



Geophysical Society of Houston

VOL. 34, NO. 4

NEWSLETTER

DECEMBER 1999

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Technical Luncheon

Date: Tuesday,
December 14, 1999

Time: Registration and Cash
Bar 11:30am
Luncheon and Talk
12:00pm

Location: HESS Building
5430 Westheimer

Title:
An integrated study of the Liuhua 11-1 Field using an ultra high resolution 3D seismic dataset: South China Sea

Authors:
Chip Story*, Patrick Peng, Christoph Heubeck, and Claire Sullivan, BP Amoco, Lin Jian Dong, CNOOC

Speaker: Chip Story

Summary

The Liuhua 11-1 Field, located 130 miles southeast of Hong Kong in 1000 feet of water, is a vuggy carbonate reservoir at shallow depths (3850 feet subsea), producing 16-22 degree API oil under a very strong bottom-water drive. The field was discovered in 1987 and is currently being developed with twenty-five long-radius horizontal wells drilled from a floating production system (FPS) tied to a modular sub-sea structure. Project success is dependent on well productivity and on limiting water production, which in turn makes an accurate reservoir description critically important.

To better define reservoir heterogeneity, a 3-D seismic survey of the Liuhua field was acquired in July, 1997. A very high resolution dataset (200+ Hz) was obtained, and has been

used in an integrated field study to evaluate the future exploitation potential of the Liuhua 11-1 Field.

Drilling and seismic data were integrated to obtain detailed maps of reservoir structure and stratigraphy. Petrophysical data coupled with seismic inversion were used to obtain a 3D spatial distribution of reservoir properties (porosity, permeability, and saturation). Coherence technology was used to map faults and fractures in the reservoir; complex attribute analysis added an improved understanding of rock quality in different parts of the reservoir. All this information has been used to build reservoir characterization and simulation models via several commercial and proprietary software systems.

Introduction

The Liuhua reef complex, of which only the western part of central core area has been developed, has 1.4 billion barrels of highly viscous crude in place.

After the initial production in 1996, it became clear that the reservoir is much more petrophysically heterogeneous than originally thought. In addition, many unexpected internal faults have been identified by drilling and inferred from production performance.

The objectives of the Liuhua project were four fold: 1) high frequency acquisition and processing, 2) a high resolution acoustic impedance inversion, 3) a highly integrated interpretation and reservoir characterization, and 4) a complete

Reminder:

The SEG Distinguished Instructor Short Course will be held on December 7, 1999. Sign up now - space is limited. See page 4 for details.

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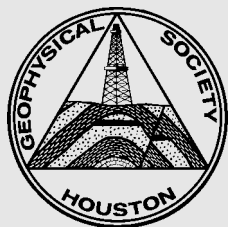
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Editor's Note

To insure your information reaches the GSH society members in a timely manner it must appear in the in the appropriate newsletter issue. Please note the following deadlines and plan your function's publicity strategy accordingly. Items must be received on or before the corresponding deadline date. Materials may be sent to wendyj@diamondg.com or faxed to 713/783-9780.

1999 GSH Newsletter Deadlines

Issue January, 2000
Deadline **Dec. 10, 1999**



GeoEvents Calendar

Make reservations by e-mail at reservations@hgs.org and include your member number (found on Bulletin mailing label), or use the phone reservation system at 713/917-0218.

Reservation Codes

Use these codes to make voice mail meeting reservations:

Technical Luncheon	601
Data Processing SIG	602
Interpretation SIG	603
Reservoir SIG	604
Potential Fields SIG	605
Environmental Applications SIG	606
Breakfast	607

November 10, 1999

Mr. Patrick J. Starich
President
Geophysical Society of Houston

Dear Patrick,

On behalf of the Society of Exploration Geophysicists, the entire 1999 Annual Meeting Steering Committee and myself, I would like to thank the membership of the Geophysical Society of Houston for the tremendous support they provided during the 1999 Annual Meeting. When the call for volunteers was made, GSH stepped up and answered the call in grand style. According to my records we had over 150 volunteers work on this year's Annual Meeting, with most of them coming from the GSH. The many hours worked by the volunteers before, during, and after the annual meeting helped guarantee its success.

