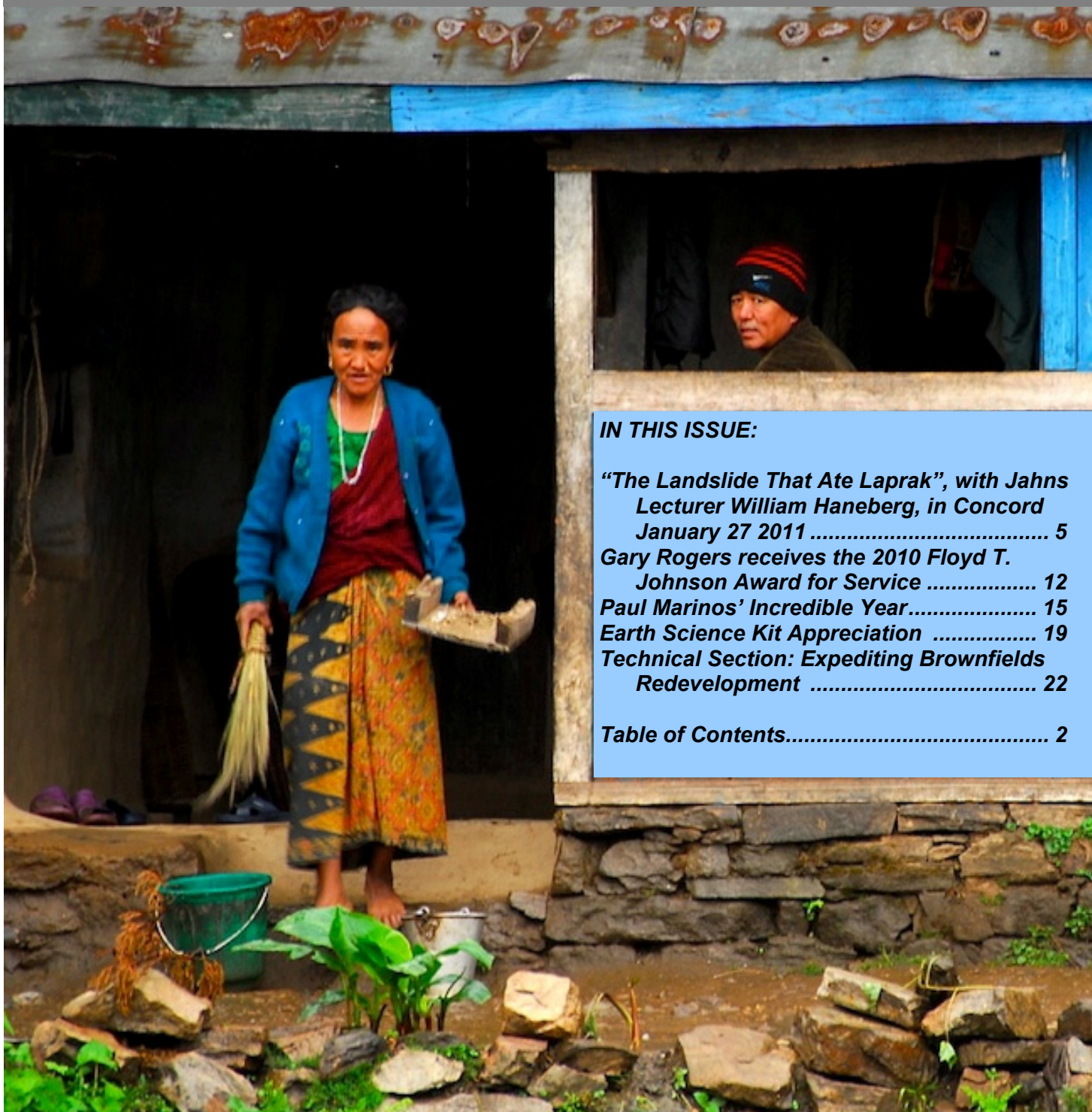


WINTER 2010

GEONews

Newsletter of the Association of Environmental
& Engineering Geologists, Carolinas Section

SAVE THE DATE! Thursday, January 27, 2011
“THE LANDSLIDE THAT ATE LAPRAK”



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GEONEWS WINTER 2010

Issue Date: December 21, 2010

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Cover: Family in Laprak, Photo by William Haneberg. See Concord Meeting information on page 5 of this issue.

Disclaimer: © 2010 Association of Environmental & Engineering Geologists - All Rights Reserved. Views expressed in this publication are not necessarily those officially representing the Association of Environmental & Engineering Geologists except where expressly stated.

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

Deadlines for submittal to AEG Carolinas GeoNews*(can be flexible depending on events)*

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

Deadlines for submittal for the National AEG News:

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

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MESSAGE FROM THE CHAIR

*By Paul Weaver, PG,
Carolinas Section Chair*

I hope this message finds you all doing well and weathering the economic storm. For those of you who may not have heard yet, I was let go from Kleinfelder on November 12 due to the economy. Therefore, please note that I can no longer be reached using my previous contact information. My new contact information is posted at the end of this message.

We had a very successful Fall meeting at Natty Greene's in Greensboro on November 11. Approximately 50 people attended and I think everyone had a very good time. I had several people come up to me afterwards and remark that we ought to have a least one meeting every year in which we don't have a speaker but instead get to spend the majority of time socializing with our fellow professionals. I know that some of you need the P.D.H.s that we give for the meetings and that, possibly, your employer may not be willing to reimburse the cost of attending the meeting if there is no speaker and, thus, no P.D.H. I would be interested in hearing if this is the case, or if you would like to have one meeting a year with no speaker. Please feel free to contact me and let me know your thoughts.

At the same time as our Fall meeting, the North Carolina Science Teachers Association (NCSTA) was holding their convention in Greensboro and we were honored to have five of the award winning science teachers from North Carolina attend our meeting. Between the Carolinas Section of AEG, North Carolina Groundwater Professionals, Jane Gill-Shaler, and Dr. Chuck Welby, a total of nearly 500 Science Tool Kits were donated and handed out at the NCSTA convention.

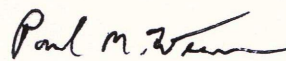
Our Winter Carolinas Section meeting will be held on January 27 at Dave & Buster's in Concord at Concord Mills. We held last year's Winter meeting at the same location and it proved to be a very good venue for us. Our speaker will be Bill Haneberg, this year's Jahns Distinguished Lecturer. We hope to have a good turnout for Bill's talk. Please see the meeting announcement on page 5 of this newsletter. Also, please send your RSVP for the meeting as soon as possible so we can get a reliable head count as much ahead of time as possible.

We will be holding our Spring Carolinas Section meeting in Raleigh on April 7 (place to be determined). Our speaker at this meeting will be Bruce Hilton, AEG National President. More about this meeting in our Spring newsletter.

We are excited that Pine Environmental and Enviro-Equipment have offered to provide a half-day course on the types and uses of environmental equipment this Spring. Pine will be hosting the course in their Raleigh office while Enviro-Equipment will host the course in their Charlotte office. This will be a great opportunity for students and environmental professionals to become exposed to equipment that they may not currently be familiar with, and we are grateful to these two AEG sponsors for providing this opportunity. More information on the dates later.

Please feel free to contact me with any questions, concerns, comments, or offers to volunteer to make the Carolinas Section as strong as it can be. My home phone is 336-294-1633, my cell phone is 336-202-0148; my email is pmweaver@bellsouth.net.

Thank you!



Paul M. Weaver
AEG Carolinas Section Chair



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AEG CAROLINAS SECTION TREASURER'S REPORT

By David Duncklee, Treasurer

AEG Carolinas Section Treasurer's Report July 1 to September 30, 2010

Balance As Of June 30, 2010	
Checking Account	\$4,900.59
Money Market Account	\$12,091.51
Charleston Planning Account	<u>\$2,528.61</u>
INCOME	
Dinner Meetings	\$1,110.00
Sponsorships	\$295.00
AEG Dues rebates	\$0.00
Defined donations	
AGI Toolkits	\$0.00
Scholarships	\$0.00
Short Courses	
AEG Short Course Sponsors	\$0.00
Interest	
Charleston 2010 Account	\$0.58
Money Market	<u>\$1.53</u>
SUBTOTAL	<u>\$1,407.11</u>
EXPENSES	
Dinner Meetings	
Charlotte Meeting Venue and Food	\$1,118.25
Educational Programs	
Visiting Professionals to Local Universities	
UNC-Charlotte	\$257.09
Student Memberships	\$0.00
NC ASCE	\$100.00
Administrative	
	\$0.00
Charleston 2010 National Meeting	<u>\$0.00</u>
	<u>\$1,475.34</u>
BALANCE As Of September 30, 2010	
Checking Account	\$4,830.25
Money Market Account	\$12,093.04
Charleston Planning Account	<u>\$2,529.19</u>
TOTAL	<u><u>\$19,452.48</u></u>

AEG CAROLINAS SECTION QUARTERLY BOARD MEETING OCTOBER 28, 2010 MINUTES

Attendees:

Paul Weaver (Chair)
Brad Worley (Vice-Chair)
Alex Rutledge (Secretary)
Frederick Love (Membership Chair)
Jane Gill-Shaler (Newsletter Editor)
Rick Kolb (Student Liaison)
Jennifer Bauer (Advisor)
Raymond Knox (Advisor)

Treasurer's Report – Dave

Moving of our Charleston account funds back to the main account? Dave Duncklee via email: We have about \$2,500 remaining in this account. The Board approves closing the Charleston account and putting our funds back into the main account.

When do we expect receipt of our 10% proceeds from the Charleston meeting? Dave Duncklee via email: I understand AEG national is closing their books on the Charleston meeting. This will probably take several more weeks. AEG Carolinas Section will receive 10% of the proceeds which is expected to be between \$2000 and \$3000.

(SEE TREASURER'S REPORT AT LEFT)

Section Meeting

This will be on November 11, 2010 at Natty Greene's in Greensboro – Paul

Paul will bring nametags and receipt

Rick will bring the sponsor poster

Paul doesn't plan on taking sound system

Gary R. has volunteered to bring laptop and projector to show pictures of 2010 meeting.

We will not purchase a cake for this meeting.

Other section meeting information:

Dave D. needs the cash box back from Paul at the meeting.

Jenn B. plans to show off the AEG Facebook page

NC Science Teachers meeting – Jane G. will discuss and show photos

Jenn B. may talk about AEG national

Earth Science Kits – Jane

The Carolinas Section will pay for 250 kits at a cost of \$1625 to the Section

Additional kits are being paid for by others, including:

\$500 donation from Jane G.

\$100 donation from Chuck Welby

Jenn B. plans to make a donation

Other donations welcome – send donations to Dave Duncklee and indicate it is for Earth Science Kits.

There will be a total of 450.

Other information:

Jane G. needs help with putting labels on Earth Science Kits – Paul W. may be able to help

Jane needs help handing them out at the NC Science Teachers meeting – contact J. Gill at janehgill@aol.com.

Jane plans to contact Randy Bechtel to ask how many teachers plan to attend the upcoming sectional meeting in Greensboro.

(Continued on page 7)

**THE LANDSLIDE
THAT ATE LAPRAK**
presentation by
2011 Jahns Lecturer
William Haneberg,
Concord NC January 27

AEG Carolinas is very proud to present the 2011 Richard Jahns Lecturer, William C. Haneberg, as our guest speaker at our first dinner meeting of the year in Concord, NC on Thursday, January 27, 2011. This is a great venue, with lots of room, great food, and a variety of games and shopping if you want to come early and tour around this huge shopping center.

Mr. Haneberg is reputed to be a very interesting and dynamic speaker, so let's show him our good Carolinas Welcome! Information on the meeting is in the BIG BLUE BOX on this page, and directions and a map are on p. 6.

ABSTRACT:

Located in a remote region of western Nepal and 2- to 3-days' walk from the nearest road, the Himalayan village of Laprak is built atop a large landslide that began moving during an exceptionally heavy rainstorm in 1999 and continues to move today.

Part travelogue and part technical presentation, this lecture introduces the geologic setting of Laprak and its influence on slope stability, the use of modern technology like digital terrain modeling and finite element simulations to better understand the landslide, the challenges of dealing with geologic hazards in a isolated part of a developing country. It'll also explain why things are more interesting when one shows up in the middle of the local festival.

ABOUT THE SPEAKER:

I'm an independent consulting geologist whose clients have included engineering firms, state and federal environmental and natural resources agencies, mining and logging companies, law firms, and private landowners. Most of my work involves earth movements of one kind or another—landslides, rockslides, debris flows, land subsidence, earth fissures, and other geologic hazards—that occur either naturally or as the result of human activities.

I also rely on modern tools such as GIS, airborne laser scanning (LiDAR), computer simulations, image processing, and digital photogrammetry to solve practical geologic problems. My field experience includes projects throughout the United States, Papua New Guinea, Nepal, and the Indian Himalaya. If you'd like to see some of the places I've worked and traveled, you're welcome to visit my photography web pages at www.billhaneberg.com.

