



GEONews

Newsletter of the Association of Environmental & Engineering Geologists, Carolinas Section
2009 and 2011 AEG Section of the Year

FALL 2012

IN THIS ISSUE

The Good, The Bad, and the Ugly;
Compliance issues at NC DSCA4
Geoscience Congressional Visit Days
by Brad Worley.....7
Photos from the AEG 2012 Annual
Meeting in Salt Lake City14-15
NCSU graduate student Matt Burnette
Wins AEG Scholarship! 16
Section Meeting on November 8 in
Greenville SC to Feature AEG President
Matt Morris.....36

SPECIAL REPORT:

Shale Gas in North Carolina Conference;
An Overview by Jane Gill-Shaler 17

SAVE THE DATES!

*October 25 AEG Meeting
at Natty Greene's in Greensboro:
Compliance Practices Impacting
the NC DSCA Program; page 4*

*November 4-7: GSA 2012 in
Charlotte; Flyer on page 30*

*November 8: AEG President Matt
Morris in Greenville SC; page 36*



GEONEWS FALL 2012
Issue Date: September 21, 2012
TABLE OF CONTENTS

Articles and Reports

The Good, the Bad and the Ugly: Compliance Practices Impacting the NC DSCA Program. AEG Carolinas October 25 Meeting..... 4
 Geoscience Congressional Visit Days by Brad Worley..... 7
 AEG Planning a Needs Assessment by Duane Kreuger and Deb Green 13
 Photographs of the AEG 2012 Annual Meeting in Salt Lake City 14-15
 Section Meeting on November 8 in Greenville SC to Feature AEG President Matt Morris..... 36

Columns and Regular Features

Message from the Chair by Paul Weaver..... 3
 Treasurer’s Report by Alex Rutledge..... 4
 GeoRamblings by Dr. Charles Welby..... 10
 Announcements 31
 Job Opportunities (go to www.AEGCarolinas.org for the latest Job Opportunities) 33

Education Section 16-29

Matt Burnette Wins AEG Scholarship!..... 16
 Shale Gas in North Carolina—An Overview of the AEG/AWGT Program on August 9-10 by Jane Gill-Shaler, GeoNews Editor 17

Upcoming Events

GWPNC Oct 18-19 (flyer) 9
 GSA 2012 Nov. 4-7 (flyer)..... 30
 Schlemmon Specialty Conference (flyer) 34-35
 Calendar of Events 37

Carolinas Section Stuff

Deadlines for Submittals 2
 Section Officers..... 2
 AEG Carolinas Treasurer’s Report 4
 AEG Membership Application (flyer)..... 39
 Sponsor Application (flyer)..... 40
 Thanks to our Sponsors!..... 41-42

GeoNews is a publication of the Carolinas Section of AEG. There are four issues per year, with deadlines and issue publication dates listed below. We publish news of the profession, announcements, student member news, technical articles, and job openings.

Deadlines for submittal to AEG Carolinas GeoNews

(can be flexible depending on events)

- Spring – deadline March 1, issue date March 21
- Summer – deadline June 1, issue date June 21
- Fall – deadline September 1, issue date Sept.21
- .. Winter – deadline December 1, issue date December 21

Deadlines for submittal for the National AEG News:

- March issue – January 15
- June issue – April 15
- September issue – July 15
- December issue – October 15

AEG Carolinas Section Current Officers and Contacts

- Chair.....Paul Weaver, P.G., pweaver@espassociates.com
- Vice Chair.....Alex Rutledge, P.G., P.E., frutledge@schnabel-eng.com
- Treasurer... Briget Doyle, Ph.D., bdoyle@uscupstate.edu
- Secretary.....Jeremy Strohmeyer, P.G., jstrohmeyer@schnabel-eng.com
- Membership Chair.....Jake Sarna, jsarna@espassociates.com...
- Field Trip Chair Jim Stroud, stroudjr@hotmail.com
- Student Liaison Rick Kolb, rick.kolb1@gmail.com
- Social Committee Chair.....Adam Phillips, Adam.Phillips@sgs.com
- Past Section Chair.....Rick Kolb, rick.kolb1@gmail.com
- Advisor.....Jennifer Bauer, jennbauer@gmail.com
- Advisor..... Gary Rogers, grogers@schnabel-eng.com

AEG Carolinas Section Website www.aegcarolinas.org

- Webmasters.....Tami Idol, tami.idol@ncmail.net
- Brad Isles, bcisles@gmail.com

AEG National Website www.aegweb.org

GeoNews Editor (2003-present)

- Jane Gill-Shaler, P.G. (336) 883-0170... cell (336) 687-6144
- JaneHGillShaler@gmail.com

Cover: Utah’s Little Cottonwood Canyon south of Salt Lake City is the site of some spectacular geology. The cover photo was taken by Rick Kolb during our Special Event at AEG 2012. The view is of Twin Peaks, on the western edge of Snowbird resort. The rock exposed consists of quartzite and shale of the Precambrian Big Cottonwood Formation. Though the bedding appears to be folded, this is just an apparent fold resulting from exposure of south-dipping beds within the cirque on the northeast side of Twin Peaks (at the head of Gad Valley). You can see this on a geologic map, in the upper right area of http://ngmdb.usgs.gov/ngm-bin/ILView.pl?sid=841_1.sid&vtype=b.

Insert: Alicia Roh, Eric Swope, and Jack Kitchen (left to right) from the North Carolina Dry Cleaning Solvent Cleanup Act (DSCA) Compliance Program, will discuss regulatory compliance pertaining to operating dry-cleaning facilities in North Carolina. An abstract, Eric’s Bio, details of the speaker meeting, and directions are on page 4 of this issue.

Disclaimer: © 2012 Association of Environmental & Engineering Geologists - All Rights Reserved. Views expressed in this publication are not necessarily those officially representing the Association of Environmental & Engineering Geologists except where expressly stated.

MESSAGE FROM THE CHAIR

By Paul Weaver, PG,
Chair—AEG Carolinas Section

The Carolinas Section, in conjunction with the American Groundwater Trust, held a two-day “Shale Gas in North Carolina” conference in Raleigh on August 9 and 10. The conference was well attended with close to 200 people participating. We also received a significant amount of media coverage for the conference. I think that everyone who attended came away with a greater understanding of the myriad of issues involved in the production of shale gas and what potential North Carolina has for becoming a player in the industry. A synopsis of the talks begins on page 17.

By the time you read this article, we will have already held a Section meeting in Asheville on September 13 at Pack’s Tavern. We will be having a Section meeting in Greensboro on October 25 at Natty Greene’s, for which you should soon receive an announcement (if you haven’t already).

The Geological Society of America’s (GSA’s) national meeting will be held in Charlotte from November 4 through 7. The AEG Carolinas Section is sponsoring and convening a technical session entitled “Practical Applications and Environmental and Engineering Geology”. We will also have the AEG booth at the meeting to spread the word about AEG. If any of you are planning on attending the meeting and can donate some time to help man the AEG booth, please let me know at your earliest convenience. The flyer is on page 30.

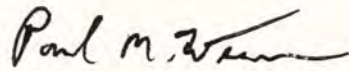
The Carolinas Section will be giving away earth science tool kits to teachers attending the North Carolina Science Teachers Association meeting which is scheduled for November in Winston-Salem. This is an annual event for us which is greatly appreciated by the teachers receiving the tool kits. If you would like to volunteer to help us give out the tool kits, and/or if you would like to donate money to help us pay for the tool kits, your assistance will be greatly appreciated.

On the social front, we were not able to put together the pig pickin’ that I had hoped to have in Greensboro this summer. There were just too many other things going for me to be able to put the event together. I hope maybe we can make it happen next year. We also weren’t able to organize the camping trip to the mountains that we had considered; again, hopefully we can make this happen next year. We plan on continuing to have monthly brew pub socials at various locations throughout the state. We will continue to utilize GeoNews, AEG News, and email alerts to provide you with information on these and other opportunities to expand your knowledge and to network with your colleagues.

Elections for your Carolinas Section Board of Directors took place during the month of August. Alex Rutledge has been elected your Vice Chair, Briget Doyle has been elected your Treasurer, and Jeremy Strohmeier has been elected your Secretary. The terms of office for the Board of Directors run from the AEG Annual Meeting to the next annual meeting. This coming year will be the second year of my second two-year term as Chair; it will also be my last term as Chair. Beginning next September, I will move into the role of Past Chair. I’m excited about the opportunity that new leadership for our section represents.

Thank you all for your membership and support of the Carolinas Section. As always, please feel free to contact me at the email address listed below with any ideas, concerns, comments, etc. that you have for AEG and the Carolinas Section in particular.

Sincerely,



Paul M. Weaver, P.G.
AEG Carolinas Section Chair
pweaver@essassociates.com



REGENESIS

Drew Baird, P.G.
Southeast District Manager

115-B Broadus Avenue
Greenville, SC 29601

Tel: 864.240.9181 • Cell: 864.884.4346 • Fax: 864.240.9182
dbaird@regenesis.com • www.regenesis.com


SAEDACCO

South Atlantic Environmental Drilling and Construction Company

Peter I. Byer President

pbyer@saedacco.com Cell: 704.634.1046


Toll Free: 800.849.0353 Tel: 803.548.2180 Fax: 803.548.2181

9088 Northfield Dr. Fort Mill, SC 29707  **SAEDACCO.COM**

**AEG CAROLINAS SECTION 2Q
TREASURER’S REPORT**

By Alex Rutledge, Section Treasurer

AEG Carolinas Section Quarterly Treasurer's Report
March 31, 2012 to June 30, 2012



BALANCE As Of March 31, 2012	
Checking Account	\$1,150.25
Money Market Account	\$16,664.87
	<u>\$17,815.12</u>
INCOME	
Dinner Meetings	
Raleigh Meeting at Spartan's	\$1,275.00
Sponsorships	
Five Silver Sponsors	\$1,250.00
Miscellaneous	
Refund for GSA Exhibit booth	\$150.00
Interest	
Savings account	\$2.07
SUBTOTAL - INCOME	<u>\$2,677.07</u>
EXPENSES	
National Board Meeting Expenses	
Section Chair - AEG National Board Meeting	\$656.60
Section Chair - Mid-year National Board Meeting	\$352.90
Other Meetings	
Section Board Meeting - Lunch	\$50.00
Educational Programs and Sponsorships	
Visiting professional talks	\$141.36
Science festival / Fracking Conference expenses	\$21.53
Web Design	
6 hours	\$210.00
Shipping	
Ship AEG Booth to Denver, CO	\$136.26
SUBTOTAL - EXPENSES	<u>\$1,688.66</u>
BALANCE As Of June 30, 2012	
Checking Account	\$2,256.60
Money Market Account	\$16,666.94
TOTAL	<u>\$18,923.54</u>

**AEG CAROLINAS MEETING SET
FOR OCTOBER 25 AT NATTY
GREENE’S IN GREENSBORO**

THE GOOD, THE BAD, AND THE UGLY: COMPLIANCE PRACTICES IMPACTING THE NC DSCA COMPLIANCE PROGRAM

Eric Swope, Compliance Supervisor for the North Carolina Dry Cleaning Solvent Cleanup Act (DSCA) Compliance Program, will discuss regulatory compliance pertaining to operating dry-cleaning facilities in North Carolina, the impact of non-compliance to the environment, and the State and Federal regulations that the DSCA Compliance Program staff enforces in North Carolina. The presentation will demonstrate acceptable compliance practices, poor practices, and practices that immediately




Poor housekeeping at a dry cleaning facility.

impact the environment. The meeting will begin at 5:30 pm, and will include a social hour, dinner, and the talk. Details and a map and directions are at the end of this article.

Abstract:

NCDENR has been authorized under DSCA to develop rules that operating dry-cleaning facilities must follow to prevent environmental contamination by dry-cleaning solvents. These rules, or Minimum Management Practices (MMPs), were approved as permanent rules in 2002. In 2005, the DSCA Compliance Program was created to conduct formal inspections of dry-cleaning facilities across the state. In addition to the program’s MMP regulations, DSCA was authorized to inspect facilities for compliance with Resource Conservation and Recovery Act (RCRA) regulations, which currently are administered by the Division of Waste Management’s Hazardous Waste Section. The program also entered into a memorandum-of-agreement with the Division of Air Quality that enables DSCA staff to perform compliance inspections for air quality regulations that are applicable to dry-cleaning fa-

(Continued on page 5)



ROBERT "BUTCH" STEVENS
VICE PRESIDENT

PO BOX 1029, 501 MILLSTONE DRIVE, HILLSBOROUGH, NC 27278
(919) 644-2814 (800) 627-7920 FAX (919) 644-2817
bstevens@pwinc.com www.pwinc.com
EAST SYRACUSE, NEW YORK (800) 782-7260
ENVIRONMENTAL AND GEOTECHNICAL DRILLING SERVICES

(Continued from page 4)
 cilities.

In June of 2008, DENR's Secretary delegated enforcement authority to the DSCA Program for violations of the air quality rules. The DSCA Compliance Unit is an effort by DENR to consolidate all of its environmental compliance requirements into one inspection team within DENR to ensure compliance with all environmental regulatory requirements and provide dry cleaners and the public a single DENR point-of-contact for compliance questions or concerns.

The DSCA Program consists of two units: Compliance and Remediation. The Remediation Unit oversees the cleanup of contaminated dry-cleaning sites under a voluntary agreement between the program and the potentially responsible party (the dry cleaner and/or property owner). Most of the costs for cleanup are paid by the DSCA Fund. The Compliance Unit inspects active dry-cleaning plants and enforces the MMPs and other environmental regulations. All operating drycleaners must be in compliance with the North Carolina DSCA Program's



Poor solvent storage at a dry cleaning facility.

Minimum Management Practices as well as Air Quality, Hazardous Waste and Solid Waste environmental rules and regulations.

Speaker Bio:

Eric Swope—Mr. Swope has undergraduate studies in Computer Science and Environmental Engineering from Edinboro University and Wake Technical Community College, respectively. Eric has over 20 years of experience in environmental compliance, air quality testing, and consulting and is the Compliance Supervisor for the North Carolina Dry Cleaning Solvent Cleanup Act (DSCA) of the North Carolina Department of Environment and Natural Resources (NCDENR).

Prior to working for NC DENR, he worked for 10 years in the private sector as an environmental consultant and project manager for an air emission testing and consulting company conducting EPA test methods at various industrial sites such as refineries, hazardous waste incinerators, chemical plants, pulp and paper industry, and

(Continued on page 6)

TRS-Environmental is your leading source for environmental testing and monitoring equipment.

From our 24-hour technical support and high availability to centralized distribution coupled with a leading-edge logistics capability, we are your essential partner when it comes to delivering the equipment you need anywhere, any time.

Order Online at: www.TRS-Environmental.com

Frederick Love
 E-Mail: Frederick.Love@TRS-Environmental.com

1830 West Airfield Drive, P. O. Box 619260
 Dallas-Ft. Worth Airport, TX 75261

Phone: 800.532.3381 Fax: 972.456.7011

(Continued from page 5)

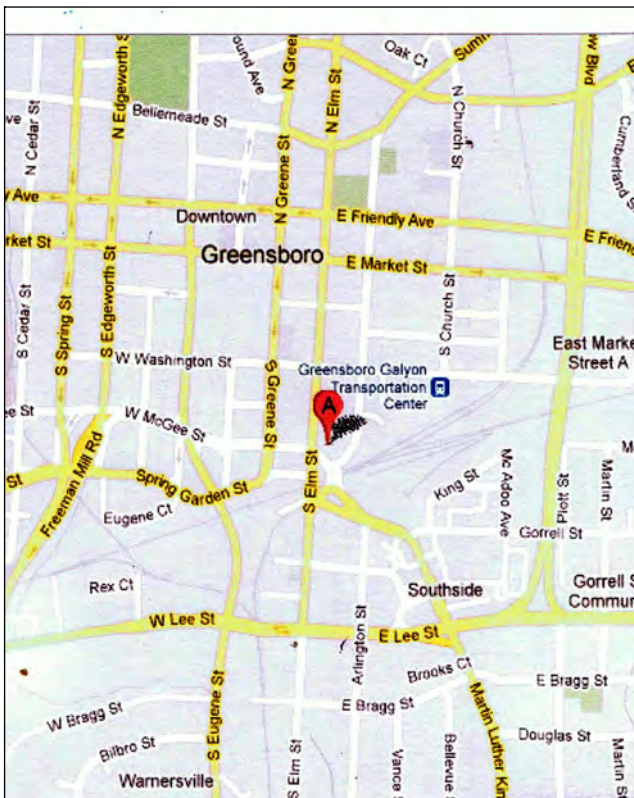
municipal waste treatment facilities across the United States (US) for regulatory compliance.

Eric left the private sector to work as an Environmental Inspector at the NC Division of Air Quality, inspecting synthetic minor and small permitted facilities, observing compliance emission source testing for NC, and maintaining ambient monitoring sites in the Raleigh Regional area. He was hired in April 2005 to start a compliance inspection program for the DSCA Program.

In 2005, Eric became the Compliance Coordinator for the DSCA program, where he assisted in the development of the Program's compliance efforts, and directed the activities of the DSCA Compliance Program and its inspectors. Since the Program's inception, Eric has been focused on clarifying the DSCA Compliance regulations, inspection requirements, training inspectors and coordinating field inspections for his staff.



Unacceptable filter storage at a dry cleaning facility.



DIRECTIONS TO NATTY GREENE'S:

From the East or West: Take I-40 to Exit 218B, Freeman Mill Road North (also labeled as Coliseum Area). Go about 2-1/2 miles on Freeman Mill Road (the name will change to Edgeworth as you travel north) to Washington St. Turn right on Washington and go 5 blocks to S. Elm St. Turn right onto S. Elm, go about 1/2 block and park in the metered public parking lot on the right unless you are lucky enough to find a parking spot on Elm Street. The meeting will be in a private room (The Loft) on the third floor of Natty Greene's

From the South: Take I-85 North and exit onto Business I-85 (about mile marker 120), then take Exit 122 (US 220, Future I-74). This will turn into Freeman Mill Road North, then to Edgeworth as you travel north. Go about 4 miles to Washington St. Turn right on Washington and follow the directions above.

