



Geophysical Society of Houston

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NEWSLETTER

JANUARY 1998

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Technical Luncheon

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

Date: Tuesday,
January 20, 1998

Time: Register and cash bar,
11:30 AM ; Luncheon
and Talk 12:00 Noon

Location: NEW Hess Building,
5430 Westheimer
Formerly the Carlyle
Restaurant located on
the north side of
Westheimer between
Chimney Rock and
Yorktown.

Cost: \$20 for pre-registered
members; \$25 for
walk-ins and guests

Reservations: Call (713)-917-0218
and use the reservation
code 6-0-1.
Or email
reservations@hgs.org
No later than 11am,
Monday,
January 19, 1998

Speaker: Dr. M. Turhan Taner ,
Seismic Research
Corporation;
Rice University

Topic: DYNAMICS OF
STATICS

Abstract:
Computation and application of
statics, whether short wavelength, long
wavelength, residual or trim statics is
one of the most discussed subjects in
the seismic data processing. We have
to consider the signal-to-noise ratios, leg
jump problems, truncated refractors,
vibratory wavelets, hidden first arrival
times and etc. If we overcome some of
these problems, we still have to face the
Catch 22 - accurate velocity estimation
requiring good statics and good statics

estimation requiring accurate velocities.
Then we have to consider large
elevation variations, which create
questions as to what type of floating or
phantom datum, or zero velocity layer
should be applied. We even invented a
new name, an oxymoron, "the time-
varying statics"! Some of us considered
that the difficulties were so
insurmountable, that Monte-Carlo and
genetic algorithms were introduced. In
this paper I present a simple procedure
that addresses all of these problems.

The initial wave-front starts as a
hemisphere. It will be perturbed by the
inhomogeneity of the near surface
layers and which will cause the
generation of many, smaller radius,
diffraction patterns. However, as the
propagation progresses, with longer
distances, the radii of the diffraction
patterns increase, hence the
perturbation wavelengths become
longer. Thus reflections coming from
deeper layers will lose the short
wavelength effects, leaving only an
average delay on the arriving wave-
front. We call these effects source
statics.

On the other hand, the near surface
inhomogeneities will superimpose
additional diffraction patterns on the
upward traveling waves. They will arrive
at the receivers with various
wavelengths which will be proportional
to their distance from the receivers.
Since the disturbances near the source
are healed, then the majority of the
short wavelength time disturbances will
only be generated by the near surface
around and below the receiver
positions. They effect all of the upward
traveling wave-front, thus, their effect
will, essentially, be time constant. We
will call them "receiver statics".

GEOPHYSICAL SOCIETY OF HOUSTON

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

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Editor's Notes

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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 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 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: Wednesday,
January 14, 1998

Location: Chevron, 1301
McKinney

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: Free
Host Company: Chevron
Reservations: Reservations should be
made with the GSH
office by 4 pm on
Monday, January 12.

Subject: Unambiguous signal
recovery above the
Nyquist using random-
sample-interval imaging
(RSI2)

Speaker: R. Daniel Wisecup,
Western Geophysical
Co.

Abstract:
Aliasing is generally understood to mean that sampling causes those frequencies above the Nyquist frequency to be irretrievably "mixed" with those below. As a result, the perceived need to prevent signal aliasing has played a major role in limiting useable signal bandwidth. Yet the evidence of aliasing in multi-channel seismic data is often paradoxical and contradictory, suggesting that aliasing may be more apparent than real.

A simple, exact sample-mapping methodology, random sample-interval imaging (RSI2), is seen to overcome aliasing in many of the processes currently used for the imaging of seismic data. The robust process recovers broadband signal, on both synthetic and real data, with frequencies significantly above the Nyquist limit predicted by the one-dimensional sampling theorem. The method appears to be applicable whenever the signal trajectory is irregularly-intersected by a sampling grid of two or more dimensions.

