr.**, Consulting Geologist	461-1817
Arrangements	**John A. Adamick**, TGS Offshore	951-0853
GCAGS Representative	**Richard S. (Dick) Bishop**, Exxon Prod. Research	973-3323
GCAGS Alternate	**Ronald W. (Ron) Harlan**, BHP Petroleum	780-5032
AAPG Delegate Foreman	**Synthia E. Smith**, Exxon USA	775-6278
AAPG-DPA Representative	**Albert F. Allong**, Consultant	495-2012
AAPG Group Insurance	**Barbara & John D. Bremsteller**	751-0259
Memorial Scholarship Board Chairman	**C.R. (Chuck) Noll, Jr.**,New Bremen.Corp.	621-9558
HGS Foundation Chairman	**Merrill W. Haas**, Consultant	468-1906
Engineering Council of Houston Representative	**Claudia P. Ludwig**, Consultant	723-1436

—HOUSTON GEOLOGICAL AUXILIARY—

President	**Mrs. Charles E. (Myrtis) Trowbridge**	468-3161
President-Elect	**Mrs. Stuart (Mary) Folk**	781-2336
First Vice President (Social)	**Mrs. Robert C. (Geri) Pace**	855-7655
Second Vice President (Membership)	**Mrs. James C. (Theresa) Barker**	782-2754
Third Vice President (HGS Rep.)	**Mrs. Gerald A. (Jeanne) Cooley**	665-8432
Secretary	**Mrs. William B. (Joree) Hill**	474-7045
Treasurer	**Mrs. Charles E. (Linnie) Edwards**	785-7115

The Houston Geological Society *Bulletin* is published monthly September through June by the Houston Geological Society, 7171 Harwin, Suite 314, Houston, Texas 77036. Subscription to the *Bulletin* is included in membership dues ($15.00 annually). Subscription price for non-members within the contiguous U.S. is $15.00 per year and $30.00 per year for those outside the contiguous U.S. single copy price is $2.50. Subscriptions received after March 1, will be applied to the remainder of the fiscal year (ending with the June issue) and also to the following year.

The Houston Geological Society was founded in 1923 and incorporated in 1975. The Society's objectives are to stimulate interest and promote the advancement of geology in this area, to disseminate and facilitate discussion of geological information, and to enhance professional interrelationships among geologists. The Society includes nearly 4500 members locally and publishes special scientific publications in addition to a monthly *Bulletin*. The HGS als provides student scholarships and continuing education programs for professional geologists.

PRESIDENT'S COMMENTS

Folks, it's time to sit up and take notice. A small group of dedicated, resourceful, and insightful Houstonians just put on a landmark convention. Houston GEOTECH, 1990, attracted almost 1500 attendees. This was almost as large as the 1989 GCAGS.

This is an important point in exploration history because we are witnessing both the birth of a new technology and the movement of computer applications from "high tech" to "everyday tech". Although its applications will be slower, horizontal drilling will be to the nineties what bright spots were to the seventies. In addition, all of us soon will expect, rather than be surprised at, computer applications in exploration.

This GEOTECH is also significant because it shows both the attractiveness of clearly focused, topical programs and that we can effectively integrate disparate disciplines. Furthermore, it reaffirms the remarkable accomplishments that are possible from unpaid but dedicated volunteers.

Next time you see the organizers of GEOTECH (**Steve Starr**, **Jeanne Fisher**, **Judy Schulenberg**, **Gary Branson**, **Magge Abraham**, to name a few), give them a pat on the back.

*****

That time flies is not news but the fact that it's already time for another HGS election surprised me. Please take a few moments to peruse the candidates in this issue of the *Bulletin*. Thanks go to **Deet Schumacher** and the nominating committee for not only finding these candidates but for continuing the standard of excellence.

Historically, the HGS voter participation is similar to the rest of American society: about 20 percent. This indifference is somewhat understandable because all of the candidates have the judgment, expertise, energy, and willingness to serve. Nonetheless, your opinion shapes this society and you have an obligation to express it. Last year, only two votes decided one of the races (yes, they were recounted) so remember that your voice does make a difference..

*****

News Flash! HGS benefits offset dues increase. This month each member will receive two free tickets to the Houston Astros. The letter explaining the details will be included with your ballot. We still have some loose ends to settle (I'm writing this in February) but look to the May issue of the *Bulletin* for late details. The game probably will be a weekday in mid-May. The HGS won't sit together as a group but will receive "best available seating" whenever the voucher is turned in (perhaps on game day).

This is a no-strings-attached promotion sponsored entirely by the Houston Sports Association. Tell them thanks.

*****

The HGS is noted for many things and like any successful organization, it has an outstanding trait: leaders everywhere. All of you can recognize them and, although examples abound within our Society, a few will make the point: **John Hefner** building new bookshelves at the HGS office; **George Kronman** organizing a leadership seminar, **Bruce Falkenstein** arranging for two round trip tickets to Amsterdam in the membership drive (details are elsewhere in the Bulletin), **Clint Moore** proposing and organizing Guest Night at the IMAX (see the ad elsewhere), **Team Mather (Tom and Annette)** finding new ways to utilize the HGS publications inventory, and on and on. This willingness to offer leadership is a trait which characterizes many cultures on this planet and is a distinction between dynamic and bureaucratic professional organizations.

PRESIDENT'S COMMENTS

Continued from page 7

The HGS has roughly 30 committees and perhaps 300 active committee members. Recognizing individual contributions is logistically difficult but all of us are deeply indebted to these leaders. Therefore, I ask each of you, on occasion, to express your appreciation (or better yet, join them). To all of you 'unnamed leaders', please accept our collective gratitude.

*****

More good news comes from **Steve Brachman**, chairman of the Personnel Placement Committee. Steve received more than 32 requests for resume's in January and February; many of these were for persons with more than 10 years experience. It's significant testimony to Steve's effectiveness that employers now regularly look to the HGS placement services. Congratulations, Steve.

*****

Happy days, folks. It took **Dick McLeod** an uncounted number of lunches to find the right person but the HGS at long last has a chairman for New Publications. Arco's **Bill Hill** is responsible for finding and organizing existing technical material for the HGS to publish. The plan is to locate those nonconfidential materials that would be helpful to the HGS membership. Hopefully the HGS will publish topical interpretations and the authors will enjoy the fruits of their labor in a timely fashion (i.e. one year or less). Currently in the mill are regional structure maps, regional cross sections, and a paper on deep water sediment transport (by Emiliano Mutti). If you have something appropriate, give Bill a call.

*****

The demands on **John Chronic**'s Academic Liaison committee continue to increase. John is receiving requests for speakers to secondary schools at the rate of more than one per day and we cannot meet the current requests. Please volunteer, or find a volunteer, if you can.

Many of you are aware of, and concerned about, the decline of science majors in general and the precipitous decline of earth science majors in particular. The HGS sponsors the AAPG student chapter at Texas A & M and part of our support includes annually inviting the students to present posters at a spring evening meeting. We are delighted they will do so at our April meeting.

At the same time, the HGS also will recognize outstanding students from 6 area universities. This is an excellent opportunity to see some good science, to reacquaint ourselves with campus activity, and to meet our future members.

Please join us.

DICK BISHOP

EDITOR'S COMMENTS

DESK TOP PUBLISHING ARRIVES

Desk Top Publishing (DTP) has come to the HGS *Bulletin*. Members of the HGS Computer Applications Committee, along with several other volunteers are gradually getting set up to use our *Ventura Publisher* program along with the HP Laserjet Printer to output *Bulletin* copy. We have located a DTP font that is the same as that used by Four Star (our current printer), so we can gradually add articles without any noticeable difference, even if copy from the two different sources appears on the same page.

The Presidents Comments was the first article to be printed with DTP. This was because Dick Bishop provided the *Bulletin* Editors with his comments on a floppy disk so the transition to the printed output was quite easy. Bill Eisenhardt's Exploration Activity Review was the next column to go to DTP. Rather than typing his Review data, Bill now comes to the HGS office each month and enters the Review data into the HGS word processor. This simplifies both his job and that of the DTP crew. Several articles have been added this month by use of our scanner to produce computer code. This is faster and easier than re-keying the data, but considerable time is needed to correct mistakes that the scanner makes.

We would like to ask all other *Bulletin* contributors to please **submit their copy on floppy disks** too. This really speeds up the process of publishing your article. If you have done a good job of proofreading your material, our editing job is minimized because no further errors are introduced by re-keying the text. The expenses of keying the text are also eliminated.

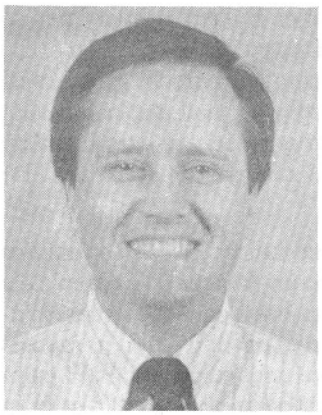
Last year, a proposal was made that the *Bulletin* be entirely done with DTP, and plans were to implement DTP completely by the end of this year. Start-up has been slower than anticipated, but with more volunteers coming forth, it appears we may well be as far along as we originally planned. If plans are fulfilled, the 90-91 *Bulletin* will be published entirely from the HGS office. Camera ready copy will be provided for every article in all issues of the *Bulletin*.

Do you have a burning issue on your mind that you would like to share with your fellow professionals? Consider sending a "Letter to the Editor" to the *Bulletin*! We welcome all comments and thoughts! Broader issues, such as registration of geologists or educational requirements to remain certified would be especially welcomed. If you have more to say than can fit in a "Letter to the Editor", consider writing an Opinion article .

MEETINGS

HGS DINNER MEETING—APRIL 9, 1990

NOEL TYLER—Biographical Sketch



Noel Tyler is Program Coordinator for Oil Recovery Research at the Bureau of Economic Geology, and lecturer in Geological Sciences at The University of Texas at Austin. Noel joined the Bureau in 1981 after receiving his PhD from Colorado State University. For the past nine years he has been working on developing models of reservoir architecture in a variety of reservoir types, and evaluating their utility in predicting fluid flow and the location and volumes of unrecovered hydrocarbons. He has published several papers on this subject and is active in teaching continuing education courses in the field of reservoir characterization. Noel was recently named Director of the new Center for State Lands Energy Resource Optimization, a research consortium of state universities, headquartered at the University of Texas at Austin.

RESERVOIR ARCHITECTURAL STYLES AND RECOVERY RESPONSE

Ultimate recovery from Texas oil reservoirs at current technological and development levels is projected to be 36 percent of the oil in place. Thus, of the 165 billion barrels (Bbbl) of oil discovered statewide, 106 Bbbl will remain in existing reservoirs after recovery of proved reserves. This remaining resource is composed of residual oil (71 Bbbl) and mobile oil (35 Bbbl). The remaining mobil oil is conventionally recoverable but is prevented from migrating to the well bore by intrareservoir seals or bounding surfaces.

Reservoir architecture, the internal fabric or structure of reservoirs, governs paths of fluid migration during oil and gas production. Reservoir architecture is, in turn, the product of the depositional and diagenetic processes responsible for the origin of the reservoir. Therefore, if an understanding of the origin of the reservoir is developed, reservoir architecture, and hence, the paths of fluid migration, become predictable. Thus, with greater understanding of the fabric of the reservoir and its inherent control on the paths of fluid flow, we can more efficiently design and implement advanced recovery strategies.

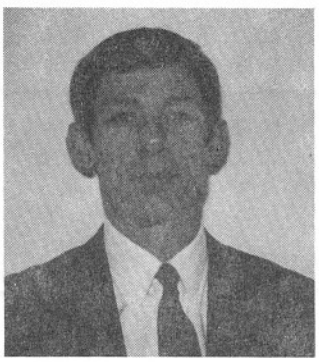
Reservoirs can be assigned to a relatively small number of depositional systems. These depositional systems, and their component facies, are characterized according to varying degrees of lateral and vertical heterogeneity. For example, fluvial-dominated deltas display a high degree of lateral heterogeneity; in contrast, wave-dominated deltas are characterized by very low lateral heterogeneity. Highly stratified restricted-platform carbonate reservoirs in the Permian Basin contrast with Gulf Coast strandplain sandstones that are relatively simple in vertical character.

NOTE RESERVATION POLICY ON PAGE 2

Reservoirs of different depositional origins can therefore be categorized into a "heterogeneity matrix" on the basis of varying intensity of vertical and lateral heterogeneity. The utility of the matrix is that it allows prediction of the nature and location of remaining mobile oil. Highly stratified reservoirs, for example, will contain a large proportion of bypassed oil; thus, an appropriate recovery strategy will be waterflood redesign and profile modification. Laterally heterogeneous reservoirs would benefit from targeted infill drilling and, possibly, horizontal wells. Potential for advanced recovery of remaining mobile oil through heterogeneity-based recovery strategies in Texas is projected to be an incremental 16 Bbbl. In the lower 48 states this target may be as much as 45 billion barrels (AAPG, 1989).

HGS LUNCHEON MEETING—APRIL 25, 1990

GARY L. KRATOCHVIL, Lieutenant Colonel, U.S. Army—Biographical Sketch



Gary L. Kratochvil graduated with a BS degree in Geology from the University of Alaska, Fairbanks, Alaska in 1969 and was commissioned to active duty in the U.S. Army. Military duties have included combat in Vietnam as a cavalry lieutenant and subsequent assignments as a staff officer and command of military intelligence companies. The Army afforded him an opportunity to undertake a masters degree in geology at the Colorado School of Mines, Golden, Colorado. Following graduation in 1987, assignments included teaching terrain analysis, geology, and geomorphology at the U.S. Military Academy at West Point and command of the Eighth U.S. Army Tunnel Neutralization Team in the Republic of Korea. That team is charged with the mission to employ geophysical means to search for and locate tunnels constructed by the North Koreans to breach the Korean Demilitarized Zone.

Since June 1987, Gary has been assigned as the Geological Science Advisor to the Astronaut Office and Space Shuttle Operations Program at NASA's Johnson Space Center, Houston, Texas. Duties there have included teaching geology and photointerpretation to astronauts; conducting geotechnical evaluations of Shuttle landing facilities, including the Rogers dry lakebed at Edwards Air Force Base, California; and formulating experiments in Earth observation to be flown aboard the Shuttle.

GEOLOGY AND THE ENVIRONMENT AS SEEN FROM LOW EARTH ORBIT

Astronauts aboard each mission of the Space Shuttle record some 2,000 hand-held 70 mm and 4 inch × 5 inch format still-camera photographs of terrestrial, marine, and atmospheric phenomena. Photographs are taken from flight altitudes of 110 to 330 nautical miles depending upon specific primary payload mission profiles. Variable altitude, coupled with the flexibility to photograph from nadir to Earth limb perspective using a variety of camera lenses and film types, has provided an extensive library of dramatic Earth views. These beautiful photographs, many with ground resolution to less than 10 meters, are public-domain data available to private citizens at little more than the cost to produce a 35 mm slide or color print.

This presentation offers a series of slides to illustrate the dramatic perspective of Earth afforded our astronauts as they orbit in the Space Shuttle. Views include some of the classic geological features on the Earth's surface, immense tropical storms, colorful oceanographic features, and documentation of subjects of environmental concern. Fundamentals of orbital mechanics and Shuttle crew activities will also be discussed to provide an understanding of the geographic distribution of photo coverage and the frequency of site revisit afforded by the Space Shuttle.

POSTER SESSIONS

April 9, Monday evening
"Student Night"

Posters have been solicited from local universities. We expect a large turnout, including many from the HGS - sponsored AAPG Student Chapter at Texas A&M.

Brogdon, Ron - "Distribution of the Lower Woodbine/ Eagleford Sandstones in IDS Field, Brazos Co., Texas."

Davidoff, Andy - "Evidence for a Deep Mesozoic Basin in Central East Texas."

Franklin, Stan - "Diagenesis of the Dakota Sandstone."

Golding, Bob - "Controls on Deposition of the Upper Eagleford A & B Sandstones, Brazos Co., Texas."

Hinds, Greg - "Interpretation of Well Log Response in the Austin Chalk."

Kantaatmadja, Budi - "Reservoir Characterization of the Bekasap "A" Sandstones in Kotabatak Field, Riau, Sumatra, Indonesia."

Malisce, Ariel - "Diagenesis of the Shattuck's Reservoir and Non-Reservoir Sandstone."

Smith, Tad - "Meteoric Alteration of Early Formed Dolomite: Isotopic, Trace Element, and Petrographic Data."

Tandircioglu, Ahmet - "Well Log Interpretation of Carbonate Reservoirs with Bimodal Porosity."

May 14, Monday evening

"Computer Applications/Development Geology." We hope to have some posters showing software for mapping programs and for log-analysis applications; maybe a field study or two.

Anyone wishing to contribute a poster at the appropriate session is asked to call Pat Gordon, 654-5919.

EIGHTH THEMATIC CONFERENCE ON REMOTE SENSING FOR EXPLORATION GEOLOGY
April 29-May 2, 1991
Denver, Colorado, USA

If you have any questions or need additional information, please contact Robert H. Rogers, Chairman, Thematic Conference or Nancy Wallman, the Conference Coordinator at (313) 994-1200, extension 3234. Our Fax number is (313) 994-1575.

INTERNATIONAL EXPLORATIONISTS

Chairman's Column

As many of you might recall, back in August 1989 you responded to a questionnaire canvassing your opinion on the feasibility of a new AAPG Workshop entitled: ANNUAL WORLDWIDE EXPLORATION EVALUATION. To summarize the results of that effort, there was an 80% response and it was overwhelmingly positive. Your ideas are still being digested and the 'workshop' is being considered for the early 1990s in either Houston (co-hosted by our Group) or London. Thanks to everyone who participated for making the effort a success. The time and effort you took in responding is proving very valuable to AAPG for future planning, and has shown that the brainstorming of HGS International Explorationists is a great resource.

The proposal, in summary, was that AAPG sponsor an ANNUAL WORLDWIDE EXPLORATION EVALUATION WORKSHOP. We asked: Is there a need for this? Would your company send representatives? What are the pros and cons of the idea? The main purposes of the workshop would be as follows: 1) to review results of recently drilled wells, as presented in the Drilling Development Annual Issue of the AAPG Bulletin. The Workshop would present the material in a technical format and include more geology; 2) to involve presenters from around the world, with wide geographic and geologic expertise; 3) and to provide updated information on the non-geologic aspects of international exploration that require management consideration, e.g., changes in international law, economic variables, political climates, etc.

Gary Howell, AAPG International Development Director, and I formulated the questionnaire and sent it to some of the most active members of our group with the objective of reaching the maximum possible number of companies. In recent years, AAPG has been 'bouncing ideas' off HGS International Explorationists to improve service to its members who are working and/or living abroad. We were impressed by the thoughtfulness of the responses we received, and expect that they will prove very valuable in influencing some future AAPG decisions.

The single biggest concern mentioned by over one-third of the respondents was that specific confidential exploration data would not be released for presentation at an annual meeting. This is probably true to a great degree, however, the goal would be to obtain management support for the spirit of the meeting (which is now being addressed by AAPG), and to include in the program data being publicly released for the first time whenever possible. Obtaining cooperation of foreign governments and national oil companies would be essential to the success of the program and could be handled in part by AAPG.

Additional valuable comments and recommendations were that we establish a management advisory board, present international statistics, have poster sessions, videotape sessions for viewing by those who can't attend, publish transactions, don't call it a 'workshop', organize the agenda by basinal trends, include the whole thing in the AAPG annual meeting, etc. All these and more are being considered carefully by Gary Howell and the AAPG staff.

Any further comments HGS *Bulletin* readers would like to make on this topic should be forwarded to either myself or Gary Howell, AAPG Director of International Development, in Tulsa. More input is welcome and encouraged! Membership opinion surveys of this kind can only improve the fine services our organization already provides. We may be seeing more of them in the future.

DENISE M. STONE

INTERNATIONAL EXPLORATIONISTS DINNER MEETING—APRIL 18, 1990

JOHN D. EDWARDS—Biographical Sketch

Dr. John D. Edwards is currently a geology lecturer at Fort Lewis College, Durango, Colorado and an active member of the American Association of Petroleum Geologists. He was honored as a 1989-1990 AAPG Distinguished Lecturer, on his talk entitled Divergent Margin Basins.

Dr. Edwards holds a BS in Mechanical Engineering from Cornell University in Ithaca New York and a MS and PhD, both in Geology, from Columbia University in New York. He began his geological career as a field geologist with the United States Geological Survey, working primarily in Mexico. In 1951, he joined Shell Oil Company. From then until 1962, he gained experience in field geology, subsurface interpretation and photogeology in West Texas, New Mexico, and southern Colorado. From 1962-1966 he worked in Shell's California region, first as Division Exploration Manager in the Bakersfield, California office, and then as Area Exploration Manager in Los Angeles.

A transfer to Shell's New York City office came in 1966 for Dr. Edwards, where he was appointed Chief Geologist and later Assistant to the Vice-President of Exploration for Shell Oil Company. He became Exploration Training Manager in Houston in 1974 and in 1979 joined Pecten International Company in Houston to work international exploration geology. His final position at Shell Oil Company before his retirement in 1987, after 36 years, was Latin American Exploration Operations Manager.