I began my consulting practice in the Seattle area but in mid-2009 moved to Cincinnati, which is one of the most landslide prone cities the United States (*Ed: note the*

latest weather news on landslides in the northwest!). I am also an Adjunct Professor of Geology at the University of Cincinnati and a member of the Board of Trustees for The Hillside Trust. Before leaving to establish my consulting practice in 1999, I was Assistant Director and Senior Engineering Geologist with the New Mexico Bureau of Mines & Mineral Resources. I've also worked as a petroleum geologist, and taught as an adjunct professor at New Mexico Tech and Portland State University.



**AEG CAROLINAS
DINNER MEETING
THURSDAY, JANUARY 27, 2011**

**Program: THE LANDSLIDE THAT ATE
LAPRAK**

**Speakers: Richard H. Jahns Lecturer Wil-
liam C. Haneberg**

**Place: Dave and Buster's – 8361 Concord
Mills Blvd, Concord, NC 28027 (see
directions on page 6)**

Date: Thursday January 27 2011

**Time: 6:00 PM social, 7:00 dinner, 8:00
speaker**

**Cost: Members/Non-members \$25, Student free
with college ID**

**Reservations: Please make reservations with
Brad Worley by Monday, Jan. 17,
2011.**

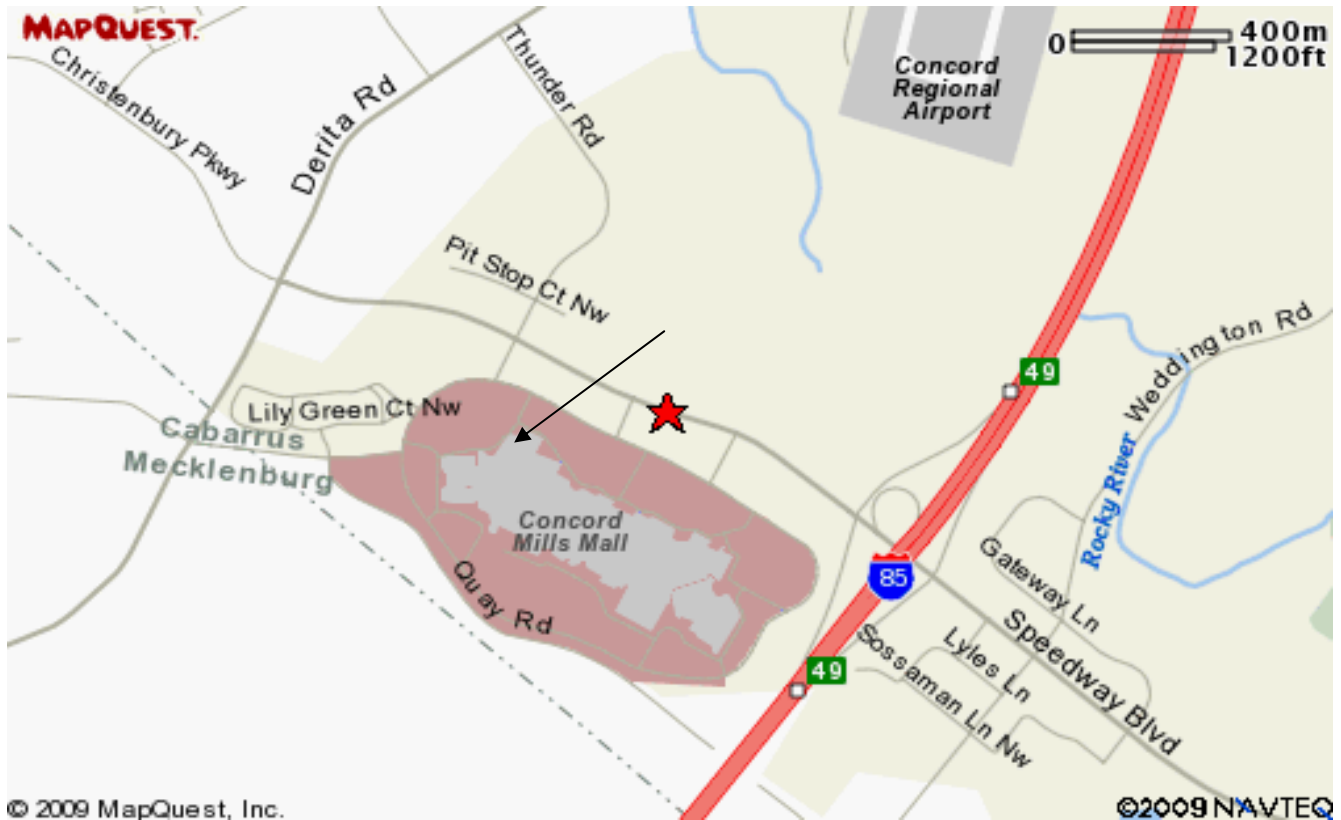
Phone: 919-250-4088

E-mail: bdworley@ncdot.gov

Or you may SNAIL mail your check
to:

Brad Worley, NCDOT
Geotechnical Engineering Unit
1020 Birch Ridge Dr
Raleigh, NC 27610

Directions: See next page



DIRECTIONS: Dave and Buster's
8361 Concord Mills Blvd
Concord, North Carolina 28027
704-979-1700

FROM THE SOUTH

Take I-85 North towards Greensboro. Take the BRUTON SMITH BLVD exit, EXIT 49, toward CONCORD MILLS BLVD. Turn left onto SPEEDWAY BLVD. SPEEDWAY BLVD becomes CONCORD MILLS BLVD. Make a left into the Concord Mills Mall. Dave and Buster's is located at the western end of the mall facing Concord Mills Blvd. (See arrow on map)

FROM THE NORTH

Take I-85 South towards Charlotte. Take the BRUTON SMITH BLVD/CONCORD MILLS BLVD exit, EXIT 49. Turn RIGHT onto CONCORD MILLS BLVD. Make a left into the Concord Mills Mall. Dave and Buster's is located at the western end of the mall facing Concord Mills Blvd. (See arrow on map)

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 Raleigh, NC 27612

*Quarterly board meeting minutes (Continued from page 4)
(Ed—see letter and article on page 19).*

Summary of National Board Meeting – Paul

Need to work hard on recruiting new members

Need someone to keep an eye on legislative web page to see when issues arise affecting our profession. Kenneth Taylor of NCDENR has agreed to do this for N.C. and Raymond Knox has agreed to do this for S.C.

Technical working groups need volunteers

Permanent Nametags for Meetings – Paul

Will have permanent nametags for regular members and students listing which they are. Not sure about the cost, but it shouldn't be more than \$20

Those without permanent name tags will let us know who to speak with about becoming members.

Contacting New Members – Paul

I will now send personal email to each new member listed for Section in each issue of AEG News (have already done this for those listed in September AEG News)

Welcome Frederick Love as new Membership Committee Chair.

Fred to contact members who haven't renewed in January.

New ideas for membership recruitment are welcome.

Need to get Frederick Love's contact info onto the website.

Ideas for field trips this coming year – Ben

We may be able to sponsor a field trip during the Southeastern GSA meeting. See website for info on GSA meeting: <http://www.uncw.edu/earsci/2011SEGSA.htm>

Other ideas for field trips – contact Ben Draper at Benjamin_draper@golder.com

Side note: GSA meeting will have a mentor lunch that attendees should attend. Can hand out AEG application forms.

Ideas for short courses this coming year

National will take care of majority of setting everything up. Our section decides on the topic, location, and finds a speaker(s) and National can take venue and logistics.

Should we and can we get someone to chair a short course committee? Volunteers contact Paul W. at pmweaver@bellsouth.net

From Jenn - I talked to Paul Federline with Pine Environmental Services, who exhibited at the meeting in Charleston. He said he would be happy to do a workshop for students and members, showing them how to use the equipment that Pine has. I think this would be a great opportunity for the Section to take advantage of.

Pine is located in Raleigh. This is less effort than our typical short

courses because Pine will take care of most of the work.

Possibly another one in Charlotte with Enviro-Equipment.

Paul's contact info is pfederline@pine-environmental.com, 919-713-0008 (office), 919-333-6287 (cell).

Other ideas:

Potential Instructor - Marty Woodard – Rock Slopes

Webmaster - Tami

Is the person who volunteered to assist you going to be able to take over the webmaster duties? Has Tami spoken to the guy at Mactec, and has he agreed to take over? Rick will talk with the guy at Mactec.

If not, who can we get to take this over so you can get a break? National has hired a webmaster (very responsive), we may want to look into that as well (<8 hours a month). Jenn B. will call next month to check on details.

Newsletter Editor – Jane

Any ideas what we can do to relieve you of this burden?

Yes—help with keeping sponsors up to date; starting next month Jane is sending out sponsor renewals.

Appoint a Sponsor chair? Maybe ask at meeting in Greensboro if someone can help.

Is there an outside person or company we could affordably get to do the newsletter?

Other information:

Next letter from Paul is due by 1st of December.

Charlotte Winter Meeting – January 27, 2011

Jahn's Lecturer, Bill Haneberg will speak

Will most likely be a joint meeting with ASCE

Who will volunteer to put this together?

Brad will contact them for reservations in the next few weeks.

The date is firm. Rick will keep in contact with the ASCE folks.

(Continued on page 9)



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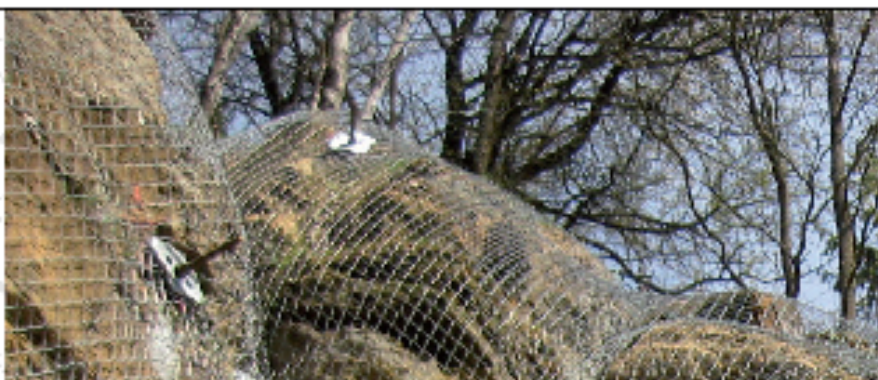
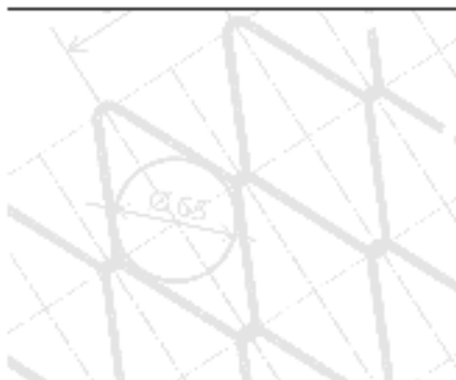
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www.geobrugg.com



Quarterly board meeting minutes (Continued from page 7)

Provide info to Jane (janehgill@aol.com) for Newsletter.

Raleigh Spring Meeting –

Bruce Hilton to speak at our meeting on April 7 2011.

Rick will organize this meeting

Bruce has agreed to do day talk(s) at schools in the area. He will arrive on Wednesday evening and leave Friday mid-day, so we have at least one talk and maybe two.

Shall we offer to take Bruce out to dinner on Wednesday night if he arrives early enough?

Other information:

Natty Greens in Raleigh is a potential meeting location. Rick will check into venue.

2011 Jahns Lecturer

What schools do we want to target? Somewhere we've never been with the Jahns lecturer?

He's volunteered for one week (last week of January) plus two days the following week.

Will we help with his hotel expenses if the school(s) can't?

ETSU and Furman would like a visit again, and Va Tech and Radford already scheduled him on their own.

Tentative schedule:

Monday, January 24th - ECU in Greenville, NC

Tuesday, January 25th - UNC Wilmington, NC

Wednesday, January 26th - Guilford College in Greensboro, NC

Thursday, January 27th – Appalachian State in Boone, NC and Thursday evening at Sectional meeting in Charlotte

Friday, January 28th - UNC Charlotte

Visiting Professional visits

Any volunteers?

Keep an eye out and try to recruit speakers for visiting professionals talks. Paul will do Guilford and/or East Tennessee State University. Rick K. with do NC State and UNC Chapel Hill,

Other opportunities: During Clemson symposium (March or April). USC maybe?

We'll do them in the spring as usual

2011 Darcy Lecturer

Rick made a request through NGWA earlier this year to have 2011 lecturer **Stephen Silliman** (Univ. of Notre Dame) come to Raleigh. It was a joint request w/ NCSU, and if we get him, we'll probably make it a joint meeting w/ NCSU, EWB, GWPNC and ASCE. This lecturer is highly sought nationally and internationally, so we may not "win" a visit, but if we do, I think there will be a lot of interest. Depending on his schedule, he might not be able to be the speaker at a section meeting. We will probably know by end of November if we're approved.

