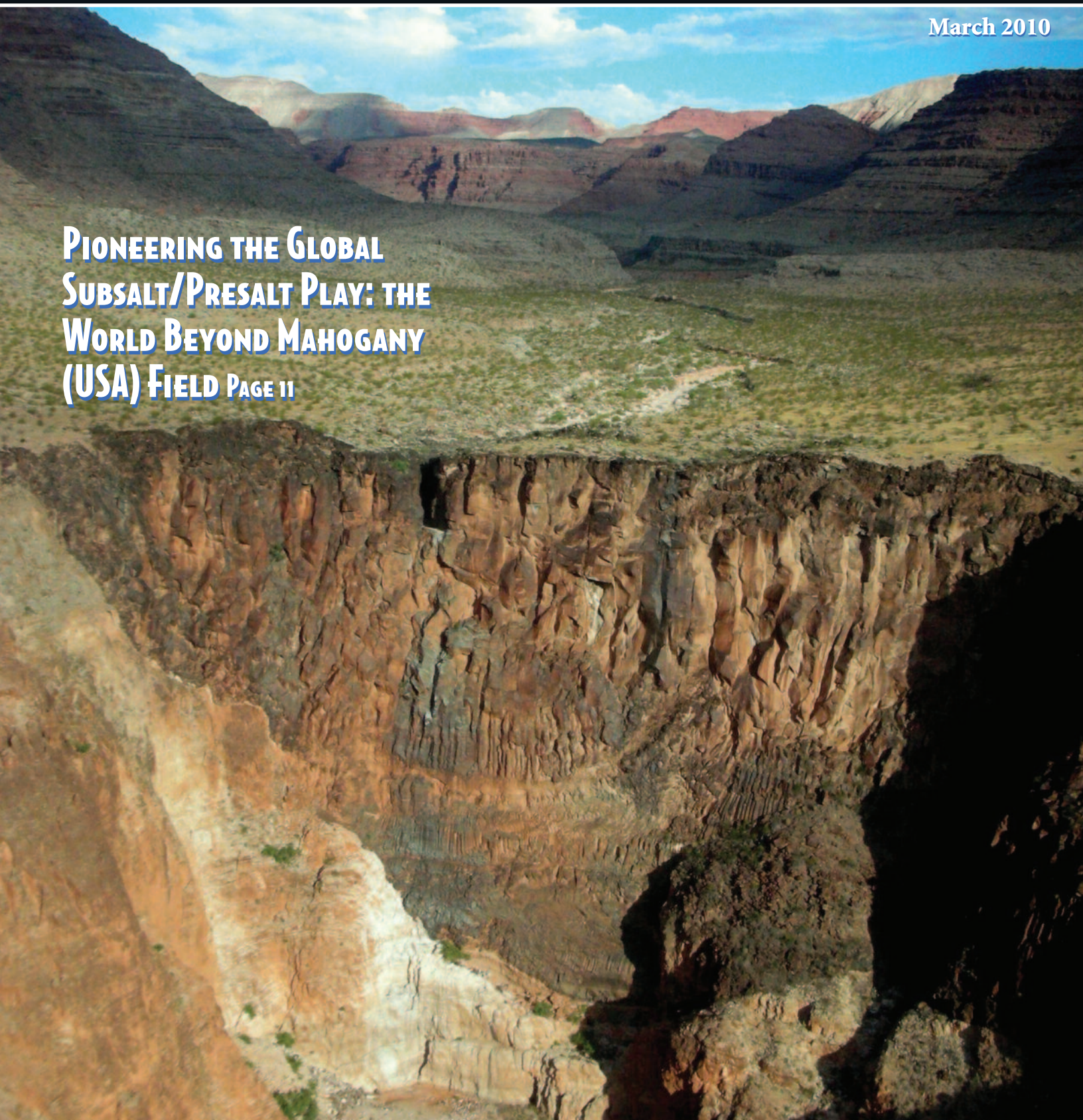
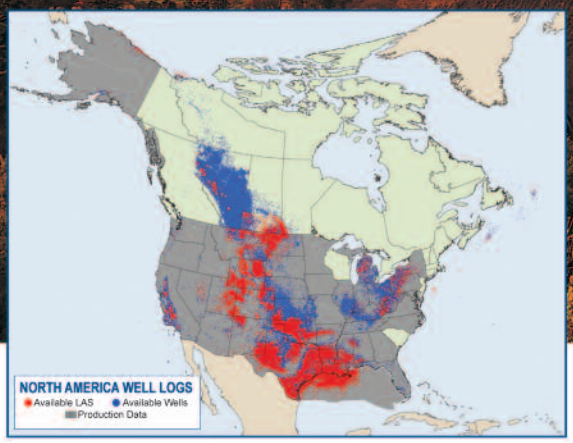
HGS Bulletin
Houston Geological Society
Volume 52 Number 7
March 2010

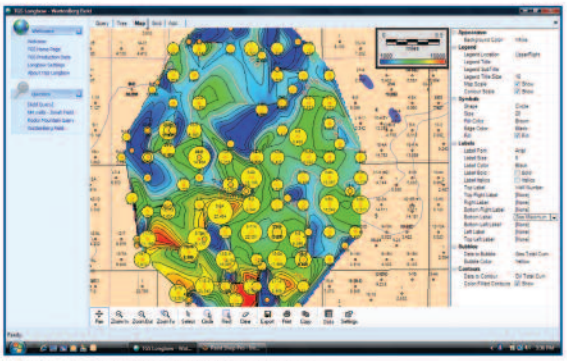


Pioneering the Global Subsalt/Presalt Play: the World Beyond Mahogany (USA) Field Page 11

You Trust Our Well Logs.



States with Production Data



Longbow: Production Cumulatives

Now Have the Same Confidence with Production Data.

For our production database, we applied the same dedication to data quality, coverage completeness and ongoing updates that helped grow our well log collection into the industry's largest and most trusted. Working with users across disciplines, we designed our collection, delivery mechanics and the LONGBOW query and export tool to create an alternative that provides continuity and increased capabilities: all at an extremely competitive price.

For more information, contact your TGS account representative, or call toll free 1 (888) LOG-LINE.

TGS

Geophysical Products | Geological Products | Imaging Services

www.tgsnopec.com

NORWAY +47 66 76 99 00 | USA +1 713 860 2100 | UK +44 (0) 1234 272122 | AUSTRALIA +61 8 9480 0000

The Bulletin
Houston Geological Society

Volume 52, Number 7 March 2010

In Every Issue

The Houston Geological Society Bulletin (ISSN-018-6686) is published monthly except for July and August by the Houston Geological Society, 14811 St. Mary's Lane, Suite 250, Houston, Texas 77079-2916. Phone: 713-463-9476; fax: 281-679-5504

Editorial correspondence and material submitted for publication should be addressed to the Editor, Houston Geological Society *Bulletin*, 14811 St. Mary's Lane, Suite 250, Houston, Texas 77079-2916 or to BJKatz.hgs@gmail.com

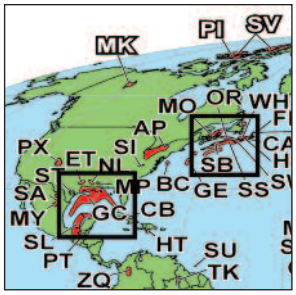
Subscriptions: Subscription to this publication is included in the membership dues ($24.00 annually). Subscription price for non-members within the contiguous U.S. is $30.00 per year. For those outside the contiguous U.S. the subscription price is $46.00 per year. Single-copy price is $3.00. Periodicals postage paid in Houston, Texas.

POSTMASTER: Send address changes to Houston Geological Society Bulletin, 14811 St. Mary's Lane, Suite 250, Houston, Texas 77079-2916

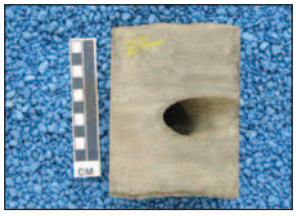
Technical Meetings

Other Features

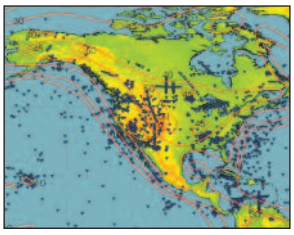
page 5



page 11



page 15



page 21

page 29

About the Cover: The edge of the Grand Canyon near the Arizona/Nevada border as taken from the front seat of a helicopter. The photo shows a cliff-face that few people ever see, except by plane or helicopter. *Contributed by Linda Sternbach.*

Board of Directors 2009–10

http://www.hgs.org/about_hgs/leadership.asp

President (P)	Gary Coburn	Murphy Oil	281-782-7021	garycoburn.hgs@gmail.com
President-elect (PE)	John Tubb	INEXS	713-805-5649	jbtjr@sbcglobal.net
Vice President (VP)	Art Donovan	BP	281-850-4312	donovan@bp.com
Secretary (S)	Amy Sullivan	Shell	281-705-8280	amy.e.sullivan@mindspring.com
Treasurer (T)	Matt Boyd	Southwestern Energy Company	281-618-7379	matboyd@gmail.com
Treasurer-elect (TE)	David Meaux	BP	281-366-2847	dpmeaux@gmail.com
Editor (E)	Barry Katz	Chevron	832-854-6989	BJKatz.HGS@gmail.com
Director 07-09 (D1)	Ianthe Sarrazin	Petrobras America	713-808-2775	ianthe.hgs@gmail.com
Director 07-09 (D2)	Walter Light	Thunder Exploration	713-823-8288	wthunderx@aol.com
Director 08-10 (D3)	Robert Pledger	Consultant	832-512-0495	rpledger@hotmail.com
Director 08-10 (D4)	Tarek Ghazi	Aramco Services	713-432-4562	tarek_ghazi@yahoo.com

Committee	Chairperson	Phone	Email	Board Rep.
AAPG HOD Foreman	Steve Levine	832-486-6018	steve.d.levine@conocophillips.com	P
Academic Liaison	Brad Hoge		hogeb@uhd.edu	D3
Ad Hoc Constitution & Bylaws	Steve Earle	713-328-1069	steve.hgseditor@gmail.com	P
Advertising	Lilly Hargrave	713-463-9476	lilly@hgs.org	E
Arrangements	Matt Boyd	281-618-7379	matt_boyd@swn.com	TE
Awards	Mike Deming	281-925-7239	michael.deming@deepwater.com	VP
Ballot	Paul Hoffman	713-871-2350	phoffman@jlaev.com	S
Calvert Memorial Scholarship	Carl Norman	713-461-7420	dod895@aol.com	PE
Community Outreach	Walter Light	713-823-8288	wthunderx@aol.com	D1
Continuing Education		VOLUNTEER NEEDED		D1
Directory	Michael S. Benrud	713-785-8700 x104	mbenrud@sbres.com	EE
Earth Science Week	Martha McRae	713-869-2045	mcrae_1125@comcast.net	D1
	Jennifer Burton		jlbgeo@comcast.net	D1
Engineering Council	Claudia Ludwig	713-723-2511	petra@hal-pc.org	D4
Environmental & Eng Geologists	Matthew Cowan	713-777-0534	wrcowan1@hal-pc.org	VP
Exhibits	Mac Mckinney	281-353-0661	wnmckinney@comcsat.net	D3
Field Trips	Gary Moore	713-466-8960	gmoore@wellhub.com	D4
Finance	Joe Lynch	281-496-9898 x134	jly@sptgroup.com	T
Foundation Fund	John Adamick	713-860-2114	jada@tgsnopec.com	PE
General Meetings	Art Donovan	281-850-4312	donovan@bp.com	VP
Golf Tournament	Mark Dennis	281-494-2522	mdennis@petrolog.com	D1
Government Affairs	Arlin Howles	281-808-8629	tidenv@sbcglobal.net	D4
	Henry Wise	281-242-7190	hmwise@yahoo.com	D4
Guest Night	Bill Osten	281-293-3160	bill.w.osten@conocophillips.com	D2
Houston Energy Council	Sandi Barber	713-935-7830	sbarber@seismicmicro.com	D4
HPAC	Winona Labrant Smith	713-952-2007	wlbrant@hal-pc.org	S
International Explorationists	Justin Vandenbrink	281-448-6188	vandenbrinkj@rpsgroup.com	VP
Ad Hoc Int'l Year of Planet Earth	Sandi Barber	713-935-7830	sbarber@seismicmicro.com	D3
Membership	Shari Sartain	281-382-9855	smsartain1@comcast.net	S
Membership Growth	Linda Sternbach	281-679-7333	linda.sternbach@gmail.com	D2
Museum of Natural Science	Inda Immega	713-661-3494	immega@swbell.net	D3
NeoGeos	Cecelia Baum	713-346-5826	cecelia.baum@maerskoil.com	S
New Publications	Bill Rizer	281-392-0613	rizerwd@gmail.com	D1
Nominations	Kara Bennett	832-452-3747	kcbhgs@gmail.com	P
North American Explorationists	Steve Getz	713-871-2346	sgetz@jlaev.com	VP
Northsiders	Tony D'Agostino	832-237-400	tony.dagostino@weatherfordlabs.com	VP
	David Tonner	713-516-6894	David.Tonner@weatherford.com	VP
Office	Ken Nemeth	713-689-7605	knemeth@slb.com	PE
Publication Sales	Tom Mather	281-556-9539	geomather@aol.com	D1
Remembrances	Art Berman	713-557-9067	bermanae@gmail.com	EE
Shrimp Peel	Lee Shelton	713-595-5116	lshelton@knowledge-reservoir.com	D1
Skeet Shoot	Tom McCarroll	713-353-4728	tom_mccarroll@yahoo.com	D1
Technofest	Deborah Sacrey	713-468-3260	dsacrey@auburnenergy.com	D1
Tennis Tournament	Ross Davis	713-659-3131	rossdavis@davisbros.com	D1
Vendor's Corner	Paul Babcock	713-859-0316	pebabcock@aol.com	TE
Volunteer Coordinator	Sue Pritchett	281-451-6522	UTSueP@aol.com	S
Web Site Manager	Tarek Ghazi	713-432-4562	hgs.webmanager@yahoo.com	D4
Web Master	Lilly Hargrave	713-463-9476	webmaster@hgs.org	PE
HGS Office Manager	Sandra Babcock	713-463-9476	sandra@hgs.org	

Gary Coburn
garycoburn.hgs@gmail.com

Where Are All Those Faults?

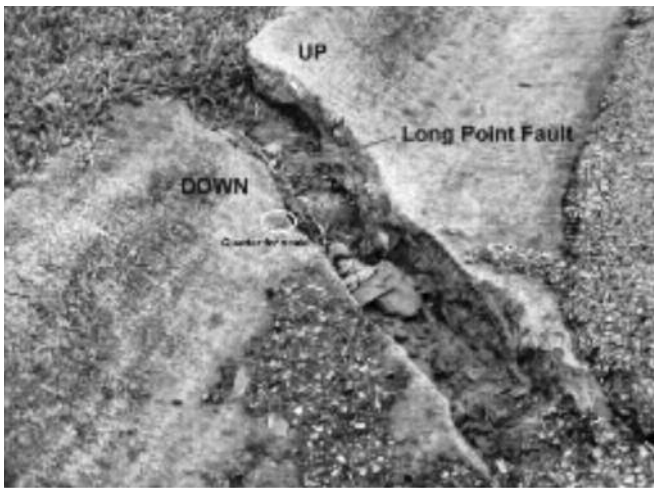
Spring!! Yes, it is upon us! For those of us involved in the Federal Offshore it is almost time to put those lease sale maps aside and see the sunlight again! Time to shake off the winter doldrums and get outside! There is the spring yard work to do, the spring sports activities with the kids, maybe even a little golf could be squeezed in there as well? It is also a great time to start or get involved in new projects at the HGS. Hey this is the HGS *Bulletin*! What did you expect? There is a project I would like to start and I need volunteers to help with every aspect of it. The HGS at one time had a field trip guide showing the faults of Houston. Traffic, congestion, crime…No I mean the REAL faults of Houston! There is quite a bit of information out there on Houston and the surrounding areas' active faults. For instance, in 2005 former HGS Vice President Art Berman gave a talk entitled "The Debate Over Subsidence in Coastal Louisiana and Texas" in which he discussed such things as the famous Long Point – Eureka – Heights fault system as illustrated in these photos taken by Art previously published in this bulletin.

In 2008 U of H professor Shuhab Khan and Richard Engelkemeir, a PhD student, mapped more than 300 surface faults in the Houston area using lidar technology. The result of their work was a comprehensive fault map which can be viewed at http://www.uh.edu/news-events/archive/nr/2008/04april/geological-faultsph.html.

I would like the HGS to put together a field guide which could be used by schools

I would like the HGS to put together a field guide which could be used by schools as well as purchased by our members. Documenting faults that have visible surface expressions and putting them in a cohesive easy-to-use guide will take time and dedication. The area to be covered is very large and the surface expressions can be subtle. This will take volunteers getting out and photographing fault scarps and cracks, making detailed location notes, and tying all this back into the appropriate fault system. It will take a dedicated group to organize, compile, and publish such a guide. Make no mistake, it is an ambitious task to put together a quality publication the HGS can be proud to offer our members and the public. I would like to especially ask our retired HGS members to consider participating in this project. Your experience as well as your time would be of great value in such an endeavor. I truly believe that this is the type of publication that will help the HGS give back to the community in a very unique and important way. We have the expertise and the ability, now we need the manpower! Please contact Sue Pritchett, our volunteer coordinator (pritchettsue@gmail.com) to express your desire to join the committee that will put this guide together. Perhaps we can even have it in time for the 2011 AAPG convention. There are faults visible in every school district, which would make for great quick field trips for literally thousands of kids. Perhaps

From the President *continued on page 9*



Barry Katz
BJKatz.HGS@gmail.com

Science and Our Children

For the second year I visited my daughter's elementary school and discussed the world's quest for energy. No, my daughter Rebecca is not a student, but rather a fifth grade science teacher. Rebecca has spent her seven year career teaching in Title 1 schools, where most of the students come from economically disadvantaged homes. Since moving to Houston, every year she has requested that I teach a geology lesson to her students. She wants to provide an opportunity for exposure to a working scientist.

My visit, the geology curriculum, and the headlines were in perfect alignment. The students and I discussed a number of world events and other topics. I emphasize the word discussed because these were two-way conversations. Subjects included the causes and effects of earthquakes, the geologic map of North America, which HGS donated to the students of Hemmenway Elementary School, and the story of energy including fossil fuels and renewables.

I was impressed by the students' grasp of the facts and their logical thought processes. They were truly interested in science and found geology exciting. In fact, we ran out of time and then Rebecca joked, "Perhaps we should work through lunch", and the kids actually cheered. I was totally surprised.

The question that we need to examine is what happens from the time these kids leave elementary school and complete middle and high school. Politicians have discussed the standing of U.S. eighth grade student's science abilities for several years. Based on the 2007 TIMSS (Trends in International Mathematics and Science Study), U.S. students ranked 11th in science, behind students from such countries as Singapore, England, and Slovenia. By the time our children complete high school much of their interest in science has waned, their factual knowledge has weakened, and geology is far from a career choice. Meanwhile, foreign students fight to get into American universities. Some of these students will remain here but many will return to their country of origin and will compete against our children, who will be less prepared to take on the challenge.

The question is why do our elementary students who so eagerly study science become nonparticipants a few years later. There are no simple answers or solutions. A senior executive from Chevron once asked a number of senior and high performing employees how to keep the staff from leaving. My response was that people stay where their job is challenging, exciting, and fun. I believe that the same idea applies to students. They will remain interested in science and mathematics as long as those criteria are met.

So how might this elevated interest level in science be achieved? In the classroom, teachers need to focus on hands-on experimentation and relevancy rather than a focus on the memorization of "facts". These "facts" will soon be forgotten after the test has been taken. Experimentation permits a more thorough understanding of the concepts and allows the student to remain engaged. Science education should focus on the news and everyday activities, which make science more relevant. Earthquakes, hurricanes, forest fires, shuttle and satellite launches all provide excellent topics for discussion between student and teacher dealing with plate tectonics, climate, atmospheric circulation, natural cycles, man's exploration of space, and so on. Food safety, baking, freezing ice cubes, boiling water, changes in the length of the day offer additional areas for hands-on learning.

Teachers shouldn't be asked to fight the classroom battle without "backup troops".

Teachers shouldn't be asked to fight the classroom battle without "backup troops". Industry scientists need to team with schools and become partners in science education. With regular visits to the classrooms by geologists, chemists, biologists, and others engaged in research and the application of science and mathematics students will have viable role models. A single visit once a year by a single geologist or chemist is not sufficient. Mentoring programs need to be established and corporations that rely on the sciences and mathematics for their growth and future need to encourage and support such activities by the employees. They need to provide time, resources, and even the opportunities for site visits.

From the Editor *continued on page 9*

From the President continued from page 5

more importantly, such a guide may interest kids in geology and observing active geologic processes in their own back yards. Such a guide would be another way to make kids, and the rest of us for that matter, realize that we do not have to spend a great deal of money and travel to exotic places to observe geology in action. We merely have to use our eyes and observe the earth around us.

I hope everyone enjoyed the Mudstone Conference in February. Another successful meeting for what is now the premier shale conference in the world. Thanks to all the HGS members who volunteered their time to make this possible.

We have a lot of excellent talks coming up this month, such as the dinner meeting talk by former HGS President Clint Moore entitled, "Pioneering the Global Subsalt/Presalt Play: The World Beyond Mahogany (USA) Field" and the HGS general Lunch presentation by Lauren Peschier of Newfield entitled, "The Boquillas (Eagle Ford) Formation of South Texas: Potential Outcrop Analogs for Nonconventional Eagle Ford Shale Reservoirs in the Subsurface". I hope to see you at these great talks! Have a great "Spring Break"!

From the Editor continued from page 7

Administrators need to make the necessary resources and training available to the teachers to allow hands-on activities. The curriculum should have sufficient flexibility to account for the study of actual scientific events as they occur. They need to remember that advances in science require one to learn critical thinking in addition to the basic fundamentals.

