



Geophysical Society of Houston

VOL. 32, NO. 14

NEWSLETTER

DECEMBER 1997

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Technical Breakfast

Chair - **Scott Sechrist**, 713-961-1804, fax 713-961-9773, email: acoustic@neosoft.com

Technical Breakfasts are scheduled monthly, on the Wednesday of the second full week of each month: Dec. 10; Jan. 14; Feb. 11; Mar. 11; Apr. 15; May 13; June 10 (possible).

Please contact Scott for further breakfast information or to suggest potential topics and speakers.

Breakfast Date:

December 10, 1997

Location:

The Greenspoint Club, "Oak Room", 16925 Northchase, Houston, TX 77060, Phone: (281) 875-0191

Directions:

From Sam Houston Tollway (Beltway 8), take Greenspoint Drive (east) to Greens Road, go right on Greens (south) to Northchase; turn right on Northchase (west) and continue past Exxon building. The Greenspoint Club sign will be visible on right side of the street. The Greenspoint Club is located in the parking garage immediately behind the sign; 16925 Northchase.

Time:

Breakfast from 7:00 - 7:45 a.m.;
Speaker from 7:45 to 8:15 a.m.;
Meeting ends by 8:30 a.m.

Cost: No charge - A full breakfast will be served.

Host Companies:

The GSH would like to thank **Mobil** management for graciously providing both the location and breakfast.

Reservations:

Reservations should be made with the GSH office by 4 pm on *Monday, November 8.*

Subject:

GRAVITY DEFINITION OF CHAPPEL FORMATION PINNACLE REEFS, FORT WORTH BASIN

Speaker:

by: William Cathey, Earthfield Technology

Abstract: An analysis of more than 14,000 commercial gravity stations covering Montague, Wise, Cooke, and Denton counties in the Fort Worth Basin, has revealed that numerous previously unidentified pinnacle reefs may exist and be delineated using gravity data.

Several pinnacle reefs, primarily in Montague County have been successfully completed and have produced both oil and natural gas in the Eanes NW, and Osage fields. These pinnacle reefs, located in the Mississippian age Chappel Formation, are extremely attractive exploration targets due to their location relative to existing facilities, and due to the shallow drilling depths required to test them (<6500 feet).

The identification of these reefs is accomplished by the detailed frequency

GEOPHYSICAL SOCIETY OF HOUSTON

**Joan Henshaw, Office Manager • 7457 Harwin Drive, Suite 301 • Houston, Texas 77036
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Office Hours 7 a.m. - 4 p.m.

Event Reservations Number: (713) 917-0218

email: reservations@hougeo.org • website - http://www.seg.org/sections/gsh/gshhome.html

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Editor's Notes

To insure your information reaches all GSH society members in a timely fashion it must appear in the appropriate newsletter issue. Please check our deadlines and plan your function's publicity strategy accordingly. The newsletter editor must receive materials on or before the corresponding content deadline date.

Remaining 1998 GSH Newsletter Deadlines

Issue February, 1998
Deadline December 18, 1997

Issue March, 1998
Deadline January 15, 1998

Issue April, 1998
Deadline February 19, 1998

Issue May, 1998
Deadline March 19, 1998

Issue June, 1998
Deadline April 16, 1998

Content deadlines occur approximately six weeks prior to publication, usually on the third Thursday of the month.

Technical Luncheon

Chair - **Phil Hosemann**,
713-655-9838, 713-655-7301

There is no Technical Luncheon scheduled for December.

The GSH Technical Luncheon schedule will resume in January.

Technical Breakfast continued from page 1

domain filtering of the gravity data to enhance the positive gravity anomalies produced by these features. The pinnacles are composed of dense carbonates encased in the much lower density Barnett Shale unit, thereby creating a strong density contrast between these formations. The gravimeter is extremely sensitive to these strong contrasts, measuring positive local anomalies associated with these reefs and their adjacent flanking material.

It is therefore possible to quickly and inexpensively identify new lead areas using this technique, and to help determine more efficiently where new 3-D seismic acquisition programs should be conducted.

Speaker Bio: William Cathey is Chief Geophysicist, and Vice President of Earthfield Technology, Inc., for the past eight years. Prior to his joining Earthfield, he served as Staff Geophysicist for the Aero Service Division of Western Atlas International for seven years. Bill has been an active member of numerous geologic and geophysical societies and has served as the Chairman of the Potential Fields Group of the Geophysical Society of Houston and as a member of the Executive Committee of that group for seven years.

SIG Announcements

Interpretation SIG

SIG Chair - **Larry Godfrey**, 281-499-6068, email lgodfrey@intertex.net

The Interpretation SIG will announce four meetings throughout the coming year on topics concerning *Technology for Interpretation*. Larry is actively seeking volunteers to serve on the Interpretation Committee. These volunteers could help to organize meetings, contact and schedule potential speakers, arrange venues, etc. If you are interested in helping out, please contact the SIG Chairman, Larry Godfrey.

Contact Larry Godfrey for meeting information.

Data Processing SIG

SIG Chair - **Young Kim**,
713-966-6156, 713-966-6333,
young.c.kim@exxon.sprint.com

The Data Processing SIG has scheduled nine monthly meetings for the coming year with themes for each of the meetings as listed below. The meetings are scheduled from September 1997 through May 1998, with two speakers at each meeting. The selected dates and topics are:

12/10/97

AVO

Stan Truxillo*, Chengbin Peng

1/21/98

Velocity for depth migration

Alfonso Gonzalez*, Dave McMann

2/18/98

Time lapse (4-D) seismic

Jozica Gabizsch*, Chengbin Peng

3/18/98

Anisotropy

Chengbin Peng*, Richard Verm

4/15/98

Multiple attenuation

Jerry Kapoor*, Richard Verm

5/20/98

Traveltime calculation for depth migration

Ilkka Noponen*, Karl Schleichler,

Jerry Kapoor

* denotes the primary organizer

December Meeting

Date: Wednesday

December 10, 1997

Time:

Social 4:30 p.m.;
presentations 5:00 to
7:00 p.m.

