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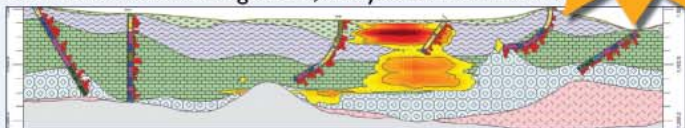
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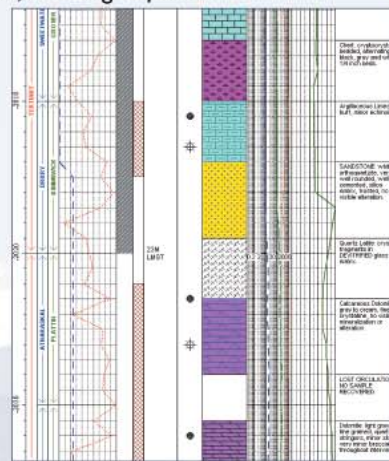
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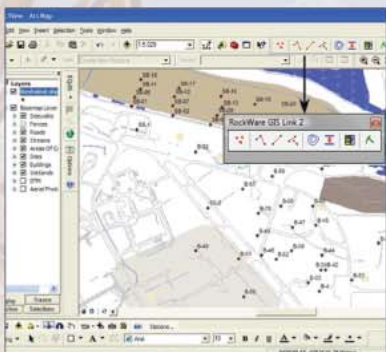
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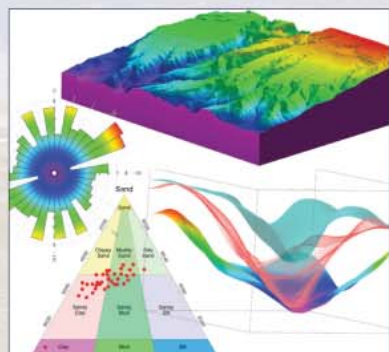
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American Institute of Professional Geologists (AIPG) is the only national organization that certifies the competence and ethical conduct of geological scientists in all branches of the science. It adheres to the principles of professional responsibility and public service, and is the ombudsman for the geological profession. It was founded in 1963 to promote the profession of geology and to provide certification for geologists to establish a standard of excellence for the profession. Since then, more than 10,000 individuals have demonstrated their commitment to the highest levels of competence and ethical conduct and been certified by AIPG.

The mission of the American Institute of Professional Geologists (AIPG) is to be the superior advocate for geology and geologists, to promote high standards of ethical conduct, and to support geologists in their continuing professional development.



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For AIPG news and activities go to www.aipg.org.

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS

SCHOLARSHIP PROGRAM

Purpose

To assist students with college education costs and to promote student participation in the American Institute of Professional Geologists (AIPG). Up to four scholarships will be awarded to declared undergraduate geological sciences majors who are at least sophomores.



Scholarship Awards

Scholarship awards in the amount of \$1,000.00 each will be made to eligible students attending a college or university in the U.S. Scholarships are to be used to support tuition and/or room and board.

Eligibility Requirements

Any student who is majoring in geology (or earth science), is at least a sophomore, and is attending a four-year accredited college or university in the U.S. can apply. Also, the student must be either a student member of AIPG or must have applied for student membership at the time the application for the scholarship is submitted.

Each student who is awarded a scholarship agrees, by accepting the scholarship, to prepare a 600 to 800 word article for publication in *The Professional Geologist*. The subject of the article must be related to a timely professional issue.



Application Process

Applicants must submit: a letter of interest with name, mail and e-mail addresses, and telephone number; proof of enrollment in an eligible geological sciences program, transcripts; an original one-page essay on why the applicant wants to become a geologist; and a letter of support from a faculty member familiar with the applicant's academic work. The application packet should be submitted to:



American Institute of Professional Geologists
Attn: Education Committee Chr.
1400 W. 122nd Ave., Suite 250
Westminster, CO 80234

For questions regarding the application process
call (303) 412-6205 or e-mail: aipg@aipg.org.

Applications must be
received by
FEBRUARY 15th
Awarded the month of
SEPTEMBER

Basis of Awards

Awards will be based on the content and creativity of the essays as judged by the Education Committee. The decisions of the Education Committee are final.



Thank You

David M. Abbott, Jr., CPG-04570 46th Annual Meeting General Chairman

The 46th AIPG Annual Meeting in Grand Junction, Colorado is now history. We had a great time, learned a lot, renewed old friendships and made new ones, and saw some great geology on the field trips (and out the hotel windows). We wish more of you had been able to come. Several first-time attendees told me how much they enjoyed the meeting because you really had the chance to meet and get to know interesting people and learn about a wide variety of interesting geology with an emphasis on the practical rather than the academic.

A successful meeting results from the efforts of a lot of people, each of whom makes a contribution of varying size and which combine into a successful whole. One of the nice things about AIPG members is their willingness to step up when asked and knowing that the task will be accomplished. I knew I could count on the members of the Annual Meeting Committee and they in turn knew that they could count on individual contributors. This reduced the worry factor a great deal for all of us. Ed Baltzer was the technical program chairman who reviewed the abstracts for acceptance and the papers for publication. Jim Burnell arranged for a great variety of field trips ranging from half day to 2 days. We received great support from our Grand Junction co-hosts, the Grand Junction Geological Society (Bill Hood, Bill Chenowith, and Joe Fandrich) and Mesa State College (Verner Johnson). Vince Matthews, Colorado State Geologist, stepped in when our planned keynote speaker was unable to attend due to a death in the family. The AIPG staff, led by Professional Services Manager Cathy Duran, took care of the business side of the meeting, which spared the Annual Meeting Committee a lot of work and worry.

But the people who really made the meeting were those who contributed an abstract and paper, who gave a talk, who organized a field trip, who offered a short course, who agreed to exhibit,

who agreed to be sponsors, and all the attendees and their guests. Everyone contributed something and without you, the meeting would not have happened. Thank you for your contribution to the meeting, whatever it was.

Not everything was perfect but everything worked out. Like the Galloping Goose, those buses converted to narrow-gauge "trains" that used to run in the San Juan Mountains, the mission was accomplished and we had a good time doing it.

Hope to see all of you in Orlando, Florida in 2010.

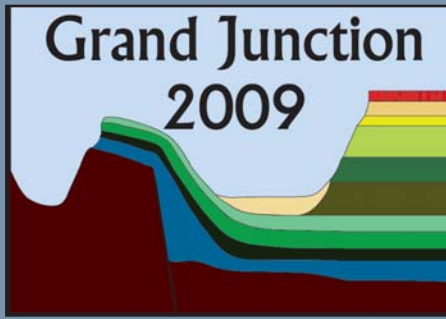
Photos below are from the West Elk Mine Tour. Photos by Wendell Koontz



Ouray Hot Springs trip in front of a Galloping Goose.



The Galloping Goose, Ridgway, Colorado.



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See you next year in Florida!

2009 Annual Meeting Photos



Continuing Professional Development

David Palmer, CPG 09960,
AIPG National Secretary

The value of continuing education and professional development for geologists beyond the traditional academic experience is well recognized by employers and government licensing agencies. With increasing frequency, employers and state agencies are requiring practicing geologists to maintain and enhance professional growth through continuing education. In most cases a means of recordkeeping and reporting of Continuing Education Units (CEU) is mandated to promote the completion of those activities and ensure compliance. As a leader in advocating for the professional geologist, the American Institute of Professional Geologists (AIPG) maintains an on-line Continuing Professional Development (CPD) Program on its website for recording and recognizing activities by the Certified Professional Geologist (CPG).

AIPG's CPD Program was established in May 2005 to provide a means for CPGs to **voluntarily** record professional activities. Subsequently in March 2006, the Executive Committee amended the By-laws [Section 2.3.1.1. **Continuing Professional Development**] to require mandatory participation in the CPD Program for members who were awarded the CPG after July 1, 2006 (e.g., "new CPGs"). New CPGs are required to complete at least 20 Professional Development Points (PDPs) per year, or 60 PDPs in a 3-year period and report their participation to the AIPG website's on-line CPD Program. It has been three years since mandatory reporting was implemented for new CPGs. Recently, AIPG Headquarters audited the on-line reporting records of the CPD Program and found that 114 CPGs have participated. However, of the 186 new CPGs required to participate, only 44 currently are participating (24%), while 67 voluntary CPGs (2% of all CPGs) are participating. Concerned that many new CPGs were not in compliance, the Executive Committee reviewed the CPD Program and decided a comprehensive

policy is needed to direct the required on-line CPD reporting.

A Policy Letter is being developed by an ad hoc CPD Committee for review and adoption by the Executive Committee, with implementation scheduled for later this year. The policy will include: 1) promoting awareness of the CPD Program requirements; 2) defining the frequency and percentage of participants that are monitored or audited; 3) outlining the types and frequency of notification of audit results sent to participants; 4) reporting of compliance results to the AIPG Continuing Education Committee; and 5) developing enforcement actions. In advance of the Policy Letter, the CPD Committee is providing the following information to improve member awareness of the CPD Program and promote its use by CPGs to record their professional activities. For complete CPD Program information and guidance the reader is referred to the AIPG website. Log on to www.aipg.org, then in the menu on the left side of the home page click on "Education".

What activities can be completed to qualify for CEU? As described in detail on the AIPG website, there currently are three categories containing 12 types of qualifying activities: Continuing Education (6 types), Technical (3 types) and Professional Participation (3 types). Qualifying activity types include: college courses; seminars or short courses; qualifying CEU-rated courses; programs at technical or professional meetings, or employer in-house programs; teaching or instructing one of the above courses; writing an accepted National Association of State Boards of Geology (ASBOG) question; publishing an article, paper or book; holding a professional/technical society officer position at the national or state/section level; and membership in another technical organization. Each of these activities are assigned a PDP value by the AIPG Continuing Education Committee and can be achieved as follows: 1) completing a semester college course equates to 45 PDPs; 2) completing

a quarter college course for 30 PDPs; 3) publishing an article or paper equates to 10 PDPs; or 4) obtaining membership in another technical organization for 1 PDP. Note that CEUs can be earned through active participation in AIPG National and Section level activities, and by completing an AIPG-sponsored Distance Learning course (there currently are six courses offered).

What are the Reporting and Auditing requirements? It is your responsibility as a CPD Program participant to maintain a record of CPD activities on the AIPG website. AIPG Headquarters provides each member with a username and password for secure access to the on-line reporting system. The AIPG Continuing Education Committee will conduct audits twice each calendar year to evaluate the success of the program and verify participation by new CPGs. As part of the auditing process, audited participants will receive notification that their records were audited. For those new CPGs that have not reported their CEUs or are deficient in the requisite PDPs (for either a 1-year or 3-year period), the notification will verify their current compliance status and remind them of the requirement to maintain their CPD records and continuing education. For new CPGs who are maintaining their PDPs, the notification will include a letter of recognition for successful participation in the CPD Program. They also will be recognized in a future *TPG* announcement for successfully maintaining their CPD.