From this experiment, we see that one-dimensional sampling theory does not set a rigid upper limit of recoverable (unaliased) signal for multi-channel systems; hence, many anti-alias strategies currently in use may be inappropriate. We also learn that input and output sample intervals are not necessarily directly coupled. The results further suggest that both spatial and temporal aliasing of signal can and should be simultaneously resolved by

this strategy. The consequences for such processes as DMO and migration are significant.

Speaker Bio:

Dan received his B.Sc. in physics from Ohio State University in 1967 and joined Shell Oil Company as a geophysicist. In 1970, joined Western Geophysical Company in Houston where he is currently a Senior Geophysicist and Manager of Geophysics for Western Hemisphere Land Operations.

He has worked in acquisition, data processing, interpretation and geophysical research in both domestic and foreign assignments. He has been particularly involved in land seismic issues, especially in the area of statics and 3-D seismic. He has been working with 3-D survey methodology for 20 years.

His principle current interests include signal processing and the development of new 3-D survey design, acquisition and processing methodologies. He is a recipient of the SEG best paper award (1976) and is a member of the SEG (Society of Exploration Geophysicists), and the EAEG (European Association of Exploration Geophysicists).

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:

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 Schleicher,
Jerry Kapoor

* denotes the primary organizer

January Meeting

Date: Wednesday,
January 21, 1998

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

Location: Western Geophysical
Auditorium, 10001
Richmond Avenue,
Houston Tx 77042

Directions: Corner of Briarpark
and Richmond

Cost: NO COST
Topic: Velocity for depth
migration

Speakers: Luis Canales, Paradigm
Geophysical; Uwe
Albertin, Western
Geophysical

Organizers: Alfonso Gonzalez*,
Dave McMann

Title: Aspects of Velocity
Model Building for
Subsalt Depth Imaging
Authors: Uwe Albertin, Alfonso
Gonzalez, Jerry
Kapoor, Tim
Richardson and
Wenfong Chang

First Abstract & Bio:

Over the last several years drilling activity in the deep waters of the Gulf of Mexico has increased dramatically, partially due to the potential prospects associated with subsalt drilling. Because of the expense of such drilling, accurate depth imaging of salt structures is crucial for well placement. One of the key elements required for a quality salt and subsalt depth image is an accurate velocity model. In this talk we examine standard velocity-model building techniques used for subsalt imaging. In particular we discuss where one-dimensional residual velocity analysis is successful, and where it may be expected to fail. In addition, we examine how model representation, smoothing, and the choice of migration algorithm can affect the results. Model representations we discuss will include regular grids and tetrahedral meshes, and migration algorithms will include poststack F-X and Kirchhoff migration with both first arrival and maximum energy traveltimes. The various techniques will be illustrated with synthetic examples and data examples from the Gulf of Mexico.

Speaker's Biography:

Uwe Albertin received his B.S. degree in Physics in 1981 from Juniata College and his Ph.D. in Physics in 1989 from Berkeley. He joined Western Geophysical as a research geophysicist in 1990. His main interests lie in seismic migration and parallel computer modeling of geologic structures. He is a member of SEG.

Second Speaker Abstract and Bio:

A second paper will be announced at the meeting.

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.

Date: Thursday,
January 15, 1998
Time: 5:30 - Social Hour,
6:30 - Dinner, 7:30 -
Talk
Location: NEW Hess Building,
5430 Westheimer
Formerly the Carlyle
Restaurant. Located on
the north side of
Westheimer between
Chimney Rock and
Yorktown.
Cost: \$20.00
Topic: NASA Mission Plans
for Gravity and
Magnetic Field Studies
Speaker: Clark Wilson, NASA
Reservation: RSVP by 3 pm., Jan.
14th. to:
Chuck Campbell,
ACCEL Services, Inc.
campbell@neosoft.com,
or 713-993-0671

Abstract:

Observations from spacecraft over the next few years will provide important new descriptions of both the Earth's gravity and magnetic fields. Global gravity field models have continued to improve over time, using satellite orbit perturbations, surface gravity data, and satellite based radar altimeter observations of sea surface topography. However, an unprecedented understanding of the global gravity field will come from the GRACE (Gravity Recovery and Climate Experiment) Mission, led by the University of Texas at Austin, that was