Location:

Amoco Corporation,
580 Westlake Park
Blvd., Houston, TX.

Directions:

Amoco is located off
Memorial between
Eldridge and Highway
6. From Memorial,
turn North on Westlake
Park Blvd., then take
the first left turn.
Proceed to the Visitors'
parking area in the

Data Processing continued on page 4

parking garage. Park towards the South end of the garage and take the elevators down to the ground level.

Follow the walkway across the street and head straight into the Westlake 3 Building. The meeting will be in Rooms 177-179 (ground floor). Upon entering the building, register with the receptionist and go straight through the elevator lobby area to the meeting rooms. NO CHARGE. The Data Processing SIG and the GSH would like to thank AMOCO for sponsoring this SIG meeting.

Cost:

Topic:

Speakers:

Stanton Truxillo, Amoco Corporation; Robert Vauthrin, Western Geophysical

Organizers:

Stan Truxillo*, Chengbin Peng

First Abstract & Bio:

Risk Assessment in Seismic Direct Hydrocarbon Detection

by Stanton Truxillo
Amoco Corporation

Fifteen years of industry experience with AVO has produced numerous successes, but also some great disappointments. The early rule of thumb associating positive AVO with hydrocarbons led to drilling anomalies which occasionally turned out to be other than productive reservoirs: high-porosity wet sands, low saturation "fizz gas", shale on shale contacts, or other unexpected lithologies. Our rule of thumb proved too simplistic. Rock properties analysis and often-bitter experience showed that hydrocarbon AVO signatures varied with hydrocarbon type, age of section, depth, pressure, lithologic details, nature of contact between seal and reservoir, thickness, and other variables.

Several technological developments

improved our subsequent success in direct detection. Where we once did AVO analysis on one or two lines over a prospect, we now routinely use 3D or dense 2D AVO surveys to see if our anomalies make structural or stratigraphic "sense". Processing workstations permit interactive testing of processing parameters, especially moveout or migration velocity, leading to better tracking of amplitudes across CDP or CRP gathers. Pre-stack migration of gathers more-accurately positions energy information on dipping events. Interpretive workstations enable an interpreter to try various displays and interpretations in interactive fashion. Widespread use of the dipole sonic tool provides measured shear data in place of generic estimators such as the mudrock line. Larger rock properties databases show us the complexity of real rock interfaces, including siltstones, shaly sands, laminations, gradational contacts, etc.

Where we once looked only at the AVO intercept and slope, we now look at an array of prestack computed parameters, and crossplots of these. The recent interest in TIV and azimuthal anisotropic effects in AVO is a reflection of our growing sophistication. Paradoxically, it is this technical sophistication with its attendant variation in application techniques which created the need within Amoco for a systematic approach to assessing the confidence and attendant chance of success of DHI-related prospects. In addition, we needed a feedback mechanism to help the organization learn from our past AVO applications to improve business results.

THE EXPLORATION DECISION PROCESS

Several years ago Amoco developed and began applying a process for systematizing the assessment of technical risk in the exploration decision process. This process assesses the likely range of values of the hydrocarbon system components (source, migration pathway, trap, seal, etc.) necessary to place hydrocarbons in the prospect, and uses Monte Carlo statistics to predict a distribution of outcomes in terms of reserves. In contrast to this approach, seismic direct detection (DHI or AVO)

attempts to predict whether hydrocarbons are present in the reservoir now, with no explanation of how or when they got there. The connection between these two approaches is qualitatively obvious, but not quantitatively so: if there are hydrocarbons in the reservoir now, there are implications about all the components in the hydrocarbon system needed to put them there. The dilemma is simply put: in a portfolio management decision, how much weight should be given to the DHI or AVO prediction versus the hydrocarbon systems prediction? The answer is obviously case specific: a 3D DHI prediction in a geological setting where the technology has a proven record of success is more credible than a two-line 2D analysis in an area where the rock properties are less well-known. But how much more credible?

MODEL-DRIVEN APPROACH

In response to the issues listed above, Amoco developed a quantitative rating system for DHI analyses which attempts to assess the confidence of an analysis in the exploration decision process and in exploration portfolio management. We have written a model-based confidence algorithm that mimics the mental checklist an experienced geophysicist might follow, and assigns values to the answers. The algorithm is model-based at both the local or micro scale, and the overall prospect or macro-scale.

The micro-scale model is the usual rock properties model of the expected seismic response at the proposed well location, using full-offset synthetics, fluid substitution, etc. The modeled pay and brine seismic responses predict the ability to discriminate between pore fluids, while consistency between the modeled brine signature and the observed seismic background provides a quality control check of the modelling and of the relative-amplitude seismic processing.

At the macro scale, we expect that the anomaly should fit the overall geological interpretation of the prospect. If the micro-scale model says that the seismic response of hydrocarbon-filled reservoirs and brine-

filled reservoirs will be detectably different given the local rock properties and seismic acquisition parameters, then obvious criteria for defining an anomaly follow: structural conformance, contact events, stratigraphic overprint, "sag" and attenuation in underlying reflectors, etc.