To return to the interstate: Go back the way you came on Elm and Washington St, passing over S. Edgeworth to S. Spring St. Turn left on S. Spring St. which will merge back into Freeman Mill Road. Freeman Mill Road will take you back to I-40.

MEETING DETAILS

Place: Natty Greene's, Greensboro, NC
 Date: Thursday, October 25, 2012
 Time: 5:30 PM socializing begins, 7:00 buffet dinner, 8:00 Eric's talk
 Program: **"The Good, the Bad and the Ugly: Compliance Practices Impacting the NC DSCA Compliance Program"**
 Cost: AEG members \$25, non-members \$30, students FREE with college ID; Teachers are \$10.
 Reservations: Please make reservations with Paul Weaver by 6:00 PM on Thursday, October 18, 2012
 Email: pweaver@espassociates.com

REPORT ON THE FIFTH ANNUAL CONGRESSIONAL VISIT DAYS

By Brad Worley, Summit Design and Engineering, AEG Representative for AGI

This year, AEG again asked me to attend the 5th Annual Geosciences Congressional Visits Day (GEO-CVD), on September 11-12, 2012, in Washington, D.C. I am also AEG's national representative to the American Geosciences Institute's (AGI) Geoscience Policy Committee, formerly known as the AGI Government Affairs Program (GAP).

On September 10, 2012, I attended the AGI Leadership Forum, representing AEG. This year's Leadership Forum was entitled "Media in the Geosciences: Trends and Tools for Publication, Education, and Outreach." The day-long forum centered on the recent trends of moving away from printed media (newsletters, journals, textbooks, etc.) to digital media. The day was filled with talks and discussions about digital media in geoscience education, how to go about publishing digital media, "Big Data," and member society outreach utilizing



Brad Worley in front of the Capitol Building.

social media such as blogs, Facebook, LinkedIn, and Twitter.

On September 11, 2012, I attended AGI's GEO-CVD Orientation Program. This annual meeting centers on how to conduct a Congressional visit. In this meeting, all GEO-CVD participants listen to talks by Congressional staff and employees of AGI member societies that work in government policy. Attendees also get to hear talks about current geoscience-related budget concerns. This is also where CVD attendees are given to publically practice the parts of their "message" and receive critique from employees of AGI member societies, Congressional staffers, and from those who have taken part in CVD's before. It is on this day that you will be paired with others from your state. This year I was the only GEO-CVD participant from North Carolina.

This was my fourth CVD, so AGI allowed me to conduct all of my Congressional visits the following day on my own, without having an AGI chaperone. Also, being the only one in a meeting, allowed for more one-on-one interaction with the member or staffer. This gave me the opportunity to stress AEG's ability to assist members of Congress when they need help or information on certain legislative issues. We also give each office we meet with a "leave-behind" folder including AGI's latest Critical Needs Document. All attendees of this year's GEO-CVD had the opportunity to include AEG handouts in their leave-behind as well.

I began my GEO-CVD on September 12, 2012, at "Carolina Coffee" with Senator Kay Hagan (D-NC). During this time I was able to meet with Senator Hagan and let her know why I was on "the Hill" that day. For those that may not know, Senator Hagan's daughter is a petroleum geologist, so she enjoys taking time with visiting geoscientists. Afterward I meet with Shaniqua McClendon, staff member for Senator Hagan to give her our leave-behind information and to talk about key issues that AGI sees in the upcoming budget year (FY 13).

My second meeting of the day was with Dave Wegner and Katherine Waring, with the House Transportation Committee. This was my second meeting with Dave and Katherine and I must say it is a treat to find scientist working on "the Hill" that understand the geoscience community's budget concerns. They were both also very interested to hear all about my move away from NCDOT to Summit Design and Engineering and pleased to hear that the bulk of my project load is still transportation related. I again stressed that AEG can be a very valuable resource for the House Transportation Committee. Matter of fact, Mr. Wegner has since contacted me to help him with contacts on barrier island processes that affect current Coast Guard stations.

My third meeting of the day was with Brandy Dillingham, staff member in Representative Brad Miller's (D-NC-13) office. This was my first visit to Representative Miller's office, but being a member of the House Sci-

(Continued on page 8)

(Continued from page 7)

ence, Space and Technology Committee, AGI thought this would be a great opportunity to reach out to a member of Congress who has a direct hand in budget issues that directly affect the geoscience community. This meeting was very well received and I was again able to stress AEG’s ability to assist their office on any geoscience-related issues. My last meeting of the day was with Kirk Bell, staff member in Representative Howard Coble’s (R-NC-6) office. Again, this was my first visit to Representative Coble’s office. He is a member of the House Transportation and Infrastructure Committee and AGI again thought it would be a good idea to let their office know more about AGI, its member societies (such as AEG), and to give their office some insightful information on geoscience federal budget concerns.

Mr. Bell was very interested to hear how a geologist contributed to transportation and was happy to hear that AEG Carolinas was very active and that we could be a resource of information if their office needed help. The day ended with attending the USGS Coalition Leadership Awards reception from 5:30-7:30 in the Rayburn House Office Building Foyer. Representative Steven LaTourette (R-OH) and Representative Betty McCollum (D-MN) were given awards for their efforts to support the USGS. This concluded another GEO-CVD.

As reminder, any AEG member is invited to attend CVD’s. This is a very unique opportunity to be a voice for the AEG and the geoscience community. Please

visit <http://www.agiweb.org/gap/events/geocvd/index.html> for more info. I would like to thank AEG for once again having the faith in me to attend the CVD’s.

Brad Worley



Senator Kay Hagan (D-NC) and Brad Worley, AEG’s national representative to the American Geosciences Institute’s (AGI) Geoscience Policy Committee

Geosciences Congressional Visits Day





HYLAND
GOLF CLUB



GROUNDWATER PROFESSIONALS OF NORTH CAROLINA

SOCIAL AND ANNUAL GOLF TOURNAMENT OCT. 18-19, 2012

SOCIAL - Thursday, October 18th; 5:30 - 7 PM

Days Inn Conference Center Southern Pines / Pinehurst

805 SW Service Rd -US Hwy 1 at Morganton Rd. Exit

Southern Pines, NC (910) 692-8585

Group Room rate \$54.99/nite

**** Free Appetizers and drinks ****

GOLF - Friday, October 19, 2012; 8:30 AM Shotgun

Hyland Golf Club

115 Fairway Avenue - Southern Pines, NC (910) 692-6400

\$65 per person, includes golf and BBQ/chicken lunch

Contact Mike Stanforth mstanforth@excelegenr.com 704-913-7614

SPONSORS NEEDED FOR EVENT

Contact Mark Brown mbrown@hesnc.com 919-608-4582

GEORAMBLINGS

*By Dr. Charles W. Welby,
Former AEG Carolinas Section Chair*

As I considered a topic for this issue of GEO-RAMBLINGS, I sat with cup of black coffee cogitating where I had been over the last few years (for some people it is perhaps better described as centuries, I suppose). Not only did where I had been creep into the thought pattern but also how I had gone and what led to a particular “wandering” episode crept into my semi-dozing mind. That thought seemed to be followed by the word “wondering.” So out of this reverie came the idea that the column should be called, “Wandering and Wondering.”

Sometimes incidental events make the word Wondering especially important. One example came to mind as I thought about such matters. While mapping in the northern California Coast Ranges as part of an undergraduate field camp exercise during the early Paleozoic, I was seeking the contact of a Miocene ash fall and the underlying Cretaceous rocks on a sloping wooded area. A few tree trunks were lying on the ground more or less parallel to the contours of the slope.

So with nose close to the ground looking for fragments of the key rocks in the soils or some ground squirrel holes, I came upon a tree trunk and happened to look over the tree trunk. There on the other side of the trunk were two beady eyes of a good-sized rattlesnake a

little below my eye level. So I began to wonder about what I was doing at that spot and retreated down hill and away from that locality. To this day I wonder if the rattle snake had some guardian role for the contact.

In my youth I took advantage of the open territory surrounding the town where I grew up and rode my bike up into the hills and visited various canyons that exposed the sediments that comprised the hills. One canyon in particular had as a “guardian” a wooden oil derrick, the well, given its age, having been drilled by cable tool methods. The wondering associated with that wandering was about the folding of the rocks exposed in the canyon and how their deformation and slippage had led to the exploration for oil at that particular spot. In addition, there seemed to be a certain beauty to the canyon and how it was sliced into the hills whose cross-sectional shape was generally half of an ellipsoid. Out of the mouth of the canyon there continued a channel with vertical sides about four or five feet high that ran across the alluvial fan which headed into the canyon. So we have an erosional period as the hills were folded and uplifted and then some climate change added to the runoff off the hills to incise a stream downward into the alluvial fan. And so one has to wonder how these various features came into existence and how long it took.

During the early Eocene I had the opportunity to spend a summer at Utah State University which was about the time that the world was taking notice of the ideas of plate tectonics and the associated ideas that parts of North America which are widely separated had at one time been part of a large sea. In canyons behind the University there is a limestone formation that resembles in most ways the Glen Falls Limestone of the Champlain Valley and parts of the Hudson River Valley. A well-known fossil in the Glen Falls Limestone is *Cryptolithus tessellatus*, a relatively small trilobite with a “lace” collar. Well, if one wanders around the canyons above Logan, UT, one discovers a limestone like the Glens Falls Limestone, and the fossil assemblage includes *Cryptolithus tessellatus*. The best outcrops of the Garden City Limestone are in a National Forest above Logan, and fossil collecting is restricted; i.e. forbidden.

(Continued on page 11)



- C - Customer Focused**
- H - Honest**
- O - Open**
- I - Innovative**
- C - Committed to Excellence**
- E - Environmentally Responsible**

Find out more about us at:
www.esclabsciences.com

or contact: Barry C. Kroll
Sales Manager – East Region
bkroll@esclabsciences.com
(704)614-2660



GeoRamblings (Continued from page 10)

During the Eocene I had wandered into some of the outcrops in the National Forest and from those exposures came the “wondering” of what is the geological connection between the Logan area and the Champlain Valley. As time flew by, we learned more about the concepts of plate tectonics, the connections between areas that now seem far apart structurally, environmentally, and otherwise, and the presence of the *Cryptolithus tessellatus* on the opposite sides of North America makes sense.

Fluvial geomorphology plays a significant role in environmental matters, ecological matters, and water supply matters. So as I wander hither and yon, I try to consider what a perennial stream that I chance upon is up to. That consideration is related to the behavior of the stream when it is in a low flow stage, when it is in a high flow stage, or some intermediate stage. Also part of the “wondering” is how the stream performs its ecologic function and what are the differences in overall behavior of various streams coming out of similar headwaters or flowing over similar surfaces. Wondering how the stress of the moving water affects movement of pollutants, food for animals and plants whose livelihood depends upon the stream and even the conditions in the stream bed which allows the organisms to survive becomes an important part of one’s delving into the life of a stream, a river, or for that matter the shoreline of a lake or the ocean.

During a trip last June into Austria, Czech Republic, and Poland I happened to encounter someone’s view point of rocks that is somewhat different from that

of most geologists. I happened to be in Cracow, Poland, and was walking along a cobble stone sidewalk. Being interested in the type of rocks that I was passing over, I was looking for a piece of the pavement that I could pick up and examine. I happened upon a small area of loose cobble stones (about fist size) and picked one up. While I was beginning to examine the rock, a passerby began yelling at me in Polish; the tone of her voice indicated that I should not have picked up the rock and that there was some special reason for that restriction. Later in reflecting on the matter and knowing something of the history of the area, I came to the conclusion that the woman was relating my action to some riot where the cobblestones became weapons for the rioters. Hmmmmm???

Each of us has an interest in the life around us, the physical world, and as geologists we have an intellectual responsibility to be aware of the geologic features and processes that contribute to our world and life and to “Wonder as We Wander.” Perhaps we might broaden our perspective and understanding of a lot of things.

QED

Charles W. Welby

Dr. Charles W. Welby is a former Section Chair for AEG Carolinas and a regular contributor to this newsletter. He may be reached at cww_ral@hotmail.com.

GARCO, Inc.
 Environmental, Industrial & Recycling Services

P.O. Box 1907
 Asheboro, NC 27204
www.egarco.com



Al King
 Sales Representative
alk@egarco.com

† 336.683.0911
 c 919.451.3960


JOYCE

ENGINEERING, INC.

Joyce Engineering, Inc. is a full-service consulting firm. We provide engineering & environmental solutions to private & public clients throughout the Southeastern United States.

Hannu Kempainen, Client Services Manager
 Joyce Engineering, Inc., 2211 W. Meadowview Road
 Greensboro, NC, 27407
 phone and fax # (336) 323-0092

hkempain@joyceengineering.com



AMERICAN
Environmental
Drilling, Inc.

800-779-8854 / ContactUs@aedi.biz
 NC, SC and VA Licensed and Certified
WWW.AEDI.BIZ

For All Your Drilling Needs

Environmental - Geotechnical
Auger, Mud Rotary, Air Rotary, Geoprobe

Certified NC DOT "DBE" Women Owned Business
and HUB Corporation

SAEDACCO

Roto-Sonic Drilling Services
saedacco.com

THE ENVIRONMENTAL INDUSTRY SUPPORT SPECIALIST

We're proud to announce that we will be taking delivery of a new Geoprobe® Model 8140LS Roto-Sonic Drill Rig

Key features of this machine are...

- * Geoprobe® GV4 Sonic Head w/ Oscillator Frequency 0-135 Hz
- * Full Rotational Drilling Capabilities w/ Head Tip Out 35 Degrees
- * Swing-Arm Control Panel w/ Advanced Diagnostics System
- * Variable Location Control Panel per Operator Preference & Safety
- * Digital Display Screen w/ Multi-Function Output
- * Advanced Warning Display Screens for Operator & Equipment Safety
- * Variable Speed Controls for Drilling Operations
- * Rear Stabilizer Blade and Drop Rack Tooling Systems
- * Maneuvered w/ Wireless or Tethered Remote Systems
- * Front Outriggers have 26" of travel (12" below tracks)
- * Rear Outriggers have 28" of travel (12" below tracks)
- * Breakout System w/ Clamps for Casing from 3" to 11"
- * Additional Features include GP50 Pressure Washer, SPX40 Hose Pump, FMC Triplex Pump and more!

To learn more about how the 8140LS can benefit your next project simply reply to this message or give us a call.

SAEDACCO also provides direct push, conventional drilling with truck and track-mounted drill rigs, UST removals and soil and groundwater remediation services.



saedacco.com

800-849-0353 (toll free) 803-548-2180 (local) 803-548-2181 (fax)

9088 Northfield Dr. Fort Mill, SC 29707

AEG PLANNING A NEEDS ASSESSMENT

By Duane Kreuger and Deb Green

Why Does AEG Need a Needs Assessment?

As you may have read in recent issues of the AEG NEWS, the AEG has experienced several years of declining membership. In conjunction with the financial burden directly related to that decline, we're experiencing reductions in or failure to increase other revenue streams. We're also concerned about the loss of several university geoscience departments, and the problems that will pose in recruiting our future colleagues in our profession, as well as members of AEG.

AEG President Bauer and the Executive Council have asked the Strategic Planning Committee (SPC), and specifically Deb Green and Duane Kreuger as SPC Co-Chairs, to begin working on a Needs Assessment. A Needs Assessment is a systematic process for determining needs or "gaps" between current conditions and desired conditions. Our goal for the Needs Assessment and any recommended changes that result from it, is to ensure the long term viability of the profession of environmental and engineering geology, and of the Association, by better serving the needs of the various groups within our profes-

sion.

Our first step was to assemble a diverse and committed team to participate in and guide the Needs Assessment process. Deb and Duane felt strongly that this team should consist of younger and older members representing self-employed individuals, employees of small to large professional firms, and include members within industry, consulting, academia (both professors and students), government, retired professionals, and perhaps, a non-member professional.

To date, we've conducted conference calls to lay the foundation for this process. We anticipate this multi-phase process taking up to two years, as we'll utilize the results of each phase to plan the next. One of our first tasks will be to prepare an RFP and select a vendor to help guide us through this process. Since AEG is undergoing financial belt-tightening, we'll explore ways to fund this important work that will not impact the budget. Ultimately, we envision conducting another round of strategic planning and implementation to act on the recommendations of and direction provided by the Needs Assessment.

Simple | Powerful | Reliable



Real-Time Systems Maximize Remediation Progress

Characterize aquifers, track treatment progress, and conduct required sampling with rugged In-Situ® equipment.

- **Virtual HERMIT® Kit** streamlines groundwater testing.
- New **Rugged Tapes** and **Meters** measure water level, LNAPL, DNAPL, conductivity and more.
- **TROLL® 9500** with optical **RDO® DO Probe** offers robust performance for downhole remediation systems and for low-flow sampling.

For details, visit www.in-situ.com
and call us at **1.800.446.7488**





Innovations in
Water Monitoring

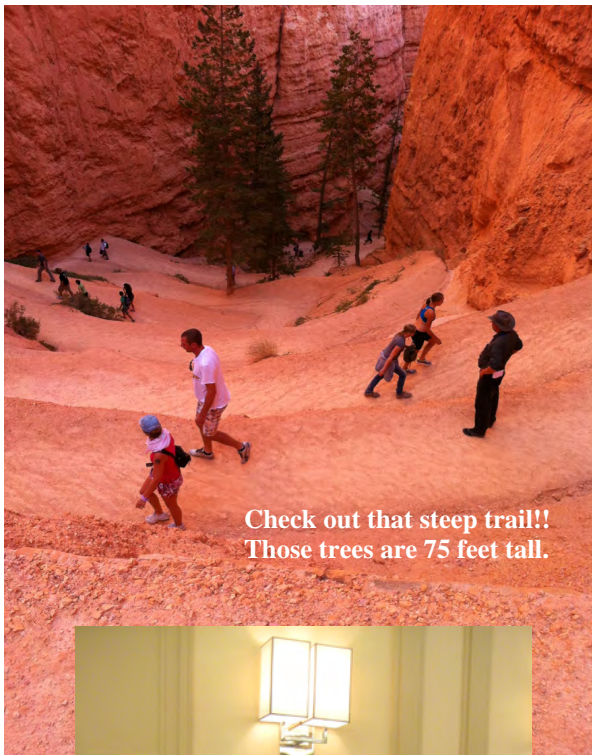
AEG•2012—55th ANNUAL MEETING September 17-22, 2012
Some photos of the events

We Carolinas Section members had a wonderful time in Salt Lake City and all over Utah. We went on some interesting field trips, hiked the local mountains, tasted the local brews, talked and ate and talked and ate, and got to know each other, as well as going to some very interesting and informative technical sessions. Way to go, Carolinas Section!