Parents have an important role to play. Children need to visit local museums, the zoo, aquarium and parks. To the best of their abilities they need to explain what they are seeing. They also need to explain what is happening in their surroundings. Explaining such things as why we wrap pipes when freezing conditions come, how planes stay up, and that electricity doesn't magically appear from the wall become part of the parenting role. This may mean that parents may need to go back to "school" and do a little learning themselves. A simple "because" is not an acceptable answer. Some of us may start by reading Bill Bryson's *A Short History of Nearly Everything*, while others may simply switch from the Cartoon Network to the Discovery Channel.

Our kids also have a part to play. They must ask us why and push for explanations, when necessary. They need to ask us to take them to places where they can learn and explore rather than simply sit in front of their video game or head to the mall. And, finally they need to accept that the easiest class is not always the best class. They need to look for those that challenge them.

When Rebecca asked me to provide a lesson on geology, she was attempting to reach her students on several levels. They took part in a hands-on demonstration, discussed world events, were exposed to a working scientist, and learned about the role of geologists.

I hope that I have been able to reach at least one student. Perhaps one day, Chevron will meet a young geologist who was inspired by my participation. As someone who has been involved in science for more than four decades, I remain engaged because I always seem to find a challenge, excitement in finding something new, and fun in the process of discovery.

Until next time…

Mark Your Calendars!
HGS Guest Night Saturday, May 22, 2010

Guest Night returns to the HMNS for another memorable event — an enjoyable happy hour in the exhibits area, delicious buffet dinner, door prizes, a great speaker and a 3D IMAX movie.

HGS/PESGB
9th International Conference on African E&P
Africa: A Multi-faceted Promise
Houston, 2010
September 8-9, 2010

Marriott Houston Westchase Hotel • 2900 Briarpark Drive, Houston, Texas

FINAL CALL FOR PAPERS

Plan to attend this event during the week before the AAPG Int'l Convention in Calgary.

This annual conference has become established as the primary technical E & P conference on Africa. Scheduled for 8-9 September 2010 in Houston, a two-day program of talks is planned along with technical posters and exhibits from sponsoring companies. Opening reception will be Tuesday evening September 7th.

The conference series, organized by members of the International Group of Houston Geological Society (HGS) and Petroleum Exploration Society of Great Britain (PESGB) covers all aspects of African E&P, with particular emphasis on new ideas for plays and prospects, the geology of the continent and its conjugate margins, and application of emerging technologies.

Technical Contributions and Sponsorships are welcomed now.

Submit topics as soon as possible for consideration of the Technical Committee to Africa2010@att.net. Abstracts (~200 words) are due no later than 31 March. The program will be finalized by end April.

For sponsorship opportunities or exhibit space, please contact David Schwartz DSchwartz@fugro.com .

Special thanks to Fugro Gravity & Magnetic Services for again sponsoring the CD of Proceedings.

Pre-registration will be available from April, further details will be appear in the HGS *Bulletin*, PESGB newsletter and websites.

Conference Committee for 2010 includes Al Danforth, Ian Poyntz, Martin Cassidy, Dave Schwartz, Justin Vanden Brink, Tarek Ghazi and Claudia Lopez (Houston), Ray Bate and Duncan Macgregor (London).

Monday, March 8, 2010

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $28 Preregistered members; $35 non-members & walk-ups

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

Dwight "Clint" Moore
ION Geophysical Corporation

Pioneering the Global Subsalt/Presalt Play: The World Beyond Mahogany (USA) Field

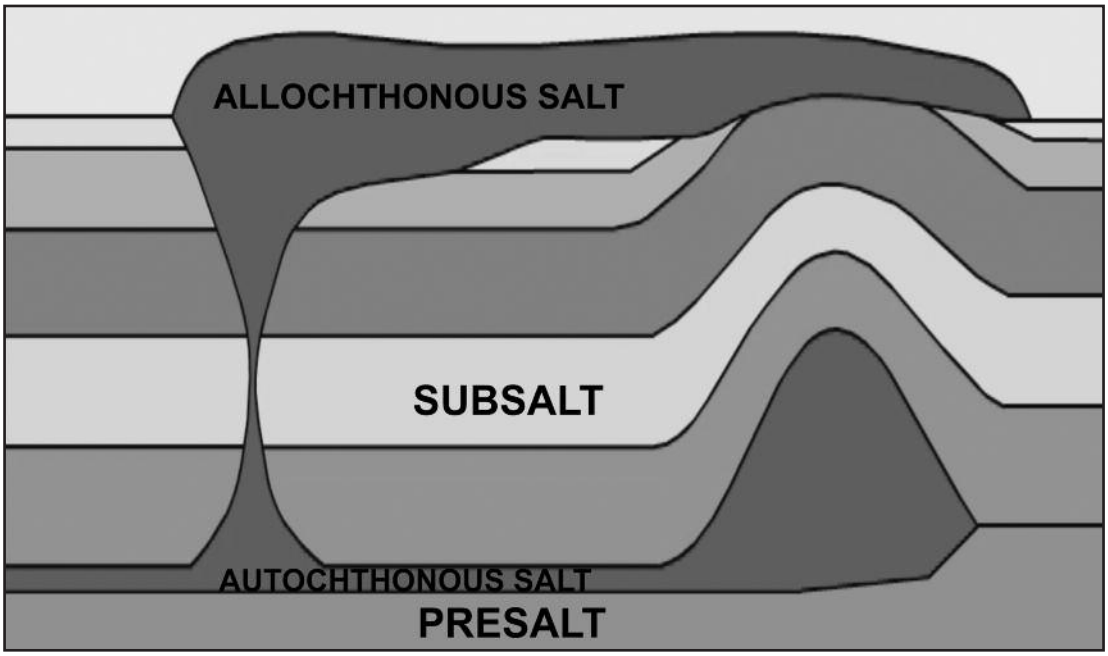
Ten years into the 21st century, the subsalt play that began in the U.S. offshore Gulf of Mexico during the 1980s has evolved into a growing global subsalt/presalt play of likely historic impact. Today, we are at the dawn of major reserve and production additions to the world oil & gas supply, as global subsalt/presalt petroleum exploration yields major results, not only in the Gulf of Mexico, but also off Brazil and West Africa. In the years ahead, these new discoveries will fuel further exploration & production below complex salt layers worldwide.

There are now fewer limits on the future global oil and gas potential below salt

Since its inception the greatest challenge for the subsalt/presalt play concept has been explorers' difficulty in accurately imaging the seismic data below and around salt in order to identify the potential structures to drill. As a result of recent major advances in seismic processing algorithms and computer processing speeds, explorers can now see subsalt/presalt images much more clearly. The most aggressive explorers are applying these latest technologies to more salt basins globally.

Reverse Time Migration (RTM) represents the most recent and significant advance in seismic imaging below salt layers. Propelled by advances in workflows, computing power, and data management, RTM now provides the most accurate view of subsalt/presalt prospects, discoveries, and fields. In addition, improved seismic acquisition technology utilizing longer seismic cable lengths and denser, larger data volume collection programs, such as wide-azimuth (WAZ) and multi-azimuth (MAZ) geometries, provide extensive data volumes for the application of advanced RTM technology. Without accurate seismic imaging

HGS General Dinner *continued on page 13*



Subsalt vs. Presalt. Graphic: Mike Hudec, Bureau of Economic Geology, The University of Texas at Austin; Annotation: Clint Moore, ION Geophysical Corporation

10th ANNUAL GSH/HGS SALTWATER FISHING TOURNAMENT

Saturday, June 19, 2010

The FISH SPOT Marina • 4009 20th Street North • Texas City, Texas

Galveston Bay Complex and Offshore

This year's Saltwater Fishing Tournament will include an Offshore Division to be held on Saturday, June 19 at the Fish Spot Marina, Texas City, Texas. We are looking forward to a big event this summer and we encourage full family participation.

Galveston Bay Complex Division

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

Galveston Offshore Division

Trophies will be awarded for the heaviest individual Red Snapper, King Mackerel, and Mahi-mahi.

Registration fee includes: Launch Fee, GSH/HGS Fishing Cap, Fish Fry Meal after weigh-in, Refreshments, Trophies, and DOOR PRIZES.

For more information, please contact:

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

The Geophysical Society of Houston and the Houston Geological Society are non-profit organizations serving the Geosciences Community. Corporate and individual contributions are appreciated and will be acknowledged on several sponsor boards and banners at the Weigh-In Station and Marina. All contributors will be recognized in the GSH newsletter and HGS *Bulletin* following the tournament. This is a great way to entertain friends, family, business associates, and clients. So spread the word!

GSH/HGS SALTWATER TOURNAMENT

NAME: _____ COMPANY: _____

ADDRESS: _____

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

E-MAIL ADDRESS: _____

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

Please return this form with your check for $60.00 per contestant payable to:
GSH SALTWATER TOURNAMENT and Mail to:
Geophysical Society of Houston, 14811 Saint Mary's Lane, Suite 250 • Houston, Texas 77079

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

DISCLAIMER:
I acknowledge that the Geophysical Society of Houston / Houston Geological Society will not be held responsible for injury or accidents during this event. PRACTICE SAFETY!!!!!

Signature: _____ Date _____

HGS General Dinner continued from page 11

technology, the drilling and development of prospects is much riskier and more expensive than desired.

Discovery and development of subsalt/presalt fields found in past decades using less-advanced pre-stack depth-imaging applied to short-offset 2-D and narrow azimuth 3-D seismic surveys, has resulted in the addition of significant reserves and production, but this represents only a fraction of the potential that will likely be globally discovered using new RTM technology. As was learned in the early years of exploring subsalt in the US Gulf of Mexico, we must accurately image below the salt layers in order to have sufficiently high success rates to justify future economic investments. There are now fewer limits on the future global oil and gas potential below salt and the likely discovery of substantial oil and gas reserves and production for the world of tomorrow.

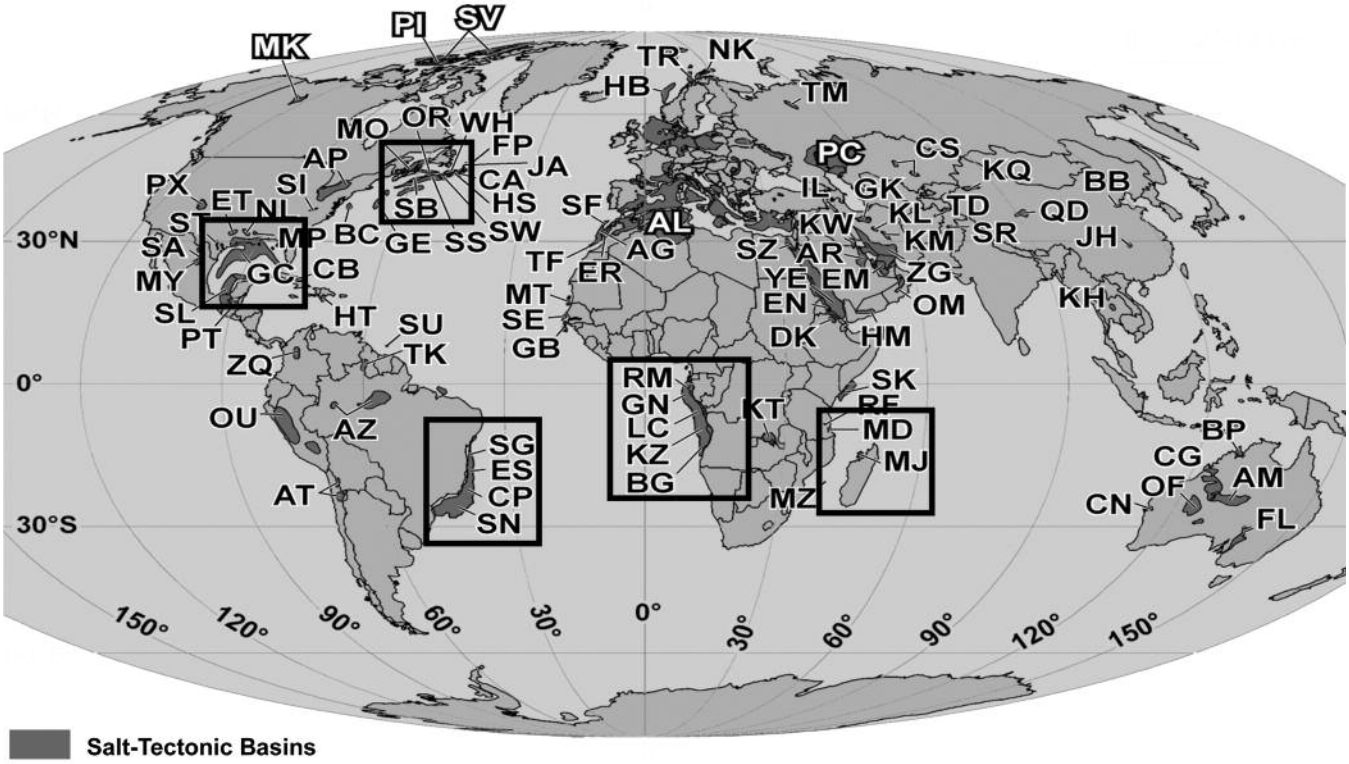
Biographical Sketch

Dwight "Clint" Moore is presently Vice-President – Corporate Development at ION Geophysical Corporation. He has previously worked as a staff geoscientist, supervisor, and manager in petroleum exploration development, business development, and strategic planning at Diamond Shamrock-Maxus, Anadarko, and Murphy.

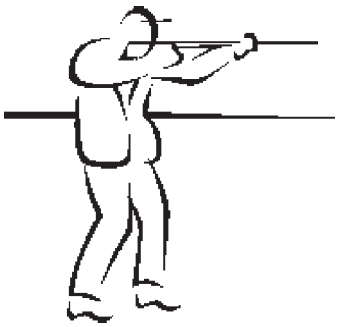
Mr. Moore has focused much of his 30+ year professional career on petroleum exploration and development offshore, especially in North America, where he has worked on the discovery and development of many offshore fields. He has extensive experience in salt tectonics, complex depositional systems, sedimentary and stratigraphic processes, subsalt/presalt petroleum exploration, development, and economics, and now subsalt/presalt seismic imaging.

Since 1985, he has intensely focused on subsalt/presalt exploration, as a result of his work on the Diamond Shamrock SMI Block 200 well, which discovered the first massive sands below a regional salt sheet in the offshore Gulf of Mexico. He joined Anadarko in1987, where he was lead geoscientist in pioneering their subsalt play and concepts, which led to the discovery of Mahogany Field, the first productive subsalt field in the Gulf, as well as Tanzanite and Hickory fields.

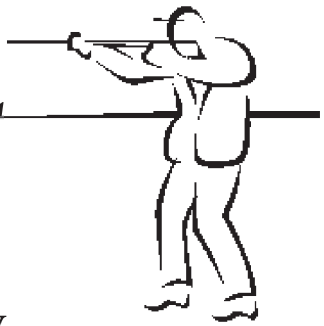
He is a past-president (1994-95) of HGS and a past-treasurer of AAPG (1904-06), and has received the HGS President's Award, Distinguished Service Award, and Honorary Membership Award. He was Chief Editor of the HGS/NOGS guidebook, *Productive Low Resistivity Well Logs of the Offshore Gulf of Mexico*, and has produced multiple technical articles and presentations on subsalt/presalt exploration. Moore earned degrees with honors in geology and business administration/finance (economics minor) from Southern Methodist University in 1978.



5 major salt provinces–subsalt-presalt potential. Map graphic: Martin P. A. Jackson, Bureau of Economic Geology, The University of Texas at Austin; Box annotation: Clint Moore, ION Geophysical Corporation



27th Annual HGS SKEET SHOOT



Saturday, June 19, 2010

Greater Houston Gun Club
6702 McHard Road, Missouri City

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

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

IMPORTANT!!

WE ARE LIMITED TO 160 SHOOTERS IN FOUR ROTATIONS. ENTRY FEE IS $65 PER SHOOTER FOR REGISTRATIONS RECEIVED BY FRIDAY, JUNE 11. AFTER THAT, REGISTRATION WILL BE STRICTLY ON A "SPACE AVAILABLE" BASIS AND THE ENTRY FEE WILL BE $80 PER SHOOTER. REGISTER EARLY!!

For more information, contact: Tom McCarroll at (713)419.9414 or tom_mccarroll@yahoo.com.

****

HGS SKEET SHOOT REGISTRATION FORM

Name: _____ Company:_____

Email: _____ Phone:_____

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

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

Please return form(s) with check for $65.00 per shooter, payable to: ***Houston Geological Society***

If you prefer to pay by credit card, please call Sandra at the HGS office, (713) 463-9476.

Mail to: ***Tom McCarroll • 2668 Hwy. 365 #329 • Brenham, TX 77833***

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

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

****

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

Tuesday, March 16. 2010

Crowne Plaza Hotel - Greenspoint (former Sofitel)
425 North Sam Houston Pkwy E

Social 11:15 AM, Luncheon 11:30 AM

Cost: $31 pre-registered members; $35 for non-members & walk-ups.

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

HGS Northsiders Luncheon Meeting

Aris Pramudito
BP

Understanding the Geologic Controls on *Shale Oil Play*: Lessons Learned from the Bakken Formation, Williston Basin, Elm Coulee Field, Montana

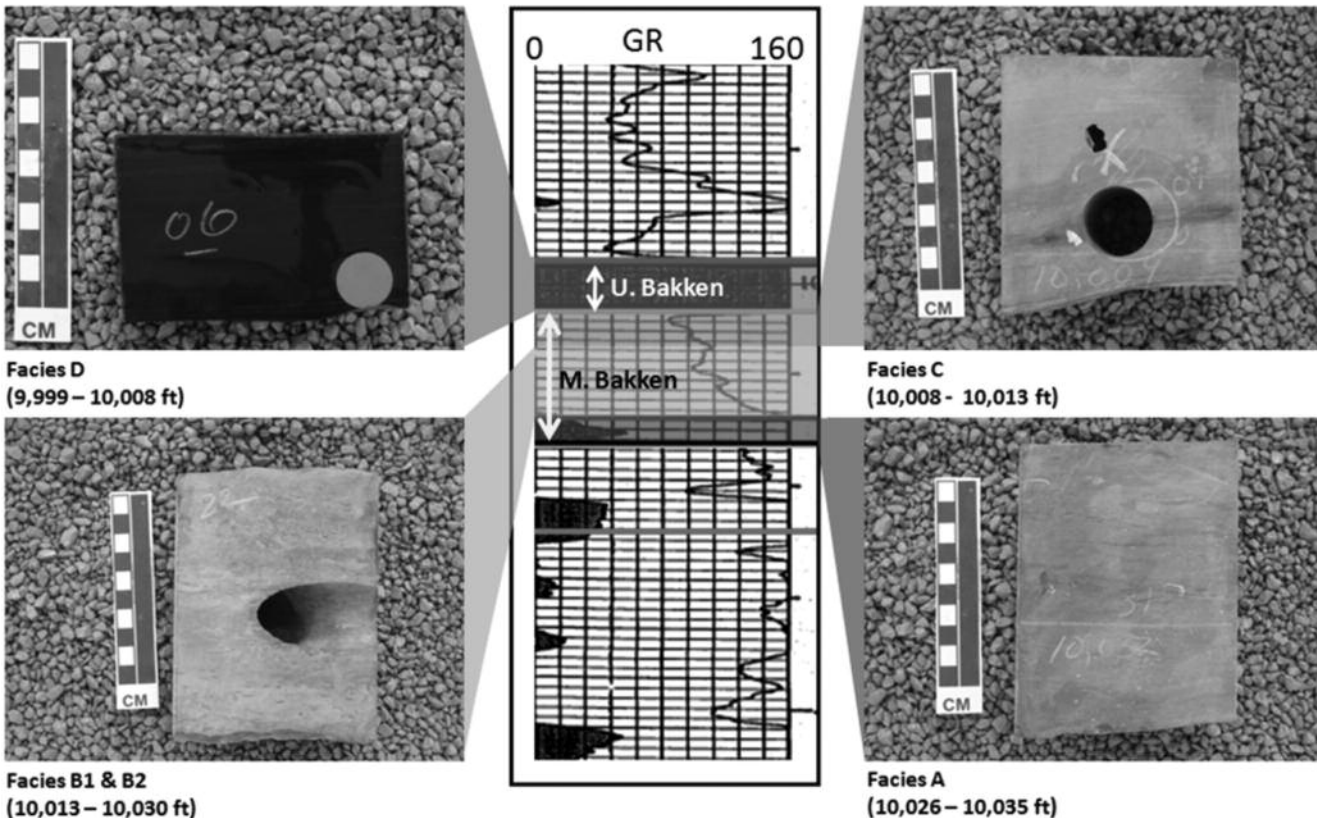
The Bakken Formation in the Williston basin is divided into three informal members: upper, middle and lower. The upper and lower Bakken consist of dark grey to black pyritic and finely laminated mudstones. The middle member of the Bakken is composed of various lithologies including siltstones, sandstones, limestones and dolostones. Total thickness of the Bakken Formation in the Williston basin ranges from 0 to 110 ft, with the upper member ranging from 0 to 30 ft, the middle ranging from 0 to 92 ft, and the lower ranging from 0 to 46 ft.

Due to the simplicity of structural deformation in the Williston basin, the oil generated by the upper and middle Bakken remains in the system.

The upper and lower mudstones are world-class petroleum source rocks with TOC ranging from 8% to 36% wt., with an average of 25% to 28% wt. across large areas of the basin. They can easily be identified by their high radioactive signatures (GR > 200 API). The Bakken was estimated to have generated 200 – 400 billion barrels of low sulfur (< 0.1%), 40 – 45° API gravity oil in place.

