

WELCOME, NEW DEG OFFICERS!

We are pleased to introduce the members of our 2014-15 DEG Executive Committee:

President

Jeffrey G. Paine,
*Bureau of Economic
Geology, The
University of Texas*

Vice

**President
Dirk A. Nieuwland,**
*NewTec
International BV.*

Secretary- Treasurer

Steven P. Tischer,
ConocoPhillips Co.

President-Elect (2015-2016)

Jeffrey B. Aldrich,
*MHA Petroleum
Consultants*

Past President

Douglas E. Wyatt,
Halliburton

Editor-in-Chief

Michele L. Cooney,
*Pennsylvania
Geological Survey*

Over the next few issues, *Spheres of Influence* will acquaint you with our new officers. In this issue, we present the biography of our vice president, Dirk A. Nieuwland.

MEET OUR NEW VICE PRESIDENT



Dirk A. Nieuwland

Dirk is a freelance consultant working from his own company "NewTec International B.V." since 1999. Dirk provides advice in the fields of structural geology and geomechanics, and he regularly teaches courses in these subjects.

Dirk received a master's degree in structural geology and sedimentology from the University of Leiden in 1975. He then received a scholarship from the Australian National University, where he obtained his Ph.D. from the Research School of Earth Sciences in 1980. At Shell Research in The Netherlands, he became involved in geomechanics and its application to petroleum systems. He wrote about 80 reports for Shell Research, authored and co-authored some 30 peer-reviewed publications, and edited two Special Publication series books for the Geological Society of London. One of his papers received the Gold Award for best publication of Shell Research in 1993. As Secretary of the Petroleum Geological Society of The Netherlands, he co-organized the first International Petroleum Geology Conference in The Netherlands (1983).

As a consultant, Dirk was instrumental in solving long-standing field development problems for a large oilfield of SonaHess in Algeria, which resulted in the proposal for an

exploration well that ultimately added 1 billion barrels of oil to the reserves. For a client in Yemen, he predicted the location, orientation, and depth of open fractures in granite basement. Dirk has developed a geomechanical fault seal prediction method that has been tested and proven in many field cases since its first application in 2007.

Dirk's current focus is on geomechanical issues and seismicity associated with gas storage in depleted gas fields. The gas storage project has afforded Dirk the opportunity to be closely involved with microseismic monitoring.

As a geomechanics specialist, Dirk is interested in hydraulic fracturing and the perceived effects of this technique on the environment. Better and broader education of the general public on the impact of subsurface projects on the near-surface and surface environment have his special interest.



FROM THE EDITOR-IN-CHIEF'S DESK

**Michele L. Cooney**

Greetings! My name is Michele Cooney, and I have recently been appointed as your new Editor-in-Chief, after having served as the journal's Special Issues Editor for the past two years. Kristin Carter stepped down from this position in late July due to increased workload associated with her Assistant State Geologist position. She will remain onboard with the Editorial Committee, though, as Managing Editor for the next couple years.

The December issue of *Environmental Geosciences* will wrap up another wonderful year of thought-provoking science and impressive manuscripts! Readers can look forward to James Rine's evaluation of the economics of climate change and the impact of government response on the petroleum industry by examining fossil fuel production numbers, emissions, and how regulations may affect future production. In the meantime, you will get a sneak peak of this discussion when you read Jim's editorial on carbon, taxes, and attitudes toward global warming in this newsletter. Our second manuscript from George Case, Amy Weislogel, and Keith Coffindaffer explores the characterization of diagenetic properties for predicting post-CO₂ injection changes in the Donovan Sand member of the Rodessa Formation in Alabama.

Thank you to all of our authors, readers, and staff for another successful year of *Environmental Geosciences*!

DEG MISSION STATEMENT AND PURPOSE

- **EDUCATING** the membership of AAPG and the general public about important issues that affect petroleum energy minerals exploration and production.
- **COMMUNICATING** to the general public and government agencies the Association's commitment to protect the environment while developing the world's natural resources in a responsible manner.
- **APPLYING** the expertise developed in the petroleum/energy minerals industries and hydrogeology to resolve environmental problems.
- **PROMOTING** environmental self-regulation within the petroleum/energy minerals industries.
- **PROVIDING** relevant educational opportunities and services for professional development of the AAPG membership through seminars and conferences in environmental geosciences, hydrogeology and related fields.

CARBON, TAXES, ATTITUDES TO GLOBAL WARMING, AND AAPG

**Contributor's Comments by James M. Rine (Member of DEG/AAPG)**

The main theme of the paper "An Examination of Carbon Budgets, Carbon Taxes, Industry Attitudes to Global Warming, and AAPG" (December 2014 *Environmental Geosciences*) is a search for reasons behind AAPG's lack of a public stand regarding anthropogenic climate change. AAPG's current stand can be summarized as "...

research into the basic controls on climate is important" (<http://dpa.aapg.org/gac/statements/climatechange.cfm>). The paper's search is precipitated by a kind of cognitive dissonance that has recently developed within AAPG over this issue. On one hand, a number of large oil companies not only admit to the existence of anthropogenic climate change but are also planning for it. Concurrently a number of senior AAPG members are vocally denying its importance or even the existence global warming.