What enforcement actions are being considered by the National Executive Committee? The National Executive Committee recognizes that each new CPG has been identified and certified as a geologist who upholds the highest standards of professionalism, integrity and ethical conduct. As such, it is the responsibility of the new CPG to maintain the required CPD Program. The AIPG Continuing Education Committee

Continued on Page 30

AIPG's 2009 Honors and Awards Program

The American Institute of Professional Geologists (AIPG) has a history of effective and outstanding service to the profession of geology. From its beginning in 1963, the Institute has emphasized the role that professional geologists play in this fascinating, changing, and highly complex world in which we live.

In an Institute such as this, there are so many highly motivated geologists contributing to the profession, the Institute, the public, and the nations in which we live and work that the identification of a select few for particular awards is a monumental task. The continued success of the Honors and Awards Program is dependent on an accessible nominating process and a diligent screening of those nominated. This is done by the Honors and Awards Committee.

Currently, there are six honors bestowed by the Institute: Ben H. Parker Memorial Medal, Martin Van Couvering Memorial Award, John T. Gale, Sr., Memorial Public Service Award, Award of Honorary Membership, Outstanding Achievement Award, and Presidential Certificate of Merit.

AIPG 2009 HONORS

AND AWARDS COMMITTEE

Members of the AIPG Honors and Awards Committee

James F. Howard, Chr.

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AIPG MISSION STATEMENT

The mission of the American Institute of Professional Geologists (AIPG) is to be an effective advocate for the profession of geology and to serve its members through activities and programs that support continuing professional development and promote high standards of ethical conduct.

July 13, 2009

Stephen M. Testa, CPG-06464 2009 Recipient of the Award of AIPG Honorary Membership



Stephen M. Testa was born in Fitchburg, Massachusetts, on July 17, 1951. At the age of 13, Stephen's family moved to southern California. He took his first geology class under the former State Geologist of California, Dr. James Slosson.

He would pursue the BS and MS degree in Geology at the California State University at Northridge, with an emphasis in geochemistry and igneous petrology. As the first graduate student under the late Dr. Peter Weigand, he would complete his Master's Thesis titled "Tholeiitic Basalts from Spitzbergen and Liberia, West Africa."

Stephen worked for several consulting firms including Bechtel, Converse, Dames and Moore, and Engineering Enterprises, where he performed geologic studies in the North Cascades, Washington, and throughout the states of Georgia, Arizona and California. By the mid-1980s, Stephen became involved in geologic studies and investigations with an environmental focus, and was involved in the early phases of the Superfund program, and on the leading edge in aquifer restoration, LNAPL recovery, and soil recycling and reuse technologies.

By 1990, Stephen was founder, President and Chief Executive Officer for

an international consulting firm, which he would take public in 1993. Applied Environmental Services became internationally recognized, providing strong and innovative expertise in soil and groundwater restoration, and recycling and reuse technologies.

Testa's last position was as President of Testa Environmental Corporation, a geological and environmental consulting firm, located in Mokelumne Hill, California, serves as a consultant and mine inspector on behalf of the State Mining and Geology Board, and provides litigation support and expertise.

Testa was appointed Executive Officer of the California State Mining and Geology Board in August, 2005. He continues in this role to this day.

Testa is the author of 11 books and over 125 publications. He has served as an instructor at University of Southern California and California State University at Fullerton, where he taught Physical Geology, Mineralogy and Crystallography, Hazardous Waste Management, and Environmental Petroleum Engineering. In addition, he has co-authored a book for those entering the geological consulting profession titled "Principles of Technical Consulting and Project Management", and received the Geological Society of America Roy Shlemon Geology Mentor Honorarium for excellence in application of applied earth science.

Testa is the Past President of the American Geological Institute (AGI) and Past-President of the American Institute of Professional Geologists (AIPG). Testa is a Fellow of the Geological Society of America and Society of Economic Geologists.

Response

I was pleasantly surprised and honored to be AIPG's 2009 recipient of the Award of Honorary Membership. In response to this honor that is bestowed, I wish to thank the membership of AIPG, and share some thoughts about the relevancy of certification and professionalism. I have been a member of AIPG since 1983, over 25 years ago. It was not until

I re-located back to California in 1986, however, that I truly became engaged with AIPG and its mission and goals.

My position on certification and the need for professional codes of ethics has not changed since I first became a member of AIPG, that being, it remains as relevant today as in the days when such concepts were first conceived by AIPG's founders. Relevancy of AIPG has been addressed by every President of AIPG since its founding in 1963. In thinking about our society's continued need for certification and professional geologists, I am reminded of the 1948 film "The Treasure of the Sierra Madre," a classic tale for the search for the color, gold, in the Sierra Madre Mountains in Mexico, by three ill-matched prospectors. There is a memorable scene when after the group strikes it rich, they are visited by bandits pretending to be Federales.

"Badges? We ain't got no badges! We don't need no badges. I don't have to show you any stinkin' badges!"

In the Mel Brooks film Blazing Saddles, the modified version was:

"Badges? We don't need no stinkin' badges!"

Regardless of the exact phrasing, my point is, we don't need any stinkin' badges either. But the general public which we serve does need certification and professionalism and expects excellence from the geologic community. It always has and, as long as there is civilization, always will. AIPG certification is recognition among one's peers that an individual is qualified to perform geological work within his or her area of expertise, and live and work by a code of ethics with integrity and competence. Unlike State registration, certification serves the geological profession and, through our professionalism and code of conduct, the public good. This is the fundamental value and relevancy of AIPG.

The science and profession of geology has been very good to me. As with any professional endeavor, I have had many mentors, whether they were aware of it or not, that I've looked to for guidance and direction. It is not surprising that most of them were AIPG members, and it was through AIPG that I was fortunate to consider them more than just my colleagues, but my friends. This list includes William Fisher, Robert Fakundiny (the Great Fak), Charlie Mankin, Robert Jordan, John Parrish, Dennis Pennington, Jonathan Price, Richard Proctor, Russell Slayback, and

one of my strongest supporters, Larry Woodfork, who served as AIPG President when I attended my first annual meeting in 1987. I am truly blessed to consider these outstanding individuals, these geologists, as my colleagues and friends.

My second point I wish to make pertains to public service. It is not surprising that most of the individuals I mentioned have spent many years in public service. When I left my consulting endeavors and transitioned into public service, a role I am fortunate enough to serve in today, it was these individuals who showed me the importance of public service, and getting involved in earth science policy and the implementation of such policy. I also must thank my wife, Lydia, who without her understanding and support, I could not divert the necessary time from other obligations to devote to the profession of which we all are a part. A profession to me is a life style, and she has helped make it possible for me to live in a world of perpetual geology. In summary, AIPG has provided me much more than I ever gave back. For that I thank the membership of AIPG, and its bestowing of Honorary Membership to me.

Stephen M. Testa

**P. Patrick Leahy, CPG-10507
2009 Recipient of the
AIPG John T. Galey, Sr.
Memorial Public Service Award**



In March of 2007, Dr. P. Patrick Leahy was named Executive Director of the American Geological Institute (AGI) of Alexandria, Virginia, a non-profit federation founded in 1948, and consisting of 45 geoscientific and professional associations that represents more than 120,000 geologists, geophysicists, and other earth scientists. Prior to his

current position, Dr. Leahy served as Associate Director for Geology of the U.S. Geological Survey where he had responsibility for Federal basic earth science programs, which include worldwide earthquake hazards monitoring and research, geologic mapping of land and seafloor resources, volcano and landslide hazards, and assessments of energy and mineral resources. Dr. Leahy served with the U.S. Geological Survey for 33 years in various technical and managerial positions. He has authored or co-authored more than 70 publications on a wide array of earth science topics. Dr. Leahy was born in Troy, New York. He holds undergraduate and graduate degrees in geology (1968) and geophysics (1970) from Boston College. He received his doctorate in geology (1979) from Rensselaer Polytechnic Institute where he specialized in regional ground-water studies and hydraulics. He is both a certified professional hydrogeologist and professional geologist.

Dr. Leahy is a Fellow in the Geological Society of America and a member of the American Geophysical Union, the American Institute of Hydrology (Former President), Sigma XI, the American Association of the Advancement of Science, the American Association of Petroleum Geologists, and the Geological Society of Washington. Dr. Leahy was the recipient of the 1996 Boston College Alumni Association Award of Excellence in Science, the 1995 Alumni Association Fellow in Science for Rensselaer Polytechnic Institute, the 1996 Department of the Interior Meritorious Service Award, in 2003 a Meritorious Senior Executive Award, the Department of Interior 2006 Distinguished Service Award, and in 2007 was recognized as a Distinguished Senior Executive by President George W. Bush and received the Khan Medal (the highest award for a non-Afghan citizen awarded by Afghanistan) from President Hamed Karzai.

Response

It is with great pleasure and honor that I accept the John T. Galey, Sr. Public Service Award of the American Institute of Professional Geologists. I am humbled to be associated even remotely with an individual of John's professional stature. Not only was John Galey a marvelously talented geologist but he certainly contributed selflessly to ensure the vitality of our profession and to AIPG. I am also humbled to be in the company of previous award recipients, many of who I know

personally and hold in high regard and consider them colleagues and friends.

Since this award is focused on public service, I wanted to share a few thoughts with you relative to the importance of interacting with the public as a service to the profession. I don't think many if any individuals pursue the geosciences with the primary goal of public service. The rigorous academic preparation of developing an understanding of the earth and how it works consumes most students. However, I think that at least in the recesses of our minds during that formative period, we all harbored a desire to make a difference in both our professional and private lives. Certainly today, this desire is more visible among students than when I was a student and that is a good thing. The geoscience profession needs to build upon this ethic to serve.

Society today is confronted with critical challenges, many of which involve a geoscience component. How do we deal with increasing energy, water, and mineral demands? How do we ensure a safer and better prepared world from natural hazards like earthquakes, floods, volcanoes, landslides, and tsunamis especially in light of an increasing population that lives, works and plays in harms way? How do we provide a sound understanding of the earth's climate and its changes to the general public and policymakers so that policy is based on sound science and not speculation? How do we ensure that society will have the quality of life it desires and deserves? Helping to answer these questions for the public and for our policy makers is the essence of public service for the geoscientist.

Yet all too often, the public does not understand the significance of our profession's contribution to possible solutions and the crafting of a balanced way forward. The role of the geoscientist has changed. It is no longer enough to be one-dimensional in our professional lives. Academics can no longer be comfortable with simply conducting research or teaching students. Those in government and industry can no longer be satisfied with completed projects designed to address specific issues. We, as geoscientists have much more to offer and society needs 'Citizen Geoscientists.' It is important that we not be zealots but rather trusted sources of information and understanding of the geoscience elements of societal issues.

A new era of public service by the geoscience community is long overdue.

The thirst for our wisdom is probably at its all time high and organizations like AIPG are uniquely positioned to answer the call through its membership, forums, publications and other means. I encourage all of you to find time in your professional career to perform some public service no matter how little. It will bring both personal as well a professional reward in service to our great science.