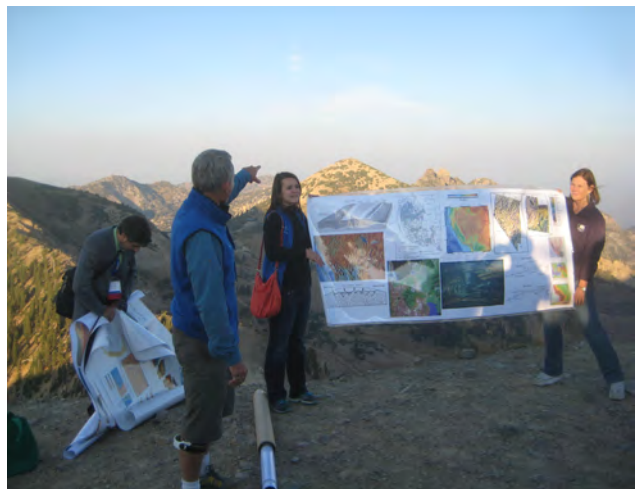
There were lots of other photos taken by members of our group. Please let us know, and we can share them on our DropBox site.



Field trip leaders Robert Biek and Grant Willis, both from Utah Geological Survey, describe the geology of Utah.



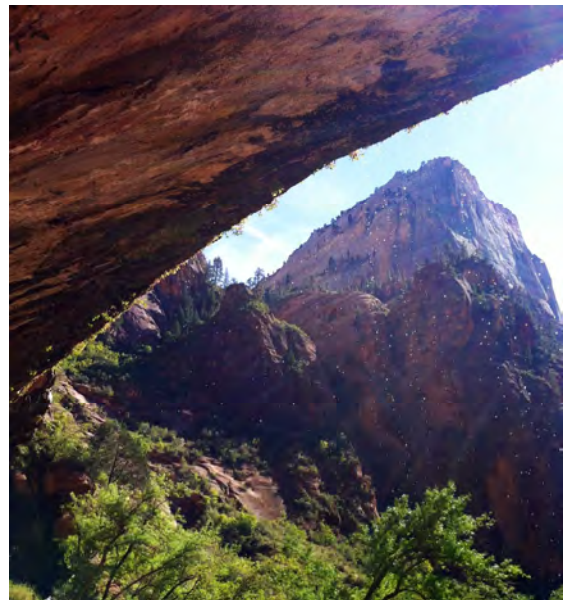
**Check out that steep trail!!
Those trees are 75 feet tall.**



Geology of Little Cottonwood Canyon from the peak; the wind is pretty fierce!



Alex Rutledge, and Paul Weaver, with Alex's co-presenter on the left.



Weeping rock from the inside of the alcove. You can see the drops of water falling.



Awards banquet. Talking and eating and talking and eating



Joan West, Eldon Gath, and Jane Gill-Shaler at Snowbird.



Brigham Young's home in Salt Lake City.



One of the interesting local spirits.



Joan and Terry West at a sculpture garden near our hotel.



Some of the members (and former members) of the AEG Carolinas Section who attended AEG 2012 in Salt Lake City. The quilt "Geology of Utah" was used to raise money for the AEG Foundation.

Left to right: Kerry Cato (former AEG-C member), Jane Gill-Shaler (GeoNews editor), Rick Kolb (former Section Chair), Paul Weaver (current Section Chair), John Palmer (former AEG-C member), Briget Doyle (Section Treasurer), Alex Rutledge (Section Vice Chair), Charles Welby (former Section Chair), and Gary Rogers (former Section Chair). Not pictured but in attendance at the meeting were Debbie Green (former AEG-C member and Jennifer Bauer (AEG President and former AEG-C Section Chair).

EDUCATION SECTION

NCSU'S MATT BURNETTE WINS AEG SCHOLARSHIP

By Rick Kolb, AEG Carolinas Student Liaison

Matthew Burnette, a graduate student in NCSU's Marine, Earth and Atmospheric Sciences (MEAS) Department, has been awarded a Tilford Field Studies Scholarship of \$2,000 by the AEG Foundation. His award was announced at AEG's annual meeting in Salt Lake City in September. Though Matthew could not make it to the annual meeting, Section Chair Paul Weaver will present a plaque to Matthew at the next meeting of the Carolinas Section in Greensboro on October 25. Be sure to congratulate him when you see him at the meeting.

Matthew is from Mount Airy, NC and did his undergraduate work at Western Carolina University in Cullowhee. He graduated summa cum laude in 2011 with a BS in Geology. He is currently working on his MS degree in hydrogeology with Dr. David Genereux in MEAS and Dr. Francois Birgand in Biological and Agricultural Engineering. His thesis is titled Applicability of the Hvorslev Solution in Modeling Streambed Hydraulic Conductivity with Layered Heterogeneity. He is using

MODFLOW and field work to see how a model derived for homogenous sediment actually works with sediment that is heterogeneous. Matthew plans to pursue a PhD after finishing at NCSU. He spends time away from NCSU playing golf, hunting, or fishing. He is also big into NC State athletics.

Attention Student Members: The AEG Foundation offers many scholarships to both undergraduate and graduate students. Three years ago, Chesney Gilleland of Appalachian State won a Stout Scholarship. Matthew is our section's second winner. The application deadline is February 1, 2013, so it's not too early to apply. Apply for a scholarship on the foundation website at www.aegfoundation.org.





Pine Environmental Services, Inc.

THE ENVIRONMENTAL SUPPLY & SUPPORT PEOPLE
RENTALS - SALES - REPAIRS
WWW.PINE-ENVIRONMENTAL.COM



The Leading Supplier of Environmental Monitoring, Environmental Sampling and Safety Supplies

Ask us about free delivery and pick-up in your area

Toll Free: (866) 646-PINE (7463)
email: Pine-NC@Pine-Environmental.com

For After Hours Emergency needs Call
Paul Federline (919) 333-6287

Dedicated to Quality and Customer Satisfaction




EDUCATION SECTION

SHALE GAS IN NORTH CAROLINA — A REVIEW OF ECONOMIC AND ENVIRONMENTAL ISSUES

By Jane Gill-Shaler, AEG Carolinas Editor

Special Report on AEG/AGWT Shale Gas Program

The much-anticipated “Shale Gas in North Carolina” program was attended by nearly 200 professionals, regulators, business owners, interested citizens and community representatives on August 9 and 10, 2012 at the DoubleTree by Hilton Brownstone University in Raleigh, NC. A lot of both old and new information was presented at the two-day symposium by a variety of speakers from many walks of life; the breadth and depth of information was challenging to assimilate. The American Ground Water Trust (AGWT) and the Association of Environmental & Engineering Geologists (AEG), Carolinas Section, organized the conference. Brian Smith of Hart & Hickman, Rick Kolb of Duncklee & Dunham, and Andrew Stone of the AGWT were the conference co-chairs. Cooperating organizations were the American Geosciences Institute (AGI), Groundwater Professionals of North Carolina (GWPNC), American Institute of Professional Geologists, Carolinas Section (AIPG), and International Association of Hydrogeologists (IAH). Gill Editing Online, EGIS Professional Associates, Ward & Smith, and WyrickRobbins were sponsors. The NC Water Well Contractors approved the conference for 6 continuing education units (CEUs), and the South Carolina Board of Registration for Geologists and North Carolina Board of Examiners for Engineers and Surveyors approved the conference for CEUs, which are self-claimed.

The purpose of the symposium was to provide a balanced information-exchange opportunity between the energy industry, water industry, citizens, and communities with an interest in the economic potential of shale gas development and the long-term environmental sustainability of water sources and water dependent ecosystems. The following is a synopsis of the talks. There is a CD available of all the PowerPoint presentations for \$20 from www.agwt.org.

Session 1 – Issues and Concerns, resource assessment, and shale gas footprint.

Andrew Stone, Executive Director of the AWGT, *Public Perceptions and Mis-Perceptions of Shale-Gas Development Impacts.* Mr. Stone introduced himself and gave an overview of the program. He noted that all the presenters are volunteers who believe that understanding the issues is the most important basis for making informed decisions.

There is an ever increasing need for water, and only a

finite supply. As so much water is needed to develop each well and tap the potential for shale gas, water is the element of concern, both with supply and the potential for contamination. We are dealing with a global issue, and need to have a global perspective in dealing with shale gas. He stressed the need to look at the whole spectrum of data with calm and objective care.

There is a range of opinions regarding shale gas, but we can't deny that we need hydrocarbon products at this point in our history, and these come from the extractive industries. This is a political, economic and environmental decision, and should be decided rationally based on currently available data and national, state, and local concerns. Some of the concerns involve water contamination, spills, noise and dust, access to good science information, common sense, and intelligent regulations with enough oversight staff to enforce them. Also, every community needs to have an exit strategy, when the shale gas has been extracted and is no longer available in economic amounts. The last thing any state or community leader needs to do is to make important decisions based on misinformation and hype. “Over the two days of the program,” he said, “you will have a lot of calm, objective perspectives on both sides of the argument about this issue.”

Robert Milici, Research Geologist for the US Geological Survey in Reston VA. *USGS Shale-Gas Reserve Assessment Methods.* Mr. Milici gave an overview of the assessment methods used to estimate the reserves of shale gas in North Carolina. They assess technically recoverable undiscovered hydrocarbon resources, or oil, natural gas, and natural gas liquid. These are the resources that have not yet been drilled out. There are two kinds of resources: conventional (trapped), and continuous, or unconventional, resources. They take the last, a blanket-like accumulation of multistoried reservoirs (black shale, tight sandstone, coal beds). To estimate conventional resources, they go from the known to the unknown. They take the numbers and sizes of discovered fields, and estimate from this the number and sizes of undiscovered fields, such as the maximum, minimum, and most likely, in the undrilled areas. In unconventional resources, there are no field boundaries, so the area is divided into cells of varying acreage, based on the drainage area of each of the wells. From this, specialized petroleum engineers estimate the number of untested cells, and look at the Estimated Ultimate Recovery, or EUR, for each cell. All this data is put into a proprietary computer program, which estimates the recovery of each cell, with a percentage of uncertainty. They were off in their estimates of the Marcellus Shale by a considerable amount, as there was no data from wells when they did the estimating, and the new technology of horizontal drilling had not yet been refined.

Mr. Milici then gave an overview of the geologic

(Continued on page 18)

(Continued from page 17)

history of the Mesozoic Basin. As there is little actual drilling data from the Mesozoic Basin rocks, they combine their estimates into a “Continuous Gas Assessment Unit.” Published data from NCGS that includes continuous deposits and conventional deposits from Sanford, Danville, and other areas indicate source rocks may contain economically recoverable shale gas.

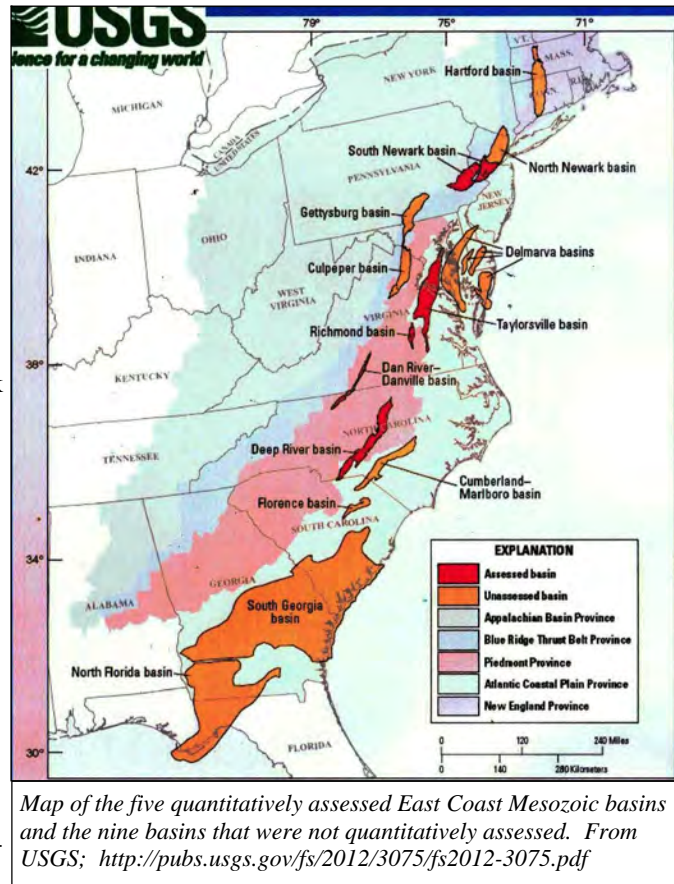
Dr. Ken Taylor, North Carolina State Geologist, Chief NC Geological Survey; *The Potential for Shale Gas Exploration & Production in North Carolina.*

For the last four years, Dr. Taylor has coordinated a research program, with Dr. Jeff Reid, to assess the resource potential of shale gas from the Mesozoic basins of North Carolina. NCGS has been around since 1823 – their mission is to look at resources, and to provide unbiased analysis to the state and the citizens of North Carolina. To do this, his group went back to their core repository, and to cores that had been archived by industry to assess the presence of shale gas source rocks. The source rocks are from fresh-water basins, within a rift system, similar to the African rift basin, where organic matter built up over time and was eventually buried by sediments from the surrounding horst rocks. There are some important differences between these and the Marcellus Shale rocks of the northeast.

The cores came from the Mesozoic basins Deep River (composed of the Durham, Sanford, and Wadesboro sub basins) and the Dan River Basin. Not all the basins had complete cores, however. During the 1980s and 1990s, there was a tax incentive to drill for oil and gas. All the data collected during those years were archived, as it was considered not economically viable to develop the potential at that time.

Times have changed, however, and these data were finally analyzed last year, using specialized computer programs. The depth of the basin is not known, but the deepest part of the shale gas layer they have data for is at about 7,000 feet, and is about 800 feet thick at the thickest part. The deepest part of the basin is not where the shale is the thickest. Organic-chemistry data, not re-

flective data, are what is needed for a more accurate assessment; organic information requires additional drill holes. They had no data for the Durham basin, but organic-rich shale was found at the surface at a brick company in the area. They have compiled the data from about 600,000 acres, and from this they estimate reserves of mature resources of approximately 1.6 billion cubic feet of gas, or the equivalent of 8.3 billion barrels of natural gas liquids. They estimate that the Dan River Basin has approximately 49 billion cubic feet of gas reserves. This is undiscovered, but technically recoverable. When it is found and drilled out, it will become a known quantity.



Robin Smith, Assistant Secretary for the Environment, NC DENR. *Past, Present and Future Time Line for the Development of NC Shale Gas Regulations.* Ms. Smith oversees development of major policy initiatives for diverse programs within the DENR. She asks the questions, what do the rules actually mean, and why do we need them? We need rules for our safety, for health, maintaining order, and in the case of the DENR, managing competing uses for the same resources. Agriculture and other industries need to dispose of their waste water, but towns, individuals and industry are taking their drinking water out of that same water-supply stream. To allow for these competing uses, you have to regulate the intakes, the disposal, and the water treatment. This is largely the function of state environmental agencies. We

try to find a balance between competing uses of the same resource.

This requires, in the case of a new industry, incorporation of their needs into the existing rules, if the resources are there, and not in such a way that you are sacrificing existing users. The commission passed 21 categories of rules that are under consideration, such as standards for hydraulic fracturing, adopting casing and cementing standards for wells to be used in hydraulic fracturing, and so on. The categories are enumerated in **SB820**, found on the General Assembly website. The difficulty is managing how that work moves forward with an eye toward the potential impacts. The framework for these rules will be based on the standards for other states,

(Continued on page 19)

(AEG Carolinas BOD Meeting Minutes: Continued from page 18) among which were Texas and Pennsylvania. The deadline for the NC legislature to do all the rulemaking regarding hydraulic fracturing is October 2014. This is on a fast track.

But rulemaking is a slow process. For example, the Jordan Lake nutrient excess and water reservoir study took about 5 years, and this started with a process that actually had some data to begin with. The rules for Falls Lake took 3 years. There are water quality and nutrient rules, non point sources, etc. The more time spent at the beginning of the process, the better the final documents will be, and the less controversy at the end. We are also starting from a new position, not knowing the detailed geology and hydrogeology. There is no plan yet to train inspectors, and there will be no permits to drill issued until the regulations and the inspectors are in place. There will always be some compromise, as there are so many stakeholders.

Frank Sheffield, Ward & Smith, PA, New Bern, NC. *Water Law Related to Shale Gas Development in North Carolina.* Mr. Sheffield is a leader of the Environmental Practice group, advising clients on shale gas development and other alternative energy sources. What is not covered in the law or regulations yet are water-quality issues posed by hydraulic fracturing, wastewater issues, and rule development. From 4-7 million gallons (MG) per well are required for development, or 400-700 MG for 100 wells; water from nearby rivers and lakes, purchased from local utilities, and wells on leased premises could be utilized. DENR indicates that there is adequate capacity in the region except during droughts, but local utilities are concerned that this may raise the local water prices.

SB709 calls for an inventory of water resources, and the expected impact of hydraulic fracturing. SB820 requires a water-management plan before well permitting is allowed. Most water-supply legal rights are based on common law, such as riparian doctrine (if you live by a stream, you have rights to reasonable uses). Leasing uses can be slippery – there is a common clause to “make every effort” to replace water if the existing water supply is contaminated or damaged, but the water-supply rights for shale gas drilling are uncertain.