Potential Fields continued on page 5

selected by NASA in the Spring of 1997, and planned for launch in 2001. This mission will provide not only a greatly improved average gravity field, but will have sufficient sensitivity to use time-variable gravity (due to atmospheric, oceanic, and hydrologic activity) as a new remote sensing tool for monitoring the global climate. Magnetic field observations will, likewise, take a great leap forward with the launch of a dedicated Danish magnetic observatory satellite, Oersted, in 1998. This will be the first high quality satellite observations of the magnetic field since the launch of Magsat, over 15 years ago. NASA is the principal partner in the Oersted satellite, providing the launch, and also a GPS receiver for spacecraft navigation and other studies. Additional magnetometer observations will be provided by a South African satellite to be launched with Oersted, and, in 1999 by German and Argentine satellites, which also involve partnerships with NASA.

Biography:

Clark R. Wilson is the Wallace E. Pratt Professor of Geophysics at the University of Texas at Austin, Department of Geological Sciences. He is a graduate of the Scripps Institution of Oceanography, University of California at San Diego, and has been on the faculty of the University of Texas since 1976. He has served as Chairman of the UT Department of Geological Sciences (1990-1995), and is also affiliated with the University of Texas Institute for Geophysics in the College of Natural Sciences and the Center for Space Research in the College of Engineering. He has been a member of the Society of Exploration Geophysicists since 1969 and the American Geophysical Union since 1971. He served as president of the Austin Geological Society (1982-83), and currently serves on the executive committee of the International Association of Geodesy. He is temporarily at NASA Headquarters, Washington, DC, as Program Scientist in charge of Geodynamics and Geopotential Field studies at NASA.

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.

Technical Luncheon continued from page 1

It will take at least 4 to 6 receivers per wavelength, thus these short wavelength disturbances can not be recorded accurately. Only the longer wavelength portion of the wave-field may be used to estimate the velocity fields for conventional processes such as CDP stacking and time or depth imaging. The effects of the short wavelength perturbations has to be corrected in order to reduce the arrival time variations to longer wavelengths. In concurrence of these observations propose to change some of the conventional processes

- Velocity field: The shortest wavelength velocity field or reflector geometry can be defined depending on the recording geometry and seismic band-width. This in turn, will account for the longer wavelength arrival times. The boundary between velocity and statics is a fuzzy, but a real, one.
- Elevation Corrections: Only short wavelength near surface elevation effects should be removed. All of the processes like CDP stacking and time migration should be generated from the surface thus eliminating excessive, and less accurate static corrections. The

thing we know best about the subsurface is the surface.

- Refraction Statics Corrections: This is the so called the "long wavelength" correction. It needs first break picking, which can be problematic with vibratory type data, or where there is noise contamination or truncated refractors. Stacking from the surface eliminates the need for refraction statics.
- Residual Statics: Short wavelength statics can be computed from the differential arrival times, therefore, residual NMO and long wavelength trends will not have any appreciable effect to their computation. They can be computed from the first breaks or from the reflection time differences, thus eliminating the iterative processes of residual statics and velocity computation.

The procedure outlined here eliminates all of the elevation corrections, the so called refraction statics and velocity/statics ambiguity of residual statics. I tried to define statics as a part of the velocity problem, as an ambiguity of our recording processing procedures, and proposed to handle it as such.

Speaker Bio:

Dr. Taner graduated from the Technical University of Istanbul in 1950 with a Diplome-Engineer degree (Master of Science) in Structural Engineering. He attended the University of Minnesota to continue his studies in Engineering Mechanics. During his studies at the University of Minnesota, he started using computers in engineering computations. He also met Dr. Fulton Koehler, who was his Applied Mathematics Professor at the Institute of Technology and later became his collaborator and business associate.

