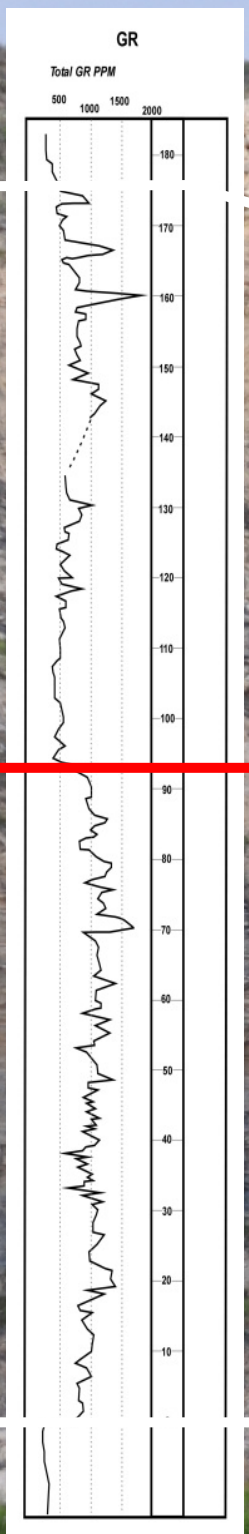
HGS Bulletin
Houston Geological Society
Volume 61, Number 3
November 2018



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EAGLE FORD GROUP

BUDA

Unraveling the Secrets of the "Eaglebine"

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Upper Eagle Ford

Lower Eagle Ford

The Bulletin
Houston Geological Society

Volume 61, Number 3 — November 2018

In Every Issue

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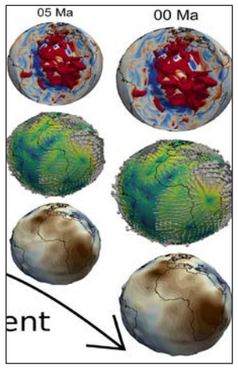

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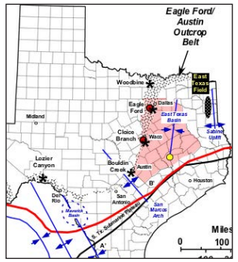

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69th Annual Gulf Coast Association of Geological Societies 2019 GCAGS Convention

October 23-25, Marriott Westchase, Houston

Hosted by the Houston Geological Society and the GCSSEPM

General Chair: Mike Erpenbeck, Vice Chair: Larry Bartell, GCAGS President: Deborah Sacrey

Submit an Oral or Poster Abstract by March 4, 2019

Convention Themes

1. **Unconventional GOM Mudrocks and Shale Plays**
   Austin Chalk, Eagle Ford, Haynesville, Eaglebine and other plays
2. **Onshore GOM Conventional Plays, Discoveries, and Case Studies**
   Louisiana and Texas Wilcox, Miocene, Yegua, and other trends
3. **Offshore GOM Exploration and Production Studies**
   Cretaceous, Miocene, Deepwater Wilcox Plays, Risking, and Dry Hole Evaluation
4. **Over the Border: Mexico Geology and Exploration, and Caribbean Exploration**
   Mexico, Cuba, Belize, Trinidad, Offshore Central America, Regional Studies
5. **Structural Geology, Gravity, and Magnetic Case Studies**
   Ground Penetrating Radar Imaging, Use of Drones, and Lidar Imaging
6. **Gulf Coast Environmental Geology**
   Subsidence & Flooding Impact, Groundwater Quality, Public Education Outreach, Environmental Studies, and Professional Licensing
7. **Petroleum Engineers and Geologists Working Together for a Better Answer**
   Estimating Reserves, GeoModeling, Economics, Waterflooding, and Permeability Enhancement
8. **Seismic Technology and Salt Tectonics**
   Depth Migration, Subsalt Processing, AVO, Seismic Attributes, and Shallow Hazards
9. **Understanding Big Data and Computer Aided Interpretation**
   Machine Learning, Visualization, Augmented Intelligence, and Pattern Recognition
10. **The Road to Business Success**
    Deals, Financing, Starting Own Company, Young Professional Careers, and Consulting

2019 Convention Oral and Poster abstracts of up to 300 words must be submitted to the Technical Chair, Linda Sternbach, by March 4, 2019. Send abstract and contact info in a Word document to linda.sternbach@gcagshouston.com. Authors will receive notification of acceptance by March 25, 2019

If you'd like to publish in the *GCAGS Journal*, the peer-reviewed journal of Gulf Coast geoscience, submit an extended abstract of at least 600 words, including 1–2 representative figures, to the *GCAGS Journal* Editor, Robert Merrill (rmerrill@catheart.com) by December 15, 2018.

www.gcagshouston.com

Cheryl Desforges
President@HGS.org

HGS Committees – the *Invisible Hand*

Some people don't really understand that HGS is a bottom up member-driven organization of ***volunteers*** who administer and execute tasks that create, develop, and continually change our organization. HGS is always changing, sometimes slowly, sometimes quickly, to adapt to member needs and interests – all member-driven. It may look like HGS is haphazard, but we are actually a well oiled machine of volunteers!

You might remember from economics that Adam Smith employed the invisible hand metaphor to describe the unintended social benefits resulting from individual actions. The invisible hand of HGS is our many committees that focus on many areas.

We have committees that keep HGS functioning smoothly, committees that are involved in public outreach, some that help our members keep current in their skills and knowledge, and some that execute purely social and sporting activities. All committees provide great opportunities for networking.

But our persona is seen mostly through our events. Many committee volunteers, led by committee chairmen create, manage, and execute these events, including conferences, short courses, social events, and community outreach events.

In September and especially in October we had many events that served our members and colleagues, as well as our community.

HGS started out the 2018-2019 year with the strong worldwide public persona with the ***Africa Conference***, where 296 conveners from all over the world came to Houston to keep current on Africa Exploration and to network. This is an annual conference in collaboration with the Petroleum Exploration Society of Great Britain (PESGB) which Houston hosts biennially. Kudos to **Brian Horn** and his steering committee for a job well done!

October brought a very active agenda that really showed the breadth of HGS activities. There was no excuse to say you couldn't socialize with other Geoscientists during October! There were educational community outreach activities, social and sporting events, and technical and continuing education events.

Three of our committees which specifically reach out to children in our community – potentially the next generation of geoscientists – and introduce them to geology were very busy during October: the ***Earth Science Week Committee***, Chaired by **Sharon Choen**, the ***Museum of Natural Science Committee***, Co-Chaired by **Janet Combs** and **Inda Immega**, and the ***Educational Outreach Committee***, Chaired by **Letha Slagle**.

- ***Earth Science Week*** is a multi-day event every year at the Houston Museum of Natural Science (HMNS). Both the Earth Science Committee and the Museum of Natural Science Committees participate in it. Hands-on activities and interactive demonstrations are presented in the Glassell Hall, Wiess Energy Hall and Morian Hall of Paleontology. This year 53 passport station volunteers at 7 stations distributed 230 passports and shark teeth and 139 were returned for a prize. However, many more kids participated in the activities without progressing through the passport sequence. The committees gave out 32 teacher kits. The following weekend, there was a fieldtrip through the Wiess Energy Hall at the HMNS.
- The ***Educational Outreach Committee*** is active during the entire school year going to individual schools. The Committee has a partnership with the IPAA/PESA Extern Program from high school students, but has recently reached out to middle and elementary schools with their Bones in Schools and Rock Lab programs.

From the President *continued on page 9*

Jim Tucker
editor.hgs@hgs.org

An Interesting Month

A few thoughts while waiting to circulate bottoms up…

Early this month I was talking to one of our distinguished long-time members after an AAPG Delegates gathering, and we were both amazed at how consultants and colleagues looking for work fail to keep their contact information updated. Numerous times over the years I have reminded colleagues to update/change their contact information in online listings. Avoid using your work email for other professional correspondence. When you leave a job, your logon access and email account will be blocked, so you do not want to have your professional contacts disappear. One of the benefits of professional society membership is access to membership databases or directories to facilitate contacting colleagues. Reciprocally, it allows colleagues to contact you, so remember to keep all your membership contact information current.

Elsewhere in this issue is **John Tubb**'s description of how networking with colleagues has been important for his career. Networking is continuous, not something you start flat-footed when you are on a job search. Every job or consulting project I have had has been a result of networking, in some way or another. At the HGS table in the SPE hiring event this month, I was talking to a fellow who just graduated from U of H. As we talked about his thesis work, it came out that his advisor was someone I worked with at ARCO years ago, and who had later provided me with a consulting job lead. As he told me about the father of a friend who reviewed his work and provided advice, it dawned on me that is was another colleague I had known since grad school, and started with at ARCO. Our professional community is not that large, so these coincidences are common. It's not all receiving, but assisting colleagues without the promise of a reciprocal benefit. Get in the habit, if you are not already.

This week I attended an HGS NeoGeos happy hour after work. Met lots of interesting early-career colleagues, and several service suppliers there to support us. Among the conversations I had were with two geos who had moved to Houston recently from Lafayette, where they had been active in the Lafayette Geological Society. Your local society is your first circle of professional involvement and continuing education, and they had that lesson instilled already—Welcome to Houston. Look for the new Early Career Contest elsewhere in this issue, along with **Jeff Lund**'s Lessons from a Career.

I received a short submission for the "Lessons" that focused on the impact of one person's inspiring early-career mentor. If you have a paragraph or two about "My Most Memorable Mentor", please send them along.

Be safe, and volunteer for something this month. ■

From the President continued from page 5

October saw its share of HGS social and sporting events.