The above criteria, weighted for the completeness and applicability of the well log data and for the density and quality of the seismic data, have been incorporated into a DHI Assessment algorithm, using the collective perceptions of 40 experienced processors, interpreters, and researchers to determine the initial weighting factors. These collective perceptions were captured using a hierarchical decision process called Expert Choice (tm). The consensus weightings for all the criteria have been built into the assessment calculator algorithm.

When a geoscientist enters answers to descriptive and quantitative criteria about a prospect horizon into the DHI Assessment tool, two things happen: 1) a value of the DHI confidence is computed, and 2) the descriptive data, along with the well name, basin name, age, depth, etc. is entered into a database to be used for testing and calibration of the algorithm. If and when the well is drilled, the well results are entered into the database to provide calibration and feedback.

The database records a number of values that can be used for data extraction, such as age of objective, depth, sedimentary column thickness, pressure regime, etc. Well results record not only presence of hydrocarbons, but whether the well met or exceeded predicted results (by horizon), and if not, what caused the anomaly.

Confidence numbers are based on a scale from +1 to -1. A positive value predicts that hydrocarbons are present; a negative value predicts that hydrocarbons are not present. A zero value indicates that the technology cannot discriminate between the two outcomes. Increasing absolute value indicates increasing confidence in the prediction.

RESULTS

To date there are 140 drilled cases (total) in the database; of these, 54 are for AVO and the rest for DHI (stack amplitude) analysis. Some results:

1. AVO "works". For the 54 cases in the database, AVO correctly predicted presence or absence of hydrocarbons 78% of the time.

2. For type 2 reservoir responses, where DHI doesn't work well at all, AVO was again correct 77% of the time.

3. The DHI assessment database is a useful diagnostic and learning tool, and will be more valuable as it is brought up to date to include all Amoco AVO analyses worldwide.

4. The DHI assessment algorithm shows quite good correlation between the predicted confidence values and subsequent drilling success rates.

Biography:

Stanton G. Truxillo received a B.S. degree in Physics from Loyola University, New Orleans, and a Ph. D. in Physics from Louisiana State University. After a one-year postdoctorate at LSU's Coastal Studies Institute studying ocean surface waves, he began a teaching career at the University of Tampa. In 1981 he joined Amoco Production Company in New Orleans as a geophysicist, and has held various technical and supervisory assignments since then, including 2D and 3D acquisition design, data processing, and interpretation. He has been interested in amplitude and AVO technology since 1982, and is currently coordinator of the Direct Hydrocarbon Detection Network of Excellence at Amoco, a company-wide organization committed to sharing best practices in amplitude and AVO technology development and application.

Second Speaker Abstract and Bio:

3-D Processing for AVO - A case study.

Robert Vauthrin
Western Geophysical

During the past fifteen years AVO technologies proved to be very successful in the Gulf of Mexico. Until recently, these analyses were mostly performed on 2-D seismic data. Due to the large quantity of 3-D prestack

data available today, AVO effects started to be viewed on 3-D volumes. Most of the discussions regarding processing for AVO studies address concerns with amplitude handling. These discussions tend to be directed at ensuring that individual processes preserve amplitudes. Designing a flow for preservation of amplitudes seems simple enough, just be certain that a process will not have any undesirable effect on the signal. In practice this is much more difficult, as it is seldom a simple task to separate the signal from the noise and to preserve the stability of the amplitude and phase of the wavelet along offset.

In order to gain more accurate information from AVO studies, the processor must design flows which minimize these effects. These flows will be discussed in detail, and an optimum processing flow will be demonstrated on a case history from the Gulf of Mexico.

Biography:

Robert Vauthrin is a Technical Coordinator for Western Geophysical's data processing group in Houston. After receiving a Bachelors degree in Mathematics from Saint Mary's University in San Antonio in 1969, he joined Western Geophysical in 1981. He helped design many of Western's flows for processing data for 3-D.

Potential Fields SIG

SIG Chair - **Chuck Campbell** of Accel Services (713-993-0671 or email at campbell@neosoft.com)

The Potential Fields SIG plans to have 1997-98 meetings every other month, from September to May (September, November, a holiday party in December, January, March, and May). Meetings typically consist of a social hour, dinner, and technical presentation. Anyone interested is invited to attend. For information about meeting times, locations and speakers, please contact the SIG chairman, Chuck Campbell.

The Potential Fields SIG
will host it's annual
Christmas Party
at the University Club
on December 18th.

Please contact Chuck Campbell,
the Potential Fields SIG Chairman for
details.

Near Surface Geophysics SIG

SIG Chair - **Tom Dobecki**, with
FUGRO-McClelland (281/679-5558)

Contact Tom Dobecki for meeting
information.

Reservoir Geophysics SIG

SIG Chair - **John Eastwood**
Exxon Production & Research Co.,
P.O. Box 2189,
713/966-3196, 713/965-7309(fax),
john.eastwood@exxon.sprint.com.

Contact John Eastwood for
meeting information.

Notices

Geophysics on the Internet : A Seminar

Sponsored by the Geophysical Society
of Houston

Friday, January 16 , 1998

2:30PM till 4:30PM

Texaco [(3901 Briarpark, at the corner
of Briarpark and Westpark]

Conducted By:

John C. Butler

Professor of Geosciences
Associate Dean, Natural Sciences
University of Houston

What is the Internet? Why should
I at least be aware of its potential? . . .
What's in it for me for my company
. . . for my professional organization(s)?
. . . How do I begin to prepare
information for distribution via the
Internet?

