

GeoNews

Newsletter of the Association of Environmental & Engineering Geologists,
Carolinas Chapter 2009, 2011, 2013, 2016, and 2017 AEG Chapter of the Year

SPRING 2018



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SAVE THE DATE

- April 19, 2018
AEG & ASCE Carolinas Spring Meeting
Trophy Tap & Table—Raleigh, NC
- August 2, 2018
AEG Carolinas Summer Meeting
Raleigh, NC

GEONEWS SPRING 2018
Issue Date: April 19, 2018
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Thanks to our Sponsors!

GeoNews is a publication of the Carolinas Chapter 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 AE 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 Sept 1, issue date Sept 21

Winter—deadline Dec 1, issue date Dec 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

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AEG Carolinas Chapter Website www.aegcarolinas.org

AEG National Website www.aegweb.org

Cover: Before (Top) and After (Bottom) redevelopment of Revolution Mill, Greensboro, NC

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MESSAGE FROM THE CHAIR

By Madeline German, P.G., Carolinas Chapter Chair

Greetings Carolinas Chapter!

We kicked off 2018 in Charlotte, NC for the January 25th dinner meeting at Draught. Dr. Kevin Finneran, associate professor of environmental engineering at Clemson University and owner of Finneran Environmental, LLC, presented “Combined microbial-chemical redox reactions for Cr(VI) transformation”. In his talk he discussed how Cr (VI) bioremediation has generally been predicated on stimulating strictly microbial reactions, in which the cells must directly interact with the contaminant(s) to transform it. While this can be effective and efficient, there are times when direct cellular interactions are slow, incomplete, or completely impossible. Kevin presented new approaches in technology including electron transfer via activated carbon, with both laboratory and field examples.

At the January meeting we “passed the hat” to raise money to send well supplies to Haiti. AEG members raised \$160 to support fresh drinking water for the people of Haiti.

On February 22nd and 23rd the 2017-2018 Jahns Distinguished Lecturer Dr. John Wakabayashi visited UNCC, Guilford College, Wake Tech and NCSU. He presented “Evolution of step-overs and bends along strike-slip faults: Implications for seismic hazards assessment” and “Attempting to bridge the growing gap between academic and applied geology: A personal odyssey”.

He also joined the students for lunch between talks and attended a social at Raleigh Brewing Company Friday evening. John’s enthusiasm and passion for geology and life were obvious to the students and professionals who were privileged to see him speak.

The spring 2018 dinner meeting and field trip hosted by the University of South Carolina, AEG and ASCE were held in Columbia, South Carolina, March 9th and 10th. This amazing event was on the **Dam Failures during the historic October 2015 Flood in South Carolina**. The field trip included locations that were impaired during flooding including the Old Mill Dam, an earthen dam located in Lexington County, which was one of the largest dams destroyed during the flooding and Lake Elizabeth, located in Richland County. Details related to the dam locations visited during this field trip and others affected by this flood can be found in; “Embankment Failures during the Historic 2015 October Flood, South Carolina: Case Study” (2016) in the Journal of Hydraulic Engineering.

(Continued on Page 4)



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(Continued from Page 3)

Coming up On March 29th AEG is cosponsoring with Cascade Technical Services to present Field Days! At this event attendees will learn about the Vertical Aquifer Profiling tool, Mobile Analytical as well as geoprobe and sonic drilling. This will be a great event for students as well as professionals. License credits are being offered. There will also be a BBQ lunch!

On April 19th in Raleigh, North Carolina AEG is partnering with ASCE to present North Carolina Brownfields Eastern District Supervisor Sharon Poissant Eckard, PG, who will be presenting “Opportunities in the Brownfields of Dreams & Brews”. Come hear what’s new in Brownfields and how we are helping turn contaminated properties into fields of dreams and brewpubs.

As always, your board and I look forward to hearing from each of you regarding your suggestions and/or concerns related to our Chapter. We are here to serve the needs of our membership, so your feedback is vital and welcome.



Maddie German, PG

madeline@smithgardnerinc.com

AEG Carolinas Chapter Chair

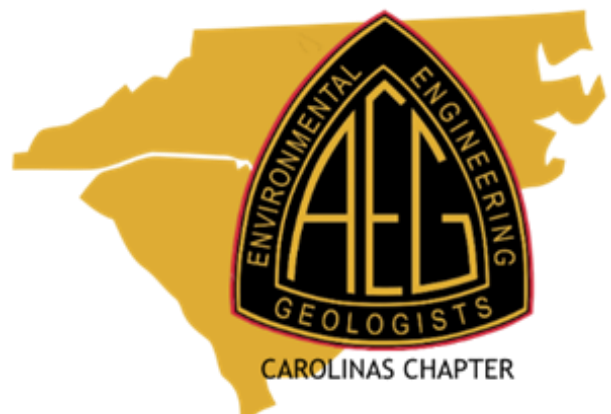


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AEG Carolinas Chapter 4Q 2017 Treasurer's Report

By Walt Plekan, P.G., Carolinas Chapter Treasurer



AEG Carolinas Section Treasurer's Quarterly Report October 1 - December 31, 2017

BALANCE As Of October 1, 2017

| | |
|------------------|--------------------|
| Checking Account | \$2,594.91 |
| Savings Account | \$15,707.64 |
| | <u>\$18,302.55</u> |

INCOME

Meetings

| | |
|-------------------|------------|
| Fall Field Trip | \$2,120.00 |
| September Meeting | \$2,340.00 |
| VI Conference | \$4,963.00 |

Sponsors

| | |
|---------------|----------|
| VI Conference | \$750.00 |
|---------------|----------|

Interest

| | |
|-----------------------|------|
| Interest from savings | 2.28 |
|-----------------------|------|

SUBTOTAL - INCOME

\$10,175.28

EXPENSES

Fees

| | |
|------------------|-------|
| Card reader fees | 48.61 |
| Paypal fees | 197.4 |
| Bank Fees | 6 |

Meeting Expenses

| | |
|-----------------------------------|------------|
| Fall Field Trip-location and food | \$1,605.00 |
| Fall Field Trip-refunds | \$170.00 |
| Fall Meeting-location and food | \$1,283.70 |

Additional Expenses

| | |
|------------------------------|------------|
| AEG Educational Grants | \$270.00 |
| NC OEST Awards | \$750.00 |
| VI Conference Reimbursements | \$1,962.15 |
| AEG Gift Membership | \$160.00 |

SUBTOTAL - EXPENSES

BALANCE As Of December 31, 2017

| | |
|------------------|---------------------------|
| Checking Account | \$ 3,433.05 |
| Savings Account | \$ 18,591.92 |
| TOTAL | <u>\$22,024.97</u> |

AEG Carolinas Chapter 1Q 2018 Treasurer's Report

By Walt Plekan, P.G., Carolinas Chapter Treasurer



AEG Carolinas Section Treasurer's Report January 1 - February 28, 2018

| | |
|--|----------------------------|
| BALANCE As Of January 1, 2018 | |
| Checking Account | \$3,433.05 |
| Savings Account | \$18,591.92 |
| | <u>\$22,024.97</u> |
| INCOME | |
| Meetings | |
| January Meeting | \$2,110.00 |
| Winter Field Trip | \$1,136.00 |
| March Meeting | \$250.00 |
| Sponsors | |
| 2018 Annual Chapter Sponsors | 4800 |
| Interest | |
| Interest from savings | 1.5 |
| | SUBTOTAL - INCOME |
| | \$8,297.50 |
| EXPENSES | |
| Fees | |
| Card reader fees | 22.48 |
| Paypal fees | 92.19 |
| Meeting Expenses | |
| January Meeting-Food and Beverage | \$2,235.24 |
| Additional Expenses | |
| AEG Scholarship Donation | \$2,500.00 |
| | SUBTOTAL - EXPENSES |
| BALANCE As Of February 28, 2018 | |
| Checking Account | \$ 6,879.14 |
| Savings Account | \$ 18,593.42 |
| TOTAL | <u>\$25,472.56</u> |

Continuing Education for Registered Geologists

By Rick Kolb, P.G., Duncklee & Dunham

The North Carolina Board for the Licensing of Geologists implemented a change to the rules and now requires 12 hours of continuing education in geology each year. The article below was sent out last month as an email blast to licensees. We are putting this in the chapter newsletter as an FYI for those geologists not yet licensed.

Licensees,

We are in our first year of fulfilling the requirement to earn 12 continuing education (CE) credits in geological or geology related courses, or field trips. The continuing education year runs from July 1, 2017 to June 30, 2018, so you have less than 5 months left to earn these credits. The Continuing Education committee of the board has spent many hours reviewing applications to be considered as pre-approved CE providers. The board has pre-approved 68 CE providers and expects to approve more in a conference call next month. These providers are listed under the “[Continuing Ed.](#)” button on the board’s website, www.ncblg.org. Be aware that just because these providers are pre-approved, not all courses they offer may be geological in nature; non-geology related courses do not qualify for CE credit. While we would like to also list the geological courses they offer, the board has been advised by our legal counsel that we should not do that in order to appear non-partisan.

Your CE credits do not have to be through a pre-approved provider. There are geological CE courses offered by entities not listed on our website as pre-approved, and these courses may qualify for CE credits. It is up to the licensee to determine if he/she will claim the CE hours offered by a provider that is not pre-approved. If you come upon a course offered by such a provider, we encourage you to contact the provider and suggest they make

application to the board for pre-approval for the specific geological courses they offer or to be included on the list of pre-approved sponsors. Also remember approval by the board can be gained for up to 6 months after the course. Be prepared to justify your claim for a course if you are among the 5 to 10 percent of licensees whose CE we expect to audit. We recommend you securely store CE course documentation in case you need it for an audit.

Remember that up to 12 hours of CE can be carried over to the next year. I have already earned enough credits in the past 6 months to fulfill this year’s requirements and carry 12 hours over to the next reporting year. We understand some licensees cannot take time off work to earn CE credits. There are many offerings of field trips on weekends, often at nominal cost, through which you can earn the majority of your 12 hours.

Two final notes: Licensees who were granted a license by taking and passing the ASBOG® exam are not required to meet the CE requirement in their first year of licensure, but will be required to obtain and report 12 hours of Board approved continuing education for their second license renewal, and inactive geologists are exempt from the CE requirement, until such time that they reinstate the license. At that time, they will be required to report 12 hours of Board approved continuing education obtained during the prior license renewal period. However, just because CE is not required is not reason to continue to expand your geological expertise. The newly licensed and inactive licensees can carry over 12 hours, just like the active licensees. We encourage you to try and stay abreast of the changes in the geological field.