- Does any one like beer? HGS launched our first ***RocktoberFest*** social, arranged by Board Members **Annie Walker** and **Rachel Todkill**, and continued the ***NeoGeos Happy Hour*** events with their new Chair **Casey Langdon**. These were great events to see old friends and meet new friends.
- Then there were 2 annual sporting events: the ***Saltwater Fishing Tournament*** in partnership with the Geophysical Society of Houston (GSH), Chaired by **Bobby Perez**, and the ***Golf Tournament***, Chaired by **Elliot Wall**. The Saltwater Fishing Tournament reported that despite the strong breeze and some choppy water, most anglers had good catches for the day. Out of 55 in attendance, there were 48 anglers. Everyone enjoyed the great food and socializing. Awards were given for the heaviest Trout, Redfish, Flounder and Stringer. The ***Golf Tournament*** had a healthy turn out of 124 in attendance! Everyone had a ball (ha! ha!).

As always, Geologists can learn more technical information, along with socializing. Even if I have never worked the geographic area highlighted in a talk, I always learn something new I can apply.

The ***Continuing Education Committee,*** Chaired by **Thom Tucker** and **John Suter**, brought back by popular demand an encore of *Introduction to UAV (Drones)* instructed by **Mike Allison**.

And then there are our ever present monthly meetings, including our ***General Dinner*** and ***Lunch Meetings***, arranged by **Penny Patterson**, HGS VP, as well as the ***North American Dinner Meeting***, Chaired by **Martin Cassidy**. Our General Dinner meeting reactivated a much older tradition of having a joint meeting with the GSH.

I can't finish this column without a special call-out to some of the committees that aren't well known, because they are the unsung volunteers who work in the background with our Office Staff, Andi Peoples and Jacky Jordan, to keep HGS functioning smoothly and growing. For example, going down the list, **Brian Guzman** – Advertising, **Mike Deming** – Awards, **Penny Patterson** – Arrangements, **Paul Hoffman** – Ballot/Elections, **Dianna Phu** – Communications, **Radhika Sangani** – Finance, **Gustavo Carpio** – Membership Growth, **Sharie Sartain** – New Membership, **John Adamick** – Nominations, **John Tubb** – Office Management, **Lauren Robinson** and **Dianna Phu** – Social Media, **Rich Germano** – Vendor's Corner, **Linda Sternbach** – Video and Web Management.

As amazing as it may seem, the committees mentioned in this column are only a portion of all HGS committees.

Get involved by joining a committee and make HGS the organization you want it to be! ■

2019 Applied Geoscience Conference
1st "Subsurface Intelligence and Analytics" Conference

FIRST ANNOUNCEMENT

Houston Geological Society
2019 Applied Geoscience Conference
1st "Subsurface Intelligence and Analytics" Conference

Call for Content Papers

5th – 6th March 2019
Anadarko Petroleum Allison Tower
The Woodlands, TX

HGS Technical Committee
Rebecca Morgan, Co-Chair
Jason Simmons, Co-Chair
With Subsurface Digital Industry Experts

Deadline for Submission: Nov. **16th 2018**

Sponsors:

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https://www.hgs.org/

Conference Overview

The 1st HGS Applied Geoscience Conference on Subsurface Intelligence / Digital Oil and Gas will be held in The Woodlands, TX in March 2019.

Digital Transformation of the Geoscience- hype or hope? When you ask an industry professional to define digital transformation, you find that the words mean something different to everyone. **However, one idea permeates, this could be a potential paradigm shift in the industry. How do we get from bytes to barrels, particularly in the Applied Geosciences field?**

A report from the World Economic Forum in 2017 states that Digital Transformation in the Oil and Gas industry could generate between $1.6 to $2.5 trillion for the industry, customers, and greater society over the next decade. **The Economist (May 6, 2017) recently stated that "the world's most valuable resource is no longer oil, but data."** What direction is the industry heading? What initiatives are currently ongoing?

The Two-day conference will cover the questions above and key issues related to the Applied Geosciences field: big data and advanced analytics, reliability and productivity, data storage, the changing workforce and digital transformation of the Geoscience disciplines. The workshop is open to a variety of topics and ideas, both from the industry and academia.

Conference Objectives

The main objective of this is to **achieve a better understanding of current digital work flows in the Geoscience disciplines as well as the latest advancements in utilizing new Digital Technologies.** We hope to create a collaborative environment between Geoscience and Industry professionals to present and discuss the Digital Transformation and fresh ideas that may apply to your workflows.

Who Should Attend

The list of topics will focus on Applied Geosciences and new digital technology, but will include discussions across the E&P lifecycle. **Consultants, Academics, Technology, and Industry professionals will all be suited for this event.**

2019 Applied Geoscience Conference
1st "Subsurface Intelligence and Analytics"

Theme & Schedule	Main Topic	Topic Focus Areas
Opening	Opening and Keynote Address Session	
Theme 1	**Digital Transformation – The Changing Workforce**	This theme focuses on the digital workforce and the skill sets needed for transformation. The session could be also open to HR professionals and will allow **technical discussion on the necessary skills and competency for Digital Transformation and the fears around workforce replacement.**
Theme 2	**Machine Learning and Data Analytics in Exploration and Production**	New technologies and advanced analytics are leading to updated workflows. Are we becoming more efficient in our workflows? How do we find more in Exploration? How do we produce more in Production? **How are the subsurface data being transformed and utilized in modern workflows?**
Theme 3	**Automation– Reliability and Productivity**	The challenges to increase reliability and productivity through automation in the digital world. This theme will explore how the Geosciences are turning to automation for faster decision-making. **Ideally the session will capture where industry-leading automation is occurring in the Geoscience field.**
Theme 4	**Leveraging Cloud and Machine Learning to Transform How Geoscientists Work Data**	With more and more data being captured, how are companies storing and accessing the data? This theme will examine how Geoscience databases are changing and the latest topics for streamlining data in different workflows. **What are the best approaches to storing and accessing Geoscience data?**
Theme 5	**Digital Transformation of the Geosciences - Hype or Hope**	The theme focuses on the Geoscience disciplines (Geology, Petrophysics, Reservoir Engineering, Geophysics, and Geochemistry) **and new digital efforts ongoing in each of them.**
Posters	**Student Poster Session**	
Closing	**Speaker and Poster Awards**	

2019 Applied Geoscience Conference
1st "Subsurface Intelligence and Analytics"

Submission Guidelines

We welcome submissions of all types, such as papers, case studies or reviews of new industry digital trends. We invite speakers to submit an abstract of maximum one (1) page (not exceeding 300 words). The information contained in your abstract is the basis for the acceptance of your paper into the program. The technical committee will look for content containing strong technical and innovative content.

We ask you to refrain from commercialism and focus on the promotion of subsurface intelligence and digital transformation as it applies to Geoscience. Submissions will be accepted online by emailing us at **AGC2019@hgs.org** . Abstracts submission deadline is **Friday, 16th November 2018**.

Important Dates

Registration open	31st August 2018 31st
Early bird deadline	December 2018 25th
Registration deadline	February 2019
Walk-up Registration	With availability

Fees

HGS members Early Bird $400 / Non-member $500

General Registration HGS members $450 / Non-member $550

1 Day HGS Member Registration $200 / non-member $250

Student Registration $100

Sponsorship

Enhance your visibility and corporate image by participating as a "Conference Sponsor" and presenting your technical expertise to a focused and exclusive regional audience. The conference offers a variety of sponsorship categories on a first-come basis. Companies interested are invited to Contact Thomas Reed @ thomasreed979@gmail.com or Andrea Peoples at andrea@hgs.org or call the HGS office at 713-463-9476

2019 Applied Geoscience Conference
1st "Subsurface Intelligence and Analytics" Conference

Guidelines For Abstract Submission

Please submit your abstract for either an oral presentation by sending it, as an email attachment to AGC2019@hgs.org . Submissions should be sent as soon as possible and no later than November 16th 2018.

Assessment of the abstracts will be based upon the quality and relevance to the suggested topics below:

- **Digital Transformation - The Changing Workforce**
- **Machine Learning and Data Analytics in Exploration and Production**
- **Automation – Reliability and Productivity**
- **Leveraging Cloud and Machine Learning to Transform Seismic and Geoscience Data Use**
- **Digital Transformation of the Geosciences – Hype or Hope**

Abstracts should be:

- Length should be 1 page (8½" x 11"), no more than 300 words, and may include diagrams in color or black and white, and references.
- Submit as MS Word documents with embedded graphics.
- Each file name should include the principle author's surname.
- Include contact information (email address) for the principle author in the abstract
- Indicate the speaker with an asterisk (*) after their name in the author list.

The principle author of submitted abstracts will be notified of the committee's decision no later than **December 14th 2018.**

Accepted Submissions

Each author of an accepted submission is requested to submit an EXTENDED ABSTRACT for their oral presentation by January 14th 2019.

The extended abstract may contain references, appendices, figures and maps. Please indicate if you **do NOT** wish this to be part of proceedings of the event.

2019 Applied Geoscience Conference

March 5-6, 2019

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Brand your company with the premier event designed for integrated asset teams. To sponsor, please contact Thomas Reed at thomasreed979@gmail.com or Andrea Peoples at **andrea@hgs.org** or **713.463.9476**

OPPORTUNITIES	Platinum Sponsors $10,000	Titanium Sponsors $7,500	Gold Sponsors $5,000	Silver Sponsors $2,500	Bronze Sponsors $1,000
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Recognition by HGS in Program Book, onsite signage, post show highlights and thank you in HGS Bulletin	✔	✔	✔	✔	✔
Recognition in Conference Announcements and Website (logo with hyperlink)	✔	✔	✔	✔	✔

Mail Sponsor Request to:
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Houston, TX 77079

For more information and to register please visit: www.hgs.org

2019 Applied Geoscience Conference

March 5-6, 2019

1st Subsurface Intelligence and Analytics Conference

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HGS, 14811 St. Mary's Lane, Ste. #250, Houston, Texas 77079, Attn: Andrea Peoples.
You may also email your completed sponsorship form to **andrea@hgs.org**.