Earl Hagstrom, Sedgwick LLP, San Francisco. *Shale Gas and Litigation: Who is Suing Whom and For What Reason?* This is of course a politically charged subject, as energy independence, economic impact, and water resources are all in the mix. There are considerable surface environmental risks, such as erosion during well pad construction, handling and disposal of drilling fluids, pipeline construction and maintenance, and impact of habitat and surface resources from exploration and production. Subsurface environmental risks include corruption or disruption of water-bearing zones. Potential plaintiffs include landowners, with both surface and mineral

rights at stake, and neighbors, municipalities, water companies, and environmental groups; the list goes on. Potential defendants are the same, with the addition of production, drilling, chemical, and testing companies, and all workers involved. Causes of action could be assault, negligence, nuisance, failures, deception, fraud, misrepresentation, liability, and so on. Mr. Hagstrom enumerated many types of claims arising from hydraulic-fracturing operations. Disclosure requirements are not the same in all states, so the chemicals used may not always be revealed. Water contamination, product liability, and professional negligence are all common categories of cases. Fraud (financial fraud and fraudulent concealment) and class actions are another category. Their advice? Keep on top of developments. They have a hydraulic fracturing digest online at <http://www.sedgwicklaw.com/publications>

A question from the audience prompted some advice, in that if you lease your land to an oil/gas company, it may void your home mortgage. Mineral rights should be disclosed in the title.

Stanford Baird, Attorney, K&L Gates LLP. *Legislative and Policy Issues for Shale Gas Development in North Carolina.* Mr. Baird regularly advises manufacturing clients regarding environmental regulatory matters. Shale gas is a global resource, although there is not much data on the potential shale gas resources in North Carolina. It has been estimated that there is less than a 7-year supply in the Deep River Basin. There are real issues, including social and environmental, and there is a long and winding road to clean energy and economic-security legislation. Hydraulic fracturing and horizontal drilling were not allowed in North Carolina, historically, but very recent legislation (2011) lifted the ban. No permits will be issued until regulations are in place and the general assembly takes further legislative action. The recently reconstituted Mining Commission headed by a former oil and gas industry professional, has been granted authority to develop a modern regulatory program for the management of oil and gas exploration and development activities in North Carolina, including the use of horizontal drilling and hydraulic fracturing for that purpose. Parameters include management of wastes and wastewaters, disclosure of chemicals and hydraulic fracturing constituents, financial assurance for closure, regulation on well spacing, and limitation on water use during operations. Other provisions include protection of landowners, real estate disclosures, generation of public revenue, and so on. This is on a very fast track, as the shale gas regulatory program must meet a statutory deadline for the adoption of regulations by October 1, 2014, or just two years.

Hughbert Collier, Ph.D., P.G., Collier Consulting. *Groundwater Resources: What to Expect What You're Expecting Shale Gas Development in your Area.* Mr. Collier, who is from Texas, has done work both for and against the oil companies regarding oil issues. He

(Continued on page 20)

EDUCATION SECTION

(Continued from page 19)

suggested a good reference book, Groundwater & Wells, Third Edition. Another good reference he suggested is “North Carolina Oil and Gas Study under Session Law 2011-276” dated April 30, 2012.

NC is in some ways similar, and in others, very different from TX. Both states rely heavily on groundwater. About 52% of North Carolinians depend on groundwater for their drinking water, and over 900,000 NC households are served by privately owned individual wells. This does not include wells that have been drilled and plugged in the past. With nearly 16,000 public supply wells in NC, this makes for a complicated mix of stakeholders – both private and public consumers, and industry consumers.

In TX, 59% of the water used is groundwater. TX has well over a million wells in the well database, which includes a lot of water quality, levels, and other information. The difference in the states is in the oil and gas wells. TX drilled its first oil and gas well in 1919; NC in 1925. In TX they drilled over a million wells; in NC there are maybe 130.

The shale gas plays and aquifers in Texas are well characterized as to geology, production, depth, and aerial extent. There are areas in which aquifers are underlain by shale gas plays. What to expect when there is shale gas drilling in your area? Start with the historical

data: geology, geophysical logs, water-level data, water quality, etc. Drillers and regulatory agencies are sometimes the only source of the data. Establish a baseline, first thing, using these data. This baseline data are not as common in NC, although recent work on the existing data from NCGS has helped fill in the gaps. Baseline aquifer information in both states comes from geology, geophysical logs, water levels, water quality, drillers’ logs, and

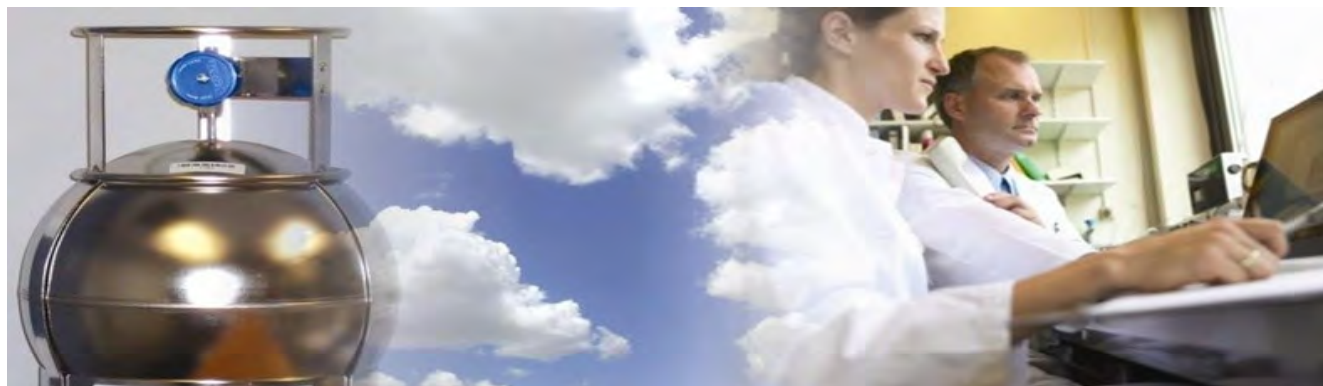
pumping tests. However, the Mesozoic Basins in NC have not been fully characterized for the presence or extent of either aquifers or shale gas. Now is the time to start collecting the baseline data, *before the drilling starts*. It will be more valuable in the decades to come. The data will not be wasted (monitoring, pumping rates, water levels, water quality, video surveys, site inspections, well construction data, etc), as people will always be drinking groundwater.

Potential problems could be prevented by referring to the data, including water quality (saline water), pathways for contaminants such as oil and shale gas (faults and old wells), etc. There is not usually a problem with injection wells if you do your homework and the wells are done properly. Dr. Collier would be happy to answer questions – he can be reached through www.collierconsulting.com, at 254-968-8721.



Hughbert Collier of Collier Consulting

(Continued on page 21)



SOIL

AIR

WATER

**FULL SERVICE ENVIRONMENTAL LABORATORY · QUALITY DATA & SUPERIOR SERVICE
ON-LINE DATA MANAGEMENT—LOCAL REPRESENTATION · SMALL WOMEN-OWNED BUSINESS**



EDUCATION SECTION

(Continued from page 20)

Will Morgan, Director, NC Sierra Club.

Fracking in North Carolina: An Environmental Advocate's Perspective. At the Sierra Club, Mr. Morgan advocates for strong environmental laws and regulations at the state level. The NC Sierra Club was established in 1970, and currently has about 15,000 members. Potential environmental impacts are to groundwater and surface water quality, air quality, and wastewater and solid waste. Hydraulic fracturing could impact water supply for about 2.4 million people.

Horizontal drilling and high pressure injection had been illegal in NC since the 1920s, but in 2011 the NC Legislature passed S.L. 2011-276, which authorized a study of environmental, economic, and social impacts, and consumer protection issues. The draft report was issued in March 2012, and there have been three public hearings. The final report was issued May 1, 2012. The conclusion was prescient:

“Production of natural gas by means of hydraulic fracturing can only be done safely in North Carolina if the state adopts adequate safeguards in the form of regulatory standards specifically adapted to conditions in the state and invests sufficient resources in compliance and enforcement. Development of appropriate standards will require additional information on North

Carolina’s geology and hydrogeology to identify conditions under which hydraulic fracturing can be done without putting the state’s water resources at risk.” The key findings: “Based on some informed assumptions about the number of wells that could potentially be located in the Sanford sub-basin and the pace of well development, there appear to be adequate surface water supplies to meet the needs of the industry.” However, North Carolina currently cannot ensure that groundwater or surface water withdrawals for natural gas development will be appropriately managed to avoid stream impacts and conflicts with other water users.

Daniel J. Soeder, US DOE, National Technology Laboratory, Morgantown, WV; *Environmental Risk Assessment for Shale Gas Development.* With the DOE, Mr. Soeder is seeking a better understanding of the engineering risks of shale gas production. The 1973 OPEC oil embargo was traumatic on the population of the US, causing huge shortages and a resultant precipitous

spike in gas prices. As a result, the Department of Energy was formed, and the Eastern Gas Shale Project was instituted. Cores were drilled throughout the northeast to assess the presence of natural gas, but it wasn’t until the horizontal drilling and fracturing techniques were perfected in the late 1990’s that extraction of this domestic resource became economically viable.

The risks of this process include impacts to air, groundwater, surface water, landscapes, and to both land and aquatic ecosystems. Other threats are the presence of the heavy equipment on large drill pads and the destruction of local roads by heavy trucks, and the human factor (inexperience of new hires, lack of knowledge, cost-cutting, distractions, etc.); not all risks are known, not all known risks are regulated, and not all regulations are enforced.

The DOE, through the National Risk Assessment Partnership (NRAP) coordinates their efforts between multiple national labs, using FEP-based components and probabilities. **FEP** is an anagram for **Feature**: the properties of the geology or geologic system that may affect risk; **Event**: an action that introduces higher risk into a system; and **Process**: a method or procedure that increases the risk. The system works, but translating the parameters to the new system of hydraulic fracturing is a challenge: CO₂ activity vs. CO₄,

pressure changes, old wells, etc. In April 2012, the President ordered the DOE, EPA, and USGS to cooperate on assessing and evaluating environmental and health risks from oil and gas production, primarily deepwater and shale gas. There are both overstated and understated risks. There were much higher risks from surface leaks and spills than from the actual underground fracking. There was also very little baseline data to assess damage resulting from the fracking process.

Mr. Soeder went on to discuss technical aspects of monitoring for air and water quality, the hazards of improperly abandoned wells, and the development on integrated modeling tools to provide a framework for well designs, completion techniques, etc. The data collected from ongoing work is constantly being integrated into the existing databases for future use.



Daniel Soeder, US Department of Energy

(Continued on page 22)

EDUCATION SECTION

(Continued from page 21)

Theodore (Ted) Feitshans, Department of Agricultural & Resource Economics, NC State University; *The Role of Local Government in Gas & Oil Production.* Mr. Feitshans teaches courses in agricultural law and environmental law at NC State University in Raleigh. As the U.S. Constitution says nothing about local government, the 9th and 10th Amendments have been interpreted to mean that state and local governments (or the *people*) have the authority to enact or change their own legislation. Sources of local authority are the federal government and the States (and some Indian tribes.) The local governments may not, however, act beyond constitutional or legislative grant of authority. The oil and gas industry, therefore, is regulated by state and local governments. But the state laws are governed by state constitutions, so local authorities may not lose their authority without changing the state constitution.

There are two basic choices for grants of authority – strictly read, and liberally read (allowing action unless prohibited). Different local governments/cities have different rules. Home rule is the idea that local people should rule themselves, with the power to manage local affairs, and with the ability to avoid interference from the state. However, the devil is in the details. Local regulation is invalid under certain conditions; the local lawyers need to know the local rules.

Swine-industry rules, oddly enough, are very similar to those of the oil and gas industry. State laws are often ambiguous as to the boundary between state and local authority. Mr. Feitshans went into the allocation of regulatory authority by area; property interests, taxation (property is locally taxed, severance is taxed by state, with or without revenue sharing), exploration, production, and processing. Also included are transport, access, sedimentation control, waste storage and treatment, water supply (both surface and groundwater), chemical management and disclosure, emergency management, and worker housing. Even in states like Texas, the issues have not been fully resolved. But now there is production in dense urban areas, and problems have arisen.

NC laws regarding siting for wells and other production infrastructure, and disclosure of chemicals and constituents, are shared by local and state agencies. Funding for regulatory enforcement is under consideration in Session Law 2012-143 (S820). The Mining and Energy

Commission, in conjunction with DENR, DOT, NC League of Municipalities, and NC Association of County Commissioners, is studying sources of funding and technical and other issues related to hydraulic fracturing, and will report their findings to the Joint Legislative Commission on Energy Policy on or before January 1, 2013. Final regulations have a deadline of October 1, 2014.

Lynn Weaver, Assistant Attorney General, Consumer Protection Division, NC Department of Justice; *Landowner and Public Protections in North Carolina.* Ms. Weaver is the Assistant Attorney General with the Consumer Protection Division with the NC Department of Justice. The Division enforces the AG's statutory and common law authority in the areas of, among other

genres, consumer protection. The division attempts to protect NC consumers from fraud, deception, price fixing, price gouging, restraint of trade and other unfair and deceptive practices.

Their primary responsibilities are interfacing with consumers, investigating and prosecuting violations, and educating North Carolinians about their rights. At this time, there are 13 attorneys, 13 consumer specialists, and support staff, who together handle about 20,000 written complaints and 100,000 phone inquiries regarding

assistance or information about NC antitrust and consumer protection laws.

The Session Law 2011-276, enacted in June 2011, contains some protections for landowners, much of which was superseded by S820. As part of the mandated Oil and Gas Study, consumer protection and legal issues relevant to oil and gas exploration in NC were examined. The report, "North Carolina Oil and Gas Study under Session Law 2011-276: Impacts on Landowners and Consumer Protection Issues," was issued in May 2012, and is available at the NCDOJ website, www.ncdoj.gov.

According to the report, development of shale gas can have serious adverse impact on landowners who lease their land for gas exploration, as well as their neighbors and surrounding communities. Air pollution, water contamination, soil compaction and erosion, removal of timber, chemical spills, explosions, and other physical surface damages have happened in the past and are possible in the future. Also, if a landowner enters into a gas lease or stores hazardous substances beyond those used in normal

(Continued on page 25)



Ted Feitshans, NC State



Enviro-Equipment, Inc.

Leading Supplier of Quality Environmental
Equipment and Supplies

1-888-274-8929



Aggressive Fluid Vapor Recovery Trailer (AFVR)

Enviro-Equipment, Inc. (EEI) is pleased to announce the construction of another Aggressive Fluid Vapor Recovery (AFVR) Trailer, also referred to as Dual Phase Extraction (DPE) and Mobile Multi-Phase Extraction (MMPE). While we have sold AFVR Trailers to clients in the past, we now plan to stock AFVR Trailer units for rental or subcontracting. Clients have the option for as little or as much assistance from EEI as they require. Options range from renting and operating the system yourself to subcontracting EEI to do your entire AFVR event.

Key Features of our AFVR Trailers Include:

- Dekker Oil Sealed Liquid Ring 300 SCFM @ 25"HG
- Epoxy Coated KO Tank with Float Tree for Automatic Transfer Pump Operation
- Progressive Cavity Transfer Pump with Manifold and Totalizing Flow Meter
- Manifold allows pumping from KO Tank to Storage Tank AND Pumping From Storage Tank through Totalizing Flow Meter to discharge point simply by adjusting valves
- Vapor Phase Carbon Drum for Off Gas Treatment
- Ultra Silent Diesel Generator, 230volt 3 Phase, Push Start, Auxiliary 115 and 230V Outlets
- Galvanized Steel Inlet Manifold, 3" Header, (7) 2" Zones with Ball Valve and Vacuum Gauge
- Multiple Sampling Ports
- UL Listed Control Panel

Check out our new clean carbon CleanInject™
Go to <http://www.enviroequipment.com/blog/?p=302>

EEI also carries all of the necessary accessories for AFVR events including "tanker truck" cam lock hoses, vapor phase granulated activated carbon media, thermo anemometers, photoionization detectors (PID), flame ionization detectors (FID), well head assemblies and stinger piping.

EEI is your one stop shop for rental of pilot test equipment or full scale remediation systems. We also custom build remediation systems on skids, in trailers or in buildings to your specifications. EEI is a Met Lab Certified Control Panel shop.

Enviro-Equipment, Inc. is your full service center for AFVR Trailers. We build them, so we can maintain and repair them. Whether it's a unit we built, you built or someone else built, we are your one stop service center. Contact Evan Chew at our Remediation Division 1-866-855-8287 or email us at remediation@enviroequipment.com.

ENVIRO-EQUIPMENT, INC. "WHEN IT HAS TO WORK"

www.enviroequipment.com

Exclusive distributor of the CleanInject™ System



Natural Hazard Solutions – Accomplish your priorities for hazard protection.

Systems engineered for maximum protection are not just products, but tested and proven solutions for:

- Debris flow
- Landslide
- Rockfall
- Slope instabilities
- Avalanche

Matching your cost-saving priorities for:

- Strength and durability
- Easy installation
- Simple maintenance

See more www.geobrugg.com



Geobrugg North America, LLC
Frank Amend, PE
Southeastern USA Regional Manager
PO Box 7453 • Rocky Mount, NC 27804-0453
Phone 252-937-2552 • Cell 252-904-6986
frank.amend@geobrugg.com
www.geobrugg.com



EDUCATION SECTION

(Continued from page 22)

residential activities, without the prior approval of the landowner’s mortgage lender, the lender may potentially have the right to foreclose on the property. Some lenders have refused to issue mortgage loans to landowners who have signed gas leases.

These impacts can be very problematic in cases where the subsurface gas rights have been severed from the property, or where they have been granted or sold separately. In these cases, the owner of the surface property is different from the owner of the subsurface property. The owner of the surface may not even know that the gas rights have been severed. In North Carolina, the subsurface estate is considered dominant; that means the gas rights holder has the right to access and use the surface to obtain the gas under the property.