I need to say a special thanks to the five individuals who worked with me directly on the Arrangements Committee. Without their assistance, the Arrangements Committee would not have been able to carry out its required functions. They are Mike Cooper of Geo Focus (Delegate Bag Preparation), Rob Dammer of Jebco Seismic (Signs), George Lauhoff of Fairfield Industries (Golf Tournament), Roy Clark of Exxon Exploration (Communications), and GSH's Volunteer Coordinator Claire Bresnahan (Session Monitors). They spent untold hours recruiting volunteers and working during the Annual Meeting.

I would like to express appreciation to my employer, Craig Limbaugh of Alliant Geophysical, for allowing me the time to serve as the Arrangements Chairman for the 1999 Annual Meeting. I would also like to thank the employers of all the other volunteers who helped carry out the various duties of the Arrangements Committee. With out the support and commitment of those companies, we could not have succeeded. This was not an insignificant commitment as I estimate that the volunteers spent some 1500 to 2000 hours working on the meeting.

Thanks again for your support.

Sincerely,

Robert L. Ayers
Arrangement Chairman
1999 Annual Meeting Steering Committee

SEG DISTINGUISHED INSTRUCTOR SHORT COURSE

December 7, 1999 • 8:00am - 4:30pm • Houston Marriott Westside



SHEAR WAVES FROM ACQUISITION TO INTERPRETATION

By Robert Garotta

COURSE DESCRIPTION

Multicomponent studies are perhaps today at the same stage that 3-D studies were fifteen years ago. The renewed interest in shear waves is obvious, especially in the subsea environment where millions of dollars are being spent on acquiring the elastic response of the earth. Because shear wave-related techniques are raising the interest of the E&P industry, this course addresses, through case histories, the practical aspects of multicomponent data acquisition, processing and interpretation.

Although the industry resorts to shear wave propagation when the usual compressional response is poor, the main promise of the shear wave response is in its combination with the compressional one. However, this is possible only when the quality and resolution of the two responses are similar.

The first part of the course is devoted to overcoming the difficulties associated with shear wave acquisition. Converted mode operation is covered in detail using real-life examples. The particularities of sea bottom receivers are also examined.

The second part of the course reviews the processing and the main challenges of the shear converted modes: static corrections, gathering, velocity

analysis and compensation for shear wave splitting in axial anisotropy. The course gives a detailed description of processing sequences. 2-D and 3-D results, yielding natural axis orientation of layers, are compared in shear and PS converted modes.

The third part of the course is devoted to case histories where new attributes, such as V_p/V_s ratio, crack density, or fracture orientation, are illustrated in a reservoir characterization context. These case histories can guide the geophysicist to decide if a particular geological situation can be best handled using shear waves.

WHO SHOULD ATTEND?

For those who are interested in the potential of the methodology involving shear waves, it is a good opportunity to learn from one of the leaders in this field and to maximize the chances of getting the most out of the data when big investments are at stake.

AUTHOR'S BIOGRAPHY

Robert J. Garotta graduated from the Faculté des Sciences in Paris and began his career in the geophysical department of the French National Center for Scientific Research (CNRS), where he conducted work in the magnetotelluric method. He spent 37 years at CGG, first in the gravity method, then as a seismologist in field operations. Later he joined the General Geophysics Division as an area geophysicist in charge of quality control

and technical assistance to operations. His solid technical background, combined with his permanent involvement in field operations, gave him the experience to successfully address the most complex geophysical problems. He concluded his career at CGG as senior vice president of geophysical methods. He is now advising the CGG group in the area of multicomponent seismic data from acquisition to interpretation. He has made significant contributions in various fields of research and development such as vibroseis, velocity analysis, static corrections and 3-D survey design, and is the author of numerous technical papers. He was one of the key promoters of shear wave acquisition, processing and interpretation in our industry. His pioneering work on the use of converted shear waves led him from the first experiments in France to active participation in the Colorado School of Mines projects. A longstanding member of the SEG and of the European Association of Geoscientists & Engineers (EAGE), he was the co-recipient of the Conrad Schlumberger award in 1965. Mr. Garotta has two children and five grandchildren, and he spends a lot of time in his vineyard in the South of France.