The lower Bakken is absent in the Elm Coulee Field. Source of

Northsiders Luncheon *continued on page 17*



HGS Shrimp Peel

Saturday, May 15, 2010
6pm - 10pm
Sam Houston Race Park
7275 N. Sam Houston Pkwy. West
281.807.8700

Boiled Shrimp - Beer & Beverages - Horse Races - Music - Door Prizes - Boiled Shrimp - Beer & Beverages - Horse Races - Music - Door Prizes - Boiled Shrimp

Tickets $30 Advance / $35 at the Door

* Event held indoors - Pavilion Centre
* Enter through North gates
* Valet parking available
* Purchase tickets online at hgs.org
* Or use form with check or credit card
* Purchase tickets by May 7 - No Refunds

Many thanks to our Gold sponsors:

CGGVERITAS

SCM INC
Subsurface Computer Modeling, Inc.
Geoscience ◆ Consulting ◆ Training ◆ Software

knowledge reservoir

ODS
OVATION DATA SERVICES, INC.
www.OvationData.com

SMT

2010 Shrimp Peel Ticket Order Form

2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form

Send ticket order form and check or credit card information to:
Houston Geological Society, Shrimp Peel,
14811 St. Mary's Lane, Suite 250 • Houston, Texas 77079-2916

Name: _____ Company: _____

Address: _____ City/State: _____ Zip: _____

Number of tickets: _____ Phone: _____ Email: _____

If paying by Credit Card:

Name on card: _____ Billing Address: _____

Card Type: (circle one): VISA / MASTERCARD / AMERICAN EXPRESS / DISCOVER

Card Number: _____ Expiration date: _____

Signature: _____ Date: _____

Daytime Phone Number of Card Holder _____

Make checks payable to: HGS Shrimp Peel.

For more information call 713.595.5116 or email lshelton@knowledge-reservoir.com

2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form

2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form

2010 Shrimp Peel Ticket Order Form - 2010 Shrimp Peel Ticket Order Form

HGS Northsiders Luncheon continued from page 15

petroleum in the middle Bakken is primarily from the upper Bakken mudstone with TOC varying from 8% – 15% wt. and estimated initial TOC ranging from 12% – 25% wt. and increasing towards the basin center (northwest to the Elm Coulee).

The total thickness of the Bakken Formation in the Elm Coulee field is from 10 to 50 ft with the middle Bakken ranging from 5 to 45 ft. Low permeability rocks generally characterize the lithologies of the Bakken member overall. The accommodation space for the Bakken in the Elm Coulee field is believed to be developed by the dissolution of the Prairie Formation evaporites to the north of Elm Coulee or by basement related structures or both.

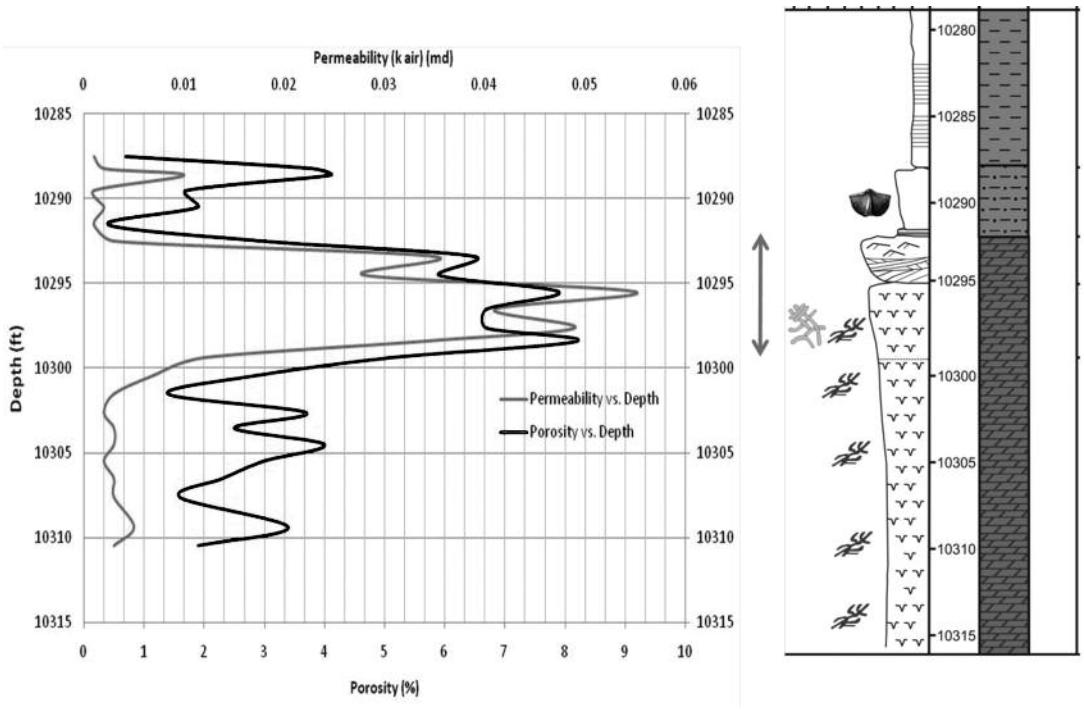
The upper Bakken mudstone is dark-grey to black, hard, siliceous, slightly calcareous, pyritic, and fissile. The mudstone consists of dark organic kerogen, minor clay, silt-size quartz, some calcite and dolomite. The kerogen consists mainly of amorphous material and is distributed evenly throughout the mudstone interval. The middle Bakken in the Elm Coulee Field consists of dolostones with 3 identified lithofacies: calcareous dolo-mudstones, bioturbated dolo-mudstones and arenaceous dolostones. Identified lithofacies represent different rock properties of the middle Bakken. Arenaceous dolostone lithofacies has the greatest porosity and permeability calculated both from core analysis and wireline logs (5% - 10% porosity and 0.05 – 0.2 mD of permeability). The pore network development in the middle Bakken is the function of degree of bioturbation, mineralogical-depositional fabric, and diagenesis. Permeability is highly dependant on intergranular matrix porosity and intragranular dissolution of dolomites, with less of any natural fractures involved, based on core observation in the field.

Due to the simplicity of structural deformation in the Williston basin, the oil generated by the upper and middle Bakken remains in the system. Therefore the Bakken petroleum system is self-sourced. The middle Bakken in this field is oil-saturated. Both fractures and pore network are the important factors in controlling petroleum charge access from the upper Bakken source to the middle Bakken tight reservoir.

The boundaries of the middle Bakken fairway in the Elm Coulee field were defined using porosity from neutron-density logs, with a cutoff of 5%, and true resistivity above 20 Ohm-m. Net thickness of the saturated oil zone within the middle Bakken ranges from 5 to 25 ft. The Bakken in the field is slightly overpressured due to petroleum generation. The over-pressuring and middle Bakken reservoir quality are the important factors in understanding oil production rates in the Elm Coulee field. The middle Bakken is a brittle dolostone, which lends itself to hydraulic fracturing completion. Long-lateral horizontal drilling and multi-stage hydraulic fracturing of the middle Bakken dolostones are keys to success in the Elm Coulee field development area. ■

Biographical Sketch

Aris Pramudito is a geologist working with the BP Arkoma Regional Exploration and Appraisal team. He specializes in unconventional reservoirs, mudrock characterization and petroleum geology. He holds an M.S. degree in Geology from the Colorado School of Mines and a B.E. degree in Geological Engineering from the Bandung Institute of Technology (ITB). He has worked in a number of unconventional and conventional oil and gas plays in the US and had been involved in carbonate reservoir characterization studies in different basins in Indonesia.



Gulf Coast Association of Geological Societies and the Gulf Coast Section of SEPM

60th Annual Convention October 10-12, 2010 *San Antonio, Texas*

Hosted by the South Texas Geological Society

Welcome back to San Antonio! Our theme this year is "**Weathering the Cycles**" — a challenge that resource geologists have faced and overcome in the past. How do we weather the economic cycles? We...

✓ Network with our community

✓ Experience the latest technology in the technical exhibition

✓ Take a course or a trip and grow new and diverse skills

✓ Listen to special presentations on strategies to endure and prosper during an economic downtime and prepare for the inevitable rebound.

By celebrating our successes, facing our challenges, and learning from the research results of our peers, we are paid back many fold by sharing ideas and experiences among our professional community. So come and share your experiences!

PROPOSED TECHNICAL SESSIONS INCLUDE…

✓ Organic 'Shales' of the Gulf Coast — Controls on Reservoir Quality and Producibility

✓ Gulf of Mexico Paleogene — Reservoirs, Events and Controversies

✓ Eastern Gulf of Mexico — Exploration Potential and Environmental Challenges

✓ Texas/Mexico Borderlands — Structures, Hydrocarbons, and Lessons Learned

✓ Unconventional Resources — Exploration Decisions and Production Issues

✓ Integration of Seismic Geomorphology and Wellbore Data — Case Studies

✓ New and Evolving Technologies — Impact on Commerciality

✓ Horizontal Drilling and Formation Stimulation — Edwards, Wilcox, and elsewhere

✓ Carbon Sequestration — Risks, Opportunities, and Implications for EOR

✓ Alternative Energy Solutions — The Role of Geoscience

✓ Water for a Growing Region — Geology, Water Quality and Resource Management

✓ Geologic Training and Education — Preparing for the Crew Change

Questions about the technical program should be directed to:

Dr. Mary Feeley	Dr. Alan Dutton
Technical Program Chair	SEPM Co-Chair
281-654-3588	210-458-5746
missy.feeley@exxonmobil.com	alan.dutton@utsa.edu

Tuesday, March 16, 2010

Black Lab Pub, Churchill Room • 4100 Montrose Blvd.

Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 non-members & walk-ups

The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476 (include your name, e-mail address, meeting you are attending, phone number and membership ID#).

Brent P. Stafford, PhD, PG

Fate and Transport of Ethanol-Blended Fuels

Concerns regarding potential impacts to environmental resources from releases of ethanol-blended fuels have increased due to the rise in use and transport of ethanol fuel blends. Potential release scenarios include ethanol-blended gasoline (10-20% v/v ethanol) or E85 (85% v/v ethanol) leaking from underground storage tanks at service stations and fuel grade (denatured) ethanol (95-97.5% v/v ethanol) spills during transport or after reaching bulk terminals.

…there have been recent significant gains in the state of knowledge of the fate and transport of ethanol-blended fuels.

The hydrophilic properties of ethanol drive the environmental transport of these fuels and influence the locations and geometries of generated non-aqueous phase liquid (NAPL) secondary source zones from the gasoline or denaturant fuel fractions. Also, due to the ability of highly concentrated ethanol to dissolve NAPL, large releases of fuel-grade ethanol may exacerbate impacts to groundwater or surface waters at sites with pre-existing NAPL in soils or sediments. As a result, commonly understood and utilized conceptual models used as tools for site management for released (non-ethanol blended) fuels may be inadequate for some ethanol fuel blends.

This study presents an overview of the state of knowledge of the fate and transport of released ethanol-blended fuels. Included are recent quantitative results from bench- and pilot-scale experiments that simulated releases of fuel-grade ethanol near the water table, highly concentrated ethanol in the capillary zone upgradient of a pre-existing residual NAPL, and dissolved ethanol and aromatic hydrocarbons from a steady-state simulated gasohol source in groundwater. The results show: (1) fuel ethanol releases that reach the water table will be largely confined to the capillary zone due to ethanol's physical properties. As a result, generated secondary NAPL sources from gasoline fuel fractions in fuel grade ethanol will largely form within a collapsed capillary fringe. (2) The mass transfer of ethanol from the capillary zone will determine the resulting ethanol concentrations in groundwater; thus, surface recharge, water table fluctuations, groundwater seepage velocity and dispersion, and position within and down-gradient of the source will be important determinants of aqueous ethanol concentration; and (3) pre-existing residual NAPL may be mobilized by ethanol in the capillary zone closer to the water table, which would increase hydrocarbon concentrations in neighboring groundwater.

Collectively, there have been recent significant gains in the state of knowledge of the fate and transport of ethanol-blended fuels. These compiled results from recent research and field investigations provide insight for evaluating or managing potential risks to environmental resources. ■

Biographical Sketch

Brent Stafford is an environmental engineer and hydrogeologist with Shell Global Solutions (US) Inc. In this role Brent specializes in evaluating the environmental behavior of and risks associated with alternative fuels, fuel components, and enhanced oil recovery agents used for the E&P industry. Brent's responsibilities also include providing technical consulting services for management of impacted industrial sites with complex hydrogeology and interactions between groundwater and surface waters.

Mr. Stafford's education includes a BS in Environmental Geology and Technology and graduate degrees in Environmental Engineering. His continuing education background and experience have allowed him to develop expertise in chemical fate and transport, remediation technologies, and environmental and ecological risk associated with the petroleum and petrochemical industry.

Monday, March 22, 2010

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $28 Preregistered members; $35 non-members & walk-ups

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

HGS International Dinner Meeting

Walter D. Mooney

Understanding the Crust Beneath Sedimentary Basins

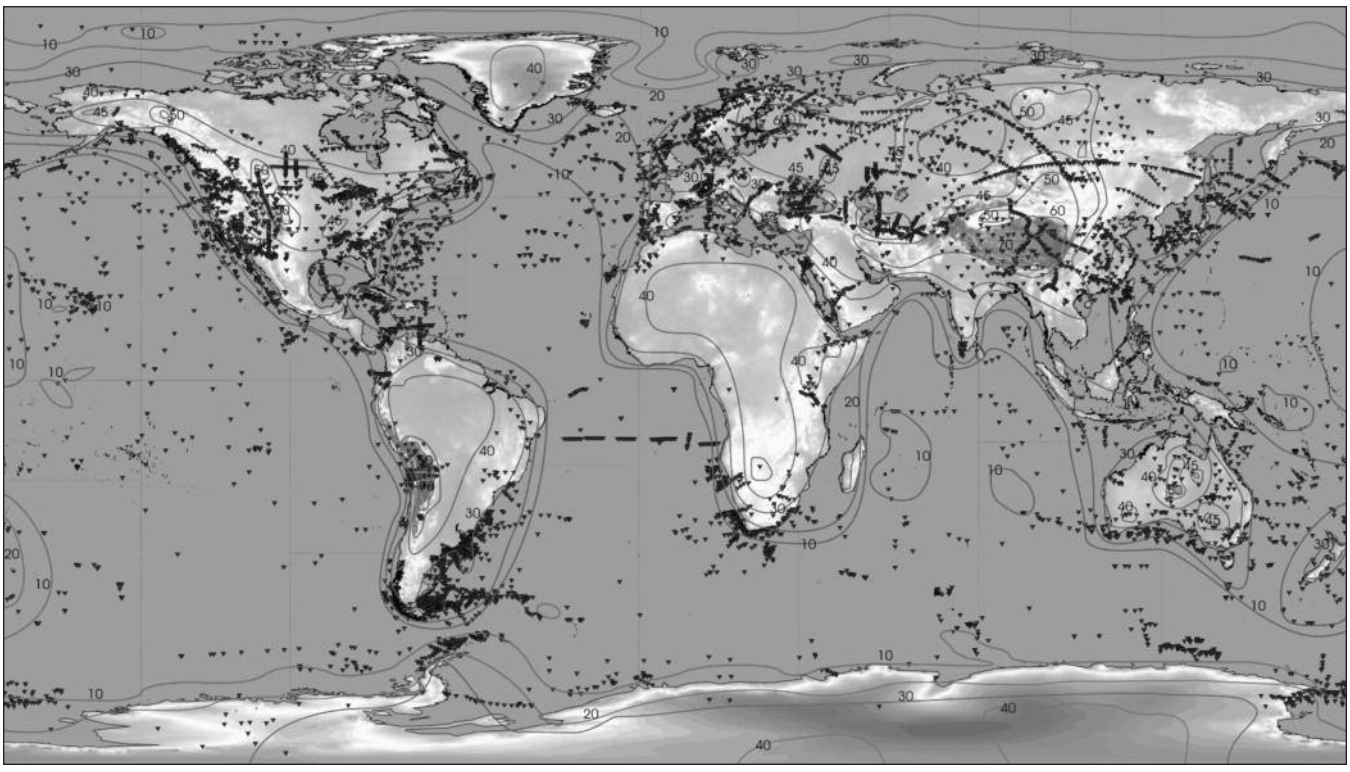
Understanding how sedimentary basins evolve is an exciting, but difficult task. Seismic reflection data do a marvelous job of imaging the internal structure of sedimentary basins. There is no better technique. However, we often want more than just a detailed image of the basin. Of particular interest are the physical properties within the basin and below it, within the crystalline crust. For example, seismic P- and S-wave velocities are closely tied to lithology, and hence crustal type (oceanic versus continental). Consequently, seismic reflection studies are complemented by seismic velocity studies. Such velocity information is very effective in determining basin geometry, and can be used to determine Poisson's ratio, an important parameter for determining the kind of source rocks, crustal type, as well issues related to the Law of the Seas convention.

…many of these results challenge conventional views of "how the Earth works".

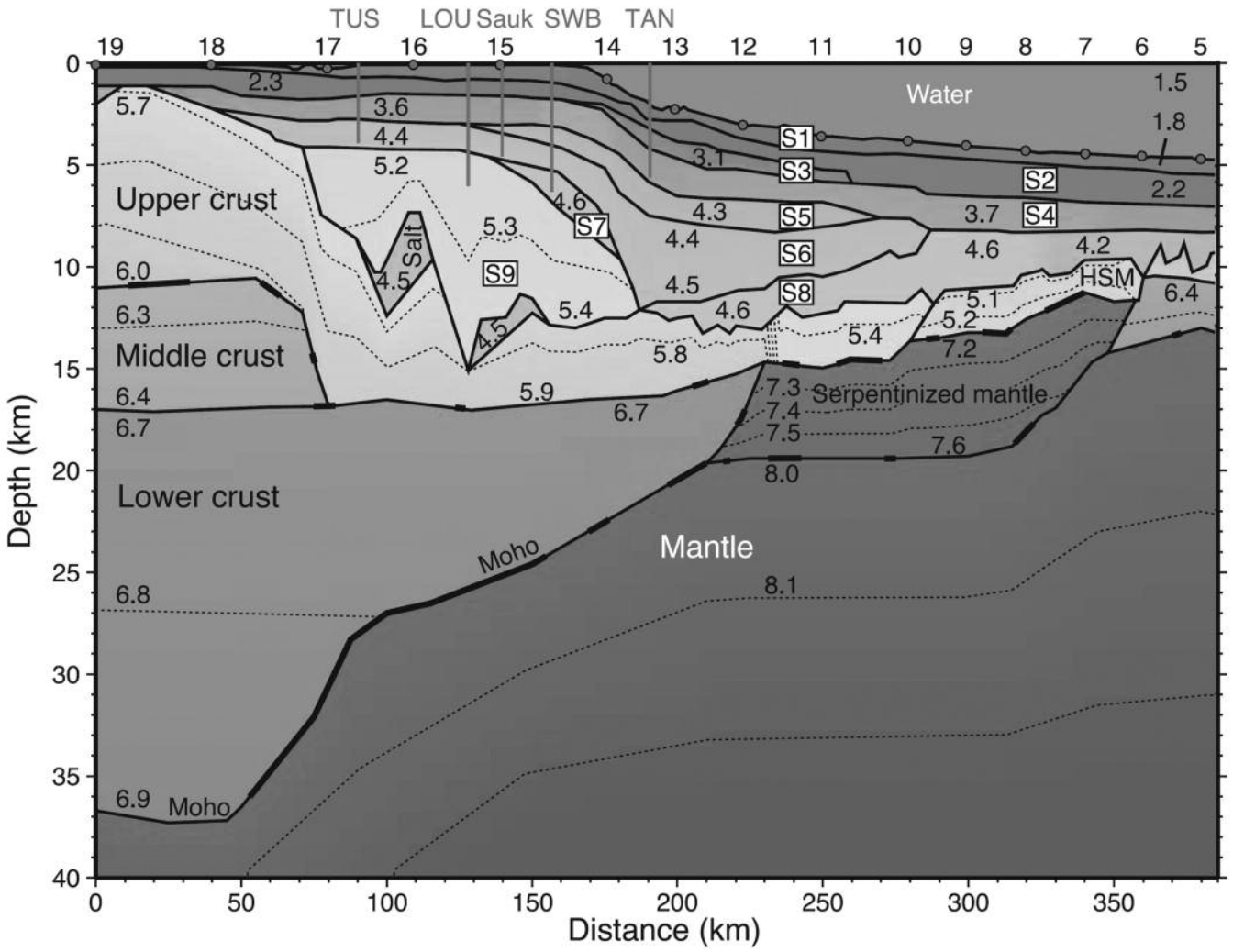
One good way to obtain reliable deep seismic velocities is to shoot wide-offset seismic refraction profiles. Actually, this technique is a classical one that all students encounter in their first course about the Earth's crust. Indeed, seismic refraction profiles formed the basis for the early exploration for hydrocarbon resources. Today, high-resolution seismic refraction profiles are recorded on land and at sea using a wide variety of techniques.

In this talk I will present a global synthesis of what we have learned from deep crustal seismic velocity profiles, from the Gulf Coast to the Bay of Bengal and beyond. A very extensive literature search has been undertaken to track down as many of the seismic refraction publications as possible. The resulting database

HGS International Dinner *continued on page 23*



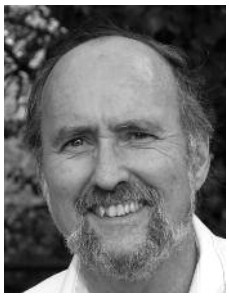
HGS International Dinner continued from page 21



contains over 10,000 one-dimensional P-wave and S-wave profiles, making it the largest such catalog in existence. These data, especially when examined as complete crustal cross sections, reveal a number of surprising results, such as the discovery of highly thinned continental crust extending 100s of km offshore, serpentinized peridotite (rather than basalt) right at the sea floor, and evidence for deep, highly metamorphosed sediments that mimic crystalline basement rocks, thus confounding traditional basin interpretations. Indeed, many of these results challenge conventional views of "how the Earth works". That's just what makes this investigation so exciting! ■

Biographical Sketch

Walter D. Mooney, Ph.D., is a senior research geophysicist with the US Geological Survey in Menlo Park, California, where he has worked since 1978. He has studied the structure, composition, and evolution of the Earth's crust for more than thirty years. His work has taken him to locations throughout the world, with much of his recent work in China, Indonesia, and Africa. His undergraduate degree was from Cornell University (physics) and his Ph.D. (geophysics) from the University of Wisconsin-Madison. He is the recipient of the George P. Woollard Award from the Geological Society of America (GSA), and is a Fellow of the GSA, American Geophysical Union (AGU), and Geological Society of London. He was a visiting professor in the Department of Earth Sciences at Rice University in 2003, and has authored or co-authored over 150 publications. He collects British sports cars, some of which are actually running.