In my own case, I am certainly proud of the work I was able to publish; but I have also been fortunate that my career gives me many opportunities to discuss the geosciences with others. Early in my USGS career it was discussing ground-water availability in Delaware with policymakers at city, county, and state levels. Later in my USGS career, I often testified before Congress on issues ranging from earthquakes to energy and mineral resources and at times briefed the Secretary of Interior on a weekly basis on a wide variety of topics. I even met once with the royal family and Vice President of Afghanistan to offer them insights on the status of their energy, mineral and water resources. More recently, my position, as Executive Director of AGI, has provided me with a platform to influence the next generation of geoscientists. I hope the legacy of my efforts serve to influence young people on the importance of the geosciences as a career choice and instill a renewed spirit of public service to the professional geoscientists of the future.

I wish to thank the leadership of AIPG for this recognition and I want to thank my family, especially my wife Cathy, for the support and encouragement they have provided during my career.

Patrick Leahy



**Daniel J. St. Germain,
CPG-07858**

**2009 Recipient of the AIPG
Martin Van Couvering
Memorial Award**

Dan's interest in geology started in his youth while growing up near a tailings pile of an old barite mine in Cheshire, Connecticut. Spending his high school and college years as a welder building fireplace heaters and log splitters, and later repairing turbine blades for the US Air Force motivated him to earn a Bachelors Degree in Marine Geology from Southampton College of Long Island University in 1984. While at Southampton College he participated in a cooperative education program working for Rollins Environmental Services (a hazardous waste incinerator) where he worked with Geraghty and Miller, Inc. A few weeks after graduation, he began his professional career as a field technician with Geraghty & Miller, Inc. in Syosset, Long Island, New York. He was soon promoted to a field geologist delineating soil and groundwater contamination and developing groundwater supplies across the nation. After four years at Geraghty & Miller, Dan moved on to Leggette, Brashears & Graham, Inc. in Wilton, Connecticut to be closer to his family. After a few more employment stops, Dan settled in at Malcolm Pirnie, Inc. (an Arcadis Company) where he has been employed for over 14 years. Dan currently manages a portfolio of industrial, municipal, and federal clients and a staff of nine geologists.

Dan became a member of AIPG in 1990. In 1998, Dan became active with the Northeast Section Executive Committee. He served on the Section

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Executive Committee and served as the Section President in 2003-2004. He also led the organization of the very successful 2004 Annual Meeting in Saratoga, New York. Dan was elected to the National Advisory Board in 2005 and 2006 where he challenged AIPG's leadership to find value for those of our members who are also licensed Professional Geologists.

As President and building on changes made by Past Presidents, Dan continued to develop the organization into a more professional society where many of its members would possess a state Professional Geologist license, while still offering the CPG certification for those who saw value in the certification. As President, he developed and implemented a successful national marketing campaign targeted at licensed Professional Geologists. He jump-started the Continuing Education Program by identifying leadership roles and assembling an ad hoc committee to organize and host conference-style technical courses, the first of which was in the Fall of 2008. Reluctantly, Dan also tackled the increasingly controversial subject of climate change within the organization by assembling an ad hoc committee that vetted the subject in the *TPG* and developed a position statement that was passed by a polarized Executive Committee.

Response

It is with great surprise and honor that I accept the Martin Van Couvering Memorial Award. I would like to thank the Honors and Awards Committee, Executive Director Bill Siok, the Staff at National Headquarters, and the past and present National and Northeast Section Executive Committees. I would like to thank my employer and my colleagues at Malcolm Pirnie, Inc. (an Arcadis Company) for their unconditional support. Most of all I would like to thank my wife, Jennifer, and my children, Danica and Connor, for their understanding and support during my time away from home. Without your support, this would not have been possible. I consider serving as your President and receiving this award as highlights of my professional career. I humbly think my accomplishments and leadership pale in comparison to many of the previous recipients of this award.

When I was a teenager my father told me that I would be judged by the company I keep. I'm pretty sure it was not meant as a compliment. Looking at

this list of prestigious recipients, I am in good company indeed!

Like many of those before me, I have worked tirelessly for this organization. And like many of you, I have received much more than I have ever given. Thank you very much for the opportunity to serve this great organization!

Daniel J. St. Germain



**Robert H. Fakundiny,
CPG-04977
2009 Recipient of the AIPG
Ben H. Parker Memorial Medal**

Dr. Robert H. Fakundiny was born in Manitowoc, Wisconsin, in 1940. He spent his childhood in California. Bob recently retired from the post of State Geologist of New York and Chief of the New York State Geological Survey, which he held for 26 years.

In the 1960s he consulted to Dow Chemical Corporation at their fluorite mine in northern Coahuila, Mexico. In the 1970s and early 1980s, he served as an adjunct professor at the State University of New York at Albany. In the mid-1980s he consulted to Los Alamos National Laboratories on geothermal energy in Honduras. Currently he is consulting to the New York State Energy Research and Development Authority on the decommissioning of the nuclear reprocessing plant at West Valley, New York.

Bob received his B.A. degree in Geology from the University of California at Riverside in 1962. He then joined a minerals-evaluation program with the United States Peace Corps in Ghana, West Africa, where he did geologic map-

ping in the gold and diamond fields. That work evolved into an M.A. degree in geology at The University of Texas at Austin in 1967. His study of the structural geology and stratigraphy of central Honduras led to his Ph.D. from The University of Texas in 1970.

Bob is a Fellow of the following geological societies: Geological Society of America, where he was also past Chair of its Engineering Geology Division; The Geological Association of Canada; the Geological Society (London), where he is also a Certified European Geologist; the New York Academy of Sciences; and the American Association for the Advancement of Science. He has been a member of 20 other local, national, and international geologic societies. He is Past President of the American Institute of Professional Geologists, Past President of the Association of American State Geologists, Past Chair of the North American Commission on Stratigraphic Nomenclature, and Past Executive Director of the New York State Technical Advisory Committee on Seismic Hazards. He was appointed Secretary of the American Geological Institute during 2004-06.

Fakundiny has received several awards, including: the AIPG John T. Galey, Sr. Memorial Public Service Award, AIPG Presidents Citation of Merit, AIPG Martin Van Couvering Award, AIPG Honorary Member; George V. Cohee Public Service Award (Eastern Section of the AAPG); and AASG Honorary Member and recipient of the Distinguished Service Award. He is also a Kentucky Colonel.

Fakundiny has authored more than 40 peer-reviewed scientific papers. He has authored more than 50 abstracts and more than 100 published miscellaneous papers and articles. He is currently studying the geology of the eastern High Peaks area of the Adirondack Mountains, and a giant rock-block landslide, possibly the largest in the eastern United States, in the Tully Valley a few miles south of Syracuse.

Response

Thank you for the prestigious honor of receiving the Ben H. Parker Memorial Medal. My meager words are not capable of expressing my deep appreciation for this proclamation by my colleagues, nor can I articulate my astonishment on having been nominated for this honor out of the group of national and state leaders that constitute the membership of our

association. My belief is that no award is more precious than that from one's peers. After retiring, I never expected my name would be on this list of distinguished and accomplished members who previously were awarded the Medal. I believe that any award from the American Institute of Professional Geologists is a great honor, especially since this august group is one of the most professional, productive, and courteous that I have ever been privileged to work with. The one other group that comes to mind, and that has been closely associated with the Institute, is the Association of American State Geologists. They, in fact, convinced me to join AIPG and helped me get through the application process.

Another honor for me has been the opportunity to have served as President of both the AIPG and the AASG. Within AIPG I was privileged to have served as member of the Executive Committee, Member and Chair of the National Selection Committee, and as a member of various other committees, both at the national and Northeast Section levels. During these activities I was rarely refused any request. Usually when I approached a member for help, I received the answer "absolutely," even before the details of the request were presented to them. That is professionalism. Never did I hear a discourtesy; rather the debates were well thought out and sincere, but never acrimonious. Never did I hear idle gossip, disparagement, nor slander by any member about another.

I did not have the honor or privilege of knowing Dr. Parker, but I know of his character, history, and the respect he received from his colleagues by listening to acceptance speeches by members who formerly received this award, and through discussions with Ben Parker's friends and acquaintances. Martin Van Couvering, in his memorial to Dr. Parker (quoted in Dick Proctor's superb book *A History of AIPG, 1963-2003*) described him as one of the truly great men of the profession. Alvin D. Turquette, in his tribute to Ben Parker in the Newsletter of the Rocky Mountain Association of Geologists (also quoted in Proctor's book), stated that Dr. Parker's devotion to his profession and his willingness to serve whenever and wherever needed is testimony to Ben's character. By his example we are challenged to live our professional lives in such a manner that we may someday be deemed worthy of similar praise. I will continue to aspire to those same ideals that are associated

with the achievements of Ben Parker, his fellow colleagues who founded the Institute, and you, my esteemed colleagues and friends.

Thank you again for this honor. The greatest honor, however, is to have known and worked with you through these many years of endeavor and camaraderie.

Robert Fakundiny



A. Fred Spilhaus, Jr. 2009 Recipient of the AIPG Outstanding Achievement Award

Fred Spilhaus joined the American Geophysical Union as a graduate student in 1962. Five years later, after receiving his PhD in oceanography from MIT and two years at an eye-opening federal agency he was selected to be Assistant Executive Director of AGU and the likely successor to the then long-term Executive Director. Fred met the challenge and in September 1970 became the Executive Director of AGU. He held that position until February of this year. During his tenure at AGU the membership grew from 7,000 members to 56,000 and the net worth, which was a negative number in the early 1970s blossomed to well in excess of \$70 million in 2008. One key to the growth of AGU has been the maintaining a low dues rate that few can use as a reason to give up membership. The annual \$20 has not changed since it was set in 1968. Both the size of AGU and the growth of membership outside North America from essentially zero in 1970 to 39% today are indicators of strengthening the geoscience research community.

Fred has worked far beyond AGU to advance our science and its utility, to assure integrity in science, and to increase the public image of science. He has labored to integrate people as diverse as biologists and economists with Earth and space scientists so that relevant interdisciplinary problems can be addressed. He has been a participant, and frequent instigator at the start-up of new organizations and in mergers. A prime example is in AGU's and Fred's personal role in the start-up years of the European Geophysical Society and 30 years later in the merger of the EGS and the European Union of Geosciences, which brought geology and geophysics together in Europe. Another success was the formation in Japan of a coalition of societies in the geosciences that now work more closely together and have a regular joint meeting and many other relationships they did not have previously. Most recent is the Taiwan Geophysical Assembly, a triennial meeting and a consortium of geoscience societies. Fred has also held leadership positions in other associations that support our societies, particularly those related to publications, meetings and organization management. His contributions have been as diverse as leading the establishment of what is now the most respected credentialing program for professionals in the meeting industry, participating in the conception for the Copyright Clearance Center and in the founding of the Renewable Natural Resources Foundation and the Society for Scholarly Publication. These and many other activities, including particularly his work with legislators, have contributed to the strength of our societies and to the advancement of the geosciences and other learned areas.