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Anadarko

ANADARKO CONFERENCE CENTER
1201 Lake Robbins Drive, The Woodlands, TX 77380

For more information please visit: www.hgs.org

Monday, November 12, 2018 HGS General, International and N. American **Dinner Meeting**

Live Oak Room • Norris Conference Center • 816 Town and Country Blvd #210
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $40 Preregistered members; $45 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

If you are an Active or Associate Member who is unemployed and would like to attend this meeting, please call the HGS office for a discounted registration cost. We are also seeking members to volunteer at the registration desk for this and other events.

Gary Mavko
Professor Emeritus,
Stanford University

The Robert E. Sheriff Lecture Series

Sponsored by the Department of Earth and Atmospheric Sciences at University of Houston and the U.H. Geoscience Alumni Association

In addition to the presentation by the guest speaker, Dr. Hua-wei Zhou, Chair of the Department of Earth and Atmospheric Sciences, will present an update of activities at U.H. as well as the departmental Outstanding Alumni Award. There will be a poster session on current thesis and dissertation research of U.H. students.

Come and meet the next generation of geoscientists from the University of Houston!

The Robert E. Sheriff Lecture Series was initiated in 1999 by the University of Houston Geoscience Alumni Association to honor Dr. Sheriff as an educator, scholar, and proponent for the geosciences. The series has recently been co-sponsored by the Houston Geological Society.

The Sheriff Lecture mission is to

bring some of the best known geologists and geophysicists in the world to the Houston community to share ideas relevant to exploration geology and geophysics, and to showcase geoscience activity at the University of Houston.

A full list of the Student Posters will be available on the HGS Website.

R.E. Sheriff Lecture: Navigating Messy Rock Physics Problems

Two common tools for modeling physical properties of rocks are *Estimators and Bounds.* Estimators predict a particular value of rock property: for example, Archie's Law to predict saturation or porosity, or Gassmann's equations to predict how effective moduli change when the pore fluid changes. In contrast, bounds predict the range of possible rock properties, given the limited information that we typically have in geophysics. Rock microstructure and heterogeneity are critical – determining where the measured value falls within the bounds, and why predictors sometimes fail or mislead us.

In this presentation, I'll show strategies for using bounds to navigate messy rock physics problems. Examples include (1) using bounds to test and sometimes falsifying popular predictors, (2) using bounds to infer microstructure from common measurements, and (3) using bounds, themselves, as predictors, especially in complex materials such as unconventionals. I'll also touch on a less familiar topic: using bounds on the cross-relations between different measurements (elastic modulus, electrical resistivity, dielectric constant, thermal conductivity, etc.) on the same rock. Cross bounds help us to validate our multi-physics measurements and our assumptions used to interpret measurements. ■

Biographical Sketch

Gary Mavko is a Professor of geophysics at Stanford University. He received his PhD in geophysics from Stanford in 1977. Gary then joined the Tectonophysics branch of the USGS in Menlo Park where he worked in areas of rock physics and earthquake fault mechanics. In 1984 Gary joined Entropic Geophysical, in its first months as a start-up reflection seismic processing company. Gary developed many of Entropic's algorithms and software for reflection and refraction analysis, and eventually became their VP of research and development. He returned to Stanford in February, 1989, and is now Professor (Research) of Geophysics. He has been working on modeling and analysis of the acoustic properties of rocks and techniques of seismic interpretation for rock and fluid properties. In 2001 he was elected an Honorary Member of the Society of Exploration Geophysicists "for his deep understanding of rock physics and for the distillation of his ideas into the "squirt" theory for porous, saturated rocks". Gary was a 2006 Distinguished Lecturer of the Society of Exploration Geophysicists.

HGS Scholarship Night & Dinner Meeting

HGS Foundation Scholarship & Calvert Memorial Fund February 11, 2019
Speakers: Cindy Yeilding, Senior VP for BP and Robert Ryan, former VP of Global Exploration for Chevron
Location: The Norris Center, City Center, 816 Town and Country Blvd. #210

Elizah Sims - Big Bend Paelontology Fellowship Awardee

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All event profits benefit the HGS Scholarship Funds.

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Wednesday, November 14, 2018

Black Lab Pub, Churchill Room • 4100 Montrose Blvd.
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $30 Preregistered members; $35 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

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Brad L. Cross, PG
WSP

A 2-D Electrical Resistivity Survey of a Pipeline Crossing on the Colorado River, San Saba and Burnet Counties, Texas

Fifteen high-resolution multi-node electrical resistivity river bottom surveys (marine surveys) were completed at a proposed pipeline crossing along the Colorado River in San Saba and Burnet Counties, Texas. The objective of the surveys were to provide preliminary subsurface information along a proposed pipeline right-of-way and to identify geologic hazards such as faults, fractures, and voids in the subsurface that may impact horizontal directional drilling activities.

The resistivity data collected from each survey line was processed and modeled using a two-dimensional inversion modeling package. A penetration depth of approximately 90 feet beneath the river bed was obtained in each of the modeled profiles. The modeled resistivity values ranged from less than approximately 5 ohm-meters in the low resistivity (high conductivity) silty and clayey river bed sediment to approximately 100 ohm-meters and higher in the competent higher resistivity carbonate bedrock along all the profiles. The existence of unstable material in the path of the proposed pipeline would be a potential concern that needed to be evaluated prior to advancing the horizontal directional drilling bore through the right-of-way.

An overview of the data collection methods as well as a brief summary of the results will be provided during the presentation. ■

Biographical Sketch

Brad Cross, is a supervising hydrogeologist with WSP (formerly LBG-Guyton Associates). He has over 35 years experience in the field of groundwater resources, underground injection control, public water supply, and project management. Brad obtained his geology degree from the University of Texas at El Paso in December 1980.

Prior to his 18 years with WSP, Brad spent 15 years with the TCEQ serving as permit writer for numerous injection wells as well as various aquifer storage and recovery projects. He also developed and directed Texas' statewide drinking water protection program and provided site-specific technical assistance to hundreds of communities through the State's Source Water Protection Program.

Tuesday, November 20, 2018

Southwestern Energy Conference Center, 10000 Energy Drive, Spring, TX 77389
Social 11:15 a.m., Luncheon 11:30 a.m.

Cost: $35 Preregistered members; $40 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

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HGS Northsiders
Luncheon Meeting

Lorenzo Colli
Department. of Earth and Atmospheric Sciences
University of Houston (lcolli@uh.edu)

Dynamic Topography: How Mantle Convection Generates Accommodation Space and Leaves a Trace in the Geologic Record

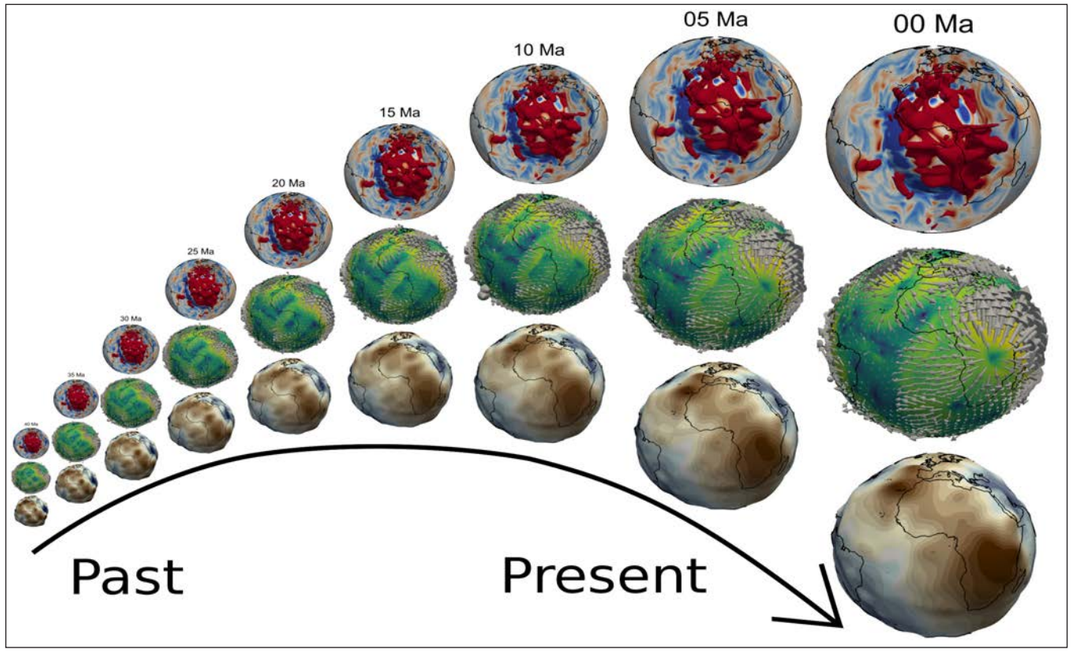

Figure 1. *Example of reconstructed history of mantle convection for the African hemisphere, showing 3D temperature anomalies in the mantle, flow velocity at 270 km depth and predicted long-wavelength dynamic topography.*

Dynamic topography is the warping of Earth's surface caused by viscous stresses in the mantle. These stresses, in turn, are due to the buoyancy anomalies that drive mantle convection. As mantle convection evolves through time, so do its associated stresses. Dynamic topography thus changes through time over 1–100 Myrs, with uplift and subsidence events of many hundreds of meters affecting areas of 104–108 km2.

Such events can destroy or create large amounts of accommodation space, shifting the location of depocenters and erosional areas and modulating the sediment flux. This direct effect compounds with the fact that variations in topography of such scale can impact atmospheric and oceanic circulation, thus affecting erosion and sediment transport indirectly through changes in climate.