This seminar — Geophysics on the
Internet — will attempt to provide at
least partial answers to these and related
questions. This will not be a hands-on-
experience; the costs associated with
providing all participants with Internet
access are prohibitive and it is too easy
for the participants to "get lost surfing"
— herding cats would be easier than a
hand-on approach.

A show and tell approach will be
used and each participant will be given
an Internet address where the contents
presented during the seminar will be
available for independent work.

A brief over view of some of the
components of the Internet will be
presented — client/server models, e-
mail, file transfer protocol, gopher
protocol and the World Wide Web
protocol. Sources of applications and
good starting points will be provided as
part of an Internet-based interactive
page. In addition, links will be provided
to demonstrate the potential of Java
Applets and QuickTime Virtual Reality.

The seminar will conclude with an
introduction to preparing documents to
distribute via the Internet; just enough
to make you dangerous.

Will you become a proficient Java
Applet provider or the producer of
common gateway interfaces if you
attend? No, but if you are wondering
about and wandering about the Internet,
this should be a good investment of 90
minutes or so of your time.

Cost: \$10.00 to members of the
Geophysical Society of Houston if you
register before the course and \$15.00
on the day of the course. Non-members
are encouraged to attend. The fee for
non-members will be \$15.00.

So that we can complete our
arrangements in a relatively short period
of time, send your check payable to the
GSH, to Joan Henshaw at the GSH
office, 7457 Harwin, Suite 301,
Houston, TX 77036.

Technology Conference: "Innovations in E&P . . . from 3D Seismic to the Drillbit"

The LSU Basin Reearch Institute
(BRI) will sponsor "Innovations in E&P.
. . . from 3D seismic to Drillbit", an oil
and gas technology conference, on
January 22-23, 1998 at the
Monteleone Hotel in New Orleans.

This will be the fourth event in BRI's
ongoing series of technology
conferences, which are created and
produced by consulting geologist Louise
S. Durham.

For further conference information
please contact:
Louise Durham
2200 Post Oak Blvd., Suite 750
Houston, TX 77056
(713) 840-1510

In Memoriam

Paul Lester Farren



When Paul died September 20,
1997 our industry lost a truly creative
and caring person who was a friend to
many. A Rice graduate '37, he worked
for National Geophysical for 18 years
before becoming a consultant. He was
a blessing to his clients, bringing to each
assignment a patient, gentle, jocular
manner and the lively enthusiasm of an
eager oil finder. In 1961 he and G.J.
Long founded GeoData Service, Inc.
(later changed to Farren and Long), the

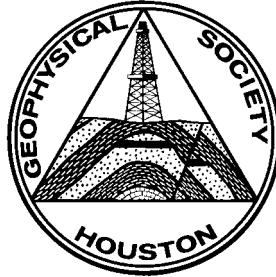
first climate controlled, information retrieval center designed specifically to serve the geophysical industry by providing security and preservation of proprietary data. Paul possessed the precise analytical mind of a mathematician/physicist and the unfettered imagination of a poet/philosopher. His contributions to Geophysics include the design of special pontoon and air boats as well as containers and racks (Tiltshelf) for the efficient storage and easy retrieval of magnetic tapes.

The GSH remembers Paul as its' 1960 president who gave a shovel to incoming president Dave Carlton to start the society's tradition of the passage of the shovel to each new president as a symbol of authority. He is also primarily responsible for initiating GSH's large collection of geophysical

artifacts. Paul was honored with life membership in both GSH and SEG.

Paul and June Farren celebrated their 60th anniversary on July 13, 1997. The many family members, members of our industry, church friends and neighbors who celebrated with them and were later at Paul's memorial service are a great testimony to a well respected man . He will be greatly missed!

Tom K. Fulton



GSH Volunteers

The GSH still needs a volunteer for the **Assistant Newsletter Editor** position. If you are interested in adding your expertise to the society's newsletter contact Dennis McMullin (281-560-1069) or Bill Gafford (281-366-7873).

All volunteers interested in helping with SIG meetings, speakers or organizational items are always appreciated. Please contact the specific GSH SIG Chairpersons to see how you can help.

SEG Distinguished Instructor Short Course Registration Form December 17, 1997 Exxon Brookhollow Auditorium 4500 Dacoma

Name: _____

Company Name: _____

Street Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Society Membership Status

SEG and GSH Member	NO SHORT COURSE COST
SEG Member (not a GSH Member)	\$20.00 (GSH membership cost)
GSH Membership only (not a SEG Member)	\$70.00 (SEG membership cost)
Non-Member (neither SEG or GSH)	\$90.00 (SEG + GSH membership cost)

Total Amount Submitted: \$ _____
(Make check payable to Geophysical Society of Houston)

Send to: GSH, 7457 Harwin Drive, Suite 301, Houston, Texas 77036-2160

Short Course Location: Exxon Brookhollow campus is located at 4500 Dacoma, Houston, one block to the east of Highway 290 just north of Loop 610. Drivers northbound on 290 should exit mangum, go left under the freeway, and then head south on the 290 access road to Dacoma, where they will take another left. the Exxon facility will be on the left (North) side of Dacoma.

SEG Distinguished Instructor Short Course

Time-Lapse Seismic in Reservoir Management
presented by Ian Jack

Offered by the Society of Exploration Geophysicists Continuing Education Committee and the Society of Exploration Geophysicists Foundation

Sponsored by the Geophysical Society of Houston

December 17, 1997

The Distinguished Instructor Short Course (DISC) will be held Wednesday Dec. 17. This is an exciting new initiative of the SEG to offer real value to the practicing geophysicist. Houston is the first venue for what will be a year-long, world-wide speaking tour. The course is free for those members of GSH who are also member of SEG. The inaugural speaker will be Ian Jack, BP's expert on 4D seismics. The location will be Exxon's Brookhollow facility

auditorium. The course will run from 9 a.m. to 4 p.m.