Dr. Edwards is Editor of the DIVERGENT MARGINS BASINS Volume of the AAPG Special Series on WORLD PETROLEUM BASINS. That volume contains detailed discussions and illustrations of the geology, geophysics and basins of the Northwestern Shelf of Australia, emphasizing stratigraphic sequences, and structural styles related to hydrocarbon habitats.

This year, Dr. Edwards serves as AAPG Program Committee Chairman of the Offshore Technology Conference in Houston. Professional memberships held by Dr. Edwards include AAPG, GSA, HGS, and Four Corners Geological Society.

DIVERGENT MARGIN BASINS

Divergent margin basins such as the Campos Basin, Gabon Basin, and Niger Delta Basin and basins of the Northwestern Shelf of Australia contain sediment thicknesses ranging from 10 to 15 kilometers. The complete set of stratigraphic sequences that may be present in divergent margin basins include pre-rift, rift, transition-early drift, and late drift. Reservoir sandstones can be high-quality due to their origin as first cycle sediments derived from proximal quartz-rich cratonic basement. Rich source rocks are important in the rift sequence, as well as in paralic facies, coastal swamps, and shallow marine environments in deltaic sequences.

All phases in the development of divergent margin basins are dominated by gravity-driven extensional tectonics. A variety of structural traps exist. Stratigraphic trap potential was recently demonstrated by giant Tertiary turbidite discoveries in the Campos Basin, offshore Brazil.

Divergent margin basins are capable of developing and preserving source rocks, reservoir rocks and traps during continuous burial in one tectono-stratigraphic megacycle. The hydrocarbon prospectivity of divergent margin basins is enhanced by these processes and by traps formed contemporaneously with sedimentation in both the rift and drift phases.

INTERNATIONAL EXPLORATIONISTS MEETING INFORMATION

Westin Oaks Hotel, April 18

Dinner (5:30 p.m.) $20.00

Admission to all International meetings is by **advance ticket purchase only.** Tickets may be purchased from representatives in the International departments of most companies or by sending a **check for $20.00 and a stamped, self-addressed envelope to:**

Houston Geological Society
7171 Harwin, Suite 314
Houston, Texas 77036

Ticket distribution and receipts are handled by Chris Nicholson (629-6600, x3817). All inquiries should be made between 8 a.m. and 4 p.m.

APRIL POSTER SESSION

The following poster session will be on display at the social hour of the April 18th dinner meeting of the International Explorationists Group:

SOVIET UNION:
Tinman-Pechora Basin
Hydrocarbon Exploration and Development

It will be presented by Grant Lichtman and David Fontaine, on behalf of Jebco Seismic Ltd., in cooperation with the USSR Ministry of Geology.

CALL FOR INTERNATIONAL POSTERS

The International Explorationists Group invites interested authors to display technical posters on aspects of International Hydrocarbon Exploration or Development during their pre-dinner social hour from 5:30 to 6:30 p.m. Authors should prepare a title and written technical summary of the poster, with their name, daytime phone and dates the poster will be available. Please submit this to Denise M. Stone. Posters will add a new feature to the monthly meeting and should promote informal discussion and exchange of ideas.

CALL FOR EXOTIC ROCKS

What morsels of international geology are you keeping in your garage or office?? The International Explorationists Group is looking for donations of exotic rocks collected by its globetrotting members to use for speaker's awards over the coming year. If you have a rock (or mineral) that would look presentable to mount on a 5x7 walnut base, consider submitting it. Rocks should have a short summary identifying them by country of origin, locality, formation name, and significance to exploration, if any. Please submit samples to Denise M. Stone at any International Explorationists dinner meeting.

INTERNATIONAL EXPLORATIONISTS GROUP COMMITTEE

Chairman & Finances:
Denise Stone, Amoco 556-4207

Technical Program:
Pinar Yilmaz, Exxon Prod. Res. Co. 966-6033

Ticket Reservations:
Chris Nicholson, Marathon Intl. 629-6600 x-3817

Membership:
Kumar Bhattacharjee,
Sita Oil Exploration House, Inc. 999-6957

Audio-visual/Meeting Arrangements:
George Tappan, Consultant 358-4061

INTERNATIONAL BRIEF

HUNT TACKLES GUYANA RIFT PLAY*

By George Tappan

Hunt Oil Co. has been granted a license encompassing all of the Guyana portion of the Takutu Graben, a little explored and potentially rewarding basin.

The government of the Cooperative Republic of Guyana has granted a petroleum prospecting license and production sharing agreement to Guyana Hunt Oil Co., a subsidiary of Hunt Oil Co. of Dallas, Texas. The license covers a 10,294 sq km (2,543,650 acre) block which encompasses all of the Guyana portion of the Takutu Graben, about 350 kms south-southwest of Georgetown, in the dense jungle interior of the country.

The contract was signed and became effective December 22, 1989. The exploration term is for four years, with two optional extensions of three years each. The contract provides for a production term of 20 years. The Guyana Natural Resources Agency negotiated, and will administer, the license and production sharing agreement on behalf of the government of Guyana.

Hunt plans to reprocess existing seismic data, acquire new data, and conduct other geological and geophysical studies during the first 2-1/2 year phase of the operation. Hunt is then obligated to drill an exploratory well.

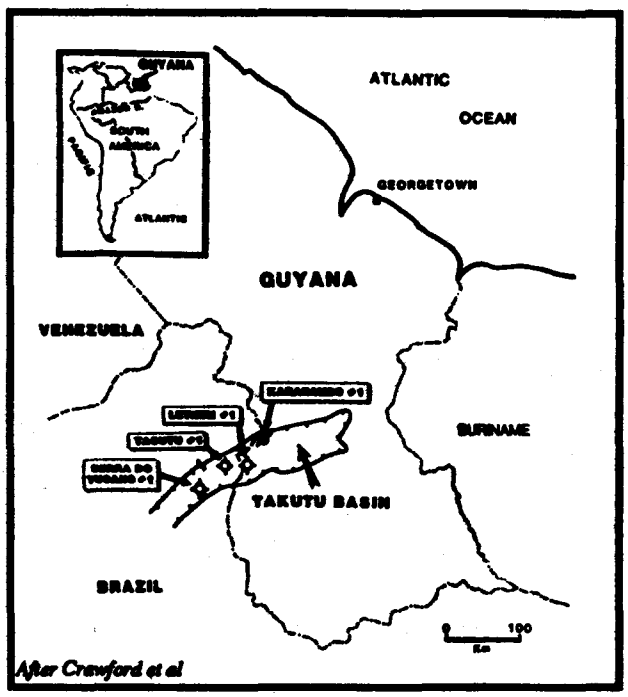
Hunt Oil news release: Jan. 5, 1990

The Takutu Graben is a Mesozoic rift basin with all the necessary parameters for hydrocarbon generation and entrapment. The graben extends into Brazil where Petrobras drilled two unsuccessful wells, Tacutu-1 to 2428m (7966 ft) and Serra do Tucano-1 to 3997m (13,114 ft). Home Oil Company of Canada drilled Letham-1 to 2823m (9262 ft) in the Guyana portion of the graben near the Brazilian border and Karanambo-1, a non-commercial discovery, to 2882m (9456 ft) farther east near the north flank.

The area is particularly interesting as a little-explored, potentially rewarding basin.

The two Home Oil wells are 65 kms apart. The Guyana portion of the basin underlies an area of approximately 11,200 sq km. Home Oil Company proved the presence of source rocks, hydrocarbon generation, reservoirs, abundant structure, and seals. Good reservoir rocks may be scarce in the center of the basin but should be found in old alluvial fans along the basin margins.

Home Oil identified source shales with 1.5-3.1% total organic carbon in the early and middle Jurassic below the top of the salt. A drill-stem test of a 32m (105 ft) section at 2699.7-2731.6m (8858-8962 ft) over the lower Manari shale and upper Apoteri fractured basalts in Karanambo-1 flowed 411 b/d 42° API low-sulphur, low-wax crude, no water. GOR was 500 cu ft/bbl, FSIP 3814 psi. A deeper production test of the basalt produced 1015 bbls oil and 142 bbls of 92,000 ppm formation water. During the test, formation pressure dropped to 185 psi. The test was considered non-conclusive. The well was deemed non-commercial.



The Takutu Graben was formed as a rift in the Archean Guyana Shield during the taphrogenic events of the late Triassic and is most likely related to the breakup of Gondwanaland and the proto-Atlantic rift system. The known portion extends some 280 kms ENE-SW and is about 40 kms wide. Its eastern extremity, where the sedimentary section appears to be thickest, is underexplored and not well defined. The total sedimentary sequence exceeds 5400m (18,000 ft).

The basin floor was flooded with late Triassic or early Jurassic tholeiitic basalts, probably during the time of rifting. The earliest sediments consist of 300m of alluvial fans and fine-grained lacustrine silts, shales, and thin carbonates.

During the middle and late Jurassic, the graben was filled with 1200m of non-marine evaporites and shales and 3500m of lacustrine mudstones, sands, and thin limestones. The sequence is capped by very thin (100m) Cretaceous and Tertiary section. Despite speculation to the contrary,

*Published with permission from Geo-Services International, Kingwood, Texas.

no evidence of a marine connection was found in the drilled sections, three of which penetrated the basal basalt.

Rifts and associated non-marine sedimentary environments have drawn a lot of attention over the past decade as prospective hydrocarbon generating basins. Hunt Oil's interest in the Takutu Graben follows the company's success in North Yemen where astute geological thinking and an aggressive exploration outlook turned a high risk venture into a high reward play.

REFERENCE

Crawford, F. D., C. E. Szelewski and G. D. Alvey, Geology and exploration in the Takutu Graben of Guyana and Brazil: Journal of Petroleum Geology, Vol. 8/1.

NEEDED: INTERNATIONAL ARTICLES!

The *Bulletin* is seeking interesting articles that pertain to international geology, oil and gas exploration/ development, or mineral extraction. Articles relating to international personal travelogs are also welcome.

HGS FIELD TRIP

RECENT SEDIMENTS OF SOUTHEAST TEXAS

DATE: April 21, 1990

SCOPE OF TRIP: Introduction to the recent clastic sediments of S.E. Texas coast. Covers Brazos River Valley and Deltas, and the Galveston Barrier Island Complex.

TIME: Bus will leave Rice Stadium Lot at 8 a.m.

Cost: $40 (includes guidebook, lunch and refreshments)

Registration forms must be received by **April 5.**
Direct inquires to:
Wynn Gajkowski
at Total Minatome 739-3034

Instructor: Rufus J. LeBlanc
Rufus LeBlanc School of Clastic Sediments

REGISTRATION FORM
Recent Sediments of Southeast Texas

NAME: _____

ADDRESS: _____

_____

PHONE (home) _____ (work) _____

Enclose check payable to HOUSTON GEOLOGICAL SOCIETY.
Return with this form to: Houston Geological Society, 7171 Harwin, Suite 314, Houston, Texas 77036

ENVIRONMENTAL/ENGINEERING GEOLOGISTS

Notes From The Chair

Some of you may have been wondering about a February field trip to an active Superfund site which was mentioned in this column in the February issue of the Bulletin. The field trip, to refresh your memory, was to be conducted by the consulting firm, LAN, and the Environmental/Engineering Geology Committee. This field trip was never conducted, because of concerns that the Texas Water Commission had about the safety of individuals on the trip who may not have had the OSHA 40 hr. training course. To avoid any possible problems, they discouraged the trip. HOWEVER, for those who are still interested in finding out about the Superfund site, Lana Spencer, LAN's Sr. Hydrogeologist heading the project, will be discussing "The Petrochemical Systems, Inc. Superfund Site (Liberty County): RI/FS" at our Business meeting on April 11th. The meeting, as usual, is held at Charlie's Hamburger Joint, located on Ella Blvd. about 1/4 mile south of the 610 North Loop.

The Committee is conducting two field trips this month. Well, actually we are conducting one trip, twice. The West Harris County Field Trip is being held on April 7th for the HGS Membership and anyone else interested in learning more about the environment. On the 21st we will conduct a special run of the field trip for Langham Creek High School, which will supply the bus and chaperones. The Environmental/Engineering Committee will supply the expertise. This is our most significant effort yet to bring environmental subjects to the attention of young adults. We hope that a first-hand glimpse of local points of interest will excite more interest than a textbook.

As all of you are no doubt aware, the Committee is always looking for interesting articles to be printed or reprinted in the Bulletin. I would like to take this opportunity to invite any and all companies which publish internal newsletters to submit any article(s) from the newsletter you think would be of interest to the general readership. All such articles will have an element of 'self-recognition', the internal corporate 'pat on the back'. That's OK. The article's main emphasis, however, should be focused on a study conducted by the company, how it was solved and the results obtained, mini-case histories as it were. All articles must have been pre-approved for publication. Please send a letter with the article specifically stating that permission has been given to publish it in the Bulletin. Send the article and letter to:

Glenn Lowenstein
Committee Editor
5915 Flintlock #1102
Houston, Texas 77040

This month contains the first such article, from the Fall/Winter issue of the 'Newsletter' published by Groundwater Technology, Inc. concerning the common environmental exposure to benzene, a compound recognized as a human carcinogen.

Also invited to be included in the Environmental section of the *Bulletin* are News Briefs about significant projects currently under study or recently completed by your company, or contracts recently awarded. This will provide our readership a better feel of what is going on in the environmental industry and provide your company with a little public relations space. Again, all items must be accompanied by a letter permitting the *Bulletin* to publish the News Brief. All information can be sent to Glenn Lowenstein, the Environmental/Engineering Committee Editor, at the address listed above. The first News Briefs have been printed elsewhere in this month's Bulletin.

Other news of interest involves the retraining seminars. The first was conducted by the Committee on January 30th, concerning Real Estate Transfers and Hydrogeologic Site Assessments, presented by Mike Munsil of Environmental Technology, Inc., and Robert Rieser of Groundwater Technology, Inc. The attendance was terrific. Almost 100 individuals attended the meeting which was held at Paul Revere High School. The unfortunate fact of the entire evening was that we were forced to hold the meeting in a classroom, as opposed to the originally assigned auditorium, and I believe the people who patiently endured the inconvenience deserve an explanation. Although the auditorium had been accidently double-booked, the High School decided that the Parents Organization (which appears to have a strong say in what goes on at the High School) must have the auditorium. So 10 people held a meeting in a room

which can hold about 400, while 100 people were crammed into a room which probably should not hold more than 50. That doesn't make much sense, but that's politics. (I hope the Fire Marshal doesn't read this column.)

The second was a field seminar, conducted on February 17th, concerning Drilling and Soil Sampling Techniques, and Monitor Well Installation. It was presented by Environmental Drillers, Inc. (drilling), Hughes-Beard Company, Inc. (well supplies), and Groundwater Technology, Inc. (installation and sampling). Again the attendance was outstanding, with 60 participants, in spite of the competition from the Houston Livestock and Rodeo Parade.

The strong positive response by our membership to these seminars is a strong indication of the need for such courses: specific (narrow in scope), very affordable, informative, and practical.

ROBERT B. RIESER
Groundwater Technology, Inc.
THE CHAIR

ENVIRONMENTAL NEWS BRIEFS

The **Geotechnical Division of LCT** has recently completed a high resolution, seismic reflection survey along a limited portion of the Superconducting Super Collider (SSC) ring near Waxahachie, Texas. The survey objectives are to map surface faulting and formation thicknesses in the vicinity of planned critical structures.

Van Reenan International, Inc. in Houston, recently completed two investigations for the Florida Corps of Engineers. The first investigation, off the coast from Jacksonville, was to map ferromagnetic objects in a sand barrow area. The second investigation, offshore of Anna Marie Island, was to profile the sand deposits and map the depth to limestone bedrock. Both investigations were related to Florida beach restoration projects.

McBride-Ratcliff and Associates in Houston is currently working on RCRA Facility Investigation work plans and fault studies, a Type I Landfill Permit Amendment in Oklahoma, a hydrogeologic investigation at a chemical Landfill near Port Arthur, and studies of Georgia Superfund sites.

UNIVERSITY OF HOUSTON TENTATIVE FALL, 1990 SCHEDULE

The following Environmental Geology Courses are tentatively scheduled to be taught at the University of Houston in the Fall, 1990, semester.

UNDERGRADUATE ELECTIVE COURSES

Groundwater/ Eng Gph	5:30-7 TT	(230)	Hall

GRADUATE GEOLOGY COURSES

Fluvial Hydrology	4-5:30 MW	(315)	Dupre'
Hydrogeology	5:30-7 MW	(315)	Capuano
Rock Mechanics	7-8:30 MW	(332)	Norman
Hydrochemistry	4-5:30 TT	(315)	Capuano
Computer Modeling	7-8:30 TT	(332)	Woronow

Priority Registration will be held on April 16-17, May 21, and June 25. Regular Registration will be held on Aug. 13 and 14. For more information call 749-1803.

HOUSTON GEOLOGICAL SOCIETY ENVIRONMENTAL/ENGINEERING GEOLOGY COMMITTEE SHORT COURSE/FIELD TRIP

GEOPHYSICAL APPLICATIONS FOR ENVIRONMENTAL AND ENGINEERING SITE ASSESSMENTS

Date & Time: May 15, 1990, 7:00 to 9:00 p.m.

Location: Paul Revere High School Auditorium, 10502 Briar Forest
Located just west of Sam Houston Tollway (West Belt)

Scope: The benefits and potential pitfalls of including geophysics in environmental and engineering site assessment programs.

Speaker: Tom Dobecki, LCT Houston, Inc.

Who Should Attend: Anyone in or interested in the environmental business

Cost: HGS members $5.00, non-members $10.00

WEST HARRIS COUNTY

Date & Time: April 7, 1990, 7:50 a.m. - 5:00 p.m.

Location: Southeast corner of Gessner/I-10 intersection;
Memorial City Mall parking lot, immediately adjacent to east bound feeder road of I-10, near Gessner.

Cost: $25.00 HGS members & spouses by March 31, $30.00 thereafter. $35.00 non-members.

Topics: Groundwater from its inception to disposal (we will observe a local aquifer, municipal water wells, and tour a wastewater treatment plant).

Gulf Coast geohazards (active faulting and flood control) and urban hazardous waste sites (is there a Superfund Site in your neighborhood?)

Trip Leaders: Carl Norman, Helen Sadik-Macdonald, Saul Aronow, and Ken Voight

FOR FUTHER INFORMATION CALL: Carl Norman 461-7420 or Helen Sadik-Macdonald 497-3622.

BENZENE IN PERRIER: A chronology of recent events surrounding the discovery of benzene in Perrier Mineral Water

By Robert B. Rieser
Groundwater Technology, Inc.

EDITOR'S NOTE: As indicated in a companion article published in this month's Bulletin (p. 20), daily exposure to benzene is more common than one would think. This article exemplifies this common occurrence and chronicles how one corporation has handled its discovery by the public.

On February 10, 1990 the Houston Chronicle (1) and the Houston Post (2) reported that the Perrier Group of America, the U.S. unit of France's Source Perrier SA, was recalling its inventory of Perrier mineral water in the U.S. (72 million bottles) because tests indicated the presence of benzene in a small number of bottles. The articles state that the French Ministry of Health had certified that the spring from which the water is collected, located in Vergeze, France, is free of contamination and is not the source of the problem. This was confirmed by a Feb. 13 article in the New York Times (3) which reported that Perrier officials said that the Hydrological Institute on the University of Clermont-Ferrand, whose laboratory is approved by the French Health Ministry, carried out new tests which vindicated the spring water as a source of benzene contamination. Instead, Source Perrier was focusing on the packaging and distribution process. The next day the New York Times (4) reported that the recall was extended to Canada. On Monday, February 12th, the Wall Street Journal (5) reported that Source Perrier believed the problem was caused by an employee who "mistakenly used cleaning fluid containing benzene to clean machinery used on the bottling line that fills bottles for North America." Perrier officials assured that only the North American line was involved and that the machinery had been repaired and cleaned.

The Environmental Protection Agency (EPA) has set the acceptable limit of benzene in water at 5 parts per billion (ppb), which is the limit used by the Federal Food and Drug Administration (FDA). Tests of Perrier in North Carolina and Georgia by health officials, who use the Perrier as a laboratory standard because of its purity, found benzene levels at 12.3 to 19.9 ppb (4). Although this was above the acceptable limit, the FDA said that these benzene levels don't pose "a significant short-term health risk" (5).

On February 15th, the Houston Chronicle (6) reported the recall was extended to include the 160 million bottles in distribution worldwide because of an old dirty filter. The Wall Street Journal, however, went further to report on the same day (7) that Source Perrier officials admitted for the first time that benzene occurs naturally in the Perrier water and that the chemical was transferred to the bottled water because workers failed to replace filters designed to remove it. Needless to say, this statement from Source Perrier raises more questions than it answers, considering previous statements from the company and the French Ministry of Health.

REFERENCES

1. "Perrier mineral water recalled", Houston Chronicle, February 10, 1990.
2. "Perrier recalls U.S. inventory over impurity", Houston Post, February 10, 1990.
3. "Perrier asserts source of water unaffected", The New York Times, February 13, 1990.
4. "Perrier recall is extended to Canada", The New York Times, February 14, 1990.
5. "Perrier's strategy in the wake of recall: Will it leave brand in rough waters?", The Wall Street Journal, February 12, 1990.
6. "Perrier pulls water", Houston Chronicle, February 15, 1990.
7. "Perrier expands North American recall to rest of globe", The Wall Street Journal, February 15, 1990.