Monday, March 29, 2010

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $28 Preregistered members; $35 non-members & walk-ups

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

HGS North American Dinner Meeting

Steve Schutter

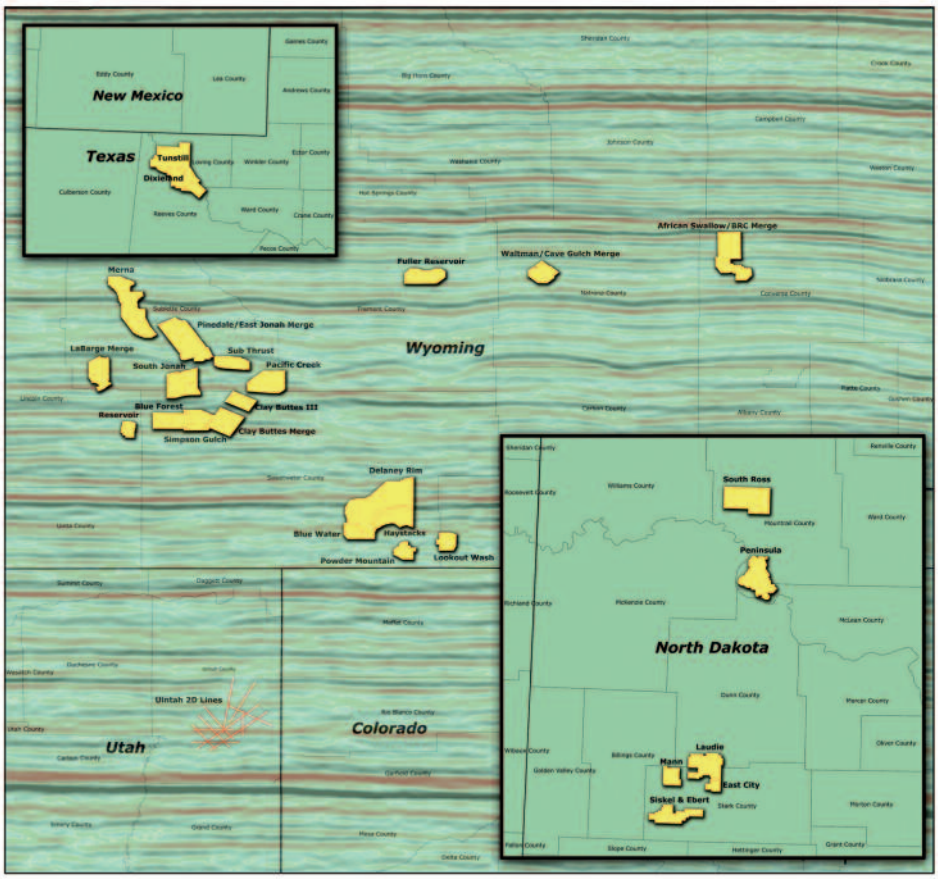
Hydrocarbons Associated with Igneous Rocks (North America and Worldwide)

Explorationists generally disregard igneous rocks and their immediate surroundings, condemning the surrounding sediments as overmature and the igneous rocks themselves as nonporous crystalline masses. However, these are misconceptions, and there is opportunity in moving beyond them. The maturation effect of the igneous activity is often overrated. Most shallow igneous intrusions are volumetrically too small to affect a large volume of rock and even flood basalts cool too quickly to have a marked effect. Most thermal effects are due to regional heating or hydrothermal circulation.

Porosity in igneous rocks may be due to fracturing, particularly fracturing developed during cooling. Some extrusive rocks are also vesicular or may have a clastic texture. However, retrograde metamorphism can also provide significant porosity by creating

HGS North American Dinner *continued on page 27*

Explore the Promise of the Western US



CGGVeritas develops and maintains an extensive library of 3D multi-client seismic data shot in the most promising regions of the United States and Canada. The US key areas include: Gulf Coast, West Texas, Mid-Continent, and Western US. Let CGGVeritas give you the edge you need to make informed drilling decisions.

DATA LIBRARY WITH A DIFFERENCE

Gulf Coast
Scott Tinley
+1 832 351 8544
scott.tinley@cggveritas.com

Cheryl Oxsheer
+1 832 351 8463
cheryl.oxsheer@cggveritas.com

Western US
Rick Trevino
+1 832 351 1051
rick.trevino@cggveritas.com

Mid-Continent
Dennis Langlois
+1 832 351 1052
dennis.langlois@cggveritas.com

Contact:
Houston +1 832 351 8300

CGGVERITAS

cggveritas.com/landlibrary

HGS North American Dinner continued from page 24

what is essentially a vuggy texture. Combinations of these can produce effective reservoir rock.

Igneous rocks can also provide their own traps. Variations in porosity can produce a pseudo-stratigraphic trap. However, thick intrusive bodies (such as laccoliths and plugs) and volcanic cones can also provide trapping structures. Dikes can block migration pathways. Syndepositional sedimentary and igneous facies may also provide traps, as well as post-emplacement draping over non-compacting igneous bodies.

While generally not considered to be source rocks, extrusive igneous terrains are often lake-prone, and thus may provide source rocks for subsequent igneous rocks. Migration in igneous areas is predominantly normal. But, CO_2-dominated systems and those subject to supercritical steam may both be present and they may have distinctive favorable peculiarities. Since they are nonpolar fluids, they are considerably more effective than water-dominated systems at mobilizing hydrocarbons, and the conventional "rules of thumb" for organic matter type, richness, and maturity may not apply.

Exploration methods need to be as variable as the igneous reservoirs … Due to the lack of "rules" and systematic study, currently the best approach to exploration in and around igneous rocks is to look for analogs.

Exploration methods need to be as variable as the igneous reservoirs. Some igneous rocks contain abundant iron, and have a strong magnetic signature. Others do not. Some igneous rocks are much denser than the surrounding rock; others are not. Notably, one of the earliest plays in Texas, the "serpentine" trend, was instrumental in developing many of the early geophysical techniques. Likewise, log results may be so variable as to be ambiguous. Some characteristics may be recognizable, but the nature of the igneous rocks and their relationships must be considered.

Due to the lack of "rules" and systematic study, currently the best approach to exploration in and around igneous rocks is to look for analogs. The search for analogs cannot be limited to one area or continent, but a global view is needed. Analogs from around the world have applicability to possible plays in North America. Thus, an extensive reference list of possible analogs should be considered.

More broadly, the presence of hydrocarbons in or around igneous rocks in a basin may indicate the presence of an effective hydrocarbon system in that basin. There are still basins in the world where leaking hydrocarbons may indicate the potential of the basin. Also, large areas of productive sedimentary basins are covered by volcanics, both flood basalts and ash-flow tuffs. Exploration models can complement and enhance geophysical methods in such areas. ■

Useful References

DeJarnett, B. B., 2007, Oil in a basaltic reservoir? West Rozel Field, Box Elder County, Utah: Houston Geological Society *Bulletin*, v. 50, n. 3 (November), p. 35, 37.

Schutter, S. R., 2003, Hydrocarbon occurrence and exploration in and around igneous rocks: in Petford, N., and McCaffrey, K. J. W., eds., Hydrocarbons in crystalline rocks, Geological Society of London, Special Publication 214, p. 7-33. Discussion.

Schutter, S. R., 2003, Occurrences of hydrocarbons in and around igneous rocks: in Petford, N., and McCaffrey, K. J. W., eds., Hydrocarbons in crystalline rocks, Geological Society of London, Special Publication 214, p. 35-68. List of occurrences.

Biographical Sketch

Steve Schutter received his graduate degrees in geology from the University of Iowa, where he worked on the depositional environments of Ordovician and Pennsylvanian shales. He went to Exxon Production Research, where he worked on Paleozoic eustasy and the stratigraphic expression of salt tectonics, as well as on several regional studies. This was followed by work for Subsurface Consultants and now at Murphy International E&P. In addition to Paleozoic eustasy and the depositional environments of shales, he has published on hydrocarbons associated with igneous rocks.

Wednesday, March 31, 2010

Petroleum Club • 800 Bell (downtown)
Social 11:15 AM, Luncheon 11:30 AM

Cost: $30 pre-registered members; $35 for non-members & walk-ups;
Emeritus/Life/Honorary: $15; Students: FREE

To guarantee a seat, you must pre-register on the HGS website (www.hgs.org) and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

HGS General Luncheon Meeting

Lauren Peschier

The Boquillas (Eagle Ford) Formation of South Texas: Potential Outcrop Analogs for Nonconventional Eagle Ford Shale Reservoirs in the Subsurface

The Eagle Ford Shale (and the laterally equivalent Tuscaloosa Shale) of the Gulf Coast Basin has long been considered to be a source rock for Mexico, Texas, and northern Louisiana production, but is now drawing interest as a resource play. With industry focus on non-conventional reservoirs and advancements in multilateral horizontal completion technology, fractured bituminous shales have become viable exploration targets. Well-known examples of shale reservoirs include Bakken Shale (Mississippian of Williston Basin), Barnett Shale (Mississippian of Forth Worth Basin), Woodford Shale (Late Devonian/Early Mississippian of Arkoma Basin), and Marcellus Shale (Middle Devonian of Appalachian Basin). The Cretaceous experienced three major oceanic anoxic events, including one at the Cenomanian-Turonian boundary, represented by the Eagle Ford, and it is not surprising that exploration interest is now being attracted.

Deep road cut exposing fresher rock of the middle member of the Boquillas (Eagle Ford) Formation.

The current study is concerned with outcrops observed along U.S Highway 90 in Val Verde and Terrell counties, Texas, where the Eagle Ford (locally called the Boquillas Formation) lies on the northern margin of the Maverick Basin. The Boquillas Formation (Cenomanian-Turonian) is about 200 ft thick in this area but thickens ten-fold into northern Mexico. It was deposited during a time of exceptionally high sea levels and represents a transgressive-regressive sequence. For the purpose of the study, the formation was divided into three members based on lithological differences, including limestone to shale ratio. Attention was focused on the lowest member, which has characteristics of slope depositional

HGS General Luncheon *continued on page 31*

HGS General Luncheon continued from page 29

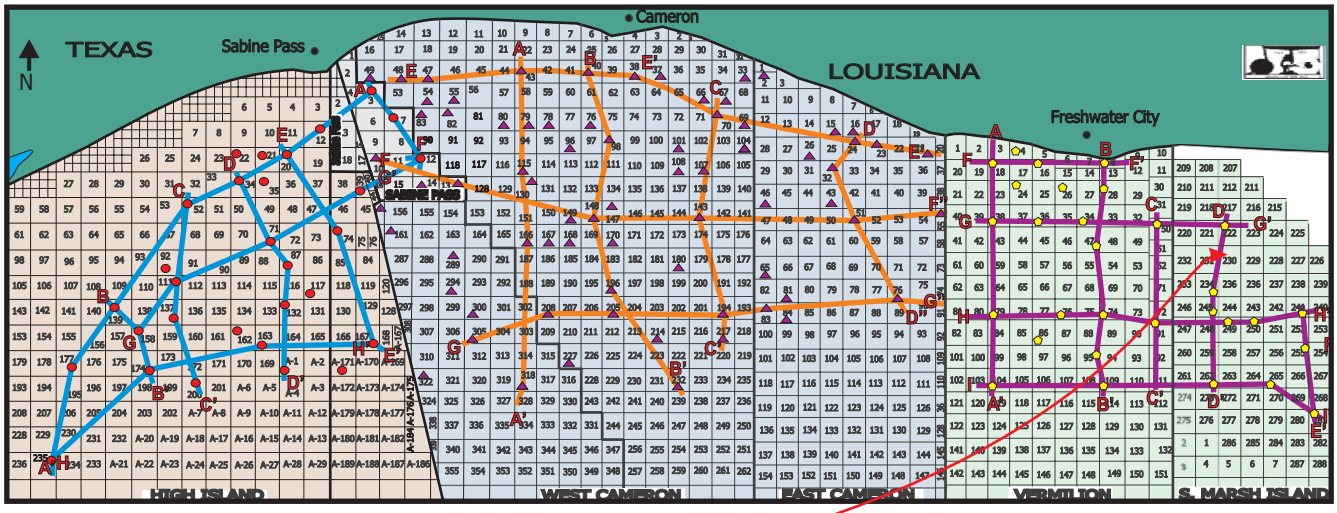
conditions. Features seen in this member contradict previous interpretations of the Boquillas in this area, which had been thought to be composed of tidal-flat or shallow shelf sediments. The sedimentary features of the lower member include slump folds, debris flows, probable turbidites, and possible contourites (previously interpreted as hummocky cross-bedded grainstones). The strata consist mainly of interbedded limestone and calcareous shales. These sediments were probably once black and organic-rich, but there are no exposures where the lower member is sufficiently unweathered for proper description. Diagenetic differentiation, the repartitioning of carbonate from the shales into the limestone, has selectively exaggerated the geometry of the contourites and caused their resemblance to hummocky cross-stratification. When freshly broken, the limestone beds emit a hydrocarbon odor. The faunal assemblage of the lower and middle members consists mainly of planktonic foraminifera, calcispheres, and ammonites. Bottom-dwelling fossils are less common and are mainly found in the matrix of debris flow deposits, with the exception of Inoceramus sp. This bivalve genus has species that are adapted to low-oxygen conditions. The lack of bioturbation and scarcity of fossils suggests deep water and possibly anoxic bottom conditions. The combination of the lithofacies observed in outcrop and the fauna suggests that the lower member of the Boquillas represents the beginning of sea level rise, with sediment accumulating on the upper margin of the basin's slope, in moderately deep water.

Features seen in this member contradict previous interpretations of the Boquillas

The transition between the lower and middle members is marked by the abrupt end of the unstable slope features and a much higher proportion of organic-rich shales to limestones. At the base of the three deepest road cuts along Highway 90, fresher rock is exposed. When freshly broken, these shales are black. They are very finely laminated on a millimeter scale, and contain planktonic foraminifera and calcispheres. Coarser laminae, ranging from millimeter to centimeter thick, consist of microfossil concentrations that are thought to be a product of winnowing by bottom currents. Inoceramids are also present in the middle member. Some of the interbedded limestones are laterally continuous while others are more nodular in appearance. The preservation of fine laminae, with little to no bioturbation, combined with the fauna present, indicate anaerobic to dysaerobic conditions with a total lack of infauna during the time of deposition. Water depth

HGS General Luncheon *continued on page 33*

"DAVY JONES" CITED AS VERY LARGE GULF SHELF DISCOVERY



Project Cost:
$8,900 High Island-Sabine Pass (30 wells)
$14,900 West-East Cameron (74 wells)
$8,900 Vermilion-S. Marsh Island (30 wells)
$8,900 Eugene Island (30 wells)
$8,900 Ship Shoal (30 wells)
$8,900 S.Timbalier-South Pelto (35 wells)

DAVY JONES
200? FT NET PAY
WILCOX
2 - 6 Tcf?

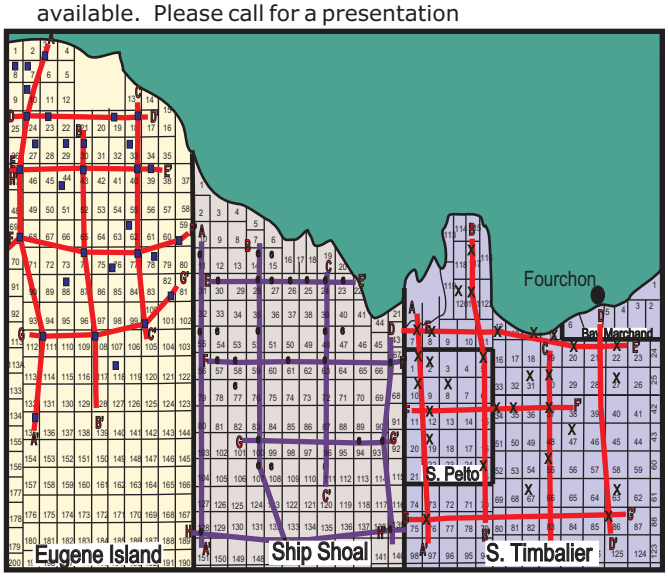
Digital well-logs:
$900 High Island-Sabine Pass (30 logs)
$1,800 West-East Cameron (74 logs)
$900 Vermilion-S. Marsh Island (30 logs)
$900 Eugene Island (30 logs)
$900 Ship Shoal (30 wells)
$900 S. Timbalier - S. Pelto (30 wells)

PROJECT DELIVERABLES

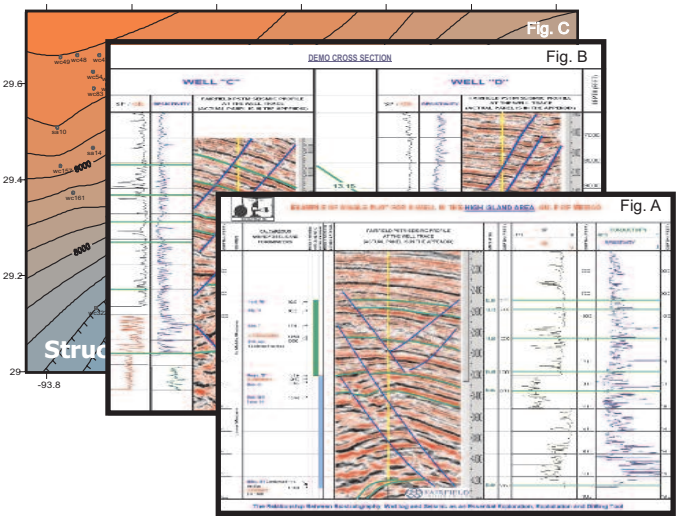
1. 229 single well plots. Most wells 15000' with mapable Genetic Sequences correlated with marker species, paleowater depth, well log and FAIRFIELD INDUSTRIES INC., Extracted 3-D PSTM seismic panels (one mile in length) (Fig. A).
2. Biostratigraphic and Sequence Stratigraphic tables, with marker species, paleowater depth, age dated MFS (Seals).
3. Cross Sections (Dip & Strike) 7-9 per project with age dated MFS and well logs (Fig.B)
4. Deliverables in two types of formats:
   a. Hard copy binder (11"x 17") printed on premium paper and includes written report, single plots, etc.
   b. Report and raw data is delivered in digital format.
5. Individual projects have been completed and are now available. Please call for a presentation

PROJECT BENEFITS

- Identify and correlate MFS with continuous reflectors on seismic panels with regional FAIRFIELD INDUSTRIES INC. dataset.
- Identify MFS (seals) on well-logs and 3-D seismic to provide local and regional timelines.
- Identify optimum producing and potential deep gas targets in 12 Genetic Sequences.
- Use MFS to construct isopach, sand %, structural and biofacies maps (Fig. C)
- Assist in identifying reservoir-type sands, play concepts and facies on seismic within each Sequence in an 360 degree arc from each of these project wells.
- Reduce your company's risk in prospecting, reservoir and exploration evaluation.



Integrating Biostratigraphy, Well-Logs, Seismic Profiles and Sequence Stratigraphy



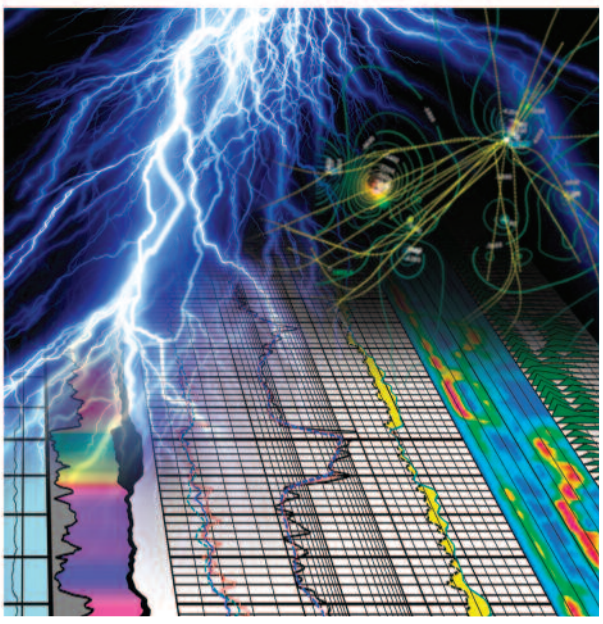
Please Contact us at:
MICRO-STRAT INC., 5755 Bonhomme, Suite 406, Houston, TX 77036, Tel: 713-977-2120, Fax: 713-977-7684,
e-mail:msiw@Micro-Strat.com, Web-Site: www.Micro-Strat.com

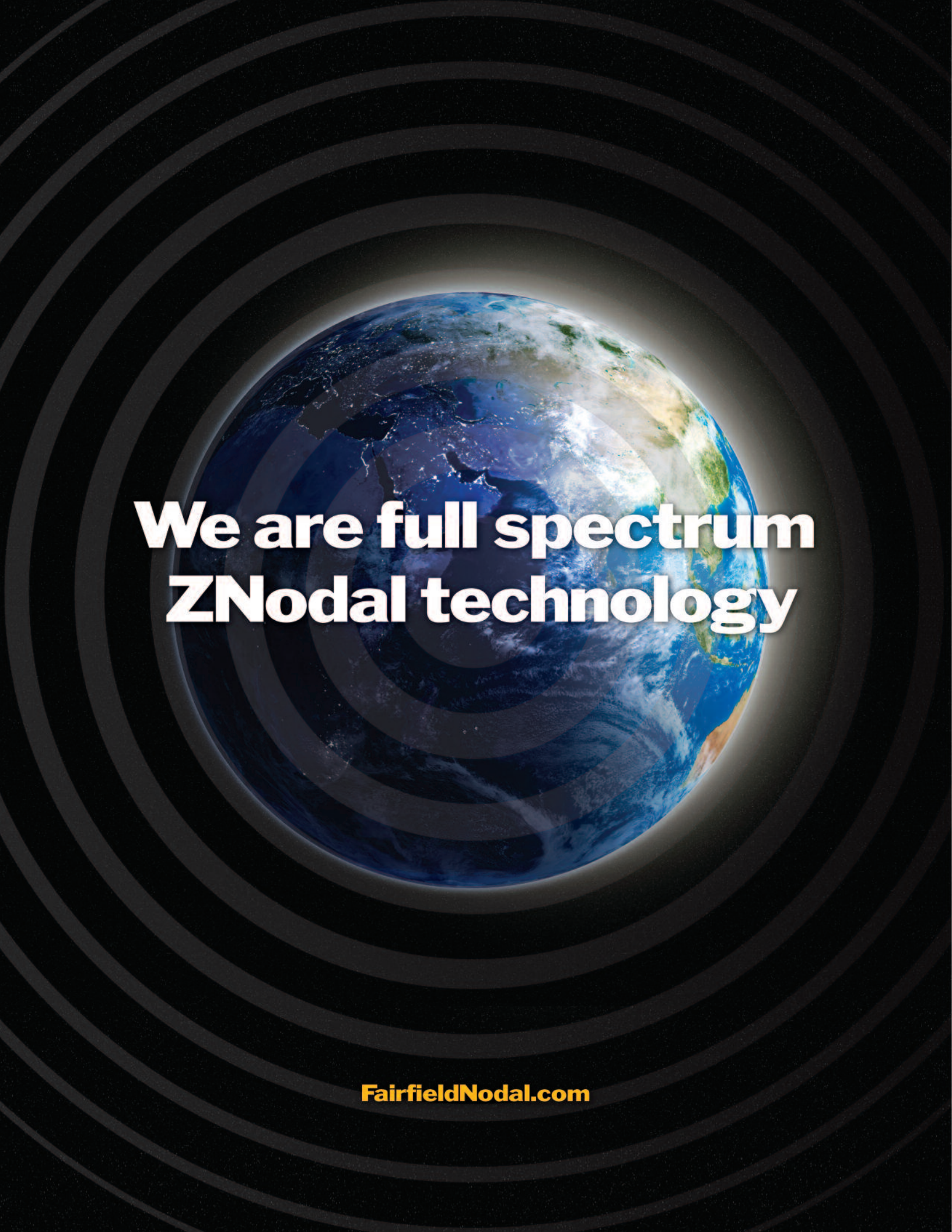
HGS General Luncheon continued from page 31

for the majority of the middle member was probably deeper than for the lower member, with sediment being deposited on the middle to lower basin slope. Nearing the top of this member there is an increase in limestone beds suggesting a decrease in water depth, consistent with the interpretation of a transgressive-regressive cycle.