For GSH members who are not members of SEG, the cost for the course is \$70. For SEG members who are not members of GSH, the cost for the course is \$20. For individuals who are not members of either society, the cost for the course is \$90.

The course is limited to room capacity (about 150). There is a possibility of a second course being offered on Dec. 18 if the first course is over-subscribed.

GSH members who are also members of SEG may register by email at reservation@hougeo.org or by FAX at (713) 785-0553.

Others may send their check (made out to the Geophysical Society of Houston) to Geophysical Society of Houston 7457 Harwin Drive, Suite 301 Houston, TX 77036-2160

PLEASE note on your check that the payment is for the Dec. 17 DISC.

ABSTRACT:

This course, intended to appeal to a wide audience, will bring participants up-to-date with the current state of the art and will enable them to make decisions involving the use of the method.

It will cover the rationale and driving forces behind "time-lapse seismic" by examining the limitations of existing methods of tracking fluid flow between wells and will examine those reservoir properties which change with time and what might be observed on seismic data as a function of elapsed time, together with those things which may also change, which we would prefer to remain constant.

Rock physics is the link between reservoir depletion and seismic observations. In this area key success factors, key calibration requirements, and key uncertainties will be addressed.

The repeatability of seismic data and the use of "legacy" data sets will be discussed, together with a review of the seismic data acquisition schemes and data processing requirements for time-lapse analysis. Analysis and

interpretation options will be investigated, as will the risks and value of this new technology.

A representative selection of industry case histories will illustrate many of the above points and some of these will be worked through in detail. The course finishes by noting some remaining challenges.

Biography:



Ian Jack holds a degree in physics from the University of St. Andrews. His career includes 10 years with Geophysical Service Inc., working as observer and seismic data processing before moving to seismic software and systems development in Dallas, Texas. He joined the Technical Service Division of BP Exploration in 1978, and became manager of their acquisition services branch in 1982. His current assignment is geophysical advisor and R&D project manager, based in BP's London office. He has been a guest lecturer on postgraduate geophysics courses at several universities in the United Kingdom. His interests are in most aspects of geophysics and he has contributed papers to SEG and EAGE on topics such as 4D seismic, the downgoing vibroseis wavelet, and marine seismic interference as well as several workshop and review papers. Mr. Jack has served SEG as Second Vice-President, and as a member of the SEG Technical Standards Committee since 1981. He is a member of SEG, EAGE, EAPG, and PESGB.

1998 Worldwide Technology Forum

Landmark Graphics Corporation announces its 1998 Worldwide Technology Forum. This year's conference "Vision in Action" will focus on global business issues facing the petroleum industry, and is scheduled for *February 23-25, 1998 at the Adam's Mark Hotel in Houston.*

In addition to technical papers and case studies related to exploration and production, this year's program will include keynote addresses, executive sessions, an in-depth track on data management, advanced training mini-sessions, and more than 40 exhibits. The conference has been designed to facilitate the exchange of ideas and to accelerate the transfer and application of information technology to meeting the specific business needs of Landmark's industry customers.

Keynote speakers include Bob Peebler, Landmark President and CEO, and John Gibson, Landmark Executive VP, Integrated Products Group. A special keynote speaker will be Dr. Gary Hamel, well-known author of the widely-read book, "Competing For the Future." He will address breakthrough strategies for oil and gas companies as they compete for the markets of the future.

To receive more information or to register on line go to Landmark's Worldwide Technical Forum webpage at <http://www.lgc.com/wwtf>, or call 1-800-823-1542 (in the U.S.) (847) 384-7730 (outside the U.S.). Early registration is available before January 16, 1998

GSH PHOTO ALBUM

October 1997 Technical Luncheon



*Leon Thompson, SEG Distinguished Lecturer
John Sumner, GSH first Vice President*



*GSH/HGS Shrimp Peel Organizers
Matt Bogar, Venitas • Tim Hartnett, BHP*



*GSH/HGS Shrimp
Wulf Massell, Epic • Debra Fontenot, Fairfield • Mike Fontenot, Fairfield*

GSH/HGS SHRIMP PEEL

GSH Ladies Auxiliary Calendar of Events

January 23, 1998

Junior League; Luncheon with
"The BUZZ Lady" Roseann Rogers.

March....., 1998

"The view from within"
Tour+Lunch; Inside access to
downtown Houston.

April 19, 1998

Museum of health evening with the
director, includes Dinner, Video, and
Guided Tour.

**ALL SEG MEMBERS,
SPOUSES AND GUESTS** are
invited at an auxiliary price to attend
any function - contact Donna
Parrish at 281-785-7115. Annual
Auxiliary Membership Dues \$10

GSH Year-End Holiday Gathering

Mark your holiday calendars and come join all your jolly
fellow GSH members in our year-end holiday gathering!!

We'll be holding the shindig in the Texas(-sized) Ballroom
(with seating for 200) at the new
H.E.S.S. building
(the former Carlyle Restaurant) at
5430 Westheimer just outside Loop 610 West.

Our party date is **Thursday December 4, 1997**
from 5:00 till 9:00 p.m.

Our holiday gathering will be an open house arrangement
with casual seating for rediscovering old friends and meeting new
ones.

The admission cost is \$15.00 per person.

Make your check payable to the GSH, and send them to
Joan Henshaw at the GSH office
7457 Harwin, Suite 301, Houston, TX 77036.
Come and share in the GSH holiday merriment!