November 11, 1989 Environmental Field Trip. Coastal Environmental Problems, Colorado River Delta to Brazos River Delta.

ENVIRONMENTAL UPDATE

ENVIRONMENTAL EXPOSURE TO BENZENE IS COMMON*

By Carol Gillis, Envirologic, Inc., Portland, Maine

Within the past 24 hours, you have probably been exposed to a milligram or more of benzene, a compound recognized as a human carcinogen. Most likely, this exposure was not the result of a landfill in your back yard or an emission stack from a nearby factory; nor did it involve violation of an environmental statute. Rather, it was probably due to a variety of activities associated with daily life.

In conjunction with Groundwater Technology, Envirologic Data, Inc. was asked to develop a remediation goal for benzene vapor in indoor air for homes impacted by an accidental gasoline release to soil. As part of the process, a dose-comparison analysis was performed to assess typical exposure to benzene for the general population and relative contribution to total exposure from various sources.

The analysis resulted in the development of a benzene exposure budget and an estimated cumulative daily dose. Additionally, individual lifetime cancer risks associated with these exposures were calculated for smoking and nonsmoking population groups,

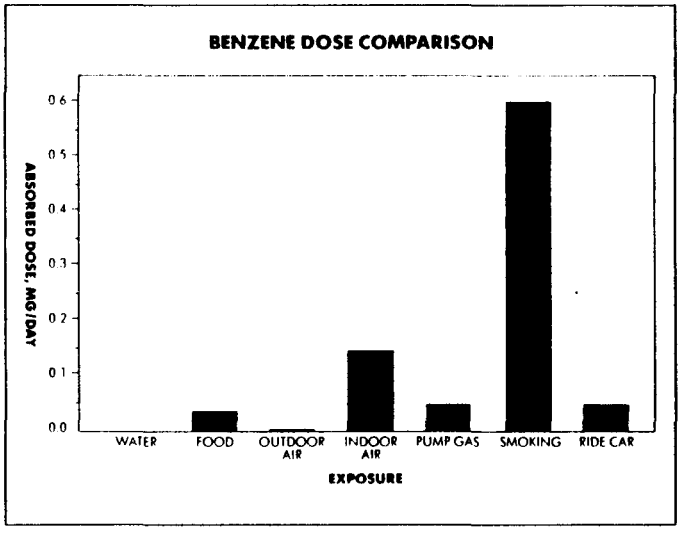
Benzene is among the most commercially important industrial chemicals. Derived primarily from petroleum, benzene is used in chemical synthesis and manufacturing, and is a constituent of gasoline as a substitute for tetraethyl lead. Benzene's use in consumer goods has decreased since evidence of its toxicity has emerged. However, it is still reported to be found in small amounts in a variety of products, including solvents, paints, cleaning materials and carpeting.

In addition to being an industrial chemical, benzene is also a natural substance. It is found in plants, many foods and crude oil, and is a metabolite in some animals. Benzene is produced as a combustion product during such natural phenomena as forest fires and volcanic activity.

Due to its widespread presence in the environment, a large percentage of the population is exposed to varying levels of benzene from a variety of sources. Typical routes of exposure include inhalation of cigarette smoke, consumption of food and water, riding in an automobile, pumping gasoline and inhalation of outdoor and indoor air. What is surprising is that the levels of exposure are dependent primarily on personal behavior, habits and choices. It is now believed that a significant percentage of exposure occurs in the home.

Utilizing data from the published literature on concentrations of benzene in the environment and in consumer products, and employing exposure models and parameters, Envirologic Data estimated daily doses for these typical exposure sources and derived cumulative daily dose ranges. These results (see graph) indicate that the source of the most significant impact to the total exposure is cigarette smoking, representing more than half of total daily exposure for that group. It is interesting to note that exposure to benzene from inhalation of indoor air is significantly greater than exposure from breathing outdoor air.

Calculated risks associated with various exposures are proportional to the magnitude of the calculated dose. Risk probabilities for carcinogens are currently based on a non-threshold mechanism of toxic action. In other words, any level of exposure during a lifetime poses some level of risk. Risk probabilities are considered upper-bound estimates, and therefore, most likely overestimate risk.



As a result of this analysis, a remediation goal for benzene in indoor air was developed which incorporated background levels for benzene in indoor air. Background concentrations were determined from local off-site sampling in non-impacted homes and were corroborated by data from an extensive federal agency study of volatile organic vapors. The remediation goal for the impacted homes was submitted to the state regulatory agency and subsequently approved.

In conclusion, risk assessment traditionally focuses on the evaluation of single-source exposure to chemicals. While this provides an assessment of exposure from a specific source, it does not incorporate exposure from other sources in the environment. Background exposures, typically low-level ones encountered from environmentally ubiquitous chemicals, may represent significant exposure burdens to receptors and should be considered as a component of risk assessment and applied to the development of remediation goals.

Editors note: This article is being reprinted with permission from Groundwater Technology, Inc. from their quarterly publication, the Newsletter, *Fall/Winter, 1989 issue.*

SUBSIDENCE SLOWS IN RECENT YEARS*

By Dave Smith, Vice President for Environmental Affairs, Houston Audubon Society

The Harris-Galveston Coastal Subsidence District was formed in 1973 in response to a clear need to halt the alarming sinking of the area. The district is one of only two in Texas and is governed by a 17-member board appointed by local elected government officials and supported entirely by revenue from permits for more than 2,500 water wells.

Early settlers and developers in the Houston-Galveston area were blessed with an abundance of fresh water from the artesian aquifers underlying the fertile soil. But there was a worm in the apple. By 1975, overuse of groundwater had caused subsidence exceeding nine feet along the ship channel. The area around Clear Lake, including the Johnson Space Center, had lost four or more feet of elevation, and nearly all the two-county area had sunk at least one foot. Subsidence led to the much-publicized flooding and eventual abandonment of the Brownwood residential subdivision in Baytown.

"...overuse of groundwater had caused subsidence exceeding nine feet along the ship channel."

Subsidence contributed to the devastating flood on Brays Bayou in 1983 and permitted encroachment of the sea into San Jacinto State Park.

In 1976, groundwater use was 457 million gallons per day (mgd), divided among public use at 56 percent, irrigation at 11 percent, and industry use at 33 percent. By 1988, the picture had changed dramatically to 380 mgd, with public use at 84 percent, irrigation at nine percent, and industrial use at seven percent.

Changes have been brought about by a switch from groundwater to surface water use, by conservation, and by the good work of the subsidence district. Area industries have been very cooperative and innovative in conservation and "switching" efforts. This laudable effort is a good example of how industry and the community can work together to solve a common problem.

From 1976 to 1988, water supply by source changed. Usage increased from 739 mgd to 850 mgd. Groundwater as a source was reduced from 62 percent to 44 percent. The Trinity River Basin source has risen from one percent to 19 percent of the total.

**From the Houston Audubon Society's publication* The Naturalist, *Jan. 1990 issue. Reprinted with permission from the Houston Audubon society.*

The Harris-Galveston Coastal Subsidence District stresses individual water conservation as a measure to protect the limited supply of fresh water, to curb subsidence problems in our area, and to avoid increases in water and sewer service rates. Here are some tips to help you conserve water in your home:

Outdoors

- Water the lawn early in the morning to avoid waste due to evaporation and wind.
- Don't waste water sprinkling the road, sidewalk or driveway.
- Use mulch in flower and shrub beds to help them retain moisture.
- Soapy water containing detergents safe to use on your skin won't harm plants either. Think about recycling laundry, bath, or other cleaning water to water plants indoors and out.

In the Kitchen

- An automatic dishwasher uses 15 gallons per load. Don't wash unless you have a full load. Hand wash dishes in a pan or sink of soapy water, then rinse in another. Don't run the water to rinse.
- Peel and clean all vegetables for a meal in a pan of water rather than with running water.

In the Laundry Room

- The average washer uses 40 gallons of water per load. Only wash full loads, or if your machine has a variable water level control, use it to do small loads.

In the Bathroom

- Test toilets for leaks by placing a few drops of food coloring in the tank. If the color shows up in the bowl you have a leak. Fix it yourself or call a plumber.
- Repair leaky faucets promptly. A slow drip can waste 20 gallons of water per day.
- Keep showers short. Every minute uses an average of seven gallons of water.
- Install water-saving devices such as low-flow shower heads, toilet dams, and faucet aerators available in most hardware stores.

Dramatic decreases in subsidence rates have been seen in areas most affected by subsidence abatement programs. At Pasadena, Baytown, and Texas City sites, monitoring stations show no significant subsidence in the last eight years. The

Chicot Aquifer has recorded water-level increases of 180 feet in wells east of Houston. But monitors in Southwest Houston and Addicks reflect continuing subsidence at a rate of one and one-half inches per year. Aquifer levels continue to decline. Halting this loss of elevation requires a change from groundwater use to surface water use.

The district plan to continue reducing subsidence divides the two counties into eight regulatory areas and designates a percentage reduction in ground withdrawals required by a particular time. For example, users in area 1 southeast of Houston and the Galveston area must reduce groundwater use to just 10 percent of total water demand by 1990; area 2 in Southwest Houston, 20 percent by 1990; and area 3 in Southwest Houston, 20 percent by 1995.

This progressive change will not be achieved without some pain and controversy. Building lines from the east of Houston to the west and southwest, together with pumps and treatment facilities, will cost hundreds of millions of dollars. The cost will be borne by consumers.

There will undoubtedly be controversy as users of groundwater search for sources of surface water. Baywood Country Club wants to use water from Armand Bayou for irrigation replacing groundwater. Lakeside Country Club in west Houston wants to use water from Buffalo Bayou. Controversy over water rights and allocations fills the pages of Texas history. At least we have an agency, the Texas Water Commission, to adjudicate disputes.

The Harris-Galveston Subsidence District is doing an outstanding job under the leadership of General Manager Ron Neighbors. In 1988, the Texas Water Conservation Association presented the district with the "Outstanding Water Conservationist of the Year" award in recognition of its achievements.

References for this article include three publications of the district: "Water Conservation," "Subsidence 89," and "District Plan." These brochures and other information are available by calling 486-1105.

NEW HGS MEMBERS

ACTIVE MEMBERS

Leslie E. Adams
Sr. Geologist
Amoco Production Co
501 Westlake Park Blvd
Houston, TX
(713) 556-2987

Brian S. Anderson
Operations Manager
L C T Houston Inc
1155 Dairy Ashford #306
Houston, TX
(713) 558-8383

Mitch P. Anderson
Geologist
Wilcox Oil & Gas Inc
8610 N New Braunfels
San Antonio, TX
(512) 829-7019

Richard L. Anderson
Petrophysical Acct. Admin.
Atlas Wireline Services
P O Box 1407
Houston, TX
(713) 972-4841

Florence R. Arya
818 Ivy Wall
Houston, TX
(713) 496-0864

Brian K. Ayers
Dist Exploration Mgr.
Coastal Oil & Gas Corp
9 Greenway Plaza
Houston, TX
(713) 877-7806

John S. Baldwin
Geologist
Bois D Arc Resources
13430 NW Freeway #204
Houston, TX
(713) 690-0438

Mohit K. Banerjee
Dist Geophysicist
Santa Fe Energy Co
1616 S Voss #555
Houston, TX
(713) 783-2401

Roger J. Barnaby
Geologist
B P Exploration
5151 San Felipe
Houston, TX
(713) 552-6048

James A. Beer
Geologist
Pecten International Co
P O Box 205
Houston, TX
(713) 556-4596

Thomas G. Binig
Geologist
Ballard Exploration Co
1021 Main #1705
Houston, TX
(713) 651-0181

James William Buettner
Core Laboratories Inc
5295 Hollister
Houston, TX
(713) 460-9600

Donald B. Caldwell
Mgr. Exploration
Callon Petroleum Co
1111 Caroline St #2305
Houston, TX
(713) 529-7907

Michael D. Campbell
Law Engineering Inc
5500 Guhn Rd
Houston, TX
(713) 939-7161

Hector Luis Caram
Geologist
Mobil Corp
12450 Greenspoint Dr.
Houston, TX
(713) 775-2422

Dana Kent Clark
Sr. Staff Paleontologist
Shell Oil Co
200 N Dairy Ashford #5-388
Houston, TX
(713) 870-2410

John A. Clendening
Sr. Geological Assoc
Amoco Production Co
P O Box 3092
Houston, TX
(713) 556-3549

H. Roland Clubb
Staff Geol/Hydrogeol
E R M Southwest Inc
1600 Memorial Dr. #200
Houston, TX
(713) 496-9600

Bryan K. Coffman
Hydrogeologist
Applied Earth Sciences
8323 SW Frwy #710
Houston, TX
(713) 981-7140

David M. Cole
Amoco Production Co
P O Box 3092, 1010-WI3
Houston, TX
(713) 556-2503

Cecil S. Cosse
Geophysicist/Geologist
4619 Whispering Rock Ln.
Spring, TX
(713) 288-8656

Donald R. Cowden
Sr. Area Geologist
T X O Production Corp
333 Clay St #3600
Houston, TX
(713) 658-0111

Jeffrey H. Danko
Sr. Petroleum Geologist
Exxon Co USA
16945 Northchase
Houston, TX
(713) 775-6226

Bruce A. De Bartolo
Oil & Gas Consultants
De Bartolo & Associates
3210 Aspen Bend Dr.
Houston, TX
(713) 440-5638

Joseph Robert De Dominic
Geologist
Oxy USA Inc
1200 Discovery Dr.
Bakersfield, CA
(805) 321-6616

James F. Desanto
CEO
Southern Seismic Expl Inc
12219 Old Huffmeister Rd
Cypress, TX
(713) 469-9192

Kelly A. Dowler
Mgr.-Image Mapping
Petroleum Information Co
4150 Westheimer
Houston, TX
(713) 961-3300

Betsy J. Dransfield
Geologist
Phillips Petroleum Co
P O Box 1967
Houston, TX
(713) 669-7949

Susan L. Duffield
10823 Elmdale Dr.
Houston, TX
(713) 955-1323

Richard J. Ebens
Mgr. - Reservoir Geology
Marathon Oil Co
5555 San Felipe
Houston, TX
(713) 629-6600

Olav Elmstad
President
T G S Int'l Geophysical Co
333 Clay #3900
Houston, TX
(713) 951-0853

Karen A. Englehart
V Pres - Environmental
McKenzie Petroleum Co
5847 San Felipe #4300
Houston, TX
(713) 783-4300

Allan J. Filipov
Mktg Rep / Geophysicist
First Seismic Corp
10375 Richmond #1100
Houston, TX
(713) 954-4600

Kent L. Fouret
Exploration Geologist
Enserch Exploration Inc
4849 Greenville Ave #1400
Dallas, TX
(214) 987-6446

Gerald M. Gilbert
Vice President-Operations
Halliburton Geophysical Srvcs
P O Box 36306
Houston, TX
(713) 778-3402

Joseph G. Greenberg
Expl Geologist
Shell Western E & P
P O Box 991
Houston, TX
(713) 870-2103

Richard H. Groshong Jr.
Professor
University of Alabama
Dept of Geology
Tuscaloosa, AL
(205) 348-1882

Henry Hamilton III
Mgr.-Exploration Srvcs
GECO Geophysical Co Inc
1325 S Dairy Ashford
Houston, TX
(713) 596-1802

Robert L. Handley
Manager - A E O
Conoco Inc
P O Box 2197
Houston, TX
(713) 293-3382

Mark E. Hargis
Geological Engineer
Shell Western E & P
200 N Dairy Ashford
Houston, TX
(713) 870-3283

Gregory A. Hargreaves
Petroleum Geologist
Independent
P O Box 13589
Denver, CO

Alana L. Haveman
Technical Assistant
Williamson Petr. Consultant
1010 Lamar #1000
Houston, TX
(713) 658-8278

Frederick B. Henderson III
President
Geosat Committee Inc
601 Elm St R438C
Norman, OK
(405) 325-3329

Rosalyn W. Henry
Sr. Geological Aide
Shell Western E & P Inc
200 N Dairy Ashford
Houston, TX
(713) 870-2314

Robert J. Hofer
Staff Geologist
Phillips Petroleum Co
6330 West Loop South
Bellaire, TX
(713) 669-3478

Stig Horvik
Coordinator
Exxon Co International
P O Box 146
Houston, TX
(713) 973-3135

William M. House
Geologist
Amoco Production Co
501 Westlake Park Blvd
Houston, TX
(713) 556-2292

Gary A. Hummel
Geologist
Amoco Production Co
P O Box 3092
Houston, TX
(713) 596-7987

Marilyn Hyde
Trace Geoph Consulting Srvcs
5123 Birchmont
Houston, TX

Erec S. Isaacson
Geophysicist
Phillips Petroleum Co
P O Box 1967
Houston, TX
(713) 669-3536

Jere B. Jay
Sr. Geologist/Explor
Arco Oil & Gas Co
P O Box 1346
Houston, TX
(713) 584-6439

Thomas H. Jenkins
President
Terra-Mar Enterprises Corp
P O Box 700
Alvin, TX
(713) 331-1959

David D. Jetelina
Sr. Sales Engr
Atlas Wireline Srvcs
10205 Westheimer
Houston, TX
(713) 972-5737

Jay W. Johnson
Exploration Mgr.
Texas Eastern Production Inc
P O Box 2302
Longview, TX
(214) 759-1795

David G. Jones
Project Supervisor
Exxon Co USA
233 Benmar
Houston, TX
(713) 775-7347

Carol S. Kazmer
Geologist
Amoco Production Co
P O Box 3092
Houston, TX
(713) 586-3576

Everly M. Keenan
Research Geologist
Shell Western E & P
P O Box 4252
Houston, TX
(713) 870-2787

Michael E. Kelldorf
Staff Geologist
Arkoma Basin Expl Co
9201 Fair Oaks #701
Dallas, TX
(214) 349-4500

M. J. Keyes
President
Frontier Resources Int'l Inc
10375 Richmond Ave #1175
Houston, TX
(713) 954-5043

Patrick W. Klem
Marketing
Exploitech
15990 N Barker's Landing
Houston, TX
(713) 584-5780

Dwight S. Kranz
Independent Petro Geolo
307 Wycliffe Dr.
Houston, TX
(713) 465-8648

A. Tony Kratochvil
Phillips Petroleum Co
P O Box 1967
Houston, TX
(713) 669-3538

Joe C. Ku
Owner/Geophysicist
Kutek Exploration
13243 Rain Lily Ln.
Houston, TX
(713) 498-5317

Catherine J. Langley
Production Geologist
Mobil Oil
12450 Greenspoint Dr.
Houston, TX
(713) 775-2244

Paul E. Lehmann
Geologist
Texas World Operations
520 Post Oak Blvd
Houston, TX
(713) 850-0003

Nina C. Lian
Exxon Prod Research Co
3120 Buffalo Speedway
Houston, TX
(713) 965-4721

Edward C. Loomis
Staff Geol
Amoco Production Co
501 Westlake Park Blvd
Houston, TX
(713) 556-3079

Christopher A. Maranuk
Sales Representative
Sperry-Sun Drilling Srvcs
3000 North Belt
Houston, TX
(713) 987-5003

Scott P. McGrath
Engineer
Schlumberger
369 Tristar Dr.
Webster, TX
(713) 480-2000

Glenn E. McMaster
Geologist
Amoco Production Co
P O Box 3092
Houston, TX
(713) 556-3636

Michael R. McWilliams
Geologist
Sandefer Oil & Gas Inc
1001 Fannin #2300
Houston, TX
(713) 651-1551

Michael B. Miller
Research Geologist
Louisiana Geological Survey
P O Box G
Baton Rouge, LA
(504) 388-5329

Robert C. Mistrot
Sr. Sales Engineer
Schlumberger Well Srvcs
5005 Mitchelldale
Houston, TX
(713) 957-6600

Witold E. Mroszczak
Staff Geol Assoc
Amoco Production Co
P O Box 3092
Houston, TX
(713) 556-2580

Scott N. Neumann
Staff Geologist
Amoco Production Co
P O Box 3092
Houston, TX
(713) 556-2501

David A. Nickson
Reserves Asst
Tenneco Gas Pipeline
1010 Milam
Houston, TX
(713) 757-2897

Dave E. Normand
Consultant
12606 Misty Valley
Houston, TX
(713) 444-0645

William B. Oliver
Consultant
304 Audubon
Lafayette, LA
(318) 233-4198

John B. Ouzts
Geologist
Oryx Energy Co
8150 N Central Expwy
Dallas, TX
(214) 891-3655

Joseph D. Patterson
Reporter
Petroleum Information Srvcs
4150 Westheimer
Houston, TX
(713) 961-5660

Glenn C. Peltier
Geologist
Southwestern Laboratories
1850 S IH 10
Beaumont, TX
(409) 842-0414

K. Scott Renbarger
Expl Geophysicist
Greenhill Petroleum Corp
11767 Katy Frwy #540
Houston, TX
(713) 558-0281

John B. Ross
Consultant
2500 Tanglewilde
Houston, TX
(713) 789-3545

Richard Savage
Geophysicist
Plains Resources Inc
1600 Smith #1500
Houston, TX
(713) 654-1414

David A. Scolman
Geophysicist
Corpus Christi Oil & Gas
1200 Travis #1960
Houston, TX

Michael G. Simpson
Sr. Staff Geol
Amoco Production Co
P O Box 3092
Houston, TX
(713) 596-7808

Scott W. Singleton
Geophysicist
Fugro - McClelland
6100 Hillcroft
Houston, TX
(713) 778-5500

Charleen M. Sirosky
Appraiser
Hayes Appraisers
8730 Banzer
Houston, TX
(713) 827-1365

John J. Sisler
Geol Engrg Advisor
Shell Oil Co
P O Box 2463
Houston, TX
(713) 241-5261

Kennedy L. Small
Manager - F S S
Petroconsultants
P O Box 740619
Houston, TX

HOUSTON GEOLOGICAL SOCIETY MEMBERSHIP APPLICATION

PLEASE PRINT

LAST NAME FIRST INITIAL

This application must be endorsed by two active members.