Joint Dinner/Meeting

***The Carolinas Chapter of the
Association of Environmental & Engineering Geologists
and
The Eastern Branch, North Carolina Section of the
American Society of Civil Engineers***

Present

Guest Speaker:

*Sharon Poissant Eckard, PG
North Carolina Brownfields Eastern District Supervisor
Brownfields Program, NC DEQ*



Presentation:

Opportunities in the Brownfields of Dreams & Brews

Dinner and Talk: 5:30-9:00 PM on Thursday, April 19, 2018

Trophy Tap & Table

225 S Wilmington Street

Raleigh, NC 27601

Meeting Details

- Place:** Trophy Tap & Table
- Date:** Thursday, April 19, 2018
- Time:** 5:30 PM socializing begins, 7:00 buffet dinner, 8:00 talk
- Cost:** AEG/ASCE members \$30, non-members \$40, public-sector employees/teachers \$20, students free with college ID
- Reservations:** Please make reservations with Josh Hanks (joshmhanks@gmail.com) by 5:00 PM on Thursday, April 12, 2018

Presentation Abstract

The North Carolina Brownfields Program has been helping to bring jobs, increasing the tax base of local jurisdictions, and driving other public benefits across North Carolina since it was authorized in 1997 by the Brownfields Property Re-use Act (NCGS §130A-310.30 - §130A-310.40_). This unique program, funded by U.S. EPA Brownfields funds and private fees from voluntary prospective developers, provides an approach to safely redevelop known or suspected contaminated properties, using a legal contract, the Brownfields Agreement (BFA) between the State of North Carolina's Department of Environmental Quality (DEQ)'s Division of Waste Management (DWM) and the developer. The BFA documents site facts and contaminant conditions at a Brownfields Property, outlines the appropriate combination of actions and land use restrictions for a specific type of reuse, and provides environmental liability protection in the form of a covenant-not-to-sue from the State of North Carolina as long as the terms of the BFA are abided by. Qualifying improvements on Brownfields Properties are also eligible for a partial tax exclusion, which can offset the costs of assessment, and if necessary, mitigation. Come hear what's new in Brownfields and how we are helping turn contaminated properties into fields of dreams and brewpubs.

Presenter Résumé

Bio: Sharon Poissant Eckard, PG; North Carolina Brownfields Eastern District Supervisor; Brownfields Program, NC DEQ

Ms. Eckard is a registered geologist in North Carolina and the Eastern District Supervisor for the North Carolina Brownfields Program. Ms. Eckard has worked in the Brownfields Program since 2008, first managing standard track, then Redevelopment Now Brownfields projects, and becoming a supervisor with the program in 2015. Prior to joining the Brownfields Program, Ms. Eckard worked initially as an environmental consultant, originating her career in the San Francisco Bay area, and later as a corporate environmental project manager with both General Electric Company's Corporate Environmental Programs and Pacific Gas & Electric Company. She is a past President of the San Francisco Bay Area Chapter of the Association for Women Geoscientists. Ms. Eckard earned her Bachelor of Science degree in geological sciences from the State University of New York at Albany (now the University of Albany) and her Master of Science degree in geology (hydrogeology concentration) from the University of South Carolina, Columbia. Ms. Eckard moved to North Carolina in 2002, and hung out her own shingle, providing consulting services to clients in California and ultimately to a North Carolina consulting firm. That work situation parlayed into project management roles within the EPA and NC brownfields arenas. Ms. Eckard hails from the Lake Champlain area of New York State and, except for the humidity, enjoys all that her adopted home in North Carolina offers from the coast to the mountains.



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Haiti Still Needs Our Help

Our chapter is again in a fund-raising mode to send well screen to Haiti. We have arranged three shipments in the past, with donations of 4-inch well screen by chapter sponsors SAEDACCO and Geologic Exploration, and monetary donations by AEG members and employees of Duncklee & Dunham to pay for the shipping cost and import duties. For those of you that attended the chapter meeting in January in Charlotte, you know that we passed a hat to raise money for this effort, and we raised \$160.

For those of you who weren't involved in AEG in 2014, below is an article I compiled for *AEG News* in 2014. This provides background on the conditions in Haiti.

A Former Environmental Consultant Helps Bring Potable Water to Post-Earthquake Haiti

By Rick Kolb, P.G., Duncklee & Dunham

Most geologists recall the devastating earthquake that rocked Haiti in January 2010. Haiti was already one of the most impoverished, if not the most impoverished, country in the western hemisphere. While international response and sympathy were strong initially, much of the funding promised soon after the earthquake never arrived. Consequently, the recovery has been extremely slow, and tens of thousands of Haitians still lack the basic human needs: food, water, and shelter. Doug Rakoczy, formerly an environmental scientist with environmental consultant Duncklee & Dunham in Cary, North Carolina, and his wife Susan enlisted their family in the effort to provide safe drinking water to Haitians. This article summarizes the situation and the efforts since 2011 by Doug and Susan, the Carolinas Section, individual members of the Carolinas Section, and section sponsors to help provide safe drinking water for Haitians.

Doug Rakoczy first contacted Dave Duncklee and Tom Dunham in 2011 and asked if they could help secure well supplies with which to construct water-supply wells. Such supplies are difficult to come by and are expensive in Haiti. Dave and Tom recruited Carolinas Section sponsors Geologic Exploration, a well contractor, and ESC Lab Sciences, a laboratory, to help in this effort. Geologic Exploration donated wells supplies and screen, and ESC donated water-testing services. Dave and Tom donated their time and expenses to drive the well supplies to Florida for its shipment to Haiti. The Carolinas Section donated \$500 to support this effort. The first part of this article provides an overview of the situation at that time in Haiti, though it hasn't changed significantly since 2011.

This article is atypical for AEG NEWS in that it is both a technical article and a highly personal testimony of the challenges Doug and Susan faced, as documented in their emails that started prior to the *first* shipment of well supplies. Thus, the writing style is different from the usual articles in this section of the NEWS. Comments in quotation marks are taken directly from the Rakoczy's emails of February 2011, less minor edits, and with text additions in brackets [] for clarity. As you read these minimally edited emails, take time to think a little bit about the things the western world accepts as a given. Perhaps you have just had a tall glass of cold iced tea, or did the dishes, or treated yourself to a nice hot shower and gotten in some clean clothes after a hard day at work. All of this requires water, clean water; readily available and plentiful here, but not so in many parts of the world.

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Haiti Still Needs Our Help

(Continued from Page 11)

Former North Carolinians Doug and Susan Rakoczy live with the youngest three of their five children about seven kilometers west-southwest of Cap-Haitien on the northern coast of Haiti. “The distance means nothing in Haiti,” says Doug, “because it takes about 30 minutes to drive that distance because the roads are so bad”. Doug and Susan work with two organizations called Global H2Ope based out of Fargo, ND and Lifewater Canada (www.lifewater.ca), installing water wells and teaching the Haitians to maintain them.

Doug has earned several degrees, including a master of science in geo-environmental studies and an education degree with emphasis on special education. In addition to his more recent teaching position in Minnesota, he has over 12 years of prior experience as an environmental consultant and project manager for Dunklee & Dunham. His experience included soil and groundwater assessment and remediation sites in just about every state between Connecticut to Texas. Asked why they went to Haiti in the first place, Doug said that it all stemmed from Susan’s background in long-term missionary work. “She first went to Haiti in January 2009 on a short-term mission trip to do some nursing/medical clinic work. She was with a group from near where we live in Minnesota, [which] had also been going to Haiti for a number of years on short term mission trips to drill wells and do [hand] well pump repair.” Susan returned to Haiti after the big earthquake with a faith-based crisis response team. One of her Minnesota group, Bryan Odegard, “decided to start an organization called Global H2Ope, so that there could be some sort of a year-round program to help drill and repair well pumps.” Doug says “We decided that we felt guided to be the people working on the ground in Haiti with Global H2Ope, and they agreed. Because my wife is an RN and I had a background in environmental geology, it seemed like a good fit.

Clean water (or lack of it) is such a HUGE health issue here, and leads to the sickness and misery of so many people. I guess we thought we could try and help, and we felt that this was the direction that God was leading us.”



“Susan spent a good part of the summer of 2010 [in Haiti], and I came for several weeks in late July/early August. We moved here with our children Jacob (14), Julia (12), and Joshua (9) in November of 2010. We also have 2 [independent] older children. “We feel it’s important to help develop a sustainable system to help Haitians get clean water through a well drilling and pump repair program (and I mean hand-pumps, which is what many of the wells drilled here have) that will eventually be run by Haitians. We seek to give them the training and resources to do the work themselves (and not have to rely on Americans or Canadians). We also seek to do this work from a Christian perspective as we are a Christian-based organization.”

Doug and Susan’s group partners with Lifewater Canada to drill wells, repair pumps, and provide health education, training, and equipment with the goal of enabling Haitians to do the work for themselves.

(Continued on Page 13)

Haiti Still Needs Our Help

(Continued from Page 12)

This provides not only clean water but employment opportunities for the Haitians, and is a catalyst for a sustainable program with the responsibility for Haitians to continue.

WELL DRILLING

Doug's team drilled a well at a nearby orphanage/school in February 2011. The school has 400 students, 108 of them orphans, and is run by Catholic nuns." Doug is bending over the mud pit shoveling cuttings. "The existing well at the school is located adjacent to where their latrines were later built so it has been contaminated. The new well was drilled in the portion of the property as far upgradient of the latrines as we could get (around 250 or 300 feet). We are drilling with small trailer mounted rotary drills. The other two rigs that are used are smaller than the one in the picture...."



"We don't have a mud tub. You have to dig your mud pits before you start drilling. The drilling is strictly wash rotary/mud rotary. This well was drilled to a depth of around 90 feet. The driller (Bryan, on left) is from Minnesota and is one of the Global H2ope founders. We are trying to train Haitians to run the rig. Edrick (in the blue hat) will be the driller. "The Haitian drillers rarely use



bentonite gel to mix drilling mud and they have trouble with holes collapsing, especially since they take a long time to get their drill rods out of the hole. They don't use bottom caps on the wells - they flush water inside the casing to get the sand out and get the well down. Then they put a little gravel down inside the casing to the base of the screen to keep sands from running up inside the casing. I've not seen anything like it before. It's like going back in time about 40 years. Most of the wells have hand pumps set in them, and people just come and fill up their containers and carry it back to their homes. I believe 75% of Haitian homes don't have running water."

"All the drilling I have seen here is wash/mud rotary. I've never seen any hollow stem augers. They are too expensive and hard to get. The small drills are also not capable of turning 6 1/4 inch ID augers to the depth necessary. We also don't have bentonite pellets; too hard to get and ship in economically. We use 4-inch PVC casing in 20 foot lengths with bells to connect; again, threaded casing and screen is not available here and is too expensive to ship in. We cut the screen with a hacksaw, but I cut 3 rows of slots no more than 1 inch apart. It takes a long time to cut the screens, and the importance of cutting the screens properly is something we are trying to get across."

(Continued on Page 14)

Haiti Still Needs Our Help

(Continued from Page 13)

Doug describes more well drilling: “The drill used for the well installed at the orphanage was a Deep Rock D 20, I think. We actually had an end-cap on this well. The other drill one of the Haitian drillers is using is a smaller Deep Rock D 50. That rig only has 1½” drill rods, no stabilizer rod, and only a drag bit (no roller cone bit). That engine on the smaller rig only turns the drill stem; you have to use a hand crank to drill down or pull the drill stem back out. There is a separate generator for running the pump to pump the water.”

“The drillers here don't like using mud because of the cost of the bentonite gel and difficulty getting it in here. They do have problems with holes collapsing, however, as you can imagine. It is also difficult getting filter pack here. It's hard to find sand the right size, and you have to do a lot of screening. Often, the sand (or gravel) is too coarse and too angular to serve any purpose, and they have a hard time getting it down to the screen. However, it is often better if the formation just collapses around the screen, because the coarse sand and fine gravel that we try and screen the wells in makes a great natural sand pack.”

