

# SPHERES OF INFLUENCE

A QUARTERLY NEWSLETTER FOR DEG – 2013 ISSUE 3

## President's Column

Douglas E. Wyatt, Jr., PhD., P.G.



The old joke goes something like this, "How many opinions will you get from any two geologists?" with the typical answer being "at least three, yours, mine and ours". In the DEG how many opinions do we have for the word "environmental" as it applies to oil and gas exploration, production and utilization? I suspect many, but also suspect that there would be a very common theme in all of our opinions, something like 'using sound geological science to make sure things were done in a beneficial environmental manner'. This is our fundamental goal as a Division of the AAPG and in our routine day-to-day work.

The papers in the upcoming journal discuss research that uses sound geological science in the evaluation of two very different reservoirs for potential geological sequestration of CO<sub>2</sub>. Our authors provide a discussion of their research from a CO<sub>2</sub> storage perspective using techniques that are similar to what a production reservoir geologist might use for better oil or gas extraction. Although this may seem an obvious reference the subtle difference is that the general public may view one approach as environmentally friendly (storing CO<sub>2</sub>) and the other as not so friendly (oil production). This can be frustrating but our job as the DEG is to merge these ideas so that the general terms "environmental" and "oil and gas" are not mutually exclusive. I thank our authors for helping us along our way.

## From the Editor-In-Chief's Desk

Kristin M. Carter, P.G.

Our September 2013 issue of *Environmental Geosciences* contains two papers on the subject of geologic carbon sequestration, although their particular areas of focus are unique. Nelson Rono and others delve into geochemical modeling to assess the impact and extent that solubility trapping and mineral precipitation could have on a prospective sequestration reservoir in Missouri, and Tina L. Roberts-Ashby and others evaluate the porosity and geologic storage potential for the Upper Cretaceous Lawson and Paleocene Cedar Keys formations in southern and south-central Florida. We thank our authors for these submissions, and we encourage our readers to contribute to a future issue of *Environmental Geosciences*.





# SPHERES OF INFLUENCE

## Book Review

### Full Rip 9.0: The Next Big Earthquake in the Pacific Northwest

Sandi Doughton  
Sasquatch Books  
288 pages

Sandi Doughton's *Full Rip 9.0* is a history of understanding seismicity in the Pacific Northwest, the ongoing work to understand the Cascadia Subduction Zone (that parallels the shoreline of Oregon and Washington), and what's being done to predict the next mega-quake (magnitude 9.0 earthquake) and tsunami to hit this area. Doughton, a science writer for the *Seattle Times*, prefaces the book with a warning from the past: a description of the magnitude 9.0 megaquake that hit the Pacific Northwest in 1700, considered to be "one of the most ferocious the Earth can yield." Unfortunately details of this event were lost to the point that until the 1960s, people viewed the region as seismically quiet, especially compared to California.

In a before and after fashion, she then jumps to an October 2011 fire sale at the Satsop nuclear plant above Washington's Chehalis Valley where big plans for nuclear power generation have since fizzled due to the diligent work to educate the public on seismic risk in the northwest. For the remainder of the book, Doughton fills in the gap between these two events by weaving historical accounts passed down verbally with scientific advancements from the late 1800s to the present.

The book holds your interest by jumping back and forth between the decades of major events, key players, and scientific advancements that forced an acknowledgment that "the Big One in the Pacific Northwest has the potential to be the most costly and destructive disaster in the history of the United States, both in terms of loss of life and economic damage." Doughton brings to light where we are in our understanding, and what's currently being done, including cutting edge research of seafloor monitoring along the Juan de Fuca Plate.

As with everything, the politics involved make things quite interesting, and Doughton doesn't go politically overboard, but includes enough of the political backstory to round out the context of the situation. She provides details on the push for nuclear power plants in the area to offset the economic impact of the decline of the timber industry, as well as the role of the Cold War and arms race on earthquake research (bomb testing could be done covertly if detonated underground within seconds of an earthquake, which led to an influx of money for testing, analytical methods, and instruments). Not until Alaska's 1964 megaquake did the federal government shift earthquake research motivation from Cold War driven initiatives to prediction and general public protection. At this point, the seismic research in the northwest took off.

Doughton steps through the scientific advancements in mystery novel fashion, building on clues from mapping residential structural damage to field work to gravity measurements to core work to lidar to geophysics to modeling to seafloor monitoring (yes- quite an exhaustive list), but also points out that probably the most requested piece of information is still unattainable—the ability to predict where, when, and how strong the next earthquake will be. When the USGS learned they couldn't predict the next quake, they turned their focus to understanding faults and generating seismic hazard maps that highlight areas where the next earthquakes could occur. The "maximum credible earthquake" approach (still used for critical facilities, including dams and nuclear facilities), combined with probabilistic data from earthquake scenario models, are both used to balance the cost of earthquake preparedness with the benefits.

So where are we now?

Doughton details the area's advancements, including detailed fault and fault zone maps for deep, shallow, and mid-level faults. Discoveries of these shallow and mid-level faults caused a "fundamental rethinking of the seismic risk" in areas where radioactive and toxic waste is currently stored. In response to the decades of discoveries, mapping advancements, and continued change in thinking in this area, the Department of Energy launched new studies to understand seismic risk in this area in 2012, and more regional updated earthquake hazard maps are scheduled to be released in 2014. Doughton also highlights the advancements in commercial and residential building codes, but she is careful to point out that there are still major areas for improvement (especially in the historical brick buildings and newer concrete tilt-up box stores). Seismic retrofits for bridges are also being done (including expansion joints that allow for larger scale panel sliding, shock absorbing bearings added to the concrete supports, additional concrete added to the bridge footings, and carbon fiber reinforcing layers wrapped around the support columns).