The concept of dynamic topography dates back to the 1930s, when C.L. Pekeris pointed out that thermal convection in the interior of the Earth would push up the crust above warmer regions and pull it downwards above colder regions. This is a direct consequence of the extremely large viscosity of the mantle, which causes stresses to be diffused over long distances and ultimately compensated at the surface. But the lack of viable observational constraints meant that dynamic topography remained a theoretical speculation. At the same time, the growing acceptance of continental drift and plate tectonics focused the attention to horizontal movements and plate-scale processes.

It was only in the 1980s, when advances in satellite geodesy allowed for high-precision measurements of the geoid, that a series of works by R.J. O'Connell, B.H. Hager and M.A. Richards provided the theoretical framework to link dynamic topography to the geoid, resulting in the first predictions for the present-day dynamic topography of the Earth. In recent years more direct observations of dynamic topography have come from careful analysis of oceanic seismic surveys by M.J. Hoggard, leading to the compilation of a large dataset of residual basement depths.

At the same time, results from a number of techniques, such as sediment stratigraphy, thermochronology, geomorphology and paleoclimatology are revealing the extent to which spatial and temporal changes of dynamic topography can leave a trace in the geologic record. Dynamic topography can thus be exploited to link models of mantle convection to the geologic record and, potentially, to global reconstructions of past mantle flow and past dynamic topography. ■

Biographical Sketch

Lorenzo Colli received his BS and MS in physics from the University of Milan. He then moved on to a PhD in geophysics under the supervision of Hans-Peter Bunge and Andreas Fichtner at the Ludwig Maximilian University of Munich, which he completed in January 2017. Since September 2017, he has been a research assistant professor at the University of Houston. His current research focuses on the assimilation of geophysical datasets into geodynamic models of mantle convection to reconstruct past histories of mantle convection, in order to test these histories – and the assumptions they are based on – against the geologic record.

The Value of Networking in the Petroleum Industry

by John Tubb, Jr.

When I graduated in 1959 with a BS in Geology, the petroleum industry was in the second year of a downturn. So I went to graduate school. Four years later when I received my PhD degree, the industry was just emerging from the downturn. In my 55 year career as a Petroleum Geologist, I have lived through many ups and downs, the worst two being 1986 and the one we are just emerging from. Ups and downs are part of the game.

I moved to Houston from Lafayette, LA in 1975. While living in Lafayette, I was active in the Lafayette Geological Society. Upon moving to Houston, I found that almost no one at my company went to HGS meetings. I went anyway. As a result, it took a long time before I could go to meetings and see people that I knew. Networking is not quick or easy, but it is very necessary.

During my career as a geologist, I have been an employee at 6 different oil companies and a consultant for 11 companies. For the first job I was recruited out of graduate school. The second job was found through resumes. The remaining four jobs as an employee were obtained through people I knew or from recommendations from these geologists. Of the 11 consulting jobs, only ONE came from resumes, the remaining 10 were from people that I knew in the industry. My scorecard shows that I received 3 jobs through resumes and 14 through networking. In my case, mailing out resumes was simply a waste of trees.

As a result of the downturns during my career, I was without a job several times. Unfortunately, chances are that many of you will meet a similar fate. That's when networking becomes a critical factor in your overall career strategy.

HGS has a multitude of opportunities to network: meetings, Continuing Education, social events, etc. I hope to see you soon at one of our events soon. *Laissez les bon temps rouler* ■

Note: John Tubb has received the Gerald A. Cooley Award, was President 2010-2011, and Treasurer 2008-2009 and has been a Member of HGS since 1975.

Wednesday, November 28, 2018

Petroleum Club of Houston • 1201 Louisiana (Total Building)
Social Hour 11:15 a.m.
Luncheon 11:45 a.m.

Cost: $35 Preregistered members; $40 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
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HGS General **Luncheon Meeting**

A.D. Donovan, M.J. Meyer, A. Pramudito, and M.C. Pope
Texas A&M University

Unraveling the Secrets of the "Eaglebine": Using Sequence- and Chemo-Stratigraphy to Differentiate Unconventional Plays and Play Fairways within the Woodbine and Eagle Ford Groups in the East Texas Basin

Along the western flank of the East Texas Basin (**Figure 1**), the Latest Early Cenomanian to Earliest Middle Cenomanian Woodbine Group and Late Middle Cenomanian to Latest Turonian Eagle Ford Group are mapped (Adkins and Lozo, 1951) as distinct unconformity-bounded chronostratigraphic units (**Figure 2**). In the outcrops and subsurface near Waco Texas (**Figures 3** and **4**),

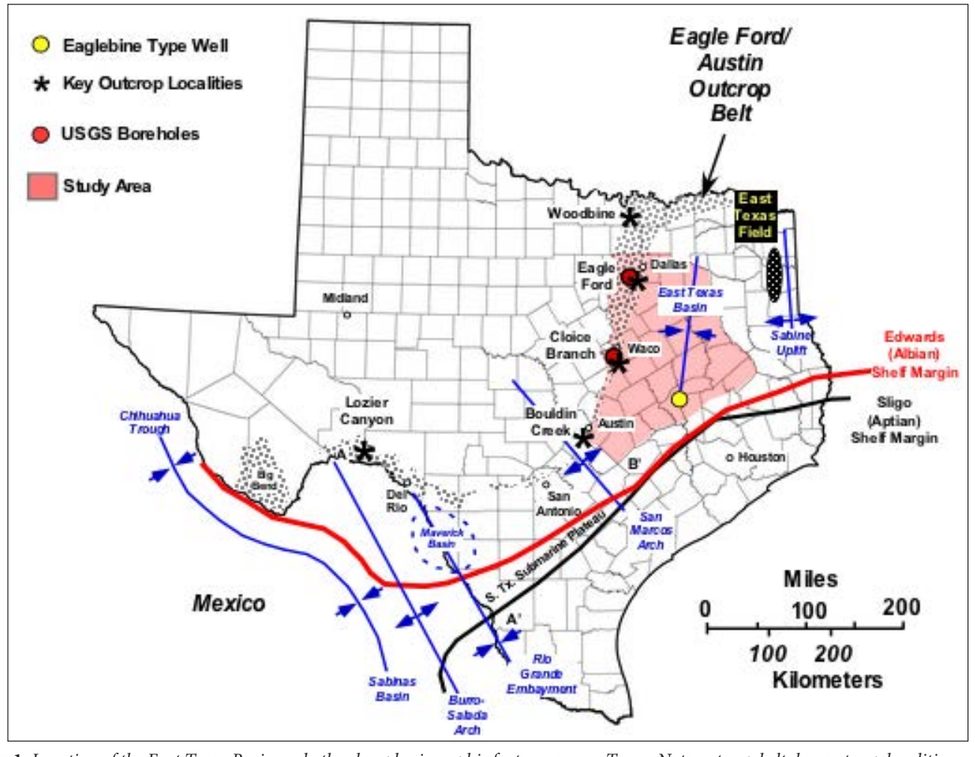

Figure 1. *Location of the East Texas Basin and other key physiographic features across Texas. Note outcrop belt, key outcrop localities, location of USGS boreholes, and "Eaglebine" study area highlighted in red. After Donovan and others, 2015.*