“We are also working on helping the Haitian drillers understand the need for a grout seal. Sometimes the hole will collapse and they'll want to put their filter pack around solid casing 20 or 30 feet above the screen. They need to understand they need a longer grout seal, at least 20 or 30 feet.”

GEOLOGY

“We are in the Northern Plain of Haiti [which is] basically a bowl surrounded by mountains on 3 sides and the ocean to the north. The drilling is in sediments consisting of clayey sand to silty fine sand to more coarse sand and eventually sand and gravel. There are some harder layers occasionally (limestone or coral?), and there are also sometimes issues with salt-water intrusion as you get closer to the coast.”

“Once you start getting up in the foothills the drilling becomes much more difficult as rock is obviously much shallower. It gets rugged in a hurry once you rise in elevation out of the Northern Plain, and we can't drill in these locations. In the Northern Plain, there are confining layers that are present in places between 70 and 100 feet below grade and I have seen some wells that are flowing at the surface if they are drilled deep enough. The deepest I have seen a well drilled is 140 feet.”

PUMPS

“Most of the wells we install will have hand pumps installed in them - we are using AFRIDEV pumps (designed in India).” According to an online description, the Afridev pump is a fully corrosion resistant, lever action hand pump, designed for heavy duty use and for serving communities of up to 300 people. It is a public domain pump defined by Rural Water Supply Network (RWSN) specifications.

Doug continues; “We drill wells for communities, churches, and schools, and there has to be a certain amount of community involvement. Many people will use the community wells – people come with their buckets and other containers to get water from the wells for cooking, drinking, etc.”

(Continued on Page 15)

Haiti Still Needs Our Help

(Continued from Page 14)

“As I said before, around 75% of Haitian houses don't have running water. It would also not be practical to put submersible pumps in the wells because there is no consistent and reliable power source available. There are huge infrastructure issues here.”

LABORATORY

In an email dated February 18, 2011, Susan reports “one of the projects of this week has been to take a concrete shed behind our house and turn it into a laboratory to house an incubator to grow water samples and check for bacteria. So as part of that process it was determined that we needed some sand to mix the cement for blocks and plastering the walls. It was arranged that on Wednesday morning at 6:00am the sand would arrive. I picked out a place to put it that would be convenient for mixing and anticipated a pick up truck to show up in the morning. That night it once again rained torrentially and was still cloudy as I was up preparing to direct where the sand was to be placed.”

“At 6:30 am... I hear this loud noise at the front gate... I look out the window and in comes an

enormous dump truck filled to the brim with sand!!! I was in a bit of shock, but thought, OK ... I guess we can make this work.

So the truck started backing into the area I had arranged, unfortunately, because it was HUGE, and the ground was spongy, it created about 6 to 8 inch tracks and demolished our cute little brick walkway! Before he went any farther and hit a tree or the house, I stopped him and told him I'd find another place! “So we went to the other part of the lawn, (again leaving deep tire tracks) and he dumped the sand. As he got ready to move out, we noticed that he now had a flat tire in the back and that he was quite stuck in the mud that he had just created. I could not help but find this so typical and amusing. So the driver now had to take the sand which he had just dumped into a pile and use our shovel to throw our sand under his wheels to get his enormous 1970ish beat up dump truck out of our yard!

When it was all over and he had eventually gotten unstuck...I surveyed the broken walkway, the new trenches in our yard and the deep hole now filled with muddy sand and looked over at our [9 year old] son who said, ‘That was a really cool dump truck!’ and that about sums it up.”

“Getting back to the Lab, it will become a very useful tool to identify whether or not wells are contaminated with just normal bacteria or with things that can cause harm, like E. coli. All the wells that are being surveyed are also having sampling done. About 1/3 of those are coming back with positive results for bacteria. Of those, we are resampling and then growing the sample in the incubator. So far all but one sample has grown ‘bad stuff.’”

Carolinas Section sponsor ESC Lab Sciences provided free well-water analysis service for the project.

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Haiti Still Needs Our Help

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WELL REPAIR

Susan writes, “Yesterday, I went out with one of the Canadian team members and Edrick to do the second round of sampling. It was still pretty cloudy and I was in the back of the open truck. At one point a Haitian man came over to me and was attempting to describe a well close by that needed work. After getting the full picture from Edrick, we went to see this pump, up the steep hill, into a little enclave of simple homes. The well did indeed need work! Evidently, a large truck or bulldozer [had] backed into it and pushed it over, twisted the handle and destroyed the concrete pump pad. Of course as is common, this incident took place and then [the driver] just drove away leaving the people in this area of many hundreds having to walk a long distance to get water. All we could do yesterday was document what had happened and say we will see what we can do.”

“There are many broken wells, many wells that need to be cleaned, many wells that need to be replaced, and many wells that need to be drilled so that the current wells will last longer. It takes a lot of time and money. The government is not involved at all in drilling or repair in the rural areas. The challenge is great, but again, doing something is the first step.”

SANITATION EDUCATION

“We are finding it is not enough to just drill a well or fix a well; it needs to be clean water, not just water. There is so much education that needs to be done here in the villages to teach [the people] about keeping animals, laundry, bathing etc. away from the wells. But mostly, there needs to be education on [basic] sanitation issues i.e. latrines. They are few and far between.”

“Let’s just say, while it is great to have water, it is even greater to know how to protect that water and in turn yourself and family. This is done



through health and hygiene classes for the residents around the wells. It is the only long term solution. Anyway, we will now have to decide how to go about dealing with all these contaminated wells that we are finding. One more step in the process.”

“On the way home from taking the samples, it started to down pour. It was cold and I was drenched. As I rode along in the open back of the truck, going past homes that are little more than shacks, seeing people waiting patiently under overhangs or trees, themselves getting wet, I realized afresh how fortunate I was to be going back to warm clothes, a dry house and hot food. Many Haitians will see none of those things during this rainy time. I also saw again the beauty of the mountains, the open fields of rice patties, animals quietly grazing in marshy land and the laborers in the field, machete in hand, cultivating the field of beans. How can such beauty and such suffering exist together...and yet it does here in Haiti. Maybe that is why this is such a special place.”

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SCHOOLS

"The school kids gathered around while on recess. We really had to work to get them to back away from the drill. The school uniforms are not just for Catholic schools. In every Haitian school, kids wear uniforms (including the one our kids go to). Also, every child must pay to go to school in Haiti (even those going to government sponsored schools which are like our public schools). That is one of the things that continues the cycle of poverty in Haiti -- lack of ability for kids to access schools and education because their family can't afford it and they don't have a sponsor.

This ends the emails by Doug and Susan from 2011.

In 2012, Doug and Susan contacted Dave Duncklee again for a request for more well supplies. Once again, Geologic Exploration provided the riser pipe and well screen for shipment to Florida, from which it would go to Haiti.

The Carolinas Section donated \$700, which was combined with donations by geologists Dave Duncklee, Tom Dunham, and Tom Proctor that totaled almost \$2000 for shipping the supplies and to cover import duties. The cost was significantly higher than for the supplies we sent in 2011. Finally, in July 2014, the supplies arrived in Haiti. The logistics and "import duties" were much more challenging. The fact that it took two years to send the supplies tells you it wasn't easy. However, we have finally succeeded and the supplies have arrived in Haiti. The following pages include an email from Doug that explains how we are helping Lifewater provide training and equipment so that Haitians can install wells and supply their own citizens with potable well water.



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Correspondence from Doug Rakoczy on Lifewater Efforts

Hi Dave,

I had been meaning to write before but with school so busy I just hadn't had time. Now that school is over, I wanted to send a note to thank you, Tom [Dunham], Rick [Kolb], Tom [Proctor], Steve [Taylor, Geologic Exploration], and everyone else involved in trying to get the screen and casing to Haiti. I know things haven't gone as smoothly as last time, but that is why Susan and I appreciate everyone's efforts even more. Believe me, that screen and casing makes a BIG difference in the lives of many people.

It would be impossible to spend almost 3 years living in Haiti and not come away significantly changed by the experience. The level of poverty is hard to describe, and many people live without the basic necessities of life that we take for granted here in the US. The Lifewater people (and I mean all of the Haitians who work with us in the north of Haiti) work really hard each day to try and provide one basic necessity for life - clean water. Lack of clean water is a huge factor (probably the most important) in many health-related issues in third-world countries. When we first moved to Haiti, they were in the midst of a cholera outbreak that has since caused thousands of deaths. Cholera is easily treatable in this day and age, but you need to have access to clean water.

The drilling we're doing is wash/mud rotary drilling with drills that are not very powerful. Two of the drills do not have any hydraulics and so it takes a long time to get the drill rods out of the ground, and we have to use 5-foot rod lengths because there is no mast. One other drill does have a small mast but we can still only use 10-foot rods. It's hard to get the holes to stay open and get the wells set sometimes, especially if we're drilling to 100' or greater (which is often necessary to get a good well). That is why having the threaded casing is so important. It's quicker and less labor intensive to set the wells because the guys don't have to set 20-foot sections and glue them and wait for the glue to dry before they can put the next section on. It's also hard to set 20-feet of casing at a time, especially if you don't have a mast to lift up the casing. There are also times when it is hard to find 4" Sch 40 PVC. It's not like being in the US where you can always quickly find whatever you need.

Having the factory-cut screens is really important to the quality of the well. It's very time-consuming to have to use a saw to cut the slots by hand, it's not good for the structural integrity of the screen, and it's difficult to evenly space the slots so you can control the velocity of the water entering the well. There are a lot of issues with high turbidity and sediment in the well when you have to hand-cut the screens, even if you take your time and do everything correct when you're constructing the well.

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Haiti Still Needs Our Help

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The overwhelming majority of people Lifewater drills wells for (and we drill wells that MANY people use because we are drilling for communities, churches, and schools) do NOT have indoor plumbing or bathrooms or any kind of running water. They have to take their buckets or containers to the well and, using a hand-pump, get whatever water they need for all of their essential activities - drinking, cooking, washing, etc. They need to have good quality water because it is essential to their life, and having proper casing and screen goes a long way toward allowing them to have something that we in the United States and Canada take for granted because we can just go to the sink or bathroom and get all the clean water we need whenever we need it.

I know it has been really challenging to get the casing and screen into Haiti this time. Susan and I have come to understand that is the way it goes sometimes and you just do your best to keep trying. That is why we appreciate everyone's efforts even more. *Lavi se difisil anpil nan Haiti, li se yon peyi di* (Life is very difficult in Haiti, it is a hard country). But there are many wonderful, faithful, inspiring people who live there, and what all of you guys are doing does make a difference to them.

Can you please forward this e-mail to everyone involved and tell them thank you very much from not only Susan and I but also Hanania, Edrick, Homil, Rony, Feden, Richard, Marvin, Junior, Henel, Merlyn, and everyone at Lifewater Haiti. We appreciate your help so much.