The upper member consists mainly of somewhat bioturbated limestones that are much thicker than those of the other two members. Trace fossils include Chondrites, which still suggests relatively low oxygen levels. The upper member appears to lack the high organic content present in the rest of the Boquillas. This top unit represents a progressive return to shallower, better oxygenated conditions. Along with pyrite-filled burrows, an abundance of regular and irregular echinoids supports this interpretation. ■ **HGS General Luncheon** *continued on page 39*

Poorly sorted debris flow of the lower member of the Boquillas Formation. Also shown is the contact between the Boquillas and Buda formations.

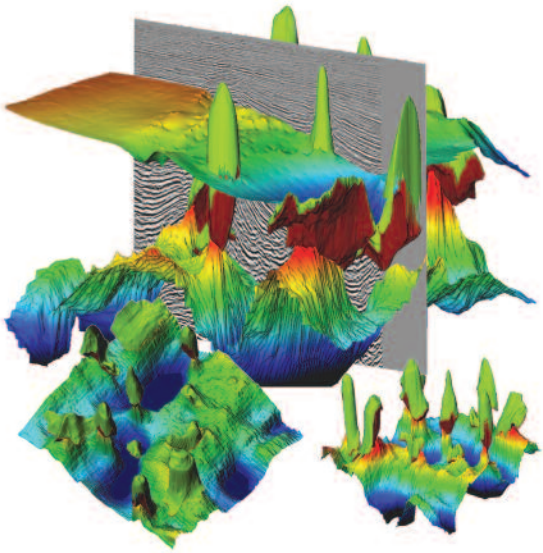



We are full spectrum
ZNodal technology
FairfieldNodal.com

From ZSYSTEMS to ZIMAGING

OK, we admit it. We get really excited about nodal data. All kinds of nodal data. From land data acquired in dense urban areas or pristine wilderness to marine data from the shallowest to the deepest regions of the ocean floor. All from our ZNodal Systems. We love to collect it, license it, process it and image it with specialized software we've designed to optimize the unique advantages of nodal data.

And we are good at it. We've been at this seismic data collection business for over 30 years. In fact, much of our spec data has been shot with cableless nodal systems that we developed right here at FairfieldNodal.



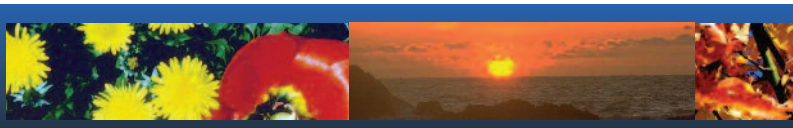
Our ZNodal Systems are cost effective, reliable and available now for your next project anywhere in the world. And, we can assist you with the full spectrum of seismic data services from systems and acquisition through imaging.

We are not the biggest, slickest outfit in the business. We don't wear designer suits or drink chocolate martinis. But you can depend on FairfieldNodal for the highest quality nodal data systems and information anywhere. It's what we're all about.

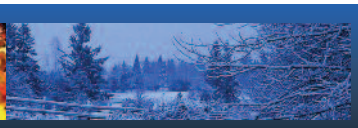
fairfieldnodal

SYSTEMS ACQUISITION LICENSING PROCESSING IMAGING

March 2010



Sunday	Monday	Tuesday	Wednesday
	1	2 **HGS Board Meeting** *6 p.m. HGS Office*	3
7	8 **HGS General Dinner Meeting** *"Pioneering the Global Subsalt/Presalt Play: The World Beyond Mahogany (USA) Field" Dwight "Clint" Moore, Westchase Hilton* Page 11	9	10
14	15 **Deadline for Submission to the May *Bulletin***	16 **HGS Northsiders Luncheon Meeting** *"Understanding the Geologic Controls on "Shale Oil Play", Crowne Plaza Hotel* Page 15 **HGS Environmental & Engineering Dinner Meeting** *"Fate and Transport of Ethanol-Blended Fuels" Black Lab Pub* Page 19	17
21	22 **HGS International Dinner Meeting** *"Understanding the Crust Beneath Sedimentary Basins", Walter D. Mooney, Westchase Hilton* Page 21	23	24
28	29 **HGS North American Dinner Meeting** *"Hydrocarbons Associated with Igneous Rocks (North America and Worldwide)" Steve Shutter, Westchase Hilton* Page 24	30 **NOW you can make your reservations on-line at www.hgs.org**	31 **HGS General Luncheon Meeting** *"The Boquillas (Eagle Ford) Formation of South Texas: Potential Outcrop Analogs for Nonconventional Eagle Ford Shale Reservoirs in the Subsurface", Lauren Peschier Petroleum Club* Page 29

GeoEvents

Thursday Friday Saturday

4	5	6
11	12	13
18 **SIPES Luncheon Meeting** *"Developing an Exploration Tool in a Mature Trend: a 3-D AVO Case Study in South Texas", Mark E. Gregg and Charles T. Bukowski, Jr., Petroleum Club* Page 51	19	20
25	26	27

Reservations:

The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476. **Reservations for HGS meetings must be made or cancelled by the date shown on the HGS Website calendar, normally that is 24 hours before hand or on the last business day before the event.** If you make your reservation on the Website or by email, an email confirmation will be sent to you. If you do not receive a confirmation, check with the Webmaster@hgs.org. Once the meals are ordered and name tags and lists are prepared, no more reservations can be added even if they are sent. **No shows will be billed.**

Members Pre-registered Prices:

General Dinner Meeting	$28
Nonmembers & walk-ups	$35
Env. & Eng.	$25
Luncheon Meeting	$30
Nonmembers & walk-ups	$35
International Explorationists	$28
North American Explorationists	$28

Upcoming GeoEvents

April 11-14, 2010
AAPG Annual Convention & Exhibition *New Orleans, Louisiana*

April 22-23, 2010
Modeling Sedimentary Basins and Their Petroleum Systems *Geological Society, London, England*

May 3-6, 2010
Offshore Technology Conference *Houston, TX*

May 16-18, 2010
AAPG Southwestern Section Meeting *Dallas, TX*

May 15, 2010
HGS Shrimp Peel *Houston, TX*

May 22, 2010
HGS Guest Night – Houston Science Museum *Houston, TX*

June 8-10, 2010
Applications of Reservoir Fluid Geochemistry –AAPG Hedberg Research Conference *Vail, CO*

June 13-16, 2010
AAPG Rocky Mountain Section Meeting *Durango, CO*

July 4-8, 2010
Australian Earth Sciences Convention *Canberra, Australia*

September 8-9, 2010
9th African Conference – Africa: A Multi-faceted Promise *Houston, TX*

September 12-15, 2010
AAPG International Conference & Exhibition *Calgary, Canada*

October 4-7, 2010
Geology of Unconventional Gas Plays *Geological Society, London*

October 31 – November, 2010
Geological Society of America Annual Meeting *Denver, CO*

November 4-5, 2010
Advances in Carbonate Exploration and Reservoir Analysis *Geological Society London, England*

April 10-13, 2011
AAPG Annual Convention & Exhibition *Houston, Texas*

HGS General Luncheon continued from page 33

Biographical Sketch

Lauren Peschier received her B.S. in geology in 2004 and M.S. in geology in 2006 from the University of Louisiana at Lafayette. She has six years of experience as a geologist in the oil and gas industry, working exploration, development, and operations in the Gulf of Mexico. She worked for Marlin Energy, LLC in Lafayette, Louisiana from 2004 through 2006 as an associate geologist and is currently employed as a geologist by Newfield Exploration. At Newfield, she worked the Gulf of Mexico shelf from 2006 to 2009 and currently works subsalt exploration in the deepwater Gulf of Mexico.

Slump fold with bedding preserved, lower member of the Boquillas Formation.

HOUSTON
FINE MINERAL SHOW

APRIL 30TH - MAY 2ND, 2010

DEALERS

Gobin
Ausrox
Heliodor
Kristalle
Mineral Zone
JBF Minerals
Rocksaholics
GTA Minerals
Evan A. Jones
Mineral Décor
Crystal Monster
eShop-Minerals
The Arkenstone
Crystal Classics
Andreas Weerth
Lehigh Minerals

DEALERS

Laurent Thomas – Polychrom Minerals
Crystal Springs Mining Company
Horst Burkard Minerals Fossils
Mineralien Fossilien Galerie
Columbia Trading Company
Fine Minerals International
The Sunnywood Collection
Green Mountain Minerals
Alpine Mineral Company
Dan and Diana Weinrich
Wilensky Fine Minerals
Tucson Store Fixtures
Exceptional Minerals
Don and Gloria Olson
Vasconcelos – Brazil
Mineralien Zentrum
Sanjay Maheshwarii
Wright's Rock Shop
Graeber and Himes
Edward's Minerals
Atomic Perfection
Pala International
Wendy's Minerals
Majestic Minerals
Awake Aesthetics
Miner's Lunchbox
Superb Minerals

Embassy Suites Hotel near The Galleria – 2911 Sage Road, Houston, TX

For more information contact Dave Waisman at 509.458.2331 | www.FineMineralShow.com

Photo: Joe Budd

HGS Undergraduate Scholarship Foundation Presents Seven Scholarships

The HGS Undergraduate Scholarship Foundation has been providing scholarships to deserving college students since 1984. To date, over $163,500 in scholarships has been awarded. This year the Foundation awarded scholarships totaling $11,500 to students from six of the seven universities participating in our scholarship program. Due to a generous donation by the estate of Robert Maby, Jr., the Foundation also has established the Maby Scholarship, which will be presented each year to the Foundation's top applicant. The inaugural recipient of the Maby Scholarship is Kelsey Schiltz of Rice University. Foundation Chairman John Adamick presented the scholarships to the recipients at the January 18th HGS dinner meeting.

Vitae for our scholarship winners are listed below. These students are to be commended for their accomplishments.

Kelsey Schiltz
Maby Scholarship recipient
Rice University

Kelsey is a junior at Rice University majoring in Earth Science. She is interested in pursuing a career in exploration geophysics and plans on attending graduate school after graduation in 2011. Kelsey is passionate about tutoring. She works as an Earth Science tutor for the Athletics Department at Rice and tutors high school students at an afterschool program in Houston. Kelsey also serves as a coordinator for the Rice Women's Resource Center. In her spare time, she enjoys playing the flute, working out, and exploring the beauties of her home state of Montana. ■

Janette England
Stephen F. Austin State University

Janette England is a senior at Stephen F. Austin State University double majoring in geology and psychology. She is a member in honor societies for geology, psychology, and sociology and is consistently on the

Undergraduate Scholarships *continued on page 43*

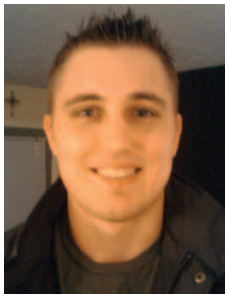
HGS Undergraduate Scholarships *continued from page 41*

Dean's List or President's Honor Roll. She is also active in many school clubs, including the AAPG student chapter. Janette is currently working with Dr. Kevin Stafford on a carbonate diagenesis project associated with modern tufa deposits in a hydrologically active karst region in central Texas. She will be making a presentation on this subject at the South Central Sectional meeting of the Geological Society of America in Branson, Missouri this spring. Her interests include hydrology and carbonate sedimentology. She will attend graduate school upon completion of her bachelors degree. ■

Nicholas Perez

University of Texas

Nick is a December 2009 graduate of the University of Texas at Austin. After spending a few years as a liberal arts and saxophone performance major, he finally followed in the footsteps of his grandmother, a UT Austin geology alum herself, and made the switch to geosciences. At UT, Nick completed a senior honors thesis under the supervision of Dr. Brian Horton. The project used paleomagnetics to determine the timing and rates of Miocene sediment deposition in the central Andean foreland basin, which has implications for understanding the kinematic and climate history of the region. Nick will begin an internship with EOG in Fort Worth in February, and plans to go to graduate school in fall 2010. ■



Tommy Ringo

University of Houston

Tommy is a senior in the geophysics program at the University of Houston. After high school, he served five years in the Navy as a cryptologic technician, and following his military service he worked as a network defense analyst in San Antonio, Texas. In 2008 he decided to pursue education full time and moved back to Houston and began his undergraduate geoscience career in the summer of that year. He received the 2009-2010 Hamill Foundation scholarship. His main interests involve geophysical applications for the purpose of petroleum exploration. After graduating in May 2010, he plans on pursuing a graduate degree in geophysics beginning in the fall. ■

Undergraduate Scholarships *continued on page 45*

HGS Undergraduate Scholarships continued from page 43

Ryan Lewis
Sam Houston State University

Ryan is a senior geology student at Sam Houston State University. He is active in the geology department as a lab instructor for undergraduate geology labs and acted as vice president and treasurer for the Sam Houston Association of Geology Students. He has worked while attending school and gained experience in the earth sciences through employment at Diamond R Chemical LLC., an internship with Canyon Exploration Company in the Midcontinent, and through research opportunities through Sam Houston State. Ryan has been on the Dean's list four consecutive semesters and was awarded a departmental scholarship in the spring of 2009. He achieved the honor of top field geologist while attending the University at Buffalo field camp. After graduation in the spring Ryan plans to enter the petroleum industry and pursue graduate work in geology. In his free time he enjoys mountain biking, hunting, rock climbing, fine arts, and experiencing the great outdoors with family and friends. ■

Cyndi Kelly
Rice University

Cynthia Kelly ("Cyndi") is a senior at Rice University pursuing a degree in Earth Science with a focus in geophysics. Since the spring of her sophomore year she has been working with Dr. Fenglin Niu studying global seismology and processing seismic data. During the fall of 2009, she began working on a project utilizing seismological techniques to examine potential rigid zones on the core-mantle boundary, the early results of which were presented as a poster on which she was first author at the fall 2009 AGU meeting in San Francisco this December. Cyndi was also a contributing author on another poster presentation at AGU this fall related to her summer field work with the SAGE (Summer of Applied Geophysical Experience) program in New Mexico for which she did forward modeling of gravity data collected in the area to develop plausible geologic models of the subsurface and aid in a preliminary characterization of a carbon dioxide driven geyser in the Rio Grande Rift. Cyndi is also currently working with other gravity and seismic refraction data collected by SAGE in an effort to develop a regional

Undergraduate Scholarships continued on page 47

HGS Undergraduate Scholarships *continued from page 45*

characterization of the substructures of the Rio Grande Rift, as well as to determine the volume of a potential aquifer in Santa Fe. Cyndi plans to pursue a graduate degree in geophysics after finishing her undergraduate studies in May 2010. Outside of geology and geophysics, Cyndi is interested in riflery, and hiking in areas of great geologic interest. She is also currently training to become a group fitness instructor. ■

Kristopher Bruce Farmer

Lamar University

Kristopher is a graduate of Kingwood High School and a senior at Lamar University where he is majoring in geology with a minor in space science. He is the president of Lamar University Geological Society and a lab instructor at Lamar. He has gained research experience in the STAIRSTEP program where he has been conducting field work in Chambers and Jefferson County. There he is measuring the storm surge from Hurricane Ike. He is looking forward to pursuing a master's degree in geology after his graduation in August 2010. His hobbies include photography and hiking. ■

Undergraduate Scholarships *continued on page 49*

HGS Undergraduate Scholarships *continued from page 47*

HGS Undergraduate Scholarship winners and John Adamick

John Tubb presenting to John Adamick, a $25K check from the HGS-Mabry gift

SIPES Luncheon Meeting
Developing an Exploration Tool in a Mature Trend: a 3-D AVO Case Study in South Texas

Mark E. Gregg and Charles T. Bukowski, Jr., *Edge Petroleum Corporation, Houston, Texas*

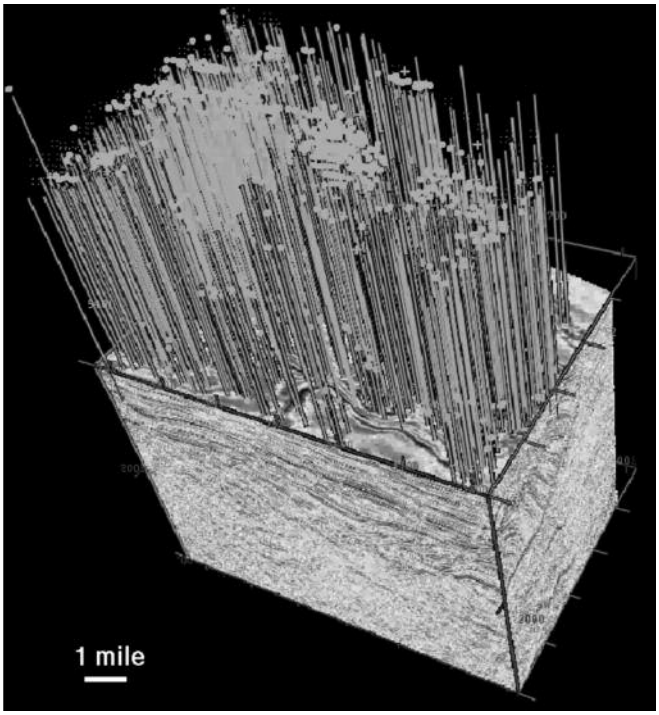


Figure 1. A 100-mile2 portion of the Vicksburg Trend, drilled with a density of up to 20 wells per square mile.

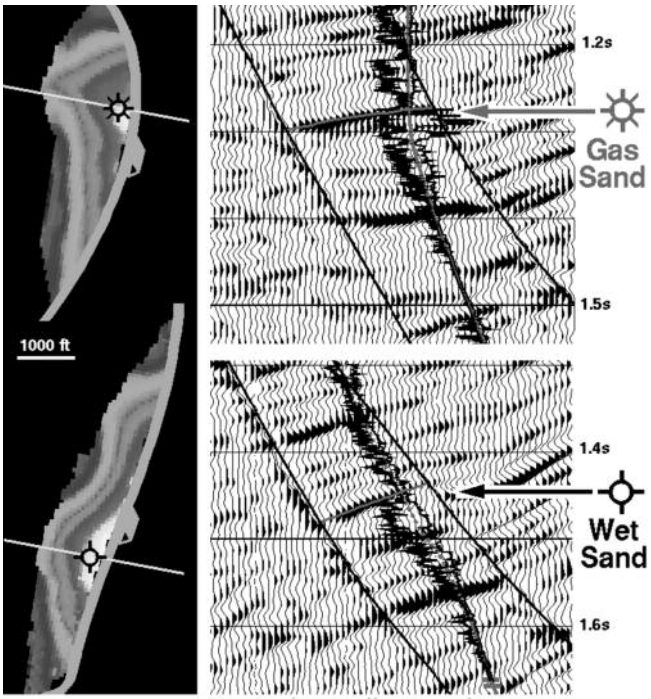


Figure 2. Two geologically similar prospects resulted in a gas discovery and a dry hole. Structure maps and conventional migrated sections are shown.

If at first you don't succeed, try something unconventional. Successful exploration for new reservoirs in mature trends often requires trying techniques unproven in the area. The mature Oligocene Vicksburg play in south Texas has been heavily explored since the 1920s (Figure 1) using subsurface geology and structural mapping based on conventional seismic data. There is a scarcity of direct hydrocarbon indicators such as bright spots that have been key to much of the success in other Tertiary formations in the region. Our initial exploration campaign with conventional 3D seismic was disappointing. However, attention to rock properties coupled with application of a novel processing technique allowed us to develop a solution to our dilemma.

In the 1990s a large nonexclusive 3-D seismic survey which was acquired in the area led to increased exploratory activity. The prime motive for the 3-D was to image the complex faulting and resulting compartmentalization of the Vicksburg. Given the mature nature of the area, typical exploration targets are moderate-potential fault blocks in productive intervals and higher-potential targets in deeper, untested section.