**Registration form for
SEG Distinguished Instructor Short Course**

Shear Waves from Acquisition to Interpretation

December 7, 1999

Houston Marriott Westside

NW Corner of Katy Freeway IH-10 and Eldridge Parkway

13210 Katy Freeway • Houston, TX

Presentation: 8:30 a.m. - 4:30 p.m. • Registration opens at 8:00 a.m.

Advance registration is required - Registration is limited to 200.

Important: Please complete a separate form for each registrant

Name: _____

Company Name: _____

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City: _____ Country: _____ Postal Code: _____

Phone: _____ Fax: _____

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SEG Member? Yes No

Geophysical Society of Houston Member? Yes No

Cost: (Check ONE)

- Member of SEG and GSH - includes lunch - \$50
- Member of SEG but not GSH - \$70 (\$20 will be applied toward GSH membership)
- Member of GSH but not SEG - \$120 (\$70 will apply toward SEG Associate Membership)
- Member of neither GSH nor SEG - \$140 Please complete both applications

* If you wish to join either GSH or SEG and would like to apply this registration fee to your membership dues, please submit the appropriate membership application form(s) with this registration form.

AMOUNT ENCLOSED: \$ _____

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reservoir simulation driven by the characterization to guide future sidetracks and thereby optimize exploitation of the reservoir. The acquisition was conducted during extremely calm seas with short (1500m) streamers and very shallow (3.5m) tow depths. The 180Hz field data were enhanced during processing to produce peak frequencies of 240Hz. Approximately 4 million traces were acquired at a bin spacing of 5m x 5m over a 100 sq. km. area. These data were converted to acoustic impedance using geologically constrained inversion techniques and then to porosity based on a linear impedance vs. porosity relationship. The interpretation and characterization of the reservoir from the seismic data are the prime subjects of this paper.

Discussion

Two groups of bounding faults on the north and south sides of the Liuhua reservoir delimit the production area in a horst block that has a maximum relief of approximately 250 feet. Figure 1 is an east looking 3D visual of the top of the Miocene Zhujiang Formation carbonates. A coherence image of this surface is provided in Figure 2 with the bounding fault groups shown at the edges of the production area near the ends of the horizontal wells.

Both groups of bounding faults are associated with low velocity gas sags on the seismic time sections. In addition, the southern fault system is associated with four large circular karst collapse structures (sinkholes) clustered together roughly due south of the central production platform. Six or seven additional major karst features are shown on Figure 2 rimming the main platform in the southwest area of the 3D dataset. The major faults provide channels for significant vertical movement of bottom water at the edges of the reservoir. The karst sinkholes present a model for additional vertical water encroachment within the productive area of the reservoir. As a result of this field study, karst collapse is now thought to be a significant factor effecting the hydraulics of this reservoir and was simulated during the flow modeling.

Figure 3 is an east-west seismic cross section, paralleling the southern bounding fault trend within the reservoir development area, using the reflection strength attribute. Gas sag zones associated with the bounding fault systems just inside of the reservoir edges are thought to represent zones of incipient carbonate collapse due to karst leaching and appear as areas of low amplitude chaotic reflectivity on the seismic. The associated gas chimney dim zones are also seen on the seismic. These smaller, internal partial karst features are not completely collapsed into cylindrical patterns as are the large off-structure sinkholes, and therefore only the linear edges show up on the coherence image in Figure 2. The mechanical process for all the solution collapse is identical, and is important to document because of the suspected relationship of these features with abnormal vertical water movement upward through the associated microfracturing. Several isolated karst "dimples" which are suspected to exist within the core producing area are associated with very subtle seismic discontinuities, and may ultimately be part of the reason for the higher than expected water production from the reservoir through sub-resolution fracture swarms.