After one year of teaching at Duke University School of Engineering in Durham, North Carolina during the 1956-1957 school year, Dr. Taner returned to Minnesota to join Ellerbe and Company, Architects and Engineers, as a Structural Design Engineer with the specific assignment of developing engineering applications

Technical Luncheon continued on page 6

on the Bendix G-15 Computer.

In the summer of 1959, Dr. Taner co-founded Scientific Computers Inc., a scientific computation service bureau. The company later expanded to New York City and Kansas City. In the summer of 1962, Dr. Taner came to Houston, Texas to open the branch office when he met Dr. Burton McCollum, inventor of many early geophysical exploration techniques. With Dr. McCollum's tutorage and encouragement, Dr. Taner and Dr. Koehler started developing geophysical processes on the computer. In December 1964 Dr. Taner, along with Mr. Scott Kelso and Dr. Koehler, founded Seismic Computing Corporation, which, after merging with Delta Exploration Company, became a multi-national company under the name of Seiscom Delta Inc. Dr. Taner served as Chairman of the Board and Senior Vice President Director of Research. In 1973 he became Chairman Emeritus to concentrate on research. During his years at Seiscom Delta, he has cooperated, including to Dr. Koehler, with an outstanding team of Dr's. Norman Neidell, Robert Sheriff, Johann Saettlegger, Mr. Nigel Anstey and Mr. Ronen O'Doherty.

He continued serving as the Director of Research until July 1980, when he left Seiscom Delta to establish Seismic Research Corporation. He is now the Chairman and Chief Executive Officer of Seismic Research Corporation, dedicated to developing advanced seismic data processing technology. Dr. Fulton Koehler served as the Senior Vice President responsible for the theoretical developments.

Dr. Taner co-authored numerous papers with his associate Dr. Koehler, covering subjects such as seismic velocity computation, seismic attributes, special band pass filters, reflection and refraction statics computation methods, high resolution wave equation migration and velocity analysis for time and depth migration, seismic attributes, plane wave processing and imaging systems, practical multi-channel deconvolution, etc. The paper on seismic velocity computation has been recognized and reprinted by Geophysics as a classical paper.

Dr. Taner is a member of the Society of Exploration Geophysics, Geophysical Society of Houston, American Association of Petroleum Geologists, European Association of Exploration Geophysicists, Institute of Electronic and Electrical Engineers and Turkish Chamber of Geophysical Engineers.

Dr. Taner in 1978 was awarded the honorary membership of the Society of Exploration Geophysics in recognition of his significant contribution to Geophysics. He was also awarded the life membership in 1979 and the honorary membership of the Geophysical Society of Houston. In 1991 Dr. Taner was given honorary Doctor of Science degree from Technical University of Istanbul in recognition of his contributions to Geophysics in general and Geophysical education in Turkey. In 1993 Dr. Taner received the prestigious Maurice Ewing Gold Medal of the Society of Exploration Geophysics for his major contributions to Geophysics as a Scientist. He served as a distinguished lecturer for the American Association of Petroleum Geologists in 1975. He has been a continuing education lecturer for the Society of Exploration Geophysics since 1972, lecturing on the subjects of Velocity Computation and Interpretation, Depth and Interval Velocity Estimation, Seismic Migration, and Reflection and Refraction Statics. Dr. Taner has also served as a distinguished lecturer for Society of Exploration Geophysics during the spring 1992.

On July 18, 1995 in Milan, Italy, Dr. Taner received Italian Oil Company AGIP's 1995 Technological Achievement Award. This was in recognition for his lifetime of achievement in science and geophysics.

Dr. Taner in 1988 was appointed to the Geology and Geophysics Department of Rice University as an adjunct Professor.

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 Research 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

Immediate Opening for Geophysical Technical Advisor in Tulsa, Oklahoma

SEG is seeking to fill the full-time position of Technical Advisor. His/her principal responsibility is to provide technical direction and advice to the SEG Business Office in Tulsa. Though the Advisor will offer expertise in a variety of technical areas to the SEG staff, particular focus will be placed on geoscience education.