Edge Petroleum and Carrizo Oil and Gas licensed a 450-mile^2 portion of the 3-D survey. Early work led to the identification an drilling of several Vicksburg structural traps, resulting in one commercial gas discovery, one noncommercial discovery, and three dry holes. Given the moderate potential of the prospects, a 20% success ratio meant the economics of our exploration program were marginal. Hence, we were prompted to search for an exploration tool that would help us to improve our success rate.

SIPES Luncheon Meeting *continued on page 53*

Thursday, March 18, 2010

Houston Petroleum Club in the Discovery Room, 800 Bell St. (downtown Houston). Social 11:15 AM, Luncheon 11:45 AM

Reservations Required: *Make reservations by telephone (713-651-1639), fax (713-951-9659), website (www.sipes-houston.org), or e-mail bkspee@aol.com to B. K. Starbuck-Buongiorno by 12:00 noon on Tuesday preceding the meeting. You can now sign up for the meeting online at www.sipes-houston.org, but payment is still required by regular mail or at the door.*

Cost: *$30 for SIPES Members and Chapter Affiliates who register by 12:00 Noon Tuesday; $35 for new registrations at the door. The price for guests, non-members and walk-ins is $35. No-shows will be billed.*

SIPES Luncheon Meeting continued from page 51

Two prospects drilled a few miles apart in our initial exploration campaign targeted Vicksburg sandstones at 5500-7500 ft. Our technical evaluation showed them to have analogous stratigraphy, structure, timing of trap formation, and proximity to source. Neither exhibited anomalous seismic amplitude. Drilling found the predicted reservoir facies in both. However, one was a commercial gas discovery and the other a dry hole (Figure 2). Perplexed and challenged by these results, we selected these two prospects as our laboratory for developing a better risk-assessment technique.

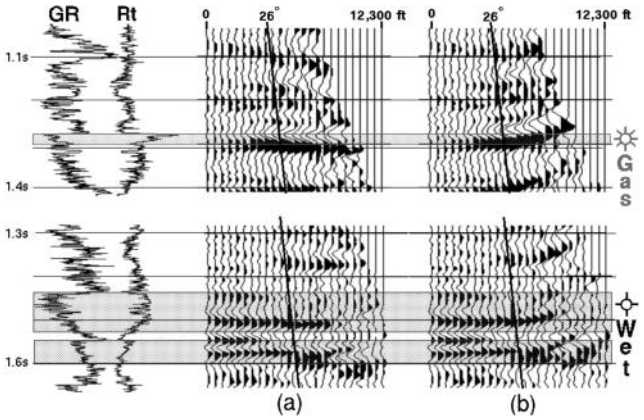


Figure 3. Reprocessed CDP gathers at the two test wells with (a) nonhyperbolic moveout and (b) conventional normal moveout reveal a Class 2 AVO anomaly at the gas reservoir. The best-developed part of the anomaly would be muted on a stack processed with conventional normal moveout.

Seismic models were generated using dipole sonic data gathered in the discovery well. The models suggested that Class 2 AVO anomalies would be associated with Vicksburg gas reservoirs. A pilot reprocessing study demonstrated that known gas reservoirs generate Class 2 AVO anomalies and that seismic incident angles greater than about 26 degrees are required to observe them. It was observed that the application of conventional normal moveout resulted in improper imaging of the far offsets needed to discern the Class 2 anomaly. However, reprocessing the data utilizing nonhyperbolic moveout produced usable data at incident angles of up to 40 degrees, resulting in proper stacking of the needed far offsets (Figure 3).

Resulting angle stacks were visualized on a workstation. Several untested AVO anomalies were identified, including stratigraphic traps. Wildcat drilling based on this effort resulted in six commercial discoveries and two dry holes, a success rate significantly higher than was achieved through conventional subsurface geology and structural mapping in this mature play. ■

Biographical Sketch

Mark Gregg is President and CEO of KiwiEnergy, Ltd., an independent E&P company based in Houston. He began his career in 1981 with The Superior Oil Company, followed by Mobil Oil and Edge Petroleum, primarily in exploration roles, including several years in both Indonesia and Nigeria, before founding KiwiEnergy in 2000. Mr. Gregg has over 28 years of exploration experience and is responsible for numerous discoveries along the Gulf Coast and in Nigeria. He received his B.Sc., Geophysical Engineering (1980) from the Colorado School of Mines and MBA (1988) from the Bauer College of Business, University of Houston. He is a Director of the Society of Exploration Geophysicists Foundation, an officer of the Houston Chapter of the Society of Independent Professional Earth Scientists, and a member of SEG, AAPG, Houston Producers Forum, and IPAA.

How to Make a Map from an Outcrop

*By **Franz L.Kessler,** Curtin University of Technology, Miri, Sarawak and*
***John Jong,** Nippon Oil Exploration Malaysia Ltd, Miri, Sarawak*

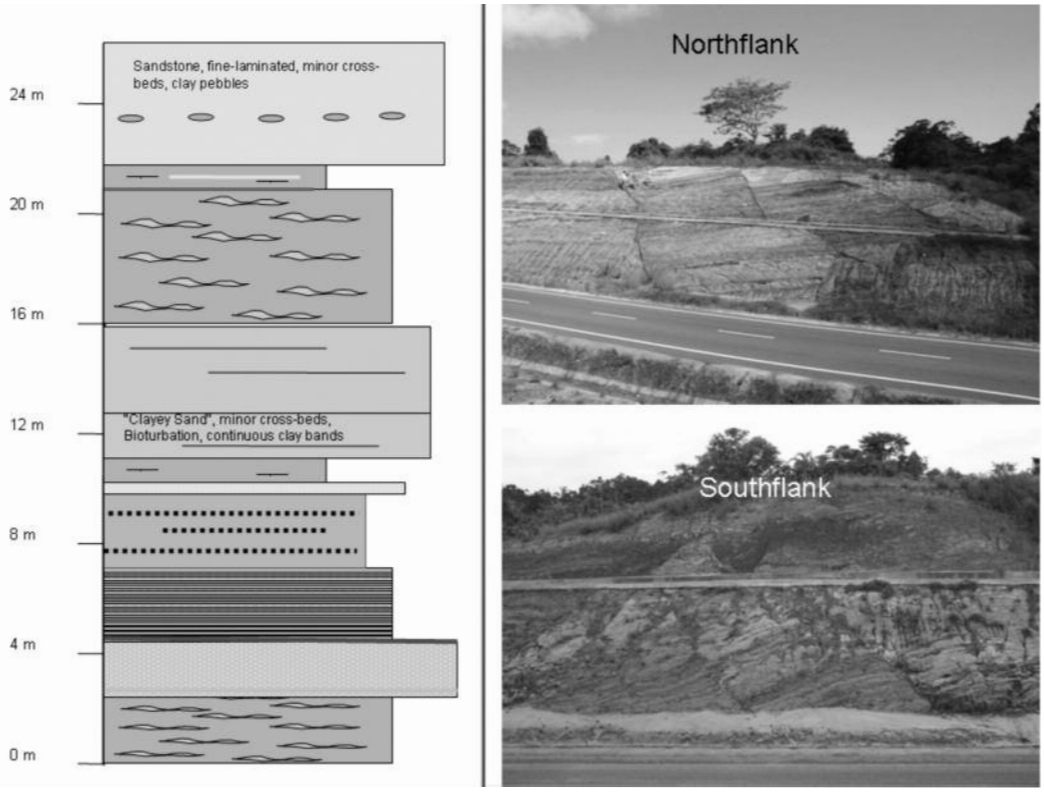


Fig. 1: Both flanks of the road display outcrops. Please note that the oldest part of the stratigraphic sequence is found on the crest of the Southflank, and the youngest on the crest of the Northflank. Sedimentary deposits are of intertidal origin.

This paper shows the process of generating a reasonable map from a complex clastic outcrop near Miri, Sarawak, Malaysia. Steps are: measure the outcrop, establish fault type and throw, fault strike, fault dip; proceed with data synthesis; make a fault model, a data grid; and finally, a map.

I. Introduction

With an overwhelming, and sometimes naïve emphasis on technology and reliance on computer automation ("Nintendo geology," "Black Box monkey geology"), the basic but absolutely essential discipline of extracting geological information from outcrops is in danger of being sidelined. Students of petroleum geology often are not sufficiently trained in mapping and map generation – although these skills are vital in the context of prospect creation. From the standpoint of petroleum business, in which geoscientists are mainly confined to the office environment with geological interpretation being conducted on workstations, the neglect of field geology is somewhat understandable: outcrop data are difficult to translate into numbers, and to incorporate such numbers on the long road from geology to money is sometimes an art by itself. This said, however, it is argued that outcrops are more than venues for social events and/or brain stimulators, and some of us are still enjoying tremendously attending occasional field trips. The chosen example (Fig. 1) is an extremely tricky one. Located some 40 km SW of Miri, Sarawak, this Coastal Road outcrop offers excellent insight into fault-seal and clay-gouging dynamics.

the basic but absolutely essential discipline of extracting geological information from outcrops is in danger of being sidelined.

II. From outcrop to map

Step 1: Measuring an outcrop: The best thing to start with is camera, notebook, and a GPS. This way, important landmarks, horizon-fault intersection points, etc. can be captured. The GPS data can be made easily decimal, and imported into an Excel spreadsheet. It was useful to add a scale to the outcrop – in this case every meter of the outcrop was marked along drains that intersect the outcrop in mid-section.

Step 2: Strike and dip: Here our main tools are compass, hammer/knife, measuring tape, and notebook.

Step 3: Data synthesis: All the data are plotted onto one sheet that shows all the data – GPS, horizons, horizon thickness, faults, fault throw, relief, and landmarks. This is shown in Fig. 2 on next page.

Step 4: Making a fault model and a data grid: Most outcrops are 2-dimensional, the cited example is somewhat 3-dimensional though complex. Grids can be generated by: (1) correlating

Technical Note *continued on page 57*

Warren L. and Florence W. Calvert Memorial Scholarship Fund

The Warren L. and Florence W. Calvert Memorial Scholarship Fund provides scholarships to US citizens who are graduate students majoring in the earth sciences. Each year half of the earnings of monies invested in the fund are paid out in scholarships, while the remaining half is added to the corpus of the fund. This growth factor, along with donations from individual HGS members, allows the fund to award larger scholarships each year to meet, at least in part, the increasing costs of a college education. For the current year, the fund awarded $3200 scholarships to 5 exceptional students.

The HGS and the Memorial Scholarship Fund Board gratefully acknowledge the following contributions to the Fund in 2009. The three categories of contributions are Patron ($500 or more), Donor ($100 to $500), and Contributor (less than $100).

Patrons ($500 or more)

Eugene A. Gibson (in memory of Elmer Dobbins)

Contributors (up to $100)

John S. Baldwin
Eric D. Carlson
Jerry Clark
Sheridan Conley
Kim Doud
William R. Edwards
Patrick T. Gordon
Richard Hughart
Larry Jones
Robert F. Kraye
Stan Morris
Norman Neidell
Richard Paige
Walter Pusey III
Amir Rangwala
Stefano Santoni
Tomas Vargas

HGS Welcomes New Members

Effective January 2010

ACTIVE MEMBERS

Cathy Buchanan
Lyn Canter
Steven DeVito
Ursula Edwards
Patrick Friend
Khaled Hashmy
Andrew McCarthy
Dennis McConnell
Rayford McCoy
Miguel Morales
Bennie See
Don Van Nieuwenhuise
Khryste Wright

Welcome New Members

Technical Note continued from page 55

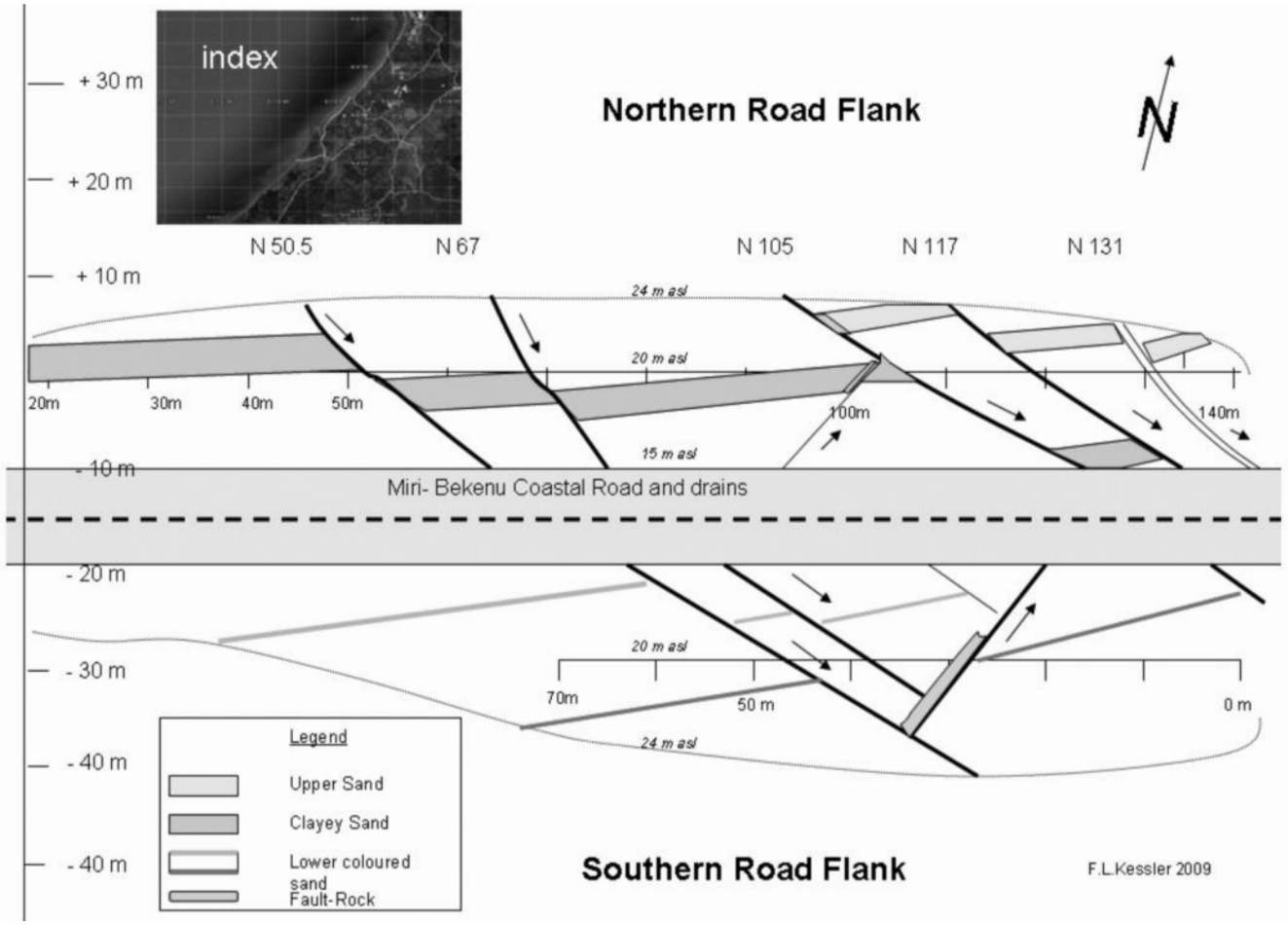


Fig. 2: Map of the outcrop Note that the rocks are dipping 80 deg NW which gives the outcrop a "map-view" flavour.

horizons and faults between several outcrops, and using interpolation techniques; (2) by outcrops into a well; or (3) simply by extrapolating strike and dip data (as is done here) as long as this can be justified in the context of the regional setting and sound structural model.

Extrapolating fault data is always tricky, but there is a statistical relationship between fault throw and length of a given fault [Walsh and Watterson, 1988]. A good rule of thumb is that faults are mostly 10-times longer than their throws. Using the existing strike and dip data, it is possible to create a data grid. Such a grid should be regular – in this example grid nodes with 10 m distance are chosen. Furthermore, in order to define faults, grid points first need to be defined. In this example, points for the up- and down-thrown sides of the faults were picked every 10 m on the y axis.

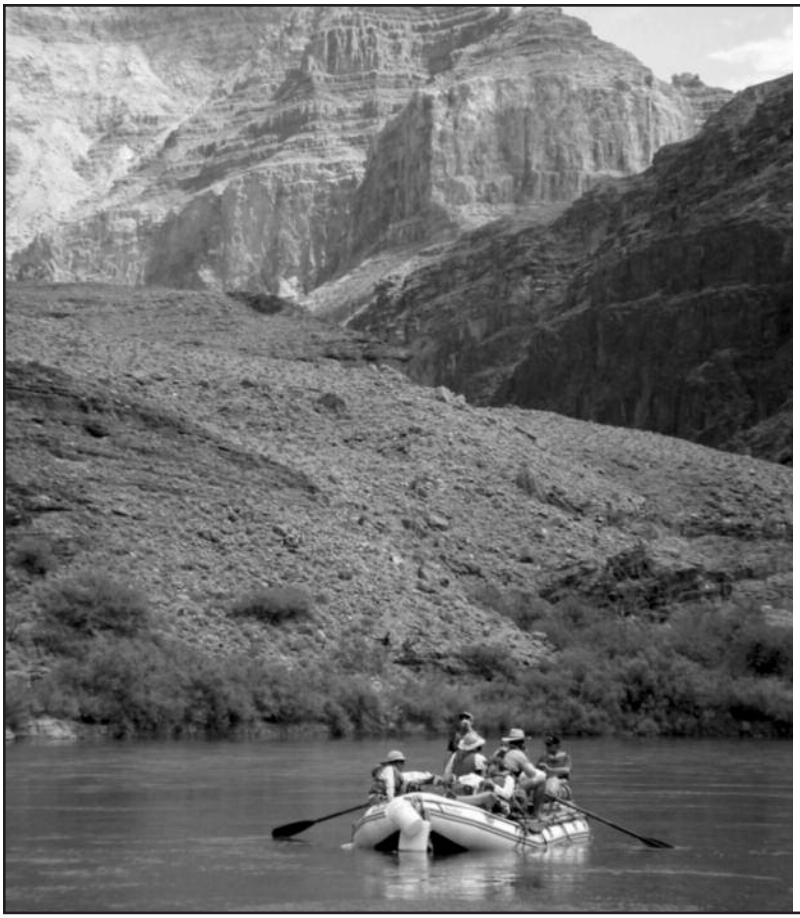
Step 5: Data export: Data can be exported as X, Y, Z files to any commercial mapping package.

Step 6: Gridding and contouring are performed. The final map is shown in Fig. 3.

III. Map Applications

There can be a variety of applications. In this example, the goal was to provide data for a clay gouging and fault rock simulation, to compare model simulation results with measured data, and to predict the clay gouging and fault rock prediction on larger faults seen on seismic [Kessler et al., in preparation]. ■

Technical Note *continued on page 59*



June 2010 Grand Canyon Geology Field Trip

Experience the majestic beauty of the Grand Canyon as we raft the mighty Colorado River and examine some of the finest classical geology exposures in the world. Reservations are now being taken for the 2010 Grand Canyon Geology Field Trip through the HGS website. Trip runs June 13-21, beginning and ending in Las Vegas. Estimated cost is $3000. A $300 deposit will secure your spot on this popular field trip. Reservations due by March 15. Please contact Steve Earle at 713-328-1069 with any questions, or email him at steve.hgseditor@gmail.com

Countdown to AAPG

The AAPG 2011 Technical Program Committee along with representatives from the DEG, DPA, EMD, and SEPM have been hard at work designing the eleven theme topics for the convention's oral talks and posters. Cooperation between the groups has been excellent. The task is not a simple one and has gigantic implications for the arrangement of the 42 sessions and approximately 440 talks and 600+ posters. These themes act as buckets into which the multiple session topics can be grouped. As authors submit their abstracts it is so important that they recognize the general theme pertinent to their topic. Theme chairs will soon be contacted and these subject experts will have a large input on identification of the session chairs and the abstract reviews.