Spilhaus, with AGU at his back, has been a force for bringing together disciplines and diverse scientists. He has a gift for helping individuals with different perspectives see how they can work together to achieve their goals and a better result for all. The synergy in these relationships has clearly strengthened the community of Earth scientists worldwide and touched many individuals.

Response

When President Bognar told me that I had been selected to receive the Outstanding Achievement Award of AIPG, I was astounded. I went to the Web to find out more. I saw Steve Gould's name heading the list as the first recipient and the names of other extraordinary

people below his – almost all of whom I have worked with in one or another aspect of the geosciences over the years. I was shaken and humbled by the honor you are according me.

My father, a meteorologist/oceanographer, led me into the Earth science community from the day I first asked why the sky was blue. During my school days he brought the aliens to Roswell, directed the A-bomb tests in the early 50's that gave us strontium 90, and helped spark the International Geophysical Year. He also sent me to sea as a summer research assistant on ships out of Woods Hole. As an undergraduate at MIT 50 years ago, I began to make my own commitment to the outdoor sciences.

In 1967, 2 years after graduate school, my fantastic post-doc was interrupted by an amazing opportunity. I was offered the position of Assistant Executive Director of the American Geophysical Union with the understanding that I would likely become Executive Director a year later. That was when I met Waldo Smith, a hydrologist/engineer who had served AGU as its staff leader from 1944. I was truly fortunate and thankful to have worked beside him for 3 years before he turned the AGU helm over to me. I am extremely proud to have followed in his footsteps.

Throughout my tenure at AGU I focused on strengthening the community of scientists and engineers who are contributing to a greater understanding of how the Earth works within our solar system, and who are using that knowledge to serve mankind's needs now and into the future. One must engage in many activities on this quest. It starts with stronger science education for our children and continues through bringing accurate and understandable information based on the best available science to our policy leaders and to the general public. In our areas of research it is critical to bridge disciplines, cultures, geography, and even political entities. We must work to tear down the inhibitions and constraints of every type of boundary and at the same time build and safeguard the integrity of the scientific process and its outputs.

On every day of my working life I have had fun and I drawn satisfaction from my efforts. With your encouragement through this award, I can guarantee you that I am not going to stop now.

Fred Spilhaus

**Robert G. Corbett, CPG-04502
Special Recognition Award**



For unwavering dedication, loyalty, and commitment to AIPG, including as Chairman of the Academic Education, Student Scholarship, and Continuing Education Committee.



**J. Matthew Justice
CPG-10485
Fairborn, Ohio**

For his leadership in organization and bringing together the Ohio Section to contribute relevant professional geologic judgment to national policy deliberations.

AIPG 2009 Annual Meeting Abstracts

All annual meeting abstracts can be viewed on the AIPG website at www.aipg.org. Click on 'Meetings' at the top, then select 'Meeting Proceedings.' All of the abstracts are listed.



**Ronald J. Wallace
CPG-08153
Roswell, Georgia**

For his leadership in focusing viewpoints and scientific data on national energy issues, and his unyielding determination to craft a credible energy statement for AIPG.

AIPG Energy Committee

For sharing their valuable time, knowledge, and guidance in preparing the AIPG Statement on Domestic American Energy.

John Berry, Doug Ganey, Don Harris, Dennis James, David Ryckman, Lee Smith and Ron Wallace.

Presidential Certificate of Merit

Each year, the AIPG President may award one or more certificates of merit to individuals who, through dedicated and meritorious service, have made an outstanding contribution to the Institute.

Recipients of the AIPG Presidential Certificate of Merit

Presented by
John L. Bognar,
2009 President

Ohio Section Members Vote to Oppose Markey-Waxman “Cap & Trade” Bill

J. Matthew Justice, CPG-10485
President, AIPG Ohio Section

This past August Ohio Section members voted by 77% majority to publicly oppose House Bill H.R. 2454, the Markey-Waxman “cap & trade” bill. The membership vote was held in response to the bill’s passage through the U.S. House of Representatives on June 26, 2009 and projected Senate vote in September. With little time available before the anticipated Senate vote, the Ohio Section executive committee held a special meeting on July 29. During the meeting, a motion carried unanimously approving guidelines for a general membership vote, in accordance with Section by-laws, to determine whether the Section would oppose the bill. During a three day voting period, Ohio members cast their ballots through a secure, password protected, members-only website. The preamble to the ballot question read as follows:

Dear Member,

You are being asked to vote on whether the Ohio Section of AIPG should publicly oppose house bill H.R. 2454, the Markey-Waxman climate bill. A full senate vote is expected this September. According to Ohio Section by-laws, a quorum shall consist of 10% of our membership, and votes decided by a majority. If a majority vote affirmatively with a “yes”, the executive committee will issue a position statement, publicly opposing the bill. Letters opposing the bill will also be sent on behalf of the Section to Senators Brown and Voinovich. However, if a majority cast a “no” vote, the Ohio Section will take no action. A “no-opinion” vote will be counted toward the quorum, but shall not be counted either “for” or “against” the question. Please select one response to the following ballot item:

1. Are you in favor of the Ohio Section issuing a public position statement opposing house bill H.R. 2454? a) yes; b) no; c) no opinion

In response to the affirmative majority “yes” vote, the executive committee approved the enclosed position statement, on August 27, 2009. The position statement reasons strictly on scientific grounds, to oppose the bill based on an absence of evidence supporting its major premise, that human induced “global warming poses a significant threat to the national security, economy, public health and welfare, and environment of the United States and other countries” (H.R. 2454, Title VII, Part A, Section 701). Although we acknowledge the proposed bill would have grave economic consequences, particularly at this time, during a serious domestic and global recession, the authors and executive committee concluded an economic evaluation was beyond the scope of our Section’s charter. As a public service, the paper includes ready-access to academic and support research materials, through embedded hyperlinks

to the works cited and listed references. The full statement with works cited and references may be accessed through the Ohio Section website at <http://www.aipg-ohio.org/>.

We on the executive committee believe our members may take pride that Ohio Section engaged the entire membership in a timely, transparent, democratic process, in accordance with our by-laws. We may also take pride that we did not shrink from an issue of great national importance. For us to have done nothing would have made us derelict in our obligation to uphold our Section charter, to inform the public and advise government officials on issues and legislation of geological consequence.

Ohio Section of American Institute of Professional Geologists Position Statement Markey-Waxman “Cap & Trade” House Bill H.R. 2454

The Ohio Section of the American Institute of Professional Geologists does hereby oppose House Bill H.R. 2454, the Markey-Waxman “cap & trade” bill. The bill is based on the premise that human production of CO₂ gas is responsible for “global warming” and that “global warming poses a significant threat to the national security, economy, public health and welfare, and environment of the United States and other countries” (H.R. 2454, Title VII, Part A, Section 701). The Ohio Section of AIPG professes that there is no scientific evidence supporting this premise. We therefore reject the bill’s aforementioned, unsupported premise. Subsequently, we also reject the bill’s alarmist claims and unprecedented, economy-wide, government-control proposals.

As geologists, we affirm that any evaluation of climatic change should be viewed through the context of geologic time and processes. We recognize that world climate has and will change. We concur with the U.S. Geological Survey position that, “the earth’s surface does not exist in a static, unchanging ‘natural’ condition interrupted only by the work of humans, but instead is a dynamic system of which humans are a part.”¹ Indeed, the earth’s 4.5 billion year history contains evidence of thousands of climatic variations pre-dating the dawn of humanity to present time. Rock records contain evidence of numerous transgressions (advances), and regressions (retreats) of sea-level. The greater part of Ohio and the northern latitudes were buried by four major continental glacial ice advances within the past one million years, with the

most recent ice-retreat occurring approximately 10,000 years ago.² More recently, temperatures were warmer than present during the Medieval Warm Period (550 A.D. to 1150 A.D.), and cooler than present during the Little Ice Age (1500 A.D. to late 1800s A.D.).³ Past geologic history and physical evidence from the most recent ice-ages indicate that the northern latitudes are now experiencing a warming cycle. Therefore, observed ice-melting is to be expected. Dominant natural causes for climate change are several and include but are not limited to: solar variation in multi-spectral radiation; solar wind cycles; magnetic-pole reversals; wind circulation cycles; oceanic current cycles; greenhouse-gas fluctuations associated with volcanism and other natural causes; oceanic-atmospheric gas exchange cycles; plate tectonics; astronomical cycles; earth rotational cycles; and other natural influences discovered and undiscovered.

We are concerned that the bill relies primarily on reports by the United Nation's Intergovernmental Panel on Climate Change (UN IPCC), to support its premise. Our concerns include IPCC reliance on unrepresentative ground-based temperature stations.⁴ We note an inability of ground-based data to agree with superior quality temperature values from weather-balloons and satellites.⁵ Of additional concern is the 2001 IPCC Third Assessment Report's heavy reliance on the work of Mann et al. (1998)⁶ to support the claim that 1998 was the "warmest year, in at least a millennium." The claim, along with its prominently featured "hockey stick" temperature graph has since been discredited by the National Academy of Science (2006).⁷ We also take concern with IPCC dependence on unreliable climate computer-model simulations. A high degree of model uncertainty was made clear during a recent failure to predict a current cooling trend revealed by NASA satellite data (2008).⁸ Dr. Roy Spencer, former Senior Scientist for Climate Studies at NASA's Marshall Space Flight Center, contends that an incomplete understanding of clouds, and water vapor in its role as the dominant green-house gas, are prime sources of model error.⁹ The bill's authors are apparently aware of model limitations, since the bill contains no temperature reduction goals, contrary to its stated climate control objectives.

Given the lack of evidence supporting the bill's premise, we reject the claims of near-term increases in human-caused severe weather, fire, coastal flooding, drought, disease, mass animal extinctions, and displaced human populations (H.R. 2454, Title VII, Part A, Section 701). As geologists, we advocate careful conservation of the earth's resources, sound stewardship, and protection of the environment. The United States has become a leader in developing effective strategies to achieve these objectives. However, these objectives are not paralleled in emerging markets. We therefore oppose the bill because it will increase global pollution, by shifting American manufacturing to emerging countries such as China, India, and others. We also recognize grave economic consequences from the bill, which extend beyond the scope of this geologic-advisory position paper.

There is compelling evidence to support the position that human CO₂ emissions do not cause climate-change. Existing data reveal that human change-agents are so small in the total climate force-field that they are negligible. We therefore advocate thoughtful evaluation based on the scientific method and oppose any hasty and drastic action. We, the Ohio Section of the American Institute of Professional Geologists, find we

are in the company of some 30,000 scientists world-wide who objectively subscribe to this same position.¹⁰

Approved by

The executive committee on this date, August 27, 2009.