The Advisor must successfully encourage SEG members to volunteer their time to actively participate in developing and implementing programs that advance the geophysical sciences; and initiate activities that communicate the importance of the role of geoscience education to society at all levels. The Advisor will report directly to the SEG Executive Director and will work with the membership individually and through committees and with the staff to initiate, develop, and implement these and other programs.

Qualifications include a B.S. or M.S. in geophysics or a related scientific area, proven ability to stimulate and persuade others to achieve desired results, excellent oral and written skills, and the ability to communicate at all levels. Some experience in geoscience education is desired. This position is located at SEG Headquarters in Tulsa, Oklahoma.

Interested candidates should send a letter telling why you are interested in the job, a resume and salary history to:

Society of Exploration Geophysicists
Attn: Human Resources
8801 South Yale Ave. Suite 500
Tulsa, Oklahoma 74137
Fax: 918 497-5560
E-mail: jpaull@seg.org

Job Description:

The principal responsibility of the Technical Advisor is to provide technical direction and advice to the SEG Business Office in Tulsa. Though the Advisor will offer expertise in a variety of technical areas to the SEG staff, particular focus will be placed on geoscience education. The specific responsibilities of the Technical Advisor

are as follows:

General:

At the direction of the SEG Executive Director, be available to assist the SEG Business Office staff in Tulsa in all areas where geophysical technical expertise is required.

Continuing Education:

Identify geophysical trends which have opportunities for SEG to provide substantial value to its membership by offering education/training. Network within the geophysical industry to identify potential instructors for proposed Continuing Education courses. Solicit advice from industry contacts and the membership on how the CE program can be made more meaningful, relevant and useful. Work with instructors to help prepare necessary course materials. Assist in the critique of newly developed SEG courses and suggest ways to improve the program content. Under the guidance of the Continuing Education Committee, work with new or existing instructors to improve their courses or course proposals. Identify areas where online, Web-based, and CD-ROM, based SEG instruction may be valuable and recommend action where appropriate. Attend all Continuing Education Committee meetings.

SEG Foundation:

Advise the SEG Foundation and various SEG committees on education related activities where Foundation support may be appropriate. Offer assistance to the SEG Foundation in their recruiting efforts where technical advice and vision in future geophysical trends and challenges are required.

K-12 and University Geoscience Education:

Provide assistance to the SEG Student Affairs/Academic Liaison Committee to identify programs which may offer greater support in activities which benefit the SEG Student membership. Identify and provide direction for ways in which the SEG may better educate K-12 students in the geosciences and attract them to geoscience careers. Evaluate education

programs in other organizations, such as the AGI, as to their applicability to the Society.

This information is also available on the SEG website at:

<http://seg.org/job-list/Seg.html>

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.

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

Dobrin Memorial Lecture

This year's Dobrin Memorial Lecture will be held at the Hilton Hotel on the campus of the University of Houston at 5:30 pm on Wednesday, February 11, 1998. The speaker will be Dr. Thomas L. Davis, Professor at Colorado School of Mines. His subject will be Multicomponent time-lapse seismology; a tutorial on determining dynamic reservoir characterization.

Dr. Davis holds a BE degree from the University of Saskatchewan, M.Sc. from the University of Calgary, and a Ph.D. from Colorado School of Mines. He was the SEG Distinguished Lecturer in 1995 and Technical Program Chairman for the Denver SEG Annual Meeting in 1996.

Abstract:

Multicomponent Time-Lapse Seismology and Dynamic Reservoir Characterization

Multicomponent (3-C) time-lapse (4-D) seismology enables more accurate determination of rock/fluid property characteristics, their geometry, and changes over time. Time-lapse surveying compares one survey with a repeat survey taken in the same geographic locations at a later time. A higher degree of resolution can be obtained by differencing measurements (where one measurement is subtracted from the other). Multicomponent seismic imaging records one vertical and two horizontal components (3-C).

Seismic anisotropy can give us information on porosity, permeability, fluids, and flow pathways. Seismic anisotropy, for instance, attenuation of split shear waves, gives us a potential

measure of permeability anisotropy within a reservoir. Reservoir production will be enhanced if we can see if reserves are bypassed by channeling around lower permeability parts of the reservoir. Injection patterns can then be changed to sweep the reservoir more efficiently.

