

# Association of Environmental and Engineering Geologists

The Rocky Mountain Section Newsletter

MAY 2008

## MEETING DATE

**THURSDAY**  
MAY 8th, 2008

## TIME

5:45 p.m. Social Hour  
6:30 p.m. Dinner  
7:30 p.m. Presentation

## LOCATION

**Berthoud Hall,**  
**Colorado School of**  
**Mines**  
**1516 Illinois St.**  
**Golden, Co 80401**  
**See Map Below**

## COST

**\$25 Members**  
**\$27 Non-members**  
**Students, free first**  
**time then \$10**

## RESERVATIONS

Kristi Ainslie  
(303) 440-5236  
or  
[meetings@aeqrms.org](mailto:meetings@aeqrms.org)  
or  
[WWW.AEGRMS.ORG](http://WWW.AEGRMS.ORG)

**BY NOON,**  
**TUESDAY**  
**April 6<sup>TH</sup>**

## **Case Studies: Closing Solvent Sites Using Activated Carbon Impregnated with Iron**

Thomas A. Harp, P.G.  
LT Environmental

Sites impacted by even extremely high concentrations of chlorinated solvents are being closed using a specially-prepared, activated carbon impregnated with an iron salt that is pyrolyzed into nano-sized deposits of porous, metallic iron. Contaminants are adsorbed by the carbon catalyst and quickly and efficiently treated via reductive dechlorination by the iron. Until the advent of this new trap-and-treat technology (BOS 100<sup>®</sup>), reactive iron alone was the material most commonly used to induce reductive dechlorination. Although effective in reducing “mother products” such as perchloroethene or trichloroethene (TCE), placing “raw iron” in the subsurface can result in slow or incomplete treatment because the period of time in which the solute and iron are co-located is primarily dependant upon seepage velocities. If the contact time is insufficient, then the dechlorination process can be prematurely interrupted leaving derivative “daughter products” (e.g. vinyl chloride) that can cause greater health risks and/or increase cleanup costs. These deficiencies are avoided by the innovative combination inherent to BOS 100<sup>®</sup> in that the carbon carrier ensnares the initial contaminant (and continues to hold kinetically-generated byproducts) during the cleanup cycle. The resident solutes are then reduced to innocuous end products via adequate contact with the interstitial iron.

When the carbon-iron injectate is placed in the subsurface where chloroethenes/chloroethanes and elemental iron co-exist in the carbon pore network, the dechlorination process is a surface reaction whereby iron molecules are oxidized and the chlorine molecules are replaced by hydrogen molecules derived from hydrolyzed slurry water. The rate of reaction is dictated by the local concentration of the solute and the amount of available surface area of the iron.

As chloroethenes/chloroethanes diffuse into the carbon, the solute concentrations within the pore network are substantially higher than concentrations that existed in the surrounding soil or groundwater. Thus, the rates of dechlorination within the activated carbon are significantly faster than rates commonly observed using reactive iron alone or other dechlorinating reagents due to the concentrating effect and the substantial

Continued from Page 1

surface area offered by the reactive iron. The final step in the dechlorination sequence is the generation of end-product hydrocarbons (ethene or ethane) which, due to very high vapor pressures and low affinity, escape the matrix and allow for “fresh” contaminant to be adsorbed by the carbon catalyst.

LT Environmental, Inc. has pioneered the TerraCert™ program for implementing remedies using this carbon-iron injectate. The remedies have resulted in the closure of or the initiation of closure monitoring at all contracted sites in months rather than years. Case studies involving field-scale applications include a former industrial facility in Denver, Colorado where initial groundwater concentrations of TCE in the percent level, i.e. 1,280,000 parts per billion (ppb), were reduced to concentrations below the maximum contaminant level of 5 ppb. Half of the 2.3 acre plume was closed under the Colorado State Voluntary Cleanup Program in just 20 months (which included one year of closure monitoring). A 2-year, closure-monitoring program has commenced on the remaining portion of the plume, where a no-further-action determination is expected by the end of 2009.