J. Matthew Justice, CPG-10485, President, Ohio Section of American Institute of Professional Geologists

Co-authors designate

J. Matthew Justice, CPG-10485, President, Ohio Section

William E. Shafer, CPG-R-1620, 1974 Past-President, Ohio Section

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Note: Numerous support and academic citations are accessible through the above stated references.

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Some Thoughts on the Value of Volunteerism, and the Latest in Licensure

Robert A. Stewart, CPG-08332

The cover photograph for this edition of TPG says much about the 2009 annual meeting and may be considered a metaphor for AIPG as well. The image depicts Independence Monument, in the center, viewed from Rim Rock Drive, which follows the erosional edge of the Uncompahgre Plateau in Colorado National Monument. In the background is Grand Junction, our host city, in the Grand Valley of the Colorado River; in the distance are the Book Cliffs, built of the Cretaceous Mesa Verde sandstone, behind which are the Roan Cliffs in the upper right, consisting of the Eocene Green River Shale. A tour of Colorado National Monument was one of excellent field trips that were part of the annual meeting, led by Dr. William Hood, a local geologist and volunteer for the National Park Service. The Monument owes its origin to the singular efforts of John Otto, whose enthusiasm for the canyons in the early 20th century stimulated the population of Grand Junction to support his proposal to the United States government. The Taft administration established the monument in 1911, and named Otto its first caretaker for the sum of \$1 per month.

Before the Monument was created, Otto built an extensive trail system for the benefit of others who wished to study the area; these trails are still enjoyed by the many visitors to the area. Otto was also very patriotic, and celebrated each Independence Day by climbing what is now called Independence Monument, and hanging a flag at the top. Local climbers continue this tradition in honor of John Otto. Independence Monument consists of the eolian Wingate Sandstone, with a caprock of the more resistant Kayenta sandstone. Although John Otto was not a trained geologist, he doubtless understood and appreciated much of the geology through his many years of deliberate observation.

The success of the 2009 annual meeting, and AIPG for that matter, is also a reflection of the volunteer efforts of its members. Our organization thrives only through the fervor of our members, who volunteer for local and national activities, as is evident from the contributions in each issue of TPG. We may not persuade Congress to designate the next national park or monument, but as John Otto did, individually and collectively we can inform fellow citizens of the varied geologic processes responsible for the grandeur of our landscapes.

A *Prairie Home Companion* recently reprised a *Guy Noir*, *Private Eye* sketch from last May. Guy is hired to help resurrect the career of a country-western singer named Brad Paisley. Brad's career flopped following his release of an 8-CD collection entitled "Rocks" – in the geological sense. Some dialog follows:

Guy Noir: Rocks.

Louise Lewis (Brad's agent): And it's all songs about geology. Tectonic plates. Volcanoes. Geysers. Shore erosion.

GN: Interesting.

LL: Not really. A half-million copies of those CDs are in a landfill in New Jersey. And now – we have to relaunch Brad as the exciting performer that he used to be before he got fascinated by soil.

GN: And what's my job?

LL: Keep him indoors.

GN: Okay.

LL: You let him outside and right away he's picking up rocks off the ground.

I imagine AIPG has more than a few amateur (...even professional?) c/w performers; hopefully any releases have been more popular than Brad Paisley's opus. But keeping us indoors? Definitely a tough sell. Nonetheless, "There is no such thing as bad publicity except your own obituary."¹

But speaking of landfills in New Jersey, that state is the next to follow the lead of others by enacting legislation to license environmental consultants to act as agents of the state for the purpose of investigating and remediating contaminated sites, and bringing them to regulatory closure. In this issue, Bob Blauvelt and colleague Daniele Cervino discuss the implications of the New Jersey's new credential, the Licensed Site Remediation Professional (LSRP). The program is modeled after those in Connecticut, Massachusetts, and Ohio, and in many ways seems to be the most onerous of the lot, considering the responsibilities of the LSRP. Blauvelt and Cervino point out that there may be considerable advantage to not obtaining the LSRA license, in view of mandated reporting requirements imposed upon the LSRA in the event of discovering contamination even during routine real estate investigations unrelated to regulatory enforcement actions.

The number of backlogged sites in New Jersey is a staggering 20,000, and the requirements to be placed on the LSRPs beg the question of how rapidly the new program will be able to process stale sites. Despite misgivings and continued objections by the regulated communities and consultants in other states, the programs work, and clients become accustomed to doing business under the various regulatory programs. Agency audit programs ensure compliance with regulations, and penalties may escalate to civil and criminal actions depending on the violation.

Similar to its counterparts elsewhere, the New Jersey program will grant a license to any suitably qualified scientist or engineer, and under certain conditions will waive the requirement of a baccalaureate degree. Consequently, CPGs, PGs, PEs and other licensed professionals have no regulatory standing under the new program.

1. Brendan Behan, Irish author & dramatist (1923 - 1964) - www.quotationspage.com

Geologic Storage of Carbon Dioxide: What's Hot, What's Not, and Who Cares?

Lee Smith, CPG-03385

Optimal Value Energy LLC, *OptimalValueEnergy.com*

Conferences on carbon dioxide storage and sequestration are currently being held all over the world. What topics are discussed at these conferences, who attends them, and what opportunities exist to participate in such a conference in the United States?

At the AAPG/SEG/SPE Hedberg Research Conference Geological Carbon Sequestration: Prediction and Verification, held in Vancouver, British Columbia from August 16-20, 2009, sessions were organized around the themes of case studies, geochemistry, simulation, monitoring, and risk assessments. Attendees invited to the Hedberg Conference included those from academic institutions, research organizations, governmental agencies, oil companies, and a few from consulting organizations like myself.

Geological storage of carbon dioxide has evolved from a theoretical concept to multiple ongoing research efforts, pilot field-test demonstrations, and commercial applications. The largest project discussed at the Hedberg Conference was the Gorgon Project in North-West Australia where drilling approval has been received for wells to dispose of more than 100 million metric tons of CO₂. The Gorgon presentation described the modeling, well evaluations, seismic data interpretations, and quantifications of uncertainty conducted to define the development plan for the project and demonstrate that the CO₂ would remain in the subsurface.

In addition to the Gorgon, other CO₂ storage areas were discussed where modeling and monitoring work has been accomplished or is currently in progress: the Weyburn Field in Canada, the In Salah Field in Algeria, and the Sleipner Field in the North Sea. These three projects, all of commercial scale, i.e.,

sequestration of more than one million tons of carbon dioxide a year, were excellent case studies. Abstracts of all of the oral presentations and posters from the Hedberg Conference will be available on the AAPG website in October 2009.

Following shortly after the AAPG event was the international conference, "CO₂ Capture, Storage, and Utilization", held November 2-4, 2009 in San Diego, California sponsored by the Society of Petroleum Engineers (www.spe.org/events/co2). Co-chairpersons for this conference included representatives from the electric power industry, academic institutions, research organizations, governmental agencies, oil companies, and consulting organizations.

The American Association of Petroleum Geologists (AAPG) Annual Convention scheduled in New Orleans for April of 2010 will include a session on carbon capture and geologic sequestration. The session's conveners plan to invite world-class specialists for the oral session and will select a few additional oral and poster presentations. For more information on the New Orleans Convention, go to <http://www.aapg.org/neworleans/topics.cfm#>.

Whatever your views are on climate change, ever increasing numbers of geologic professionals are needed to make critical evaluations to determine the cost and feasibility of the geologic storage of CO₂. The technical conferences mentioned in this article, among others, provide a way to become educated on all of the unique aspects of evaluating the geologic storage of massive amounts of CO₂.

A geological viewpoint of CO₂ storage was summed up in the announcement of the AAPG session as follows:

"Carbon dioxide capture, transport and sequestration, especially its geologic storage in depleted oil and gas fields and saline formations, is now considered one of the necessary options

to stabilize atmospheric CO₂ levels and global temperatures at values that are considered acceptable for society and the environment."

LeRoy (Lee) Smith is President of Optimal Value Energy LLC (OptimalValueEnergy.com). Optimal Value Energy provides services to utility and industrial users of natural gas and electricity to assist them with energy procurement and carbon management strategies. Prior to October of 2004, Mr. Smith was employed as part of the management team of the Midland Cogeneration Venture Limited Partnership (MCV) from 1988 to 2004. Mr. Smith received Bachelor of Science and Master of Science degrees in geology from Michigan State University and is both a Certified Professional Geologist (CPG-03385) and a Certified Petroleum Geologist (CPG #1819).

Should I become a CPG?

Have you been thinking about upgrading your membership to CPG? If the answer is yes, What are your waiting for?

To find out if you have the qualifications go to Article 2.3.1 of the AIPG Bylaws. The AIPG Bylaws can be found on the AIPG website or the directory.

The CPG application can be found on the website under 'How to Join'. Just follow the instructions. The basic paperwork includes the application, application fee, transcripts, geological experience verification and sponsors.

If you have any questions, you may contact Vickie Hill, Manager of Membership Services at aipg@aipg.org or call headquarters at 303-412-6205.

www.aipg.org

Politicization of Science From Within the Profession – Career Reflections

Andrew “Drew” Diefendorf, CPG-03598

Having essentially retired from nearly 40 years of practice as an environmental geologist and 33 years as an AIPG member, I’ve had time to reflect, not only on my career, but on my experience last year as a member of AIPG’s Ad Hoc Climate Change Committee. There is a sharp difference between a constructive scientific debate and one that is blurred by a scientist’s political viewpoint. Recent presentations in the *TPG* relating to global climate change actions are examples of the latter and warrant some response, but first, some historical background.

My geological journey began in the early 1960’s, when I was inspired by my Geology 101 professor with his statement “the oceans cover over 70 percent of the earth, and yet the ocean floor represents some of the youngest geology in the world. We don’t know why. When this paradox is resolved it will revolutionize the science of geology!” This piqued my interest in geology as a major. During my undergraduate years the debate about continental drift raged between students and faculty in and out of the classroom. It seemed obvious to most of us newbies that the visual evidence of continental fit was just too compelling. Yet, most structural geologists, content that there was no known mechanism by which this could occur, looked at other modes of tectonics. However, those of us aware of T. C. Chamberlin’s Method of Multiple Working Hypotheses (1897) learned to keep our minds open to the potential of various geologic processes and combinations of processes, and looked for other scientific answers.

During graduate school, just as things seemed to be heating up in the area of sea-floor spreading, my education was interrupted by a letter of greetings from President Johnson (a Draft Notice). After returning to civilian life and graduate

school, I found that the new science of plate tectonics had indeed revolutionized geology. Fortunately I was able to get up to speed, and probably benefited from all of the debate and ultimate consensus building that had taken place within the scientific community. Geology would later go through similar throes with proposed mechanisms for mass extinctions, particularly those at the K-T boundary event and at the end of the Permian. While debates on these mechanisms continue, they do not seem to be politically driven. This, however, does not apply to matters that affect the employment and income of those engaged in the practice of geology or their employers.