The second significant finding related to fluid flow within the Liuhua reservoir is a revised understanding of the primary deposition and secondary diagenesis, and the associated heterogeneity of the reservoir flow units. Because the majority of the porosity stratification in Liuhua is believed to be diagenetic in origin, it was important to be careful in interpreting the mix of chronostratigraphic and lithostratigraphic events that comprise the seismic reflectivity. The diagenetic tight streaks are important in that they have had a divergent double effect on individual well productivity: 1) Highly cemented zones below the horizontal wellbores reduce pressure support from the bottom-water drive, and 2) these same zones protect attic oil accessed by the wellbores from early water breakthrough.

Given the complex geologic backdrop associated with a reef system,

it became imperative to generate a high quality seismic inversion to properly define the porosity heterogeneity (and fluid flow) in the reservoir. Fortunately, the acoustic impedance vs. porosity relationship is excellent and an inversion of the seismic data has produced a 3D property model of porosity that is in very close agreement with the well log-derived porosity values. Figure 4 is a cross section through the 3-space porosity structure model as an example of the internal characteristics of the reservoir near one of the horizontal development wells. The porosity ranges from 10% to 34% and demonstrates the spatial variability of the stratigraphic zones.

A prime objective of the Liuhua asset team was to produce an accurate geoscience characterization based on the porosity inversion for input to flow simulation. The high frequency and quality of the seismic data input to the inversion cube shown in Figure 4 has allowed for temporal and spatial resolution on the order of 14 feet, with detectability approximately 1/3 of that. The depth conversion process which produced the structure model of Figure 4 was complicated by both the thin porosity layers in the reservoir and the gas sag effects in the solution collapse zones. Because the main reservoir producing zone averages about 25 feet in thickness, the depth conversion required a very tedious, high precision process to ensure that the 25 horizontal wells were in the correct zones predicted by the well log porosity data. This entire 3-space model was then exported directly to the reservoir simulator.

Conclusions

Much of the prior geoscience knowledge affecting the reservoir flow characteristics during the engineering simulation was revised significantly as a result of this new work. The structural location of the wellbore, which is always important, must be considered along with the internal faulting/fracturing, the porosity/permeability of the producing zones, and the integrity of the "tight" zones. A critical finding as demonstrated by the porosity model is the general heterogeneity and lack

of continuity in the tight layers as called for in the original development plan. The Liuhua reservoir is now seen to be riddled with porosity soft spots and suspected fracture swarms in the zones that were originally required to be spatially competent as tight protection from aquifer influx. This model was refined and re-exported to the simulator a number of times after examination by the engineering staff. Limits on the perturbation of the basic geoscience variables in the characterization were therefore tightly bounded during simulation, and forced a fast and accurate convergence on a solution during history matching and field modeling.

Acknowledgments

The authors would like to thank the management of BP Amoco, Kerr McGee, and CNOOC for permission to publish this work.

An integrated study of the Liuhua 11-1 Field

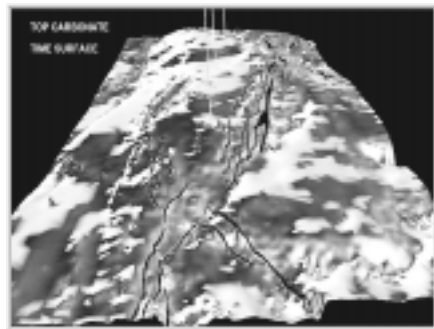


Figure 1: 3-space image of the top of the Liuhua reef complex. Fault breaks shown as gaps, karst features as deep sinkholes.

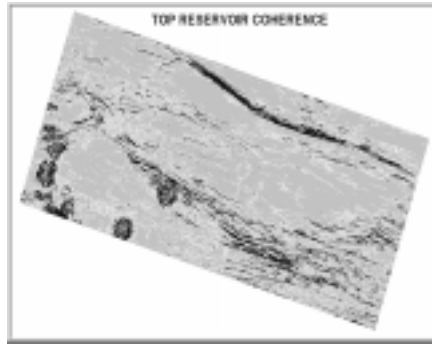


Figure 2: Coherence image of the reservoir top. Large circular features are karst collapse zones; linear features are faults.