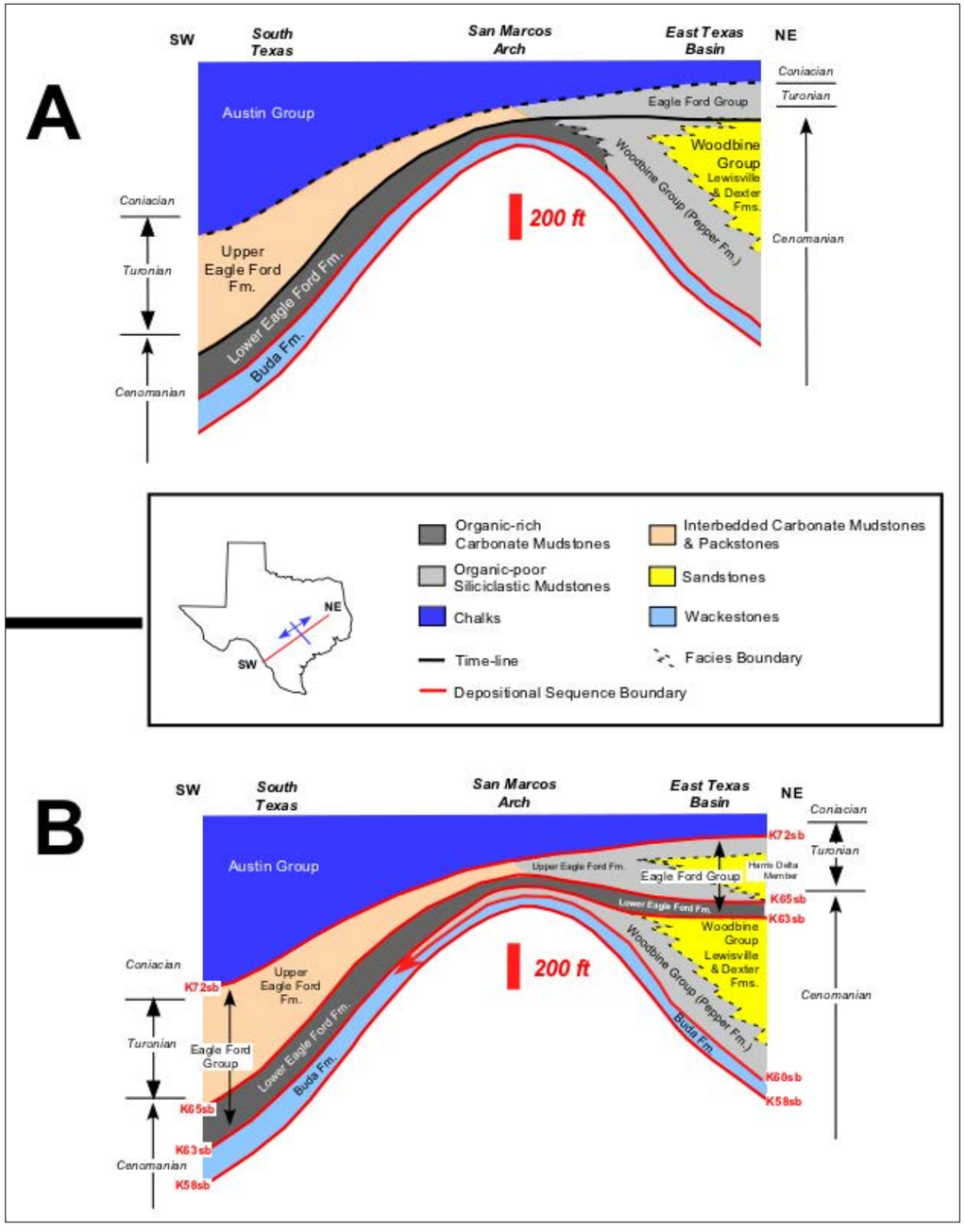

Figure 2. *A) Stratigraphic relationships proposed by Adkins and Lozo (1951), as well as Donovan and others (2015). In this scenario, the Eagle Ford Group is a coeval unconformity-bounded unit across the state of Texas, and the Woodbine Group is an older unconformity-bounded chronostratigraphic unit. B) Stratigraphic relationships proposed by Hentz and others (2014). In this scenario, The Lower Eagle Formation in South Texas is equivalent to the Woodbine Group in the East Texas Basin, and the Upper Eagle Ford Formation in South Texas is equivalent to the Eagle Ford Group in the East Texas Basin.*

HGS General Luncheon *continued on page 24*

HGS General Luncheon Meeting

HGS General Luncheon continued from page 23

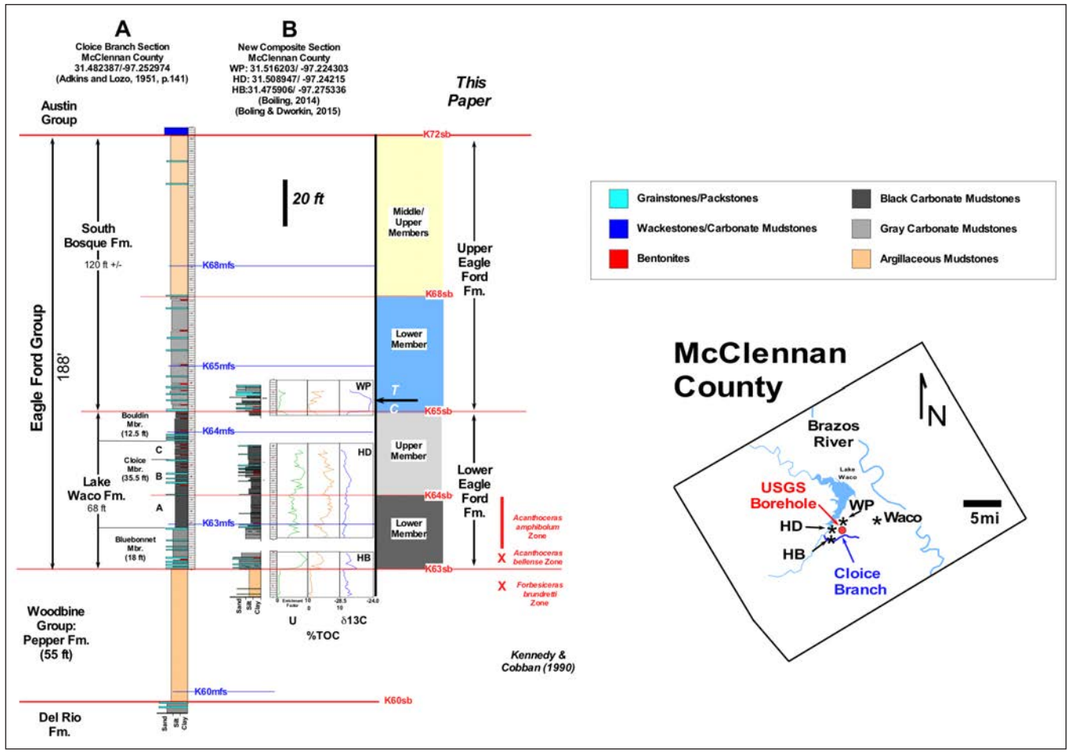

Figure 3. *Lithologic and geochemical characteristic of the Woodbine and Eagle Ford Group near Waco, Texas (after Donovan and others, 2015)*

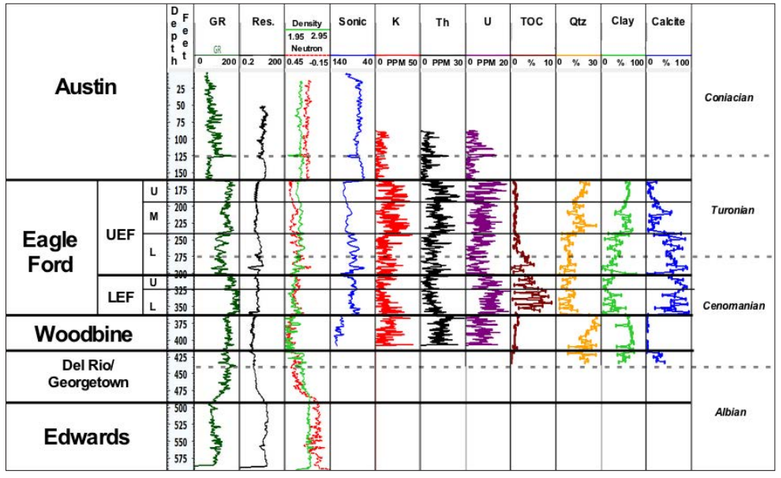

Figure 4. *Petro-physical and geochemical data from the USGS GCA-1 Waco Borehole. Please note the characteristics of the various stratigraphic units, especially the differences between the TOC-poor, clay- and quartz-rich Woodbine, and TOC- and calcite-rich, as well as clay- and quartz-poor Lower Eagle Ford. Data courtesy of the USGS Gulf Coast Assessment Group.*

the Woodbine Group consists of argillaceous and organic-poor mudstones, which transition both vertically and laterally into more sandstone-prone strata into the subsurface and outcrops to the east and north. These Woodbine mudstones have distinctive low to moderate gamma-ray and low resistivity values on geophysical logs (**Figure 4**). Across the outcrop belt (**Figure 3**) as well as in the subsurface (**Figure 4**), Woodbine strata are unconformably overlain by high gamma-ray and resistivity, organic-rich calcareous mudstones in the basal portions of the Lower Eagle Ford Group. The Lower Eagle Ford Formation is overlain by the more carbonate-prone strata in the basal portions of the Upper

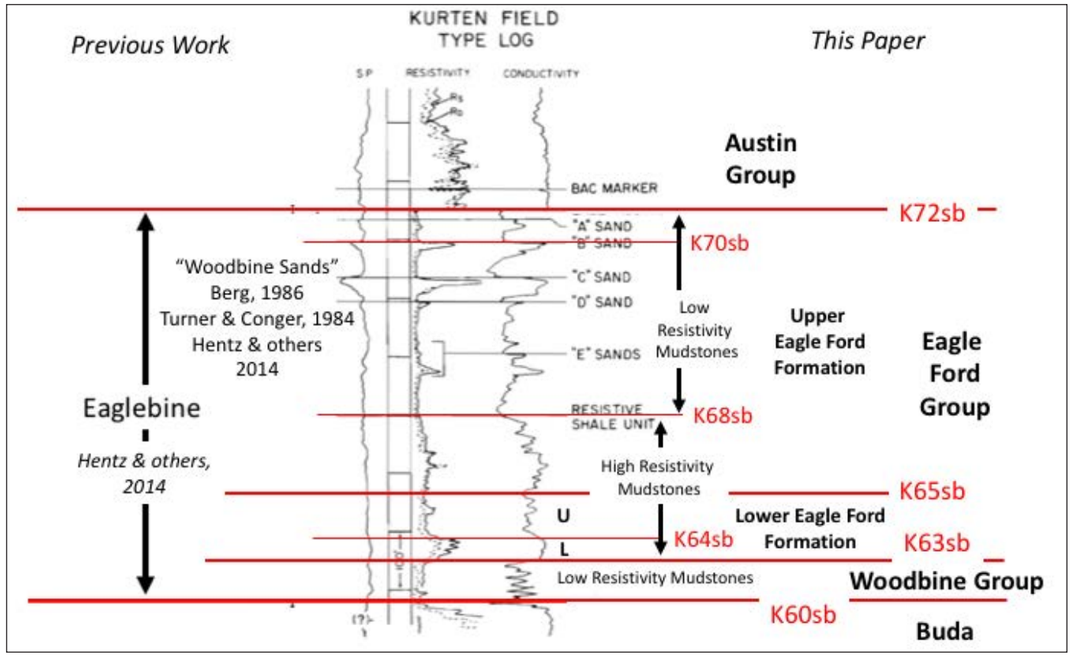

Figure 5. *Subsurface stratigraphy of Kurten Field (Brazos County), proposed in previous work, as well as this stud (after Turner and Conger, 1984; Berg, 1986; and Hentz and others, 2014)*

Eagle Ford Formation, the base of which is marked by a distinct decrease in gamma ray values, driven by a decrease in Uranium content (**Figures 3** and **4**). The positive δ13C excursion, associated with the OAE2, as well as the base Turonian, also occurs in the basal portions of the Upper Eagle Ford Formation in the outcrops near Waco (**Figure 3**) and elsewhere across Texas (Donovan and others, 2016).