My first experience with AIPG and political issues was with the Northeast Section in the 1970’s. Since then I have belonged to six different sections of AIPG. The Northeast Section was somewhat isolated from the rest of the membership and rather outspoken on environmental issues amongst a sea of members practicing in the petroleum and extractive minerals industries. Most of these issues were not directly to the science, but because they focused on economic impacts of environmental regulations, some politicization of the science occurred on both sides. With the advent of Federal programs such as the Clean Water Act and Superfund, the demographics of AIPG membership changed rapidly and AIPG seized the opportunity to promote professional registration. Having been heavily involved in the development of a registration bill in Wisconsin, I found that politics and turf wars with the engineers became major issues. Dealing with politics was unavoidable during our heavy lobbying effort in Madison, but it did not interfere with our execution of the science.

Global climate change seems to be a significantly different issue than most

other issues encountered by AIPG, and it seems to have dulled the sense of scientific curiosity amongst some of our members. While serving as a member of AIPG’s 2008 Ad Hoc Committee on Climate Change, it became evident that the membership is so highly polarized on the causes of global climate change, that some members deny that any change is taking place, regardless of cause. I believe the Ad Hoc Committee was actually making progress toward a meaningful and constructive position statement early in the process, but was given insufficient time to vet the issues or to consider and agree upon the appropriate content of that message. As a result, the message delivered from AIPG’s Executive Committee and sent to the legislators on March 6, 2009 was weak and noncommittal. Unlike position statements of most other scientific organizations such as AGU, AAAS, EGU and most others, which are conveniently summarized in Wikipedia (2009), AIPG’s statement offered little convincing scientifically based decision-making content or constructive role that AIPG members could play in the process. Lack of response from congressional leaders, as noted in The President’s Message in the July/August 2009 issue of the *TPG*, is understandable. It should be noted that the position statement by the American Association of Petroleum Geologists, which is still noncommittal, was significantly revised after a negative response and fear that it would lose a large number of members. Political polarization within an organization can be damaging to that organization.

In addition to discussing the reception of the position statement, The AIPG President’s Message also focuses on concerns regarding the “politicization of science”, yet the message itself seems fraught with political rhetoric.

It is agreed that members should be concerned with political abuse of federal agencies such as NASA and NOAA, which the public trusts to soundly measure, analyze and report climate change findings. Underfunding of scientific research and censoring or watering down of agency reports has, in fact, occurred in the recent past. While there has been a change in administrations over the last year, there has not been a change in the scientific facts, or the direction in which climate change research or private sector action is and should be moving.

The article “.....of Science, Religion and Politics” in the July/August 2009 issue of *TPG* also uses political rhetoric to argue against politicization of science. There is no question that the economic and environmental impacts associated with the control of carbon emissions require careful deliberation. The idea of geo-engineering or “tinkering” with the atmosphere or the oceans should also leave any conscientious scientist with pause for thought. What the article did not convey was that the Director of the Office of Science and Technology Policy, who was the basis for the reference to shooting particles into the atmosphere, discussed this as a “last resort” technology (Guardian News & Media, 2009). Sensationalizing on statements made by public figures is another form of political rhetoric but it doesn’t get us anywhere. What the membership needs to hear are the facts and constructive measures to which geologists can contribute their expertise. For instance, efforts to conduct carbon sequestration have been underway for many years. There are myriad geologic and other physical constraints and challenges that affect the environmental viability and economics of this technology. Many AIPG members have the expertise to address these issues.

What concerns me the most about AIPG’s espousing to the public and legislators that we are the experts on global climate change is the way some scientific data are interpreted and put forth to the membership and the public. The conclusions presented in *TPG* Article “..... of Science, Religion and Politics” that NASA’s global temperature data “show a short-term, multi-year cooling trend that was not forecasted by modeling” are in sharp contrast to NASA’s own summary report for 2008 cited in the AIPG article. While NASA (2009) concluded that “calendar year 2008 was the coolest year since 2000,” it also noted that it was

“the ninth warmest year in the period of instrumental measurements, which extends back to 1880. The ten warmest years all occur within the 12-year period 1997-2008.” In addition, NASA summarized by stating that “The Southern Oscillation and increasing GHGs continue to be, respectively, the dominant factors affecting interannual and decadal temperature change.” NASA also noted that “Given our expectation of the next El Niño beginning in 2009 or 2010, it still seems likely that a new global temperature record will be set within the next 1-2 years, despite the moderate negative effect of the reduced solar irradiance.” El Niño has returned, and, according to NOAA (2009) “The world’s ocean surface temperature was the warmest on record for June, breaking the previous high mark set in 2005.”

Based on the numbers provided in the Executive Director’s Column of the July/August 2009 issue of the *TPG*, AIPG membership accounts for roughly 3 to 5 percent of practicing geoscientists in the USA. Within that number the expertise relating to the causes of climate change is surely limited. Perhaps as the Executive Director suggests, we should cease our inward gazing. If AIPG collectively believes the majority of members of our sister organizations such as AGU and GSA are wrong on the issue of climate change, then the future of AIPG is in peril. I was encouraged by AIPG President-Elect Lawless’ Message (2009) that the foundation of our advocacy and professional development efforts will continue to be competency, integrity and ethics,” and that “it is our responsibility as professional geologists to provide the long-term perspective necessary to make informed decisions.” This seems most appropriate, if the science of these issues falls within our personal level of expertise.

AIPG’s past success and greatest worth has been in promoting the profession, and providing the aids to develop competent and ethical practitioners, as well as informing the public on issues in which we have expertise. There are countless areas relating to the impacts of global change that fall within the expertise of our membership and many AIPG members are already engaged in these activities. Many business opportunities also exist and include areas such as carbon sequestration, water resource development and protection, coastal stabilization, and alternative energy development.

“Climate Change is increasingly seen as a major factor for business. Reducing carbon emissions is good for the environment and good for business. Finding ways to take advantage of climate change initiatives is seen as a key business opportunity.” Not my words, rather the opening paragraph from the climate Change Position Statement of Halliburton (2009). In addition to American business recognizing the opportunities presented by climate change, the Defense Department is concerned about the potential effects of climate change on the stability of the world and the security of the USA (Broder, 2009). Hopefully AIPG and its members will contribute to these issues with a high degree of competency, integrity and ethics and less politicization.

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Drew Diefendorf is a Past-President of the Wisconsin and Tennessee Sections of AIPG, a past member of the Michigan, Carolinas and Northeast Sections, and is currently a member of the Pennsylvania Section. He has been a licensed/registered geologist in eight states. He has served on the AGI Human Resources Committee as well as the executive committees of numerous state-wide and regional environmental management and planning organizations in New York State. Drew has also served on the geology advisory councils for Syracuse University and the University of Missouri. He can be reached at *drew.diefendorf@gmail.com*.



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The AIPG Foundation is proud to support future geoscientists through the AGI Internship program and activities of the AIPG Sections. The following are thank you letters from the Stephanie Praus and Rachel Potter, both recipients of 2009 AIPG Foundation - AGI Internships. The AIPG Foundation is also proud to support the activities of the AIPG Sections. The Kentucky Section requested AIPG Foundation support for various educational outreach programs. The AIPG Foundation support went to help support the Section's symposium on climate change in conjunction with the United Nations International Year of Planet Earth as well as supporting students at their annual field trip.

The AIPG Foundation encourages all AIPG Members to find out more about financial support for geologically-oriented public information and education, research support on public issues, and support for information forums for professional geologists. Please visit the AIPG Foundation link on the AIPG webpage to find out more about the AIPG Foundation. I hope that you will contribute to the AIPG Foundation so that we can support the AIPG Membership and AIPG Section activities.

We need your support!

Thank you,

**Ray Talkington, Chairman
AIPG Foundation**

Dear Dr. Talkington,

I am writing to thank you for giving me the opportunity to work at the American Geological Institute in the Government Affairs Program this summer as a public policy intern. I truly believe the policy experience I gained during the internship is indispensable, as my career has previously been limited to research as a geology student. I am also greatly appreciative that I was able to expand my knowledge of geology and geoscience policy by working on Capitol Hill, where the policy is discussed, debated and created.

I came to the AGI internship after receiving my master's in geology from the University of Maryland at College Park. My research focused on the geochemistry of the Bushveld Complex of South Africa, and built upon modeling I had used during research for my bachelor's degree in Earth Sciences from Boston University. At both universities, I was exposed to an academic research environment that did not put any emphasis on the impor-

tance of policy. I never appreciated how interrelated government and academic research are. My time in Washington DC has not only shown me the importance of keeping geoscientists connected to the government, but has also shown me how imperative this two-way communication is.

As a public policy intern this summer, I spent days on Capitol Hill and in the AGI office working to help facilitate this communication. In just the first few weeks, I was exposed to Congressional hearings, briefings, coalition meetings and even a Senate committee markup that had people crammed in every corner to see what the committee would do. It was exciting to witness how legislation is conceived.

This opportunity has been a great experience to learn geoscience policy in the nation's capital. I will leave with a greater understanding of legislative processes and the difficult decisions the government has to make. Thank you again for providing me with this wonderful experience.

Rachel H. Potter

Dear Mr. Ray Talkington,

I would like to thank the American Institute of Professional Geologists Foundation for giving me the opportunity to work for the American Geological Institute Government Affairs Program this summer. I have found the experience to be very educational and invaluable to me as I move forward in my career.

I graduated from the University of Michigan in May with a B.S.E. in Earth System Science and Engineering, concentrating in climate physics. I have been very interested in atmospheric science and climate change for several years now, and my education has helped me better understand how the entire Earth system from the atmosphere to solid earth to biota are all intricately related, and will all inevitably be affected by climate change. I will begin pursuing a Master's in Public Policy, focusing on environmental policy, at the University of Maryland this fall. My goal is for my career to be centered on the development of a comprehensive climate policy for the U.S.

During the internship this summer, I had the opportunity to attend several Congressional hearings on climate change and geoscience-related issues. Then, I provided information about the hearings on the AGI website so member

societies could stay up-to-date on relevant issues being discussed in Congress. I also met with one of my senators and my congresswoman from my home state of Michigan about my concerns regarding climate change. It was also great meeting different scientists at both the U.S. Geological Survey and the Department of Energy. We went on what was my first field trip ever to Douglas Point, MD to look for fossil shark teeth with the National Paleontologist from the Bureau of Land Management.

I truly had a wonderful experience during my internship with AGI this summer. I believe that I learned something new everyday about the lawmaking process, about how policy and politics do or do not accomplish something in Congress, and how federal agencies work to make the intentions of enacted legislation become a reality. I would not have had the opportunities that I had to meet people working on policy firsthand if not for this internship. Thank you for the opportunity to work for the American Geological Institute. I am now confident going forward in my education that I want a career in policy that works to advance science and technology.

**Stephanie Praus AGI/AIPG
Summer 2009 Intern**

Dear Mr. Buchanan,

The Kentucky Section of AIPG would like to thank you for the AIPG Foundation contribution to our section to assist us in creating various educational outreach programs.