An integrated study of the Liuhua 11-1 Field

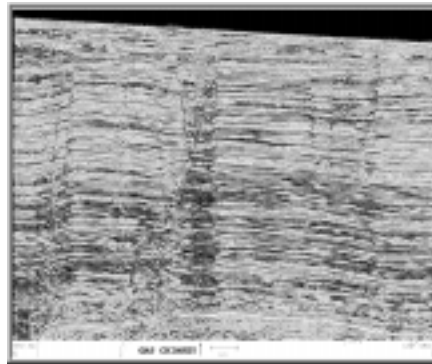


Figure 3: Reflection strength section showing amplitude loss in the gas chimney zones within and above the reservoir.

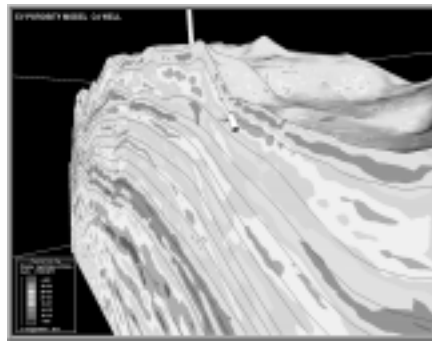


Figure 4: Combined structure and property model in depth showing carbonate porosity flow units input to well simulation.

Biography of Chip Story



Chip Story holds a B.S. degree in Geological Engineering from the South Dakota School of Mines and an M.S. degree in Geophysics from the Colorado School of Mines. His career began with Amoco in 1977 with the early efforts in the Wyoming Thrust Belt. Subsequent projects included work in the Paradox Basin and Williston Basin. Project assignments in New Orleans and Houston starting in 1983 involved the Gulf of Mexico Norphlet Trend, the Tuscaloosa Trend, the Hackberry Trend, the Santos Basin offshore Brazil, and the Liuhua Field complex offshore China. Chip is currently working as a consulting exploration geophysicist on Norphlet/Smackover projects in the Mississippi Interior Salt Basin and on the Tuscaloosa in the Tuscaloosa Trend for CAEX Services of Houston. His professional interests include 3-D seismic interpretation, visualization, and reservoir characterization technology. Chip holds active memberships in the Geophysical Society of Houston and the Society of Exploration Geophysicists.

SIG Meetings

Reality Center - SIG Organizing

Date: December 9, 1999
Time: 9:00am
Place: Continuum Resources

The RC-SIG will meet regularly to review the operating tips and tricks of the running a virtual reality center.

The two-day technical kick-off meeting of the North American RC-SIG will be January 31st and February 1st of 2000 at Continuum, 11700 Old Katy Road at Kirkwood, Suite 100. About one-half day will be devoted to each of these four topic areas (contact H. Roice Nelson for more details):

**Technology
Operations
Research
User experiences**

With centers at UH, BP-Amoco, Landmark, Halliburton, Veritas, EPR, Texaco, Occidental, Rice, Continuum, Schlumberger, Geco, and other places in Houston, and with all of the users involved with these centers, the RC-SIG will provide a significant service to the geoscience community in Houston. The North American RC-SIG is modeled after the European RC-SIG, which Darrell Fangui helped found.

The Geophysical Society of Houston Board on 11 November unanimously approved the new Special Interest Group with H. Roice Nelson as its first Chairman.

In addition to the two-day technical kick-off meeting starting 31st January 2000, there will be an initial organizing meeting December 9, 1999 at 9:00 am at Continuum Resources which will include interactive collaboration with an afternoon activity of the European RC-SIG. All persons interested in helping direct the activities of the RC-SIG should contact RC-SIG Chairman, H. Roice Nelson for details of the organizing meeting in December:

H. Roice Nelson
Visualization Director
Continuum Resources International,
Inc.
11700 Old Katy Road, Suite 100
713.860.5000
713.860.5050 (Fax)
roice@continuum-corp.com

The GSH initiated the North American RC-SIG, but we encourage other professional organizations to also recognize the RC-SIG.