Here is what Doug writes about the locations of the water-supply wells:

The work is done in the northern plain of Haiti around Cap Haitien (the second largest city in Haiti, which is located on the northern coast, trending toward the northeast portion of Haiti). The lithology in the northern plain is sands grading into fine gravel with clay layers. There is an area from Plain du Nord down to Lory and Laggosett where there is a clay layer from about 75 or 80 feet that is up to 40 or 50 feet thick. If you get through that layer into the underlying sands we have had some flowing wells that produce up to 10 gallons a minute. You transition into the mountains pretty quickly if you get to far northwest, west, or south of the northern plain. The mountains are either volcanic rock or limestone. We obviously can't drill in rock with the drills we have.

We asked Doug if they could use a rig for drilling in rock. His response:

It would be expensive to get and operate a bigger drill that is capable of drilling in rock, and it would be hard to get to a lot of places because the roads are so bad (and in many places non-existent compared to what we consider to be roads).

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Haiti Still Needs Our Help

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It would be expensive to purchase a bigger drill and very expensive to get it into Haiti. In the mountains people use cisterns or bio-sand filters (to treat whatever water they can find) or if they are lucky maybe someone comes in on rare occasions with a bigger drill and people have to walk a long way to get to a well. There are some springs in the mountains in some places. Water is a problem in the mountains.

One photo is from the foothills on the north side of the Northern Plain looking to the south across the northern plain. The one with the water flowing from the pipe is a well we drilled near Plain du Nord in May 2012. Went through a clay layer about 50 feet thick; once we got to the sands below it at about 120 or 130' the well was producing about 20 gallons a minute on its own. During the dry season it was making about 10 gallons per minute. The well was drilled at a school. We put a "T" on the piping coming out of the well with a valve. When the school needs water we open the valve and let it flow to the school. Otherwise it is piped to a drain ditch along the road where people come with their containers to get water whenever they need it.

Contributions

If you would like to contribute material, supplies, or other resources to these efforts, you can go to www.lifewater.ca -- this is Lifewater Canada's website; Doug and Susan worked with them. Lifewater Haiti is the Haiti operation of Lifewater Canada. Alternately, you can contact Susan at lifewater.haiti@yahoo.com or feel free to contact Dave Duncklee at dave@dunckleedunham.com if you would like to be included in our team that is going to begin preparing a third shipment of supplies to Haiti.



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Visit to the Carolinas Section by Jahns Lecturer John Wakabayashi

By Rick Kolb, P.G., Chapter Student Liaison

At the suggestion in 2006 of past chair Jenn Bauer, the Carolinas Section began hosting the Jahns Lecturer in 2007. We have hosted the following 11 lecturers in the past decade:

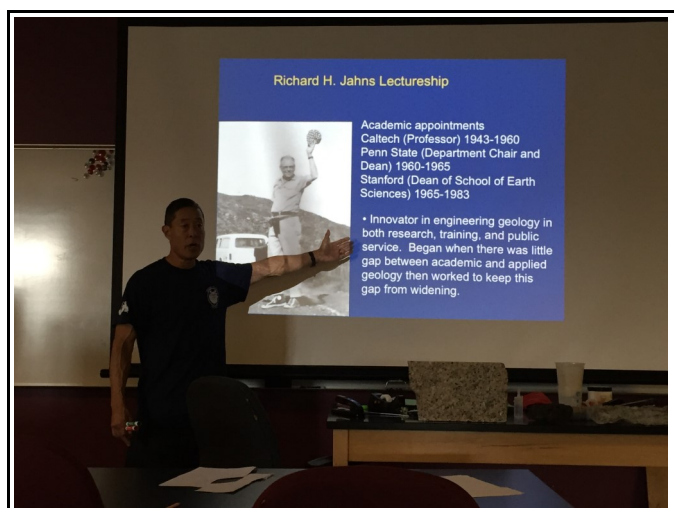
| | |
|------|----------------|
| 2007 | John Moylan |
| 2008 | John Clague |
| 2009 | Ed Medley |
| 2010 | Paul Marinos |
| 2011 | Bill Haneberg |
| 2012 | Scott Burns |
| 2013 | Jim McAlpin |
| 2014 | Greg Hempen |
| 2015 | Eldon Gath |
| 2016 | Jerry De Graff |
| 2017 | Scott Anderson |

The Jahns Lecturer is supported by AEG and GSA, and the objective of the lecture series is to facilitate interactions of the lecturers with students. Thus, the visits to our chapter are focused on presentations to geology departments in North and South Carolina, and if the timing is right, presentations at a chapter meeting. The Carolinas Chapter has also arranged transportation between presentations by AEG members, faculty, and



students, and has covered most of the living expenses while in the Carolinas, which we are able to do *only* through the generous financial support of our chapter's sponsors. While we aspire to have each lecturer for an entire week, the lecturers' schedules often don't allow an entire week. Our presentation record is held by Eldon Gath, who made nine presentations in 4 days on his visit to the Carolinas in 2015.

The 2017-18 Jahns Lecturer, Dr. John Wakabayashi of California State University, Fresno could spend only two days with us due to his teaching duties back in Fresno. However, Chapter Vice Chair Susan Kelly of The Wood Group, who scheduled his visit, kept John busy in those two days. He had breakfast with students at UNC Charlotte and made presentations at UNC-C and Guilford College on Thursday and at Wake Tech and NC State on Friday, and had lunch at Top of the Hill in Chapel Hill on Friday with five students from UNC. Thank yous to Dr. John Diemer at UNC-C, Dr. Marlene McCauley at Guilford, Gretchen Miller at Wake Tech, and Dr. Karl Wegmann at NC State in setting up his presentations at your schools. To those of you who saw his presentations, you know John is an entertaining




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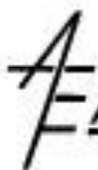
speaker and makes you look at geology in a little different way. After John's presentation on Friday afternoon at NC State, we took him over to Raleigh Brewing Company for an evening of brewed beverages with students and faculty from NC State and AEG members Maddie German, Josh Hanks, and Rick Kolb. As a beer aficionado, John appreciated the opportunity to visit three microbreweries (John and Rick Kolb made a detour to Bond Brothers en-route to NC State from Chapel Hill), and wrote that he will "seriously consider getting out to Asheville" for AEG's 2019 annual meeting. After his return to California, John wrote *I very much enjoyed my Carolinas visit and the Chapter lived up what past Jahns Lecturers told me in the past, which was that "nobody takes care of you better than Carolinas".*



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Updates on GenX

Air, Water, and Soil Impacts of GenX: Health Goals, On-going Investigations & the Litigation Front

By Edmund Woloszyn & Heather S. Kennealy, Esq.

The Chemours Company plant in Fayetteville produces a wide variety of films, fibers, and specialty chemicals. E. I. du Pont de Nemours and Company (DuPont) is the predecessor company for Chemours. DuPont owned and operated the Fayetteville Works Facility from around 1971, until ownership was transferred to Chemours in 2015 when DuPont formed Chemours as a separate company. DuPont currently leases a portion of the Fayetteville Works Facility from Chemours and has ongoing operations at the Facility. The 2,000-acre facility sits on the border of Cumberland and Bladen Counties along the banks of the Cape Fear River. One of the byproducts of its operations found in its waste stream is ammonium 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy) propanoate or known by the patented term “GenX”. GenX is included in a group of compounds referred to as per- and polyfluoroalkyl substances (PFAS).

GenX is a chemical invented by DuPont to replace its use of the fluorinated compound PFOA (C8), which was being used in products such as Teflon. PFOA and PFOS are fluorinated organic chemicals that are part of a larger group of chemicals referred to as per-fluoroalkyl substances (PFASs). PFOA and PFOS have been the most extensively produced and studied of these chemicals. They have been used to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials (e.g., cookware) that are resistant to water, grease or stains. They are also used for firefighting at airfields and in a number of industrial processes. Between 2000 and 2002, PFOS was voluntarily phased out of production in the U.S. by its primary manufacturer. In 2006, eight major companies voluntarily agreed to phase out their global production of PFOA and PFOA-related chemicals, although there are a limited number of ongoing uses.

For DuPont, specifically, it stopped producing C8 around 2006/2007 after it was discovered that the company had discharged the chemical from its plant in Parkersburg, West Virginia, into the air and waterway along the Ohio River. The legal history with C8 includes DuPont’s unlawful discharge of 2.5 million pounds of C8 polluting the drinking water in **six water districts** in West Virginia and Ohio. The chemical was then unknowingly consumed by residents on a daily basis for many years. After more than fifteen years of extensive litigation, a \$671 million settlement with DuPont was reached to compensate approximately 3,500 people who suffered injuries such as kidney cancer, testicular cancer and ulcerative colitis. C8 was also used in North Carolina before the companies phased it out in favor of GenX, and traces of it still exist in some waterways, including the Cape Fear River.

The purpose of GenX, like C8, is to provide a slippery surface in products such as Teflon, fast food wrappers, waterproof clothing, pizza boxes, microwave popcorn bags, carpet, dental floss, cosmetics, and hundreds of other products. Since 2009, DuPont and Chemours have been producing GenX at their Fayetteville Works plant, located 100 miles upstream from Wilmington. In July 2015, DuPont transferred its production of GenX to The Chemours Company. In 2016, a team of NC State researchers, lead by Dr. Detlef Knappe, working with the EPA laboratory in RTP discovered the chemical GenX in the Cape Fear River in North Carolina. Within the year, GenX would be found in the drinking water being supplied to the Brunswick County Public Utilities (BCPU), Cape Fear Public Utility Authority (CFPUA), and Pender County Utilities, which combined serve

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Updates on GenX

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population of over 770,000 people in the counties of Brunswick, New Hanover and Pender. The GenX plume, however, has not fully been delineated; groundwater wells near the plant and upgradient are also impacted. GenX has been found in rain samples as far away as UNCW Campus, roughly 70 miles away from the Chemours plant.

In June 2017, Governor Roy Cooper directed DEQ and the N.C. Department of Health and Human Services (DHHS) to launch an investigation into Chemours' discharge of GenX. The U.S. Attorney's Office for the Eastern District of North Carolina issued a subpoena to the N.C. Department of Environmental Quality on July 28, 2017. The subpoena requested that by Aug. 22, DEQ provide to a grand jury in Wilmington records and documents, including permits, environmental compliance information, reports, emails, research and notes, related to the Chemours Company's Fayetteville Works facility, GenX and other fluorinated chemicals.

No surface water or groundwater quality standards have been established in North Carolina for GenX. So DEQ requested the assistance of the DHHS to address the potential health effects of GenX as well as other PFAS. The board consists of 16 experts with expertise in toxicology, public health, ecology, engineering and other related fields. Since November

2017, the board has been evaluating health-based risks of GenX.

In regard to GenX, DuPont filed sixteen reports between 2006 and 2013 with the EPA pursuant to the Toxic Substances Control Act regarding a "substantial risk of injury to health or the environment" related to GenX. These reports cite health issues with animals tested with GenX, including tumors in the liver, pancreas and testicles, as well as kidney disease, liver issues and uterine polyps. In response to DuPont's initial GenX reports, the EPA informed DuPont in a 2009 Consent Order that it had concerns that GenX "will persist in the environment, could bioaccumulate, and be toxic to people, wild mammals, and birds. In addition, the bio-accumulative properties of GenX are not known. . . . [There] is high concern for possible environmental effects over the long-term . . . [and the] EPA has human health concerns."