The Clean Energy and Economic Security Act (S 820) contains substantial protections for landowners, some of the strongest in the country. The oil and gas developers are required to give 14-days written notice for operations that don’t disturb the surface (surveys, inspections, staking), and then 30-days written notice and a thorough description of the development plan, and an offer to consult with the owner for operations that do disturb the surface. In addition, water-supply and surface-activity issues, with their potential compensation for damages, are carefully spelled out.

Reclamation is required within 2 years following completion of operations, and the developer must post an adequate bond to cover the costs. Landmen must be registered to ensure ethical treatment of leases and titles. There are some other extensive consumer protections in the lease terms, too. For more information, you may contact Ms. Weaver at lweaver@ncdoj.gov.

John Oneacre, Groundwater Solutions; Diag-



John Oneacre, Groundwater

nostic Environmental Parameters for Differentiating Sources of Water and Gases. Mr. Oneacre, of Groundwater Solutions, Houston TX, gave some background, talking about homeowners wanting to understand the hydraulic fracturing issues fully, and also desiring there to be truth in the information they receive. You can’t play “loose and fast” with the data, but the data and the parameters may not give a full and complete picture; the investigator needs to do a bit of sleuthing and thinking.

Mr. Oneacre gave some examples where incomplete information allowed poor diagnoses of a problem. In the Pavillion, a Wyoming EPA study, where arsenic, barium, manganese, and sodium were found in water from four home wells, the EPA relied heavily on two parameters, high pH and Potassium. But these parameters by themselves give a false picture; it was actually a case of cement grout contamination. In a case from the Santa Susanna Fault splay in CA, chloride contamination was found not to originate from a landfill, but from a natural formation that contains brine. The project cost millions of dollars in attempted remediation, and it was not effective – not

enough data were included to give a correct diagnosis. In another falsely diagnosed problem, which showed discolored soil, the leak was actually not from an industrial natural gas line, but from a leak in an underground residential gas line. In this case, hundreds of thousands of dollars were wasted, where a bit of thinking would have prevented wasted effort and money.

Also, just because you find methane in your groundwater, that may not necessarily mean that you have industrial contamination. Methane may be biogenic, thermogenic, or abiogenic and mantle-derived. Biogenic gas is common in shallow groundwater, and is formed from bacterial reduction of organic matter. Sources could be

(Continued on page 26)

Visit us at www.kbmobilelabs.com



Todd Romero
Director of Operations

KB LABS, Inc.
25132 SW 1st Avenue
Newberry, FL 32669

Voice: 352.472.5830
Fax: 352.472.5832
Mobile: 352.538.4939
email: toddr@kbmobilelabs.com

Mobile Laboratory Services
State Certified WMBE
NELAP, NC, SC, Certified

Stop Guessing . . . Know What's Down Inside Your Well

Water well video, analysis, and repair

Geophysical Surveys

EGIS, PA

Mike L. Vaught, PG, CWC

(919)929-8363
441 Northside Dr.
Chapel Hill, NC 27516
gwinvest@juno.com

EDUCATION SECTION

(Continued from page 25)

coal, wetlands, peat bogs, landfills, and glacial and lake deposits. Mr. Oneacre discussed the sources and characteristics of biogenic methane, thermogenic gas, and the studies that show areas of naturally occurring methane all over North America. There are methods to differentiate methane from differing sources, including the ratios of the components, mole fractions of numerous gases, stable isotope signatures, and so on. However, the signatures of the varying components may change with time, location, and condition, so the investigator needs to think! Without baseline data it may not be possible to conclusively determine the source of gases, especially with mixing of different sources.

John A. Ughetta, Microseismic, Inc., Houston TX; *A Better Understanding of Hydraulic Fracturing Simulation Through Microseismic Monitoring and Mapping.* Mr Ughetta is Vice President for worldwide sales for MicroSeismics, Inc. in Houston TX. To put things in perspective, we are discussing earthquake seismology, or Richter **subzero magnitudes**. This is a log scale; negative 3 is equivalent to an apple falling on the ground from 6 feet; negative 4 is the energy released by pressing a key

on a keyboard.

For background, most of the Marcellus Shale in Pennsylvania is dry gas. Their company's focus is starting to be in the NC area, the Triassic Rift Basins in the Southeast. There are two types of technologies that allow extraction; horizontal drilling and fracking. Keep in mind that the animations used to educate people are not to scale on most of the cartoons or animations. Drilling can go to 10,000 feet, and then the drill bit is kicked off and with their new technology, they can resume drilling horizontally in a specific direction. The second technology is hydraulic fracturing, or fracking (this has been around since 1947). These new technologies enable much more comprehensive field development.

Typically, the formations are somewhat narrow, and deep. Marcellus Shale is about 300 feet thick and homogenous at 7,000 feet in depth; Utica Shale is 9,000 feet deep; Eagleford Shale (dry gas and oil) is down to 5,000 feet. These shales vary significantly from well to well, and from field to field. The cost of the wells is from \$3 million (mm) to \$6mm per horizontal well, but they have good returns initially, at about 20mm scf/day. After twelve months, the yield from the wells drops significantly, to about 1 to 2mm scf/d, and there is a change in stress in the reservoir from time to time. Their company works to demonstrate that the oil and gas company is not fracking into an aquifer, or causing earthquakes, and to defend fracking.

People are concerned, and uncertain, about the process and the ramifications. Public concerns include land use, traffic, pollution, water use and contamination, air contamination, and triggering of earthquakes. Passive seismic, is "out on the surface, listening." As you frack, this action creates a signal, or a popping sound, when the rock fractures. They continuously monitor the sounds, the p-wave, with geophones. They run the data through a passive seismic emission tomography processing program. Each frack event has about 12 attributes that are monitored. The monitoring may reveal several possibilities; bad cement job, casing failure, packer failure, or a sliding-sleeve failure. Monitoring may also reveal geological failures, or fracking into a fault, or out of a pay zone. It helps the completion engineers with better future fracking designs; stage intervals, cluster design, and pumping pressure, slurry volumes and rates, proppant density and type. It also helps with better development plans; stimulated reservoir volume, well spacing, stage spacing, and estimated reserves.

Land use and visual pollution is greatly reduced with the horizontal and multi-lateral drilling. In addition, pad drilling reduces the footprint and infrastructure damage.

(Continued on page 27)

Schnabel
ENGINEERING

- Dam Engineering
- Geotechnical Engineering
- Engineering Geology
- Geophysical Services

Greensboro, North Carolina / 336-274-9456 / schnabel-eng.com

EDUCATION SECTION

(Continued from page 26)

Session 5. Moderator: Jessica Godreau, NC Public Water Supply Section, NC DENR

Ryan Turner, Groundwater Protection Team Lead, Marcellus Delivery Unit, Talisman Energy USA.

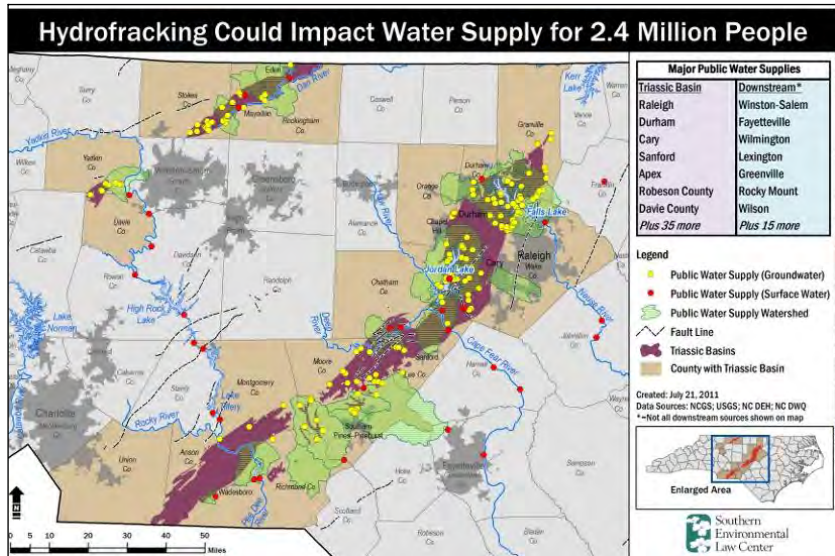
Effective Groundwater Protection Strategies in the Marcellus Shale. Mr.

Turner has served on the NC Environmental Management Commission and the NC Mining Commission. He has managed groundwater investigations in response to homeowner concerns. He lived in North Carolina for a long time, and loves it here, but moved recently to Pennsylvania to work on the Marcellus Shale. Talisman Energy is a Canadian-based company, with a long history of conventional energy development, and also unconventional development with shale gas. Their local office is in Pittsburgh. They have a dedicated groundwater protection team of about 6-7 professionals; Talisman has published a set of shale gas operating principles to establish responsible production procedures, follows principles of mutual benefit, and is transparent with the regulatory community and local homeowners. In Pennsylvania, about 50% of homeowners rely on groundwater wells. The wells are widely dispersed, and methane is naturally occurring in groundwater in the state.

Pennsylvania has a fractured aquifer system, with a series of well-indurated, fractured rocks. Because of this geology, it is hard to predict the flow of groundwa-

ter. There is not a large, regional flow system that can be predicted. Groundwater-protection practices include identifying the risks, and mitigating such risks. Then the next step is to go over the processes used, problems identified, and revise their practices. They do well-pad evaluations using a proprietary tool. They combine their risk assessment with a LIDAR-based map, identifying possible fractures on the surface.

They also look at localized cement formulations, QA/QC evaluations of annular spaces, apparent water resistivity, cement bond logs, etc. This is an integral part of their commitment to environmental stewardship. All their data are publicly available, as it is reported to the state.



Elaine Chiosso, Haw Riverkeeper.

Riverkeeper Perspective on Potential Environmental Risks to Watersheds from Shale Gas Development. Ms. Chiosso is the Executive Director of the Haw River Assembly in Bynum, NC., an organization formed in 1982 to protect the Haw River and Jordan Lake and associated sources of fresh water. Riverkeepers are licensed as part of Waterkeepers Alliance, which is a national and international organization that uses the law to protect water. There are about 200 of them throughout the world, with 11 NC Riverkeepers working together to protect NC waters.

Their concerns are the potential impact of hydraulic fracturing on shallow groundwater, pollution by spills, disposal of contaminated water, and the amount of water used for development processes. North Carolina Deep River shale basins are 1500 feet or less deep, and the shale shows on the surface in some areas. The fracture intrusions can easily impact groundwater aquifers.

There are 2.7 million well users in North Carolina, with over 100 added every year. There are no well inspections on private wells. A recent North Carolina study found that methane was linked to hydraulic fracturing operations, but there is a lack of baseline water quality data to verify the impact of these operations.

There is also a lack of adequate state oversight. It is estimated that 59% of private wells are out of compliance, with over 1,000 wells never inspected. Hydrofracking could impact water supply for both public and private

(Continued on page 28)



Woman-Owned Small Business

Brad Elkins, M.S.
Technical Sales & Support

(919) 873-2204 ext. 173
Fax: (919) 873-1074
belkins@eosremediation.com
www.eosremediation.com

1101 Nowell Road
Raleigh, NC 27607

EDUCATION SECTION

(Continued from page 27)

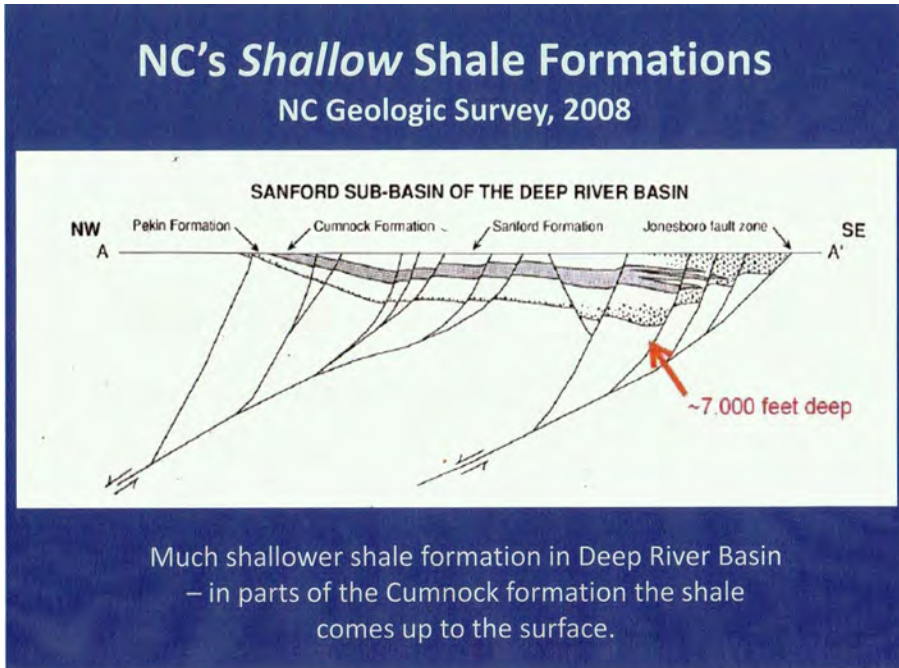
wells that supply water for 2.4 million people. The third concern is water supply. An average of 3.5 million gallons of water are used per frack—this will have to come from the regional water supplies, such as Falls Lake and Jordan Lake.

The fourth concern is the disposal of contaminated wastewater from the fracking process. Twenty tons of chemicals are added to make up the 0.5% that is not water. North Carolina has no wastewater-treatment facility large enough, and injection wells have a poor record of competence. In addition, infrastructure impacts on North Carolina streams and water quality include pipelines failures, gas-processing facilities, extra road building in rural areas, increased greenhouse gas emissions, and others. In addition, all the attention on shale gas has taken our focus off of renewable energy. North Carolina Riverkeepers believe that the uncertainties and documented problems of hydrofracturing for shale gas are too high a risk for our waters, land and people in North Carolina. For more information, contact info@hawriver.org.

Keynote Presentation

Jon Williams, Assistant Secretary for Energy, NC Department of Commerce. *Economic Dimensions for Shale Gas Development in North Carolina.* Mr. Williams gave a short history of past oil and gas exploration in the state. There have been oil wells in eastern North Carolina from 1925 to 1998; there had been some slight show

of hydrocarbons, but nothing commercially viable. In 1995, USGS did an assessment of resources, and found that there was no viable oil and gas available in the state; however, the new technology has changed everything. Shale-gas technology has gone through some incredible development in the last few years. This was a direct result of



policy decisions made during the Ford and Carter administrations that created tax credits for development of unconventional oil and gas resources, which led to the start of a company named Mitchell Energy in Houston, and the development of the GIS controls; in the last ten years this has become a huge energy producer. So how much is there? A June 2012 USGS assessment estimated 1.7 trillion cubic feet (tcf) of natural gas, and about 83 million barrels of natural gas liquids. There is not a huge percentage here in North Carolina of recoverable shale gas, compared to the lower 48 states, but the point is when will it become eco-

(Continued on page 29)

**GEOLOGIC
EXPLORATION**
Monitoring & Recovery Well Specialists

JASON MANTAK

176 Commerce Boulevard Tel: 704-872-7686
Statesville, NC 28625 Fax: 704-872-0248
jmantak@gexnc.com 1-800-752-8853

**PRISM
LABORATORIES, INC.**

Full Service Analytical & Environmental Solutions

Analytical for RCRA, CERCLA, CWA, SDWA, NPDES and more!
NELAC Accredited - US ACE Certified - SWBE

1-800-529-6364 www.prismlabs.com

EDUCATION SECTION

(Continued from page 28)

nominally recoverable? The rule of thumb in the industry is that about 20% of the existing reserves will be economically recoverable. What is it worth? Gas prices are very volatile. Current prices are about \$3.00 per million BTUs (British Thermal Units), which is considerably higher than the \$2.00 spot prices in January this year. Projected prices for late 2013 will be about \$3.50 for dry natural gas. But dynamic markets can change quickly. There are a lot of players in the industry placing bets on the future.

Storage helps to drive the market, and the price drives exploration and production. All the charts presented used the Henry Hub (HH) spot price for comparison. Vertical drilling rigs were predominant before the recession, and horizontal drilling has increased in the last few years. What's it worth in the future in NC? Keep in mind that most of the production happens in the first 1-1/2 years, as rates of production of the natural gas plays fall off after that time, for diminishing returns. There may be a 15- to 20-year production cycle for gas that is marketed from the state, but the biggest volume is going to be up front, so that the near-term prices drive a lot of the investment decisions.

But, as there are not too many current drilled holes and there is not much data, they have to do guesstimates. They are guessing that \$1.9 billion is actually recoverable in 2014 at \$3.50 HH. The cost of drilling only over a 7-year period was estimated. Cost to drill a well was about \$3 million, and to be drilled in the Sanford sub-basin was about 368 wells, amounting to about \$292.9 million (calculated by using their software program typical in the industry). This does not include the cost of fracking, bonus payments, lease payments, ownership issues, and so on. There are other basins in NC on which there is no data at all (Cumberland basin, etc.). However, with the costs and estimated return being what it is, they don't think there is much potential for favorable returns in North Carolina unless the cost of natural gas rebounds more and the production costs go down.

Having a background in the regulatory industry, it is interesting to think about what it will take to regulate this industry. The Marcellus Shale scenario is very different from basins in North Carolina because of the issue of scale. We don't have a resource anywhere like the scale they have there; here we would have fewer people, fewer rigs, and fewer sites to monitor. They built a model that assumed a 7-year buildout, peak in year 6, etc. One drill rig moves about once a month to another site; one rig arrives in the state in the first year, with about 10 active rigs in NC in year 6, and all are to be gone in year 8. This schedule makes it much more doable for an experienced regulatory crew to be on site every day to watch what happens. This is helpful to get a sense of scale.

This is an incredible time in the natural gas in-

dustry in the United States. Thomas Friedman, writing in the New York Times on August 4, 2012, said "We are in the midst of a natural gas revolution in America that is a potential game changer for the economy, environment and our national security — if we do it right." We need to regulate it correctly, but we need to appreciate that it is here. Because of this domestically produced natural gas, we have reduced the use of coal energy that produced CO₂ emissions drastically. We have cut coal CO₂ emissions back 25 years.