Lloyd Weathers
1st VP GSH

**Potential Fields SIG
Christmas Party
will be held December 16, 1999.**

**For more information contact:
Mike Kowalski at
kowalma@texaco.com or
713-432-6828.**

Membership Report

as of November 11, 1999

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Robert Aydelette
Peter Bridge
Eric Green
Harvey Hill
Gregg Johngarlo
Patrick Jonklaas
Douglas Leyden
Richard Lunam
John Morse
Marianne Rauch
Denny Rompotes
Kamal Siddiqui
Wade Skelton
James Stanton
Brian Wallick
Rudy Wilhelm
Robert Wyckoff
Mathew Martin

Associate

Nizar Chemingui
Thad Dunbar
Paul Harrison
Keith Hatch
Zoe Smith

Current Membership 1880

Membership Directory Committee Needs Chair

GSH is seeking a volunteer to chair the committee organizing our joint GSH/HGS Membership Directory. If you feel you have the organizational skills and desire to lead this important committee, please contact:

Pat Starich 713/516-4740
(patrick.j.starich@exxon.sprint.com)
or
Kathy Hardy 281/980-3371
(ladyfiz77@aol.com).

Knowledge of Microsoft Access is a plus, but not necessary.

2nd Annual Seismic Softball Tournament

The 2nd annual Seismic Softball tournament was played on Saturday, October 16, 1999, at the Sportsark in Houston. The proceeds from the tournament went to the SEG Foundation. Five teams participated. They were the PGS-Rams, BP-Amoco-Killer V's, Paradygm-Geos, Syntron-Stingrays and the Schlumberger-Geoco Prakla-Titans. The early format was a round robin to select the cedes for the afternoon final single elimination round.

Each team fielded five men and five women. This was a slow pitch game. The ball had to be between six feet and twelve feet high rather than the flat pitches in the faster game. There were several rules designed for the women. A smaller ball was substituted every time a woman came to bat. The outfielders were not allowed to move



forward in anticipation of a shorter hit when a woman was at bat. Several times they were moved back by the Umpire. If a team did not field five women, they had to take one out each time two men batted in order. If a man was walked, the following woman had the option of walking or hitting.

Everyone had a great time. There were many words of encouragement

to the batters from their teammates. One that produced the best result was, "Imagine the ball is your boss's head!" Since there were several bosses there, it also produced a lot of laughter. One such boss, Dick Miles with Syntron, batted for the first time ever. This was not his game. He suggested that he could hit better if the ball bounced on the way in and he was defending a wicket.

The tournament was organized by Marisa Rowland and Michelle Kluge from PGS. They did a great job. The final round came down to the PGS—Rams and the Syntron-Stingrays. It was a close game with the Syntron-Stingrays coming out on top. Congratulations are in order for each of the teams and all of the players.

GSH Purpose Summary 1999

The Geophysical Society of Houston was formed in 1947 to promote the science and profession of geophysics and to foster fellowship and cooperation among all persons interested in geophysics. The GSH forms the heart of a Houston-based geophysical community and gives opportunities to interact with colleagues throughout the profession. It is a public foundation and is a charitable, tax-exempt organization (under 501(c)(3) of the IRS tax code).

The GSH encourages and supports scientific, educational, and charitable activities of benefit to geophysicists.

Programs and Opportunities	Conserve, catalog, and display geophysical artifacts and documents	Fund-raising Activities
Technical Activities	Academic liaison with geophysics departments at Rice University and The University of Houston	Annual Meeting/ BBQ
Technical Luncheon, third Tuesday of the month, HESS	Publications	Shrimp Boil (w/ HGS)
Special Interest Groups	Monthly Newsletter	Sporting Clays, Tennis, Golf, and Bass Tournaments
Data Processing	Annual Membership Directory	Honors and awards annually to worthy geophysicists in the Houston area
Interpretation	Information at our website http://www.seg.org/sections/gsh/gshhome.html	
Near Surface	Scholarships - Loans	
Potential Fields	Student Loans	
Reservoir	Contributions to the SEG Foundation - administer numerous scholarships	
Technical Breakfasts, monthly at sites on the West Side, Greenspoint, and downtown Houston		
Spring Symposium		
Continuing Education		
Organize and present courses to members at cost		