## 2008 Colorado Geotechnical Seminar: GEO- velopment—Needs reviewers for Technical Papers

We need 10 more reviewers! Please ask around your office for 1-2 reviewers and have them pick a topic from the list below. If you need the actual abstracts, I can email them out.

Contact Melanie K. Longi [mklongi@terracon.com](mailto:mklongi@terracon.com) the person's NAME, EMAIL, COMPANY, and TITLES they are interested in reviewing. Reminder: Paper drafts are due May 9th and comments must be given to the authors by June 20th.

- 2 Sulfate-induced heave of lime-treated soils
- 3 Remedial Measures for Spillway Stability Problem
- 4 Southlands Orchard Road Retaining Walls
- 5 Optimization of Compaction Grouting in Collapsible Soils
- 8 Brownfield Re-Development - Burlington, New Jersey
- 9 Embankments on Soft Soil Foundations
- 10 Transient Seepage Analyses of Soil-Cement Uplift Pressures
- 14 Chilled Mirror Measurements of Soil Moisture Retention Curves
- 15 Evaluate Stability of Sound Wall Pillars
- 16 Debris Dams on Cheyenne Mountain

## Board of Directors

### Chairperson

Steve Compton  
[chair@aegrms.org](mailto:chair@aegrms.org)

### Chair-elect

David Cushman  
[chair-elect@aegrms.org](mailto:chair-elect@aegrms.org)

### Secretary

Julia Frazier  
[secretary@aegrms.org](mailto:secretary@aegrms.org)

### Treasurer

Jill Carlson  
Colorado Geological Survey  
[treasurer@aegrms.org](mailto:treasurer@aegrms.org)

### Membership

Sean Harvey  
Lyman Henn  
[membership@aegrms.org](mailto:membership@aegrms.org)

### Newsletter

Kristi Ainslie  
GEI Consultants, Inc.  
Ed Friend  
RJH Consultants, Inc.  
[newsletter@aegrms.org](mailto:newsletter@aegrms.org)

### Website

Jill Carlson  
Colorado Geological Survey  
[webmaster@aegrms.org](mailto:webmaster@aegrms.org)

### Student Chair

Diana Cook  
[student-chair@aegrms.org](mailto:student-chair@aegrms.org)

### Past Chair

Liv Bowden

## Words From the Chair

Well, it is that time of the year already, the end of another terrific AEG season. This year has seen a wild range of speakers and topics. Starting with the honor of hosting the Jahns Lecturer back in October, the 'Dino'mite family night, hosting both the AEG President and the Executive Council at our Section meetings, yet another fantastic Student Night and last month's very interesting talk on the challenges of tunnel improvements on an active rail line in the middle of nowhere, all of the talks have been well received and informative. We have covered topics including the importance of the geologic component in conducting environmental investigations, to swelling soils, to bank stabilization, and tunneling issues just to name a few. This is great evidence to the broad range of subjects we all need to be aware of everyday as geologists and engineers and the growing importance of organizations like AEG.



Thanks again to Scott Walker with Shannon and Wilson for his talk last month "From Drilling Upside-Down to Raising the Roof --The BC North Line Tunnel Clearance Improvement Project". It was very interesting to hear how they overcame the challenges of working on an active rail line using improvised equipment to complete much needed work.

Our speaker for the May meeting is Thomas Harp, PG of LT Environmental, Inc. Tom will be presenting a number of case studies covering the use of a new technology to conduct *in-situ* remediation of chlorinated solvent contamination. With the right combination of geologic investigations from the start of the project, followed by a detailed and fluid injection design, and culminated by professional implementation of the design this technology can clean-up a site quickly and economically. And the really cool part is that the product was designed right here in Golden!

Also, a reminder that Saturday 5/19 is the annual Boy Scout Day at Dinosaur Ridge. Volunteers are always needed. Please contact Clare Marshal ( [dinodiscovery@dinoridge.org](mailto:dinodiscovery@dinoridge.org) ) if you are interested. I hope to see you all Thursday May, 8th. Don't forget to RSVP by Tuesday (5/6/08) at noon.