Stephen Silliman's two talks are as follows: "Development of Reliable Hydrologic Data Sets in Difficult Environments: Case Studies from Benin, West Africa" explores how reliable hydrologic data are critical for sound hydrogeologic analyses and subsequent policy decisions. Obtaining such data sets in the face of limited budgets and limited access to field sites can be a daunting challenge. Silliman's experience in Benin demonstrates that such challenges are best met through close collaboration with a number of in-country entities (universities, local populations, government agencies, and NGOs) and integration of hydrologic expertise with political, social, and cultural considerations.

The second lecture, "Characterization of a Complex, Sole-Source Aquifer System in Benin, West Africa," focuses on the Godomey wellfield as the sole source of freshwater for Cotonou, Benin. The Cotonou/Calavi area is the largest population center in Benin, with an estimated population of between 1.5 and 2.0 million people. Located directly on the Atlantic coast, this population center is also bordered by the southern and western shores of a large, shallow lake. Groundwater wells serving this population are located approximately 6 km north of the Atlantic coast and as close as approximately 1 km to the western shore of the lake. With most production wells located within partially confined portions of this complex aquifer system, this water resource is threatened by contamination from saltwater intrusion (both from the lake and the ocean) and anthropogenic activities.

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2011 SE GSA FEATURES THEME SESSION ON GEOSCIENCE EDUCATION

The Dept. of Geography and Geology at the University of North Carolina-Wilmington is pleased to host the 60th Annual Meeting of the GSA's Southeastern Section at the new Wilmington Convention Center, located on the banks of the scenic Cape Fear River. The Keynote speaker will be William G. Ross Jr., Duke University professor, environmental lawyer, and former Secretary of the North Carolina Dept. of Environment and Natural Resources. For complete registration information on the meeting, go to <http://www.geosociety.org/Sections/se/2011mtg/index.htm>

In addition to many special theme sessions, there is one on geoscience education, chaired by former AEG Carolinas Chair Randy Bechtel, NC Geological Survey. Take a look at it, and please try to get over to Wilmington next March. Below is the description:

Title: Building a Foundation in Geoscience Education: Gathering Educators with Professionals to Create a Geoscience Literate Public.

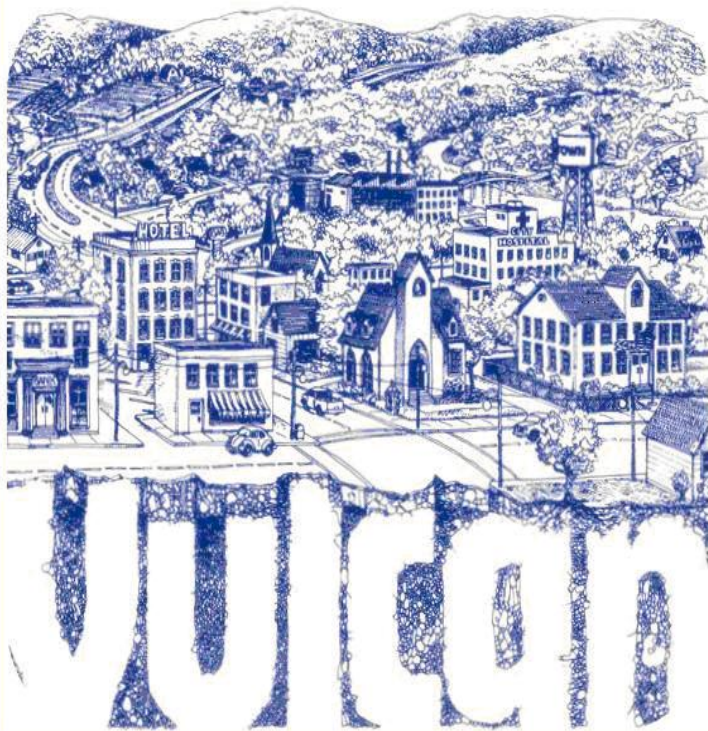
A geoscience literate public is needed to make appropriate decisions regarding health, safety and economy in an era with increasing misinformation and disinformation. Many times K-12 students and teachers do not have the time or ability to thoroughly understand the inter-

connectedness of geology other than identifying rocks and minerals and learning the layers of the Earth. These students are also ill prepared to be successful in college level science courses. The geoscience community has an opportunity to be involved in crafting the direction of the curricula (National and State (North Carolina)) and to provide educators with age-appropriate resources and educational opportunities as well as discussion, activities, and community participation. We encourage educators and geoscientists to submit their best practices for engaging students, teachers and the public in Earth Science education.

The geologic community needs to provide appropriate information and resources to K-12 teachers who may have no, or very little, science background (K-5); are trained in another science (6-12 biology, chemistry, or physics) and have to teach Earth science; and teachers who are new to the area or new to teaching and are overwhelmed in learning the geology of such a diverse state. The foundation of education begins in the elementary school (K-5) where the most assistance is needed because teachers are least prepared to teach science. The middle and high school levels (6-12) have a shortage of geologically knowledgeable teachers, and all levels have pressures to teach to the End-of-Grade and End-of-Course tests. Many times geology, science in general, and history get pushed aside because of these pressures.

Again, for more information on the 2011 SE GSA, go to <http://www.geosociety.org/Sections/se/2011mtg/index.htm>

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GEORAMBLINGS

By Dr. Charles W. Welby

“Water, water every where, Nor any drop to drink.” (A bit of Coleridge.)

It comes to mind that in places and times, it may be possible that we will find these lines from the “Rhyme of the Ancient Mariner” may be more truthful for land-related matters than for the setting at sea for which Coleridge wrote the poem. Another piece of “guidance” comes to us, often attributed to the Durants and their volumes on world history, but not clearly in any of their publications, “Civilization exists by geological consent, subject to change without notice.” This last statement pertains in many ways to the relationships among geology, water, and energy, or so it seems to me.

Intertwined in the relationship between and among the three factors, geology, water, and energy, is climate and its patterns through time. For modern civilizations and how they react to a set of climatic conditions or changes is an important consideration in their behavior and perhaps survival as they adapt themselves to their need for water. (Just remember, $K.E. = \frac{1}{2} mv^2$.)

“Out of the air” examples might be Pompey and its steam baths or the irrigation of crops along the Nile River by means of Archimedes screw pumps. The long infiltration galleries, or kanats, found in the Middle East required considerable energy to construct and maintain, yet they supported civilizations of some consequence and in parts of Morocco are still in use.

That water supply is controlled by the energy required to make it available seem obvious. At the same time water flowing in rivers can be utilized to generate energy. As an example, of course, are the large hydroelectric projects that generate electricity. On a smaller scale are the dams forming the mill ponds that fed energy into the grinding of grain, the weaving of fabrics, and the cutting of timber for construction purposes. On a more basic scale, what is the energy expended by an individual when to obtain water for just existence that person must walk 3 miles for a gallon of water, for example?

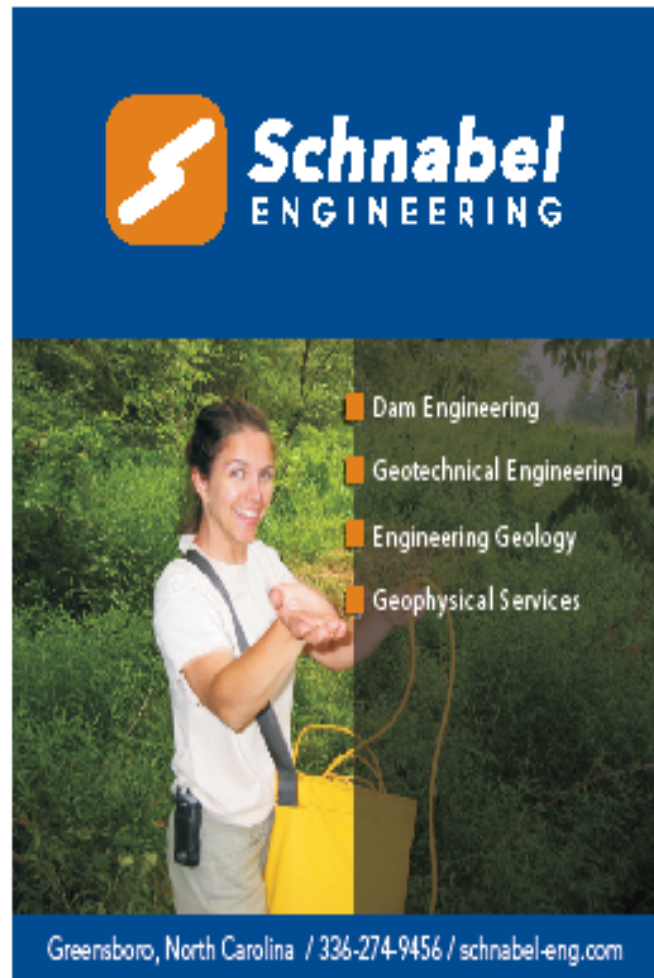
In John McPhee’s book, *The Founding Fish*, a description of the effects of small dams on the migration of shad up the rivers of the central eastern U.S. at the time of the American Revolution is described. Chapter 8, *The Founding Fish*, describes how the energy put into trapping the fish with dams and obstructions eventually led to the survival of Washington’s army at Valley Forge. Such traps were outlawed during the pre-Revolutionary days. But the Schuylkill River provided the food for Washington’s army, none the less.

If we take as examples the dams on the Columbia River and Hoover Dam on the Colorado, there is an interrelationship between energy involved in their construction, from its use in the mining of the materials used and their fabrication to the actual emplacement of the materials in the dams to the hydroelectric power generated to-

day, as well as the energy to provide the materials for the distribution system for the electricity and the energy required to construct physically the distribution system. While the Columbia River dams provided energy for the production of aluminum for WWII purposes, much of the energy is now used for production of electricity for “growth” in the Pacific Northwest. Each reader can develop an opinion about the need for the dams. Hoover Dam helps supply electricity for Las Vegas and environs as well as providing water to the West Coast in the course of things. Yet today Lake Meade is worryingly low because of the failure of sources of water to it to provide the water needed. One can see the situation well while flying into Las Vegas.

Recent stories in the Raleigh News and Observer describe plans to upgrade the city’s Neuse River Waste Water Treatment Plant. To do so, the city will of necessity have to find and use major inputs of energy. The stated purpose of the upgrade is to allow eventually for additional growth in Raleigh and Wake County. So what is to be the energy source for the upgrade and the continued improvements in the quality of the water discharged into the Neuse River? What is to be the energy cost to the citizens who depend on the Neuse River Water Treatment

(Continued on page 29)



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AEG VOLUNTEER OPPORTUNITIES

*Jennifer Bauer, AEG Vice President/
President-Elect*

Greetings Carolinas Section members! I want to thank you for taking the time to read this issue of the GeoNews and this article. Your interest in the happenings of AEG indicates to me that you care about this organization. With that in mind, I'm soliciting you now for your participation in AEG's Operational Committees. In addition to the below, there are also opportunities to volunteer at the section level. Contact Section Chair, Paul Weaver, for those positions.

At the Organizational level, there is a lot of activity going on since the 2010 Annual Meeting. At the Annual Board of Directors Meeting in Charleston, the Board held a workshop on membership. Several action items came out of this workshop and AEG's Operational Committees are working hard to get these initiatives underway, in addition to carrying out their on-going activities.

Two large-scale projects that came out of the workshop include 1) new membership applications/marketing brochures targeted toward three audiences: students, practicing professionals, and academicians and 2) updating the Outstanding Section Award with initiatives that enhance Sections' outreach to geologists in their area as well as providing some great ideas to spark new energy in the section.

The Operational Committees carrying out these goals are listed below. All of them are looking for new, energetic, dedicated volunteers that are willing to devote a few hours a month to AEG's projects to enhance member services. Please feel free to contact me, as Executive Council liaison to the Operational Committees, or any of the committee chairs listed if you have any questions or would like to become more active in the organization that you care about. Thanks in advance for your interest!

Operational Committees:

Strategic Planning – Implementation of the Strategic Plan, works closely with committees below
Paul Hale, phale@gfnet.com

Advertising/Sponsorship/Exhibiting Committee – Increases awareness of AEG's Advertising/Sponsorship/Exhibiting programs.

Aaron Christensen, achristensen@burnsmcd.com

Mark Edwards, mark.edwards@ninyoandmoore.com

Advocacy – Implements goals associated with advocating for the Environmental & Engineering Geologist profession. Rick Kolb, rkolb0915@aol.com

Continuing Education – Organizes travelling Short Course offerings for all Sections to use.

Martin Woodard, rk2fall@yahoo.com

GARY ROGERS HONORED WITH FLOYD T. JOHNSTON AWARD AT AEG 2010

Our own Gary D. Rogers was awarded the Floyd T. Johnston Service Award for 2010 in Charleston. Gary was the 25th recipient of one of the Association's highest awards, which is presented to an AEG Member for outstanding active and faithful service to the Association over a minimum period of 9 years to coincide with Floyd's tenure as Executive Director.

Gary joined the AEG Carolinas Section in early 1994, and has been extraordinarily active ever since, giving freely of his time, energy, and organizational talents. He has been instrumental in extending AEG programs to students and potential members, and enormously effective and influential in bringing together otherwise unconnected professionals and students through joint meetings, short courses, and symposia.