We continue to seek volunteers to assist all of our committees and we hope that you will also join our team for the planning of the 2011 AAPG Convention in Houston. If you are interested in volunteering please contact Steve Levine (General Chair) steve.d.levine@conocophillips.com, Marsha Bourque (General Vice Chair) m22799@yahoo.com, Linda Sternbach (Technical Program Chair) linda.sternbach@gmail.com or Carl Steffensen (Technical Program Vice-Chair) steffeck@bp.com ■

Technical Note continued from page 57

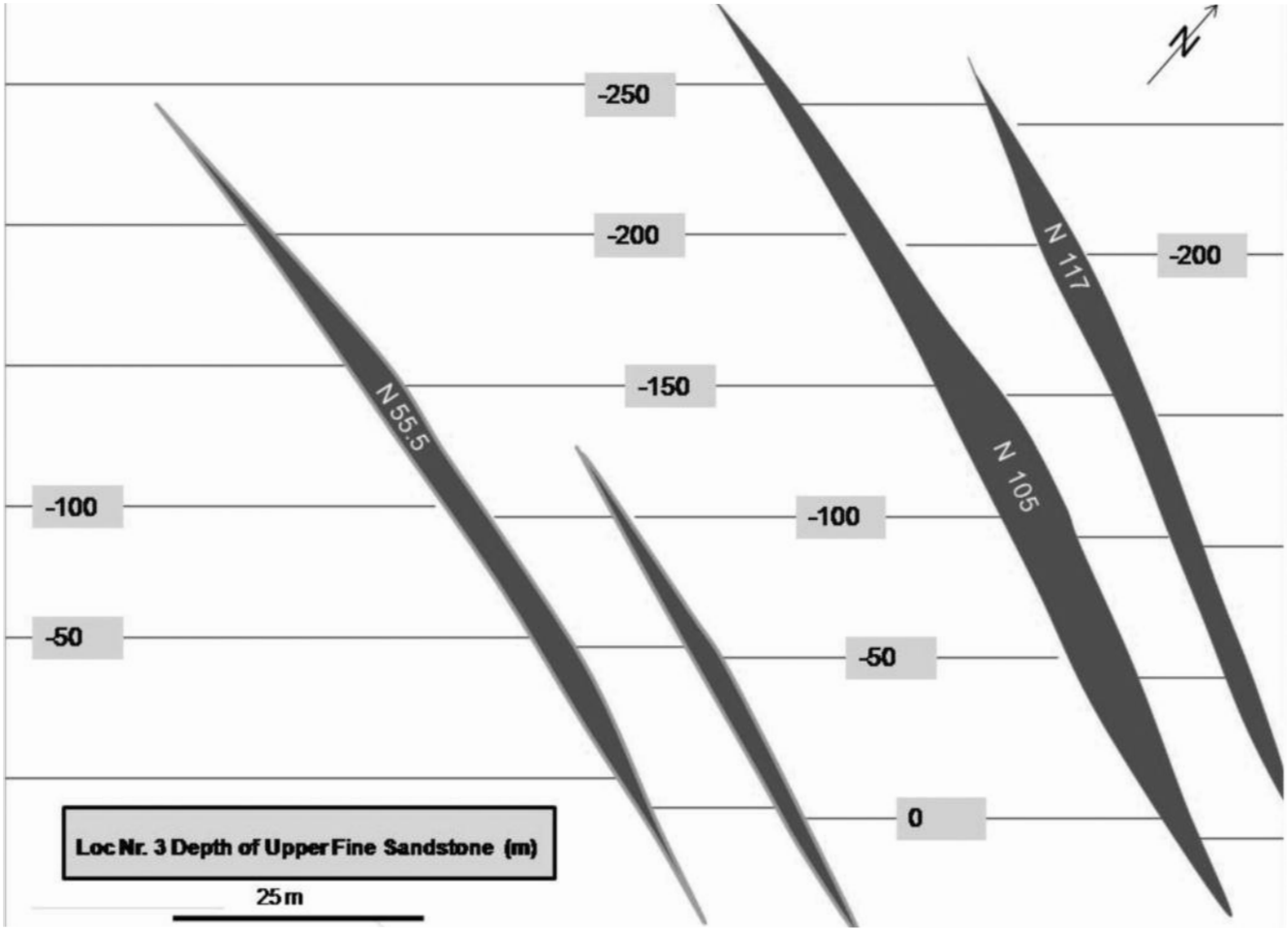


Fig.3: A simple depth map for the area NW of the outcrop, derived from the outcrop data.

IV. Acknowledgements

The authors wish to thank Titus Murray (FaultSeal Pty Ltd) for fruitful discussions.

V. References

Kessler, F. L., Murray, T. and Jong, J (in prep). Faulting and Clay Gouging in Neogene Clastics of the Lambir Fm., Sarawak, Poster Abstract, Petronas Geological Conference and Exhibition, Kuala Lumpur, 29-30th March 2010.

Walsh, J. and Watterson, J. (1988): Analysis of the relationship between displacements and dimensions of faults, J. Struct. Geol., 10, 239-247, 1988

Government Update

Henry M. Wise, P.G. *and* ***Arlin Howles, P.G.***

If you'd like the most up-to-date Texas rules, regulations, and governmental meeting information we direct you to the HGS website to review The Wise Report. *This report, which comes out as needed, but not more often than once a week, offers the most up-to-date information that may be of interest to Texas geologists.*

AGI Government Affairs Monthly Review (December 2009):

Climate Legislation on the Wake of Copenhagen

At Copenhagen, President Obama staunchly adhered to greenhouse gas emission reduction targets from the House climate bill (H.R. 2454). This is the only pertinent legislation formally approved by the House or the Senate and Obama has made it clear that the Administration will follow the lead from Congress in any international negotiations dealing with climate change.

In the Senate, work is continuing on compromise climate legislation with Senators John Kerry (D-MA), Joe Lieberman (I-CT) and Lindsey Graham (R-SC) taking the lead on drafting new language, after earlier measures failed to garner support. The three senators sent the framework for a new climate change bill to President Obama on December 10, 2009, as the Copenhagen Climate Summit was underway. The framework is a broad document that outlines 11 vision areas and a goal of reducing greenhouse gas (GHG) emissions by about 17 percent of the 2005 levels by 2020. The reduction target is the same as the 2020 target in the House bill.

The framework's vision areas ask that significant and achievable emission targets be reached through investments in clean energy technology, that we strive for energy independence, national emission standards be set by Congress not by federal agencies or states, that we provide monetary assistance and protection to consumers, encourage new nuclear power plants and a nuclear workforce, promote clean coal technology and rapid deployment of carbon capture and sequestration systems, create American jobs through the clean technology industry, make it beneficial for farmers to reduce emissions without regulations, have vigilant oversight of the carbon market, get a strong global commitment to addressing climate change and protecting intellectual property rights, and build climate legislation consensus in the Senate.

Though the lack of details is frustrating to some, the authors say it sends a clear signal to the international community that the Senate is actively working on legislation. Kerry explains that the lack of specifics allows the committees with jurisdiction over the various vision areas to provide input. He plans on taking language from the Kerry-Boxer climate bill (S. 1733), passed by the Environment and Public Works Committee in November, and the American Clean Energy Leadership Act of 2009 (S. 1462) passed by the Senate Energy and Natural Resource Committee in July.

A formal bill will not be introduced until at least the end of January. Agriculture Chairwoman Blanche Lincoln (D-AR) plans on holding climate hearings in late January before submitting her committee's input and a bill is not expected until the Finance and Commerce Committees have had a chance to do the same.

A day after the Kerry-Lieberman-Graham framework announcement, Senators Maria Cantwell (D-WA) and Susan Collins (R-ME) released a "cap and refund" bill called the Carbon Limits and Energy for America's Renewal (CLEAR) Act (S. 2877) as an alternative to the current cap and trade climate legislation model. It auctions off carbon credits and gives the revenues to low- and middle-income families to offset the increased cost of meeting a 20 percent emission reduction by 2020 proposed in the measure. Kerry and the others said they are open to incorporating any idea that will satisfy their vision areas.

As Congress tries to finalize some sort of climate legislation, the Environmental Protection Agency (EPA) has submitted its final endangerment rule that will become effective January 14, 2010. This rule says that GHGs are endangering public health and are caused in part by motor vehicles, therefore the EPA has authority to regulate these emissions under the Clean Air Act. Some members of Congress see this as EPA circumventing congressional authority and have introduced legislation to negate the EPA endangerment findings. Senator Lisa Murkowski (R-AK) and Representative Joe Barton (R-TX) are leading the charge against the EPA, but are unlikely to gain enough support to overturn the ruling. Senator James Inhofe (R-OK) admits Murkowski is unlikely to succeed, but is confident that lawsuits will soon sprout up and "kill the endangerment finding."

A comprehensive analysis of the Senate climate debate and pinpointing key senators in the 60-vote race was prepared by ScienceInsider, and is available as part of their climate blog: http://blogs.sciencemag.org/scienceinsider/copenhagen/climate-senate.html

The Kerry-Lieberman-Graham framework is available as a PDF on Kerry's website:
http://kerry.senate.gov/cfm/record.cfm?id=320688
The full text of H.R. 2454 is available from Thomas:
http://thomas.loc.gov/cgi-bin/bdquery/z?d111:hr02454:
The full text of S. 1733 is available from Thomas:
http://thomas.loc.gov/cgi-bin/bdquery/z?d111:S1733:
The full text of S. 1462 is available from Thomas:
http://thomas.loc.gov/cgi-bin/bdquery/z?d111:S.1462:
The full text of S. 2877 is available from Thomas:
http://thomas.loc.gov/cgi-bin/bdquery/z?d111:s2877:

House Passes Energy And Water Research Bill

The Energy and Water Research Integration Act (H.R. 3598) cleared the House on December 1, 2009. The bill addresses the nexus between energy and water resource demands by directing the Secretary of Energy to take water into consideration. The Secretary of Energy must work to advance energy technologies to become more water efficient, consider the implications of climate change on water supplies for energy, estimate the water needed for energy production, and understand the energy required to provide water to the public. It creates an Energy-Water Architecture Council to work on improving energy and water resources data and advance technological innovations. The Energy Department will take the lead but will work in coordination with other federal agencies.

The bill has now goes to the Senate Energy and Natural Resources Committee for consideration.

The full text of H.R. 3598 is available from Thomas:
http://thomas.loc.gov/cgi-bin/bdquery/z?d111:HR3598:/

Volcano Early Warning System Passes Committee

The National Volcano Early Warning and Monitoring Systems Act (S. 782), introduced by Alaskan Senators Lisa Murkowski (R) and Mark Begich (D), would authorize $15 million annually for the U.S. Geological Survey (USGS) to continually monitor all 169 potentially hazardous volcanoes in the U.S in real-time.

The bill will codify the USGS National Volcano Early Warning and Monitoring System (NVEWS) program already established to monitor volcanic activity and warn citizens of impending danger. The measure will organize, modernize, standardize, stabilize, expand and unify the current monitoring system to simplify coverage of all U.S. volcanoes.

The USGS fact sheet on NVEWS is available online:
http://pubs.usgs.gov/fs/2006/3142/

The full text of S. 782 is available from Thomas:
http://thomas.loc.gov/cgi-bin/bdquery/z?d111:s.00782:

Federal Agency News and Updates

DOE Announces $366 Million For 3 Energy Innovation Hubs

The Department of Energy (DOE) plans to invest up to $366 million to establish and operate three new Energy Innovation Hubs focused on: 1) fuels from sunlight, 2) energy efficient building design, and 3) computer modeling and simulation of advanced nuclear reactors. Each hub will receive $22 million the first year and up to $25 million per year for the following four years. The goal is for a multidisciplinary team of researchers to conduct high-risk research in a single area to accelerate research and commercial deployment of highly promising energy-related technologies.

"The DOE Energy Innovation Hubs represent a new, more proactive approach to managing and conducting research. "We are taking a page from America's great industrial laboratories in their heyday," said Energy Secretary Steven Chu. The centralized and focused hubs will be complemented by the Energy Frontier Research Centers (EFRC) and Advanced Research Projects Agency-Energy (ARPA-E). The EFRCs work on collaborations to make an easier transition from basic science research to game-changing discoveries. ARPA-E funds diverse research with the potential for high reward that would otherwise be too risky for industry or other programs to fund.

Originally Chu wanted eight hubs, but Congress felt they were too redundant and only allocated money for one. However, Chu shuffled existing money around to ultimately fund the three mentioned above, though at a reduced starting budget from the original $35 million.

Information on the implementation plan and strategy for managing the hubs is on the DOE Energy Innovation Hubs web site: http://hubs.energy.gov.

EPA Publishes Water Research Strategy

The Environmental Protection Agency (EPA) released a national water research strategy on December 18, 2009. The four research priorities include healthy watersheds and coastal waters, safe drinking water, sustainable water infrastructure, and water security. The plan is to "diversify the science the water program uses to develop its regulatory and non-regulatory water management tools and decisions", according to an EPA press release. Water researchers, water managers and the public are invited to view the strategy in order to understand how this national plan may affect their work and use of water. Other federal agencies with water-related research responsibilities may wish to consider this strategy in relation to their work.

Government Update *continued on page 62*

Government Update continued from page 61

More information is available at:
http://www.epa.gov/waterscience/strategy

NASA Earth-Observing Capacity Update
On December 7, 2009 NASA officially deactivated the Geostationary Operational Environmental Satellite-10 (GOES-10) after 12 years of successful service in tracking hurricanes and for other Earth-observing missions. NOAA has four GOES in space: GOES-11 and GOES-12, which are in operation; GOES-13, in orbital storage and slated to replace GOES-12 when it is repositioned; and GOES-14, which launched this spring and is undergoing post-launch tests. GOES-P, which is slated to become GOES-15 after launch, has been moved to Kennedy Space Center for final preparations for launch on February 25, 2010. GOES-15 will be the last in the series. The next-generation GOES-R satellite series, set to begin launching in 2015, is expected to double the clarity of today's GOES imagery and provide at least 20 times more atmospheric observations than current capabilities.

In addition to the GOES system, NASA announced at the fall AGU meeting that the Atmospheric Infrared Sounder (AIRS) instrument on the Aqua spacecraft has completed a seven-plus years measurement of the concentration and distribution of carbon dioxide in the mid-troposphere region of Earth's atmosphere. Carbon dioxide concentrations are less homogeneous than model assumptions and the southern hemisphere serves as a sink for carbon dioxide emitted primarily in the northern hemisphere. The carbon dioxide data combined with AIRS's daily measurements of temperature, water vapor and other gases will help improve our understanding of Earth's atmosphere and climate change.

NSF Launches Climate Science Website "To What Degree?"
The new National Science Foundation (NSF) climate science web site "To What Degree" aims to explain what science is saying about climate change through short video segments. Leading climate change experts answer common questions about the Earth system and climate change. The questions are broken down into four topics: the carbon cycle, Earth's heat balance, the water cycle, and how do we know. NSF promises that more topics are coming soon.

Watch the videos online:
http://www.nsf.gov/news/special_reports/degree

Stolen E-mails Fuel Debate On Climate Science Integrity
Over 1,000 e-mails and 2,000 other files dating as far back as 1996 from the Climatic Research Unit (CRU) at the University of East Anglia in the United Kingdom were stolen and posted on the web through a Russian file-sharing site in the city of Tomsk, Siberia on November 19, 2009. The university has called the incident a "criminal breach" and police are investigating. The timing of the release of the stolen information, just before the United Nations Climate Summit in Copenhagen, is suspicious and has led to further charges of criminality in support of climate skeptics.

The content of the private correspondences has spurred a bitter and increasingly acrimonious debate about climate science and scientific ethics. It is uncertain what effect, if any, the e-mails will have on climate legislation. In the U.K., Professor Phil Jones, the director of CRU, has stepped down and an independent investigator, Sir Muir Russell, will investigate whether there was any suppression or manipulation of data, determine if practices meet "best scientific practice," review compliance with U.K.'s data access laws and review management and security at CRU. His report is not due until the spring of 2010. In addition, more than 1,700 British scientists signed a letter in support of the scientists involved in the e-mails and in

support of the science showing global warming is in part due to anthropogenic factors.

At the United Nations, the co-chairs of the Intergovernmental Panel on Climate Change (IPCC) Working Group One, Thomas Stocker and Qin Dahe, issued a statement saying that their work provides an open, transparent and unbiased report on the current knowledge of the climate system and its changes.

In the U.S., some of the American scientists involved in the e-mails held a press conference and stated that they were not involved in any scientific misconduct. Another group of twenty-five climate scientists in the U.S., wrote an open letter (PDF) to Congress stating "The body of evidence that human activity is the dominant cause of global warming is overwhelming. The content of the stolen e-mails has no impact whatsoever on our overall understanding that human activity is driving dangerous levels of global warming."

Twenty-seven Republican senators sent a letter to the United Nations Secretary General Ban Ki-moon asking for an independent investigation of the IPCC and its reports based on "allegations of adjusting or manipulating data and why various individuals refused to disclose raw data." The senators compared their request to an investigation of the U.N.'s Oil for Food program by an outside entity in 2004.

Some Republican senators sent a letter to EPA asking the agency to halt its efforts to regulate greenhouse gases under the Clean Air Act "until the agency can demonstrate the science underlying these regulatory decisions has not been compromised" based on the information garnered from the stolen e-mails.

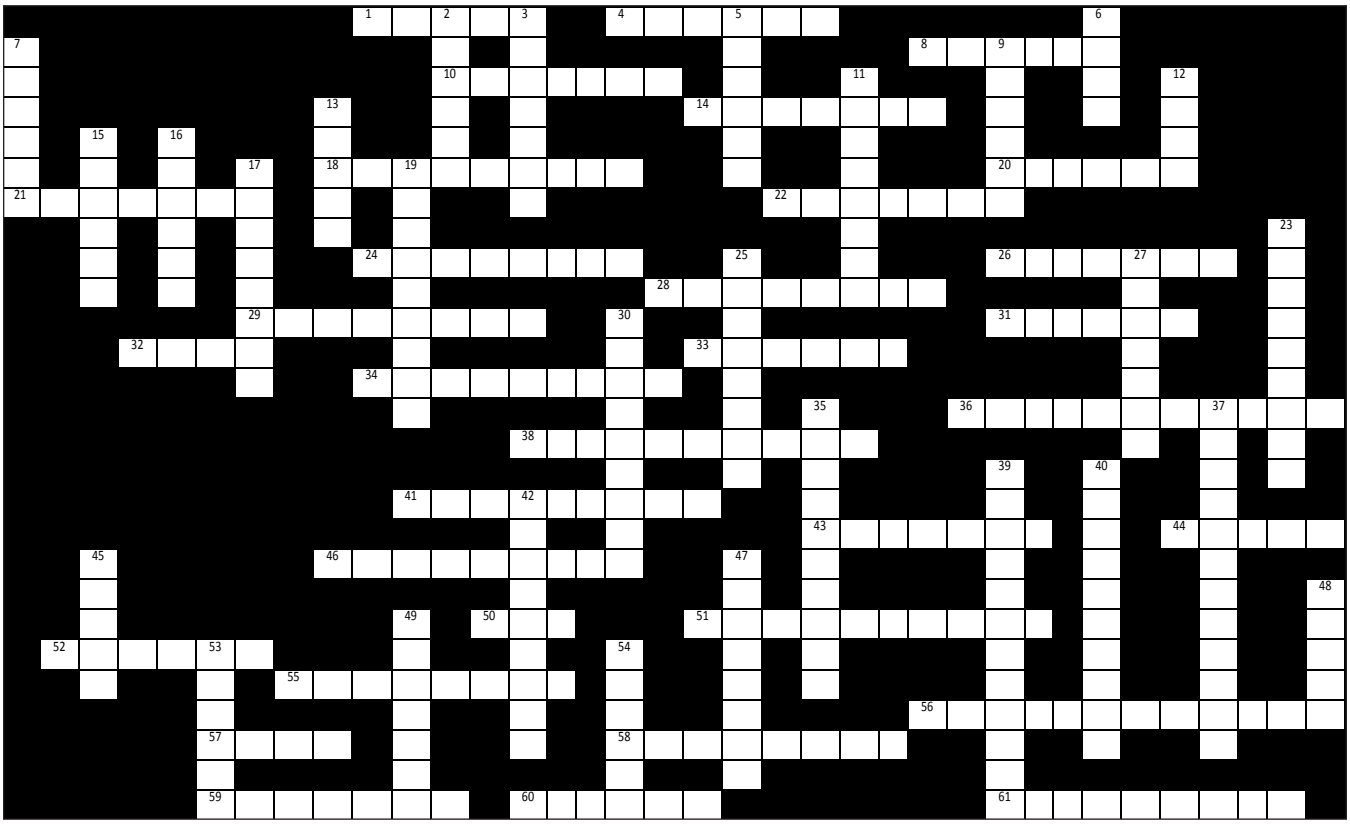
In congressional hearings in December, lawmakers and witnesses expressed their opinions regarding the e-mails and the science. "The e-mails do nothing to undermine the very strong scientific consensus…that tells us the Earth is warming, that warming is largely a result of human activity," Jane Lubchenco, who heads the National Oceanic and Atmospheric Administration, told a House committee. At the other end of the debate and in the other chamber, Senator James Inhofe (R-OK) stated at a December 2nd hearing, "One cannot deny that the e-mails raised fundamental questions concerning…transparency and openness in science."

Senator Inhofe has formally requested a hearing about the e-mails in the Environment and Public Works Committee, while Congressman Ed Markey (D-MA), Chair of the House Select Committee on Global Warming and Energy Independence, has stated he will organize a hearing about the e-mails at the beginning of 2010.

The media continues to cover the controversy regarding the e-mails from many angles. The *Wall Street Journal* provides a sixty megabyte file of all of the stolen information as a link in a November 23, 2009 news story while the Associated Press had five reporters read all 1,073 e-mails and then send summaries of their analyses to research ethics, climate science and science policy experts. The experts indicate that the science regarding global warming was not faked based on the content of the e-mails.

The open letter to Congress from climate scientists is available at: http://www.ucsusa.org/assets/documents/global_warming/scientists-statement-on.pdf ■

March Crossword of Geologic Terms



The HGS Board is offering a $50 gift card to the first correct and completed crossword received by the HGS Business Office prior to the mailing of the April issue.