1997 GSH TENNIS TOURNAMENT

The 1997 Tennis Tournament on September 26, 1997 was a great success with the enthusiastic tennis players and the generous support of the **SPONSORS**. The tournament provided GSH members an opportunity to become acquainted with each other and enjoy friendly competition as everyone changed partners each match. This format provided the opportunity for everyone to play with as many partners as possible. We again had participants from the Houston Geological Society and hope there will be more cross participation in the future.

THE WINNERS ARE

A DIVISION

1. Kennard Reed Jr.
2. Bill Steiner
3. Charles McBride
4. Andy Newton
5. Fritz Kronberger

B DIVISION

1. Bob Parker
2. David Haglund
3. Rick Trevino
4. Joe Jones
5. Hillar Anton

Trophies were presented to Winners and Runners-up. Door prizes were awarded to all participants from an imposing array of prizes and gifts which included tennis racquets, warm-up suits, tennis shirts, T-shirts, and racquet covers. The success of the tournament can be attributed directly to the **SPONSORS**. Their contribution provided for excellent food, beverages, and prizes of outstanding quality. A special tribute is awarded to the following sponsors:

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GRANT GEOPHYSICAL. INC.
INDEL-DAVIS. INC.
LANDMARK GRAPHICS CORP.

OVATION DATA SERVICES. INC.
SEITEL INC.
SYMTRONIX
TGS CALIBRE GEOPHYSICAL
TRANSYLVANIA GEOPHYSICAL
WESTERN ATLAS GEOPHYSICAL

Special thanks to BILL STEINER for his hard work and management of the tournament. The staff of The Chancellors Racquet Club and Chancellors Catering are commended for their services.

The 1997 Tennis Tournament date has not been chosen.. We plan to avoid conflicts with other functions if possible.

THANKS EVERYONE

Joe Jones, Chairman
1997 Tennis Tournament



NORTH HARRIS COLLEGE
GEOSCIENCE TECHNOLOGY TRAINING CENTER

SPRING 98 COURSE SCHEDULE

JANUARY

UNIX FOR THE WORKSTATION SCIENTIST

24 hours

Introduction to the use of UNIX as a tool for workstation manipulation and improved project management. Topics include basic Unix architecture and concepts of shells, filesystems, directory paths, and client/server relationships in addition to basic UNIX commands. Experience with keyboard and "mouse" manipulation recommended. This is NOT UNIX for dummies.

CGTTC 2D051 NN001 S 1/24 - 2/7 8:00 a.m. - 5:00 p.m. WNSP 261

WORKSTATION INTERPRETATION: GEOQUEST

24 hours

Students will utilize a UNIX workstation, GEOQUEST IEX-IESX and 3D seismic data to interpret faults and horizons, create time slices, and contour maps using a variety of workstation viewing options and utility functions.

CGTTC 2E131 NN045 S 1/24 - 2/7 8:00 a.m. - 5:00 p.m. WNSP 261

AN INTRODUCTION TO ORACLE

24 hours

This class is designed to introduce students to the ORACLE database administrator, and is the first in a series of three ORACLE courses. Topics will include client/server computing, networking and related issues, SQL, and PL/SQL.

CGTTC 2F021 NN003 S 1/24 - 2/7 8:00 a.m. - 5:00 p.m. CMED 207

LANDMARK OPENWORKS ENVIRONMENT

This course will cover Landmark Graphic's applications launcher, OpenWorks, and how various Landmark software applications are related through OpenWorks. Trick-of-the-trade and how to make software applications and third party software operate smoothly will be discussed.

CGTTC 2L091 NN052 M/W 1/26 - 2/11 6:00 p.m. - 10:00 p.m. WNSP 261



FEBRUARY

WORKSTATION INTERPRETATION: SEISMIC MICRO TECHNOLOGY 24 hours

Students will utilize 2d/3dPAK seismic interpretation software to interpret a seismic data set on PC's. Students will interpret faults, horizons, create time slices, polygons, create various vertical seismic displays, and manipulate colors using a variety of workstation viewing options and utility functions.

CGTTC 2E171 NN039 M/W 2/2 - 2/18 6:00 p.m. - 10:00 p.m. CMED 207

COMPUTER WORKSTATION MODELING: AVO

24 hours

This course deals with the analysis of Amplitude Variations with Offset (AVO) and post-stack amplitude inversion. Topics will include seismic data processing and displays, forward modeling using well log data, synthetic models, and model-based inversion methods utilizing well logs and NMO velocities, and seismic trace attribute extraction.

CGTTC 2B021 NN029 T/W/Th 2/3 - 2/5 8:00 a.m. - 5:00 p.m. WNSP 261

EXPLORATION ECONOMICS, AN OVERVIEW**24 hours**

This lecture-based course will provide students with a basic understanding of economics and how economics relates to exploration and development project planning. Topics will include the value of money through time, risk assessment, return rates on investments, profit margins, and basic economic definitions and concepts.

CGTTC 2G021 NN031 T/Th 2/3 - 2/19 6:00 p.m. - 10:00 p.m. WNSP

ORACLE ADMINISTRATION II**24 hours**

This course is intended as a continuation of Oracle Database Administration and Development. Topics include PL/SQL programming, language elements, functions, procedures and packages. Textbook will be required.

CGTTC 2F043 NN001 S 2/14 - 2/28 8:00 a.m. - 5:00 p.m. CMED 207

PERL**24 hours**

This course will provide geoscientists with basic programming skills in the Perl computer language. Perl is useful for processing binary SEG-Y files, reformatting grid and other graphic files, and mathematical tasks associated with geo-computing. This class will cover basic data types, mathematical expressions, string handling, regular expressions, control logic, standard and special file input/output, sorting, linear and associative arrays, and basic reporting operations. Some programming experience and a basic knowledge of Unix will be helpful.