Among his many positions of leadership for the Carolinas Section, Gary was Section Chair (2001-2002), Membership Chair (1998-2001), Advisor (2002 to the present); Organizing Committee Member for both the 2003 Tools of the Trade Symposium and the 2009 Short Course, Principles of Soil and Groundwater Chemistry.

On the Association level, Gary was a member of the Board of Directors (2001-2002); Section/Chapter Support Committee (2004 to present); Dams Technical Working Group; Schlemon Specialty Conference Selection Committee Chair (2005 to the present); and 2010 Annual Meeting Planning Committee Member and Publicity Chair (2005 to the present).

In addition, Gary is always calm, considerate, and ready to listen and contribute his good judgement and considerable experience to any task he takes on.

Congratulations, Gary!

Engineering Geology Education – Defining bodies of knowledge for environmental & engineering geology practitioners. Keith Turner, kturner@mines.edu

Licensure – A resource for Sections/States in issues regarding licensure of geologists and other geology related legislation. Ken Neal, kengneal@aol.com

Section/Chapter Support – Offers programs and materials to support AEG's sections and chapters

Marie M. Garsjo, marie.garsjo@ftw.usda.gov

Student and Young Professionals - Offers programs and materials to support AEG's students and young professionals. Serin Duplantis, serin.duplantis@gmail.com
Nicole Wendlandt, nwendlandt@gfnet.com

Website – Responsible for the maintenance and revision of AEG's website

Dale Andrews, Dale.Andrews@CarmeuseNA.com

Ken Ferguson, ken.fergason@amec.com



Aggressive Fluid Vapor Recovery Trailer (AFVR)

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

Key Features of our AFVR Trailers Include:

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Enviro-Equipment, Inc. is your full service center for AFVR Trailers. We build them, so we can maintain and repair them. Whether it's a unit we built, you built or someone else built, we are your one stop service center. Contact Evan Chew at our Remediation Division 1-866-655-8267 or email us at remediation@enviroequipment.com.

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EDUCATION SECTION

DR. MARINOS' INCREDIBLE YEAR AS A RICHARD JAHNS DISTINGUISHED LECTURER

By Jane Gill-Shaler and Rick Kolb

Dr. Paul Marinos, the 2009-2010 Jahns Distinguished Lecturer and a Professor of Engineering Geology in the School of Civil Engineering at the National Technical University of Athens (Greece), came to the Carolinas Section for a whirlwind visit, only part of the staggering number of people, venues, and countries he touched on in this busy year. His "succinct report" indicates that during January to March, April to June, and September to November 2010, he conducted 111 lectures at 96 venues, with 4,318 attending. He gave 17 lectures on tunneling in difficult ground, 23 on Rock Mass Characterization, 20 on Geology in Dam Engineering, and 28 on the Geology of Athens, Greece, among others. He lectured to 36 geology or earth science departments, 10 geological engineering departments, 22 civil engineering departments, 22 AEG sections or chapters, and five companies, among other groups. He was driven, or drove, a total of 27,584 km. Dr. Marinos indicates that



arrangements made for him were excellent or very good, with the most enjoyable being home hospitality from colleagues and friends.

AEG and the Engineering Geology Division of the Geologic Society of America (GSA) jointly established the Richard H. Jahns Distinguished Lectureship in 1988 to commemorate Jahns and to promote student awareness of engineering geology through a series of lectures offered at various locations around the United States. More about the Jahns Distinguished Lecturer at

www.aegweb.org. Dr. Marinos brings extensive experience from both industrial and academic sectors, having served as consulting engineer to numerous projects around the world. His work today focuses on rock mass characterization and behavior, tunneling and karstic ground. He has authored over 300 papers and received many awards for his work in engineering geology. He was president of the International Association of Engineering Geology from 1994-1998 and is currently president of the Geological Society of Greece. More about Dr. Marinos at <http://www.aegweb.org/files/public/2010Jahns.pdf>.

Bill Haneberg, the 2010-2011 Jahns Lecturer, will visit the Carolinas Section in January. Details of his visit are on page 5 of this newsletter.



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EDUCATION SECTION



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- Eligible for AEG Foundation and AEG Scholarships including funding for field camp, field studies, academic studies and travel to present at national meetings.
- Discounts to attend AEG's Annual and local Section Meetings, field trips, and short courses (sometimes you can attend for FREE).
- Network and meet YOUR future employer! One member noted, "Every job I have had was a result of shaking hands at an AEG event!"
- Free access to *Environmental & Engineering Geoscience*, co-published with Geological Society of America, *AEG NEWS*, and *AEG's Annual Meeting Program with Abstracts*.
- AND STUDENT MEMBERSHIP IS FREE!



APPLICATION FORM

NAME: _____

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PHONE: _____

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Student Membership includes online only access to AEG periodicals.

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Phone: 303-757-2926: FAX: 303-757-2969: aeg@aegweb.org: www.aegweb.org

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EDUCATION SECTION

REG Review offers ASBOG Exam Courses

The Association of Environmental & Engineering Geologists (AEG) is pleased to announce the Winter, 2011 series of review courses for the ASBOG® geology licensing exam and/or the California Supplemental exam taught by REG REVIEW, Inc. AEG and REG REVIEW, Inc. have partnered to provide these courses since 1992. In the Winter of 2011, ten one-day review courses for the ASBOG® licensing exam will be offered regionally throughout the U.S.; For this newsletter, Eastern locations ONLY are listed below.

REG REVIEW's approach is to give you the focus and direction needed to appropriately study for the exams. We cover the approach of the exam and highlight the types of information you would need for exam level questions. For specific information on our course content and study materials please visit our website at regreview.com.

The courses are taught by Patti Sutch, California PG 3949, CEG1641, and CHG 25, Lisa Dirth, California PG 3951, CEG 1240, and North Carolina RG 1627 (by ASBOG exam), and Elisabeth Ervin-Blankenheim, Pennsylvania PG 4595 and past student of REG REVIEW.

REG REVIEW, Inc students' success rate has ranged from 85% to 99% on both exams since we began teaching to the ASBOG® exam. The National pass rate during the same time was 58% to 55% for the FG and 74% to 70% for the PG. With the current state of the economy, can you afford not to pass the exam the first

time you take it?

Course dates and EASTERN locations are as follows: (For other location information please go to our website at <http://regreview.com/winter2011courselocations.html>)

EASTERN US Courses - Winter, 2011

Atlanta, GA, January 15, 2011, 8am to 4pm

Orlando, FL, January 16, 2011, 8am to 4pm

Raleigh, NC - January 22, 2011, 8am to 4pm

Philadelphia, PA, January 23, 2011, 8am to 4pm

Fees: ASBOG® Courses are \$495. AEG Members can claim a \$15 discount on their courses (please notify by email if this applies to you). To register online you can go direct to <http://regreview.com/winter2011onlineregistration.html>.

Preregistration deadlines for the Winter, 2011 courses are a postmark date of December 24, 2010 for the Eastern US courses. Included in the course price are 7 hours instructional time for the ASBOG® exam, the set of Study Manuals pertinent to the exams you are taking and a packet of course notes (60+ pages). The course notes are only available to our students. Current information on study manuals, flash cards, and courses, including specific locations, may be found online on REG REVIEW, Inc's website at <http://regreview.com>. To contact REG REVIEW Inc.: e-mail - regreview@aol.com, mailing address - 2035 Bluebell Ave, Boulder, CO 80302, telephone - East Coast call Lisa Dirth at 603-714-4841, (fax) 303-997-2151. West Coast (evenings) Patti Sutch at 916-456-4870.

Please pass this information on to any geologist that you know that might like our help for preparing for the state licensure examinations. Thanks.

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EDUCATION SECTION

MANY THANKS FOR EARTH SCIENCE KITS DISTRIBUTED TO NC SCIENCE TEACHERS IN NOVEMBER

AEG Carolinas received this very nice thank you note from Randy Bechtel, NCGS Environmental Education.

November 20, 2010

AEG Carolinas Section
c/o Paul Weaver, Section Chair

Dear AEG Carolinas Section members and sponsors:

I would like to thank everyone in the Carolinas Section of AEG, Ground Water Professionals of North Carolina, and AEG Carolinas sponsors for donating the 2010 Earth Science Week earth science tool kits to teachers attending the North Carolina Science Teachers Association (NCSTA) Professional Development meeting in Greensboro on November 11-12, 2010. All of the kits, almost 500, were given away. This included not only the kits that Jane Gill-Shaler and her husband delivered to the conference (their truck was definitely sagging under the weight), but also the extras from the national AEG meeting delivered by Jenn Bauer, and the North Carolina Geological Survey was able to donate an additional 30 kits.

The attendance at NCSTA was almost 1,300! This attendance is similar to last year's 1,200 attendance but still less than the usual 1,800 – 2,000, an obvious sign of the economic times. In that vein, thanks again to the sponsors and volunteers who made this educational resource available to so many teachers. I hope that this endeavor can continue in the future.

Thank you to Paul Weaver who invited several earth science teachers, two of whom are N.C. Outstanding Earth Science Teacher award winners, to attend the AEG

Carolinas meeting on November 11. I know the teachers appreciated the opportunity to meet some geoscience professionals, and vice versa. Hopefully this will encourage even more students to go into the education realm to help produce more geoscience professionals. This type of communication is vital if the geosciences are to grow as a profession and to educate the general public. I hope this communication will continue at SEGSA during the Theme Session "Building a Foundation in Geoscience Education: Gathering Educators with Professionals to Create a Geoscience Literate Public"


Next year the NC Aggregates Association will be giving away rock samples, and I am sure they will need volunteers and, of course, more earth science tool kits to give away. I also would like to see more teachers and geoscience professional mingle together, as was the case at the AEG Carolinas meeting in Greensboro during the NCSTA, which may be a possibility at next year's NCSTA and at other more informal venues.

The N.C Geological Survey, Geodetic Survey, and the Land Quality sections of the Division of Land Resources combined efforts to staff and supply one combined booth instead of having three separate booths. We distributed over 1,000 other free materials, including maps, posters, rain gauges, pencils, and various publications. In total, about 1,500 pieces of geoscience education materials were distributed at this year's conference. The NCSTA was smaller in both attendees and exhibitors, but I think many teachers still came away with much needed resources and information.

I look forward to meeting many of you at SEGSA March 23-25 in Wilmington, N.C., and other venues around the state.

Thank you

Randy Bechtel, CEE
Project Geologist - Environmental Education
and Piedmont Field Mapping
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EDUCATION SECTION

AGI ACCEPTING APPLICATIONS FOR 2011 AWARD FOR EXCELLENCE IN EARTH SCIENCE TEACHING

Alexandria, VA - Does someone you know teach earth science to students between kindergarten and eighth grade? Do they excel in their teaching through leadership and innovation, bringing new ideas and approaches to teaching about our planet? If so, they may be eligible for the Edward C. Roy Award for Excellence in K-8 Earth Science Teaching. Given annually, this award recognizes one classroom teacher nationwide for their leadership and innovation in earth science education.

The winner will receive a prize of \$2,500 and an additional grant of \$1,000 to enable the recipient to attend the 2011 National Science Teachers Association (NSTA) Annual Conference in San Francisco, California March 10-13. To be eligible, applications must be postmarked by January 5, 2011.

To learn more about competition requirements, application procedures, and deadlines, visit <http://www.agiweb.org/education/awards/ed-roy/>.

The American Geological Institute is a nonprofit federation of 47 geoscientific and professional associations that represents more than 120,000 geologists, geophysicists and other earth scientists.

JOB OPPORTUNITIES

ZEBRA Environmental – is seeking a Branch Manager for our Mid-Atlantic office currently located in Raleigh, NC. Strong communication skills, industry experience and business development skills are required. The position will include the management of direct push, direct-sensing & drilling field crews and further expansion of our client base. This position offers an excellent growth opportunity, with competitive salary and benefits. If you are interested in joining the dynamic team at ZEBRA, please send your resume with salary requirements to HR@zebraenv.com or fax to 813.626.1718.

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ANNOUNCEMENTS

NCDOT's Brad Worley writes; "We are about to begin drilling the US 64 Asheboro Bypass. We will be returning the first of the year to drill additional boring for the replacement of Bonner Bridge at Oregon Inlet. That project is now a design-build and is gearing up for what will hopefully be the final stages of design and replacement. Drilling there is always a challenge. And speaking of challenges, we are about to begin drilling for the US 17 Wilmington Bypass bridge over the Cape Fear River. This project presents many challenges because of limited access and the need for very specialized equipment."

SE GSA deadline for abstract submittal for the theme session Paul Weaver and Brad Worley are co-chairing at Southeastern GSA (Wilmington, NC, March 2011) is on December 14th. Below are two links for that. It would be great to get this out to the AEG Carolinas list so we get plenty of good talks. <http://www.geosociety.org/sections/se/2011mtg/techprog.htm> and <http://gsa.confex.com/gsa/2011SE/cfp.epl> for abstract submittal.