GEOPHYSICAL SOCIETY OF HOUSTON

1999 FALL SCRAMBLE TENNIS TOURNAMENT

MIXED DOUBLES-CHANCELLORS RACQUET CLUB OCTOBER 8, 1999

Results:

Bracket	First Place	Second	Third	Fourth	Fifth
A	Travis Moebes	Patrick Donais	Forrest Carpenter	Marvin Taylor	Marc Heisinger
B	Lee Lawyer	Kahlid Razvi	Bob Parker	T. K. Chao	Ronnie Bauerlein

All the tennis players and the Geophysical Society of Houston wish to thank the following companies for making this event a great success:

- DIAMOND GEOPHYSICAL SERVICE CORPORATION
- GRANT GEOPHYSICAL INC.
- INDEL-DAVIS INC.
- MITCHAM INDUSTRIES, INC.
- OVATION DATA SERVICES
- PETRIS TECHNOLOGY SERVICE
- SAIC(Science Application International Corp.)
- SEITEL MANAGEMENT INC.
- TGS-NOPEC Geophysical Company
- VERITAS GEOPHYSICAL SERVICES
- WESERN ATLAS INTERNATIONAL INC.



Many thanks to the Tennis committee Joe Jones & Bill Steiner

Milton Dorbin Memorial Lecture

The annual Milton Dobrin Memorial lecture will be held on Tuesday Feb 1 at the University Hilton Hotel on the University of Houston campus. The lecture will begin at 5:30 and will be followed by a reception at 6:30. The speaker will be Dr. Art Weglein with Arco, and his subject will be Inverse scattering multiple attenuation. The Annual Dobrin lectures are sponsored jointly by the Geoscience Department of the University of Houston and the Geophysical Society of Houston.

Abstract:

Multiple attenuation is a long-standing problem in exploration seismology. Filtering, predictive deconvolution, and forward modeling and subtraction methods are the industry standards and they have a strong (and continuing) record of enormous positive impact. However, the industry trend towards ever more

costly plays, and increasing complex targets in, e.g., deep water, or high structure, subsalt, sub-basalt, and sub-volcanics often bring serious violation of the assumptions behind these traditional techniques and a serious degradation in effectiveness. These factors drive the rejuvenated interest in developing fundamentally new demultiple techniques that can accommodate these technical challenges and remain effective when traditional methods fail.

The inverse-scattering methods for attenuating free surface and internal multiples are designed to directly respond to these challenges. They attenuate all multiples from a multidimensional earth with absolutely no subsurface information, velocity picking, or interpretive intervention. In this talk we briefly review the concepts behind these techniques and exemplify the algorithms with synthetic and field data examples. Open issues and future

directions will be discussed.

Biography

Weglein received his PhD in Physics from the City University of New York in 1975. After a two-year Welsh Postdoctoral Fellowship, he worked at the Citgo Research Lab and then Sohio-BP in Dallas. In 1985 he joined ARCO where his current position is Senior Research Advisor. In 1992-1995 he worked at Schlumberger Cambridge Research, Cambridge, U.K., as Scientific Advisor, while on a 3-year leave-of-absence from ARCO.

Weglein has held several contemporaneous adjunct and visiting academic positions including adjunct Associate Professor at Columbia University, 1982-1992; Visiting Professor at Federal University of Bahia, Brazil, 1989-1990; and Visiting Professor at Delft University, 1999-present.

Buying and Selling Production

Thursday, December 2

8:30 a.m. - 4 p.m.

Shell Auditorium, One Shell Plaza

Buying and selling production requires different focus and skills than exploration and development activities. Both novices and experienced production traders will learn from this course, featuring the following presentations:

Merger, Acquisition, and Divestment Transactions Overview

David L. Bole, VP Corporate Research & Development, Randall & Dewey, Inc.