In the southern subsurface portions of the East Texas Basin, however, a great deal of confusion exists as to what constitutes the Woodbine and Eagle Ford Groups, leading to the common subsurface practice of simply referring to entire succession as the "Eaglebine" (**Figure 5**). This confusion, however, is largely a result of the common subsurface practice of referring to every sandstone-prone interval between the Buda and Austin, as a Woodbine Sandstone (**Figure 5**). The net effect of this approach results in having Middle Turonian-aged "Woodbine" Sandstones occurring stratigraphically above Middle Cenomanian to Middle Turonian mudstones, which are included within the Eagle Ford Group in outcrops along the western margin of the basin.

An integrated sequence- and chemo-stratigraphic framework, which stresses chronostratigraphic-surfaces over time-transgressive lithofacies, demonstrates that the unconformity-bounded Woodbine and Eagle Ford Groups, as defined in outcrops along the western margin of the basin, can also be differentiated and mapped in the subsurface of the East Texas Basin. Employing this integrated sequence stratigraphic approach: 1) permits consistent outcrop-to-subsurface correlations of the Woodbine and Eagle Ford Groups across the East Texas Basin; 2) allows improved chronostratigraphic paleo-geographic mapping, as well as improved depo-center delineation through time; and 3) provides a clear chronostratigraphic framework to define Cenomanian and Turonian source rock and tight rock plays and play fairways within the study area. Within this chronostratigraphic framework, the Late Middle Cenomanian organic-rich Lower Eagle Ford Source Rock Play can be defined and mapped in the southwest and southern portion of the basin (**Figure 6**). The distribution of this source rock play is controlled by onlap onto the physiographic relief of the depositional shelf and seafloor breaks associated with the down-dip limits of the underlying Early Cenomanian to Earliest Middle Cenomanian Woodbine (Freestone) Delta, whose associated (northerly derived) shoreline and fluvial plays are also controlled by the downdip limits of the same depositional shelf break. Finally, this framework finally permits the clear delineation of the paleogeography of the Upper Eagle Ford, Turonian-age, Harris Delta Complex, which progrades into the basin from its southeast margin. ■

HGS General Luncheon *continued on page 26*

HGS General Luncheon continued from page 25

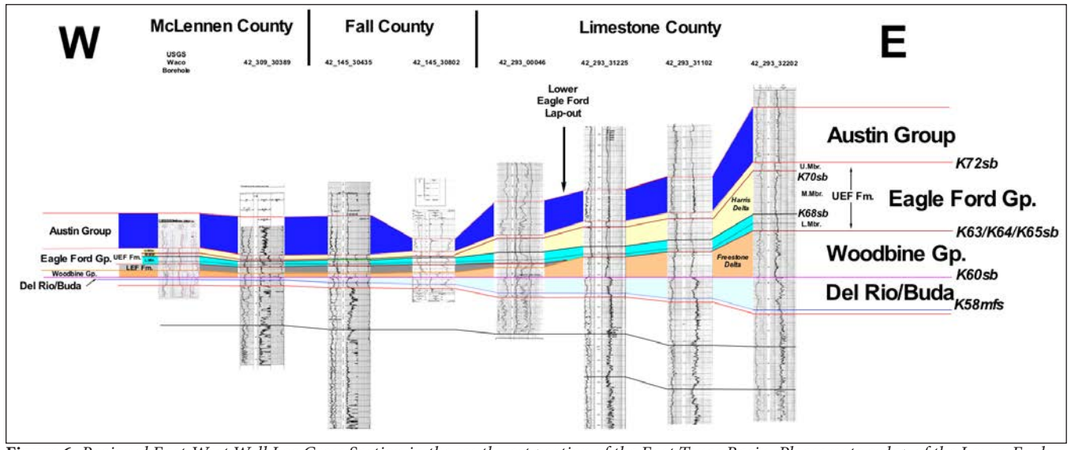

Figure 6. *Regional East-West Well Log Cross Section in the southwest portion of the East Texas Basin. Please note onlap of the Lower Eagle Ford Formation (gray unit) from west to east, as well as the distribution of the carbonate-prone Lower Member of the Upper Eagle Ford Formation (aqua unit) which can be used to separate the Woodbine Freestone Delta (orange unit), from the Eagle Ford Harris Delta (yellow unit).*

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Biographical Sketch

Dr. Art Donovan received his PhD at the Colorado School of Mines in 1984, where his dissertation research was one of the pioneering efforts to apply sequence stratigraphic concepts to outcrops and the shallow subsurface. Upon graduation, he took a position with Exxon Production Research Company where had the opportunity to conduct and manage sequence and seismic stratigraphic studies from basin around the world, as well as conduct research and training for Exxon. In 2000, Art left ExxonMobil to work for BP. At BP, he served sequentially as 1) the Sed/Strat discipline lead, 2) a member of the Global Exploration Assurance Team, and 3) Senior Geoscience Advisor for BP's Global Unconventional Exploration/Appraisal Efforts. During his time at BP, he led their entry into the Eagle Ford Play in South Texas, as well as well as their research activities on the coeval outcrops in West Texas. During his career in the oil and gas industry, Art published numerous articles on the basics and utilization of sequence stratigraphic concepts, as well as taught and led sequence stratigraphic short courses, and field seminars, for GSA, AAPG, SEPM, and The Geological Society.

After retiring from BP in 2016, Art joined the Department of Geology and Geophysics at Texas A&M University (TAMU) as a full-time faculty member. His research and teaching focus is centered on explaining and predicting the distribution, thickness, and effectiveness of conventional and unconventional reservoirs across their respective play fairways. At TAMU, Art is also the Director of the Unconventional Reservoirs Outcrop Characterization (UROC) Consortium, whose twin missions are to 1) train the next generation of geoscientists for the oil and gas industry and 2) bring the outcrop equivalents of key unconventional plays into the 21st century using modern petrophysical, chemo-stratigraphic, chrono-stratigraphic, and sequence stratigraphic techniques. Presently the UROC Consortium is focused on outcrop and subsurface studies of the Early Permian Unconventional Reservoirs in the Permian Basin, as well as Late Cretaceous Unconventional Reservoirs across Texas.

Early Career Quiz

This is a recollection of useful tools no longer in common use.
It is encouraged to ask a colleague to talk about this.

The winner of a HGS meeting registration is the first respondent to editor.hgs@hgs.org that:

1. Correctly names the items in the picture,

2. Explains their use, and

3. Has worked the fewest number of years and months as a professional geoscientist.

Send your answers to: editor.hgs@hgs.org. Have fun.

November 2018

GeoEvents

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	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 office@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.**		1	2 **Don't wait, make your reservations online at hgs.org**	3
4	5	6 **HGS Board Meeting** *6 p.m.*	7	8	9 **Houston Gem & Mineral Society 65th Annual Gem, Mineral, Jewelry & Fossil Show** *Humble Convention Center, Page 17*	10
11	12 **Joint HGS General, International and North American Dinner Meeting** ***Annual Sheriff Lecture*** *"Navigating Messy Rock Physics Problems," Gary Mavko, Page 16*	13	14 **HGS Environmental & Engineering Dinner Meeting** *"A 2-D Electrical Resistivity Survey of a Pipeline Crossing on the Colorado River, San Saba and Burnet Counties, Texas," Brad L. Cross, Page 19*	15	16	17
18	19	20 **Northsiders Luncheon Meeting** *"Dynamic Topography: How Mantle Convection Generates Accommodation Space and Leaves a Trace in the Geologic Record," Lorenzo Colli, Page 20*	21 **HGS Office closed**	22 *Thanksgiving Day* **HGS Office closed**	23 **HGS Office closed**	24
25	26	27	28 **HGS General Luncheon Meeting** *"Unraveling the Secrets of the "Eaglebine": Using Sequence- and Chemo-Stratigraphy to Differentiate Unconventional Plays and Play Fairways within the Woodbine and Eagle Ford Groups in the East Texas Basin," Art.D. Donovan Page 22*	29	30	**Members Pre-registered Prices:** Dinner Meetings members..... $40 Emeritus/Honorary members..... $40 Student members ..... $10 Nonmembers & walk-ups ..... $45 Except - Env. & Eng. ..... $30 Nonmembers & walk-ups ..... $35 Emeritus/Honorary members..... $15

November 4 – 7, 2018
AAPG 2018 International Conference & Exhibition
Cape Town, South Africa

March 23 – 31, 2019
Explore the Solitario Flatirons with HGS Fieldtrip
Big Bend Ranch State Park, Page 6

May 19 – 22, 2019
AAPG 2019 Annual Convention & Exhibition
San Antonio, Texas, USA

July 22 – 24, 2019
Unconventional Resources Technology Conference (URTeC 2019)
Denver, Colorado

Lessons from a Career

by Jeff Lund

Lesson: Sometimes a disappointing assignment will come back as a reward!

Early in my Amoco career I was bitterly disappointed to find out that I was being assigned to the Permian Basin instead of the exciting new Offshore Gulf of Mexico exploration team when our office reorganized. I worked the Midland Basin for 2 or 3 years, learning about carbonate reservoirs and how to use subsurface cross sections as a critical exploration tool. I made many trips to wellsit, witness openhole DSTs, and pick conventional core points.

Shortly after that I changed jobs to finally get in on all the offshore exploration "romance". 40 years (and several jobs) later a prospect in the southern Midland Basin crossed my desk which was a dead-ringer for a stratigraphic Wolfcamp field I had worked at Amoco. Recognizing the potential the prospect had, which was not captured in the generator's presentation, I convinced business partners and clients to take the deal. Five years later we were still drilling development wells!