Name (print) _____ Signature _____

Name (print) _____ Signature _____

HGS PROCESSING ONLY

MEMBERSHIP CHAIRMAN: _____

EXECUTIVE BOARD: _____

APPLICANT: PLEASE TYPE OR PRINT

HGS DIRECTORY & MEMBERSHIP FILE

LAST NAME FIRST INITIAL NICKNAME

COMPANY POSITION OR TITLE

COMPANY MAILING ADDRESS CITY STATE ZIP CODE COMPANY PHONE

HOME ADDRESS CITY STATE ZIP CODE HOME PHONE

SCHOOL _____ DEGREE _____ MAJOR _____ YEAR _____

PROFESSIONAL AFFILIATIONS

SPOUSE'S NAME _____ PREFERRED MAILING ADDRESS HOME ☐ BUS ☐

OUTLINE OF EXPERIENCE: _____

Annual dues, $15.00 must accompany application. HGS operates on a fiscal year: July 1 - June 30.

Upon completing this application, please return entire form along with your dues to:

Houston Geological Society
7171 Harwin, Suite 314
Houston, Texas 77036

To the EXECUTIVE BOARD:

I hereby apply for ☐ ACTIVE In order to be eligible for active membership, you shall: (1) have a degree in geology or an allied science from a recognized college or university and shall be directly engaged in the application of geology, or shall (2) have been engaged in geological work during at least the preceding 5 years.

☐ ASSOCIATE In order to be eligible for associate membership, you shall: (1) be actively engaged in geological or earth science work, or (2) be a student and have completed 2 years of college and be enrolled in geology or a related science in a recognized college or university granting degrees in earth sciences, or (3) be an administrative officer of a company directly involved with the application of the science of geology.

membership in the HOUSTON GEOLOGICAL SOCIETY and pledge myself to abide by its Constitution and Bylaws.

Signature _____

DATE _____

Darryl L. Smith
Geologist
Phylko Energy Corp
5701 Woodway #312
Houston, TX
(713) 266-2650

William M. Smith
Geologist
Wilcox Oil & Gas Inc
8610 N New Braunfels #604
San Antonio, TX
(512) 829-7019

Jeffrey C. Sprain
Sr. Geophysicist
Columbia Gas Dev Corp
5847 San Felipe
Houston, TX
(713) 787-3448

John R. Suter
Sr. Research Geol
Exxon Production Research
P O Box 2189
Houston, TX
(713) 965-4238

Erich C. Thomas
Regional Paleontologist
Unocal
4635 S W Freeway
Houston, TX
(713) 623-8000

James R. Thompson
Geophysicist
Pennzoil Co
P O Box 2967
Houston, TX
(713) 546-8285

Cheryl S. Troesser
Tech Supv
Halliburton Geophysical Srvcs
One Fluor Dr.
Houston, TX
(713) 263-2821

Kevin P. Turco
Amoco Production Co
P O Box 3092
Houston, TX
(713) 556-4152

Donald Van Nieuwenhuise
Regional Biostratigrapher
Amoco Production Co
P O Box 3092
Houston, TX
(713) 556-2525

Earl D. Van Reenan
President
Van Reenan International Inc
7220 Langtry St
Houston, TX
(713) 468-9468

Don L. Wallace
Independent Geologist
P O Box 1056
Lake Charles, LA
(318) 436-2431

Steven D. Walthour
President
Walthour Geological Consult.
825 West 11th #145
Austin, TX
(713) 860-2285

Rolf Weber
Union Texas Petroleum Crp
P O Box 2120
Houston, TX
(713) 968-3702

Chandler T. Wilhelm
Sr. Geologist
Shell Western E & P Inc
P O Box 4252
Houston, TX

Barry J. Wilson
Petroleum Geologist
Amoco Production Co
P O Box 3092
Houston, TX
(713) 556-2941

John M. Wilson
Staff Geologist
Mobil E & P Us Inc
12450 Greenspoint Dr.
Houston, TX
(713) 775-2239

Zzxsubs - Beijing
Beijing Book Co Inc
701 W Linden Ave
Linden, NJ

ASSOC. MEMBERS

Scott F. Brannan
Marketer
Geophysical Pursuit Inc
3501 Allen Pkwy
Houston, TX
(713) 529-3000

Douglas T. Collins
4203 Clay St #4
Houston, TX
(713) 222-8313

Richard C. Kantenberger
Geology Technician
Ladd Petroleum Corp
2100 One Riverway
Houston, TX
(713) 622-6911

Alice Jean Mahoney
14754 River Forest
Houston, TX
(713) 497-0062

Wesley L. Miller
Area Soil Scientist
U S Dept of Agriculture, Scs
312 S Main St
Victoria, TX
(512) 575-2277

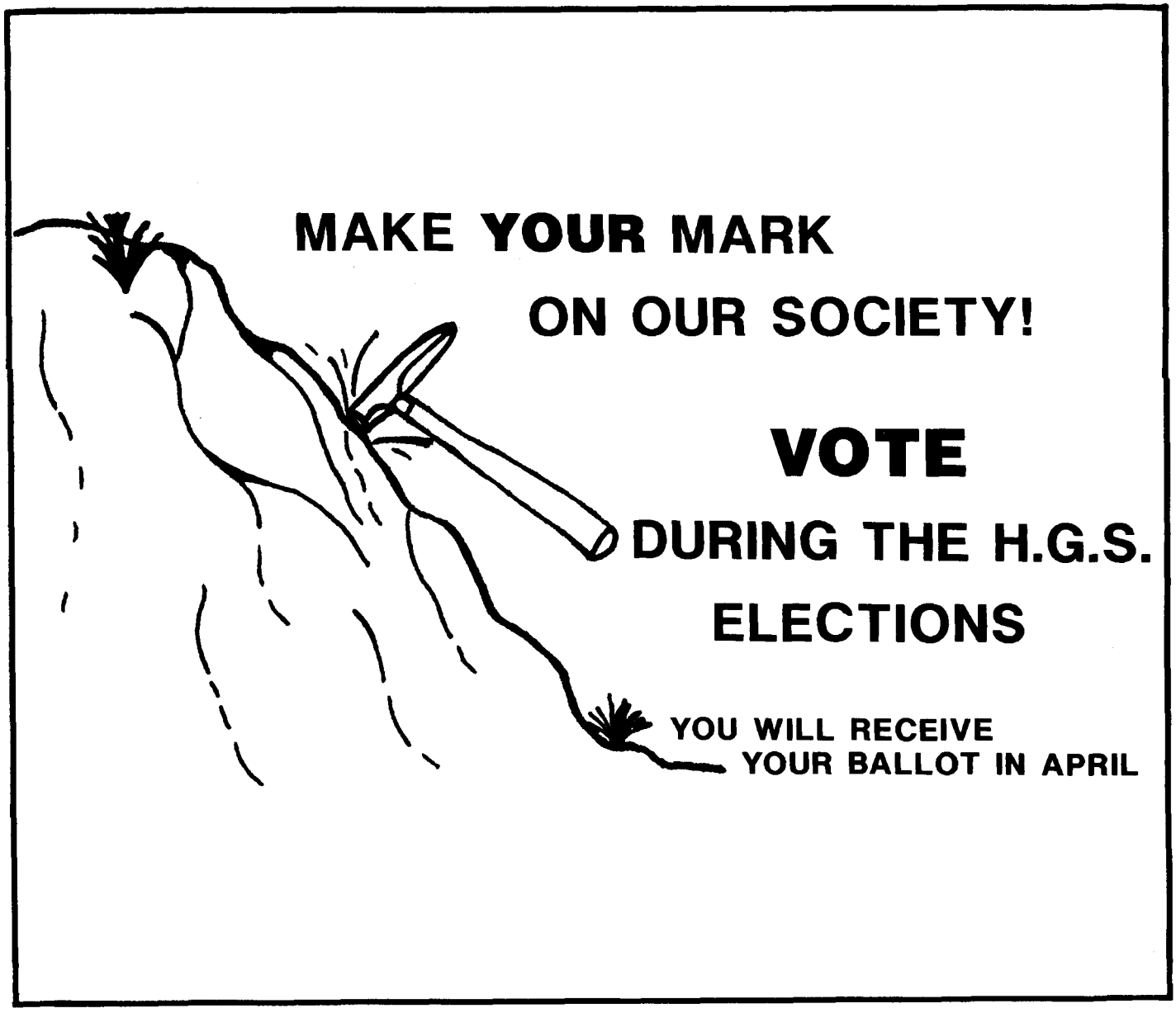
Jes Torben
Dist Rep
Willisco Inc
15995 N Barkers Landing
#200
Houston, TX
(713) 496-3460

HGS ELECTIONS

HGS OFFICER ELECTIONS, 1990-1991

Bylaws, Article III, Sec. 1. Nomination of officers shall be made by a committee consisting of the last three available past Presidents which constitute the Nominating Committee. The latest available past President shall be the Chairman of the committee. The committee shall nominate two or more candidates for each elective office and submit the names of the nominees for each office to the President no later than March 1.

Additional nominations may be made from the floor following the report of the Nominating Committee at the regular March meeting of the general membership. The complete slate of candidates shall be published in the April issue of the Bulletin. Voting shall be by secret ballot. Ballots shall be distributed by mail to all members no later than April 20, with a deadline for their return to a designated mailing address no later than May 10. Voting shall be by preferential ballot, and the candidate receiving the highest number of votes for each office shall be declared elected. In the case of candidates for Executive Committeemen, those receiving the first and second highest number of votes shall be declared elected. The newly elected officers and executive committeemen will be presented at the June meeting.



NOMINEES FOR HGS PRESIDENT-ELECT, 1990-1991

Constitution, Article III, Sec. 2. The duties of the President shall be to preside at all meetings, call special meetings, appoint such committees as are not provided for in the constitution, and jointly with the Secretary and the Treasurer sign all written contracts and other obligations of the Society.

Article III, Sec. 3. The duties of the President-Elect shall be to serve as Chairman of the Publications Committee, as a member of the Finance Committee, and as a member of the Board of Directors of the Houston Geological Society Warren L. Calvert Scholarship Fund. He shall prepare himself to serve as President and, in the absence of the President, shall assume the duties of that office. If the President is not able to complete his term the President-Elect shall assume that office for the remainder of the administrative year, and shall also serve the term as President for which he was elected.

RICHARD STEINMETZ

Academic Training:

1950-54	Princeton University, AB Geology
1954-56	Pennsylvania State University, MS Mineralogy
1958-61	Northwestern University, PhD Geology

Experience:

1956-58	Plymouth Oil Co - Operations Geologist
1961-64	Pan American Petr. Corp. - Ft. Worth Division
1964-67	Pan American Petr. Corp. - Tulsa Research Center
1967-71	Texas Christian Univ. - Asst. Prof. of Geology
1971-77	Amoco Production Co. - Tulsa Research Center
1977-80	Amoco Production Co. - Denver, Proj. Geologist
1980-84	Amoco Production Co. - New Orleans, Regional Geologist
1984-87	Amoco Production Co. - Chicago, Asst. Mgr. Geology
1987-Present	Amoco Production Co. - Houston, New Ventures, Sr. Consulting Geologist

Professional Affiliations: AAPG, CPG #3608, HGS, NOGS, RMAG, SPE, AAAS

Professional Activities:

1963-64	Ft. Worth Geol. Soc. Treasurer
1969	AAPG Ann. Meeting - SEPM Mineralogy Chairman
1974-75	Tulsa Geol. Soc. Vice President
1974-83	AAPG Visiting Petroleum Geologist Speaker
1976-77	AAPG House of Delegates
1976-77	AAPG Research Awards Committee
1983-85	AAPG Elected Editor and Executive Comm.
1985-Present	AAPG Bulletin Assoc. Editor
1986-Present	AAPG Treatise of Petr. Geol. Advisory Bd.
1988-Present	AAPG Handbook of Petr. Geol. Editor

CYRUS (CY) STRONG

Academic Training:

1954	Williams College, BA Geology
1959	Rice University, MA Geology

Experience:

1953	Bear Creek Mining Company
1955	Officer Candidate School - Fort Benning, Ga.
1955-57	Army Corps of Engineers - Captain
1958	Pan American Petroleum Company
1959-90	Shell Oil Company, New Orleans, Denver, Houston, Staff Geologist

Professional Affiliations: AAPG,HGS

Professional Activities:

1977-79	HGS Research and Study Committee Chairman
1984-87	HGS Continuing Education Committee
1985-89	AAPG,GCAGS Convention Judge
1987-88	HGS Continuing Education Committee Chairman
1988-89	HGS Treasurer
1988-90	HGS Vice President, HGS Technical Programs Chairman

NOMINEES FOR HGS VICE PRESIDENT, 1990-1991

Article III, Sec. 4. The duties of the Vice President shall be to serve as Chairman of the Technical Program Committee and, in the absence of the President and President-Elect, to assume the duties of the President for no longer that the remainder of the administrative year.

JOHN M. BIANCARDI

Academic Training:

1972	University of Wisconsin-Madison, BS Geology
1973	Stanford University, MS Geology

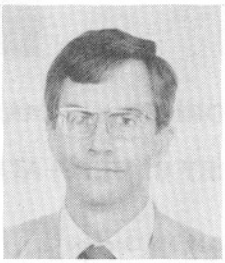
Experience:

1973-76	Tenneco Oil Company - Gulf Coast Division, Houston
1976-78	Shenandoah Oil Corporation - Gulf Coast Division, Houston
1978-Present	Petroleum Geologist - Prospect Generation and Sales, Houston (Retainers: Paraffine Oil Corporation, J3 Oil Corporation, Lauritzen Energy, Inc.)

Professional Affiliations: HGS, AAPG, SIPES

Professional Activities:

1973-79	Member Mesozoic Geologists of the Gulf Coast
1976	Chairman, Mesozoic Geologists of the Gulf Coast
1984-Present	HGS Continuing Education Committee
1988-90	Chairman, HGS Continuing Education Committee
1989-Present	SIPES Continuing Education Chairman



PATRICK T. GORDON

Academic Training:

1966	Texas A & M University, BS Geology
1968	Texas A & M University, MS Geology

Experience:

1968-70	U.S. Army
1970-82	Gulf Oil Corp. - Houston, Midland
1982-87	Michel T. Halbouty Energy Co.
1987-89	Consulting Geologist
1989-Present	Arkla Exploration Co.

Professional Affiliations: AAPG, HGS, GSA, SEPM, WTGS

Professional Activities:

1971-75	HGS Research and Study Committee
1981	AAPG Memoir 32, Contributor
1985-88	AAPG House of Delegates
1986-87	AAPG Convention Judge
1987	HGS Publication, Typical Oil & Gas Fields of Southeast Texas, Vol. II, Contributor
1988-91	AAPG House of Delegates
1989-90	HGS Technical Program Committee

NOMINEES FOR HGS SECRETARY, 1990-1991

Article III, Sec. 5. The duties of the Secretary shall be to keep the Minutes of all meetings, to attend to all correspondence, and jointly with the President and Treasurer, to sign all written contracts and other obligations of the Society. He shall assume the duties of the President in the absence of the President, President-Elect and Vice President for no longer than the remainder of the administrative year.

JEFFERY B. ALDRICH

MARTIN J. OLDANI

JEFFREY B. (JEFF) ALDRICH

Academic Training:

1983	Texas A&M, MS Geology
1977	Vanderbilt University, BS Geology

Experience:

1979-Present	Pennzoil Exploration and Production Company
1989-90	Pennzoil Western Division
1985-89	Pennzoil International Company
1979-85	Pennzoil Marine Division

Professional Affiliations: HGS (International Explorationists Group), AAPG (CPG #3791), SEG, Houston Producers Forum

Professional Activities:

1988-91	Member AAPG House of Delegates
1986-90	HGS Academic Liaison Committee
1989-90	AAPG International Liaison Committee
1988-89	AAPG Matson Award Judge

MARTIN J. OLDANI

Academic Training:

1979	Baylor University, BS Geology
1988	Baylor University, MS Geology

Experience:

1980-82	First Energy Corporation of Mississippi - Houston, Geologist
1982	Solar Petroleum Corporation - Houston, Exploration Geologist
1982-1988	Wintershall Corporation - Houston, Senior Geologist
1988-Present	Sandefer Oil and Gas Corporation - Houston, Senior Staff Geologist

Professional Affiliations: AAPG, SEPM, HGS, NOGS, COGS, HALPC

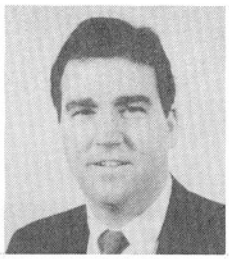
Professional Activities:

1986	HGS Guidebook, Field Seminar of the Big Bend - Trans Pecos Region, Texas, Contributor
1986-88	HGS Field Trip Committee
1988	AAPG National Convention, AAPG/HGS Field Trip Coordinator
1988-90	HGS Field Trip Committee Chairman
1989	AAPG National Convention, AAPG/STGS Field Trip Co-leader

NOMINEES FOR HGS TREASURER, 1990-1991

Article III, Sec. 6. The duties of the Treasurer shall be to handle all moneys and, jointly with the President and the Secretary, to sign all written contracts.

DENISE M. STONE



BENJAMIN E. WINKELMAN

DENISE M. STONE

Academic Training:

1979	Texas Christian University, BS Geology
1981	Memphis State University, MS Geology

Experience:

1978-80	Union Oil Company of California (Summers)
1981-85	Superior Oil International
1985	Mobil Exploration and Producing Services, Inc.
1985-Present	Amoco Production Company

Professional Affiliations: AAPG, SEPM, HGS

Professional Activities:

1988-Present	HGS International Explorationists Group, Chairman and Finances
1988-Present	AAPG International Liaison Committee
1988-Present	AAPG House of Delegates
1989-Present	AAPG Treatise of Petroleum Geology Advisory Board
1989-Present	AAPG Manuscript Reviewer
1986-1989	HGS International Explorationists Committee

BENJAMIN E. (BEN) WINKELMAN

Academic Training:

1979	University of Wisconsin (Milwaukee), BS Geology
1982	University of Wisconsin (Milwaukee), MS Engineering/ Geophysics
1987	Houston Baptist University, MBA

Experience:

1981-Present	Arco Oil and Gas Company, Dallas, Houston

Professional Affiliations: HGS, AAPG, SEG, GSH, EAEG

Professional Activities:

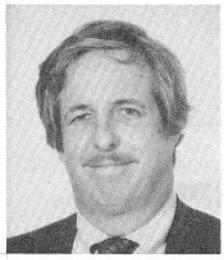
1988-Present	AAPG House of Delegates (Alternate)
1989-Present	HGS Membership Committee

NOMINEES FOR HGS EXECUTIVE COMMITTEEMAN, 1990-1991

Article III, Sec. 7. The President, President-Elect, Vice President, Secretary, Treasurer and the four executive committeemen shall constitute an Executive Board. The Executive Board's duties shall be to receive and pass upon all applications for membership, to appoint officers to fill vacancies occurring during the year, and to have general supervision of the affairs of this organization.

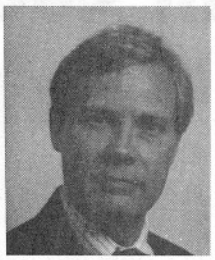
Sec. 8. The duties of the Executive Committeemen shall be to serve on the Executive Boards and to assist the President in administrative duties.

Article III, Sec. 1. ...The tenure of executive committeemen shall be two years with two members being elected each administrative year.