Find enclosed a DVD and program of our symposium on climate change that we hosted in November 2008 in conjunction for the United Nations International Year of Planet Earth program. We will be continuing this symposium series this year and are in the process of coming up with a program.

Every spring we have a field trip and awards banquet. We have extended our educational outreach to allow students from all the Kentucky colleges and universities to attend the field trip portion at no cost to them. We are hoping that this extended courtesy will attract new membership into the organization. Enclosed is a field guide of this year's field trip.

**The 2008/2009 KY-AIPG
Executive Committee**

Jonathan G. Price To Receive 2009 Ian Campbell Medal



Alexandria, VA – Jonathan G. Price, CPG-07814, has been named the 28th recipient of the Medal in honor of Ian Campbell for Superlative Service to the Geosciences. Price will be presented this prestigious award at the Geological Society of America Presidential Address Ceremony in Portland, Oregon on October 17, 2009.

Price earned his B.A. in Geology and German from Lehigh University in 1972 and his M.A. and Ph.D. in Geology from the University of California, Berkeley (1975 and 1977 respectively). Currently he serves as the State Geologist and Director of the Nevada Bureau of Mines and Geology, University of Nevada, Reno, where he has worked primarily since 1998. From 1993-1995 he was on loan from the University of Nevada, Reno as Staff Director of the Board on Earth Sciences and Resources at the National Research Council. He also has been a research geologist at the Texas Bureau of Economic Geology and an exploration and mining geologist with United States Steel Corporation and the Anaconda Company. He has taught geology courses at Bucknell University, the University of Texas at Austin, and the University of Nevada, Reno.

In addition to the Ian Campbell Medal, Price has earned many awards and distinctions including; receiving the Leadership Award from the Western States Seismic Policy Council (2003), the Award in Excellence for Mitigation Efforts, the Western States Seismic Policy Council (2002), the John T. Galey Sr. Memorial Public Service Award from the American Institute of Professional Geologists (1999), and the AGI Explorer

Award (1995). Price was also named a Fellow of both the Geological Society of America and the Society of Economic Geologists.

Price has served in several leadership roles in the geoscience community including President of the Society of Economic Geologists (2003), the Association of American State Geologists (2000-2001), the American Institute of Professional Geologists (1997), the Western States Seismic Policy Council (1998-2002), and the Nevada Petroleum Society (2006-2007). He has been a Councilor for the Geological Society of America (2005-2008) and Secretary-Treasurer of the Foundation of the Society for Mining, Metallurgy, and Exploration. He currently serves as Treasurer of the Geological Society of America, Secretary of the Nevada Earthquake Safety Council, and Chair of the Nevada Hazard Mitigation Planning Committee. Price has been a member of the USGS's Scientific Earthquake Studies Advisory Committee and NSF's EarthScope Science and Education Committee.

AGI feels that Price's tireless work for the Nevada Bureau of Mines and Geology, his leadership roles within the geoscience community, and his experience in industry and academia make him extremely deserving of this award.

The American Geological Institute is a nonprofit federation of 46 geoscientific

and professional associations that represents more than 120,000 geologists, geophysicists and other earth scientists. Founded in 1948, AGI provides information services to geoscientists, serves as a voice of shared interests in the profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role the geosciences play in society's use of resources, resiliency to natural hazards, and interaction with the environment.

To contact us, visit <http://www.agi-web.org/direct/>. American Geological Institute, 4220 King Street, Alexandria, VA 22302.

Gary D. Aho, Chairman of National Oil Shale Association.


Gary D. Aho, CPG-10426, President of Sage Geotech Inc. since 2003, is completing his second term as Chairman of the National Oil Shale Association. Aho was the Manager of Western Operations for Cleveland-Cliffs Inc. and president of four subsidiaries. He retired from Cliffs in 2003 and formed Sage Geotech Inc., which has its home office in Rifle, Colorado.

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Robert Font, Ph.D., CPG, PG, EurGeol - Author



Robert G. Font, CPG-03953

1. We are searching for an oil-prone source rock. Which of the following would be most encouraging?
 - a) Type I kerogen
 - b) Ro values >2.0%
 - c) Type III kerogen

2. This well-known Texas fault zone runs from the Uvalde area through San Antonio, Austin, Waco and toward the Dallas region. It consists of normal faults principally downthrown to the east and southeast and constitutes the eastern boundary of the "Texas Hill Country":
 - a) Luling Fault Zone
 - b) Balcones Fault Zone
 - c) Mexia Fault Zone

3. Which of the following is best related to a meteorite impact event?
 - a) Lahar
 - b) Maceral
 - c) Diaplectic

4. A horizontal well is drilled in a precisely E-W direction. It is found to intersect a fault that strikes N-S and dips 45 degrees to the west. The well also encounters a well-defined limestone marker on both sides of the fault, obviously offset by it. The limestone marker also strikes N-S and dips 30 degrees to the east. Along the well bore, the limestone marker is found at a distance of 671 feet east of the fault cut and at a distance of 1,073 feet west of the fault cut. What then is the throw of this fault?
 - a) 638.35 feet
 - b) 701.42 feet
 - c) 593.33 feet

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by Robert Font, Ph.D., CPG, PG, EurGeol

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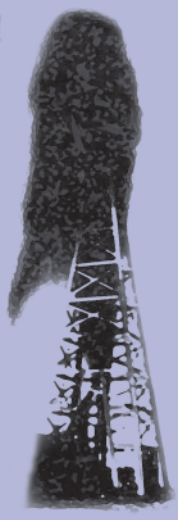
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Answers on Pages 32



Yes Professional Geologists, Be Political

John L. Bognar, CPG-08341

America's foremost founding father Samuel Adams of Boston skillfully maneuvered mostly behind the scenes, but somewhat publicly using logic, law, legal means and his pen to pressure the colonial government and the crown across the pond. While Adams did not endorse the looting of those tea cargos in Boston Harbor, you can't help but wonder if he didn't at least have a bit of a smile when he heard the news. There were other actions that Adams condemned such as the looting and burning of the colonial governor's house. Adams believed there is a correct peaceful approach to influence the political system and of course he opposed violence as a means of political persuasion. One should know however the meaning of "peaceful" is not necessarily equal to "polite", as Adams pulled no punches in his written attacks on the political system. The plain fact is the pen of Adams and others, rather than the rifle, was the catalyst that put events in motion giving America her freedom for future generations to defend again and again against foreign and domestic forces.

With our 5,500 members, there is a lot that goes on behind the scenes at AIPG. A lot of the action resides in the interface of government and science. Some of our members believe AIPG should not be involved in geology-government politics. Some believe using AIPG as a banner for the political process as it relates to the intersection of government and geology is the way to go. What is the official viewpoint? Let's look to the words AIPG uses to describe some aspects of its purpose and activities.

- *The Institute adheres to the principles of professional responsibility and public service...*
- *AIPG is an advocate for the profession and communicates regularly*

to federal and state legislators and agencies on matters pertaining to the geosciences.

- *AIPG represents, and advocates for, the geological profession before government and the general public.*
- *AIPG Intervenes with regulatory boards and agencies on behalf of individual geologists...*
- *AIPG presents testimony and position papers to Federal and State legislators and agencies on matters affecting geologists and geologists' employment opportunities.*
- *AIPG exhibits at the National Conference of State Legislators.*
- *AIPG's state and regional sections work on local political issues and the professional status of geologists in their geographic areas.*

With these words the case is plainly stated that AIPG is involved in politics. But what is the best use of our energy and where are we professional geologists most productive and influential? In one of my columns this year I wrote something to the effect that geologists are not good at coming together as a single voice and our numbers are not impressive when acting in the national political area. Even though we may have the absolute best answers and the perfect scientific approach to serve our society, it would be enormously difficult, some may say impossible, to persuade Congress or the White House that our voice is the correct one, if others of differing opinion are backed by a large volume of people (votes) and large sums of money. I am sure you can think of at least two very recent and or current examples relating to the climate and to energy. I also know from personal experience that the Congressional representatives and

senators generally do not have time to meet with you as a private citizen in their offices in DC or home. They will be polite and have an aide listen to you, if you are persistent enough to arrange a meeting, but for the most part unless you bring votes or other contributions, I do not think they are interested in what you as a private citizen professional geologist have to say.

Should we give up because it is too difficult? No, never. AIPG is not giving up on the federal scene. AIPG supports the political interaction of the American Geological Institute of which we are a member society along with 45 other geoscience societies. The AIPG Foundation provides a stipend for two interns working on political actions of AGI. By joining these other groups under the umbrella of AGI, our numbers are more impressive to those we wish to influence. I urge you to look at the AGI website to see the enormous resource of information it is.

I do not know the exact tally or have never quantified AIPG section involvement, but I believe that AIPG members were the catalysts and the most influential people at establishing licensure or registration laws in a vast majority of the 28 states that have them. In only a very few of these cases were paid lobbyists used. Instead these were grass-roots efforts by professional geologists to educate and persuade the state legislators to pass a bill for the governors to sign. AIPG sections have been instrumental in many states shaping other laws as well. For example in my home state of Missouri, AIPG-MO has taken the lead on dam safety legislation and in Ohio this year, the AIPG-OH has provided its position on climate change not only to its federal senators and representatives but its state legislative bodies as

well. The Illinois/Indiana, Arizona and Colorado sections come to mind as particularly involved with state politics not to mention the vast Northeast Section. Acknowledgment of these sections only does not preclude the fact that a majority of the others are involved in state level politics as well. I know from personal experience that the state level legislators are delighted to see you and warmly welcome your scientific testimony.

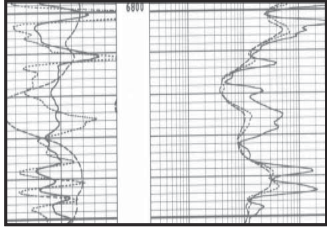
I believe we scientists have a duty to our society to become involved in politics when it intersects with our brand of science or profession. Professional geologists have an obligation to make political power brokers aware of scientific facts. Professional geologists are privileged to possess the responsibility as scientists to educate the politicians in the areas of our expertise as to the ramifications of their actions.

Let us never forget the usefulness of Samuel Adams' preferred weapon, the pen. Our society depends on your experience and opinion. Take time to write your congressional senators and representatives and the president. Take time to write your state senators, representatives and governors. For the CPGs among us, be sure to let them know your opinion was formed from your background as an ethical, properly educated, apprenticed geologist, as certified by AIPG. Become involved in politics at the AIPG section level. Make your scientific opinion be known and employed for the betterment of our society.