NCGS Henderson County landslide hazard maps to be delivered to County staff in January 2011 The North Carolina Geological Survey Landslide Hazard Mapping team has completed the fourth mountain county slated for mapping, as authorized by the 2005 Hurricane Recovery Act. A draft of these GIS-based maps, in their digital

form, will be presented to Henderson County and municipal staff for review in early January 2011. After review by these staff and other geosciences professionals, the final version of the Henderson County landslide hazard maps will be released in early 2011.

Previously mapped counties include Macon, Watauga, and Buncombe. More information, digital pdf copies, and links to online map viewers for these counties can be found on the NCGS webpage, http://www.geology.enr.state.nc.us/Landslide_Info/Landslides_main.htm

SCAEP (South Carolina Association of Environmental Professionals) is having their next meeting 2011 January 20th, on a Thursday night. Chris Lock, the 2011 SCEAP President, will be sending out more details the first week of January 2011. The meeting will be held at the Edens & Avant Office building at 1221 Main Street (corner of Main & Gervais), in the 10th floor conference room. The social starts at 6:30pm with refreshments and pizza, and the presentation is at 7:30pm. There is a parking garage located inside the building which is accessible from Main Street. There is no charge to park there during the meeting, just bring your parking stub to the meeting so it can be validated. It is my understanding that street/metered parking is free after 6pm, as well. For reservations, contact **Deborah Langley**, (843) 860-1420, DLangley@JoyceEngineering.com



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TECHNICAL SECTION

Expediting Brownfields Redevelopment by Applying TRIAD for Source Area Delineation Using the Membrane Interface Probe

By: **Brad Carlson**, ZEBRA Environmental Inc.; **Maria D. Watt, PE**, CDM.; **Michael J. Burlingame, PE**, NJDEP; **Jessica R Beattie, PG**, CDM; **Melissa Koberle**, CDM.

ABSTRACT Redevelopment and reuse plans are often based upon an expedited delineation and remediation life cycle, since delayed reuse usually has economic consequences. In this article, the TRIAD approach is used to expedite the delineation of a source area within a municipal landfill to complete the remedial effort prior to construction of an urban civic center.

The TRIAD approach uses the three elements of systematic project planning, dynamic work strategy, and real-time measurement to expedite site characterization (ITRC,2003). In this article, the strategy consisted of two phases; in situ screening of soil and groundwater using the membrane interface probe (MIP); and confirmatory sampling via vertical profiles in the soil and groundwater. This study found that, using this approach, combined with the proper placement of confirmatory samples, significantly reduced overall project cost and will expedite the site redevelopment. *(ED – This article was edited for length. The complete article in pdf format may be obtained from Mike Early, ZEBRA Environmental, at MikeE@zebraenv.com.)*

INTRODUCTION The TRIAD approach uses real-time field measurements to allow sampling strategies to be dynamic and evolve to establish the range of contaminant concentrations, the degree of heterogeneity, and spatial correlation of contaminant distributions. However, real-time screening does not replace offsite laboratory analysis, which has a high degree of certainty to support field decisions. The TRIAD approach can expeditiously reduce uncertainty in site characterization, thereby reducing the risk of failure for site remediation and impeding site redevelopment. The three concepts comprising the TRIAD approach are (ITRC,2003):

- Systematic project planning
- Dynamic work strategies
- Real-time measurement tools

The unifying concept for these ideas is the need to understand and manage uncertainties that affect decision making in the remedial process.

A conceptual site model (CSM) should be part of the planning to identify and clarify project objectives. This consists of a 2D, 3D, or 4D representation of physical, chemical, and biological information organized into potential fate, transport, and exposure scenarios in order to focus a remedy's assessment, design, and implementation. A CSM can include information regarding contaminant distribution, movement, and potential receptors; hydro-

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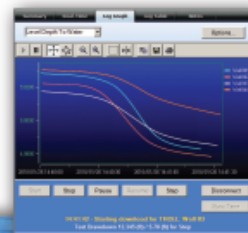
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geologic and stratigraphic conditions; land use; monitoring features; and data gaps.

During systematic project planning, the numerical and/or qualitative cleanup goals should be identified or at least estimated, and should be re-referenced during later data analysis and decision making. Consideration of potential remediation approaches/technologies should be considered, if possible, during project planning to allow for early data collection critical to remedial technology feasibility and selection. Project planning should include/consider: how background conditions will be evaluated, data flow and decision making, analytical methods (e.g., field and laboratory, qualitative and quantitative), team selection (with the necessary expertise), and integration planning with regulators and stakeholders.

Dynamic work strategies are different from conventional work strategies in that dynamic planning documents will include decision logic when complexities are encountered. This will allow field personnel to change the site activities as needed, so as to continue to achieve the project objectives with increased quality and control. A key cost-saving component of the TRIAD approach is the potential to complete field work more quickly and ideally with one mobilization. A dynamic work strategy allows for this by providing for data exchange (via telecommunications tools, such as an FTP Internet site), data management systems, and contingencies to modify field activities during implementation.

Real-time measurement technologies, necessary to the TRIAD approach because they facilitate expedient and flexible decision making, include data collection and management tools, processing, analysis, and transmittal. Reliance on arbitrary confirmation sampling of a percentage of field samples should be avoided. Rather, the desired approach uses the field data and laboratory data in a combined approach with the goal to enhance the CSM. For example, where data certainty is sufficient (i.e., in areas that are either well above or well below the regulatory or other remediation goal), less expensive field methods can be used to increase sample density and enhance the CSM. Laboratory analyses can be used in areas where an unacceptable level of uncertainty (in terms of compliance with the remedial goals) remains.

In the project discussed in this article, the TRIAD approach using the membrane interface probe (MIP) specifically supported:

- Accurate daily interpretation of real-time data.
- Use of lines of evidence in evaluation.
- Proper placement of confirmation samples,
- A well distributed sample database

The MIP uses the following probes to screen for site contamination: (1) Electron capture device (ECD) to detect chlorinated compounds; (2) Photo-ionization detec-

tor (PID) to detect aromatic hydrocarbons, and; (3) Flame ionization detector (FID) to detect straight chain hydrocarbons. Results from these detectors can be evaluated daily to optimize the sampling strategy and reduce the number of samples required to characterize the spatial contaminant distribution. Because chemical speciation is not achieved by any of these three detectors, selected supplemental confirmatory sampling is necessary at critical locations to determine the nature and extent of contamination with a high degree of certainty.

Background An 85-acre municipal landfill is located within a 200-acre brownfield development area (BDA). The BDA consists of eight abandoned brownfield sites along 2 miles of the New Jersey shoreline along the Delaware River, overlooking the Philadelphia skyline and within a highly urbanized area of New Jersey. The municipality has received significant

brownfields funding to stimulate redevelopment and revitalization. Redevelopment plans for this landfill include a state-of-the-art, 132,000-square-foot community center that will feature an atrium-style town plaza, a family service center, indoor and outdoor recreational facilities, an aquatic center,

and a child care center, as well as community enrichment, job-training, and anti-poverty programs.

To meet the aggressive construction and redevelopment schedule, an expedited TRIAD approach was utilized to comprehensively delineate a contaminated industrial source area within this site. The unlined landfill operated from 1952 until 1971; preliminary investigations revealed it contained mainly municipal solid waste. An area of industrial chemical waste material saturated with chlorobenzene (CB) and dichlorobenzenes (DCB) was identified in the southeast portion of the landfill. This material is approximately 20 to 30 feet below ground surface (bgs) and acts as a continuing source of groundwater contamination and localized soil vapor contamination. Although operations at the landfill ceased in 1971, illegal dumping activities continued at the site through the 2000s. While evaluating the property for redevelopment in 2006, a source area of volatile organic compound (VOC) contamination was identified in the southeast quadrant of the landfill. Investigations at the site identified concentrations of benzene, CB, isomers of DCB (1,2-, 1,3-, 1,4-), and 1,2,4-trichlorobenzene (TCB) above the state cleanup standards in both soil and groundwater. More specifically, it was identified that a grey-black clay layer situated below the waste fill was highly contaminated and was likely acting as the source of groundwater contamination in this area of the parcel. In late 2007, an initial interim remedial measure (IRM) was implemented consisting of excavation and offsite disposal of an estimated 14,000 cubic yards of material within this source area contaminated with CB and

The screening data generated by the MIP compared very favorably with the qualitative analytical data, and enabled gathering the data needed to define the target remediation area in one mobilization.

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DCBs. This IRM excavated a portion of the contaminated clay layer in this source area; however, residual contamination remained in the clay outside the perimeter of the IRM excavation area (hot spot) that required expedited delineation in order to meet the redevelopment schedule. The objective of this TRIAD investigation was to expedite the delineation of the remaining source material.

Physical Setting The site is located in the New Jersey Coastal Plain and is underlain by the Potomac-Raritan-Magothy (PRM) aquifer system. The PRM aquifer system consists of three principal layers of fine to coarse sand and gravel separated by stiff clay layers that are 20 to 50 feet thick. The three sand/gravel layers are referred to as the lower, middle, and upper aquifers of the PRM system. At the site, only the middle and lower aquifers of the PRM are present, and in the hot spot area, only the middle aquifer of the PRM is contaminated.

Depth to groundwater in the middle aquifer of the PRM in the source area ranges from approximately 27 to 29 feet below bgs, and groundwater flow is to the east-southeast. The waste fill is 15- to 20-feet thick and consists of fine tan sand, black silt, lenses of clay, gravel, rocks, concrete, wood, roots, construction and demolition (C&D) debris, and municipal solid waste. The C&D debris includes pieces of brick, asphalt, cement, plastic, glass, paper, tires, drums, metal scraps, wood, and cinders. The municipal solid waste includes plastics (e.g., bags, bottles), glass bottles, cans, cardboard and paper, clothing,

fabrics and rags, ceramic fragments, car metal fragments, wires, large rubber belts, and Styrofoam. The waste fill is underlain by 6 to 12 feet of dark grey to black medium plasticity clay (CL)/silty-clay (ML). The clay layer is underlain by the middle aquifer of the PRM, a light brown to gray fine to medium sand (SP) to silty-sand (SM), with trace to some gravel. This unit is approximately 25- feet thick. Beneath the middle aquifer of the PRM is a red fat clay (CH) layer extending from about 55 feet bgs to about 97 feet bgs. The clay is underlain by the lower aquifer of the PRM, a light brown to gray fine to coarse sand with gravel, which extends to bedrock.

TRIAD APPROACH FOR EXPEDITED DELINEATION

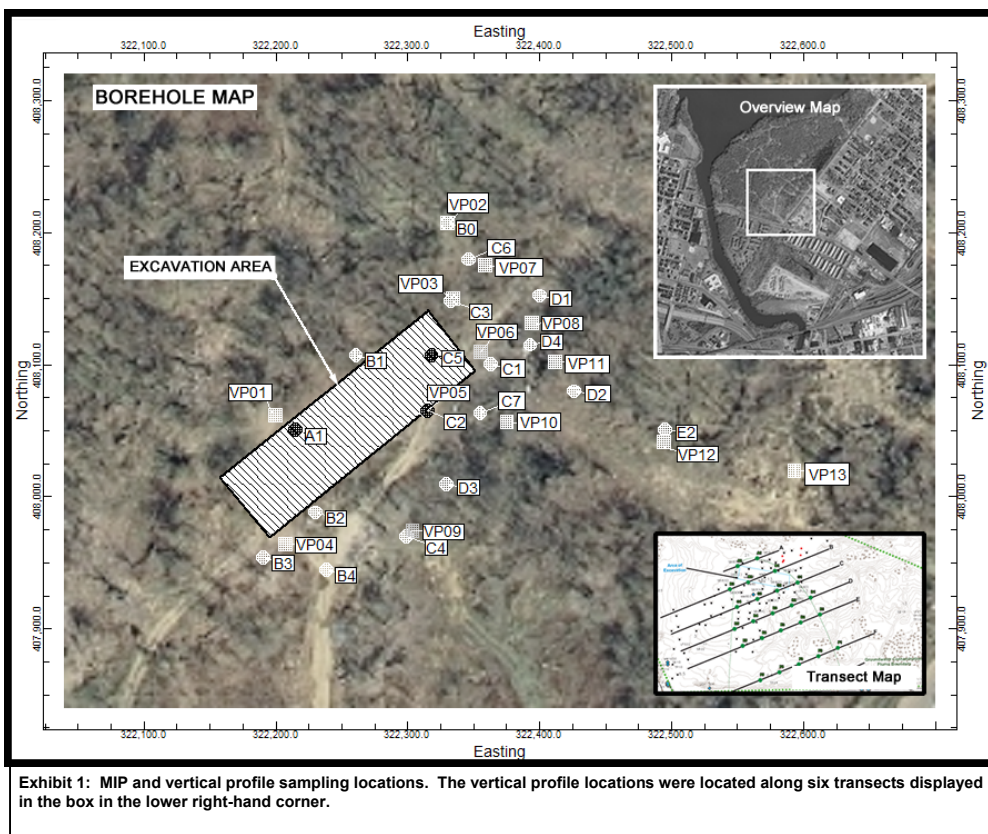
To conduct a streamlined TRIAD approach for the contaminant delineation of the remaining onsite “hot spot,” a sampling strategy was developed that consisted of two phases; in situ screening of soil and groundwater using the MIP, and the confirmatory sampling via vertical profiles, by means of a Geoprobe®, in the soil and groundwater.