F. KENNETH AITKEN

BARBARA P. BENTLEY



WILLIAM G. HARGETT

SAM H. PEPPIATT

F. KENNETH AITKEN

Academic Training:

1958-63	Loyola of Montreal - BS Geotechnical Sciences
1964-70	Penn State University - PhD Mineralogy & Petrology

Experience:

1963	Prospecting Geophysics, Ltd. - Asst. Party Chief
1964-69	Penn State Univ. - Graduate Research & Teaching Asst.
1970-72	National Academy of Sciences - Sr. Postdoctoral Research Associate (at NASA Johnson Space Center)
1972-74	Rice Univ. - Research Fellow, Geology Dept.
1974-78	Phillips Petroleum - Exploration Mapping Supervisor
1978-81	Superior Oil - Geologic Systems Coordinator
1981-Present	Pennzoil Exploration & Production Co. - Mgr., Exploration Information Systems

Professional Affiliations: AAPG, API, HGS

Professional Activities:

1976-83	Univ. of Oklahoma, Petroleum Data System Advisory Committee
1979-Present	AAPG Computer Applications Committee
1983	HGS Computer Applications Committee Vice-Chairman & Cofounder
1984-89	HGS Computer Applications Committee Chairman
1984	AAPG Session Chairman
1985	Houston GeoTech Session Chairman
1986	AAPG Session Chairman
1987-Present	Houston GeoTech Board of Directors
1989-Present	HGS Executive Committee
1990-Present	American Petroleum Institute Chairman, Subcommittee on Bulletin D-12A (API Number)

BARBARA P. BENTLEY

Academic Training:

1977	Hope College, BA Geology
1979	Rensselaer Polytechnical Institute, MS Geology

Experience:

1979-Present	Amoco Production Company - Senior Staff Geologist

Professional Affiliations: AAPG, SEPM, HGS

Professional Activities:

1985-90	HGS Awards Committee
1988-90	HGS Awards Committee Chairman
1985	GCAGS Convention Judge
1988	AAPG Matson Award Judge
1988-90	HGS Undergraduate Scholarship Foundation, Trustee & Secretary

WILLIAM G. (BILLY) HARGETT

Academic Training:

1972	University of Alabama, BS Geology
1976	University of Alabama, MS Geology

Experience:

1973-74	Amoco Production Co. - Geologist
1974-88	Tenneco Oil Co. E&P - Explor. Mgr. Gulf Coast Division
1988-Present	North Central Oil Corporation - President & CEO

Professional Affiliations: AAPG, HGS

Professional Activities:

1988	AAPG 1988 Annual Convention - Cochairman, Social Committee

SAM H. PEPPIATT

Academic Training:

1953-58	Kansas State University, BS Geology

Experience:

1958-59	Pan American Petroleum - Geologist
1959-75	Texaco, Inc. - Geologist, District Geologist, Assistant Division Geologist International Staff & Chief Geologist.
1975-79	Ladd Petroleum - Manager
1979-Present	Horizon Exploration - Vice President

Professional Affiliations: AAPG, AIPG, GSA, STGS, CCGS, WTGS

Professional Activities:

1984-87	Kansas State University - Geological Department Advisory Committee
1987-88	AIPG - District IV Representative

HGS SHORT COURSE **APRIL 11, 1990**

Recent Sediments of the Northwest Gulf Coastal Region

by Rufus LeBlanc

SYSTEM TRACTS AND SEDIMENTS - EXPLORATION TEMPLATES.

Recent sediments of the Gulf Coast represent high-stand and still-stand depositional complexes. Within these systems are predictable spatial and temporal relationships among the various facies. This course will impart an in-depth understanding of these relationships. You'll see and understand the facies interplay within the Mississippi River Valley, its meander belts, flood plain, delta plain, and the Cheniers. Westward of the Mississippi, you'll investigate the transgressive marine sedimentation of coastal Louisiana and Texas. In Texas, delta and sand bar complexes will round-out the program. You'll retain all that you learn with the aid of a 221 page manual of depositional models. The manual consists of original material and represents the essence of Mr. LeBlanc's work. (And the entire program is a terrific foundation for the upcoming HGS field trip *Recent Sediments of Southeast Texas* - April 21st). In total, this is an outstanding information-packed opportunity to quickly glean much practical information. Enroll today!

Rufus LeBlanc:

Mr. LeBlanc is a pioneer researcher of modern clastic sediments. For twenty-one years he has taught clastic sedimentation to Shell geologists. He is a lifetime honorary member of the AAPG, SEPM, GCAGS, and the Houston Geological Society. Mr. LeBlanc is one of the privileged few to hold the prestigious Sidney Powers Memorial Award. In 1986, as a means to share his knowledge and experience with other geologists, he started the Rufus J. LeBlanc School of Clastic Sediments.

Cost:	Pre-register (before April 1st)	After April 1st or At Door	Where:
MEMBERS	$35.00	$45.00	Exxon Auditorium
NON-MEMBERS	$40.00	$45.00	800 Bell Street
STUDENTS	$20.00	$25.00	8:30 a.m. to 4:30 p.m.

Please make check payable to:

HOUSTON GEOLOGICAL SOCIETY

Mail form and check to:

Houston Geological Society
7171 Harwin, Suite 314
Houston, TX 77036

REGISTRATION FORM *RECENT CLASTIC SEDIMENTS OF THE NORTHWEST GULF COASTAL REGION*

PLEASE PRINT

Name _____

Address _____

City, State, Zip _____

Home Phone _____ Office Phone _____

APRIL *CALENDAR of EVENTS* 1990

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7 HGS ENVIR/ENG Field Trip W. Harris Co.
	← AAPG Short Course - Computers →					
8	9 HGS DINNER MEETING Noel Tyler Westin Oaks	10	11 HGS SHORT COURSE Rufus LeBlanc HGS ENVIR/ENG MEETING UH Geol. Alumni Assoc. Luncheon SPWLA Westside Luncheon	12 SPE Luncheon SPWLA Greenspt. Luncheon	13	14
15	16 GSH Luncheon	17	18 HGS INT'L EXPL. DINNER MEETING John D. Edwards Westin Oaks SPWLA Cased Hole Luncheon	19 ← SIPES Convention →	20	21 HGS FIELD TRIP Rufus LeBlanc Recent Sediments
22	23	24 SPWLA Pet. Club Luncheon	25 HGS LUNCHEON Gary Kratochvil Houston Club	26	27	28
29	30					

GEO-EVENTS

MEETINGS

IN HOUSTON

HGS Dinner Meeting, Noel Tyler, "Reservoir Architectural Styles and Recovery Response", and Development Geology Poster Session, Westin Oaks, 5:30 p.m., Apr. 9.

UH Geological Alumni Association Luncheon, Petroleum Club, 11:45 a.m., Apr. 11.

HGS Environmental Business Meeting, Lana Spencer, "Petroleum Systems Inc. Superfund Sites: R.I./F.S.", Charlie's Hamburger Joint, 6 p.m., Apr. 11.

SPWLA Westside Luncheon, Holiday Inn-Houston West (1-10 & Hwy. 6), 11:30 a.m., Apr. 11.

SPE Luncheon, White Hall Hotel, 11:30 a.m., Apr. 12.

SPWLA Greenspoint Luncheon, NL Industries Cafeteria, 12 Noon, Apr. 12.

GSH Noon Luncheon, Marriott Brookhollow, 11:30 a.m., Apr. 16.

SPWLA Cased Hole Luncheon, Marriott Galleria, 11:30 a.m., Apr. 18.

HGS International Dinner Meeting, John D. Edwards, "Divergent Margin Basins", Westin Oaks, 5:30 p.m., Apr. 18.

SPWLA Luncheon, Petroleum Club, 11:30 a.m., Apr. 24.

HGS Luncheon, Gary Kratochvil, "Geology and the Environment as Seen From Low Earth Orbit", Houston Club, 11:30 a.m., Apr. 25.

AROUND THE COUNTRY

SIPES Convention, South Shore Harbour Resort, League City, Texas, Apr. 19-20.

SCHOOLS AND FIELD TRIPS

AAPG Short Courses, Computer Mapping and Contouring. Jay Leonard, "Principals of Computer Mapping and Database Systems", Apr. 2. David Hamilton: "Structural and Stratigraphic Surface Modeling Techniques", Apr. 3. Jeffrey Yarus, "Making Better Contour Maps", Apr. 4. Michael Hohn, "Geostatistics in the Search for Energy", Apr. 5. Jack Dangermond and Jim Henderson, "New Directions in Mapping (GIS Systems)", Apr. 6.

HGS Environmental/Engineering Field Trip, "West Harris County Groundwater from Inception to Disposal", Memorial City parking lot, 7:50 a.m.-5:00 p.m., Apr. 7

HGS Short Course, Rufus LeBlanc, "Recent Sediments of the Northwest Gulf Coast Region", Exxon Auditorium, Exxon Building, 800 Bell St., 8:30 a.m.-4:30 p.m., Apr. 11.

HGS Field Trip, Rufus LeBlanc, "Recent Sediments of Southeast Texas", Rice Stadium, 8:00 a.m., Apr. 21.

OTHER EVENTS

GSH Golf Tournament, Kingwood Country Club, Apr. 23.

COMMITTEE NEWS

KLM Royal Dutch Airlines

TOP PRIZE: 2 BUSINESS CLASS TICKETS TO AMSTERDAM ON KLM!!!

$5200 $5200 $5200 $5200

DELUXE WEEKEND PACKAGE AT THE WESTIN HOTELS! 17 DINNER PRIZES! LAPEL PINS FOR PARTICIPANTS!

The HGS is giving you a chance to participate in our record-breaking growth. The Membership Drive has already added over 600 new members to our rosters, and the year is not yet up. Membership totals have only been higher in 1986. We are offering fantastic incentives to reward your help in building our membership to these highs. Endorse as many new member applications as you can, and get them in to us before May 15. The more new members you are able to get for the HGS, the better are your chances to receive one of these prizes. The member credited with the most new members will take first pick from the selection of prizes available. Currently, three will get you a HGS lapel pin, 20 will make you our top prize winner. You could find yourself on your way to Amsterdam or dining at one of Houston's finest restaurants.

This top prize of two Business Class Houston/ Amsterdam tickets is going to be yours if you are credited with the most new members by May 15. The retail value is $5200! Competition for this prize will be stiff, so start now in your efforts. It's not too late.

Second prize is the Deluxe Weekend at either the Westin Oaks or the Westin Galleria, which also includes a relaxing Sunday Brunch at their exclusive "Roof".

The Dinner prizes now number 17, with a total value of over $650. Thanks to these Houston businesses for their generous support.

Palm Restaurant ($100)
Magic Island ($70)
Montesano Italian ($50)
La Tour D'Argent ($50)
Las Alamedas ($50)
Armondo's
Vargo's
Brennan's Houston
Pappas
Carmelos Italian
On The Border
Pasta LaMonte's
Ninfa's
Italian Cavatore
Olive Garden
Molina's
Rusty Pelican

Regardless if you are a prize winner or not, ALL MEMBERS WHO ARE CREDITED WITH 3 NEW MEMBERS WILL RECEIVE AN HGS LAPEL PIN, a new addition to the incentives we offer our best HGS supporters.

How do you enter the contest? It's easy; just follow these simple steps:

1. Be an HGS member, and find a prospective member (more is preferred).
2. Get an HGS Membership Application Form.
3. Print and sign your name as the first sponsor (upper of the two sponsor spaces).
4. Get a second HGS member to sponsor the lucky prospective member.
5. Be sure the new member correctly mails the application to the HGS.
6. Associate members cannot endorse new member applications.

All of my committee members and our HGS secretary, Margaret Blake, will be available with application forms and information regarding HGS qualification. Rules of the contest were published in the March Bulletin. The applications must be received by Margaret or by me at my Amoco Office on or before May 15 to qualify for the contest.

GOOD LUCK!

BRUCE A. FALKENSTEIN
HGS Membership Chairman

UPCOMING FIELD TRIPS:

West Harris County Groundwater
from Inception to Disposal ..... April 7

Recent Sediments of Southeast Texas ..... April 21

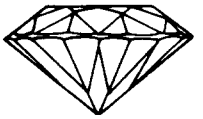
Seismic Acquisition
(w/Geophysical Society of Houston) ..... May 19

Modern Carbonate Sedimentation,
San Salvador, Bahamas or
Florida Keys ..... August 1990

Upper Jurassic - Lower Cretaceous of
Northeastern Mexico ..... Spring 1991

SEISMIC DATA ACQUISITION FIELD TRIP
Saturday, May 19

Participants will observe seismic crew operations and techniques in the field. Additional details will be given in the next bulletin(see pg. 42).



HGS GUEST NIGHT
MONDAY, JUNE 18, 1990

at

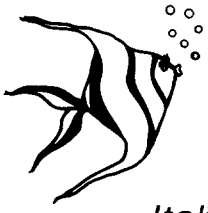
THE HOUSTON MUSEUM OF NATURAL SCIENCE

and

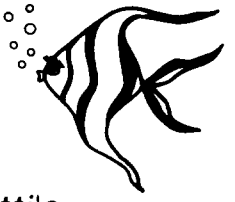
THE WORTHAM IMAX THEATRE

featuring

An Exclusive* HGS Showing of the Award Winning IMAX Film



" THE GREAT BARRIER REEF "



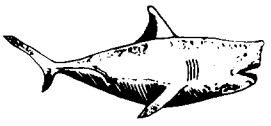
with

Italian Dinner Buffet Catered by Birraporetti's

$ 25.00 PER PERSON

SPONSORED IN PART BY

Anadarko
Petroleum Corporation

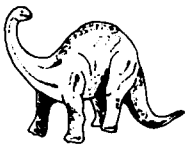


6:00-7:00pm Museum Doors Open, Social & Browsing Hour with Cash Bars
Be Sure to See the Gem, Mineral, and Seashell Collections!

7:00-8:00pm Dining in Museum on Two Levels

8:15-8:45pm Awards Presentations in Museum

9:00-10:00pm "The Great Barrier Reef" in IMAX Theatre



Reservations and Payment Required by Mailing Check to:
HGS Guest Night Event, 7171 Harwin, Suite 314, Houston, Texas 77036.
Call HGS at 785-6402 to confirm receipt of your check.
Send Your Check Soon , Only 400 Seats Available.
Refunds available thru June 1st, 1990.

NO SALES AT DOOR! ADMITTANCE BY NAME TAG ONLY!

***This film is being shipped to the Museum for our event only, and is not scheduled for any public showings in Houston.**

The Houston Museum of Natural Science is located in Hermann Park across from Miller Theatre at One Hermann Circle.

REGISTRATION FORM FOR HGS GUEST NIGHT EVENT
Enclose check payable to HOUSTON GEOLOGICAL SOCIETY.

NAME: _____ COMPANY: _____
WORK PHONE: _____ GUEST NAME: _____

Society of Independent Professional Earth Scientists
Annual Convention

TECHNICAL PROGRAM
April 20, 1990

World Oil and Gas Price Outlook. Louis W. Powers, *Powers Petroleum Consultants, Houston.*

Foreign Opportunities for The Independent - Examples from the North Sea. Gene Van Dyke, *Van Dyke Energy Company, Houston.*

High Technology for Seismic Exploration - Can the Independent Afford It? Norman S. Neidel, *N. S. Neidel and Associates, Houston.*

Geologic Features Viewed from Space - The Astronaut's Perspective. Lt. Colonel Gary Kratochvil, *U. S. Army NASA geologist, Houston.*

Horizontal Drilling, a Technology for the Nineties. Philip C. Crouse, *Philip C. Crouse and Associates, Dallas.*

Prospecting with Sequence Stratigraphy. John B. Sangree, *Sangree Exploration, Houston.*

Confidentiality Agreements - Why Not a SIPES Standard Form? A. T. Green, *Independent Geologist, New Orleans.*

Discovery and Development of Jack Starr Field, Jackson County, Texas, Using AVO Analysis. James L. Allen, *Allen Geophysical Consulting, Houston* and Edward S. Meanley, *B. P. Exploration, Houston.*

Oil and Gas Property Valuation. Gene Wiggins III, *A SIPES Foundation Seminar.*

FOR REGISTRATION INFORMATION, INCLUDING A SPECIAL NON-MEMBER TECHNICAL PROGRAM REGISTRATION, CONTACT:

B. K. Starbuck
1201 Louisiana, Suite 312
Houston, Texas 77002 (713) 651-1639

SIPES Annual Convention

April 19-20, 1990

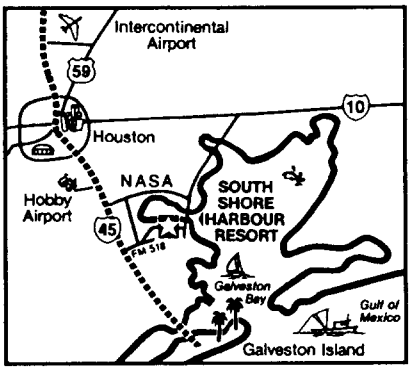
South Shore Harbour
Resort & Conference Center
2500 South Shore Boulevard
League City, Texas 77573

Technical Sessions

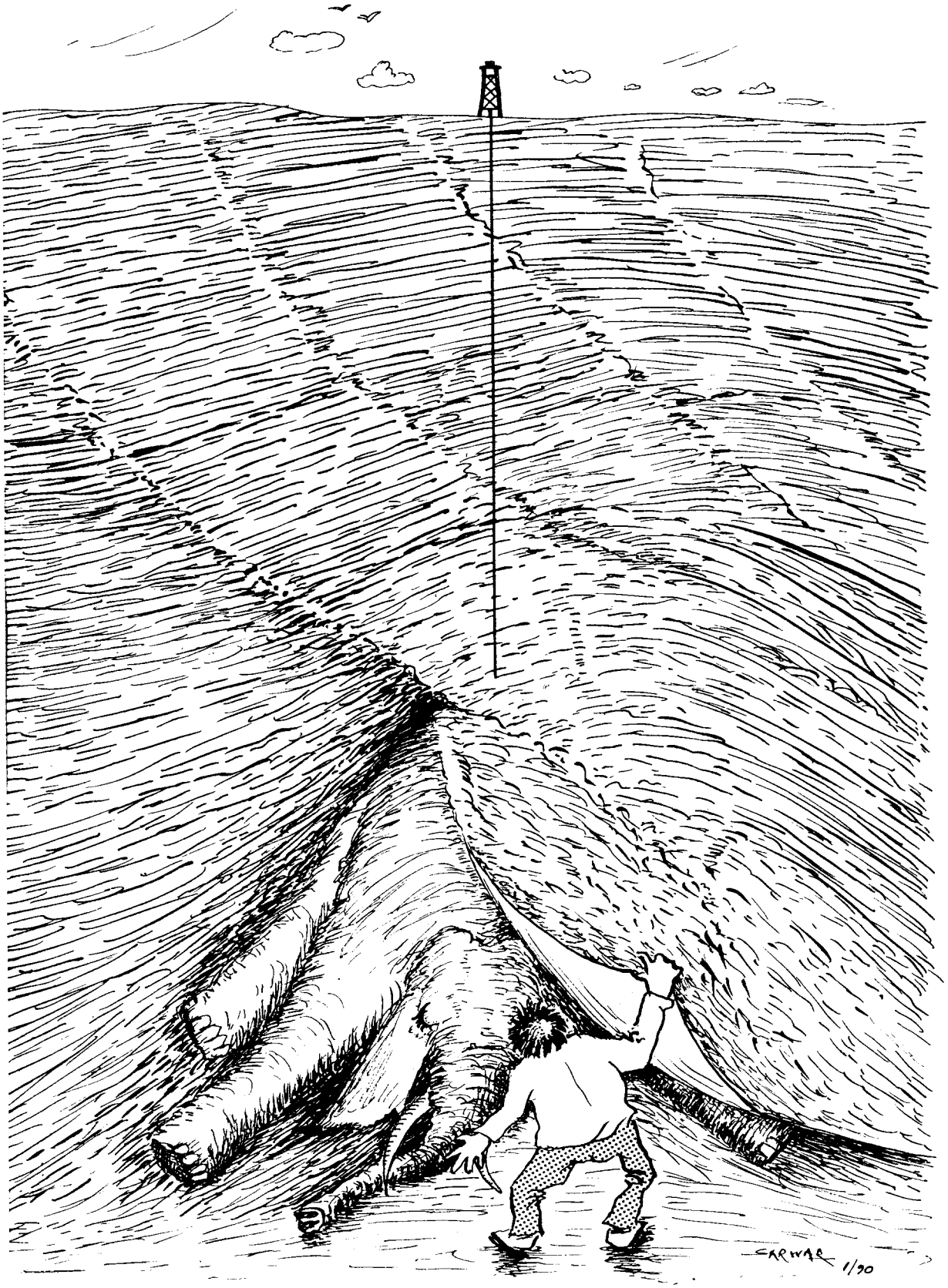
Exhibits

Ice Breaker

Social Events



JEBCO Seismic, Inc.
Supporting Continuing Education



A "Republican" Prospect

AAPG DELEGATES CORNER

by Jeff Aldrich

Proposed Changes in AAPG Membership Classification

At last April's annual meeting in San Antonio the House of Delegates was presented a proposal on changing the AAPG classes of membership. The proposed changes will affect AAPG Junior Members only, by eliminating the Junior classification. Currently the AAPG Junior classification includes, a) all graduate or post-graduate students (Junior 3a), b) working members who have less than the required 3 years of experience (Junior 3b) and c) members who have both the degree and experience but have neglected applying for Active status (Junior 7). The first two groups pay a dues rate of half of the Active status while the last group pays the full dues rate.

The proposal will put all students regardless of degree (BS, MS, or PhD) in the student membership category and all working members either not eligible for Active Membership or who have not applied for Active status in the Associate category (see table). Currently the Student category contains only undergraduate students.

There are several arguments for the proposal, but two major reasons are for structural and semantic purposes. Currently we have students in both the Student and the Junior category. Along with students in the Junior category we have working geologists at the early stages of their careers (<3 yrs) and others who have never taken the time to upgrade their membership (some with more than 40 years experience!). Thus the Junior classification, with several different groups of members and two different dues rates, has become cumbersome and inefficient. The Semantic reason is no less important. As the AAPG has gained more international members it has become apparent that there is strong resistance to the use of "Junior" in several countries as it is often translated as "Inferior".