As you can see, the author is certainly not lacking in the details she provides, but at 288 pages, Doughton does so in a very manageable and interesting fashion—holding your interest through the entire book with just enough technical, political, and historical detail, complete with the exciting (and sometimes quirky) individuals that got us to the point we are today.

Danielle Deemer, Talisman Energy USA

## Beauty in Geology

Blackwater Falls, Blackwater Falls State Park, West Virginia. The “black” water is caused by organic substances such as tannic acid from the area’s vegetation. The water fall is 57 feet high and flows over Early Pennsylvanian Connoquenessing sandstones. Photo courtesy of Dilyn Stevenson, Edinboro University, August 2013.



Cirque basin, arête, and horn located in the Northern Talkeetna mountains, Alaska. These glacial features, located in the Clark Creek Igneous field, are comprised of basaltic andesite, granitic rock, and pyroclastic breccias that range from 57- 63.1 Ma in age. Photo courtesy of Alex Ceschini, Allegheny College, July 2012.

## The Good, The Bad, and The Ugly

This installment of “The Good, The Bad, and The Ugly” spotlights the many technical aspects, opinions, and legislative approaches to forced pooling across the United States.

<http://projects.propublica.org/tables/forced-pooling>

This May 2011 article by ProPublica includes a chart summarizing forced pooling statutes across the U.S. and focuses much of its commentary and discussion on activities in New York and Pennsylvania.

<http://oil-gas-leases.com/oil-gas-pooling.html>

The oil-gas-leases.com website provides a concise definition of oil and gas pooling and how forced pooling may affect landowners..

<http://www.l-a-n-d.net/resources/what-is-forced-pooling/>

An attorney defines and discusses forced pooling as implemented by the Colorado Oil and Gas Conservation Commission in the state of Colorado.

[http://lawlibrary.unm.edu/hrj/26/3/02\\_eubanks\\_economic.pdf](http://lawlibrary.unm.edu/hrj/26/3/02_eubanks_economic.pdf)

Eubanks and Mueller, professors of economics at the University of Colorado and Clarkson University, respectively, published a paper regarding Oklahoma’s forced pooling law in a 1986 issue of The University of New Mexico School of Law’s *Natural Resources Journal*.

[http://www.wvroa.com/index.php?option=com\\_content&view=article&id=52:forced-pooling&catid=1:latest-news&Itemid=50](http://www.wvroa.com/index.php?option=com_content&view=article&id=52:forced-pooling&catid=1:latest-news&Itemid=50)

This webpage addresses how the forced pooling process affects property and subsurface rights owners in West Virginia.

[http://www.pennlive.com/editorials/index.ssf/2011/08/forced\\_pooling\\_for\\_marcellus\\_s.html](http://www.pennlive.com/editorials/index.ssf/2011/08/forced_pooling_for_marcellus_s.html)

This link takes you to an August 2011 editorial published in The Patriot-News regarding motivations for forced pooling in Pennsylvania.

<http://www.oilandgashelp.com/blog/act-66-of-2013-pennsylvanias-newest-forced-pooling-statute/>

The OilandGasHelp website explains the history of forced pooling in Pennsylvania (yes, in a manner of speaking it dates back to 1961!) and how PA Act 66 of 2013 now comes into play.

<http://www.energyandthelaw.com/2013/01/24/is-texas-ready-for-forced-pooling/>

Sartrain and Booher explain the contents of a bill recently proposed in the Texas House of Representatives that would institute forced pooling in the state.

## Call for Abstracts!

Next year's Annual Convention and Exhibition will be held in Houston, Texas, at the George R. Brown Convention Center (<http://www.aapg.org/houston2014/>). The Division of Environmental Geosciences is looking for abstracts to fill several sessions for Theme 6: Energy and the Environment. This theme incorporates many interesting and multi-disciplinary topics – check out the list below!

- The Great American Carbonate Bank — geology and economic resources of the Cambro-Ordovician Sauk Megasequence
- Water Management in Hydraulic Fracturing Projects
- Microseismics for Drilling and Fracture Tracking
- Managing Risk of Induced Seismicity in Water Disposal, Carbon Dioxide Storage, and EOR
- CO2 Capture and Availability for EOR: Economics and Environmental Issues, Source-to-Sink
- Environmental Impacts of EOR Activities, Onshore and Offshore
- Arctic Drilling: Environmental Issues and Management

Please consider submitting an abstract for this DEG-sponsored theme.

Abstracts are being received online at: <http://www.aapg.org/houston2014/abstracts.cfm>.

*We welcome your articles, comments and feedback for this quarterly Newsletter publication.*

*Kristin Carter, DEG Editor-In-Chief  
Danielle Deemer, DEG Managing Editor*  
**4th Quarter submissions deadline is November 1, 2013**  
**Submit to [ddeemer@talismanusa.com](mailto:ddeemer@talismanusa.com)**



<http://deg.aapg.org>

**Street Address:**

1444 South Boulder Ave.  
Tulsa, OK 74119 USA

**Mailing Address:**

P.O. Box 979  
Tulsa, OK 74101-0979 USA

(918) 584-2555  
Toll Free (U.S./Canada): (800) 364-2274

Fax: (918) 560-2694