Steve Compton, PG  
Chair AEG-RMS



# 20008 Student Night Sponsors

Jill Carlson	<b>Bronze Level Sponsor</b>
TC Wait	
William K. Smith	
Tilford & Green	
Apex Consulting Services	<b>Silver Level Sponsor</b>
Tunneling Solutions	
Steve Compton	
Paula Jo Lemonds	
Shannon & Wilson	
All Service Septic	<b>Gold Level Sponsor</b>
Church Onsite Wastewater Consultants	
Colorado Geological Survey	
Investigative Engineers & Geologists	
Lyman Henn	
Phoenix AMC/Becky Roland	
J.A. Cesare & Associates	
Lachel Felice & Associates	
Deere & Ault Consultants, Inc.	<b>Platinum Level Sponsor</b>
Michael W. West & Associates	
Geobruigg North America, LLC	
Zonge Geosciences, Inc.	
Kleinfelder, Inc.	
Susan Steele Weir	
Brierley Associates, LLC	
RJH Consultants, Inc.	
GEI Consultants	<b>Diamond Level Award Sponsor</b>
LT Environmental, Inc.	
Golder Associates	

## 2008-2009 Upcoming Meeting Presentations

If you would like to present during the 2008-2009 season, contact Steve Compton at [chair@aeqrms.org](mailto:chair@aeqrms.org) and he will get you on the schedule.

## Michael W. West and Associates Job Position

Michael W. West & Associates, Inc. is looking for geotechnical/geological engineers or geologists for our office in Denver (Englewood), Colorado. Michael W. West & Associates are consulting engineers and geologists providing a broad range of professional consulting services in the applied earth sciences. Competitive salary and benefits. Please email resume and references to: [jcoleman@m-west-assoc.com](mailto:jcoleman@m-west-assoc.com) or call Frank Harrison or Pete Stauffer at 720-529-5300.

## International Year of Planet Earth

**First-ever**

**joint**

**meeting,**

**October 5-9,**

**2008**

More than 10,000 scientists, professionals, and students will gather in Houston on 5-9 October 2008 to discuss the latest research and current trends in energy, water resources, science education, earth systems, and related sciences.

This meeting is sponsored by the Geological Society of America, American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, and Gulf Coast Association of Geological Societies. Also participating is the Gulf Coast Section of the Society for Sedimentary Geology and the meeting is hosted by the Houston Geological Society.

The intention of this first-ever joint meeting is to highlight and stimulate discussions in areas of common interest across the diversity of disciplines of the organizations represented. Held under the theme, "Celebrating the International Year of Planet Earth," the meeting recognizes the International Year of Planet Earth initiative, organized by International Union of Geological Sciences and the United Nations General Assembly.

The event will be held at the George R. Brown Convention Center and will feature presentations of scientific papers, hundreds of exhibits, and a myriad of distinguished lectures and special events that will engage students to professionals to scientists across the earth sciences and in every employment sector.

The scientific program features joint scientific sessions in the following topical categories:

- \*Climate Change through Time: Evidence in the Geologic Record
- \*The Impending Global Water Crisis: Geology, Soils, Agronomy, and International Security
- \*Energy Budgets and the Global Market
- \*Globalization of Biogeochemical Cycles
- \*Wetland and River Restoration: Environmental Saviors or Scientific Failures?

**Continued on page 6...**

# International Year of Planet Earth

## Con't from page 5

- \*Coastal Impacts: Can Massive Environmental Restoration and Coastal Engineering Protect the Gulf Coast from Future Hurricane Impacts and Rising Sea Levels?
- \*Geobiology and Biomineralization: From the Origins of Life to the Origin of Cities
- \*Emerging Trace Contaminants in Surface and Ground Water Generated from Waste Water and Solid Waste Application
- \*Carbon Sequestration: Methods, Markets, and Policy
- \*Human Influences on the Stratigraphic Record

In addition to the joint sessions, each participating scientific society will have its own sessions, symposia, workshops, field trips, tours, and special events.