Phase I: Membrane Interface Probe Investigation

In the planning stages of the MIP investigation, a series of six transects (labeled A through F in Exhibit 1) oriented perpendicular to the groundwater flow direction, were established covering the hot spot area and downgradient. On each transect, between two and five potential MIP locations were selected, spaced approximately 60 feet apart. These points were selected to try to identify the most significant soil and groundwater contamination in

the “hot spot,” based on the available data. A 3D model showing the ECD responses was then generated and updated daily during the MIP investigation. This enabled the project team to generate a detailed conceptual model of the contaminant distribution in both the saturated and unsaturated zones in an efficient, effective, and sustainable manner. The MIP investigation was designed to start at the upgradient transect and proceed towards transects downgradient of the “hot spot,” but the exact placement and order of the locations was a dynamic process based upon the data obtained daily. The objective was to use the MIP to provide real-time data at 1-foot intervals from the ground surface to the top of the con-

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fining red clay layer, 55 feet bgs, producing a vertical profile of the contamination. An electrical conductivity meter on the MIP was used to aid in distinguishing between the grey-black clay layer (source material) and the sandy aquifer below. Once the vertical profile of contamination was obtained from one location, it would be analyzed and compared against the data obtained at the other points to select the next sampling location. At this point, the original transects that had been established were just a guide, and MIP points were adjusted to better define the plume. A total of 18 locations (A1, B0 through B4, C1 through C7, D1 through D4, and E2) were screened with the MIP during the investigation (Exhibit 1). Once the area of contamination was defined with the MIP screening, the next phase of the investigation involved collecting confirmatory samples

Membrane Interface Probe Screening For MIP screening, the ASTM Standard D-7352 and Geoprobe® MIP standard operating procedure (SOP) (Kejr, 2006), were followed. The MIP acts as an interface between VOCs in the subsurface and the detectors at the ground surface. As the MIP tool is advanced through the subsurface, the tip of the tool is heated to volatilize contaminants. VOCs in soil and water particles diffuse across the MIP membrane, enter into a carrier gas stream, and are conveyed to gas phase detectors at the ground surface for measurement. The MIP uses a replaceable, thin film fluorocarbon, polymer membrane, approximately 6.35 mm in diameter that is in direct contact with the soil. This thin film membrane is impregnated into a stainless steel screen, which serves as a rigid support for the fluorocarbon polymer. The down-hole, permeable membrane serves as an interface for detectors at the surface. Geoprobe® currently provides two different configurations of its MIP "trunkline." This project used a PEEK® return line and a TFE Teflon® supply line to transport the supply gases. The PEEK® return gas tube (part of the MIP "trunkline") is typically 100 to 200 feet in length and allows the transport of the VOCs to the surface detector. The trunkline is able to clear itself of the VOCs much more efficiently than the TFE Teflon®. The time required for the MIP sampling depends on the carrier gas flow rate and the types of contaminants. Subsurface contaminants in the gaseous, dissolved, and free product phases can partition via molecular diffusion into the membrane. Bulk fluids, either gases or liquids, do not travel across the membrane. This allows the MIP to be used in both saturated and un-

saturated subsurface matrices. The gas phase detectors used in this project were a photoionization detector (PID), electron capture detector (ECD), and flammable ionization detector (FID). All three detectors provided a relative screening response rather than a concentration. Electrical conductivity is also measured to generate a lithological log of the subsurface, by using a dipole measurement arrangement at the end of the MIP loop. Both conductivity and VOC detector readings were logged simultaneously as the MIP advanced.

Limitations The MIP is highly sensitive to hard lithological material, such as bedrock, brick, and fill debris. The FID, ECD, and PID detectors associated with the MIP are limited to detecting specific compounds, which have the ability to volatilize and stay in a gaseous state during the trip from the membrane at the probe, through the rod string, to the detectors at the surface. The detection limits are reliable at about 1 parts per million (ppm) and can be pushed to about 250 parts per billion (ppb) total VOCs, but not much below that. Sufficient temperature must also be maintained in the trunkline itself, as mentioned previously concerning the site-specific temperature of 132° C, or the CB compound could condense. The FID, ECD, and PID cannot detect screening concentrations below the detection limits, and above the concentration which super-saturates the upper limits of the detectors. Because the thermal conductivity of soil varies depending on degree of saturation, particle size, density, and composition (Mitchell, 1993), a qualitative comparison of MIP detector data across different strata can be misleading.

Phase II: Confirmatory Delineation Sampling All soil

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samples were analyzed for target compound list (TCL) VOCs by U.S. Environmental Protection Agency (EPA) Method 8260, and a select number of soil samples were analyzed for total organic carbon (TOC) by EPA Method 9060. All of the groundwater samples were analyzed for VOCs+10 by EPA Method 624, and TOC by EPA Method 9060.

Confirmatory soil and groundwater sampling was conducted via direct push technology using an 8010 Geoprobe® to facilitate penetration of waste fill and C&D debris. In the saturated zone at each location, between two and five groundwater samples were collected through the aquifer thickness, biased to intervals with elevated MIP responses.

Quality control samples, including trip blanks, field blanks, and duplicate samples, were collected according to New Jersey Department of Environmental Protection (NJDEP) requirements during the investigation. Three duplicate samples were collected during the groundwater investigation. None of the analytical data was rejected based on quality control samples.

Sustainable Attributes For this project, the MIP fuel was switched from diesel to biodiesel, which is a clean burning alternative fuel, produced from domestic, renewable resources. Biodiesel is biodegradable, nontoxic, and essentially free of sulfur and aromatics (NBB, 2009). The MIP, Geoprobe® track unit, and support vehicles used 5-percent biodiesel as their main fuel. The project also involved the replacement of all petroleum-based hydraulic fluids with bio-hydraulic fluids. These are nonhazardous, high-performance, hydraulic fluids engineered as drop-in replacements for petroleum-based hydraulic fluid formulas. Bio-hydraulic fluids meet the newest original equipment manufacturer industrial requirements for premium, heavy-duty energy conserving hydraulic fluids (USDOE, 2008).

Using the TRIAD approach, we were able to expedite characterization with fewer borings. Instead of having to grid the site with borings, we were able to target specific sampling locations and depths using real-time data. We completed full delineation of the source area within a 6-week field program as opposed to several phased investigations extending over several months to years.

NATURE AND EXTENT OF SOURCE AREA/HOT SPOT

For this study, an elevated ECD detection was considered equal to or greater than 1 million micro volts (uV). The ECD readings present at less contaminated areas were between 119,000 and 500,000 uV. Based on the MIP detector responses, two hot spots were located adjacent to the former IRM. One hot spot was observed to the north and northeast of the IRM excavation based on screening results from MIP locations C1, C2, C3, C5, and C7. A

second hot spot was observed to the southeast of the IRM excavation based on MIP locations B2 and B4.

Soil/Clay Contamination

Soil sampling results were compared to NJDEP site-specific, impact to groundwater soil cleanup criteria (SCC) using an average TOC value for soil of 16.5 kilograms per gram (kg/g) (NJDEP, 2008). A total of nine VOCs exceeded the site-specific soil cleanup criteria: 1,2,4-TCB; 1,2,3-TCB; 1,2-DCB; 1,3-DCB; 1,4-DCB; benzene; CB; 1,1-dichloroethane (DCA); and trichloroethene (TCE). Soil analytical samples from vertical profile locations VP05, VP06, and VP07 exhibited the highest concentrations of TCBs, DCBs, and CB. VP05 and VP06 are located along the northeastern side of the excavation area within the north/northeastern ECD hot spot of MIP locations C1, C2, C5, and C7. VP05 is located next to MIP location C2, which exhibited the greatest ECD response. The highest concentrations of TCBs and DCBs were detected at VP05. The highest CB concentration was detected at VP07, located along the northern side of the excavation area and east of MIP location C6 and north of C3.

Concentrations of TCBs, DCBs, and CB exceeding the site-specific criteria were also detected at VP03, located at MIP location C3. This MIP location (C3) exhibited an elevated ECD response and is associated with the north/northeastern ECD hot spot. Concentrations of TCBs, DCBs, and CB exceeding the site-specific criteria were detected in soil samples collected from VP04. This vertical profile location (VP04) is located along the southeastern side of the excavation area, south of MIP location B2 and west of B4. The southeastern ECD hot spot is located within MIP locations B2 and B4. These two MIP locations also exhibited ECD hits within the waste fill between 5- to 6-feet bgs at MIP location B2 and 2.5- to 3.5-feet bgs at MIP location B4. The soil sample collected from 3-feet bgs from sample location VP04 did not contain any analyzed compounds above the site-specific soil cleanup criteria.

Based on the soil samples and MIP logs, a mass of soil contamination is present in two hot spots: along the north/northeastern and southeastern portion of the form IRM in the grey-black clay layer situated immediately below the waste fill material. In both of these areas, high ECD responses were observed in the grey-black clay during the MIP investigation, which were verified by confirmatory soil samples. These areas of impacted clay appear to be acting as sources of contamination by means of diffusion and desorption to the PRM aquifer below.

Groundwater Contamination Groundwater analytical data was compared to NJDEP's N.J.A.C. 7:9C Groundwater Quality Standards (GWQS) (NJDEP, 2009). Eight VOCs exceeded GWQS: 1,2,4-TCB; 1,2-DCB; 1,3-DCB;

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1,4-DCB; benzene; CB; cis-1,2-dichloroethene (DCE); and vinyl chloride (VC). All 13 vertical profiling locations (VP01 through VP13) detected VOCs exceeding GWQS.

Benzene and CB detections exceeded GWQS in all groundwater samples collected from each of the 13 vertical profile locations (VP01 through VP13), since both benzene and CB have a high solubility and, therefore, are relatively mobile. Overall, the highest benzene and CB concentrations were detected in groundwater samples collected from the middle aquifer of the PRM at locations VP08 and VP11. These locations are located within a U-shaped channel in the stratigraphy east/southeast of the IRM excavation and the northeastern ECD hot spot.

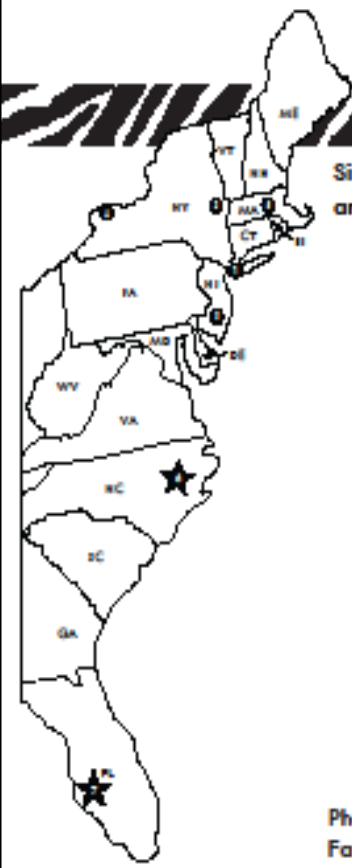
TCB and DCB compound detections exceeded GWQS in groundwater samples collected within all three lithological units. The highest TCB and DCB concentrations were detected in groundwater samples collected from the grey-black clay at location VP03 and the middle aquifer of the PRM immediately below the clay at locations VP06 and VP09. Vertical profile locations VP03 and VP06 are located within the northern/northeastern ECD hot spot in close proximity to MIP locations C3 and C1. Samples from these MIP locations exhibited the highest ECD detections (C1 at 13 million uV and C3 at 14 million uV). Vertical profile location VP09 is downgradient of the southeastern ECD hot spot. The groundwater sample collected from the sand layer at VP07 also contained elevated

concentrations of DCB.

Groundwater contamination at concentrations significantly above NJDEP CGWQS is present in the middle aquifer of the PRM. The highest concentrations of DCB isomers in the groundwater are in the upper and middle portion of this aquifer in the source areas north-northeast (VP03, VP06, and VP07) and southeast of the excavation (VP04). However, the distribution of CB and benzene contamination extends the full thickness of the aquifer at, and downgradient of, the IRM excavation. The discrete groundwater analytical data as well as the MIP logs show contaminant concentrations at vertical profile locations VP04, VP06, VP08, VP09, and VP11 have concentrations of VOCs at the same order of magnitude in the lower portion of the aquifer as in the shallower portion. The CB and benzene plume in the middle aquifer of the PRM was found to extend from the source areas offsite.

Streamlining Delineation with MIP The MIP logs generated from the investigation correlated well with direct data from soil and ground water sampling analysis. Soil boring logs validated the electrical conductivity data, which tentatively defined the top and bottom of the grey-black clay layer. Soil and groundwater sampling results also correlated well with the ECD responses presented in the MIP logs. The ability to promptly site MIP and sampling locations enabled the project team to reduce mobili-

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zation and demobilization time, as well as the reduction in investigation derived waste (IDW) by minimizing the amount of confirmatory samples needed to meet the project objectives.