Lesson: Sometimes the leader has a good idea despite his staff's "expert opinions"

Burlington Resource's predecessor company had the commanding mineral ownership position in the Williston Basin, a legacy of the building of the Northern Pacific Railroad. The Williston was considered an unexciting place until our CEO "suggested" the local office try drilling the first horizontal Bakken well in the mid 1980s. Few observers today recognize how the Bakken horizontal drilling story started. Despite no geosteering technology, and before staged fracking was practiced, productivity increased, and the rest is history.

The same company inherited a huge acreage position in the San Juan Basin Cretaceous Mesa Verde play which had the annoying trouble zone called the Fruitland Formation. Another unexciting place until the same CEO "suggested" the Farmington office try a completion in the Fruitland and the most prolific coalbed methane play in history resulted.

Lesson: The "Super Basin" concept is real, but timing is everything

Ashland exited the "dead" Appalachian Basin where it operated thousands of marginal Devonian Shale shallow vertical gas wells, some dating back to the 1800s. The company exited their huge legacy Held-By-Production acreage position and the successor found they owned a key position in the "new" horizontal Marcellus Shale play. Both parties were surprised. Colonel Drake must be smiling.

Lesson: Serendipity is real and it's helped by broad experience and going back to basics

A consulting assignment led me to help a fellow geologist sell a deep prospect in south Texas. A disappointing and expensive wildcat proved non-commercial, was plugged and the acreage nearly allowed to expire. However, the well had mud log shows in the Eagle Ford Shale, and some on-trend operators were rumored to actually be making Eagle Ford oil completions. The "wisdom" at the time was maybe Eagle Ford gas was commercial but no hope for oil from tight reservoirs!

After some technical homework, geochemistry on cuttings, lease renewal and searching for new participants, the project ended up as an Eagle Ford "oil window" development with dozens of horizontal producers and only one unsuccessful well (guess which one?). ■

Note: Jeff Lund has received the Gerald A. Cooley Award, was HGS President 1997-98, is an Honorary Life Member, and joined HGS in 1972.

Submissions of *Lessons from a Career* may be sent to: Editor.hgs@hgs.org.

HGS Golf Tournament

The HGS Golf Tournament was held at Sterling Country Club on October 22nd. There were 124 total participants, with 13 sponsoring companies and many volunteers hosting the event. The event itself raised over $10k for the Houston Geological Society.

1st Place Team
Nate Lenz – TGS
Preston Haygood – Core Lab
Matt Tyrell – PGS

2nd Place Team
Stanley Stackhouse – BXP Ltd.
Elliot Wall – Core Lab
Tom Tierney
Tyler Engelhardt – Oasis Energy

3rd Place Team
Linda Santiago – TGS
Andrew Mehlop
Forrest Burton – Anadarko
Adam Majeski – Anadarko

Longest Drive Luke Fidler – Range Resources

Closest to the Pin Ton Schuessler – Exxon Mobil

Longest Drive Joe Landry – PGS

Closest to the Pin Stanley Stackhouse – BXP Ltd.

Thanks to our Sponsors!

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Lone Star Beer
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Oasis Petroleum
Weatherford Labs

1st Place Team Winners

2nd Place Team Winners

3rd Place Team Winners

Government Update

*by **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 Geoscience Policy Monthly Review (August 2018)

EPA Acting Administrator Testifies Before Senate Committee on Agency Operations

Andrew Wheeler, the acting administrator of the Environmental Protection Agency (EPA), appeared before the Senate Committee on Environment and Public Works on August 1 to discuss the EPA's priorities going forward under President Donald Trump. Wheeler assumed his current position after Scott Pruitt resigned from his position as EPA Administrator on July 6, 2018. During the hearing, Wheeler emphasized the EPA's focus on certainty and transparency, specifically in risk communication, enforcement and regulation, and communications with state and local governments.

During questioning, Wheeler committed to allow experts, such as scientists and professional staff, to give unrestricted information in the EPA decision-making process and to attend policy conferences.

When asked by Senator Shelley Capito (R-WV) to outline his perspectives on the future of the coal industry and its relationship with the environment, Wheeler responded that it is not the role of the EPA to "pick winners and losers" in energy. "It is very important that we don't enact regulations that penalize (or emphasize) one energy source over another," he stated. Wheeler later clarified that a polluting energy source bearing a regulatory burden due to its pollution would not constitute promoting one energy source over another.

Senator Sheldon Whitehouse (D-RI) asked why environmental regulation enforcement and fining decreased by 30 percent and 50 percent, respectively, in the first nine months of President Donald Trump's administration compared to those of the Bush administration. Senator Whitehouse related this trend to a 2017 EPA Office of Enforcement and Compliance (OECA) memo requiring headquarters' approval of all information requests proposed by regional EPA agencies, meaning that regional EPA offices would have to obtain approval from the national level before requesting information related to ongoing regulatory investigations. According to Senator Whitehouse, this review requirement "[hinders] the prerogative of the regional agencies on getting information about potential violations." Wheeler responded that he was not aware of the memo or if it is still in effect. However, Wheeler noted that there was no Senate-confirmed head of OECA until December 2017 and posited that as a reason for the lower enforcement and fining rates.

EPA Releases Revamped Regulations on Emissions from Coal Power Plants and Passenger Vehicles

Pursuant to President Donald Trump's executive order (E.O. 13783) promoting energy independence and economic growth, the Environmental Protection Agency (EPA) proposed a new rule on August 21 to reduce greenhouse gas (GHG) emissions from existing coal-fired electric utility generating units and power plants across the country. The Affordable Clean Energy (ACE) Rule would establish emission guidelines for states to develop plans to address GHG emissions from existing coal-fired power plants, replacing former President Barack Obama's 2015 Clean Power Plan (CPP) Rule.

In early 2016, the Supreme Court halted the implementation of the CPP pending further review, and in late 2017 the EPA proposed to repeal the CPP rule after determining that the rule exceeded the EPA's authority. In December 2017, the EPA issued an Advance Notice of Proposed Rulemaking to solicit information from the public to replace the rule, receiving over 270,000 public comments during the 60-day comment period.

While the CPP sought to regulate emissions by considering reductions across an entire electric sector that would drive a shift to renewable energy sources, the ACE rule would define the best system of emission reduction at the plant-specific level, prompting coal-fired power plant owners to implement heat rate improvements from a range of options, so called "candidate technologies," within the fence-lines of their plants. The states will have three years from the date of the final rule to submit a plan that determines what candidate technologies outlined by the EPA will be applied to their power plant sources and what emissions reductions will result. The ACE rule would also exempt power plants that operate one-third of the time or less from implementing heat rate improvements, and would provide more flexibility to the New Source Review (NSR) permitting program that determines if major renovations, such as efficiency projects, would cause a significant net increase to a factory's emissions.

Along with the ACE rule, the EPA released a 289-page analysis of the rule including effects on the nation's economy and health, which can be compared to a previous analysis for the CPP. The EPA will accept comments on the proposed Affordable Clean Energy rule through October 30, 2018. A public hearing will also be announced in the Federal Register.

Government Update *continued on page 34*

Government Update continued from page 33

Three days after proposing the ACE rule, the EPA and National Highway Traffic Safety Administration (NHTSA) issued a notice of proposed rulemaking called "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks." Pursuant to the instructions of former EPA Administrator Scott Pruitt to revise the Obama-era rule, this rule would amend Corporate Average Fuel Economy (CAFE) and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards for model years 2021 through 2026.

The proposal outlines that the agencies' preferred rule is to maintain the model year 2020 standards until 2026, but a range of alternatives are presented for public comment. The SAFE rulemaking also proposes to withdraw California's Clean Air Act preemption waiver, which allows California to impose stricter standards for vehicle emissions of certain pollutants than federal requirements. California's standards have been adopted by thirteen states plus the District of Columbia, representing 35 percent of the automobile market.

BLM Releases Management Plans for Lands Associated with Reduced National Monuments in Utah

The Bureau of Land Management (BLM) released draft management plans on August 17, 2018, for the revised Bears Ears (83 FR 41111) and Grand Staircase-Escalante (83 FR 41108) National Monuments that aim to provide more flexibility for the use and management of these public lands. The draft plans utilize a less restrictive management strategy and generally focus on maximizing resource development, recreation, and other uses, while still providing for resource protection. These plans were developed following President Donald Trump's removal of more than 2 million acres from the two Utah monuments in December 2017—the largest reversal of federal monument protections in U.S. history. For Grand Staircase-Escalante, the plans also evaluate lands now excluded from the monument boundaries after its reduction.

According to BLM, the purpose of this planning effort is to provide proper protection and care of the scientific, cultural, and historic resources identified in the original proclamations establishing these two monuments, as modified by President Trump. The draft plans provide alternatives to address issues that were identified through a public scoping process. Those issues include management of paleontological and cultural resources, recreation and access, livestock grazing, and natural resources such as water, vegetation, soil, and minerals.

BLM is accepting public comments on the Bears Ears management plans through November 15, 2018 (documents available at https://goo.gl/uLrEae) and the Grand Staircase-Escalante management plans through November 30, 2018 (documents available at https://goo.gl/EHvhbc). The agency particularly seeks feedback concerning the management alternatives described in the draft plans, the analysis of their respective management strategies, and any new information that would help to produce the Proposed Resource Management Plans and Final Environmental Impact Statements.

Senate Committee Advances Space and Coastal Community Bills

On August 1, 2018 the Senate Committee on Commerce, Science, and Transportation amended and advanced several bills to the Senate calendar. Among these bills were the Space Frontier Act (S. 3277), the Waterfront Community Revitalization and Resiliency Act (S. 3265), and the COASTAL Implementation Act (S.2242).