What You Can and Should Do

The House of Delegates will vote on the proposed changes in membership in June at the annual meeting. If you are for or against the proposed changes let your Houston delegates know. They are your voice to AAPG. For the Junior 7's in Houston, you should upgrade your membership. For one reason, only active members can elect delegates and thus you are not truly represented in the decision that most affects you! The Houston House of Delegates is trying to personally contact the over 1,000 Junior 7 members in Houston and urge them to upgrade. There is no cost to upgrade and if AAPG Headquarters already has a record of a valid degree in earth science your transcripts are not needed. AAPG will send you the forms if you call the membership office at (918) 584-2555. If you are still not convinced that it is worth 15 minutes of time filling out the paperwork in order to upgrade, then remember, only Active members can be granted Emeritus status at age 65 (and thus get the 50% reduction in dues).

AAPG MEMBERSHIP BY CLASS

	Present Classification			Proposed Classification		
	No. of Members	% of Total	Dues ($/yr)	No. of Members	% of Total	Dues ($/yr)
Active	24,024	64	52	24,024	64	52
Associate	1,200	3	52	10,444	28	52
Junior 7	7,057	19	52		to Associate status	
Junior 3b	2,187	6	26		to Associate status	
Junior 3a	2,653	7	26		to Student status	
Student	442	1	12	3,095	8	12

Junior 7: Degree plus >3 yrs experience
Junior 3b: Degree plus <3 yrs experience
Junior 3a: Graduate or post-Graduate Student

HGS WARREN CALVERT MEMORIAL SCHOLARSHIP FUND

The Society's Graduate Memorial Scholarship Fund, launched in December, 1974 with an $8,000 contribution by Warren L. Calvert, has grown steadily over the past fifteen years through contributions from individuals, corporations and fund earnings. Warren L. Calvert received the coveted HGS Distinguished Service Award in 1989.

The Scholarship Board is responsible for investing the funds in safe, high yield securities. Half the earnings of the fund are used to support scholarships for graduate students majoring in the earth sciences and planning a career in some area of economic geology. The remaining half is added to the corpus of the fund. This year the fund has awarded four $2,000 scholarships.

Three categories of contributions are designated: Patron ($500 or more), Donor ($100 to $500) and Contributor (less than $100). The Board expresses its appreciation to those who have made recent gifts to the Fund as follows:

COMPANY PATRONS

Sonat Exploration
B. P. Exploration, Inc.

INDIVIDUAL PATRON

James E. Werner

COMPANY DONORS

Texoil Company
Hunt Oil Company
Brooklyn Union Exploration Company

INDIVIDUAL DONORS

Edward McFarlan, Jr.
Mr. & Mrs. C. Paul Hilliard
Ralph C. Duchin
Harry A. Vest
Sabin W. Marshall
John D. Bremsteller
J. T. Goodwyn, Jr.
Thomas A. Bay, Jr.
Ralph R. McLeod
George M. Nevers

INDIVIDUAL CONTRIBUTORS

Sam N. Webb
Edward A. Bush, Jr.
John Amoruso

HOUSTON GEOLOGICAL AUXILIARY

IT'S LATE - IT'S LATE - IT'S LATE

But ladies, it's never too late to join the Houston Geological Auxiliary. Come and join in the fun, fellowship, and entertainment of our group. Mark your calendar for the May 9, 1990, Style Show, "Petticoats, Parasols, and Paraphernalia" and lunch, plus the installation of our new officers for 1990-91.

The February Board Meeting was held in the home of Edythe Bishop. After the business meeting, the Board members entertained the new members of the Auxiliary with a covered-dish luncheon.

JEANNE COOLEY

PARTNERS IN SPACE

Background

In 1963 the NASA Johnson Space Center (JSC) brought space exploration to the state of Texas. In the past 26 years, the space center has successfully supported NASA's Gemini, Apollo, Apollo-Soyuz, Skylab, and Space Shuttle programs, and looks forward to America's future space endeavors. The Space Station Freedom, and the goals to return to the Moon and travel to Mars are just a part of our future in space.

Along with the space age, JSC gave Texas a solid foundation on which businesses and research, educational, and technological institutions could broaden, diversify, and strengthen their own economic base. In short, JSC offered and continues to offer tremendous economic development potential.

Identifying and nurturing this growth potential is part of what Partners in Space is all about.

Registered as a nonprofit 501(c)3 corporation in the State of Texas, Partners in Space works for the benefit of everyone—JSC, small business, and the existing aerospace community. "Partners" functions in the public interest to provide information and education concerning the NASA Johnson Space Center and other technology-based centers related to space.

Also, through its annual symposium, "Partners" provides opportunities for the aerospace and non-aerospace businesses throughout the state to learn more about each other's technology and resources as well as NASA's procurement process, its personnel and programs, and future needs.

1990 Program

The Partners in Space Third Annual Symposium will be held April 26-27 at the Johnson Space Center. This year's symposium will be informative to the aerospace industry as well as to the myriad of businesses interested in or just breaking into the world of NASA.

Topics such as "The Procurement Process," "Future Technologies," "NASA's Future Programs Update," and "NASA's Information Sources" are just a few of the topics to be addressed by distinguished keynote speakers. Follow-up question and answer panel discussions will be provocative and enlightening.

Along with informative speakers, panel discussions, question and answer sessions, and a wrap-up VIP tour of NASA/JSC, the 1990 symposium offers two new programs. These programs are intended to foster a closer "Partnership" and information exchange among JSC, the aerospace community, and the diverse Texas businesses base:

1. **Exhibits and Information Tables:**
   For those businesses or institutions that would like to exhibit, please call the number given below. Information Table space will also be offered for companies not wishing to exhibit but who would like information on their company to be readily available to attendees. Space will be available for both on a first come-first served basis.
2. **Mentorship Program:**
   To enable smaller companies with limited funding and/or personnel to attend, and to provide "links" between companies with mutual business interests, the mentorship program has been added. Any company who participates as a "corporate sponsor" automatically becomes "mentor" for company representatives to attend the symposium. Corporate sponsors can designate the type of small businesses they would like to be mentor for, and appropriate small businesses will be "linked" with the interested sponsor.

Partners in Space, in conjunction with the NASA Johnson Space Center, look forward to your participation in this year's symposium.

If you have questions, please contact Ava at (713) 283-7312 or Susan at (713) 486-5535.

LETTERS TO THE EDITOR

To the Editor:

I have read the HGS Bulletin for 1½ years and have found it informative and well written. I would like to make some suggestions that could improve the bulletin.

1. Add a readers' forum or commentary column for written comments and discussions similar to AAPG's 'Forum".
2. List the 1st week's meetings of the following month with the current months meetings so people that receive the bulletin late will not miss any meetings. (i.e. meetings held the 1st week of June published in the May bulletin.)
3. Return to the format of putting the calendar of meetings on the front cover. It was easier to plan ahead and be reminded of the meetings with the schedule on the front cover.

DAVID L. RISCH

We appreciate your comments on the Bulletin. We would like to have an expanded readers' column, but unfortunately, we have not received enough letters to the editor to create such a column. We have created a "Future HGS Events" column to help members plan ahead. In response to your last point, the decision to remove the calendar from the front cover was made because there are too many events currently being held in the HGS to squeeze into a half page column and it was felt that the new front page layout was more professional in appearance. (Ed. Note)

ON THE MOVE

Raymond A. Levy, to Research Associate, Bureau of Economic Geology, University of Texas, Austin. Previously with the Geology Research Department, Shell Development Company, Houston, Texas.

Richard P. Wilkerson, to Project Scientist/Geologist, Geraghty and Miller, of Los Angeles, California. Previously with Oxy USA, Houston, Texas.

S. Frank Rabbio, to Consulting Geologist, Sanchez-O'Brien Oil & Gas Corp., Houston. Previously Staff Hydrogeologist with Law Engineering, Houston and consulting geologist with Amoco Production Co. Worldwide New Ventures, Houston.

AAPG CONVENTION NEEDS JUDGES

We need help in publicizing the need for, and importance of, judging AAPG oral papers or poster presentations at the forthcoming National Convention in San Francisco.

The technical program will be a strong one. The Program Committees are excited about the numbers, content, and ranges of subjects to be covered in the papers and posters to be offered. They anticipate that a total of 210 oral papers will be given in 21 separate sessions, and that a total of nearly 280 poster presentations will be available in 28 separate sessions.

All involved with planning the Convention subscribe to our doing all possible to stimulate the continuance of the high excellence of presentations characteristically offered at AAPG meetings. A significant part of this is offering presenters a chance to go for the Matson or Braunstein Award - both now very prestigious.

We will need in excess of 340 judges, each to be one of several members judging one oral or poster session. Announcements for the Convention were mailed to our membership in late January. On the form is a highlighted place for a member to state his willingness to judge. Between January and June we will attempt to set things up for making the judging duty as pleasant and satisfying as possible. Please consider serving as a judge for the upcoming convention.

HGS FIELD TRIP

SEISMIC DATA ACQUISITION FIELD TRIP

DATE: Saturday, May 19, 8:00 a.m. - 4:00 p.m.

LOCATION: In or near the Houston area. More information will be given in the May Bulletin.

SCOPE OF TRIP: Participants will observe seismic crew operations and techniques in the field. Crew personnel will impart information and answer your questions.

LUNCH: Provide your own lunch and transportation. Cold drinks will be furnished.

COST: $5.00

REGISTRATION FORM
Seismic Data Acquisition Field Trip

NAME: _____

ADDRESS: _____

PHONE (home) _____ (work) _____

Enclose check payable to HOUSTON GEOLOGICAL SOCIETY.
Return with this form to:
Houston Geological Society, 7171 Harwin, Suite 314, Houston, Texas 77036

GCAGS ADVERTISERS NEEDED NOW!!!

The Gulf Coast Association of Geological Societies will hold its 40th Annual Convention in Lafayette, Louisiana, October 17 - 19, 1990. We are currently seeking advertisers for the **1990 Transactions** - the annual publication of the association which contains the technical papers that are presented at the convention. Preliminary indications suggest that over 2,000 people will register for the convention and each registrant will receive a copy of the **1990 Transactions.** This technical publication is purchased by both industry and schools and is widely used as a reference.

Financing for the **Transactions** is accomplished to a great degree through funds collected from advertisers. The GCAGS needs your support for this very important publication. An advertisement placed in the **Transactions** will surely prove to be a worthwhile investment for the exposure alone. Prices for advertising space are as follows:

Size of Ad Space	Ad Width-Height	Cost
Full Page (8½ x 11)	7.5″ x 10″	$300
1/2 Page	7.5″ x 5″	$175
1/4 Page	3.75″ x 5″	$110
1/8 Page (Business Card)	3.75″ x 2.5″	$ 75

If you wish to place an advertisement in the **1990 GCAGS Transactions,** please send your ad copy, payment, and any correspondence by **May 15, 1990** to:

Stephen D. Caffery
Chairman, GCAGS Advertising Committee
Post Office Box 51982
Lafayette, LA 70505
(318) 233-8840

We can provide limited assistance with drafting of advertisements and we will also provide proofs for your inspection. Payment with your order will be greatly appreciated and will be promptly acknowledged. Please make checks payable to **GCAGS 1990 Convention.** Again, the deadline for getting your ad copy to the advertising committee is **May 15, 1990.** Thank you for supporting the **1990 Transactions** and the 40th Annual Convention of the GCAGS.

SIPES FOUNDATION

DALLAS, TEXAS - The SIPES Foundation, performing the educational, charitable and scientific functions of the Society of Independent Professional Earth Scientists, is pleased to announce the election of officers for 1990. Serving as president will be Charles B. Godfrey, a consulting geologist from Midland, Texas. Other newly elected officers are Leonard E. Jordan of Shreveport, Louisiana, vice president; Roy C. Walther of New Orleans, Louisiana, secretary; and Jon F. Cobb of Dallas, Texas, treasurer.

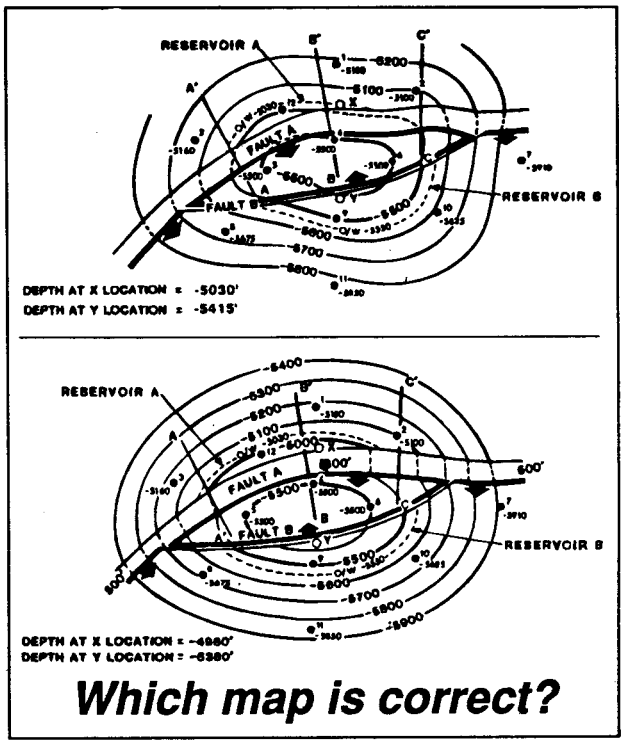
New to the SIPES Foundation Board of Directors are Victor E. Ratliff of Oklahoma City, Oklahoma; Kenneth O. Seewald of San Antonio, Texas; and W. Rand Turner, Jr. of Lafayette, Louisiana. Directors continuing their tenure on the Board are Gene L. Howard of Denver, Colorado; Fred M. Thompson, Jr. of Corpus Christi, Texas; and Gene B. Wiggins, Jr. of New Orleans, Louisiana.

The Society of Independent Professional Earth Scientists is a national organization of 1400 geologists, engineers, geophysicists, geochemists, and hydrologists in twelve chapters located in the oil and gas centers of the United States.

HGS SHORT COURSE **MAY 18, 1990**

Quantitative Mapping Techniques

The Houston Geological Society will sponsor a one day continuing education course entitled, "Quantitative Mapping Techniques." Using well log and seismic data, we will define the fault components applicable to mapping, present the qualitative and quantitative relationships of fault components (such as vertical separation versus throw), illustrate the correct techniques for contouring across faults, introduce the methods for fault and structure map integration, discuss various methods for improving the preparation of structure maps, and present equations which provide guidelines to construct structure maps, as well as the review of completed maps. Enroll now.



Which map is correct?

Your Mapping Specialists:

Daniel J. Tearpock and James Z. Harris. Mr. Tearpock is owner of Subsurface Consultants & Associates of Lafayette, Louisiana. A certified petroleum geologist, he has taught mapping to over 800 earth scientists worldwide. He is coauthor of a new textbook on mapping techniques. This book is in press with Prentiss-Hall.

Mr. Harris is a consulting geological engineer. He previously worked with Tenneco where he was responsible for in-house technical training programs, including courses on practical prospecting and subsurface mapping.

Location:

Amoco Production Co., 501 West Lake Park Boulevard, The West Lake II Building (Texas Commerce Bank), Rooms 508 A & B (Park in the Amoco Visitor Area)

Date and Time:

May 18, 1990
8:00 a.m. - 4:30 p.m.

Cost:

$50 in advance. Limited to 40.

What you'll learn:

Fault Terminology
Vertical Separation versus Throw
Fault Data Determined from Well Logs
Fault Data Determined from Seismic Sections
Quantitative Relationships
Correct Methods for Contouring Across Faults
Generic Case Study
Fault Gap versus Fault Heave
Estimating the Size of Faults
Horizontal and Dipping Beds
Two Dimensional and Three Dimensional Correction Factors
Estimating the Size of Growth Faults
The Restored Top and Single Well Methods

JEBCO SEISMIC, INC. *SUPPORTING CONTINUING EDUCATION.*

Please make check payable to:

HOUSTON GEOLOGICAL SOCIETY

Mail form and check to:

Houston Geological Society
7171 Harwin, Suite 314
Houston, TX 77036

REGISTRATION FORM *QUANTITATIVE MAPPING TECHNIQUES*
PLEASE PRINT

Name _____

Address _____

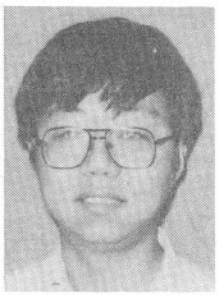
City, State, Zip _____

Home Phone _____ Office Phone _____

HGS OUTSTANDING STUDENTS

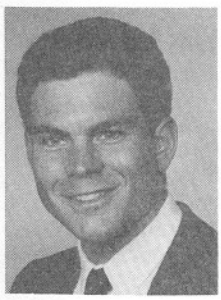
The Houston Geological Society is proud to present this year's Outstanding Student Award winners. Each year, the HGS requests that the geology departments from six local universities select one undergraduate or graduate student who has exemplified both academic and service achievements. These students are honored at the April HGS dinner meeting with an inscribed plaque and a check for one hundred and fifty dollars. The HGS congratulates all of these students and wishes them the very best in their future endeavors.

SHENGYU WU
Rice University



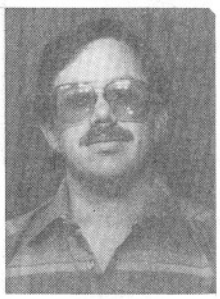
Shengyu is a graduate student of the PhD program at the Department of Geology and Geophysics, Rice University. He was born in the People's Republic of China and completed an undergraduate study in electronics at Hebei R&T University in 1982. After graduation, Shengyu continued his education by attending the Petroleum Geophysical School in P.R. of China, and by training with Western Geophysical Company in the United States and P.R. of China. Shengyu began his graduate studies at Rice University in 1987 and obtained his masters degree in 1989. He is the author of numerous publications, both in the United States and P.R. of China. Shengyu is currently studying the evolution of allochthonous salt sheets and tongues in the Gulf of Mexico and has recently presented a paper on this subject at the 1989 SEPM Research Conference.

BRIAN ELIAS
Texas A&M University



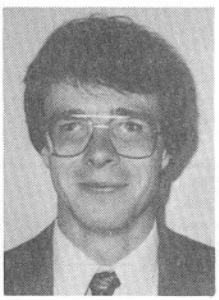
Brian is currently working toward a PhD in Geology at Texas A&M University. He obtained his BS in Geology from the University of New Mexico in 1986. While at the University of New Mexico, Brian was the American Mineralogical Society's Outstanding Undergraduate Mineralogy Student and also a geology student representative. In 1989, Brian received his MS in Geology from Texas A&M University after completing a study of the role of effective stress on silica solubility and pressure solution. While at A&M, he has been awarded a Chevron Graduate Fellowship, the Oswald Scholarship, and has also been a teaching assistant for numerous geology labs. In addition to his masters thesis, Brian has published several other papers relating to the experimental compaction and dissolution of silicate sands. He is a member of the GSA, AAPG, and the American Geophysical Union.

PHILLIP JACKSON
Stephen F. Austin State University



Phillip was born August 23, 1957 in New Orleans, Louisiana. Due to his father's involvement in international exploration, Phillip developed an early interest in geology and had the opportunity to attend school in Australia, South Africa, and Canada. He received a BS degree in Geology from the University of Texas at Arlington in 1979. Following graduation, Phillip was employed by Dresser Magcobar in Oklahoma and Ana-Log, Inc. in Texas. In 1985, Phillip entered the graduate school at Stephen F. Austin State University. During graduate studies, he has received scholarships from Oryx Energy Company and Stephen F. Austin State University, and has also received a research grant from GCAGS. His masters thesis involves an analysis of the Hosston Formation at Tatums Camp Field in Lamar County, Mississippi. Phillip will present the results of his study at the 1990 GCAGS Convention in Lafayette, Louisiana.

RICKARD TOOMEY
University of Texas



Rickard was born in Dearborn, Michigan in 1963 and spent most of his youth in Columbus, Ohio. In 1981, he began attending Brown University where he graduated with an ScB in Geological Sciences in 1985. Since 1985, Rickard has been pursuing a PhD in Geology from the University of Texas. His dissertation concerns the Late Pleistocene and Holocene vertebrate fauna of Hall's Cave, Kerr County, Texas. Rickard's foremost research interests are the use of vertebrates for paleoenvironmental and paleoecological reconstruction and, the applications of the electron microprobe and scanning electron microscope in vertebrate paleontology. He has recently published on the use of bat fossils in Quaternary environmental reconstruction diets of fossil mammals. While at UT, Rickard has been a teaching assistant for numerous courses and is currently an assistant instructor.

KAREN MARKS
UNIVERSITY OF HOUSTON

Karen is currently pursuing a PhD in Geophysics from the University of Houston. She received a BS in Geology from the University of Florida in 1977 and received an MS in Geophysics from Boston College in 1982. While at the University of Houston, Karen has been awarded a teaching assistantship each year and has taught labs in both geology and geophysics. She has been the recipient of numerous scholarships, including the SEG Carlton Award Scholarship, the SEG Education Foundation Scholarship, the Milton Dobrin Outstanding Geophysics Student Scholarship, the Natural Science and Mathematics Excellence Scholarship, and the UH Geological Alumni Association Scholarship. Karen's dissertation topic is "Geophysical Investigation of the Australian-Antarctic Discordance Zone". Part of her dissertation research has been performed at the Naval Research Laboratory and Scripps Institution of Oceanography. Karen's dissertation work has resulted in several papers and she was awarded an Outstanding Student Paper Award by the Geodesy Section of the American Geophysical Union in 1988.