CGTTC 2D062 NN003 M/W 2/16 - 3/18 7:30 p.m. - 10:00 p.m. WNSP 261

GEOLOGICAL INTERPRETATION: STRATWORKS**24 hours**

This course deals with the interpretation of geological data using a UNIX workstation. topics will include the use of well logs and log correlation, construction of cross-sections, mapping of geological data, horizon interpretation, and map editing.

CGTTC 2E121 NN043 T/W/Th 2/17 - 2/19 8:00 a.m. - 5:00 p.m. WNSP 261

COMPUTER WORKSTATION MODELING: AVO**24 hours**

This course deals with the analysis of Amplitude Variations with Offset (AVO) and post-stack amplitude inversion. Topics will include seismic data processing and displays, forward modeling using well log data, synthetic models, and model-based inversion methods utilizing well logs and NMO velocities, and seismic trace attribute extraction.

CGTTC 2B021 NN030 S 2/21 - 3/7 8:00 a.m. - 5:00 p.m. WNSP 261

**MARCH****WORKSTATION: GEOGRAPHIX****24 hours**

Students will utilize GeoGraphix Interpretation software to interpret a seismic data set on PC's. Students will interpret faults, horizons, create time slices, polygons, create various vertical seismic displays, and manipulate colors using a variety of workstation viewing options and utility functions.

CGTTC 2M021 NN049 M/W 3/2 - 3/18 6:00 p.m. - 10:00 p.m. CMED 207

WORKSTATION INTERPRETATION: Z-MAP PLUS**24 hours**

This course will utilize ZYCOR software to explore the mapping of geophysical and geological data on a computer workstation. It will cover mapping coordinate systems, projection types, importing of data files, gridding, Base map generation, contouring, editing and display techniques.

CGTTC 2E161 NN044 S 3/21 - 4/4 8:00 a.m. - 5:00 p.m. WNSP 261

WORKSTATION INTERPRETATION: SEISMIC MICRO TECHNOLOGY 24 hours

Students will utilize 2d/3dPAK seismic interpretation software to interpret a seismic data set on PC's. Students will interpret faults, horizons, create time slices, polygons, create various vertical seismic displays, and manipulate colors using a variety of workstation viewing options and utility functions.

CGTTC 2E171 NN039 S 3/21 - 4/4 8:00 a.m. - 5:00 p.m. CMED 207

AN INTRODUCTION TO UNIX-BASED SYSTEMS ADMINISTRATION 24 hours

This introductory course will discuss UNIX-based workstation systems administration from the viewpoint of the systems administrator. System maintenance, data base administration and storage, backup and restoration procedures, networking, space allocation, and security are some of the topics to be addressed by this course.

CGTTC 2D042 NN004 M 3/23 - 4/27 6:00 p.m. - 10:00 p.m. WNSP

GEOLOGICAL DATA LOADING: GEOQUEST FORMAT 24 hours

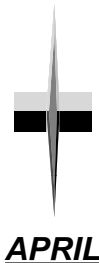
This course will cover the basic methods for loading well data from tape into a project or projects created to receive these data sets. This course will discuss well data formats such as ASCII, quality checking well data, loading individual curves, cartographic projections of well locations, and other topics relevant to well data loading in GeoQuest format.

CGTTC 2L081 NN033 M/W 3/23 - 4/8 6:00 p.m. - 10:00 p.m. WNSP 261

WORKSTATION INTERPRETATION: SEISWORKS 24 hours

Students will utilize a UNIX workstation, LANDMARK SeisWorks and 3D seismic data to interpret faults and horizons, create time slices, and contour maps using a variety of workstation viewing options and utility functions.

CGTTC 2E151 NN033 T/W/TH 3/24 - 3/26 8:00 a.m. - 5:00 p.m. WNSP 261



GEOLOGICAL INTERPRETATION: ADVANCED STRATWORKS 24 hours

This course continues the geologic interpretation of well data using a Unix workstation. Topics include graphic well log correlation; construction and editing of cross-sections; gridding, contouring and editing of maps; single and multi-well displays; and lithology computation and display on well logs and maps. Editing surface grid profiles using Seismic Backdrop, and employing bubble maps to study production trends will also be covered.

CGTTC 2E032 NN042 M/T/W 4/6 - 4/8 8:00 a.m. - 5:00 p.m. WNSP 261

WORKSTATION INTERPRETATION: SEISMIC MICRO TECHNOLOGY 24 hours

Students will utilize 2d/3dPAK seismic interpretation software to interpret a seismic data set on PC's. Students will interpret faults, horizons, create time slices, polygons, create various vertical seismic displays, and manipulate colors using a variety of workstation viewing options and utility functions.

CGTTC 2E171 NN041 S 4/6 - 4/22 6:00 p.m. - 10:00 p.m. CMED 207

RESERVOIR ENGINEERING I 24 hours

The geoscientist will be introduced to basic reservoir engineering concepts including: capillary properties of rocks, relative permeability, PVT behavior, fluid sampling, multiphase flow, and mobility ratio. In addition, classic reservoir engineering equations will be presented, including the instantaneous GOR (Gas Oil Ratio) equation, fractional flow equation and material balance. Behavior of oil and gas reservoirs will be discussed, including: dry gas, wet gas, retrograde gas, volatile oil, and black oil.