This is an important debate both here in NC and internationally. Mr. Williams may be reached at the NC Department of Commerce.

A CD of the PowerPoint slides presented during the program is available for sale through AGWT (www.agwt.org). Links to websites containing additional background information on shale gas resources and potential is available on the AEG Carolinas website, www.aegcarolinas.org, in the Summer 2011 GeoNews.

The author, Jane Gill-Shaler, is a Licensed Geologist in North Carolina, and the current Editor of GeoNews. She may be reached at janehgill-shaler@gmail.com.



ESP Associates, P.A.
www.espassociates.com

5005 Birnamwood Trail
Greensboro, NC 27407

Paul M. Weaver, PG
pweaver@espassociates.com

phone: 336.287.2165
fax: 704.583.4950

ESP Associates has offices in Fort Mill, South Carolina and in Wilmington, Raleigh, Concord, and Greensboro, North Carolina.

Providing Civil Engineering, Water Resources, Mobile 3D Mapping, 3D Laser Scanning, Geotechnical Engineering, Materials Testing, Special Inspections, Geophysics, Hydrographic Surveys, Transportation Geotechnical Engineering, Environmental Engineering, GIS, Landscape Architecture/Land Planning, and LEED services since 1986.

GSA ANNUAL MEETING & EXPOSITION

4-7 November 2012

Charlotte, North Carolina, USA

In just a few weeks, thousands of geoscience professionals and their guests will travel to Charlotte for several days of learning, networking, camaraderie, and just plain fun! You can find more information about the meeting, including the technical program, short courses, alumni gatherings, division meetings, and Charlotte cultural activities at the meeting website: www.geosociety.org/meetings/2012/

GSA is a professional society with a global and growing membership of more than 25,000 individuals at the forefront of geoscience research. In today's world, it is imperative that you, our members, have a platform to present your cutting-edge research. This is the first time in more than 25 years that GSA's Annual Meeting has been held in the Southeast, so we hope you take advantage of this opportunity. If you haven't registered yet, there is still time. You can even register online throughout the meeting or at the onsite registration desk.

Also, it is not too late to arrange sponsorship! Get your company's name out there and visible to more than 6000 attendees! Contact Debbie Marcinkowski at GSA for more details (DMarcinkowski@geosociety.org).

AEG will be represented at the meeting by a booth in the exhibits hall as well as sessions sponsored or co-sponsored by AEG:

T25. Landslides and Debris Flows: Global Problems, Local Solutions. Session No. 138. Tuesday, 6 November 2012: 8:00 AM-12:00 PM. Charlotte Convention Center 207BC.

T25. Landslides and Debris Flows: Global Problems, Local Solutions (Posters). Session No. 167. Tuesday, 6 November 2012: 9:00 AM-6:00 PM Charlotte Convention Center Hall B

T40. Practical Applications of Environmental and Engineering Geology. Session No. 50. Sunday, 4 November 2012: 1:30 PM-5:30 PM. Charlotte Convention Center 211AB.

T82. Geologic Maps, Digital Geologic Maps, and Derivatives from Geologic and Geophysical Maps (Posters). Session No. 96. Monday 5 November 2012: 9:00 AM-6:00 PM. Charlotte Convention Center Hall B

T121. Rapid Sea-Level Rise and Its Impacts: Past, Present, and Future I. Session No. 55. Sunday, 4 November 2012: 1:30 PM-5:30 PM. Charlotte Convention Center 219AB

T121. Rapid Sea-Level Rise and Its Impacts: Past, Present, and Future II. Session No. 55. Sunday, 4 November 2012: 1:30 PM-5:30 PM. Charlotte Convention Center 219AB

ANNOUNCEMENTS

NEWS FROM AE DRILLING SERVICES

AE Drilling Services has been busy in 2012 with large core drilling projects for the mining industry in Alabama & Maryland. Work begins on a large Cullman, Alabama water supply dam project in late August involving extensive inclined core drilling & packer testing throughout the dam footprint. Mark Lassiter attended the National Speleological Society Convention in Lewisburg, West Virginia the last week of June & was able to visit a number of the long & deep cave systems of the Greenbrier Valley but reports that a derecho weather event hit the campground the last night of the event wreaking havoc on property but miraculously leaving no one harmed.

CON-TEST ANALYTICAL LABORATORY Con-Test Analytical Laboratory is an industry leader providing the highest quality environmental analytical services to the Southeast. Con-Test is an established, full-service environmental laboratory that specializes in the analysis of air, soil, water and other solid materials. As an AIHA/ISO and NELAC accredited laboratory, Con-Test provides an extensive range in services and the highest degree of data integrity.

With the recent North Carolina vapor intrusion guidance document released last year by NCDENR, Con-Test is well situated to provide extensive technical guidance on sampling and analysis based on years of vapor intrusion experience in 33 states. Response time is exemplary to assist with expedited equipment orders and rush analysis. Technical capability and capacity is of the highest level and enhances the most stringent of project criteria including specific compound lists and detection limits.

Our centrally located service center in Charlotte facilitates the exchange of bottles, media, canisters and samples for return to our Massachusetts laboratory and also serves as a location for meetings and events. Tiffany Butz as Service Center Manager excels at timely, accurate and friendly service and has a strong customer service orientation. She will put together and deliver kits, pick up samples, and offer any guidance (or knowledge/ answer questions etc) to help facilitate client projects. Our Southeast team also includes Becky Wood, Account Executive and Tom Veratti, Jr., Principal. For more information or to schedule a Vapor Intrusion Seminar at your location, please contact Tom at 617-640-4424 and tveratti@contestlabs or call the Charlotte Service Center 980-406-3134. We look forward to hearing from you!

CELEBRATE GEOLOGIC MAP DAY ON OCTOBER 19! Celebrate the first annual Geologic Map Day! On October 19, as a part of the Earth Science Week 2012 activities, join the American Geosciences Institute (AGI), the Association of American State Geologists (AASG), and the U.S. Geological Survey (USGS) in promoting the importance of geologic mapping to society. Geologic

maps tell the story of each state's natural history through time, what rocks and minerals are there, how rivers and waterways were formed, where landslides and earthquakes have happened, and much more. Learn how to make geologic maps and how to read and understand them on Geologic Map Day. Go to <http://www.stategeologists.org/> and click on your state to find your state's geologic map and educational materials about your state's geology.

"In Minnesota we use geologic maps to keep our drinking water safe and to show why we have sinkholes. They are a brilliant tool to answer questions about the land and water posed by everyone from students to our state and national leaders" notes Dr. Harvey Thorleifson, President of AASG and State Geologist of Minnesota. Additional resources for learning about geologic maps can be found on the AGI Geologic Map Day web page (<http://www.earthsciweek.org/geologicmap/>). Earth Science Week 2012 will be celebrated October 14-20. To learn more, please visit <http://www.earthsciweek.org/>.

The Association of American State Geologists (AASG) is an organization of the chief executives of the state geological surveys in 50 states and Puerto Rico. The first state survey was established in 1823 in North Carolina. By 1840, there were at least 15 state surveys, most of which were charged with the discovery of mineral, energy, land, and water resources in their state or territory. Since 1908, the Association has met regularly to discuss issues of common interest and to initiate united actions when warranted. Contact: Vicki S. McConnell, AASG Past President (vicki.mcconnell@dogami.state.or.us) [Sam](#)

KB LABS IS NOW PROVIDING the Hydraulic Profiling Tool (HPT): A Direct-Push Tool Used to Further Characterize Subsurface Lithology and Locate Contaminant Pathways

Geoprobe® has provided many new advances in environmental sampling and direct sensing such as the Membrane Interface Probe (MIP). One of Geoprobe's® newer tools in their direct sensing family of products is the Hydraulic Profiling Tool (HPT). The HPT is a probe advanced into the subsurface using a hydraulic push and percussion push machine (DPT) similar to the MIP. The HPT probe consists of a robust Wenner array to provide electrical conductivity (EC) and a screened port for injection of water into the ground formation. A transducer inside the HPT probe measures the total pressure to inject the water into the formation determining a hydraulic profile of the subsurface. Uses of the HPT include determining lithology/hydrostratigraphy, qualitatively defining formation permeability, locating contaminant pathways, identifying optimal locations for monitoring and water supply well screens, guiding remedial injection programs, constructing geologic cross-sections, and estimating local formation hydraulic conductivity (est. K).

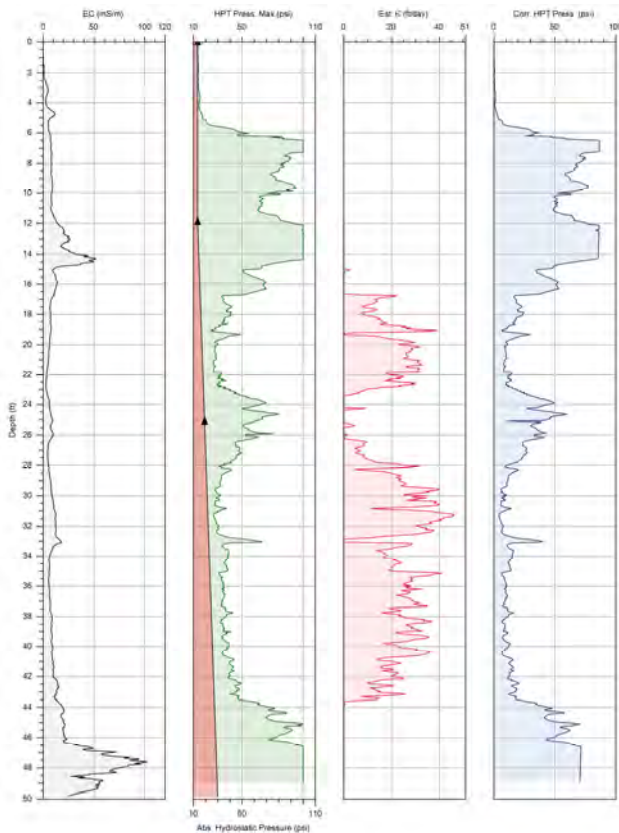
(Continued on page 32)

ANNOUNCEMENTS

(Announcements—Continued from page 31)

KB Labs is also one of the few providers in the country able to provide MIP and HPT in the same sub-surface push using Geoprobe's® new MiHPT combined probe assembly. The MiHPT probe can provide environmental data (MIP), soil hydraulic properties (HPT), and electrical conductivity (EC) all in a single sub-surface push using a direct-push (DPT) drilling platform.

To further inquire about the HPT, MiHPT, MIP, mobile labs, or any of KB Labs other onsite analytical services, please contact Todd Romero at KB Labs, 352-472-5830.



BEN JOHNSON, EIT, RECENTLY HIRED BY DUNCKLEE & DUNHAM

Duncklee & Dunham, an environmental services company based in Cary, North Carolina, has recently hired Ben Johnson, Engineer in Training (EIT), as a staff engineer. Ben received his BS degree in Environmental Engineering from NC State in June, and is quickly learning the consulting business basics, in the field. Ben also does computer aided design (CAD) work when he has time to work in the office.

Duncklee & Dunham was incorporated in 1996 to offer the highest quality and most responsive environmental services possible. They are a small business enterprise, licensed in North Carolina as a professional geologic corporation with projects across the United States. The firm offers a team of highly experienced professionals together forming a group that takes great pride in serving the needs of our clients using both traditional and innovative methods. For further information, please contact Dave Duncklee at dave@dunckleedunham.com.



Greensboro, North Carolina

336-286-9718 denilm@bellsouth.net www.geo-survey.com

Providing quality geophysical investigations at economical costs to the engineering & environmental industries



Geophysical Services

- Electromagnetics
- Ground Penetrating Radar
- Magnetometry
- MASW Seismic
- Refraction Seismic
- Resistivity Survey
- Utility Clearance



CHOICE
ENVIRONMENTAL SERVICES

WWW.CHOICE-ENVIRO.COM

RENTALS & SUPPLY SALES

WATER QUALITY, WATER SAMPLING, AIR MONITORING,
& SOIL SAMPLING

NICOLE MANNING

919-369-1001 (DIRECT)

919-363-6890 (FAX)

NICOLE@CHOICE-ENVIRO.COM

YSI

HORIBA

RAE

IN-SITU

PHOTOVAC

ISCO

LAMOTTE

QED

QUEST

TSI

LANDTEC

TRIMBLE

SOLINST

PROACTIVE

**WE ALSO RENT THE KAWASAKI MULE 3010
TRANS 4X4 XUV!**

BACKPACK & HANDHELD GPS, GEM 2000, TVA 1000B, SURVEY EQUIP., GENERATORS, LAPTOPS, ANEMOMETERS, MONSOON PUMPS, PERISTALTIC PUMPS, BLADDER PUMPS & NOISE DOSIMETERS & LOTS LOTS MORE!

JOB OPPORTUNITIES

Bonus Plans, Ownership, and Career Advancement Opportunities With Growing Environmental Firm

Apex is a national full-service environmental consulting and engineering firm with over 30 locations and 450 employees across the country. We provide environmental consulting and engineering services to national, regional, and local clients in multiple market sectors. We are looking for an experienced, senior-level environmental professional to manage and grow our Mooresville, NC office. Our Mooresville division is a smaller office comprised of very talented scientists, project managers, a program manager, and administration staff.

This is a great opportunity for an ambitious environmental professional to get involved with an entrepreneurial firm that focuses on minimizing bureaucracy. We offer bonus plans and ownership opportunities. We are looking for an environmental professional who has an established career in the Charlotte area, 15 years of experience in environmental consulting and engineering, commercial business development experience and clients, and several years of experience successfully managing P&L.

Apex is small enough that our employees still have access to our leadership, and it's easy for high-performers to be recognized for their contributions and advance without bureaucracy. And we're big enough to provide comprehensive environmental consulting and engineering services to our diverse client base and to provide resources to our employees to help in their professional development. If you know of anyone who may be interested in at least exploring possibilities for this type of career opportunity, please pass this message on and/or feel free to contact me directly at (410) 294-9631 or chenn@apexcos.com. Thanks for helping me get the word out!

KB Labs Job Opening

KB Labs is expanding its staff and has a **full time position** open for a Direct Sensing Field Specialist. This main focus of the job is the operation and maintenance of our Membrane Interface Probe (MIP), Cone Penetrometer (CPT) and Hydraulic Profiling Tool (HPT)

direct sensing field instruments. The instrumentation is used to provide real-time information regarding subsurface contamination and geologic conditions to benefit site assessment and remediation strategies. Experience is not required in the use of the tooling and we will provide all training necessary. Supplementary duties will include some mobile laboratory analytics such as the use of UV Fluorescence spectrometers and pending level of experience GC/MS volatiles analysis.

We are looking for someone who is mechanically and detail oriented, able to work without direct supervision and to effectively communicate with clients.

The following are requirements for a candidate:

Education: BS in Chemistry, Environmental Science or Geology preferred. An Associate degree is acceptable with a strong background in mechanical or electrical knowledge or with laboratory experience. Prior use of a Gas Chromatograph is a plus.

Travel: This job requires extensive travel and the candidate must be willing to be on the road as much as three weeks out of every month. The candidate must possess a clean motor vehicle driving record and possession of a CDL is a plus.

Physical: This job requires the ability to work outdoors and to safely manage objects such as compressed gas cylinders. The candidate will be required to pass a physical including ability to wear a respirator (although no actual work is anticipated to require the use) as well as a DOT Driver's physical.

Drug testing and background: Must be able to pass a drug and alcohol test as well as a background check to work on government sites. Must be a U.S. citizen.

Salary is commensurate with experience and educational background, but we are also interested in finding a highly motivated person who is willing to learn with on the job training. We offer paid health and disability insurance and vacation/sick leave as part of our compensation package.

Please contact Todd Romero at KB Labs (toddr@kbmobilelabs.com) for further information or to send a resume.



Douglas A. Canavello, P.G.
President

503 Industrial Ave. (27406)
P.O. Box 16265
Greensboro, NC 27416-0265

(336) 335-3174 ext. 121
(866) 545-9507
Fax (336) 691-0648
doug@pyramidenvironmental.com
www.pyramidenvironmental.com



Korey Drew
Account Executive

Pace Analytical Services, Inc.
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Mobile: 704.315.8068
Fax: 704.875.9091
E-mail: korey.drew@pacelabs.com



Teton Dam Foundation, Idaho, USA, from USBR

AEG is proud to present the next Shlomon Specialty conference. The conference will be held in Denver Colorado, on May 16-17, 2013 and will focus on a detailed review of select dam failures and incidents to provide a “lessons learned” to practicing engineering geologists. The conference format will include 1 hour interactive presentations and a field trip to a dam that recently underwent extensive rehabilitation. Below is the current list of dams to be discussed and the associated presenters:

Topic/dam Keynote	Presenter	Description
	Richard Goodman, UC Berkeley	Dr. Goodman, a nationally recognized expert in geology for dam foundations, will provide an overview of the importance of geology in the design and performance of dams.
Malpasset, France	Richard Goodman, UC Berkeley	Malpasset failed in 1959 as a result of uplift pressures on a removable block within the foundation. Little consideration was given to the foundation geology during design. 421 people died.
Wister Dam Incident, Oklahoma, USA	Chuck Redlinger, USACE-RMC	Wister Dam was completed in 1949 and due to extensive precipitation filled rapidly and during this filling leakage was suddenly observed

through the dam with flows up to 20 cubic feet per second. Investigations revealed the embankment experienced cracking and internal erosion due to differential settlement and several remedial actions were later completed to improve the embankment.	J. David Rogers, MS&T	St. Francis Dam Failure, California, USA
The St. Francis Dam failure was one of the worst civil engineering failures in the 20 th century in the United States, 450 people died.	USBR	Field Trip to Horseshoe Dam and Reservoir, Fort Collins, Colorado, USA
Horseshoe Dam and was rehabilitated between 2000 and 2004 to address dam safety issues with the limestone foundation, seepage through the embankment and foundation, and to improve stability.	Mark Bliss, USBR	AV Watkins Incident, Utah, USA
AV Watkins Dam experienced a severe seepage incident in 2006 when 100 to 150 gallons per minute were flowing through a location at the downstream toe. Emergency measures were enacted and the dam was saved and repaired.	Nate Snorteland, USACE-RMC	Teton, Ririe, Fontenelle Dams - Influence of Organizational Culture on Dam Safety, Idaho and Wyoming, USA
The presentation addresses the influence of organizational culture on dam safety and decision-making. Fontenelle (suffered an extreme seepage incident), Ririe (has performed extremely well), and Teton (complete dam failure).	Michael Gobla, USBR	Fontenelle Dam Incident Wyoming, USA
Fontenelle Dam experienced a severe seepage incident during first filling. The dam nearly failed adjacent to the spillway due to excessive seepage through and along the foundation of the embankment. The main incident was preceded by four other incidents that at the time were not identified to be seepage		

Teton Dam Failure, Idaho USA	Bill Engemoen and Dan Osmun, USBR	related.
Silver Lake Dam Failure, Michigan, USA	Kevin Richards, USACE-RMC	Teton Dam failed 4.5 hours after the initial signs of distress. The failure is attributed several factors including inadequate foundation preparation, inadequate design considerations for the extremely complex geology, lack of properly designed seepage collection systems for the core.
Quail Creek Dam Failure, Utah, USA	Douglas Boyer, USACE	Silver Lake Dam suffered from an extensive erosion below the spillway fuse plug resulting in release of the reservoir and failure of another downstream dam.
Summary, Lessons Learned, Design for Uncertainty	Pete Shaffner, USACE-RMC	Quail Creek Dam failed due to extensive foundation seepage and the failure caused \$12 million in damage and approximately \$8 million to reconstruct the dam.
		This presentation will provide a general summary of the conference and provide information and recommendations on how geologic information should be used help to understand risks and minimize issues with dams and their foundations.