The Space Frontier Act was introduced by Senator Ted Cruz (R-TX) and co-sponsored by Senators Bill Nelson (D-FL) and Edward Markey (D-MA). The bill seeks to enable commercial space activities by streamlining processes such as applications and safety approvals for a commercial space launch. Under this legislation, the National Aeronautics and Space Administration (NASA) would also create an accessible and searchable list of all NASA assets, services, and capabilities that are available for public-private partnerships.

The Waterfront Community Revitalization and Resiliency Act, introduced by Senator Tammy Baldwin (D-WI), invites waterfront communities to self-nominate themselves as "resilient waterfront communities" and create voluntary plans for improving their resiliency and vitality. To participate in the ten-year program, a waterfront community must have an eligible resilient waterfront community plan approved by the Secretary of Commerce. Plans must include consideration for economic opportunities, ecosystem challenges, sustainable infrastructure maintenance, and health and societal impacts. Under its existing authorities, the Commerce Department would provide support for the enactment of community plans and create a network of resilient waterfront communities to facilitate the sharing of best practices.

The COASTAL Implementation Act introduced by Senator Roger Wicker (R-MS) would extend the deadline for the development of the Named Storm Event Model for assessing water- and wind-related damage from coastal storms. The act would require the Administrator of the National Oceanic and Atmospheric Administration (NOAA) to establish this model by June 1, 2019, and to seek public input before the Named Storm Event Model, or any modification of to this model, may take effect. The bill also allows the Administrator to deploy additional sensors for data collection in areas determined to be at higher risk of experiencing potentially devastating storms.

South Carolina District Court reinstates the Clean Water Act WOTUS rule in twenty-six states

On August 16, 2018 the South Carolina District Court ruled that President Donald Trump's Executive Order 13778 to suspend the Obama Administration's Clean Water Rule was in violation of the Administrative Procedure Act.

Finalized in 2015, the Clean Water Rule—also called the Waters of the United States or WOTUS rule—clarified the scope of federal water protected under the Clean Water Act, which prohibits the discharge of pollutants from a point source into navigable waters without a permit from the Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE). The 2015 WOTUS rule, defining "waters of the United States" as bodies of water that fall under U.S. federal jurisdiction, expanded the previous definition of navigable and associated waters to encompass small streams and wetlands that were previously not included. Complex legal battles have erupted since 2015 over implementation of the WOTUS rule and resulted in ongoing uncertainty regarding the legality of enforcing the rule across the country.

Following President Trump's executive order, the EPA and USACE finalized a rule in February 2018 delaying the applicability date of the WOTUS rule until 2020. The delay reinstated the previous definition of navigable waters protected by the Clean Water Act, while the agencies undertake a complex rulemaking process to redefine these protected water bodies.

In ruling on South Carolina Coastal Conservation League, et. al. v. Scott Pruitt, et. al., the District Court found that the rulemaking to delay the applicability date was (1) issued without providing for meaningful opportunity for public comment because the government did not solicit or consider any substantive comments on the change of regulatory definition, and (2) "arbitrary and capricious" because the agencies did not provide a reasoned analysis supporting it. The nationwide halt of the applicability date rule effectively reinstates the WOTUS rule in twenty-six states: California, Connecticut, Delaware, Hawaii, Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Vermont, Virginia, and Washington.

Previous rulings by the North Dakota and Georgia District Courts have stopped implementation of the WOTUS rule in the remaining twenty-four U.S. states. The states of Texas, Louisiana, and Mississippi, and several farm industry groups have filed a motion to the District Court for the Southern District of Texas to halt the rule nationwide. In response to the South Carolina Ruling, the Department of Justice (DOJ) filed a request to the South Texas court supporting a nationwide stay saying that the injunction created a regulatory patchwork that does not serve the public interest. DOJ is also expected to appeal the ruling to the 4th U.S. Circuit Court of Appeals.

Senate Subcommittee Holds Hearing on Algal Bloom Monitoring and Impacts

On August 28, 2018 the Senate Commerce Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard held a hearing on U.S. Harmful Algal Bloom (HAB) events and the status of the algal-bloom research, technology, and monitoring techniques. HABs are overgrown colonies of harmful algae that can debilitate and kill other organisms, ranging from fish to humans. While HABs can occur naturally, they are also linked to higher water temperature or excessive influx of nutrients that are often sourced from runoff from farmlands and lawns.

During opening remarks, senators highlighted the health, economic, and cultural impact impacts from HABs in Wisconsin, Alaska, and Florida. However, according to Chair Dan Sullivan (R-AK), almost every state in the country experiences some type of HAB, which are occurring at an increasing rate.

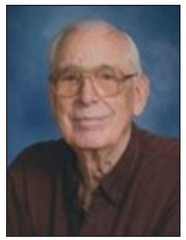
Last September, the Senate unanimously passed the Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2017 (S. 1057). The bipartisan bill would direct the National Oceanic and Atmospheric Administration (NOAA) to provide grants oriented towards HAB intervention and mitigation methods and technical assistance on HAB's to other non-federal governments. The bill would also reauthorize the national algal bloom and hypoxia program, which expires on September 30, 2018. Senators Sullivan and Bill Nelson (D-FL) urged the House to pass similar legislation introduced this July (H.R. 6645), which mandates a federal action plan to address HABs in the Everglades in addition to the actions already outlined in the Senate bill.

During questioning, Senator Ed Markey (D-MA) asked Dr. Don Anderson, Senior Scientist of the Woods Hole Oceanographic Institution, about the occurrence and severity of HABs. "The case in fresh water is crystal clear, warmth is contributing to the problem," Dr. Anderson responded. "In the marine realm we are seeing (the impact) more as a movement of species. If it gets too warm, some species may not be able to thrive…and will move north." Anderson also expressed concern for algal blooms that are moving into Alaska, calling it the biggest threat to Alaskan ecosystems and indigenous communities from invasive species.

Dr. Anderson also advocated for increased levels of funding for HAB research, saying that current levels fluctuate and "remain well below what is needed for dealing with HAB," and that reauthorization of the algal bloom program would help maintain funding allocations from federal agencies. Brian Stubbs of the Cleveland Water Alliance called for more research on technological mitigation and innovation, particularly at upstream contributors like farms. "We all eat… but we need to do it smarter," Stubbs stated. Going forward, Stubbs said that creating more affordable, real-time HAB detectors would be crucial to mitigating the impacts of HABs.

Remembrance

Harry Arthur Vest
1928-2017



Harry A. Vest, age 89, passed away on Sunday, December 31, 2017. He was born in Pond Creek, Oklahoma on December 25, 1928. He graduated from Oklahoma A&M College in 1951 with a BS in Geology and in 1957 received his MA in Geology/Petroleum Engineering from The University of Texas at Austin.

In 1960 he went to work for Continental Oil Company in Libya where he met his wife Zoe in Tripoli and they were married in Rotterdam, the Netherlands on December 28, 1965. Working for Conoco, he transferred to Dubai in 1966 where he was one of the geologists on the Fateh oil field discovery well, a discovery that helped launch Dubai into its oil era. He would go on to serve as Chief Geologist for Dubai Petroleum Company from 1969 to 1982. After transferring to Houston, TX in 1982 he retired in 1985 and lived the rest of his life in Houston. He was a member of the AAPG, AIME, and a longtime member of the Houston Geological Society.

He is survived by wife of 52 years Zoe Vest and their three sons and families. Zoe is a volunteer at the spaghetti lunch at the St. Basil Orthodox Greek church on Eldridge. ■

HGS Welcomes New Members

New Members Effective October 2018

ACTIVE MEMBERS

Ralph Baird
Annette Borkowski
Julie Bruhn
Drew Cochran
Steven Crews
Jovencio Esquito
Carlos Ferro
Amber Gonzalez Beaumont
Halina Haider
Colleen Klockow
Kirk Kolar
Robert Kust
Olga Lentz
Joan Lindsey
Shane Moreno
Brandon Myers
David Perez
John Pritchett
Thomas Simon
Virginia Sisson
Parke Snavely
Maria Wedding

ASSOCIATE MEMBERS

John Humble

EMERITUS MEMBERS

Tarek Ghazi
Charles Green

STUDENT MEMBERS

Kennedy Ajavon
Carianna Herrera
Grant Whittle
Ben Richards

Welcome New Members

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 CD in Word format with a hard copy printout to the Editor.

Figures, maps, diagrams, etc., should be digital files using Adobe Illustrator or Adobe Photoshop. Files should be saved and submitted in .ai, .eps, .tif or .jpg format. Send them as separate attachments via email or CD if they are larger than 5 MEGs 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 .tif, .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 5 MB) or on CD or DVD.

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9	$800	$1,300	$2,500	$4,700						
8	$750	$1,250	$2,250	$4,300						
7	$600	$1,100	$2,200	$3,850						
6	$550	$950	$1,800	$3,500						$2,000
5	$500	$800	$1,600	$3,000	$4,700	$4,500	$4,350	$4,000		
4	$450	$650	$1,300	$2,500						
3	$300	$550	$950	$2,000						$1,000
2	$250	$400	$700	$1,500						
1	$150	$250	$450	$1,000	$1,500	$1,400	$1,250	$1,000	$1,250	$850
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Vendor Corner	$250 *4 Pack option with 1 FREE bonus event for $1000.00 available. Send request to vendorcorner@hgs.org.	Company logo, company website, and company description will be highlighted on HGS Calendar website event. This is an opportunity to display company wares, gain personnel exposure and hand out product information at HGS dinner meetings.
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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 $30.00; emeritus members pay $15.00; students are free.

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

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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*** _____

revised 5/02/17

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