Representatives of the media are cordially invited to attend and participate in scientific sessions, field trips, and other special events. Eligible media will receive complimentary registration and are invited to use onsite newsroom facilities while at the meeting.

Eligibility for media registration is as follows:

- \* Working press representing bona fide, recognized news media with a press card, letter, or business card from the publication.
- \* Freelance science writers, presenting a current membership card from NASW, ISWA, regional affiliates of NASW, ISWA, CSWA, ACS, ABSW, EUSJA, or evidence of work pertaining to science published in 2007 or 2008.
- \* PIOs of scientific societies, educational institutions, and government agencies.

Representatives of the business side of news media, publishing houses, and for-profit corporations must register at the main registration desk and pay the appropriate fees.

Journalists and PIOs must pay for any short courses or field trips in which they wish to participate.

Media registration will begin in June 2008. Contact Ann Cairns, GSA Director of Communications/Marketing/Sales, or Sara Uttech, ASA-CSSA-SSSA Communications Program Manager, for additional information or assistance.

What: Joint Annual Meeting of the Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, and the Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM, hosted by the Houston Geological Society

When: 5-9 October 2008

Where: George R. Brown Convention Center, Houston, TX, USA

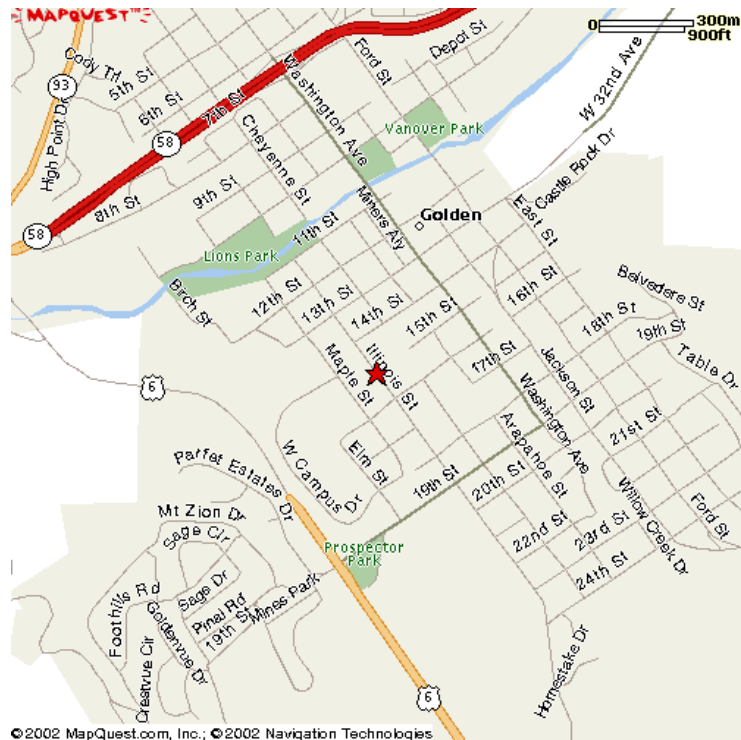
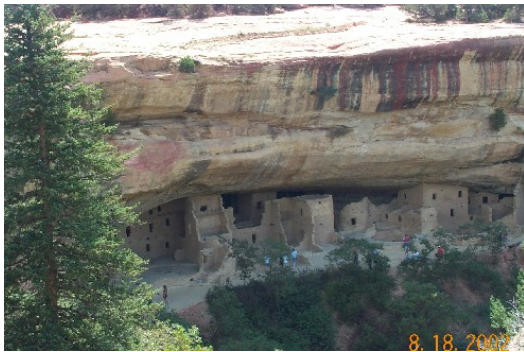
For information about the meeting or sponsoring scientific societies, go to:

<https://www.acsmeetings.org>

<http://www.geosociety.org>

<http://www.soils.org>

GEI Consultants, Inc.  
Attn: Kristi Ainslie  
1790 38th Street #104  
Boulder, CO 80301



**Colorado School of Mines - Berthoud Hall**  
**1516 Illinois Street**  
**Golden, CO 80401**