St. Francis Dam Failure, California, USA, from Ventura County Museum of History & Art, colorization by Pony Horton

Association of Environmental & Engineering Geologists

Shlemon Specialty Conference

Dam Foundations Failures and Incidents



Teton Dam Core Trench and Foundation, Idaho, USA from USBR

Hyatt Tech Center
Denver, Colorado
May 16-17, 2013



Fontenelle Dam Incident, Wyoming, USA from USBR



Appetizers will be provided at the ice breaker reception on Wednesday night. Breakfasts and refreshments during breaks will be provided Thursday and Friday along with lunch on Thursday. Transportation to Horse Tooth Dam will also be included in the conference registration.

The conference rate will be \$325 for AEG member and \$400 for nonmembers. All nonmember participants will receive a one year membership in AEG with conference registration. The conference will be held at the Denver Tech Center Hyatt in the Denver Technological Center. Rooms are offered at \$139/night and include parking and guest room internet.

Various sponsorship levels are also available. Sponsors will receive recognition on poster boards at the conference, during the introduction, and in the AEG News. The sponsor list and contact information will also be included with course documents provided to all attendees. Sponsorship levels are as follows:

Sponsorship Category	Contribution Amount
Igneous	\$800
Metamorphic	\$500
Sedimentary	\$300

For additional information please contact Edwim Friend efriend@trib-consultants.com.

A conference/sponsor registration form is attached to this Brochure and at www.aegweb.org/ShlemonDams.

The Hyatt is located within walking distance of a light rail station that services downtown. Additionally the Hyatt has a complimentary shuttle that will travel within 5 miles of the hotel and provides access to hundreds of outstanding restaurants. Hotel rooms can be reserved at the following website: <https://resweb.paskey.com/go/AEG2013>, or call

1-888-421-1442

Registration Form

NAME (LAST)	(FIRST)	(MID)	MEETING STATUS
			Attendee
			Sponsor
			Member
			Non-member
NAME FOR BADGE			
COMPANY/INSTITUTION			
ADDRESS			
CITY/STATE/ZIP			
COUNTRY			
PHONE NUMBERS			
OFFICE ()			
CELL ()			
FAX ()			
EMAIL ADDRESS			
MEETING REGISTRATION			
			By 4.1.13 After 4.1.13
Full Registration - Non-Member - includes 1 year membership in AEG			\$375.00 \$375.00
Ice Breaker Reception (Wed, May 15)			\$400.00 \$450.00
Mentor Registrar			Complimentary
SPONSORSHIPS			
			COST
Igneous			\$800
Metamorphic			\$500
Sedimentary			\$300
TOTAL AMOUNT:			
SPECIAL NEEDS:			
PREFER VEGETARIAN MEALS:			<input type="checkbox"/>
DIABETIC:			<input type="checkbox"/>
KOSHER:			<input type="checkbox"/>
OTHER:			<input type="checkbox"/>
PAYABLE TO			\$
"AEG"			
If you have any questions, contact:			
Heather Clark, Meetings Manager			
Send registration form to:			
Association of Environmental & Engineering Geologists			
303-757-2926			
PO Box 469518			
Denver, CO 80246			
Fax: 720-230-4846			
heather@aegeeb.org			
Please indicate method of payment (check one). Amount of \$			
<input type="checkbox"/> Check <input type="checkbox"/> MasterCard <input type="checkbox"/> Discover <input type="checkbox"/> VISA <input type="checkbox"/> American Express			
Account Number for charge card (include all digits): _____ Three Digit CVD Code: _____			
Expiration Date: _____			
Signature: _____			
Name on Card (PLEASE PRINT): _____			
Address for Credit Card Billing: _____			

MORE SECTION MEETINGS COMING TO SOUTH CAROLINA

The Carolinas Section includes both North and South Carolina. While the bulk of our members are in North Carolina, we know there are members and potential members that would benefit from AEG activities in the Palmetto State, and AEG would benefit from members with new perspectives on environmental and engineering geology.

Our section held a section meeting five years ago in Columbia, and it was well-attended. In 2010, Charleston was the host city for the very successful AEG annual meeting. Over the years, the section has considered holding section meetings in Charleston, Columbia and Greenville, but we've not been able, until recently, to find volunteers to take the lead in setting up these meetings.

We also feel there are enough geologists to support a South Carolina Chapter that could run independently from North Carolina, needing only the leaders to do so. Recently, Tom Lammons of Bunnell-Lammons Engineering, Paul Johnstone of AMEC Environment and Infrastructure, and Briget Doyle of the University of South Carolina volunteered/were persuaded to take the lead in setting up a section meeting in Greenville.

The new President of AEG, Matt Morris, who works for Gannett Fleming in Pittsburgh, will visit Greenville on November 8 and be the speaker at a section meeting. As of the date of this newsletter, we have not yet finalized the location. We plan to have the Jahns Lecturer visit Greenville next spring and present at the spring section meeting.

If you are an AEG member in South Carolina and would like to set up a section meeting in Charleston or Columbia, please email Rick Kolb at rick.kolb1@gmail.com. We have been setting up section meetings for years and will help you get started. It's not that difficult, and each successive meeting gets easier and easier. We hope the November and March meetings are the precursors of regular meetings in South Carolina.

AEG PRESIDENT MATT MORRIS TO SPEAK AT NOVEMBER SECTION IN GREENVILLE SC

AEG Carolinas will host Matt Morris, AEG President, at their November 8 section meeting to be held in Greenville, SC. Details of the location are being worked out, and will be sent to our membership by email blast before the event. Matthew Morris, P.G., is a Senior Engineering Geologist and Project Manager for Gannett Fleming, Inc. based in their Pittsburgh, PA office. Matt's leadership experience with AEG began as the Kent State Student Chapter President in 1998, and has progressed through his current role as AEG President.

Mr. Morris' talk will be "The History and Progression of Rock Slope Stabilization for Menoher Boulevard, Cambria County, Pennsylvania." Menoher Boulevard is the main arterial roadway connecting the City of Johnstown with Westmont Borough in Cambria County, Pennsylvania. Its construction in the 1940s created an alternative route to climb the 460 vertical feet for travelers coming from Johnstown to Westmont, as opposed to traveling the existing steep carriage road over Yoder Hill. Many local residents still refer to this section of Menoher Blvd as the "Easy Grade Highway."

Given the construction methods of the period and understanding of rock slope stability performance, the 170 foot high cut slope was originally constructed nearly vertical by means of mass excavation and blasting. Over time differential weathering between the claystone/shale and overlying more resistant sandstone has resulted in undercutting, generating a rockfall hazard to the public and adjacent facilities along this 2,000 foot long section of roadway.

Gannett Fleming, Inc. was retained by PennDOT to evaluate the nature of the failures occurring in the rock slope and develop a mitigation scheme. The project was bid in September of 2012 and construction is anticipated to begin in 2013. This presentation highlights the development history of the Johnstown area, previous rockfall mitigation efforts, summary of the evaluations conducted, and the various techniques proposed for future stabilization.

To our ever-so-valuable Sponsors: Yes, YOU! Do you know how much we appreciate you?

- 1. You make the quarterly meetings affordable**
- 2. You allow us to be able to have periodic field trips and conferences (check out the article on page 17 of this issue—YOU helped underwrite this two day conference in August)**
- 3. You help us with input to our newsletter (42 pages this issue)**
- 4. You help support our website and email announcements (each has your name on it)**
- 5. You help fund purchase of educational resources for our North Carolina science teachers**

We need you; Please Renew! The application is on page 40. Remember, we have not raised our rates in over nine years. Read it to see your tremendous benefits. THANK YOU!!!

CALENDAR OF EVENTS - 2012

Geological Events in the Carolinas

Courtesy of AEG Carolinas Section – www.aegcarolinas.org. Last updated September 21, 2012

Send updates/corrections to Rick Kolb, Duncklee & Dunham, rick.kolb1@gmail.com

Meeting Date, Time, and Location are Subject to Change – Please Verify Prior to the Meeting

Date: Tuesday, October 2, 2012 (first Tuesday of each month)

Event: Engineers Without Borders monthly meeting, Research Triangle Park Professional Chapter

Location: 6:30-8:00 PM at the offices of Camp Dresser & McKee; 5400 Glenwood Avenue, Suite 300; Raleigh

Contact: Sarah Kahn, snkahn@gmail.com

Date: October 4, 2012

Event: *Water, Water Everywhere: What the Geosciences Can Tell Us about the Present and the Future of Water Resources*, presented by Tamlin Pavelsky, Assistant Professor of Global Hydrology, Geological Sciences Department, UNC-Chapel Hill

Location: 7:00-9:00, UNC's Friday Center for Continuing Education in Chapel Hill, North Carolina, \$10, free for students

Contact: www.fridaycenter.unc.edu/pdep/wbi, or (919) 962-2643

Date: October 4-7, 2012

Event: Shakori Hills Grassroots Festival

Location: Pittsboro, North Carolina

Contact: www.shakorihillsgrassroots.com

Date: October 11, 2012

Event: *Impact of Sea-Level Rise on Barrier Islands: Lessons Learned from the Geologic Record*, presented by Antonio Rodriguez, Associate Professor, Institute of Marine Sciences, UNC-Chapel Hill

Location: 7:00-9:00, UNC's Friday Center for Continuing Education in Chapel Hill, North Carolina, \$10, free for students

Contact: www.fridaycenter.unc.edu/pdep/wbi, or (919) 962-2643

Date: October 11, 2012

Event: *Rapid Molecular Methods: A Revolution for Water Quality Management*, presented by Rachel T. Noble, Professor at UNC-Chapel Hill's Institute of Marine Sciences in Morehead City, Institute for the Environment, the Department of Marine Sciences, and the Department of Environmental Sciences and Engineering

Location: 7:00-9:00, UNC's Friday Center for Continuing Education in Chapel Hill, North Carolina, \$10, free for students

Contact: www.fridaycenter.unc.edu/pdep/wbi, or (919) 962-2643

Date: October 12-14, 2012

Event: Carolina Geological Society 73rd Annual Meeting and Field Trip

Location: Geology of Upstate South Carolina in the Vicinity of Caesars Head and Keowee-Toxaway State Parks

Trip focuses on petrology of metamorphic and ultramafic rocks and structure/tectonics of ductile and brittle structures in the western Inner Piedmont; base will be Greenville, South Carolina

Contact: www.carolinageologicalsociety.org/CGS/2012_Meeting.html

Date: Thursday, October 18, 2012

Event: Ground Water Professionals of North Carolina evening social

Location: 5:30-7:00 at the Days Inn Conference Center, Southern Pines/Pinehurst

Contact: Mike Stanforth at mstanforth@excelengr.com, (704) 913-7614

Date: Friday, October 19, 2012

Event: Ground Water Professionals of North Carolina annual golf tournament

Location: 8:30 AM shotgun start at Hyland Golf Club, Southern Pines

Contact: Mike Stanforth at mstanforth@excelengr.com, (704) 913-7614

Date: October 25, 2012

Event: First Fall Meeting of the Carolinas Section of AEG
Speaker: Eric Swope, DSCA, *The Good, the Bad, and the Ugly: Compliance Practices Impacting the NC DSCA Compliance Program* (see page 4 of bulletin for abstract)

Location: 5:30-9:00, Natty Greene's; Greensboro, North

(Continued on page 38)



Scott Pearce
Vice President

P.O. Box 484
High Point, NC 27261
P: 336.434.7750
F: 336.434.7752
C: 336.803.1783
spearce@adenviro.com
www.adenviro.com



Mark Lassiter, P.G.

President

Two United Way
Greenville, South Carolina 29607
Phone: (864) 288-1986
Fax: (864) 288-2272
E-mail: mlassiter@aedrilling.com

(Continued from page 37)

Carolina; Members \$25, non-members \$30, students with ID free.

Contact: Paul Weaver, pweaver@espassociates.com

Date: October 25, 2012

Event: *Meeting Future Water Demands: Engineering, Economics, and Managing Risk*: presented by Gregory W. Characklis, Director of the Center for Watershed Science and Management in the UNC Institute for the Environment, and Professor, Department of Environmental Sciences and Engineering at the Gillings School of Global Public Health, UNC-Chapel Hill

Location: 7:00-9:00, UNC's Friday Center for Continuing Education in Chapel Hill, North Carolina, \$10, free for students.

Contact: www.fridaycenter.unc.edu/pdep/wbi, or (919) 962-2643

Date: November 4-7, 2012

Event: Geological Society of America Annual Meeting

Location: Charlotte Convention Center

Contact: Rick Kolb at rick.kolb1@gmail.com if you are interested in sitting in the AEG booth for a couple hours

Date: Tuesday, November 6, 2012 (first Tuesday of each month)

Event: Engineers Without Borders monthly meeting, Research Triangle Park Professional Chapter

Location: 6:30-8:00 PM at the offices of Camp Dresser & McKee; 5400 Glenwood Avenue, Suite 300; Raleigh

Contact: Sarah Kahn, snkahn@gmail.com

Date: November 8, 2012

Event: Second Fall Meeting of the Carolinas Section of AEG in Greenville, South Carolina

Speaker: Matt Morris, Gannett Fleming and AEG President; Pittsburgh, PA; *The History and Progression of Rock Slope Stabilization for Menoher Boulevard (aka Easy Grade Highway or S.R. 271, Section 13), Cambria County, Pennsylvania* (see page 36 of newsletter for abstract)

Location: 5:30-9:00, Location to be determined; Members \$25, non-members \$30, students with ID free.

Contact: Rick Kolb, rick.kolb1@gmail.com

Date: Thursday and Friday, November 8 & 9

Event: NC Science Teachers Association Annual Conference

Location: Benton Convention Center, Winston-Salem, NC

Contact: Randy Bechtel, Randy.Bechtel@ncdenr.gov.

Date: Wednesday, November 14, 2012

Event: Meeting of the North Carolina Board for the Licensing of Geologists

Location: 9:00 at Upton Associates; 3733 Benson Drive; Raleigh, North Carolina

Contact: Barbara Geiger, ncblg@bellsouth.net; (919) 850-9669

Date: Tuesday, December 4, 2012 (first Tuesday of each month)

Event: Engineers Without Borders monthly meeting, Research Triangle Park Professional Chapter

Location: 6:30-8:00 PM at the offices of Camp Dresser & McKee; 5400 Glenwood Avenue, Suite 300; Raleigh

Contact: Sarah Kahn, snkahn@gmail.com

Date: September 8-15, 2013

Event: AEG Annual Meeting

Location: Westin Hotel; Seattle, Washington



Judd Mahan, PG
Project Manager


1560 Pisgah Drive
Canton, North Carolina 28716
www.mountainenvironmental.com
jmahan@mountainenvironmental.com

828-648-5556
toll free: 800-261-0031
fax: 828-648-1566
cell: 828-458-2240



Gill Editing Online

Jane H. Gill-Shaler, P.G. (NC)
Cell 336 687 6144 JaneHGill@aol.com

 <p>Environmental Conservation Laboratories</p>	<p>Cary, NC Lab: ENCOCRY@encolabs.com Tel: 919-677-1669 Fax: 919-677-9846</p>	<p>Orlando, FL Lab: ENCOORL@encolabs.com Tel: 407-826-5314 Fax: 407-850-6945</p>
	<p>Jacksonville, FL Lab: ENCOJAX@encolabs.com Tel: 904-296-3007 Fax: 904-296-6210</p>	<p>Corporate Office: 10775 Central Port Drive, Orlando, FL 32824</p>

MEMBERSHIP REQUIREMENTS

MEMBER: Applicants for Member Class shall hold a degree in geology, engineering geology or geological engineering, or a degree in a related professional field with 30 semester-hours of credit in the geosciences. In addition an applicant shall be practicing in the field of Engineering Geology, Environmental Geology or Hydrogeology. Annual Dues for new (first-time) Members = \$75.00 per year for the first year of membership. Otherwise Annual Dues = \$115.00. Applicants who qualify for Member Class, but are engaged in full-time teaching at the Primary, Secondary or post-secondary level are eligible for Teacher Status (Annual Dues = \$35.00).

AFFILIATE: Applicants for Affiliate Member Class shall be scientists or engineers who work with engineering geologists; teachers engaged in middle-school and high school Earth Science education; or persons interested in engineering geology. Annual Dues = \$75.00 (Teacher Dues = \$35.00)

STUDENT: Applicants for Student Member Class shall be full-time students enrolled in an academic program in the geosciences or in a related field in engineering. Annual Dues = FREE.