DHHS developed a preliminary assessment on GenX consumption via drinking water based on the European Chemical Agency (ECHA) study titled *Evaluation of substance used in the GenX technology by Chemours, Dordrecht* that addressed a two-year rat chronic toxicity and cancer. ECHA reported a no observable adverse effects limit (NOAEL) of 1.0 milligrams of GenX per kilogram of body weight per day (mg/kg bw/day). Based on U.S. risk assessment calculations for an infant's body weight and water intake rate, this corresponds to a concentration in drinking water equivalent of 71,000 nanograms per liter (ng/L) or parts per trillion (ppt) of GenX, which was more than 100 times greater than the mean value of 631 ng/L detected in the Cape Fear River.

DHHS revised the drinking water equivalent for GenX based on a sub chronic toxicity study performed by Dupont on mice in 2010, which reported a no observable adverse effects limit (NOAEL) of 01 milligram per kilogram body weight per day (mg/kg bw/day),

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Updates on GenX

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a 10-fold lower NOAEL than reported by ECHA.

Using a NOAEL from the sub chronic toxicity study by DuPont, DHHS used EPA guidance methodology by applying default uncertainty factors (UFs) for interspecies variability (UF of 10), intraspecies variability (UF of 10, and sub chronic to chronic extrapolation (UF=10) for a total UF of 1000. Using the NOAEL of 0.1 mg/kg bw/day and dividing by a UF of 1000 yielded a reference dose (RfD) value of 0.0001 mg/kg/day. The health goal was then calculated by multiplying the RfD by a relative source contribution (RSC) or 20 percent (0.2) and multiplying by the body weight of an infant divided by the intake rate [Health Goal = $(0.0001 \text{ mg/kg bw/day} \times 0.20 \times 7.8 \text{ kg}) \div 1.113 \text{ liters/day}$], which yielded a health goal of 0.00014 milligrams per liter (mg/L) or 140 ppt as a baseline on which to use for developing an action level for GenX in drinking water sources.

Unfortunately, current treatment processes in water treatment plants do not adequately remove the chemical out of the water. There is no direct regulation or permit standard for GenX and little is known about what level is truly “safe” for human and animal consumption. What is known is that GenX is in the same chemical family as DuPont’s previous chemical C8. The safe level of C8 also is not known, but the EPA has put the figure at 0.07 parts per billion or 70 parts per trillion. Other scientists believe concentrations as low as 0.0003 parts per billion/ **0.3** ppt can be life threatening. Yet, GenX has been found in the CFPWA drinking water at an average of .631 parts per billion/631 parts per trillion, which is at least nine times the advisory level for C8, and as much as 2,000 times the recommended level.

With the findings of GenX so prevalent in the Cape Fear, DEQ began a phased approach for investigating groundwater for GenX. The first phase of DEQ’s

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Updates on GenX

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groundwater initiative was to sample groundwater at the Chemours plant and water supply wells within a one-and-a-half-mile buffer from the center of the Chemours plant. Groundwater samples collected from monitor wells located on the Chemours property were found to contain GenX ranging from 32,000 to 50,000 micrograms per liter ($\mu\text{g/L}$) or 32×10^6 to 50×10^6 ppt and at neighboring properties' water supply wells greater than the 140 ppt health goal. After finding concentrations of GenX in groundwater at water supply wells near the plant, DEQ directed Chemours to expand the investigation to water supply wells located within a one-mile buffer from the Chemours property boundary.

It should be noted that the size of Chemours' property is actually 2,150 acres, so the buffer for the second Phase of the study extended beyond the buffer for the first phase of sampling. The results of the second phases of well sampling conducted by both Chemours and DEQ identified 121 out of 381 wells that had GenX concentrations above 140 ppt. The remaining number of well samples with reported concentrations of GenX above the detection level of 2 ppt but below the public health goal of 140 ppt were 141, with 119 well samples showing no detectable concentrations. A third phase of sampling took place in Late November and December 2017. The third phase extended the buffer around Chemours' property boundaries to 2.5 miles.

The North Carolina public health "goal" of 140 ppt is currently not reflected in the North Carolina statutes for surface water or for drinking water. It is the guiding principal for regulators and water utility managers at this time. For groundwater, however, the presence of GenX, a non-naturally occurring chemical in groundwater, provides DEQ an enforcement mechanism through the North Carolina groundwater quality standard

under Title 15A of the North Carolina Administrative Code Subchapter 2L, whereby any detectable concentration of a ***non-naturally occurring chemical is in violation of the groundwater quality standards***. See 15A N.C.A.C. 2L. The current detection limit using solid-phase extraction with liquid chromatography/mass spectrometry/mass spectrometry (LS/MS/MS) is 2 ppt (formerly 10 ppt). Therefore, any concentration 2 ppt or higher for GenX is *arguably* in exceedance of the groundwater quality standard. DEQ also emphasizes that GenX is only one of many other PFASs that are also being investigated by DEQ and DHHS. This is a critical enforcement and legal tool as to date GenX has been discovered in more than 280 private wells near the plant, including more than 150 that have elevated levels of the compound. Given these findings, the DEQ required Chemours to provide bottled drinking water to residences and install Point-of-Entry (POE) filters fitted with granulated activated charcoal in an effort to filter GenX and related PFAS compounds from locally contaminated water supply wells. So far, according to the DEQ staff, the POE systems have been effective in filtering PFAS compounds, including GenX. Future sampling and studies of the POE systems will evaluate breakthrough time of PFAS compounds through the POE filter systems.

After reviewing groundwater data generated during the first two phases of sampling, DEQ has yet to discern an obvious distribution pattern of GenX in groundwater, suggesting that groundwater transport is not the only mechanism for explaining why GenX was found in water supply wells where the groundwater aquifers were not the likely mechanism of transport to wells hydraulically up gradient of the Chemours plant. DEQ had determined through stack testing that GenX is emitted from the plant stacks at the Chemours plant and deposited onto surrounding areas. The Division of Air Quality (DAQ) had Chemours perform stack testing to project emissions rates of GenX. These results are forthcoming. To assess wet

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Updates on GenX

(Continued from Page 27)

atmospheric deposition, DAQ conducted rainwater sampling campaigns at 10 locations with varying distances 0.9 miles to 2.9 miles from the Chemours Plant. GenX concentrations were found in rainwater samples ranging from non-detectable (assume less than 2 ppt) up to 630 ppt, lending evidence that airborne GenX contributes to the contamination of private well water through atmospheric deposition following by leaching into the soil then to the groundwater table. On or about February 2018, DAQ directed Chemours to take immediate measures to install new technology to significantly reduce air emissions.

Other evidence that GenX is being distributed through the air was discovered when a Bladen County apiary found concentrations of GenX in honey at a reported concentration of 2,000 ppt. DEQ in conversations with the North Carolina Department of Agriculture is fostering plans to extend the GenX study to vegetable gardens at residences nearby the Chemours plant. Similar vegetable studies were completed in the Netherlands and in the State of Minnesota. The study in the Netherlands assumed that the source of GenX was from atmospheric deposition, whereas the study in Minnesota looked at irrigation water being the contributing source of GenX. In the Netherlands, lettuce, beans and potatoes were sampled with the highest recordable concentration of 5.4 ppt in lettuce. The Netherlands study found little risk from ingesting vegetables with GenX concentrations at this level, issuing an advisory to residences to not eat vegetables grown in their gardens “too often”. The advisory posted by the Netherlands authorities was only issued to residences within a 1-kilometer/.62 mile radius of the Chemours plant there. Questions raised from these studies included preferential uptake of GenX, C8 compounds and smaller carbon chain PFASs by various plant tissues.

In Bladen County, NC, surface water samples were collected at a nearby recreational lake at Camp Dixie, a non-profit camp and retreat center located south of the Chemours plant and in Marsh Wood Lake, which is located north of the Chemours property boundary. Samples collected from Marsh Wood Lake had reported concentration of 915 ppt. DEQ has begun investigating bioaccumulation potential of GenX, DEQ has sampled Large Mouth Bass (*Micropterus salmoides*) tissue from fish caught in Marsh Wood Lake. The results of that sampling are forthcoming.

The state’s investigation will continue to focus on protection of public health and drinking water and additional data is being generated for the distribution of GenX and PFASs through stack testing and air distribution modeling and through additional well sampling. The SAB recently held a meeting on March 19th to continue the evaluation of health risks posed by GenX and to talk about progress made by DEQ and DHHS on the GenX study, citing that available data on the health risks of GenX is insufficient to make recommendations for establishing a reference dose by which to recommend a drinking water standard. This leaves DEQ and DHHS with only the ability to use the current health goal for water consumption of 140 ppt. The DHHS has obtained several gavage studies on

(Continued on Page 29)

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Updates on GenX

(Continued from Page 28)

mice and rats to perform benchmark dose modeling with the assistance from the USEPA. However, the modeling is not complete and no definitive conclusions have been made to date.

Enforcement and Civil Litigation

State officials on September 5, 2017 officially ordered Chemours to stop releasing all fluorinated compounds into the Cape Fear River and comply with the state's other demands or face legal action and suspension of its discharge permit. This followed three months of water testing and information gathering from the EPA and institutional researchers. Two days later, the DEQ filed an injunction action in Bladen County Superior Court. The state claims DuPont told regulators in 2010 they had a closed loop system in place to ensure

that no trace of GenX would ever make it to the river. The state also claims that neither DuPont nor Chemours ever informed regulators that they were, in fact, dumping GenX into the river.

Most recently, on February 12, 2018, the State issued another Notice of Violation citing Chemours' failure to take action following a Dec. 15 letter from DEQ that directed the company to terminate or control sources of contamination and mitigate onsite hazards. The notice of violation requires Chemours to take immediate measures to mitigate any hazards resulting from exposure to GenX and other pollutants. The notice of violation comes in the wake of four spill incidents in recent weeks at the Bladen County facility. Clean-up efforts began immediately following each spill and no contaminated wastewater is believed to have reached the Cape Fear River. State officials do not believe the spills caused subsequent GenX spikes in water samples taken from the facility's discharge pipe at the river. However, DEQ notes there is a correlation between rain events and elevated levels of the chemical in water samples taken at that location.

Brunswick, New Hanover Counties and Cape Fear Public Utility Authority, have also filed lawsuits in federal court against DuPont and Chemours over the GenX contamination. In January 2018, Federal District Judge in Wilmington, Judge James C. Dever III consolidated and updated three [class action](#) suits filed since October 2017 on behalf of thousands of people who claim they are ill or could get ill, because they drank water from the Cape Fear River and from wells surrounding the plant. The consolidated complaint details extensive health problems of many Cape Fear residents, beyond previously stated claims of property damage, including diagnoses of colon and stomach cancer, among other issues. The complaint also cites a January 11, 2018 study, published in [Environment International](#) by independent researchers at Stockholm University, which suggests that GenX is even more

(Continued on Page 30)

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Doug Canavella, P.G., M.B.A.

Eric Cross, P.G.

Updates on GenX

(Continued from Page 29)

toxic than PFOA. The case consolidation was ordered to streamline the effort to try claims. The consolidated suit charges that DuPont dumped potentially toxic Fluor surfactants from the Fayetteville, N.C., plant starting in the 1980s. It also claims that DuPont knew that some of those Fluor surfactants, such as perfluorooctanoic acid (PFOA), had toxic effects on laboratory animals as far back as the 1960s.