Instead of discussing the science behind climate change, the paper explores the premise that a major reason AAPG and many of its members either ignore or deny the issue is due to perceived economic self-interests. To address the economics, the paper examines past and projected fossil fuel production statistics, calculating their resulting emissions, and then projects how likely carbon regulations may affect future coal, oil, and natural gas production. The paper then compares AAPG's position with other organizations, especially major energy companies who are apparently concluding that addressing the issue makes more economic sense than ignoring it.

The paper concludes that by ignoring the issue of climate change, AAPG is benefiting the producers of coal over the producers of oil and natural gas. Coal is the proverbial "800 pound guerilla" on the global warming stage. Based on correlations of past and future CO₂ fossil fuel emissions with a widely cited climate model (Meinshausen and others, 2009), the paper hypothesizes that all proven global reserves of oil and natural gas (as of 2012) could be burned without exceeding a 50% probability of reaching a global temperature rise of 2°C (3.6°F) assuming no additional coal is consumed. Admittedly, a 50-50 chance of the world doing itself serious harm by exceeding 2°C are not odds to be wished on one's children and grandchildren. But if all the proven reserves of coal (which comprises 67% of potential CO₂ emissions) were consumed, our offspring would be figuratively (and perhaps literally) "toast."

Another premise of the paper is that because of impending regulations and other possible economic factors, it doesn't really matter if climate change is real or not. Presently, 167 countries, including the world's largest CO₂ emitters (USA, China, India, and Russia) have formally agreed to limit their CO₂ emissions to avoid a 2°C rise in global temperatures. In addition, some environmental groups are capitalizing on these impending global restrictions by lobbying cities, universities/colleges, and other organizations to divest their investment portfolios of fossil fuel related stocks. The most noteworthy recruits to this campaign are Stanford University and the World Council of Churches, an organization that represents over a half-billion Christians.

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In 2010, then AAPG President John C. Lorenz "sunsetted" AAPG's global climate change committee, stating one reason for not continuing it was that AAPG involvement in the climate change issue would not "create or save jobs in petroleum geology." Hopefully (or unfortunately) it can now be argued that circumstances have changed. AAPG should reestablish its climate change committee, perhaps not only to discuss how AAPG should internally address this issue but also how AAPG can promote our industry has a means to support the world's economies during a collective transition to less carbon-polluting energy sources.

Right: An iconic photo from the NASA Apollo 8 lunar mission shows earth (and its resident humanity) isolated in space.



PETROLEUM FIRSTS ... FIRST RECOGNITION OF THE GREENHOUSE GAS EFFECT



Ray Sorenson

The first recognition of the greenhouse gas effect, where carbon dioxide (CO₂), methane, and water vapor cause atmospheric heating by absorption of solar radiation, has for the past century and a half been routinely credited to John Tyndall, who published several papers on the topic beginning in 1859. Contrary to conventional wisdom, demonstration of this phenomenon

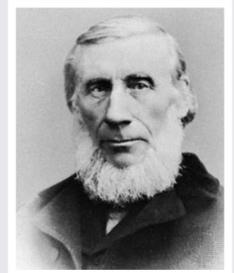
was presented at the annual symposium of the American Association for the Advancement of Science (AAAS) in 1856, two years before Tyndall began his laboratory studies.

Eunice Foote's research showed that when exposed to sunlight, closed vessels enriched in CO₂ or water vapor increased in temperature more rapidly than normal atmospheric air. Speculation followed that this might explain emerging theories that warmer climates in the geological past were associated with higher

atmospheric concentrations of CO₂.

Eunice Foote's talk was presented for her, and no formal publication has been found. Given the restrictive membership policies of AAAS during that time period, it is very possible that women were not permitted to speak at the convention or author papers for the proceedings volume. Fortunately a journalistic summary of her work was included in an annual review of scientific progress, so a record of her accomplishment was preserved for posterity.

A paper with more information on this topic can be found in AAPG Search and Discovery using the following link:
www.searchanddiscovery.com/documents/2011/70092sorenson/ndx_sorenson.pdf



John Tyndall

If you have any petroleum firsts you'd like to share for future issues of *Spheres of Influence*, please send us an email with a description of the "bragging rights" to Kristin Carter.

We welcome your articles, comments and feedback for the quarterly newsletter publication.

Kristin Carter, Managing Editor
1st Quarter submissions deadline is February 1, 2015
Please submit to krcarter@pa.gov



BEAUTY IN GEOLOGY – BLACK HILLS OF SOUTH DAKOTA



The Black Hills, parts of which are found in South Dakota, contain various state and national parks. The Black Hills are well known for two famous monuments carved out of crystalline rock: Mount Rushmore and the Crazy Horse Memorial. These photos were taken by Julianne Gmys, Marietta College, in March 2014.