KIM GUIDRY
Lamar University

Kim is a native of High Island, Texas and is currently working towards her BS degree in geology from Lamar University. While attending Lamar, she has been active in the Lamar University Geological Society, of which she is currently vice president. Kim has received the Desk and Derrick Club Scholarship for Outstanding Female Geology Student and has been on The Dean's List at Lamar three times. Her future plans are to pursue graduate studies in either petroleum geology or hydrogeology.

BUSINESS SIDE OF GEOLOGY

TAX LAWS, FINANCING OPTIONS IMPACT SMALL, MEDIUM-SIZED INDEPENDENTS

By Jim Houghton, Arthur Young & Co., Tulsa
Reprinted with permission of the Oil & Gas Journal

Independent oil and gas exploration and production companies are down to their "fighting weights," even with overheads trimmed and managements more alert and efficient than any time in recent memory. That's the good news.

The bad news is that our country's tax structure, financing sources, and low prices for oil and gas seem to be conspiring to keep the independents from doing what they do best: searching for and producing oil and gas.

Independent producers drill about 85% of the wells in the U.S. Small to medium-sized companies are thought to account for in excess of 50% of the wells drilled. Increasingly, these independents — those without refining and marketing capabilities — are being caught in a relentless economic vise.

Our country's tax policy plays a significant role. In the earlier years of the income tax laws through the 1960s, tax policy clearly contained elements designed to boost oil and gas exploration and production. Today, however, there are elements that act to discourage such investment.

Tax burdens. In recent years, we have seen two tax provisions that many feel are highly discriminatory against the industry.

The first of these is the alternative minimum tax, a headache in itself in that it requires many taxpayers to maintain virtually two sets of tax accounting records. Here's how it works: Taxpayers are required to compute their tax liability under the general rules and compare this to a flat rate tax of 20% for corporations or 21% for individuals on taxable income computed under the alternative minimum tax system. Whichever of these computations yields the larger tax is the taxpayer's tax liability for the year.

This tax provision poses two significant problems for independent producers: (1) excess percentage depletion is not deductible and (2) the deduction for intangible drilling costs is limited to 65% of the taxpayer's taxable income from oil and gas. The tax law does provide an option of deducting intangible drilling costs over a 10 year period.

The reduction or elimination of these key incentives in the computation of the alternative minimum tax, which have been in the tax laws since the 1920s, has been a tough blow to all independents, but particularly tough for newcomers to the industry. Old-timers, with revenues from oil and gas operations, are in a much better position to drill under the alternative minimum tax structure.

The second recent major disabling tax provision for the industry came with the passage of the Tax Reform Act of 1986. It disallows losses from what are defined as "passive activities." In the case of oil and gas, these provisions apply to limited partners in a partnership formed to explore and develop oil and gas.

Raising funds. Since the 1960s, limited partnerships had been considered an ideal vehicle for raising significant amounts of outside risk capital vital to the industry. Again, new investors took the brunt of the hit. People who had previously invested in oil and gas limited partnerships could continue to participate in oil and gas ventures within the new limitations.

Interestingly, independents have had a tougher time in the search for drilling funds than integrated companies. Integrated companies may use profitable downstream operations in refining, marketing, and petrochemical activities to generate funds for exploration. On the face of it, independents seem to be the "odd man out."

Contrary to popular belief, banks are still making oil loans. Banks in the oil producing states are making loans based on conservative pricing scenarios, some as low as $10/bbl. Generally speaking, existing producers get the attention of lenders, and newcomers need not apply.

Loans are based on existing production. Realistic projections on the life of the production are crucial. Independents who are not highly leveraged will, of course, receive the most favorable reception from bankers.

A few publicly held independents are having some success generating cash to drill good prospects through the securities markets. However, more recent success seems to have come through private placements, with institutions such as insurance companies.

"Contrary to popular belief, banks are still making oil loans...Generally speaking, existing producers get the attention of lenders, and newcomers need not apply."

The investor agrees to buy stock in the company and also to invest funds in the company's drilling prospects. This arrangement has been successful in generating needed cash, but the downside is that the independent is giving up part of his equity at a time when the company's stock prices are probably depressed. There's a tradeoff.

There have been a few deals where pension funds have invested in oil and gas ventures. Pension funds generally work through an arrangement where their participation is in the form of a royalty interest.

Fairly severe restrictions on the kinds of investments pension funds can make, as well as their tax liabilities, have limited the success of this borrowing option, however. A lot of attempts for this source of funding have been made, but the success rate to date has been quite modest.

Some independents have had some success generating funds through the public offering of bonds or notes based on the price of crude oil or natual gas. The base rate is generally several percentage points below what the company would have to pay on the open market.

The principal amount, carrying an interest rate that never goes below base, comes due at a specified time. Interest rates are adjusted (perhaps every 6 months) on a formula related to identified pricing sources for oil and gas.

The interest rate increases as the price of the product increases, topping out at perhaps 20%. This form of generating funds is a hedge for the independent who will pay more as his ability to pay increases.

However, there are not a lot of these deals around, probably because they are not inexpensive and they require some effort on the part of the independent to find a suitable underwriter.

In today's economic environment, tax incentives are much less of a consideration for investing oil and gas operations than previously. New tax policy rewards success more than ever, but it is also much harder on failure. As any independent will tell you, it's tougher to get loans at banks (it may be hard to find a bank), access to securities markets is limited, and generating funds internally has been severly affected by recent OPEC policy failures.

Economic outlook. The economic picture for independents is not totally bleak, however. Small and medium-sized companies can work effectively within the tax structure to obtain orderly growth. They can also generate funds for exploration and production.

Here are some options:

General partnerships, which are not subject to the limitation on losses from passive activities, are being used to replace limited partnerships as an investment vehicle. These programs may contain a provision to permit the investor to convert his general partnership interest into a limited partnership interest after tax deductions have been taken from drilling.

The general partnership investor faces risk during exploration and development, but is not exposed to liability after conversion of the general partnership interest to a limited partnership interest. With insurance coverage to ease the initial risk, this arrangement is considered an attractive option for some investors.

Strategic planning taking into account a range of variables under the alternative minimum tax can have a favorable impact on a company's federal income tax liability. Prudent independents are planning the exploration and drilling programs they can support by projecting their income into the future based on a "best guess" price scenario. These projections establish the level of exploration and development activity which can be sustained without incurring deductions for intangible drilling costs or percentage depletion for which there is little or no tax benefit.

The projections therefore may dictate the independent's level of activity for generating drilling prospects and assist in determining the desirability of selling or farming out existing prospects. The fruits of this planning will not be realized if there is not a periodic updating of these projections for changes in pricing assumptions and the results of drilling.

Mergers and acquisitions have become an increasingly important tool to increase a company's oil and gas reserves, depending on the asset value of the acquired entity and — probably equally important — the geographic fit of the target company's oil and gas production.

The bottom line on raising funds for exploration and production activity is that at any given price for crude oil, there will be prospects that are attractive to drill. Those will be developed according to economic incentives, not tax incentives as in years past. It's certainly a new ball game, but prudent independents can operate effectively.

THE AUTHOR

Jim Houghton, a partner with Arthur Young & Co., has been active in the oil and gas industry for 12 years. He is the firm's lead oil and gas industry specialist, as well as director of taxes in Arthur Young's Tulsa office. Houghton received undergraduate and LLB degrees from the University of Kansas. He is a member of the American Institute of CPAs, the Oklahoma Society of CPAs, and the tax committee of the Independent Petroleum Association of America. He is editor of Arthur Young's Oil and Gas Federal Income Taxation (Commerce Clearing House), and coeditor of Taxation of Mining Operations (Matthew Bender & Co.)

DIGITAL DIGEST

GIS AND PETROLEUM GEOLOGY: A TYPICAL HOLLYWOOD PRODUCTION.

By Mark W. Hodson

Last November, I was fortunate enough to attend the National Computer Graphics Association's (NCGA) annual conference on Geographic Information Systems (GIS) and AM/FM (automated mapping/facilities mapping). The conference was held in Los Angeles, California, at the Westin Bonaventure Hotel, contemporaneously the site of filming for an upcoming science fiction movie, *Solar Crisis*, with Charleton Heston and Peter Boyle.

On the surface, you might think the two events would have little in common. At first glance, GIS appears to be extremely different from Hollywood movies. However, both organize large numbers of discrete objects into wholes that, potentially, are greater than the sums of their parts.

"Both (GIS and Hollywood) organize large numbers of discrete objects into wholes that, potentially, are greater than the sum of their parts."

A GIS is a database and mapping software package for spatial data--data that describes spatial entities, like wells, pipelines, and reservoirs. By applying the magic of topology, a branch of mathematics, a GIS makes it relatively fast and easy to identify, compare, extract, or otherwise manipulate the data based on its spatial location. A GIS also allows you to use your data without specifying API numbers, lease names, shotpoint or line numbers, or other traditional identifiers. Since GIS's can display your data in graphic form (e.g. maps), they can be very useful in assembling petroleum-related data into displays that help develop geologic interpretations and expand such interpretations into reservoir models, prospects, and other such desirable things. Ideally, GIS applications lead to discovery wells, new fields, enhanced recovery, and other moneymaking activities.

On the other hand, a Hollywood movie organizes a large number of synthetic places, people, and events. The movie makers find or create spatial, temporal, and interpersonal relationships that organize these synthetic entities into a coherent story. A successful movie will bring in more money than it cost to produce it.

The filming of *Solar Crisis* and the GIS conference also exhibited similarities.

Both featured big names. The movie had well-known stars and a famous director. The conference featured industry-recognized data modelers, including 3-D interpretive modelers from Mobil and Exxon, and 3-D stratigraphic forward modelers from Stanford. The big vendors of the GIS world were there, too. ESRI was showing Arc/Info, and Intergraph was there with both hardware and software. Major mapping software vendors Dynamic Graphics and Zycor (in alphabetical order) were showing their GIS-related products. Operation Database, featured in AAPG's Geobyte magazine, was there, with their comparison of several GIS products.

Some of these names may be unfamiliar to many of you. One in particular, Operation Database, particularly deserves a few words of explanation. Representatives from several petroleum companies formed Operation Database to survey the database-related software packages available to the industry and determine how appropriate each is for petroleum applications. Operation Database cut its teeth on a study of PC-based well data management systems, publishing the results in AAPG's Geobyte magazine in November, 1988 and February and April, 1989. Since data management is a large part of GIS, Operation Database next turned its attention to GIS. Sample data and a problem set were prepared and distributed, surveys were compiled, and results were presented at the NCGA mapping conference and printed in the October and December 1989 issues of *Geobyte*. Results also were presented at Houston Geotech '90, and a summary is scheduled for presentation at AAPG's annual conference in San Francisco this June.

Getting back to the hotel, both the movie and the conference provided considerable "flash." The movie featured exotic costumes, attractive players, and the lights and decorations of the sets. The conference provided live demos, and papers describing successful, glamorous projects.

"The movie lights set off the hotel's sprinkler system, dousing sets, personnel, and spectators...'

Neither came off without a hitch. The movie lights set off the hotel's sprinkler system, dousing sets, personnel, and spectators alike; the hotel concierge's desk resembled the base of a waterfall. At the conference, normally well-behaved computers and their connections with graphic projectors suddenly developed glitches. When it came time for a technical paper on the wonders of 3-D reservoir modeling the video projector suddenly decided it had no idea what the attached computer was trying to send it. And a presentation of a package that fills sedimentary basins with realistic sediments while you watch repeatedly hiccuped and required restarting.

Both yielded interesting insights to those with the patience and persistence to observe the goings-on for an extended time. A movie involves endless coordination of countless details; anytime any two things don't meet up properly,

whether it's an actress and her costume or a set and the particular group of lights the directors decide it requires, an observable glitch occurs. The problem sets on sample data that comprised Operation Database for GIS consistently pointed out weak spots in the various packages. Most GIS's evaluated were either "general-purpose" GIS's or were originally written for some industry other than the petroleum industry. The "other-industry" models typically had to be stood on their ears to do many of the tasks the Operations Database people thought up; many were downright impossible. The general-purpose GIS's all require varying degrees of customization before they can address specific tasks; traditionally, the customer is expected to perform, or at least pay for, such customization. The ranking in-house applications experts of the largest vendor of generalized GIS systems spent six man-weeks on the problem set, and were able to complete only 70% of the tasks. Like most vendors of generalized GIS's, they found it very difficult to post seismic shotpoint data on maps. They weren't even close to the capabilities and flexibility I have come to expect from petroleum-related computer mapping packages. The best of the petroleum-specific GIS's wasn't perfect, either. The package didn't handle lease mapping. And it was part of a "complete" exploration system, which ran only on the vendor's not-inexpensive hardware, with the vendor's databases and the vendor's own software for other non-GIS applications. You could say they presented a complete solution, but to a partial problem.

To wind up on a bright note, the technical people of both the movie crew and the GIS vendors impressed me with their knowledge and abilities. The lighting crew was a whiz at quickly setting up just the right lights in exactly the right places. The makeup artists worked rapidly, but with consistently impressive results. The technical representatives of the GIS vendors all knew and understood their products. The vendors obviously had all spent significant time studying the petroleum industry and the Operation Database problem set. While the vendors may not yet have achieved perfection in petroleum applications, most seem to have a clear view of what they will have to do to meet our needs.

"While the vendors may not yet have achieved perfection in petroleum applications, most seem to have a clear view of what they will have to do to meet our needs."

Operation Database for GIS provided an opportunity for the petroleum industry and GIS vendors to evaluate each other as potential clients and suppliers. Both apparently liked what they saw. More GIS packages are becoming better suited to petroleum applications. On the other side of the equation, more petroleum industry personnel are learning about GIS, appreciating its potential, and actively seeking the right GIS for their applications.

Learning opportunities have been plentiful as of late. Both last fall's Denver Geotech and February's Houston Geotech '90 offered GIS short courses, and AAPG has slated a GIS course in Houston for April 6. NCGA will hold their Mapping & GIS convention in Houston this year on August 26-29, with tours of local GIS installations on August 30. For more information on the convention contact the NCGA at 703-698-9600.

THE ARCHIE CONFERENCE

Sponsored Jointly by the
American Association of Petroleum Geologists
Society of Exploration Geophysicists
Society of Petroleum Engineers
Society of Professional Well Log Analysts

THE INTEGRATION OF GEOLOGY, GEOPHYSICS, PETROPHYSICS, AND PETROLEUM ENGINEERING IN RESERVOIR DELINEATION, DESCRIPTION AND MANAGEMENT

OCTOBER 22-25, 1990
THE HOUSTONIAN CONFERENCE CENTER
HOUSTON, TEXAS

Conveners: Robert Sneider, Wulf Massell and Rob Mathis

CALL FOR ABSTRACTS

The American Association of Petroleum Geologists (AAPG), the Society of Exploration Geophysicists (SEG), the Society of Petroleum Engineers (SPE), and the Society of Professional Well Log Analysts (SPWLA) are jointly sponsoring the Archie Conference to promote multi-discipline work and communication to improve the detection, delineation, development, and management of hydrocarbon reservoirs. The inaugural conference will be held October 22-25, 1990 at The Houstonian in the Galleria area, Houston, Texas.

The theme for the first Archie Conference is:

THE INTEGRATION OF GEOLOGY, GEOPHYSICS, PETROPHYSICS AND PETROLEUM ENGINEERING IN RESERVOIR DELINEATION, DESCRIPTION AND MANAGEMENT

The Conference encourages multi-disciplinary contributions and multiple presenters. Major areas of interest are:

- Utilization of Geological, Geophysical and/or Engineering Technologies to Increase Hydrocarbon Recovery in New and Old Fields.
- The Expanding Role of Geophysics in Production.
- Use of 2D and 3D Seismic in Reservoir Delineation, Development, Supplemental Recovery and Surveillance.
- Use of VSP and Borehole Tomography in Reservoir Delineation.
- Value of Geostatistics in Reservoir Description.
- Reservoir Zonation, and Heterogeneity From Outcrops and Subsurface Data.
- Quantification of Geological, Geophysical and Petrophysical Data For Reservoir Characterization and Reservoir Modeling.
- Integration of Reservoir Modeling With Reservoir Simulation and Comparison of Predicted vs. Actual Production Performance.
- The Use of Workstations and 3D Graphics to Improve Geoscience and Engineering Integration.
- Creating and Managing Multi-Disciplinary Teams and the Value of Synergistic Teamwork.

You are invited to attend and contribute to this conference. Please submit an abstract for oral or poster presentation that contributes to the conference theme. Abstracts are due April 30, 1990. Authors selected by the Program Committee will be notified by mail in May.

There will be approximately 100 people attending the conference with about a third making presentations. The others will participate in the discussions. Each oral presentation will be allotted 25 or 50 minutes, depending on the subject and number of speakers, with additional time allocated for questions and discussion after individual or groups of papers. Space will be available for poster sessions if desired. The proceedings will be published after the conference if enough authors are willing to publish their contributions.

The conference will have scheduled morning and afternoon sessions. The anticipated daily schedule is as follows:

7:00 - 8:15 a.m.	Breakfast (provided)
8:15 - 12:00 noon	Morning Session
12:00 - 1:30 p.m.	Lunch (provided)
1:30 - 5:00 p.m.	Afternoon Session

Registration for the conference will be held from 2:00 p.m. to 6:00 p.m. at The Houstonian, October 21, 1990. A welcoming reception is scheduled for Sunday evening from 6:00 - 7:30 p.m. This will be a good time for participants to meet the speakers.

Registrations for this conference must be received in Tulsa by May 15, 1990. Should it become necessary for you to cancel, please notify us as soon as possible so that we may offer your position at the conference to someone else.

Should you have any questions regarding the conference, please contact Debbi Boonstra, AAPG Education Department, at (918) 584-2555.

Sincerely,
Conveners: Robert Sneider, Wulf Massell, and Rob Mathis

GUIDELINES FOR PREPARING ABSTRACT FORM

Technical papers presented at the Archie Conference are selected from abstracts submitted to the Program Committee. The abstracts are evaluated on the information supplied on the abstract form in accordance with the following criteria:

1. The proposed paper must contribute to the theme.
2. Information in the abstract must be technically correct.
3. The Program Committee is looking for abstracts that contain new knowledge or experience. The substance of the proposed paper must not have been published previously.
4. The abstract must be written in a style that ensures that the proposed contribution will not be commercial in nature.
5. The abstract should be 250-300 words.

TITLE/AUTHOR INFORMATION

Enter a title that is concise yet descriptive of the substance of the proposed paper. Company name and trade names are prohibited in paper titles. List the Corresponding Author (the author with whom the Committee will correspond on all matters), and include appropriate company and complete address information. If the paper will be co-authored, list the names in the order they should be printed in the program. Provide addresses for all authors on a separate sheet. Indicate whether the substance of the paper has been published previously; and, if so, where and when.

THE ARCHIE CONFERENCE
SPONSORED JOINTLY BY THE AAPG, SEG, SPE AND SPWLA
OCTOBER 22-25, 1990, HOUSTON, TEXAS

Title _____

Corresponding Author (with whom Committee will correspond) _____

Company _____

Mailing Address _____

City _____ **State** _____ **Country** _____

Zip/Postal Code _____ **Telephone** _____ **Telex/Fax** _____

Co-authors: _____

(List in order they should be printed in program. Provide company affiliation, addresses and phone numbers of all authors on separate sheet.)

Will your company allow you to present and/or publish all of the information described in your abstract?

Yes_____ **Not Sure**_____ **if not sure, please explain** _____

_____

_____

ABSTRACT: The abstract, containing 250-300 words, should be provided in the space below. If additional space is needed, please continue abstract on separate page.

☐ **Oral** ☐ **or Poster Session (check one)**

Return to: AAPG-The Archie Conference, P.O. Box 979, Tulsa, OK 74101-0979

ABSTRACT DEADLINE: 30 April 1990

EXPLORATION ACTIVITY REVIEW

By Bill Eisenhardt
Consultant, Geol. Representative—Geomap Co.

National Rig Count: March 5—894; Year Ago—761

GULF COAST

Texas

Tesoro Exploration & Production is moving in a drilling rig at their #1 Guerra, a 13,500' **Wilcox** wildcat in extreme southwestern **Starr** County. The new test is about 3600' south of the bottom hole location of the nearest Falcon Field well (in adjoining Zapata County), productive from the Wilcox above 9600'. Deeper Wilcox pays (as deep as 15,546') are found 3 miles south in Falcon Dam Field. At the Carrizo Wilcox horizon the wildcat spots on the southeast flank of the Falcon Field structure, with deeper structure speculative due to a lack of deep control.

Exxon is continuing to explore its vast King Ranch leases for Frio and Vicksburg pays with a scheduled 10,850' **Vicksburg** wildcat in north-central **Kleberg** County. The #97 King Ranch Chiltipin is 1 2/3 miles south of predominantly Frio and some Vicksburg production at Luby Field. At the Frio horizon the new test spots on the south plunging extension of the large rollover anticline upon which Luby Field is located.