These positive correlations suggests the MIP tool can be used effectively and efficiently to streamline delineation of hot spots at a site. Three-dimensional models of the hot spot areas were produced using data generated by the MIP, in conjunction with confirmatory analytical data. This enabled the project team to generate a detailed CSM of the contaminant distribution in both the saturated and unsaturated zones. The 3D visualizations were developed using a modeling algorithm.

CONCLUSIONS The use of the MIP as part of a TRIAD approach was proven an effective tool for horizontal and vertical delineation of hot spots and source areas at the landfill. The real-time data allowed placement of screening and sampling points more effectively, and resulted in a well-defined source areas to be further analyzed for remedial feasibility. The screening data generated by the MIP compared very favorably with the qualitative analytical data, and enabled gathering the data needed to define the target remediation area in one mobilization. Because of detector sensitivity limitations, the MIP may not be appropriate at all sites. The tool is geared toward sites with known contamination at concentrations above detection limits. In this investigation, it was critical that the temperature be maintained above 132°C (boiling point of CB) in order that it would volatilize and be detected by the ECD. The MIP contributed to meeting sustainability objectives for the project, and overall project objectives were met on an expedited basis due to real-time field measurements and dynamic work strategies. Reduction of the investigation's carbon footprint included using biodiesel, decreasing the amount of IDW produced from soil and groundwater sampling (e.g., bottleware, shipping materials, and decontamination fluids), by only collecting confirmatory samples, and requiring one mobilization and demobilization. This was aided by streamlining the investigation using realtime screening data during the TRIAD approach.

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REFERENCES

- Geoprobe® Systems(R), a division of Kejr, Inc. (2006). Geoprobe® Membrane Interface Probe. (MIP) Standard Operating Procedure.*
- National Biodiesel Board (NBB). (2009). Biodiesel Myths Busted (V3).*
- United States Department of Energy (USDOE). (April 2008). Clean Cities Fact Sheet, Biodiesel Blends. Midwest Research Institute, Battelle: National Renewable Energy Laboratory. DOE/GO-102008-2542.*
- Interstate Technology and Regulatory Council ITRC). (December 2003). Technical and Regulatory Guidance for the TRIAD Approach: A New Paradigm for Environmental Management. SCM-1. www.ITRCweb.org.*
- Mitchell, J.K. (1993). Fundamentals of Soil Behavior, 2nd Ed. Wiley & Sons, New York.*
- NJDEP. (December 2008). Impact to Groundwater Guidance: Soil Water Partition Equation.*
- NJDEP. (June 2008). Remediation Standards, New Jersey Administrative Code (N.J.A.C.) 7:26D: Soil Cleanup Criteria.*
- NJDEP. (November 2009). N.J.A.C. 7:9C: Groundwater Quality Standards*

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GEORAMBLINGS (Continued from page 11)

Plant to take care of their responsibility to their downstream neighbors who depend on the Neuse River for their water supply, and what is to be the source or sources of that energy?

Moving the locale overseas, one can recognize that problems with water supply, water quality, and energy are important topics on a world wide basis. Water supply becomes an important factor in the steppe areas of Mongolia. Also, China faces major water supply questions, and one has to wonder what the effect will be in the long term of the movement of water from the reservoir behind the Three Gorges Dam on the Yangtze northward to the desert area in the northern part of China. A major expenditure of energy is necessary to accomplish the construction of the canals and several long tunnels required in the project. In addition, what is the energy consumption demanded for the construction of several dams in China on the Yangtze, and the Mekong rivers as well as other rivers? Flying from Shanghai to Beijing, you can observe through the clouds the extensive agricultural area that is using energy to pull down the ground water levels. “Recharge” to the ground water through artificial recharge, if possible, requires energy.

From the day that the first well was drilled for oil, a non-renewable energy source as most of us know, and perhaps before, there has been a close relationship between water resources and oil production (read energy production). This year we (some of us) celebrated the 100th anniversary of the drilling and occurrence of the Lake View Gusher in California. The area in the southwestern corner of the San Joaquin Valley when it was first discovered by the Spanish explorers, was a lush, green valley with an abundance of wild life. The herds of elk and related animals rivaled what we now think of when we think of the wild life on the Serengeti Plain of Kenya and Tanzania.

The crater of the Lakeview No. 1 gusher can be visited and is marked by a California historical marker. One can “Google” the story about the event. In the early 19th Century cable tool drilling was the only method that was used to drill for oil, and blow-out preventers were non-existent. In that part of the world, a desert, water was scarce and had to be brought from nearby Lake Buena Vista, the terminus of the now dry Kern River. The water was purchased in 55 gallon drums and carried by

horse drawn wagons from Lake Buena Vista to the drill site. At the drill site the horses had to be watered and probably fed; so about one-half of the water carried to the drill site was used to water the horses, but the drilling operation paid for all of the water brought to the site.

Today Lake Buena Vista is dry, and a multitude of orchards and vineyards along with some cattle-raising facilities occupy the bottom of the lake. In the Sierra above Bakersfield a dam controls the flow of the Kern River to some extent. The dam for Lake Isabella and its location in relation to faults was a focus of one session at the AEG meeting in Lake Tahoe in 2009. In some scenarios Bakersfield could become a bit wetter than it is now, and Buck Owens might have to play his guitar from a rowboat.

Out of the Lakeview Gusher came in 1910 proof that a very large oilfield existed in that part of the San Joaquin Valley, and today the Midway Sunset Oilfield is the second or third largest oilfield in the conterminous USA and is still producing, perhaps even from some metamorphic rocks. (Now figure that one out.) Yet water and energy together play an important role in the production of the heavy crude.

When the Lakeview Gusher blew out, its effect on the price of oil reportedly drove the price of Texas crude down to 10 cents a barrel. Attempts were made to catch the oil and keep it out of Lake Buena Vista. There was little ecologic concern for the rattlesnakes, the ground squirrels, the horned toads, and the jack rabbits, and other members of the ecologic community as the oil spread across the desert.

Remember that transporting water across a landscape in open canals leads to evaporation of some of the water and that water accumulated behind dams does evaporate, the amount depending upon the climate, of course.



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CALENDAR OF EVENTS - 2011

Geological Events in the Carolinas

Courtesy of AEG Carolinas Section – www.aegcarolinas.org. Last updated December 19, 2010

Send updates/corrections to Rick Kolb, Duncklee & Dunham, rkolb0915@aol.com.

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

Date: January 11-13, 2011

Event: 2011 North American Environmental Field Conference and Exposition

Location: Hilton Resort Hotel on Mission Bay; San Diego, California

Contact: The Nielsen Environmental Field School; www.envirofieldconference.com; (575) 532-5535

Date: Monday, January 24, 2011 3:30 pm

Event: Presentation by 2010-11 Jahns Lecturer Bill Haneberg – The Landslide that Ate Laprak

Location: Room 114 in DeLoach Hall, University of North Carolina at Wilmington; 3:30 PM

Date: Tuesday, January 25, 2011 4:00 pm

Event: Presentation by 2010-11 Jahns Lecturer Bill Haneberg – The Landslide that Ate Laprak

Location: Room 247 in Flanagan Hall, East Carolina University, Greenville; 4:00 PM

Date: Wednesday, January 26, 2011 2:00 pm

Event: Presentation by 2010-11 Jahns Lecturer Bill Haneberg – The Landslide that Ate Laprak

Location: Bryan Auditorium in the Frank Family Science Center, Guilford College, Greensboro; 2:00 PM

Date: Thursday, January 27, 2011 11:00 am

Event: Presentation by 2010-11 Jahns Lecturer Bill Haneberg – “I Left My Probability Density Function in San Francisco”

Location and Time: Appalachian State University, Boone, lecture in RSS 023.

Date: Thursday, January 27, 2011 6:00 pm

Event: AEG Carolinas Section Winter Meeting – Concord, North Carolina

Location: 6:00-9:00 PM; Dave & Buster's, Concord Mills Mall; Concord, North Carolina

Speaker: 2010-2011 Jahns Lecturer Bill Haneberg – The Landslide that Ate Laprak

RSVP to Brad Worley -- bdworley@ncdot.gov – no later than January 24.

PDH: 1

Date: Friday, January 28, 2011 11:00 am

Event: Presentation by 2010-2011 Jahns Lecturer Bill Haneberg – Livin' LaVida LiDAR

Location: Room 125 in McEniry Hall, University of North Carolina at Charlotte; 11:00 AM

Date: February 7-11, 2011

Event: The Groundwater Pollution and Hydrology Course

Location: Orlando, Florida

Contact: Princeton Groundwater, Inc.; www.princeton-groundwater.com; (813) 964-0800

PDH: (to be determined)

Date: March 7-11, 2011

Event: The Complete Ground-Water Monitoring Field Course

Location: Tampa, Florida

Contact: The Nielsen Environmental Field School; www.envirofieldschool.com

PDH: (to be determined)

Date: March 7-8, 2011

Event: The Complete Ground-Water Monitoring Well Design, Construction and Development Field Course

Location: Tampa, Florida

Contact: The Nielsen Environmental Field School; www.envirofieldschool.com

PDH: (to be determined)

Date: March 9-11, 2011

Event: The Complete Ground-Water Sampling Field Course

Location: Tampa, Florida

Contact: The Nielsen Environmental Field School; www.envirofieldschool.com

PDH: (to be determined)

Date: March 14-15, 2011

Event: The Complete Surface Water and Sediment Sampling Field Course

Location: Tampa, Florida

Contact: The Nielsen Environmental Field School; www.envirofieldschool.com

PDH: (to be determined)

Date: March 23-25, 2011

Event: SE GSA Annual Meeting

Location: Wilmington (NC) Convention Center (see article on page 10)

PDH: (to be determined)

(Continued on page 31)

(Continued from page 30)

Date: Thursday, April 7, 2011

Event: AEG Carolinas Section Spring Meeting

Location: To be determined

Speaker: Bruce Hilton, President of AEG

Contact: Rick Kolb, rkolb0915@aol.com

PDH: (to be determined)

Date: April 11-15, 2011

Event: The Remediation Course

Location: Las Vegas, Nevada

Contact: Princeton Groundwater, Inc.; www.princeton-groundwater.com; (813) 964-0800

PDH: (to be determined)

Date: April 28-29, 2011

Event: Estimated Times of Remediation Associated with MNA and Source Removal

Location: Charlotte, North Carolina

Contact: National Ground Water Association, www.ngwa.org; (800) 551-7379

PDH: (to be determined)

Date: May 17-20, 2011

Event: The Environmental Sampling Course

Location: Las Cruces, New Mexico

Contact: The Nielsen Environmental Field School; www.envirofieldschool.com

PDH: (to be determined)

Date: June 14-6, 2011

Event: Improving Hydrogeologic Analysis of Fractured Bedrock Systems

Location: University of Wisconsin, Madison

Contact: Midwest Geosciences Group, www.midwestgeo.com; (763) 607-0092

PDH: (to be determined)

Date: September 19-24, 2011

Event: AEG Annual Meeting

Location: Anchorage Hilton Hotel; Anchorage, Alaska

Date: November 4-7, 2012

Event: Geological Society of America Annual Meeting

Location: Charlotte, North Carolina

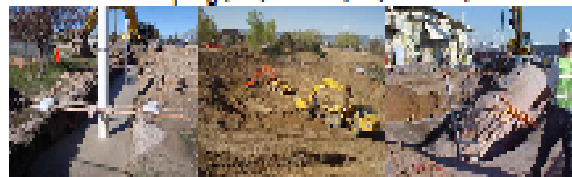
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Regional Contact (Raleigh, NC)
Joel Miller (303) 338-9879
Joel.miller@us.belfor.com

SPONSORS; PLEASE REMEMBER TO SEND IN YOUR 2011 RENEWALS

This is just to gently remind our treasured Sponsors to renew your sponsorship of AEG Carolinas Section for 2011. We are all very grateful for your past support of this vibrant professional organization, and sincerely hope that your circumstances are such that in these trying times, you are able to continue. Please also remember that our Winter meeting is set for January 27th 2011 at Dave and Buster's in Concord (the abstract and directions are on page 5), and you are welcome to bring your renewal check at that time. I will be there to personally affix a SPONSOR label to your name tag!

As you know, the Carolinas Section of AEG offers several levels of sponsorship, but they all have one goal: to keep your name in front of our members and to bring you business. We commit to connect you with potential clients, and will do all we can to help you build your business. Most of our members are practicing professionals with the responsibility of selecting subcontractors, so our group meetings are a great place to find new clients and to catch up with existing clients in an informal setting. We realize that 2010 has been a challenging year for both our members and sponsors, but we believe our sponsorship fee is a great value for the upcoming year because of the opportunities to meet new clients at our section meetings, and through our newsletter and website. Sponsorship benefits to your company include:

- Your advertisement in our quarterly newsletter, which

(Continued on page 33)

MEMBER BENEFITS

Networking, with colleagues at meetings, through technical publications and on the AEG web page, is a valuable professional development benefit because it allows a member to:

- ♦ Broaden and update technical, practical and business knowledge.
- ♦ Keep career paths open by assuring that the value, utility and scope of engineering geology is recognized in the scientific, technical, legal, and regulatory arenas.
- ♦ Explore numerous opportunities for career enhancement through contacts at technical meetings and in continuing education programs.
- ♦ Influence the profession of environmental and engineering geology as it serves society and as it is regulated.
- ♦ Establish the standards of the profession.