In 1995 a 4-D, 3-C seismic survey was undertaken in the Central Vacuum Unit, Lea County, New Mexico over a CO₂ huff-n-puff operation to determine if fluid viscosity/saturation changes and frontal movements of a CO₂ bank in the San Andreas carbonate reservoir at a depth of 4300 feet could be monitored. Two surveys were acquired with three source components recorded by three component receivers approximately 8 weeks apart during which 50MMSCF of CO₂ was injected into a well and allowed to soak.

Shear-wave data showed an anisotropy anomaly associated with high CO₂ concentrations. The anisotropy anomaly is interpreted to be caused by a zone of higher permeability that responded to changes associated with elevated reservoir pressure, and viscosity/saturation changes. The CO₂ injection involved a fluid pressure increase of 500 to 800 psi that opened microfractures or changed the pore aspect ratio of elongate or crack-like pores. The effect increased attenuation and decreased velocity of the S₂ shear wave polarized orthogonal to the dominant fracture set or pore structure orientation. Under the pressure and temperature conditions, injected CO₂ becomes miscible with the oil during a soak period and the viscosity drops by a factor of 10 to 1 as the oil swells, causing a fluid volume change of 10-20%. This swelling and viscosity change affects the stiffness or compliance of the pore/fracture system.

At Vacuum Field the northern half of the reservoir in the survey area is more compliant to shear wave propagation than the southern half. The north side has a higher and more continuous permeability than the southern part. The 4-D, 3-C seismic survey at Vacuum Field has helped determine the better areas for CO₂ flood development.

4th Annual SWLGS 3-D Technology Exposition

Lafayette Hilton Ballroom
January 12, 1998
5 p.m. - 8 p.m.
Expo Open - Ice Breaker
January 13, 1998
8 a.m. - 2 p.m.

Expo Open

Presentations will be scheduled

The 3-D Technology Exposition provides the local oil and gas community with the opportunity to view the latest in 3-D technology. This year, exhibitors will have the opportunity to make an oral presentation of their choice to supplement their exhibit and promote new technology. The Expo is free and open to the public.

For additional information contact Jana L. DaSilva, SWLGS 3-D Expo Chairman, John E. Chance and Associates, Inc., 200 Dulles Drive, Lafayette, LA 70506; (318)268-3234; fax (318) 237-0011; e-mail jdasilva@jchance.com.

HGS Grand Canyon Geology & Rafting Field Trip

Mark your calendars, dig out your rafting sandals and make your 1998 geo-vacation plans!

The Houston Geological Society will be conducting their Grand Canyon Field Trip from June 8-15, 1998. The trip will cover almost 200 miles of the Colorado River and side canyons. The approximate cost of the trip is \$1800. For more information and details see the October or December HGS Bulletin or call Dave Lazor at 713-728-0917.

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

**HAVE A
HAPPY
AND
PROSPEROUS
NEW YEAR**



**Scanned copy of PS Form 3526
(completed form was faxed to you by Joan Henshaw at GSH office)**

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(completed form was faxed to you by Joan Henshaw at GSH office)**

JANUARY 1998

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	5	6 HGS Board Meeting	7 AAPG Delegates Luncheon	8 Emerging Technologies HGS Executive Board Meeting	9	10 ECH Meeting @ UH
11	12 HGS General Dinner	13	14 GSH Technical Breakfast Environmental Engineers	15 GSH Board Meeting @ HESS GSH Potential Fields SIG	16 Internet Seminar	17
18	19 International Explorationists Dinner	20 GSH Technical Luncheon	21 GSH Data Processing SIG	22 Innovations in E&P Conference	23 Auxiliary Luncheon Innovations in E&P Conference	24
25	26 N. American Explorationists Dinner	27	28 HGS Luncheon	29	30	31

GEOPHYSICAL SOCIETY OF HOUSTON

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