Exploring Vs. Buying Reserves

Dan Olds, Manager, Petroleum Engineering Consulting, Pricewaterhouse Coopers

Structuring the Deal - Who Does What, When

Geoff Roberts, Madison Energy

Financing the Deal

Paul Riddle, VP Finance, First Union

Auctions vs. Negotiated Sales

Ken Olive, President, The Oil & Gas Asset Clearinghouse

Luncheon Keynote speaker:

John Walker, President & CEO of Enervest Management Company
Case studies on Acquisition Strategies (see website www.hgs.org for which companies)

This course is intended for any upstream energy professional - geoscientist, petroleum engineer, petrophysicist, or landman.

\$ 85 HGS and SIPES members

\$ 95 Non-members

\$125 Walk-ins

Course is limited to first 125 registrants.

Lunch and networking reception after seminar is included.

To reserve a seat, send a check payable to HGS to:

**HGS, 7457 Harwin, Suite
301, Houston, Texas
77036,
Attn: Buy/Sell Course**

Museum at the SEG

Tom Fulton

Our good fortune was to have a bold 50's museum consisting of field-ready equipment for a crew and the SEG's traveling museum located at the entrance to the exhibits. For the most part the field instruments were donated by the family of Steven H. Christensen. The "doghouse" lived up to its name in size and obviously required a small, agile, temperature-tolerant observer to operate the instruments. Which likely came first - the "Dog House" or the name "Bird Dog" for a client representative? Perhaps Lee Lawyer can ponder this and report back in his "From the Other Side" column in the Leading Edge.

Bill Gilchrist and Bill Swart deserve out thanks for their work in mounting the exhibit and for the cleaning, restoration, and painting of the doghouse.

SEG's virtual museum and prototype of the museum kiosk were viewed by many. Video taping of historical information occurred during the convention as organized by Norm

Domenico.

The Doodlebugger maquettes were on sale and exhibited in the museum. Gary Sernos and Damir Skeerl can claim that their doodlebuggers have spent time in a real "doghouse." General Hardy and I sold the latter and one other to Schlumberger.

We plan to prepare selected items that Joel Watkins chose for display on the Texas A&M campus. Following a request from Bob Tatham and a suggestion from Bob Hardage to contact Dr. William Fisher, we also plan to prepare items that will be displayed at the University of Texas. Bob Wyckoff would like to donate one of our torsion balance instruments to the University of Wyoming. We will request shipping charges as soon as we select one of the instruments. Since Bill Swart and others on the Museum Committee have seismic backgrounds, we are looking for someone with potential field experience to help select an appropriate instrument.

With 21% of SEG members in the Houston area, there are likely those who would enjoy helping the GSH Museum by contributing time and talent to our artifacts, the virtual museum, and the learning kiosk. Volunteers are needed and would be appreciated.

The presence of our museum prompted an offer from Steve Chelminski, inventor of the Bolt sleeve airgun, to offer the original prototype airgun and drawings. We may get additional artifacts donated because of the excellent exposure at the Convention.

The GSH thanks Hays International Management, Inc. for storing the artifacts and Baker-Hughes, courtesy of Martin Wiltshire, for storing the doghouse.

Thanks to all who help at the exhibit at the SEG Convention: Bill Gilchrist, Bill Swart, John Farr, Waldo Gullickson, Bob Wyckoff, and Hugh Hardy. Steve Emery (SEG-Tulsa) was especially helpful in moving things in and out of the display area.

DECEMBER 1999

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2 Buying & Selling Production	3	4
5 SEPM Conference	6 SEPM Conference	7 1999 SEG Distinguished Instructor Short Course SEPM Conference	8 SEPM Conference	9 Reality Centers SIG Meeting	10	11
12	13 HGS International Dinner Meeting NEWSLETTER DEADLINE	14 GSH Technical Luncheon	15	16 Potential Fields SIG Christmas Party	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

GEOPHYSICAL SOCIETY OF HOUSTON

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