INTERNATIONAL: Applicants shall hold the same requirements as for Member Class, but may select from the following dues schedule: \$35, which includes the *Environmental and Engineering Geology Journal*; \$45 with the *Journal*, the *Annual Directory* and the *Annual Meeting Abstracts*; or \$55 with the *Journal*, *Annual Directory*, *Annual Meeting Abstracts* and the *AEG News*.

AEG memberships are based on calendar year. Applications received after October 1 will be entered for following calendar year.

APPLICATION FORM

Please complete this form and mail it with your Annual Dues payment to the Association's Headquarters office for processing. New member applicants do not pay Section dues for their initial year of membership.

Name: _____
(Please print your name as you would like it shown on your membership certificate.)

PREFERRED ADDRESS: _____

WORK PHONE: _____ FAX: _____

PREFERRED E-MAIL: _____

Second Address: _____

Home Phone: _____

DESIRED CLASS OF MEMBERSHIP: _____ ANNUAL DUES AMOUNT: _____

CERTIFICATION: _____
(Signature)
My signature attests that, to the best of my knowledge, I meet the academic and practice requirements for the membership class I have requested and that all entries on this application are true and correct. I also authorize AEG to charge my credit card for the dues payment, if I selected the credit card payment option.

Enclosed is my check for the amount of Annual Dues of \$ _____

Credit Card Payment Option

Discover Master Card Visa Amount of Dues to be charged to my card = \$ _____

Card Number: _____ Expiration Date: _____

SUBMISSION: Send this form with your check or credit card authorization to:
Association of Environmental & Engineering Geologists, PO Box 460518, Denver, CO 80246
Phone: 303-757-2926; FAX: 303-757-2969; AEG Web: www.aegweb.org



AEG CAROLINAS SECTION – SPONSOR INFORMATION

The Carolinas Section of AEG supports many of its activities with financial assistance provided by our sponsors. Our activities include quarterly meetings, periodic field trips and seminars, a quarterly newsletter, and email announcements about our meetings and geoscience related activities. In addition, we donate large quantities of educational resources to science teachers.

We offer several levels of sponsorship, but they all have one goal: to keep the sponsor’s name in front of our members and to bring you business. We have a real commitment to connecting our sponsors to potential buyers and will do all we can to help you build your business. Most of our members are practicing professionals with responsibility for selecting subcontractors, so our group is a great place to find new customers and to catch up with existing clients in an informal setting.

Our sponsors provide the financial support that allows us to have reasonably priced dinner meetings, host seminars, provide discounted dinner meeting costs for students and teachers, underwrite the cost of newsletters and our web site, provide geoscience mentors for students and young professionals, and support science education tools to our teachers and in our schools. All costs listed below are per year and end in December. New sponsorships received after October will continue to December of the following year.

Silver Sponsor (\$250):

GeoNews Newsletter: Business card size ad (2” high x 3-1/2” wide), four times per year.

Meetings: Listing on a Sponsor Poster, located at sign-in table. Verbal acknowledgement by name in Chairman’s introductory comments.

Meeting Exhibits: Space for tabletop display at one meeting. Cost of meeting waived for one person on the exhibit date.

Email Announcements: Listing of your company name on each AEG Carolinas Section email announcement (our email list is currently over 1,000 people)

Web Page: Acknowledgement on the AEG Carolinas Section Web Page, www.aegcarolinas.org, with a link to your site.

Gold Sponsor (\$375):

GeoNews Newsletter: Quarter-Page ad (4-1/2” high x 3-1/2” wide), four times per year.

Meetings: Listing on a Sponsor Poster, located at sign in table. Verbal acknowledgement by name in Chairman’s introductory comments.

Meeting Exhibits: Space for tabletop display at two meetings. Cost of meeting waived for one person on the exhibit date.

Email Announcements: Listing of your company name on each AEG Carolinas Section email announcement (our email list is currently over 1,000 people)

Web Page: Acknowledgement on the AEG Carolinas Section Web Page, www.aegcarolinas.org, with a link to your site.

Platinum Sponsor (\$500):

GeoNews Newsletter: Half-page ad (4-1/2” high x 7” wide), four times per year.

Meetings: Listing on a Sponsor Poster, located at sign in table. Verbal acknowledgement by name in Chairman’s introductory comments.

Meeting Exhibit: Space for tabletop display at three meetings. Cost of meeting waived for one person on the exhibit date.

Email Announcements: Listing of your company name on each AEG - Carolinas Section email announcement (our email list is currently over 1,000 people)

Web Page: Acknowledgement on the AEG Carolinas Section Web Page, www.aegcarolinas.org, with a link to your site.

Platinum PLUS Sponsor (\$600):

Same as Platinum, but with a FULL PAGE ad in GeoNews. Limited to 2 Sponsors per year.

GeoNews Newsletter Sponsorship Only

Businesses or individuals can also advertise in GeoNews without being a full sponsor. The annual rates for advertising in GeoNews are as follows:

Business Card	\$ 40.00
Quarter Page	\$ 60.00
Half Page	\$ 100.00
Full Page	\$ 200.00

Please complete the form below and mail to Jane Gill-Shaler, AEG Carolinas newsletter editor. Please call or email if you have any questions (contact information below).

AEG Carolinas Section Sponsorship Form

Please begin our sponsorship of the Carolinas Section of the Association of Engineering Geologists. Our sponsorship level is:

- _____ Platinum PLUS Section Sponsorship, \$600/year
- _____ Platinum Section Sponsorship, \$500/year
- _____ Gold Section Sponsorship, \$375/year
- _____ Silver Section Sponsorship, \$250/year
- _____ GeoNews Newsletter Sponsor Only (see above)

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____ Fax: _____

Contact Person: _____

Cell: _____

Email: _____

Website URL: _____

Date of Payment: _____

Something about your company (use back of page for more room) _____

Please enclose a business card or email ad in jpg, pdf, or doc to Jane Gill-Shaler at janehgillshaler@gmail.com.
MAKE CHECK OUT TO AEG CAROLINAS
Snail mail form and payment to:
Jane Gill-Shaler, AEG Carolinas Newsletter Editor
1636 West Lexington Ave., High Point, NC 27262
(Modified 12/17/2011)

SPONSOR OR RENEW MEMBERSHIP AT WWW.AEGWEB.ORG!

Thank You, AEG Carolinas Sponsors!!

PLATINUM PLUS SPONSORS

Enviro-Equipment, Inc., Denise Chew 704-588-7970 denise@enviro-equipment.com; Brian Chew, 888-274-8929, brian@enviroequipment.com; www.enviroequipment.com; *We are a Woman-Owned Small Business, staffed by experienced professionals, committed to providing quality environmental equipment and products for rent or sale at reasonable rates. EEI is a stocking distributor of numerous environmental products for detection of air, water, and soil contamination.*

Geobruigg North America, Frank Amend 257-937-2552 frank.amend@geobruigg.com; Deborah Johnson, 252-937-2552, deborah.johnson@geobruigg.com; www.geobruigg.com; *Geobruigg North America is a premier supplier of engineered rockfall protection and slope stabilization systems. Our wire-work-based, unobtrusive, and ecology-friendly systems blend well with the natural surroundings. Well-proven anti-corrosion processes permit achieving a useful life up to 100 years and our installed systems require virtually no maintenance.*

PLATINUM SPONSORS

In-Situ Inc., Jason Evans 1-800-446-7488 ext. 587 alockwood@in-situ.com; Darlene Crosby, 970-498-1638, ; www.in-situ.com; *In-Situ Inc. designs, manufactures, distributes, and rents environmental equipment for monitoring the quantity and quality of groundwater and surface water. From advanced aquifer characterization, to long-term monitoring, to economical data collection, In-Situ instruments provide accurate results and reliable operation even in harsh conditions. In-Situ Inc.'s headquarters are located in Fort Collins, Colo., USA. In-Situ offers world-class technical support 24 hours a day, 7 days a week. Please visit www.in-situ.com.*

Pine Environmental Services, Inc., Paul Federline 866-646-7463 pfederline@pine-environmental.com; 919-713-0008, ; www.pine-environmental.com; *Pine Environmental Services, Inc., "The Environmental Supply and Support People" is the largest environmental supply and leasing company in North America. Pine is the leading provider of rental equipment in the nation with the latest instruments available. Pine Environmental Services, Inc. takes pride in their unprecedented customer support and competitive pricing. Extended hours of operation and after-hour emergency support are on hand.*

TRS Environmental, Susan Boutwell 1-800-532-3381 ; Fred Love, 972-456-4000, Frederick.Love@trs-environmental.com; http://www.trs-environmental.com; *We provide a wide variety of environmental monitoring, sampling, and field and safety supplies for rent, lease, or sale.*

GOLD SPONSORS

American Environmental Drilling, Guy Veni 910-944-3140 guy@aedi.biz; Paul Chavaz, 910-944-3140, paul@aedi.biz; www.aedi.biz; *American Environmental Drilling, Inc. provides competitive full drilling services to North Carolina, South Carolina, and Virginia. Our services include: auger drilling, mud rotary, air rotary, geotechnical, geoprobe (direct push) and geothermal. Safety is a major factor in what we do and our drilling teams are fully trained and meet OSHA standards. We pride ourselves in being able to provide safe, reliable, fast, and efficient services. Our strong relationships with our clients allow us to understand their needs and be proactive in meeting their requirements. Cell: (910) 690-7569*

Con-Test Analytical Laboratory, Tom Veratti 617-640-4424 tveratti@contestlabs.com; Kristin Fleming, 919-896-1665, Kfleming@contestlabs.com; www.contestlabs.com; *Con-Test Analytical Laboratory is a full service environmental testing laboratory with over twenty years of experience performing air, soil, and water analysis. Con-Test prides itself on its commitment to data integrity and quality, made possible by our highly experienced staff and state of the art facility. Con-Test has one of the largest air labs in the country and is one of the few laboratories on the East Coast with AIHA and NELAC air certifications (PCBs, Vapor Intrusion, LEED).*

ESP Associates, Paul Weaver *ESP Associates, with offices in Fort Mill, SC and in Wilmington, Raleigh, Concord, and Greensboro, NC. Providing Civil Engineering, Water Resources, Mobile 3D Mapping, 3D Laser Scanning, Geotechnical Engineering, Materials Testing, Special Inspections, Geophysics, Hydrographic Surveys, Transportation Geotechnical Engineering, Environmental Engineering, GIS, Landscape Architecture/Land Planning, and LEED services since 1986.*

ESC Lab Sciences, Barry Kroll 800-767-5859 bkroll@esclabsciences.com; , 800-767-5859, ; www.esclabsciences.com; *ESC Lab Sciences is the only environmental laboratory certified to support your work nationwide from one location. No other lab is as accessible or prepared to handle your needs throughout the country.*

Geophysical Survey Investigations, Mark Denil 336-335-3174 denilm@bellsouth.net; www.geo-survey.com; *Geophysical surveys for commercial, industrial and governments; GPR, EM, resistivity, and seismic.*

SAEDACCO, Peter Byer 803-548-2180 pbyer@saedacco.com; , 803-548-2180, ; www.saedacco.com; *South Atlantic Environmental Drilling and Construction Co, Inc., (SAEDACCO), founded in 1993, is a southeast regional environmental services company. SAEDACCO is located in Fort Mill, SC and specializes in providing Direct Push, Drilling Construction, and Remediation services for the environmental industry.*

Schnabel Engineering, Gary Rogers 336-274-9456 grogers@schnabel-eng.com; Robert Cannon, rcannon@schnabel-eng.com; www.schnabel-eng.com; *Schnabel Engineering, Inc. is an ENR Top 10 geotechnical engineering firm. Schnabel offers highly specialized services in geotechnical engineering, geostructural design, dam engineering, tunnel and underground engineering, environmental and applied geoscience services, construction inspection and testing, and resident engineering services.*

SILVER SPONSORS

A & D Environmental Services, Inc., Scott Pearce 336-803-1783 spearce@adenviro.com; Dan Martin, 336-434-7750, dmartin@adenviro.com; www.adenviro.com; *A & D Environmental Services, Inc., is a full-service environmental and industrial company offering remedial, industrial, emergency response, waste management, and transportation services throughout the southeast.*

AE Drilling Services, Inc., Mark Lassiter, P.G. 864-288-1986 mlassiter@aedrilling.com; www.aedrilling.com; *AE Drilling Services has provided geotechnical, environmental, water supply, and mineral exploration drilling services to fellow professionals for over 40 years.*

Choice Environmental, Nicole Manning 919-369-1001 nicole@choice-enviro.com; Steve Jenkins; www.choice-

(Continued on page 42)

Thank You, AEG Carolinas Sponsors!!

enviro.com; *Choice Environmental Services, LLC. We carry or rent backpack & handheld GPS, EEM2000, TVA1000B, Survey Equipment, Generators, Laptops, anemometers, monsoon pumps, peristaltic pumps, bladder pumps, and more. We also rent the Kawasaki Mule 3010.*

EGIS, PA, Mike Vaught 919-929-8363 gwinvest@juno.com; Lynn Bressler; www.waterwellvideos.com; *EGIS, PA specializes in downhole geophysical and borehole video inspection services. We can assist in well development and rehabilitation.*

Environmental Conservation Labs (ENCO), Jim Hays 919-467-3090 jhays@encolabs.com; Susan Purser, spurser@encolabs.com; www.encolabs.com; *ENCO operates three full-service environmental labs. Our commitment to quality and unsurpassed service makes ENCO the lab of choice with environmental professionals.*

EOS Remediation, LLC, Brad Elkins 919-873-2204 belkins@eosremediation.com; info@eosremediation.com; www.eosremediation.com; *EOS Remediation leads in producing scientifically-tested, field-proven products for Enhanced Anaerobic Bioremediation, Enhanced Aerobic Bioremediation and Bioaugmentation. EOS Remediation's products are specifically developed and designed for cost-effective, in situ treatment of groundwater.*

Garco, Inc., Al King 336-683-0911 alk@egarco.com; www.egarco.com; *Garco, Inc. provides Environmental, Industrial, & Recycling Services.*

Geologic Exploration, Inc., Jason Mantak 800-752-8853 jmantak@gexnc.com; Steve Taylor, 704-872-7686; www.geologicexploration.com; *Geologic Exploration is a full service environmental drilling contractor, specializing in monitoring and recovery wells. We also perform rock coring, packer testing, well abandonment, and other environmental services.*

KB Laboratories, Todd Romero 352-367-0073 toddr@kbmobilelabs.com; , 804-355-4520; www.kbmobilelabs.com; *KB Laboratories, Inc. Our mission is to provide high quality mobile analytical and MIP direct sensing technology services meeting the on-site needs of engineering and consulting firms requiring rapid characterization of environmental contaminants.*

Mountain Environmental Group, Judd Mahan 828-648-5556 jmahan@mountainenvironmental.com; 800-261-0031; www.mountainenvironmental.com; *Mountain Environmental provides environmental and industrial services such as waste transport and disposal, remediation, UST removal, drilling, AVFR, emergency response, industrial cleaning, XRF lead-based paint inspections and asbestos abatement.*

Pace Analytical Inc., Korey Drew 704-875-9092 korey.drew@pacelabs.com; www.pacelabs.com; *Pace Analytical Services is a full service sampling and analytical testing firm operating a network of laboratories and service centers nationwide.*

Parratt-Wolff, Inc., Butch Stevens 919-644-2814 bsteven@pwinc.com; www.pwinc.com; *Parratt-Wolff, Inc., is a full-service environmental and geotechnical drilling firm.*

Prism Laboratories, Angela Overcash 800-529-6364 aovercash@prismlabs.com; John Weiss, jweiss@prismlabs.com; www.prismlabs.com; *Since its inception in 1992, Prism Laboratories, a woman owned small business certified company, has been committed to providing the highest level of quality analytical services and technical support to our customers in the environmental monitoring, water quality and waste disposal market. Our team of highly qualified professionals is focused on ensuring on-time delivery of accurate and precise analytical results, while working one on one with our customers to provide customized service to suit each client's specific requirements. Prism Laboratories is NELAC and DOD accredited, holds State certifications throughout the Southeast and maintains an extensive list of accreditations and memberships pertinent to the analytical testing and environmental monitoring industry.*

Pyramid Environmental, Doug Canavello 336-335-3174 doug@pyramidenvironmental.com; www.pyramidenvironmental.com; *Since 1990, as a professional, licensed engineering and geological firm, Pyramid has the expertise to research and analyze relevant environmental regulations, potential hazards, clean-up alternatives and environmental protection issues to design and implement solutions for environmental problems.*

Regenesis, Drew Baird, PG 864-240-9181 dbaird@regenesi.com; , 800-529-6364; www.regenesi.com; *Our mission is to develop, manufacture and market advanced, innovative technologies for the restoration or remediation of natural resources such as groundwater and soil. Regenesis' efforts are driven by and focused on technology performance, customer needs and cost-effectiveness. Looking forward, we will seek out and explore new technologies for the prevention and/or remediation of a broad range of environmental concerns.*

SGS North America, Inc., Adam Phillips 910-350-1903 Adam.Phillips@sgs.com; Ethan House, 910-742-6581, ethan.house@sgs.com; www.us.sgs.com/environment; *SGS is one of the nation's top 20 laboratory operations and is committed to providing the best in analytical services. We are able to meet the ever-increasing needs of our clients by providing superior analytical data and customer service. SGS offers laboratory services covering the entire domain of environmental analysis of water, air, soil, and waste.*

Our sponsors are a valuable resource for the funding of meetings, outreach and educational programs. Please honor their support by giving them your business. If you don't see your company name here, contact our newsletter editor, Jane Gill-Shaler at janehgillshaler@gmail.com or Paul Weaver, pweaver@essassociates.com.net for sponsorship information, or fill out and mail the Sponsorship form on page 40 in this issue.

You may also renew or join our sponsors online at www.aegweb.org. Consider becoming a national AEG Sponsor!