The consolidated class action lawsuit(s) further seek monetary damages and injunctive relief for physical injury, property damage and reduced property values, and the cost of filtering contaminated water and air sustained by residents in New Hanover, Bladen, Brunswick, Cumberland and Pender counties who have been or are currently exposed to the contaminants.

The original toxic tort class action filed lawsuit was filed on October 23, 2017 is styled *Victoria Carey, et al. v. E.I. DuPont de Nemours and Company, et al.*, Case No. 7:17-CV-201-D, U.S. District Court in the Eastern District of North Carolina, Southern Division. The four other consolidate putative class actions are styled: *Brent Nix, et al. v. The Chemours Company FC, LLC, et al.*, Case No. 7:17-CV-189-D; *Cape Fear Public Utility Authority, et al. v. The Chemours Company FC, LLC, et al.*, Case No. 7:17-CV-195D; *Roger Morton, et al. v. The Chemours Company, et al.*,

Case No. 7:17-CV-197-D; *Brunswick Country, et al. v. DowDuPont, Inc. et al.*, Case No. 7:17-CV-209-D. All were filed in U.S. District Court in the Eastern District of North Carolina, Southern Division.

The most recent suit was filed in late February 2018 on behalf of 70 residents who live near the Chemours plant. It alleges that Chemours and its predecessor, DuPont, secretly released GenX and similar compounds into the groundwater, lakes, air, soil and Cape Fear River.

DuPont acknowledges that the lawsuits and ongoing federal and state investigations “could result in penalties or sanctions,” according to documents it has filed with the U.S. Securities & Exchange Commission (SEC). Chemours says in its SEC filings that it believes discharges from the Fayetteville site “have not impacted the safety of drinking water in North

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Updates on GenX

(Continued from Page 30)

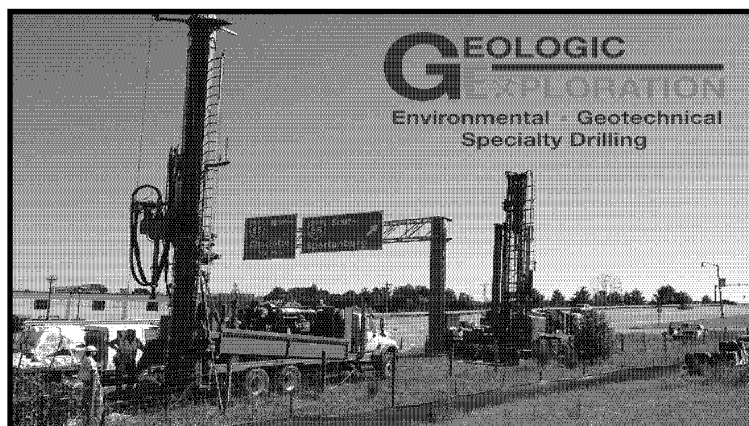
Carolina.” On March 3, 2018, Chemours filed its first Motion to Dismiss the Consolidated Class Action Complaint for Failure to State a Claim for which relief can be granted.

Plaintiffs' class counsel responded on April 13th with their own arguments on why the case should move forward. At the heart of this case is whether or not a non-regulated chemical can be litigated or proven, in the court of law, there is a breach of duty and subsequent injury. Currently, a hearing has not been scheduled for oral arguments on this Motion to Dismiss.

About the Authors

Edmund Woloszyn has over 28 years of experience in environmental consulting and is currently a Principal Scientist at S&ME, Inc., an employee-owned, ENR Top 100 engineering firm headquartered in Raleigh, NC. He received his undergraduate in Marine Biology at the College of Charleston and his Master's degree from North Carolina State University's graduate school of Marine, Earth and Atmospheric Sciences.

Heather S. Kennealy is an attorney with 15 years of environmental law experience working for both private law firms and the federal government. Mrs. Kennealy is serving as Of Counsel, and working on GenX matters, with the Law offices of F. Bryan Brice, Jr. in Raleigh. Mrs. Kennealy also maintains her own shop (Kennealy Law Practice) in Hillsborough. She received her undergraduate degree in Public Health and Environmental Science from UNC-CH and her law degree from Vermont Law School. Mrs. Kennealy holds a Masters in Environmental Law and is licensed to practice law in North Carolina and Massachusetts.



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Carolina Board Meeting Minutes 1-17-2018 from 12pm to 1pm—Conference Call*By Maddie German—Chapter Chair*

1) On the Call: Paul Weaver, Josh Hanks, Walt Plekan, Rohit Warriar, Jane Gill-Shaler, Anthony Herrmann, Maddie German

2) At the December meeting we discussed having our in person meeting in the winter. January was booked up for Maddie.

-Paul suggested end of Feb or early March or possibly have before the Dinner meeting in Raleigh

3) Carolinas Chapter Finances – Walt

- i) Financial report has been sent to National on time – Carolinas still in good standing
- ii) No word yet from National on a return from the VI Conference – Walt is expecting about \$6-\$8K
- iii) January 2017 - \$14,473
December 2017 - \$22,024
Total Checking and Savings
- iv) Sponsors made the biggest difference in 2017
- v) Food costs and free student meals will continue to provide difficulty in making dinner meetings profitable.

4) Upcoming Meetings

- A. January—Charlotte (Jenn)
 - i. Thursday, January 25, 2018
 - ii. Draught Restaurant and Bar
 - iii. MG to bring card reader, cash box, sponsor poster (will use 2017 sponsor list for this meeting)
 - iv. Agreed to mix it up and do Pass the Hat for Haiti instead of 50/50 Raffle for scholarship
 - v. Dave to present a few minutes on Well Drilling in Haiti
 - vi. Maddie and Paul going, most unsure
 - vii. Maddie to include “Carolinas Business Meeting” as part of the announcements

viii. Email blast schedule—Today and next week Tuesday or Wednesday

ix. Sponsor table for EnviroEquipment

x. Maddie to email Jen and get an update on needs for the meeting.

B. February—Jahns lecturer (Susan)

i. February 2/21 to 2/23

ii. Susan sent out an email to the schools this week

iii. So far UNCC, UNC, Guilford College

iv. Route and drivers still to be determined

v. Everyone keep an eye on their email for the driver request

vi. Also we will send out some e-blasts since John won't be speaking at a dinner meeting if people are interested in seeing his talk.

C. April—Raleigh (Josh)

i. April 19th

ii. Looking like new Trophy location will be the spot, have a room that will hold 100 people and a balcony that can be rented for \$100 each. The meal cost would be \$25 per person for two proteins and 2 sides. *Still a little high

iii. Will ask about a non-profit discount

D. Student Poster Session to do at Raleigh meeting

i. Reach out to Raleigh Area schools (UNC, Wake Tech, NCSU) in February and March to see if there is any interest.

5) Field Trips—Sue B

A. 2018 Spring USC Field Trip

i. Hosted by Lindsey LaRocquee and Ali Tabrizi in SC

ii. Includes Columbia, SC tour

iii. March 9-10, 2018

iv. Will include a Friday Dinner Meeting—in process of acquiring the room details for the dinner

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- iv. Decided against alcohol for the dinner meeting due to the complicated nature of serving on a college campus. The Boone meeting and field trip did not have alcohol at the dinner meeting and it was a very successful meeting and field trip.
- v. Announcement on the website and have 1 already signed up.
- vi. Visit the Geotech Lab at the University in the morning, visit one dam before lunch, go to lunch, then visit one to two dams in the afternoon
- vii. Maddie cannot attend; Susan A. will act as chair for the meeting and field trip.
- ix. Rohit and Jacob to help Sue organize
- x. Good opportunity to grow SC membership
- xi. Next e-blast in early February, then more frequency into the middle of February

B. 2018 Fall field trip

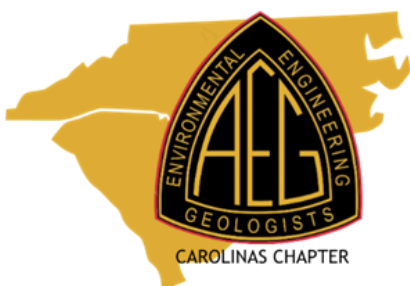
- i. Hike?
- ii. Rohit or Jacob to lead planning?

6) GEONews—Josh

- A. Submittal deadline March 1st
- B. Josh will be sending a request for articles out in early February

7) Update Carolinas Logo

- A. Update 40 year logo to just be a logo representing the Carolinas Chapter



- B. Anthony quickly figured out some options and they are being circulated
- C. New logo in pace by Charlotte meeting.

8) Association Management—Paul

- A. EC is working hard to secure and sign contract with a new company by early February
- B. Paul is interested in hearing all the details in the Mid-Year Board Meeting regarding why Offinger decided to terminate contact with AEG.

9. Membership—Anthony

- A. Expect more renewals with the January update
- B. Current total paid members: 89
- C. Of the 89 total paid members, 61 are full, 3 are emeritus, 1 is an affiliate, 3 are teachers, and 21 are students
- D. 4 members (3 student, 1 full) joined in December. Likely, January numbers will show an increase
- E. Anthony plans to develop a flyer to send out to the email addresses I have on file. Do we have a flyer from previous years to work with?
- F. Maddie to send an email connecting Eric and Anthony—Constant Contact info.
- G. \$50 drawing entry for those who participate in a survey.
- H. Put a sign up the January meeting
- I. Include a reminder on all the email blasts with a link to National website.

10) Sponsorships

- A. Eric sent out a Sponsor Renewal last week
- B. Maddie to double check with Eric and Beca about the status of sponsor renewals and potential new sponsors

11) Licensure issues WA, FL, AZ

- A. Kenneth Taylor is the Carolinas Chapter's watchdog for the legislature and Rick Kolb on Licensing Board should also hear of unfavorable legislation. If know people who are interested in keeping tabs let me know and I will help get them plugged in.