Farther north, in adjoining **Nueces** County, Union Pacific Resources will drill a significantly deeper pool wildcat in the Baldwin Field area. The #1 Countiss, projected to 18,150', is about 1 1/2 miles north of Amoco's recent successful deep **Vicksburg** wells in Shield Field, the #1 Deal and #1 Merriman Gas Units, which found gas pays between 14,796' and 15,230', and extended Vicksburg production a considerable distance seaward from its previous downdip limit. At the *Nonion struma* horizon the new test spots on the east flank of the faulted Baldwin Field anticline.

Wolverine Exploration has set pipe at the top Austin Chalk at the #1-H Halsell Ranch 29, a 7200' horizontal **Austin Chalk** test in Four Aces Field in **Maverick** County, productive from the Olmos and Austin Chalk. Bottom hole location of the wildcat will be about 1800' southeast of the Union Producing # 1-29 Halsell, which encountered 990' of Austin Chalk and initially flowed 276 BOPD from perfs 4040-4140' in the basal section of the chalk. At the Edwards horizon the new test spots on the south flank of a large southeast plunging structural nose.

Farther east, in far western **Karnes** County, Rio Exploration will drill a 7000' **Wilcox** test 2 miles north of Wilcox oil production at Buehler Field. The #1 Nuhn, et al is currently surrounded by dry Wilcox tests. At the top Wilcox horizon the wildcat spots on southeast dip, downthrown to a local down-to-the-basin fault.

Tredegar Properties have staked their #1 Pate Unit, an 8000' **Yegua** test in southeastern **Montgomery** County, 1 3/4 miles west of Yegua gas production at the one-well Splendora Southwest Field. The lone producer at Splendora SW Field, the Hughes & Hughes #1 Masters, initially flowed 2,025 MCFGPD (AOF) from 7328-47'. At the top Yegua horizon the wildcat appears to be located on southeast dip between two down-to-the-coast faults.

Santa Fe Energy will evaluate the **deep Vicksburg** at a proposed 13,500' wildcat 3 3/4 miles south of Vicksburg oil and gas production at Whites Bayou South Field in northern **Chambers** County. The #1 Leggett is one mile south of Gulf's #1 Gilfillian, a 12,377' dry hole which encountered Vicksburg sands of reservoir quality from 8980' to 10,100', but only minimal sand development between 12,040' and 12,377', probable target at the new test. At the *Textularia warreni* (Vicksburg) horizon the wildcat spots near the crest of a southeast plunging nose.

In southeastern **Chambers** County, Phylko Energy has staked a 9200' **Frio** test 3 miles southwest of Frio production at Oyster Bayou Field. The #1 Cline is about 3000' east of the 14,500' dry Cities Service #1-B Dawson which logged thin to massive upper Frio sands. At the top Frio horizon the wildcat appears to be located on the extreme southwest flank of the faulted Oyster Bayou Field structure.

South Louisiana

Gulf Coast Energy will drill a 14,500' **lower Tuscaloosa** test in extreme western **St. Helena** Parish, about 5 1/2 miles northeast of lower Tuscaloosa production at Baywood Field. The #1 Harwell, et al is just east of and slightly updip from a pair of deep dry holes, and appears to be situated on a subtle southwest plunging nose along regional dip.

MESOZOIC TREND

East Texas

Wisenbaker Production has staked the #1 Williams, a 12,000' **Travis Peak** wildcat on the southeast flank of the Whitehouse salt dome in southern **Smith** County and 3 1/2 miles southwest of Paluxy production at Whitehouse Field. Several dry Woodbine tests have been drilled around the dome, and most recently, a 7600' Paluxy wildcat was drilled by Roosth & Genecov on the north flank, for which no details were released.

Farther north, also in **Smith** County, Sklar & Phillips will drill an 11,300' **Travis Peak** test 2 miles northwest of Rodessa production at South Hitts Lake Field. The #1 Wilson-Riley is about 2000' east of the Standard Oil of Texas #1 Lewis & Floyd, a 10,937' Travis Peak dry hole which cored and drill stem tested the Paluxy with no shows reported. At the base Massive Anhydrite horizon the wildcat spots on the southwest flank of the large faulted Hitts Lake-Shamburger Lake anticline.

continued

North Louisiana

A 12,500' **Hosston** wildcat has been staked by Harvey Broyles in northern **Winn** Parish, about 3 1/4 miles southwest of Wilcox production at Dodson Field and over 8 miles east of nearest Hosston production at Calvin Field. The #1 Louisiana Mineral LTD is 3 miles southwest of a 15,000' dry hole (Getty #1 Crown Zellerbach) which unsuccessfully tested the Rodessa and Cotton Valley. At the base Massive Anhydrite horizon the wildcat spots near the crest of a large southwest plunging structural nose.

TMR Exploration will drill an 8100' **James Lime** test 3 miles east of Hosston gas production at the one-well Indian Creek Field in southeastern **Jackson** Parish. The #1 M.F.P. is one mile west of the 10,800' dry Bass & Franks #1 Olinkraft "F" which logged porous and permeable James limestone. At the base Massive Anhydrite horizon the wildcat spots near the crest of a southeast plunging nose with possible closure.

Mississippi - Alabama

Oryx Energy is preparing to drill the #1 Fairchild-Windham Exploration, a proposed 15,000' test on the south flank of Dont Dome in eastern **Covington** County, Mississippi. The wildcat is about 3300' west of the Sun Exploration #1 W.W. Speed, discovery well for Leaf River Field and productive from the Rodessa (13,410-420') and Sligo (14,029-046'). Oryx later confirmed this discovery at their #1 S.R. Speed, on the southeast flank of Dont Dome, which was completed in the Rodessa. Exploration for **Lower Cretaceous** production around the flanks of shallow piercement salt domes in the Mississippi Salt Basin is expected to continue.

Farther east, in northern **Wayne** County, Weeks Exploration has completed a new **Smackover** discovery about 1/2 mile southwest of Eutaw through Cotton Valley production at Chaparral Field. The #1 Hall Industries flowed 436 BOPD and 265 MCFGPD from a lower zone at 13,721-761', and 786 BOPD and 476 MCFGPD from upper perfs at 13,414-614'. At the top Smackover horizon the new producer spots near the crest of a downthrown fault closure, in close proximity to a large down-to-the-southwest fault.

Pruett Production has reported an apparent **Smackover** discovery at the #1 A.T.I.C. 18-13, 2 1/2 miles northeast of Smackover production at Huxford Field in **Escambia** County, Alabama, opening East Huxford Field. Well logs indicate hydrocarbons in the Smackover between 14,429' and 14,802', resulting in the staking of nine other locations over the apparent structure by PG&E, Fina and Paramount. Accumulation is probably over a pre-Jurassic basement high similar to that at Huxford Field and others along the updip Smackover trend.

INTERNATIONAL HIGHLIGHTS

Provided by PETROCONSULTANTS, Foreign Scouting Division, Geneva, Switzerland

LATIN AMERICA

Argentina (Onshore)

San Jorge Cia has spudded its first wildcat on the Huantraico block in the **Neuquen basin**, about 15 km (9.3 miles) southeast of YPF's Filo Morado Field. The Curamched 1, located on an **Upper Neocomian** structural prospect, is scheduled for a 2700 m (8859') TD.

Aruba (Offshore)

PDVSA's affiliate Maravan spudded its first commitment well, the Mero 1, on Block III in the **SW Aruba basin** off the island's west coast. The wildcat is projected to 3900 m (12,796'), presumably to test **Tertiary** clastics and limestones.

Ecuador (Onshore)

Petro-Canada has completed the Cachicayu 1 wildcat in Oriente Block 9 as an oil discovery after testing 2,300 BOPD (26° API) from the **Cretaceous Hollin** formation and 200 BOPD of 12 API crude from the **Cretaceous Napo U** sand. This is the first well drilled by Petro-Canada in Block 9.

Petroecuador has completed their Frontera 2 outpost, the first appraisal well drilled within the Ecuadorian-Colombian joint exploration area, flowing an aggregate 2,593 BOPD (34-35 API) from the Napo T and Lower Napo U sands. The new producer is located 1.85 km south of the Quillacinga oil discovery on the Colombian side of the border.

EUROPE

Italy (Onshore)

Fina has announced two **Pliocene** gas discoveries north of Pescara in the **Marche-Abruzzi** basin. The San Atto 1 wildcat was drilled in the San Mauro concession application area, only about 1 km WNW of the 1987 San Mauro 1 gas

discovery. The Fonte dell'Olmo 1 discovery was made in the Roseto degli Abruzzi permit, 3.5 km (2.2 miles) SSE of Coparex's 1985 Savini 1 gas completion.

Turkey (Onshore)

Aladdin's wildcat, the Zeynel 1, flowed 320 BPD of 30° API crude from the **Upper Cretaceous Sayindere** formation. The discovery, located in License 2479 in District XII, is about 15 km (9.3 miles) south of Adiyaman, in the **SE Anatolian basin**. At the nearby Nemrut 1 wildcat in License 2569, Aladdin tested an unreported amount of 17.3°API crude from the Upper Cretaceous Karababa formation.

Also in the **SE Anatolian basin**, Arco's Migo Kuzey 1 recently yielded encouraging amounts of 36.3° API oil on a test of the **Upper Cretaceous Mardin** formation. The well, drilled last August, is located in License 2746 in District XI, about 50 km (31 miles) northwest of Diyarbakir.

AFRICA

Egypt (Onshore)

Phillips made another oil discovery on its South Umbarka concession in the Western Desert. Their Sethos 1 wildcat reportedly tested 4,000 BOPD from **Cretaceous** clastics. The Sethos 1 structure is located adjacent to the Phillips Khepri 1 discovery which tested 1,200 BOPD and 27,330 MCFGPD from two pay zones in the **Cretaceous** sequence early last year.

Libya (Onshore)

In the **Sirte basin**, Zueitina discovered oil at E-15-103, located immediately southeast of Intisar Field. The wildcat yielded 2,000 BOPD (38° API) from an unreported formation below 9050'.

Botswana (Onshore)

PCIAC and the Geological Survey Department (GSD) of Botswana spudded the Masetlheng Pan-1, a 4000 m (13,124') stratigraphic test, the first to be drilled in the country. Location is in the Kalahari area (**Ncojane basin**) of western Botswana.

Nigeria (Onshore)

Shell has announced three new significant discoveries in the **Niger Delta** with estimated reserves of 110 MMB oil, 13 MMB condensate and 320 BCF gas. The Diebu Creek East 1 discovered a 70 million barrel field (19.8° API) some 5 km (3.1 miles) east of the Diebu Creek Field, a 200 million barrel field discovered in 1966. The Okwefe 1, about 8 km (5 miles) SSW of Panoco's Ogharefe Field, discovered some 40 million barrels of oil; and the Oguail 1, about 2 miles SSE of Ibigwe Field, was completed in November with estimated reserves of 13 MMB condensate and 320 BCF gas.

NEAR EAST

Oman (Onshore)

PDO has completed the Jisr 1 as an oil discovery in Dhofar, 23 km (14.3 miles) east of Marmul Field. Producing zone is probably in the **Haushi Group** (Carboniferous-Lower Permian).

Saudi Arabia (Onshore)

Saudi Aramco has made a third oil and gas discovery 124 km (77 miles) southeast of Riyadh, following the Al Hawtah 1 in June and the Dilam 1 in October of last year. The Raghib 1 tested a high quality, sulfur-free crude and gas in Paleozoic sandstones at an undisclosed depth. Preliminary tests indicate that the new discovery could produce 3,650 BOPD and 10,000 MCFGPD.

FAR EAST

Korea (Offshore)

The Hadson-Ultramar-Pedco Group has spudded its first wildcat in Block V, about 210 km (130 miles) south of Cheju Island. The Okdom 1, projected to 3200 m (10,499') is probably targeted for the **Tertiary**. The only previous test in Block V, Texaco's KV-1, located 76 km (47 miles) NNE, bottomed in the basement and was abandoned in 1973 after encountering gas shows in the Pliocene. The only significant discovery in the basin is the Chinese test, Longjing 2, some 150 km (93 miles) south, completed as a gas well in 1982.

Indonesia (Shelf)

Conoco's Alu-Alu E-1 in the South China Sea was completed as an oil, gas and condensate discovery, flowing an aggregate 12,289 BOPD, 61,570 MCFGPD and 187 BCPD from the **Miocene**. Location is in the Natuna Sea Block B, about 160 km (99 miles) west of Conoco's Udang oil field. The first appraisal well was abandoned with oil shows in late December, but further delineation drilling is planned.

AUSTRALIA

Queensland (Onshore)

Delhi's Bowen 1 wildcat in the **Cooper-Eromanga basin** was suspended as a new field discovery, flowing 3,400 BOPD (44°API) from 1672-1681 m (5486-5515') in the **Jurassic Adori** sandstone. Location is in license ATP-259-P, Naccowlah block. The announced oil flow is three times better than other recent discoveries in the Cooper-Eromanga basin. In addition to the Adori sandstone pay, the overlying Westbourne formation and underlying Hutton sandstone also contained oil shows.

Western Australia (Offshore)

In the **Carnarvon basin**, Wapet has suspended the Cowie 1 wildcat after testing commercial rates from two different intervals (6,390 BOPD and 1,950 MCFGPD from 3603-3612'; 1,590 BOPD from 3580-3593') in the **Cretaceous Flacourt** and **Barrow Group** reservoir sections. Location of the discovery is in license TP/3, 8 km (5 miles) south of the Saladin oil field.

"Support those who support our Society."

PO. Box 370931
Montara, CA 94037-0931

340 Seventh Street
(415) 728-5244

VICTOR H. ABADIE III
CONSULTING GEOLOGIST

CERTIFIED PETROLEUM GEOLOGIST, AAPG, NO. 3936
CALIFORNIA REGISTERED GEOLOGIST, LIC. NO. 4040

Tribow Oil And Gas Corp.

BURTON C. BOWEN
President

WILLIAM D. TURNER
Geologist

ROBERT H. FORDE
Geologist

1010 Lamar
Suite 1580
Houston, TX 77002

Telephone
(713) 650-3614

LOUISIANA TEXAS

JACK COLLE

JACK COLLE & ASSOCIATES
CONSULTING GEOLOGIST & PALEONTOLOGIST
911 WALKER - SUITE 321
HOUSTON, TEXAS 77002

JACK COLLE
713 - 228-8221
RES. 622-9555

J. G. WARD
713 - 228-8221
RES. 457-7298

BILL BAEHR
CONSULTING GEOPHYSICIST

BUS. (713) 271-9131
RES. (713) 771-4812

8302 BRAESVIEW
HOUSTON, TEXAS 77071

CROSBIE—MACOMBER
PALEONTOLOGICAL LABORATORY, INC.

Wm. A. Brantley, Jr.

THOMAS M. REILLY
FRANK J. KLOOR, III
W. GRANT BLACK, JR.

Suite 4
2705 Division Street
Metairie, LA 70002
(504)885-3930

W. F. COOKE, JR.
PRESIDENT

Acco Oil & Gas Co.
800 TULLY, SUITE 204
HOUSTON, TEXAS 77079
(713) 531-9290

BAILEY & HATFIELD
OIL & GAS PROSPECTS
5145 STONEWALL DRIVE
HOUSTON, TEXAS 77023

H. BAILEY - GEOPHYSICIST (713) 926-9934
L. HATFIELD - GEOLOGIST (409) 756-4192

EARL BURKE

PEL-TEX OIL COMPANY

FIVE POST OAK PARK
SUITE 1530
HOUSTON, TEXAS 77027
713/439-1530

---

713 360 2711

P.O. Box 5181
Kingwood
Texas
77339

Marilyn Crane
Consulting Paleontologist

Foraminifera & Ostracodes Jurassic to Recent
Specialize in Gulf Coast and Offshore Atlantic

BUYING OR SELLING:
PRODUCTION
OVERRIDES
PROSPECTS
ROYALTIES
LEASES . . .

BRENT A. BARKER

P.O. Box 1402
Houston, Texas 77251-1402
(713) 827-7348

AAPG GROUP INSURANCE PROGRAM
SEG GROUP INSURANCE PROGRAM

JOHN D. BREMSTELLER
BARBARA BREMSTELLER

1013 SAN JACINTO BLDG.
HOUSTON, TX 77002

TELEPHONES
OFFICE 751-0859
RES. 774-3188

Royal Oil & Gas Corporation
Since 1931
M Bank Center
Suite 807 North
500 North Water Street
Corpus Christi, Texas 78471

Wayne S. Croft
District Geologist
Office: (512) 888-4792
Home: (512) 991-7450

TRANS-TEXAS GAS CORPORATION

James H. Barksdale III
President

230 Westcott
P.O. Box 6597
Houston, Texas 77005

Tel. 713/880-0831
Fax. 713/880-0833

T. WAYNE CAMPBELL
PALEO-DATA, INC.
CONSULTING PALEONTOLOGIST AND GEOLOGIST

6619 FLEUR De LIS DRIVE
NEW ORLEANS, LOUISIANA 70124
(504) 488-3711

KENNETH E. DAVIS
GEOLOGICAL CONSULTANT

10806 Archmont
Houston, Texas 77070

Res. 713/469-8727

SPECTRA RESOURCES INC.

Robert H. Barton
President

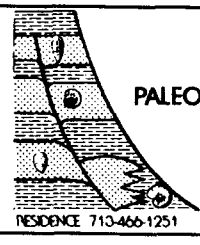
Spectra Resources Inc.
11111 Wilcrest Green Suite 201
Houston, TX 77042

713 974 6061

PAUL H. CARTER, JR.
EXPLORATION MANAGER

McCORD EXPLORATION CO.
6575 WEST LOOP SOUTH
SUITE 280
BELLAIRE, TEXAS 77401

OFFICE (713) 664-4224
HOME (713) 721-1382



BOB DRAKE

PALEO MARKETING, INC.

5625 NORTH WEST CENTRAL
SUITE D-100
HOUSTON, TEXAS 77092

RESIDENCE 713-466-1251

OFFICE 713-690-4255

BSE
B & S Exploration, Inc

JAMES B. BENNETT
Geology

RANDALL SCHOTT
Geophysics

1300 Main Street
Third Floor
Houston, Texas 77002

Bus (713) 650-1378

GENEOS PETE COKINOS
PETROLEUM AND GEOLOGICAL
ENGINEERING CONSULTANT
INDEPENDENT PRODUCER AND OPERATOR

947 HAZEL ST
BEAUMONT, TX 77701

TELEPHONE
(409) 832-0368
FAX (409) 838-3919
3919 E WEAVER

Depositional Facies and Stratigraphic Sequences; Diagenesis and Porosity Evolution; Petrology and Fluorescence Microscopy; Reservoir Description and Zonation; Play Evaluation; Core Studies; Training

JEFFREY J. DRAVIS, PhD
Carbonate Sedimentologist

4133 Tennyson • Houston, Texas 77005
(713) 667-5453 • (713) 529-9028

JACK E. COFFMAN
PRESIDENT

SONORA PETROLEUM CORP.
1201 LOUISIANA, SUITE 3100
HOUSTON, TEXAS 77002

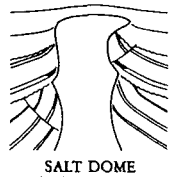
713/659-1044
713/589-2928
TX. P.E. 35812
LA. P.E. 20371

DGSI
WE MAKE GEOCHEMISTRY WORK

WALLACE G. DOW
President

1544 Sawdust Road, Suite 402
Post Office Box 7568
The Woodlands, Texas 77387

(713) 363-2176
FAX (713) 292-3528
Telex 881137 DGSI



SALT DOME
Geological Studies and Development

MARK R. ETHEREDGE
Geologist

7015 W. TIDWELL RD. STE. 111B
HOUSTON, TEXAS 77092

(713) 939-8243 (713) 890-1286

"Support those who support our Society."

"Support those who support our Society."

"Support those who support our Society."

ADVERTISERS

Ashland Exploration Co.
Core Laboratories
Marc B. Edwards
Evergreen Oil & Gas
Forney & McCombs
Four Star Printing Co.
Geco
Geo Lab
Geomap Company
Geophysical Trend Corp.
Gulf Star Petroleum Co.
Halliburton Logging Service, Inc.
Holbrook travel, Inc.
Houston Creative Connections, Inc.
Hydrexco
Integrated Energy Incorporated
Jebco Seismic, Inc.
LCT, Inc.
Mammoth Oil & Gas, Inc.
McKenzie Petroleum Company
Micro-Strat Inc.
Norcene Explorer, Inc.
Omni
Paleo Control, Inc.
Paleo Data, Inc.
Pel Tex Oil Company
Petroconsultants Sales Corp.
Petroleum Information
PetroScan, North America, Inc.
Pierce Petroleum
Prairie Producing Co.
Res Tech Houston
Schlumberger Educational Services
Shannon Exploration
Sinclair Exploration Company
Sonat Exploration
Subsurface Consultants
TGS Offshore Geophysical Co.
TGS Onshore Geophysical Co.
Tauris Exploration, Inc.
Tech-Reprographics, Inc.
Teledyne Exploration
Terra-Mar
Terra Resources, Inc.
TerraTek
Texas Crude
J. Loyd Tuttle
Union Texas Petroleum
Wentworth Energy Inc.
Wesson Energy Corporation
Western Geophysical

Houston Geological Society
7171 HARWIN, SUITE 314
HOUSTON, TEXAS 77036

J. DENNY BARTELL
PARTNER
BARTELL EXPLORATION
ESPERSON BLDG #1520
HOUSTON TX 77002