CGTTC 2H021 NN038 T/TH 4/7 - 4/30 6:00 p.m. - 9:00 p.m. WNSP

GEOPHYSICAL DATA LOADING: SEISWORKS FORMAT**24 hours**

This course will cover the basic methods for loading 2D and 3D seismic data from tape into a project, or projects created to receive these data sets. This course will discuss seismic tape formats, quality checking data, scaling and clipping data for the final load, bit integers, time slice generation, and other topics relevant to 2D and 3D seismic data loading in Landmark format.

CGTTC 2L071 NN034 M/W 4/13 - 4/29 6:00 p.m. - 10:00 p.m. WNSP 261

GIS: REMOTE SENSING I**24 hours**

This course will introduce students to the basic fundamentals of remote sensing and the growing role of this technology in industry through lecture, lab activities, demonstrations, and team exercises. Emphasis will be on practical, real world applications including petroleum exploration, environmental monitoring, oceanography, land use mapping, and new uses for remote sensing. This introductory class is not computer-based.

CGTTC 2C091 NN037 S 4/18 - 5/2 8:00 a.m. - 5:00 p.m. WNSP 259

WORKSTATION INTERPRETATION: SEISWORKS**24 hours**

Students will utilize a UNIX workstation, LANDMARK SeisWorks and 3D seismic data to interpret faults and horizons, create time slices, and contour maps using a variety of workstation viewing options and utility functions.

CGTTC 2C151 NN047 S 4/18 - 5/2 8:00 a.m. - 5:00 p.m. WNSP 165

WORKSTATION INTERPRETATION: GEOGRAPHIX**24 hours**

Students will utilize GeoGraphix Interpretation software to interpret a seismic data set on PC's. Students will interpret faults, horizons, create time slices, polygons, create various vertical seismic displays, and manipulate colors using a variety of workstation viewing options and utility functions.

CGTTC 2M021 NN050 S 4/18 - 5/2 8:00 a.m. - 5:00 p.m. CMED 207

WORKSTATION INTERPRETATION: GEOQUEST**24 hours**

Students will utilize a UNIX workstation, GEOQUEST IEX-IESX and 3D seismic data to interpret faults and horizons, create time slices, and contour maps using a variety of workstation viewing options and utility functions.

CGTTC 2E131 NN046 T/W/TH 4/21 - 4/23 8:00 a.m. - 5:00 p.m. WNSP 261

WORKSTATION INTERPRETATION: GEOGRAPHIX**24 hours**

Students will utilize GeoGraphix Interpretation software to interpret a seismic data set on PC's. Students will interpret faults, horizons, create time slices, polygons, create various vertical seismic displays, and manipulate colors using a variety of workstation viewing options and utility functions.

CGTTC 2M021 NN051 M/W 4/27 - 5/13 6:00 p.m. - 10:00 p.m. CMED 207

**MAY****GIS: ERMAPPER****24 hours**

ERMapper is a powerful package for processing satellite images, photographs, and seismic horizons into finished maps. The course will teach basic commands to process several kinds of information including land and geophysical information. Both rasters and vectors will be used in final displays, as well as converting between them. Geolinking is used in turning images into properly projected maps.

CGTTC 2C121 NN035 M/W 5/4 - 5/20 6:00 p.m. - 10:00 p.m. WNSP 261

GIS: INTRODUCTION TO GLOBAL POSITIONING SYSTEM

24 hours

Global Positioning System uses a specialized instrument to gather location information by tracking a series of satellites. Normally this information is plotted on a map. The system will be explained in lectures, followed by taking the instrument outdoors to collect point and line data on the campus. Better instruments allow one to collect attribute data along with the position data. These data will be turned into maps using one of the mapping software packages.

CGTTC 2C111 NN036 S 5/9 - 5/16 8:00 a.m. - 5:00 p.m. CMED 207

(Fee for all 24 hour courses is \$320.00)

ACADEMIC COURSE

COMPUTER APPLICATIONS IN GEOLOGY

4 hours

A semester-long workstation interpretation course featuring four weeks of UNIX, six weeks of GeoQuest IESX, and six weeks of Landmark SeisWorks geophysical interpretation. Students learn basic UNIX commands and syntax. Students will also interpret two 3D seismic prospects while learning the basic interpretation components of Landmark Graphic and GeoQuest interpretation software. Evaluation is in the form of a written UNIX exam and interpretation skills tests.

GEOL 2404 12001 T/TH Spring/Fall Semesters 6:30 p.m. - 9:20 p.m. WNSP 261

FOR INFORMATION:

REGISTRATION and GENERAL COURSE INFORMATION:

Community Education Registration Desk: 281-618-5600

Fax: 281-618-5633

COURSE CONTENT or INSTRUCTIONAL SOFTWARE please contact:

Sarah G. Stanley, Coordinator

Geoscience Technology Training Center

North Harris College

2700 W. W. Thorne Drive

Houston, Texas 77073-3499

Telephone: 281-618-5715

CHECK OUR WEB PAGE

<http://wwwnhc.nhmccd.cc.tx.us/admin/index.html>



Of Course You Can!

The North Harris Community College District provides equal employment, admission and educational opportunities without regard to race, color, religion, national origin, sex, age, or disability.

DECEMBER 1997

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4 GSH Holiday Gathering @ HESS	5	6
7	8	9	10 GSH Technical Breakfast Data Processing SIG	11 GSH Board Meeting @ HESS	12	13
14	15	16	17 SEG Distinguished Instructor Short Course	18 GSH February Bulletin Deadline Potential Fields Christmas Party	19	20
21	22	23	24	25 Holiday MERRY CHRISTMAS	26	27
28	29	30	31			

GEOPHYSICAL SOCIETY OF HOUSTON

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