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- B. Appears ALEC is behind trying to sneak these bills into legislation, they are opposed to anything they think inhibits business—requires us to be diligent and ready for action as needed
 - C. Paul and Alex Rutledge looked into a lobbyist 7 or 8 years ago, it would be about \$15,000 per year
- 12) 2019 Asheville Meeting—Paul
- A. Next meeting: Thursday 1/18/18 5pm
 - B. Submit Budget to EC/National by June 2018
 - C. Signed contract with the Community Theatre, to have the opening session (\$1500)
 - D. Accents on Asheville—Paul working with them for guest tours
 - E. Jane has drafted a great logo
 - F. Asheville Visitor folks have been helping with many items
 - G. Overflow hotels—Sheraton, Aloft
 - H. Sent out the Timeline end November
 - I. Expect some more info from Heather and field trips narrowed down after Thursday's meeting.
- 13) Carolinas Scholarship—Paul/Jane
- A. Scholarship application deadline is February 1st
 - B. Continue with the 50/50 raffle at dinner meetings
- 14) Social Activities—Adam/Rick
- A. Rohit is going to start putting together a young professionals social
 - B. Likely in the Raleigh area at a bar
 - C. Will want some senior professionals to be available for information, mentorship, etc.
 - D. Partner with GWP and graduate students from NC State and UNC
- 15) Potential Conference Ideas for 2018/2019
- A. Don't want to have a large conference in 2019—will be too much with the annual meeting that year
 - B. Can shoot for the end of 2018 if we have volunteers or 2020
 - C. Want to copy the emerging contaminants symposium in Colorado Springs for the Environmental Symposium at the Asheville Annual meeting
 - D. Could do Gen X – other topics?
 - F. Rising Sea Level (@coast with a field trip) – for the Spring field trip in 2019?
- 16) Communication and Social Media – Joanna/Rohit
- A. Rohit still needs access to Linked-In
 - B. Little to no activity on Facebook since VI conference
 - C. Reminders to apply for and donate to the Carolinas Section Scholarship should pop up at least every other week
 - D. Section meeting and social announcements
 - E. Need to start adding interesting articles – Jane will help.
 - F. Are there different or better options for social networking
 - G. Rohit reminded many still like to keep home and business separate.
- 17) Next call will be End of February or Early March 2018—prior to field trip

Carolina Board Meeting Minutes 2-25-2018 at 10:30am—ESP Greensboro Office*By Jenn Thomas, Section Secretary*

- 1) Call to Order
- 2) Roll Call
 - A. At ESP Maddie German (Chair), Paul Weaver (Past-Chair), Walt Plekan (Treasurer), Josh Hanks (newsletter), Anthony Herrmann (membership), Jacob Hundl (calendar), Jen Thomas (Secretary) (late)
 - B. On Phone-Susan Avritt (Vice-Chair), Rick Kolb (education/VP) (late)
 - C. All 5 members of the Carolinas Section Board of Directors were present – Quorum obtained
- 3) Carolinas Chapter Finances – Walt
 - A. 2017 January: \$14,473.36 to December: \$22,024.97,
 - B. Reports have been sent to AEG National
 - i. Review of current chapter finances:
 - a) Savings \$18,592.78
 - b) Checking \$8,643.14
 - c) Paypal \$1,703.51 (Walt transfers to savings monthly)
 - d) Total \$28,939.43
 - ii. Update on balances from VI?
 - a) Estimated profit \$6500-\$7000, Carolinas chapter already received \$5500
 - b) Only owed approximately \$1500 from National, Walt will follow up, but likely got lost in the shuffle of new Management Companies
 - iii. New debit cards
 - a) No one should need to use a personal credit card to hold reservations
 - i) Walt received his on 2/24/18
 - ii) Susan going to go get hers this week.
 - iii) Maddie to also get one.
 - b) Discussion related to acquiring a chip reader for increased security. Group decided the current card readers are sufficient for now.
- 4) Upcoming Meetings
 - A. April – Raleigh (Josh planning)-
 - B. Sharon Eckert with the Brownfields, Brownfield Redevelopment to Breweries
 - i. Thursday, April 19, 2018
 - ii. Trophy Tap and Table patio will fit 100-125 people
 - iii. MG to bring card reader, cash box
 - iv. Need sponsor poster & Receipts
 - v. 50/50 raffle for scholarships
 - vi. Email Blast Schedule-MG to get out once receive flyer from Josh
 - vii. Sponsor Tables and drink tickets??? We need to look for these now.
 - viii. Student poster session concurrent with networking?? Yes. NC State (Josh) and Wake Tech (Rick), UNC (Susan)
 - a) Put out to the schools and gauge response
 - C. Meeting Prices discussion
 - D. Current Prices
 - i. Members \$30
 - ii. Non-members \$40
 - iii. Public Service \$20
 - iv. Students \$0
 - v. Walk-in \$5 test in Raleigh
 - vi. Paul makes motion, Walt's second, no questions, all in favor, no opposition
 - E. Summer & Fall Meeting schedules
 - i. Ideas for speakers-AEG president in September/Asheville; Paul Weaver-eng/geotech/reg aspects of dam for the Greensboro talk Oct/Nov
 - ii. Locations-Asheville September 7-timeframe, Wedge Brewery; Greensboro October timeframe, The Public or Natty Greene's, summer will be just a social. Rick is going to look into possibly offering another summer meeting in Raleigh. Looking for a Hot Button Issue, possible topic could be Gen X and emerging contaminants
 - iii. Attach a field trip? Possible hike Saturday after Asheville meeting

(Continued on Page 36)

(Continued from Page 35)

5) February - Jahns lecturer (Susan)

- A. February 2/21 to 2/23
- B. Great feedback from John on his tour, he had a great trip and appreciates all the efforts made by the Carolinas Chapter. Good feedback from the Universities.

6) Field Trips –

- A. Sue B resigning from Field Trip Chair. USC field trip is her last event
 - i. Options for replacements: Jacob Hundl, Rohit Warriar, Russ, Kevin Kell
- B. 2018 Spring USC Field Trip
 - i. As of this meeting: 14 Registered for field trip and 11 for the meeting
 - ii. Need to add a note on the next email blasts to fill out the registration forms and email them to Sue.
 - iii. Hosted by Lindsey LaRocque and Ali Tabrizi in SC
 - iv. Includes Columbia, SC tour
 - v. March 9-10, 2018
 - vi. Will include a Friday Dinner Meeting at USC
 - vii. visit the Geotech Lab at the University in the morning, visit one dam before lunch, go to lunch, then visit one to two dams in the afternoon
 - viii. Maddie cannot attend; Susan A. will act as chair for the meeting and field trip.
 - ix. Rohit and Jacob to help Sue organize
 - x. On the website
 - xi. Send another e-blast out Monday
 - xii. Opportunity to grow SC membership – Anthony to help with this
- C. 2018 Fall field trip
 - i. Hike – Sue has some information available for next field trip chair, also tap Phil Bradley as a resource
 - ii. Rohit or Jacob or Kevin to lead planning. Do we want to include a Friday meeting? Saturday September 8th after Asheville meeting

7) Well Supplies for Haiti

- A. \$160 raised by embership donations at the Charlotte meeting
- B. Discussion related to the amount AEG would like to donate

- C. Motion to donate \$250 by Walt, second y Susan, discussion-none, all in favor, none opposed

- i. Rick to send info to Walt to cut a check

8) GEONews –Josh

- A. Submittal Deadline March 1st
 - i. Plan to have draft out March 14th
 - ii. Out the door March 21
- B. Needs-need an article or two, pretty good shape, topics should be the Jahns lecturer, the well supplies for Haiti, maybe brief piece on Gen X pulled from DEQ.

9) Membership - Anthony

- A. Does not have February Renewal data, will reach out to new Headquarters
- B. Looking for historic advertising, will contact Cortney.
- C. No plans to make calls at this time.
- D. Other ideas for membership drive include: Free to dinner if they sign up at dinner. We will need to contact National since renewal is normally through the website. Non-members get most of the same benefits as members. We don't know a way to change this without discouraging new members and weakening the organization.

10) Sponsors – Eric and/or Becca

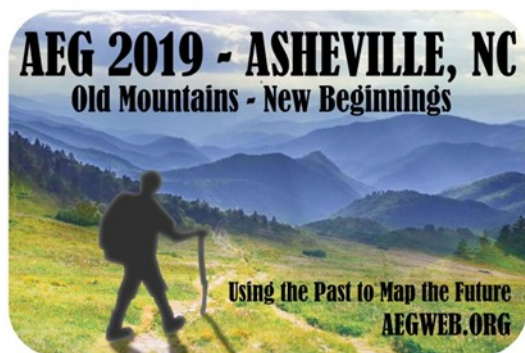
- A. Renewals slowly coming in
- B. Compared to last year we are short a few silver sponsors

11) 2019 Asheville Meeting – Paul

- A. Next Meeting is not scheduled yet
- B. Submit Budget to EC/National by June 2018, seems a bit early, Paul is double checking dates with Heather.
- C. Signed contract with the Community Theatre, to have the opening session (\$1500)
- D. Accents on Asheville—Paul working with them for guest tours—The next step is to plan the opening session and figure out field trip destinations
- E. Jane has drafted a great logo

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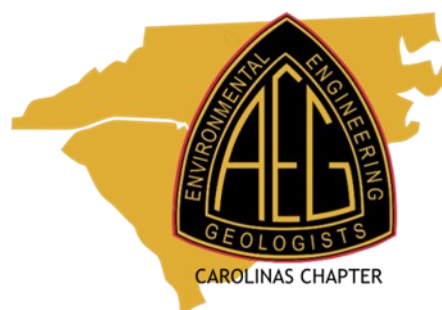


- F. Asheville Visitor folks have been helping with many items
 - G. Overflow hotels—Sheraton, Aloft
 - H. Sent out the Timeline end November
 - I. Pins for San Francisco Meeting? Ordered last week, \$500
 - J. Kevin Finneran (Clemson) to organize an environmental symposium (likely groundwater chemistry)
- 12) Carolinas Scholarship—Paul/Jane
- A. When should we hear about this year's applicants
 - i. Deadline was Feb 1
 - ii. Need to check and see how much is in the fund, Jane or Bridget
 - a) What are the fees, per year/per quarter
 - b) Motion to set award amount at \$2000 for 3 years at which time the value will be re-evaluated—Paul makes motion, Walt seconds, all in favor, no opposition. PASSES.
 - c) Motion to award \$2500 to donate from AEG Carolinas finances to the Carolinas' Fund. Walt motions, Jen Seconds, all in favor except 1 abstain (Paul).
 - d) Look into additional accounts (high yield or money market)
 - B. Plans, updates, ongoing fundraising
 - i. 50/50 @ dinner meetings
- 13) Succession Planing
- A. Maddie last year as chair
 - B. Walt and Jen would like to remain in their current roles for another term

- C. Jacob eager and excited to join board as Vice Chair (he was formerly on the TX Chapter board)
 - i. Chair is 2 year term, all others are 1 year.
- D. Other long standing board members need a change. Visiting Professionals—Rick to ask someone to take this on.
- E. Regional Director? need a new person-maybe Rick— have until May when ballots go out
- F. Need a new person for the calendar role
- G. Need a young professional or a student to handle the social media platforms and online presence....

- 14) New Management Company—AMR Management Services
- A. Discussion—Contact Delaine Bender and ask who to send monthly statements to
- 15) Social Activities—Adam/Rick
- A. Established Regional Committees: Raleigh (Josh and Adam), Charlotte (Jenn and Jacob), Greensboro—need someone—easier to plan social activities when you are in the local environment

- 16) Use Carolinas Logo



- A. Anthony to see if he can make the AEG smaller and the Carolinas Chapter text larger, Will contact Cortney about getting her original files
- 17) Potential Conference Ideas fo end 2018 early 2019?
- A. Genx
 - B. Rising Sea Level (@coast with a field trip) - spring (March/April 2019)
 - C. Try to join with the SC hydro symposium

(Continued on Page 38)

(Continued from Page 37)

D. We will be busy planning the annual meeting
Spring 2019

18) Communication and Social Media—Joanna/
Rohit

- A. Last posts for Facebook were from VI Conference in October 2017
- B. Reminders to apply for and donate to the Carolinas Section Scholarship. These should pop up at least every other week
- C. Section meeting and social announcements
- D. Need to start adding interesting articles—Jane will help. We discussed getting students involved in social media outreach since older members don't use it as much or use the same platforms as younger people. The trouble is that students are temporary.