§§§§§§§§§§§§§§

AEG members receive our quarterly professional journal, *Environmental and Engineering Geoscience* and six-issues of the *AEG NEWS* as a regular dues benefit.

Members also enjoy a 20% "member discount" on all special publications, registration fees at meetings, short courses and field trips.

PROFESSIONAL DEVELOPMENT

AEG -- Serving Professionals in Environmental, Ground-Water and Engineering Geology since 1957

- ♦ AEG sponsors workshops and short courses for which official Continuing Education Units are offered.
- ♦ AEG encourages its members to participate in activities of mutual interest with other societies and organizations.
- ♦ The annual Richard H. Jahns Distinguished Lecturer in Engineering Geology is co-sponsored by AEG and the GSA Engineering Geology Division.
- ♦ AEG members make presentations and lead field trips for students at all levels.
- ♦ AEG's Technical and Professional Practice Committees keep the Association in a position of influence through their wide-ranging activities.
- ♦ AEG's 25 Sections and 20 Student Chapters provide educational and networking opportunities for members through regular meetings, field trips and local newsletters.
- ♦ Students compete for scholarships and awards, and interact with practicing professionals.
- ♦ Short courses, field trips, and technical sessions provide opportunities for AEG members to enhance their professional practice.
- ♦ International members are found in more than 20 countries and Designated Correspondents enhance technology transfer among more than a dozen countries.

MEMBERSHIP APPLICATION

ASSOCIATION OF ENVIRONMENTAL & ENGINEERING GEOLOGISTS



The Association of Environmental & Engineering Geologists (AEG) is an international, non-profit scientific and technical society, whose 3,000 members include geologists specializing in engineering geology, environmental geology, and ground-water geology as well as other professionals in affiliated fields such as civil and mining engineering, land-use planning, public policy and education.

Through its technical and professional activities, AEG strives to promote the value and importance of geologic practice in:

- ♦ detecting, containing, and remediating contaminated soil and ground water;
- ♦ recognizing and mitigating hazardous geologic processes to promote public safety and welfare; and
- ♦ siting, planning, designing, constructing, and maintaining engineered works.

Check Us Out
www.aegweb.org

(Continued from page 32)

- goes out to our members in North and South Carolina and to others in the industry (distribution of over 1,000), and which is posted on our section website, www.aegcarolinas.org;
- Listing your company's name on a Sponsor Poster, located at the sign-in table at each of the section meetings throughout the Carolinas, and read to the meeting attendees at the start of each meeting;
 - Verbal acknowledgement by name of each attending sponsor in the chairman's introductory comments that start each meeting. Our section meetings generally attract between 50 to 100 practicing professionals;
 - Space for your tabletop display at one, two or three meetings, depending on your sponsorship level; cost of the meeting is waived for one person from your company on your exhibit or attendance date;

- Listing of your company on each AEG - Carolinas Section email announcement, and,
- Posting of your company name, logo and contact information on our website.

Again, we hope you come to our next meeting on Thursday, January 27th 2011 at Dave and Buster's in the Concord Mall. Our guest speaker will be Dr. William Haneberg, the Richard Jahns Distinguished Lecturer. We warmly thank you for your past sponsorship and hope that we can count on your continued support of our organization for 2011. A current sponsorship application is on page 34. Please note there is a **NEW** opportunity, that of **PLATINUM PLUS**, which includes a full page ad in addition to the other Platinum Sponsorship benefits.

We can also send you information on sponsoring AEG at the national level if you are interested in those opportunities as well.

MEMBERSHIP REQUIREMENTS

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

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

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

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

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

STUDENTS ARE NOW OFFERED A FREE MEMBERSHIP!

APPLICATION FORM

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

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

PREFERRED ADDRESS: _____

WORK PHONE: _____ FAX: _____

PREFERRED E-MAIL: _____

Second Address: _____

Home Phone: _____

DESIRED CLASS OF MEMBERSHIP: _____ ANNUAL DUES AMOUNT: _____

CERTIFICATION: _____
(Signature)

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

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

Credit Card Payment Option

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

Card Number: _____ Expiration Date: _____

SUBMISSION: Send this form with your check or credit card authorization to:
Association of Environmental & Engineering Geologists, PO Box 460518, Denver, CO 80246
Phone: 303-737-2926 FAX: 303-737-2969 AEG Web: www.aegweb.org



AEG CAROLINAS SECTION – SPONSOR INFORMATION

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

We offer several levels of sponsorship, but they all have one goal: to keep the sponsor's name in front of our members and to bring you business. We have a real commitment to connecting our sponsors to potential buyers and subcontractors, so our group is a great place to find new customers and to catch up with existing clients in an informal setting.

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

Silver Sponsor (\$250):

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

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

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

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

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

Gold Sponsor (\$375):

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

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

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

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

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

Platinum Sponsor (\$500):

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

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

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

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

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

Platinum PLUS Sponsor (\$600):

Same as Platinum, but with a FULL PAGE ad in GeoNews.

(Revised 11/17/2006)

GeoNews Newsletter Sponsorship Only

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

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

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

AEG Carolinas Section Sponsorship Form

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

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

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City, State, Zip: _____

Phone: _____ Fax: _____

Contact Person: _____

Cell: _____

Email: _____

Website URL: _____

Date of Payment: _____

Something about your company _____

Please enclose a business card or email ad in .jpg, .pdf, or .doc To Jane Gill-Shaler at janehgill@aol.com.

MAKE CHECK OUT TO AEG CAROLINAS

Snail mail form and payment to:

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 1636 West Lexington Ave., High Point, NC 27262
JaneHGill@aol.com

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Thank You, AEG Carolinas Sponsors!!

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Geobrudd North America. Frank Amend, 252-937-2552, frank.amend@geobrudd.com, www.geobrudd.com. Geo-Brudd North America is a premier supplier of engineered rockfall protection and slope stabilization systems. Our wirework-based, unobtrusive, and ecology-friendly systems blend well with the natural surroundings. Well-proven anti-corrosion processes permit achieving a useful life up to 100 years and our installed systems require virtually no maintenance.

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

Pine Environmental, Inc. Paul Federline, 866-646-7463, pfederline@pine-environmental.com. Pine is the leading provider of rental equipment in the nation with the latest instruments available. Pine Environmental Services, Inc. takes pride in their unprecedented customer support and competitive pricing. Extended hours of operation and after-hour emergency support are on hand.

TRS Environmental. Susan Boutwell, 972-456-4000, trs@trs-environmental.com, <http://www.trs-environmental.com>. We provide a wide variety of environmental monitoring, sampling, and field and safety supplies for rent, lease, or sale.

Vulcan Materials Company. Jim Stroud, 336-767-4600, Stroudj@VMCMAIL.com, www.vulcanmaterials.com. Vulcan is the nation's leading producer of crushed stone.

Zebra Environmental, Inc. Mike Early, 919-424-6122, MikeE@zebraenv.com, www.teamzebra.com. ZEBRA is a specialized environmental contracting company dedicated to providing high quality subsurface sampling, installation, injection and data collection services to engineering and consulting firms. Since 1992, ZEBRA has earned a solid reputation as the most experienced, best equipped and most reliable direct push/probing service provider on the East Coast.

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BELFOR Environmental. Joel Miller, 800 980-0011, joel.miller@us.belfor.com, www.belforenvironmental.com. Environmental remediation contractors for hazardous, non-hazardous, asbestos, mold, storage tanks, decontamination, facility services & system installations, demolition, railroad work.

EOS Remediation. Gary Birk, (919) 873-2204, gbirk@eosremediation.com, www.eosremediation.com. EOS Remediation leads in producing scientifically-tested, field-proven products for Enhanced Anaerobic Bioremediation, Enhanced Aerobic Bioremediation and Bioaugmentation. EOS Remediation's products are specifically developed and designed for cost-effective, in situ treatment of groundwater.

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SILVER SPONSORS

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AE Drilling Services, Inc. Mark Lassiter, 864 288 1986, mlassiter@aedrilling.com, www.aedrilling.com. A.E. Drilling Services, LLC has been providing national clientele high quality environmental, geotechnical, mineral exploration, geothermal, and water supply drilling services since 1969.

(Continued on page 36)

Thank You, AEG Carolinas Sponsors!!

(Continued from page 35)

ChemRem International. Travis Bowman (704) 728 5800, tbowman@chemrem.com. Jim Studer, (505) 858 3136, jstuder@chemrem.com. www.chemrem.com. ChemRem provides manufacturer representation service to the environmental remediation and restoration marketplace. ChemRem's focus is on products for chemical oxidation and bioremediation of organic contaminants present in soil, rock, groundwater, surface water, and wastewaters.

ENCO Laboratories, Inc. Jim Hays, 919-467-3090, jhays@encolabs.com, <http://www.encolabs.com>. ENCO is a network of full service environmental laboratories with analytical facilities in Cary, NC and Orlando and Jacksonville, FL. We support ESA projects, remediation, and short-and long-term monitoring. We analyze drinking water, wastewater, soil, sludge, air and other matrices.

Environmental Products and Services of Vermont, Inc. Peter Marotta, 919-852-3595, pmarotta@epsosvermont.com, www.epsosvermont.com. EPS of Vermont, Inc., Carolina Division. Provides emergency response, remediation, waste management, industrial maintenance, and other services.

ESC Lab Sciences. Barry C. Kroll, 1-(800) 767-5859, bkroll@esclabsciences.com, www.esclabsciences.com. ESC Lab Sciences is a nationally accredited environmental laboratory certified for the analysis of soil, water, and air by numerous certifying agencies.

Garco, Inc. Al King, 336-683-0911, alk@egarco.com, <http://www.egarco.com>. GARCO, Inc. provides environmental, industrial, waste transportation, disposal and recycling services to industrial and consulting clientele throughout the Southeast.

Geologic Exploration, Inc. Jason Mantak or Steve Taylor, 704-872-7686, jmantak@gexnc.com, www.geologicexploration.com. Geologic Exploration is an environmental drilling company serving the southeast. We have been in business since the early '90's and specialize in monitoring and recovery wells. We also have experience in all types of injection wells.

Geotech Environmental Equipment, Inc. David Hathaway, 919-460-0604, 919-460-0984, davidh@geotechenv.com, <http://www.geotechenv.com>. Geotech manufactures and distributes sampling, filtration, analytical and remediation products for the ground and surface water industry.

Joyce Engineering, Inc., Greensboro Office. Hannu Kempinen, 336-323-0092, hkemppin@joyceengineering.com, www.joyceengineering.com. Joyce Engineering, Inc. is a leading consultant serving the waste industry for over twenty-five years. Our services include: Operator training; Operations consulting; Landfill Design & Permitting; Groundwater Remediation/ Monitoring; Landfill Gas Collection and Monitoring; Leachate Management; Air Quality Services; Construction Administration, & Construction Quality Assurance/ Quality Control. Joyce Engineering serves clients throughout the southeastern United States including local governments, private solid waste facilities, regional waste authorities, and industrial facilities.

KB Labs, Todd Romero, 352-472-5830, toddr@kbmobilelabs.com, www.kbmobilelabs.com. Our mission is to provide high quality mobile analytical and MIP direct sensing technology services meeting the on-site needs of engineering and consulting firms requiring rapid characterization of environmental contaminants.

Parratt-Wolff, Inc. Robert "Butch" Stevens, 800-627-7920, bstevens@pwinc.com, www.pwinc.com. Parratt-Wolff, Inc., is a full-service environmental and geotechnical drilling firm.

Regenesis. Drew Baird, 864-240-9181 or 864-884-4346, dbaird@regenesiscorp.com, www.regenesiscorp.com. Regenesis develops, manufactures, and markets innovative technologies to clean up the environment. We are headquartered in San Clemente, CA with a regional office in Greenville, SC.

SAEDACCO. Pete Byer, 803-548-2180, pbyer@saedacco.com, www.saedacco.com. SAE-DACCO is a southeast regional environmental services company headquartered in Fort Mill, SC. SAEDACCO is structured to provide turnkey environmental services including geoprobe, drilling, UST removals, remediation system installations and remediation system fabrication.

SGS Environmental, Wilmington Lab. Adam Phillips, 910-350-1903, Adam.Phillips@sgs.com, www.sgs.com. Present in more than 40 countries with 91 offices and 52 laboratories, SGS Group has the capability to meet the environmental needs of international, as well as domestic industries, service organizations and governments.

WaveFront. Patrick Hicks, (919) 424-7563, patrickh@onthewavefront.com, www.onthewavefront.com. Wavefront specializes in developing and designing leading-edge techniques and tools for oil well stimulation, improved oil production and environmental groundwater remediation.

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