ACROSS

1 A deep opening in the Earth's surface

4 Equatorial region with dense vegetation

8 Supratidal environment in arid to semi-arid settings

10 Arrangement of grains in sedimentary rock

14 Arrangement of sedimentary rock in layers of varying thickness

18 Magnetic variety of natural iron oxide

20 Free swimming

21 Open grassy, treeless plain

22 Intrusive rock

23 Breaking of a mineral along crystallographic planes

26 Open ocean

28 Quaternary period

29 Condition of equilibrium

31 A tubular hole made in sediment by invertebrate

32 Finer than sand and coarser than clay

33 Fluid state caused by heating

34 Boundary between water and land

36 Art of making a map

38 Unmixing

41 Below Oxfordian

43 Mountain building process

44 A very small valley

46 Tropical cyclone

50 Waterlogged, spongy ground, containing decaying vegetation

51 Collapse of bubbles in a fluid

52 A layer of broken rock used to prevent erosion

55 Area not subject to earthquakes

56 Rich in organic matter

57 Mound of windblown granular material

58 Seasonal convective circulation

59 Detrital limestone composed of fossil debris

60 Crystalline silica

61 Produced by the wearing away of land

DOWN

2 Mountainous region between timberline and snowline

3 Fine-grained limestone

5 Lead sulfide

6 Rock mass on side of fault

7 Break in the continuity of the geologic record

9 A small stream

11 Small isolated reef

12 Transitional between snow and glacial ice

13 Upper part of soil profile

15 Line of separation between drainage basins

16 Between crust and core

17 Stage of development of a stream at maximum efficiency

19 Removal of loose dry fine grained particles

23 Series of beds deposited during a single sedimentary cycle

25 Calcium fluoride

27 Study of the Earth

30 Commercial term applied to clay deposit

35 Undisturbed relationship between adjacent sedimentary rocks

37 Test composed of foreign particles bound by cement

39 Deposited in an alluvial fan

40 Bluish-green gem variety of beryl

42 Concordant igneous intrusion

45 Early part of the Precambrian

47 Removal of soluble components

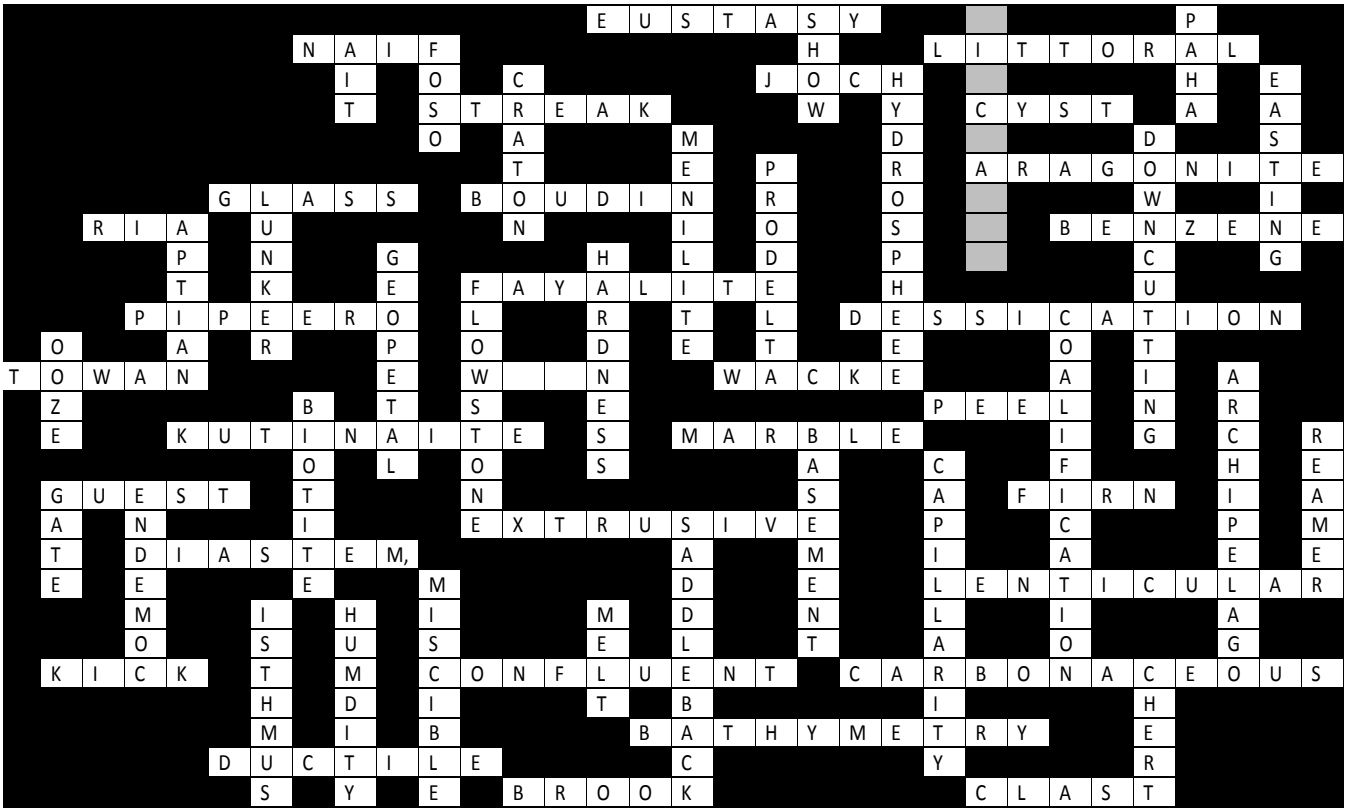
48 Collection of maps

49 Lower Middle Triassic

53 Igneous rocks with more than 60% silica

54 Reflection of light from a mineral surface

February Crossword Puzzle Answers



EDITOR'S APOLOGY – *A mistake was made in the construction of the February puzzle. The intent of "3 Down" was DISCOASTER it was misspelled when the puzzle was constructed. We will try to do better in the future.*

Full Color Ads Now Available!

HGS *Bulletin* Instructions to Authors

All materials are due by the 15th of the month, 6 weeks before issue publication. Abstracts should be 500 words or less; extended abstracts up to 1000 words; articles can be any length but brevity is preferred as we have a physical page limit within our current publishing contract. All submissions are subject to editorial review and revision.

Text should be submitted by email as an attached text or Word file or on a clearly labeled diskette in Word format with a hardcopy printout to the Editor.

Figures, maps, diagrams, etc., should be digital files using Adobe Illustrator, Canvas or CorelDraw. Files should be saved and submitted in .eps (Adobe Illustrator) format. Send them as separate attachments via email or CD if they are larger than 1 MEG each, accompanied by figure captions that include the file name of the desired image. DO NOT EMBED them into your text document; they must be sent as separate files from the text. DO NOT USE POWERPOINT, CLIP ART or Internet images (72-DPI resolution) as these do not have adequate resolution for the printed page and cannot be accepted. All digital files must have 300-DPI resolution or greater at the approximate size the figure will be printed.

Photographs may be digital or hard copy. Hard copies must be printed on glossy paper with the author's name, photo or figure number and caption on the back. Digital files must be submitted in .jpg or .eps format with 300-DPI or greater resolution at the printing size and be accompanied by figure captions that are linked by the file name of the image. The images should be submitted as individual email attachments (if less than 1 MB) or on CD or zip disk.

Advertising

The *Bulletin* is printed digitally using QuarkXPress. We no longer use negatives or camera-ready advertising material. Call the HGS office for availability of ad space and for digital guidelines and necessary forms or email to ads@hgs.org. Advertising is accepted on a space-available basis. **Deadline for submitting material is 6 weeks prior to the first of the month in which the ad appears.**

Random Inside (Black & White)					Page 2 (B&W)	Inside Front Cover (Full Color)	Inside Back Cover (Full Color)	Outside Back Cover (Full Color)	Calendar Back (Full Color)	Calendar Page (Full Color)
No. of Issues	Random* Eighth	Random* Quarter	Random* Half	Random* Full	Full	Full	Full	Half	Full	Quarter
10	$823	$1,387	$2,488	$4,734	$5,680	$7,830	$7,560	$6,858	$6,750	$2,700
9	$823	$1,387	$2,488	$4,734	$5,680					
8	$750	$1,260	$2,242	$4,307	$5,169					
7	$665	$1,123	$2,014	$3,834	$4,600					
6	$590	$990	$1,782	$3,392	$4,069					$1,890
5	$497	$837	$1,503	$2,860	$3,432	$4,698	$4,536	$4,104		
4	$405	$683	$1,223	$2,326	$2,792					
3	$327	$550	$990	$1,886	$2,262					$1,080
2	$232	$392	$704	$1,339	$1,607					
1	$146	$246	$443	$842	$1,010	$1,404	$1,296	$1,080		$810

FULL COLOR AD
* add 30% to B&W charge for full (4) color ad

BUSINESS CARD
$135 per 10 Issues – Send two cards
($30 for each additional name on same card)

Be a web page Sponsor

Effective June 1, 2009 you can now have your company logo picture posted on the Website. To have an ad posted, you must provide us with the graphic and give us the URL it should link to when clicked.

All ads appear in the "Our Sponsors" box in the upper left of the page. Each ad is displayed for a short time and replaced by the next ad in the list. Each ad will be randomly displayed on each page.

Example Sponsor Logo Size in Pixels: 120wx90h

	Logo Strip	Calendar Logo *Only 2 Available*	Website Business Card (Members only)	Personal Resumes Posting	GeoJobBank
One year	$1400.00	$2500.00	Free	Free	
6 months	$750.00	$1500.00	Free	Free	
1 month	NA	NA	Free	Free	$100.00

All Sponsor logo images must be 120 W x 90 H pixels and be no more than 8 bits per pixel with a maximum of 256 colors. The format can be either GIF or JPG, preferably interlaced or progressive. It is important to make the image file size as small as possible so that it will transfer to the users' browser quickly.

To arrange to become a web page Sponsor, contact the webmaster@hgs.org

Application to Become a Member of the Houston Geological Society

Qualifications for Active Membership

1) Have a degree in geology or an allied geoscience from an accredited college or university; or
2) Have a degree in science or engineering from an accredited college or university and have been engaged in the professional study or practice of earth science for at least five (5) years.

Qualifications for Associate Membership (including students)

1) Be involved in the application of the earth or allied sciences.
2) Be a full-time student enrolled in geology or in the related sciences.

Apply online at www.hgs.org and click on Join HGS

Annual Dues Expire Each June 30. (Late renewals – $5 re-instatement fee)
Annual dues are $24.00; full-time students and emeritus members pay $12.00.

Mail this application and payment to:
Houston Geological Society
14811 St. Mary's Lane, Suite 250 • Houston, TX 77079-2916
Telephone: 713-463-9476 Fax: 281-679-5504

Payment method:

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

Card # _____

Expiration Date: _____ Card I.D. _____

(Card I.D. – 3 or 4 digit number on front or back of card)

To the Executive Board: I hereby apply for ❑ Active or ❑ Associate membership in the Houston Geological Society and pledge to abide by its Constitution and Bylaws. ❑ Check here if a full-time student.

Name: _____

Address: _____

_____

Home Phone: _____ *Spouse's Name:* _____

Email: _____

Job Title: _____

Company: _____

Company Address: _____

_____

Work Phone: _____ *Fax Number:* _____

Circle Preferred Mailing Address: Home Office

Professional Affiliations: _____

❑ AAPG member No.: _____

Professional Interest:

❑ Environmental Geology ❑ North American E&P (other than Gulf Coast)

❑ International E&P ❑ Gulf Coast E&P (onshore & offshore)

School _____

Degree _____ *Major* _____ *Year* _____

_____

School _____

Degree _____ *Major* _____ *Year* _____

_____

Earth Science Work Experience _____

_____

_____

_____

Applicant's Signature _____ *Date* _____

Endorsement by HGS member (not required if active AAPG member)

Name: _____

Signature _____ *Date* _____

Membership Chairman _____ *HGS Secretary* _____

rev.08/11/2008

Houston Petroleum Auxiliary Council News

Winona LaBrant Smith, HGS Liaison

The standard of every event HPAC organized in the 2009-2010 year has raised the quality of their functions higher and higher. These events have been both unique and memorable. Our last party, Game Day, unfolded on Monday, February 15, 2010, at the Junior League Tea Room, 1811 Briar Oaks, with our incredible Daisy Wood, Chair. The decorations, food, and fellowship were excellent. SaraNan Grubb coordinated an informal style show highlighting clothes to be worn to the rodeo.

Thursday, May 20, 2010, will complete the 2009-2010 HPAC year with a Style Show and Installation of Officers at The Courtyard of St. James, 1885 Saint James Place, from 10:30-1:30.

Please mark your calendars. Remember that HPAC has several Interest Groups: Bridge and/or Book Club might be of interest to you.

HPAC began introducing you to our intriguing members in the month of December. It is felt that we have a virtual garden of exciting ladies who are involved in all walks of life, making HPAC a stimulating and diversified organization. Our featured member this month is Hellen Reasoner Hutchison. Like the other members we have highlighted, the story of Hellen's life would easily produce a memorable movie. After attending school in Burkburnett, Texas, progressing to Midwestern University, Wichita Falls, Texas, she entered the legal profession, specializing in oil and gas, real estate, probate, and estates. This occupied her time for a few years. The next venture was to establish and later incorporate Hellen Reasoner Petroleum Land Services. She still remains CEO of this service, serves as President of Tom Hutchison, Inc. and Vice President of Reasoner Minerals Management, Inc. Hellen, in 1981, achieved Certification as a Professional Landman. Her services (as a member, chairman, or officer) have been enjoyed by so many oil and gas associations that they are too numerous to list. If these achievements were not enough, this indomitable lady served as a director of American National Bank, Wichita Falls, Texas, until 1991. She attends St. Martin's Episcopal Church in Houston. Hellen earned her pilot's license in 1974. She has served in numerous capacities for both Republican organizations and museum boards. Her drive and ability to organize events of excellent quality is well known and in both HGA and HAPL. Five children, four grandchildren, and two great-grandchildren are the joys of her life. At this point you would think Hellen would begin to simplify her life, but she remains as busy as ever, running her office, spoiling her grandchildren, and being a delightful friend to all of us.

Geologists, please encourage your spouses to join HPAC, where they will have the opportunity to meet other wives whose husbands are geologists, geophysicists, engineers and landmen. They will participate in stimulating programs, delicious lunches and friendly fellowship.

For your convenience, a HPAC membership form is included below. If you have any questions, please contact Winona LaBrant Smith at 713-952-2007.

News from Geo-Wives

By Lois Matuszak, Geo-Wives President

On Thursday March 25, 2010 Geo-Wives will take their Annual Spring Trip to Bastrop, TX. Martha Lou Broussard and Lennie Edwards have planned a wonderful historic trip for us. Guests and husbands are welcome!

Bastrop is "The Most Historic Small Town In Texas".

Bus: Memorial Drive Presbyterian Church 8:30 a.m.

11612 Memorial Drive, Houston, 77024.

Reservations: Call or email Jackie Smith – Phone: 713-771-5427

Email: smithjandj@msn.com ■

You are invited to become a member of

HPAC

2009–2010 dues are $20.00 Mail dues payment along with the completed yearbook information to **Carol Gafford**, 13323 Misty Hills Drive, Cypress, TX 77429

YEARBOOK INFORMATION

Last Name	First Name	Name Tag
Spouse Name	Name Tag	HGS Member's Company
Home Phone	Business Phone	Business Fax
Street Address	City	Zip
Email Address	Home Fax	

Please choose a committee assignment if you are interested.

☐ Fall Event	☐ Yearbook	☐ SOS	☐ Membership
☐ Christmas Event	☐ Spring Event	☐ Notification	☐ Game Day
	☐ May Luncheon	☐ Courtesy	

Professional **Directory**

PCI

BOB LISKA
PALEO CONTROL, INC

WILCOX & Lower Tertiary BIOSTRATIGRAPHY

7706 Green Lawn Drive, Houston TX 77088
Ph 281-847-0922 rsliska@hal-pc.org

EXTERRA GEOSCIENCE LTD.
DIPMETER AND BOREHOLE IMAGING SPECIALISTS

ERIC F. PAAUWE PRESIDENT

28702 DOBBIN HUFSMITH RD.
MAGNOLIA, TX 77354
WWW.EXTERRALTD.COM

832.484.9200
281.252.0131
ERIC@EXTERRALTD.COM

Wavefront LLC *Oil & Gas Consultation*
since 1996

Steven "Eric" Getz
IT Support Consultation (Geophysical & Geological)
Network, Workstation, and Software Support
Seismic Data Loading
Seismic Modeling
Synthetic Seismogram Construction

(713) 305-5089 SMT Expert
EricGetz@EricGetz.com Microsoft Certified

SeaBird Exploration

Brian Anderson
Vice President of Marketing & Sales

SeaBird Exploration Americas
1155 N. Dairy Ashford, Ste. 206
Houston, TX 77079 USA
www.sbexp.com

Telephone: +1-281-556-1666
Mobile: +1-713-252-4680
Fax: +1-281-556-5315
Brian.Anderson@sbexp.com

Seisnetics
Automating Seismic Interpretation

4 Houston Center
1331 Lamar Suite 1265
Houston, TX 77010
713-751-0500
www.seisnetics.com

Providing automated pre-interpretation of 3D seismic volumes based on a patented methodology utilizing Genetic Algorithms.

Nortex Corporation
Established in 1957

Robert W. Kent
Executive Vice President
Land and Acquisitions

1415 Louisiana Street
Suite 3100
Houston, Texas 77002

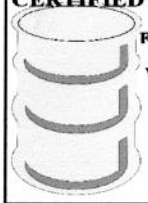
Bus: 713-658-1142 x311
Fax: 713-658-0739
Email: rwkentog@aol.com

ARNOLD & KNOBLOCH, LLP
Intellectual Property • Strategy • Solutions

CHARLES S. KNOBLOCH
Attorney at Law • Registered Patent Attorney
Texas Professional Geoscientist - Geophysics

2401 FOUNTAIN VIEW, SUITE 630, HOUSTON, TEXAS 77057
P: 713-972-1150 • D: 713-335-3021 • F: 713-972-1180
CHARLES@AKLAW.COM • CKNOBLOCH@ARNOLD-IPLAW.COM
WWW.ARNOLD-IPLAW.COM

JAMES M. NORRIS
CERTIFIED PETROLEUM GEOLOGIST



Field Studies/Field Value Enhancement
Property Purchase Evaluations
Workover/Drilling Recommendations

5222 Applevale Court
Kingwood, Texas 77345
(281)-361-5981
jmnor@aol.com

Decker Operating Company, L.L.C.

Steve H. Hill
Exploration Manager

1706 Seamist
Suite 590
Houston, Texas 77008

713-880-4343 office
713-880-1553 fax
713-248-3634 cell
STEVE.HILL@LSDECKER.COM

BILL KALIL

INDEPENDENT
PETROLEUM GEOLOGIST

P.O. BOX 1781
MIDLAND, TEXAS 79702
billkalil@juno.com

PHONE	FAX	CELL
(432) 683-0990	(432) 683-0992	(432) 349-8448

ENERGY CAREERS
Delivering Worldwide Recruiting Solutions

Stephen Preng
President

2925 Briar Park, Suite 1111
Houston, Texas 77042
www.energycareers.com

tel: (713) 335-5400
mob. (832) 259-8524
spreng@energycareers.com

TRRC Expert Witness

W.N. (Mac) McKinney, Jr.
Certified Petroleum Geologist
AAPG CERT # 2586
AIPG CERT # 6275
SIPES # 2651

3130 W. Benders Landing Blvd.
Spring, TX 77386

Phone (281) 353-0661
wnmckinney@comcast.net

Philip B. Moran, MBA, ChFC, CFP®
A Registered Investment Advisory Since 1986

Portfolio Advisory Council, L.L.C.

3 Greenway Plaza, Suite 1960
Houston, Texas 77046
www.pacadvisory.com

Phone: (713) 574-6030
Fax: (713) 622-3950
email: pmoran@pacadvisory.com

DYNAMIC GEOVENTURES, LLC.

MARC H. HELSINGER, Ph.D.
PRESIDENT

3122 West Hickory Park Circle
Sugar Land, Texas 77479
E-mail: rockdoc7@aol.com

Cell 281-773-9509
Home 281-980-8299

SeismicVentures®

Robert D. Perez
Business Development Manager

12603 Southwest Freeway Suite 600, Stafford, Texas 77477
t: 281.240.1234 f: 281.240.4997 c: 281.787.2106
h: 281.495.8695 e: r_perez@seismicventures.com

John D. Howell, Consulting Geologist
P. G., CPG

- Well Site—Centrally Located in NE Texas (Microscope and UV Box Equipped)
- Office—Yours or Mine
- 20 + Years Experience (Regional Studies, Field Studies, Trend Analysis, Prospect Generation, Submittal Evaluation)

715 CR 2914
Hughes Springs, Texas 75656-6128
903.748.8103 Cell
903.639.3113 Home
JDHoilgas@aol.com

Where is your card?
$135 per year
10 issues
713-463-9476

Steve Cossey
Chief Geoscientist

Cossey & Associates Inc.
geoconsulting

P.O. Box 1510
Durango, CO 81302, U.S.A.
phone/fax: +1 (970) 385-4800
e-mail: cosseygeo@aol.com
web page: www.cosseygeo.com

Specializing in Deepwater Clastics:
- Reservoir modeling
- Analogue Studies
- Field Courses
- Databases

Nov 2003

Louis Janos, III
Gulf Coast Basin Geophysical Advisor

Sylvan Energy

Trimont Building
1301 Grandview Avenue
Pittsburgh, PA 15211

Phone: 412-222-9600
Cell: 713-703-1228
Fax: 866-249-7162

www.sylvanenergy.com louis.janos@sylvanenergy.com

GDS

Jamie Kennedy
Office & Account Manager

Geotech & Design Services
Data Digitizing, Drafting & Computer Graphics

7171 HWY 6 NORTH # 202
Houston, TX 77095
jamie.kennedy@geotechmap.

Tel (281) 858-7100
Cell (281) 772-0574
Fax (281) 500-8534
www.geotechmap.net

RCL SYSTEMS

CITRIX Certified Administrator

Royce Landman

(281) 240-2777 • FAX (281) 240-0043
Toll Free: (800) 758-1771
Email: rcl@rcl.com • http:// www.rcl.com

Geophysical Workstations • Hardware/Software
LAN'S • Systems Analysis • Custom Programming

Providing Consultants for your Global Upstream Needs

The Only Thing More Impressive than our Depth of Knowledge....

Is our Knowledge of Depth

21 Years of Excellence

Consultancy / Projects & Studies

Our professionals can conduct global projects in your office, at locations around the world, or in our state-of-the-art facilities.

- Regional and Basin Studies
- Exploration Prospect Generation
- Field Development Studies
- Structural and Stratigraphic Analysis
- Post-drilling Evaluations
- Reserves and Resources Studies
- Integrated, Multi-disciplinary Projects

Evaluation / Investment Services

Multi-disciplinary teams experienced in performing technical / commercial evaluations of:

- Acquisitions / Divestitures
- Lease or License Position Evaluations
- Oil and Gas Producing Properties
- Investment Opportunities in Exploration / Development
- Exploration / Development Prospects
- Data Room Analyses
- Farm-in / Farm-out Evaluations

IACET The Standard for Lifelong Learning

For Our 2010 Training Schedule
Check out our website at
www.scacompanies.com/training_services
Geoscience Boot Camp coming in August 2010

Subsurface Consultants & Associates, LLC
10255 Richmond Avenue, Suite 300W, Houston, Texas 77042
Phone: +1.713.789.2444 Fax: +1.713.789.4449
General Inquiries: info@scacompanies.com,
Training Course Registration & Info: training@scacompanies.com
Consultants & Direct Hire Recruitment Services: consulting@scacompanies.com

HOUSTON
GEOLOGICAL SOCIETY
14811 St. Mary's Lane, Suite 250 • Houston, TX 77079

Periodicals
U.S. Postage
PAID
Houston, Texas