19) Next call will be Early April 2018—prior to meeting



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CALENDAR OF EVENTS—2018

Geological Events in the Carolinas

Courtesy of AEG Carolinas Chapter—www.aegcarolinas.org. Last updated March 28, 2017
Send updates/corrections to Jacob Hundl, geotex02@gmail.com

Date: Thursday, April 5, 2018

Event: Engineers Without Borders monthly meeting,
Research Triangle Park Professional Chapter
Location: 6:30-7:45 PM at the offices of CDM Smith;
5400 Glenwood Avenue, Suite 400; Raleigh NC
Details: [https://www.meetup.com/EWB-USA-RTP-Chapter/
events](https://www.meetup.com/EWB-USA-RTP-Chapter/events)

Date: April 12-13, 2018

Event: Geological Society of America Southeastern
Annual Sectional Meeting
Location: Hilton Knoxville, 501 West Church Avenue,
Knoxville, TN, 37902
Abstract Deadline: January 16, 2018
Early Registration Deadline: March 5, 2018
Hotel Registration Deadline: March 20, 2018
Details: [https://www.geosociety.org/GSA/Events/
Section_Meetings/GSA/Sections/se/2018mtg/
home.aspx](https://www.geosociety.org/GSA/Events/Section_Meetings/GSA/Sections/se/2018mtg/home.aspx)

Date: Thursday, April 19, 2018

Event: Joint AEG/ASCE Carolinas Spring Meeting
Topic: Opportunities in the Brownfields of Dreams &
Brews
Speaker: Sharon Poissant Eckard, North Carolina
Brownfields Eastern District Supervisor
Location: Trophy Tap & Table; 225 S Wilmington
Street, Raleigh, NC 27601
Time: 5:30pm social begins, 7:00pm buffet dinner,
8:00pm talk
Cost: Members \$30, Non-members \$40, Public sec-
tor/Teachers \$20, Students free with college ID
RSVP deadline: April 12, 2018
Details: <http://aegcarolinas.org/news/>

**Date: Thursday, April 19, 2018 (meetings are held on
the third Thursday of the month)**

Event: Meeting of South Carolina Association of Envi-
ronmental Professionals
Presentation: TBD
Cost: Annual fee of \$25 includes pizza, beer and soft
drinks at all meetings
Time: 6:30pm Social with Pizza & Beverages, 7:00pm
Presentation
Location: Jim Hamilton-L.B. Owens Airport – 1400
Jim Hamilton Boulevard, Columbia, SC
Contact/RSVP: David Heicher at
dheicher@dakotatechnologies.com

Date: Thursday, April 26, 2018

Event: EnviroTech7Summit
Location: Devolve, 304 Glenwood Avenue, Raleigh,
NC 27603
Time: 7:00am-8:00pm
Cost: \$125, includes access to the Wednesday, April
25, 2018 reception from 7:00pm-9:00pm
Details: <https://envirotechsummit.org/>

Date: Thursday, May 3, 2018

Event: Engineers Without Borders monthly meeting,
Research Triangle Park Professional Chapter
Location: 6:30-7:45 PM at the offices of CDM Smith;
5400 Glenwood Avenue, Suite 400; Raleigh NC
Details: [https://www.meetup.com/EWB-USA-RTP-Chapter/
events](https://www.meetup.com/EWB-USA-RTP-Chapter/events)

University Spring Semester Finals

School: University of Georgia
Date: April 27-May 3, 2018

School: North Carolina State University
Date: April 30-May 9, 2018

School: Appalachian State University
Date: May 4-10, 2018

School: University of North Carolina Charlotte
Date: May 3-10, 2018

School: University of North Carolina Chapel Hill
Date: April 30-May 8, 2018

School: University of South Carolina Columbia
Date: May 2-9, 2018

School: Clemson University
Date: April 26-May 4, 2018

School: College of Charleston
Date: April 25-May 2, 2018

(Continued on Page 40)

(Continued from Page 39)

Date: Thursday, May 17, 2018 (meetings are held on the third Thursday of the month)

Event: Meeting of South Carolina Association of Environmental Professionals

Presentation: TBD

Cost: Annual fee of \$25 includes pizza, beer and soft drinks at all meetings

Time: 6:30pm Social with Pizza & Beverages, 7:00pm Presentation

Location: Jim Hamilton-L.B. Owens Airport – 1400

Jim Hamilton Boulevard, Columbia, SC

Contact/RSVP: David Heicher at

dheicher@dakotatechnologies.com

Date: Tuesday, June 5, 2018

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

Location: 6:30-7:45 PM at the offices of CDM Smith; 5400 Glenwood Avenue, Suite 400; Raleigh NC

Details: <https://www.meetup.com/EWB-USA-RTP-Chapter/events>

Date: Thursday, June 7, 2018

Event: Groundwater Professionals of North Carolina Dinner Meeting

Presentation: Joe Alexander – Novel In-Situ Treatment Technology for Contaminated Water

Cost: \$45 Non-member, \$30 Public Sector Employees

Time: 5:30pm-9:00pm

Location: Grandover Resort, 1000 Club Road, Greensboro, NC 27407

Details: <http://gwpnc.org/meetings.html>

Date: Friday, June 8, 2018

Event: Groundwater Professionals of North Carolina Golf Tournament

Cost: \$125 per person includes golf, lunch and beverages

Time: 8:00am

Location: Grandover Resort, 1000 Club Road, Greensboro, NC 27407

Details: <http://gwpnc.org/meetings.html>

Date: Thursday, June 21, 2018 (meetings are held on the third Thursday of the month)

Event: Meeting of South Carolina Association of Environmental Professionals

Presentation: TBD

Cost: Annual fee of \$25 includes pizza, beer and soft drinks at all meetings

Time: 6:30pm Social with Pizza & Beverages, 7:00pm Presentation

Location: Jim Hamilton-L.B. Owens Airport – 1400

Jim Hamilton Boulevard, Columbia, SC

Contact/RSVP: David Heicher at

dheicher@dakotatechnologies.com

Date: Thursday, August 2, 2018

Event: AEG Carolinas Summer Meeting

Topic: GenX

Speaker: Edmund Woloszyn and Heather Kennealy

Location: TBD

Time: 5:30pm social begins, 7:00pm buffet dinner, 8:00pm talk

Cost: Members \$30, Non-members \$40, Public sector/Teachers \$20, Students free with college ID

Details: <http://aegcarolinas.org/news/>

Date: Wednesday, August 15, 2018

Event: NCBLG Board Meeting

Location: State Board of Examiners of Plumbing, Heating and Fire Sprinkler Contractors, Raleigh, NC

Time: 9:00 am

Details: <https://www.ncblg.org/meetings/>

Date: September 16–22, 2018

Event: AEG Annual Meeting

Topic: Engineering Geology for a Sustainable World

Location: Hyatt Regency San Francisco, Five Embarcadero Center, San Francisco, California, 94111

Abstract Deadline: April 1, 2018

Details: <https://www.aegannualmeeting.org/>

Date: September 28-30, 2018

Event: Carolina Geological Society 2018 Annual Meeting and Field Trip

Location: Boone, NC

Trip Leaders: Rick Wooten and Kevin Stewart

Details: http://carolinageologicalsociety.org/CGS/Next_Meeting.html

Date: Friday, October 5, 2018

Event: ASBOG Geology Exams

Details: Deadline for individual applications is Wednesday, August 8, 2018

Location: McKimmon Center, NC State University, Raleigh

Contact: www.ncblg.org

Date: November 4-7, 2018

Event: Geological Society of America 130th Annual Meeting

Location: Indiana Convention Center & Lucas Oil Stadium, 100 S Capitol Avenue, Indianapolis, IN 46225

Abstract Deadline: August 14, 2018

Early Registration Deadline: October 1, 2018

Early Hotel Registration Deadline: October 10, 2018

Registration Deadline: October 8, 2018

Details: <http://community.geosociety.org/gsa2018/home>

Date: June 8 - 14, 2019

Event: AEG Grand Canyon Field Trip

Location: Flagstaff, Arizona

Costs: TBD

Details: <http://aegcarolinas.org/aeg-grand-canyon-field-trip-june-2019/>



Association of Environmental & Engineering Geologists

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FULL MEMBER ☐ Full Member Dues - \$150*
Must be practicing in Engineering Geology and/or Environmental Geology field and 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 applied geosciences.

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Memberships are based on the calendar year. Applications received after October 1 will extend through the following year.

2. INDICATE YOUR CHAPTER

All paying memberships require applicants to pay Chapter dues in addition to the membership fee. Visit www.aegweb.org/Chapters for a list and map. Please call AEG Headquarters for assistance.

Chapter _____

Chapter Fees \$ _____

3. SELECT OPTIONAL FEATURES

Members receive free digital access to AEG publications. Order printed copies at additional cost by checking the boxes below:

- ☐ AEG News (print) — additional \$30 USD per year
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AEG is proud to be an affiliated member of the International Association for Engineering Geology and the Environment (IAEG). With this affiliation, we can offer a special rate for IAEG benefits (U.S. members only). Fees are in the USD.

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4. PROVIDE YOUR CONTACT INFORMATION (please print legibly)

Name _____ Company _____

Address _____

City _____ State/Province _____

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Work Phone _____ Mobile Phone _____

Email _____ Website _____

Are you a registered Geologist or Engineer? ☐ Yes ☐ No ☐ Please DO NOT list my contact information in the AEG Directory

Signature _____

My signature attests that, to the best of my knowledge, I meet the academic and practice requirements for the membership class requested and that all information on this application are true and correct.

5. PROVIDE PAYMENT

☐ Check (Payable to AEG) Total Enclosed \$ _____ (include membership fee, chapter dues, and any optional features)

To pay by credit card, please visit www.aegweb.org and *Join or Sign In* (upper right corner). To comply with PCI security regulations, AEG does not accept credit cards by fax, email or mail. For help with your username or password, use the *Forgot Your Password* link and enter the email address associated with your member record. Please contact AEG Headquarters if you have any questions.

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6. SEND YOUR COMPLETED FORM WITH PAYMENT TO THE ADDRESS ABOVE

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**AEG dues are not deductible as a charitable contribution for U.S. Federal income tax purposes but may be deductible as a business expense. However, Full and Affiliate members contribute to the AEG Legislative Fund along with their member dues and this portion does not qualify for any tax deduction. AEG estimates the 2018 legislative contribution made on your behalf to be \$10 for those who reside outside California. For CA residents, who already have an established member supported lobbying effort, AEG estimates the 2018 legislative contribution made on your behalf to be \$5. Chapter fees are non-deductible.*

Thank you! We appreciate your support of the Association of Environmental & Engineering Geologists.



AEG CAROLINAS CHAPTER – SPONSOR INFORMATION

The Carolinas Chapter 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 (\$275):

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

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

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

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

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

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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 Chapter email announcement (our email list is currently over 1,000 people)

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

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Please complete the form below and mail to Walt Plekan, AEG Carolinas Sponsorship Chair. Please call or email if you have any questions (contact information below).

AEG Carolinas Chapter Sponsorship Form

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

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(Modified 11/02/2016)

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