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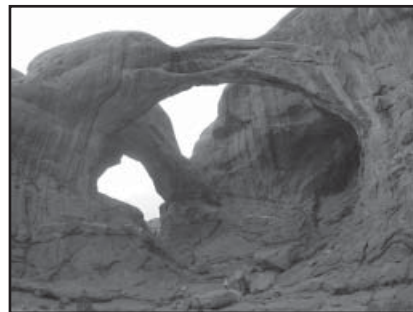
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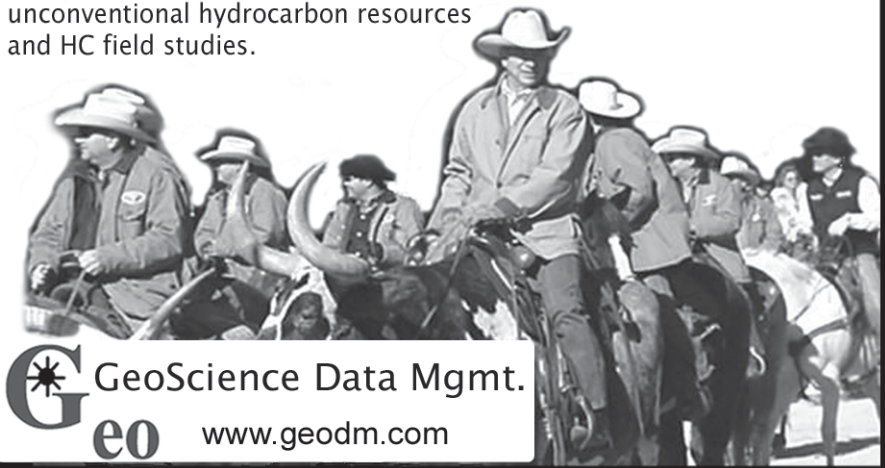


Photos from the AIPG Annual Meeting field trip to Utah's Arches/Canyonlands and Dead Horse Point. Photos courtesy of Adam Heft.

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AIPG Section Websites

AIPG Section Website links are on the AIPG National Website at www.aipg.org. Click on the top right drop down menu and click on Section Websites. If your section does not have a website contact AIPG Headquarters to get one setup (wjd@aipg.org). AIPG Headquarters will maintain a website for your section. Several sections (AZ, CA, CO, FL, GA, HI, IL Chapter, MI, MO, NM, OK, PA, and TN) are examples of websites hosted by AIPG National.



Civility

William J. Siok, CPG-04773

Although the end of 2009 is showing some signs that the economy has stabilized a bit, none of us feels totally at ease that further setbacks will not occur. Some experts predict another significant dip in the market. Although institutions and individuals alike have seen investment portfolios regain some of their value, neither are likely to begin excessive expansion of programs or other activities anytime soon.

Many of us sense that the strains caused by uncertainty associated with the economic turndown have affected the patience of many people. Individual patience is frayed around the edges and has manifested itself in some cases as strained personal relationships and carried itself into dealings with institutions and government.

Some of this ire has even crept into professional association dealings. A most obvious manifestation of this is the sometime lack of civility associated with

the ongoing debate regarding climate change.

The issue of climate change *per se* is not as hotly debated as the underlying causes. In truth, the entire debate has devolved into a political argument, with proponents of anthropogenicity arguing with the skeptics. Political alignments are in many cases motivating the point-of-view.

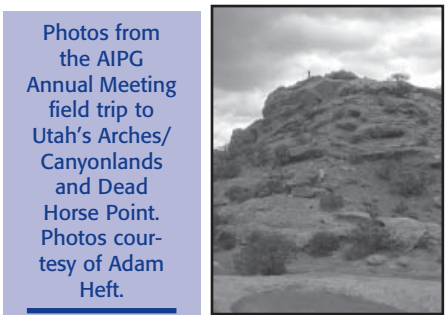
For those who have given serious consideration to this topic, there are undoubtedly strong opinions defining the individual's understanding of the debate, surrounded as it is by both scientific data and political rhetoric. These strong opinions are at the heart of the matter as far as professional associations are concerned.

A sister society recently undertook an internal evaluation of the climate change debate, and nearly split itself apart as the strong opposite positions came to the fore, fueled by political passion and personal certitude.

AIPG has had its share of tension as members within AIPG have attempted to initiate a controlled debate about climate change. A very few engaging in the debate have expressed themselves quite vociferously, creating temporary distress and perhaps even permanent hard feelings.

AIPG, like most associations, is in many respects a microcosm of society as a whole. Our members are affiliated with different political parties and organizations outside the scientific community. The level of discourse must be kept on a professional level if AIPG is to be effective in its mission to serve its entire membership and the geoscience community at large.

Incidentally, my warmest regards to Tyler and Michael, who are studying tirelessly in Wyoming to join the ranks of the gainfully employed geologic community.



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Confidentiality Agreements versus Public Health and Safety; Conflicts of Interest

An exploration group conducting a regional exploration program for uranium collected water samples from many wells drawing water from a well-known and widely used aquifer. The aquifer flows unusually fast at 30-40 ft/y. The water is used for both irrigation and for domestic purposes. As in many states the drilling of private water wells is regulated by the State government, but the *quality* of water produced by private wells is not monitored or regulated by the State.

When the samples were collected, the landowners on whose land the wells were located were told that the results would be kept confidential until both the company and the landowners agreed to release the results. In some cases these confidentiality agreements were verbal, handshake deals. In other cases, confidentiality was secured under a general mineral lease.

A 72-element analysis was conducted on the water samples, so the results also included information about the general groundwater quality. The analytical results from some of the wells contained levels above EPA drinking water standards of some trace metals, including arsenic, that are harmful. Agricultural pesticides are a potential source of these elevated trace metal levels. Preliminary discussions with landowners revealed great reluctance on part of the larger farmers to reveal the results to the authorities.

Protecting the confidentiality of agreements and protecting the public's health and safety are both primary

ethical objectives in professional ethics codes, including AIPG's. As demonstrated by the foregoing example, there are times when these two desirable objectives conflict. The exploration company desires to maintain good relations with landowners, whose commercial interest may be threatened. But there is a duty to protect public health and safety. This situation was treated in the classical literature where Henrik Ibsen's play *An Enemy of the People* illustrated the conflict between public health and confidentiality.¹

The AIPG Code of Ethics Rule 2.1.3 and Standard 3.2 make clear that when such a conflict exists, protection of the public's health and safety has priority over confidentiality. However, this priority does not address the timing of public disclosures.

How great is the threat to the public's health and safety? How can the exploration company convince the well owners that disclosure to the appropriate public health officials should be made (thereby complying with Rule 2.1.3 and Standard 3.2)? How soon will the threat become serious? Have the harmful trace metals moved beyond the boundaries of a particular landowner's holdings? How fast are the elevated levels moving within the aquifer? Are they being diluted as they move away from the wells in which elevated levels have been detected? Or, conversely, are the tested wells just a warning at the edge of a plume? Is there a difference between those with whom the confidentiality agreement was verbal and those with whom it was written—can they be treated differently? How does, or can, the exploration company avoid being perceived as a whistle blower? Is being perceived as whistle blower under these circumstances really a problem?

Conflicts of interest: in addition to the foregoing questions addressing the conflict between the public's health and confidentiality, this situation presents some interesting questions relating to conflicts of interest. On those tracts for which the analytical data support the potential presence of economically exploitable uranium occurrence and the presence of contamination from agrichemicals, there is a conflict between uranium extraction and the remediation work required thereby and the remediation required to deal with the agrichemical contamination. While there may be cost and other efficiencies in jointly remediating both the uranium extraction and agrichemical contamination, deciding who should control the operations and percentage payments for the remediation costs are likely to create conflicts of interest between the farmer and the miner (the exploration company is now assumed to have become a miner for the purposes of discussion).

Assuming that the agrichemical contamination is more widespread than the exploitable uranium occurrence(s), the mining company's willingness to and interest in working on joint remediation efforts will vary with uranium quantities. How will the mining company be viewed by those landowners whose lands are not underlain by exploitable uranium? Assuming that uranium and its daughter products, such as radon, are among the contaminants found under some tracts but in quantities below those required for commercial uranium production, should the mining company be required to be involved in remediation of this source of contamination? Regulatory authorities and NGOs are likely to contribute to multi-pointed conflict of interest situations.

1. See http://en.wikipedia.org/wiki/An_Enemy_of_the_People. I cited *Enemy of the People* in a discussion of whistle blowing in column 45, August 1999.

The answers to these and similar questions are not necessarily easily determined and will vary from one specific case to another. Please contribute your experiences with such situations and your suggested answers to the many questions posed.

AIPG Group on LinkedIn.com

As both Duane Carey and I have discussed in the past two issues of the *TPG*, LinkedIn is designed as a business networking site, one that appears to be growing. On August 14th I received a notice of a job posting on the AIPG Group on LinkedIn.com. Such postings are part of why people join LinkedIn. Groups within LinkedIn provide a means by which those with similar interests or associations can share information and discussions. The AIPG Group on LinkedIn had 184 members on August 14th. I scrolled through the membership list and found a number of folks I've known for some time and others I didn't recognize. Some of the members of this LinkedIn group are AIPG members and some appear not to be. I noticed that several members were human resources types, that the group members have a range of ages and geographic distribution. Several academics have joined.

This brief review prompted several thoughts. Clearly this group is attracting geoscientists and those interested in geoscience who are not AIPG members. One can view this either as trespass by non-members or as one way of letting people know who we are and attracting new members. Personally, I prefer the latter viewpoint, particularly as the group is attracting some of those AIPG has had trouble attracting in the past. The question then becomes, what can or should AIPG be doing to constructively broaden its outreach using this LinkedIn group and similar networking opportunities? This question is addressed both to those AIPG members who are members of the LinkedIn AIPG group (and those who join) and to the Institute as an organization. Contribute your thoughts on the answers.

Mandatory CPD Program—Are You Keeping Your CPD Log?

I recently ran into a member who recently received her CPG. She didn't know about AIPG's mandatory Continuing Professional Development (CPD) program that applies to all those whose CPG application was received by AIPG Headquarters on or after July 1, 2006 (AIPG Bylaws, 2.3.1.1). All CPG's whose applications were submitted prior to 7/1/06 are encouraged to voluntarily comply with the CPD program. The details are available on the AIPG website along with a handy system to record your CPD activities as they occur. Compliance with the program is checked by looking at this web-based form.

The CPD program is set up to be completed over a 3-year period during which you need to record 60 points worth of CPD activities. The 3-year period can start on any date, although using a calendar year is often the easiest. The 3-year period recognizes that there are years in which one can accumulate a lot of CPD points and those when fewer points can be earned. Points are awarded on the basis of the type of activity and the number of contact hours. Details are on the website, so I won't review them here. I did review the consequences of failing to comply with the CPD program in column 113 (Jan/Feb '08).

Having participated in the CPD program since its inception, I find that accumulating the suggested 20 points per year is easy. Attendance at professional meetings, going on organized field trips, completing a variety of short courses or training courses required by your particular variety of practice, giving talks, writing papers, serving as a member of a professional organization's committees or as an officer, etc. are all ways to accumulate points. Keeping the record current is easy, if you take the time to do so. The critical thing is a having a good professional diary/calendar on which you list your activities and the hours involved. This diary will be useful when you have to complete forms covering similar requirements for some state licenses and other professional organiza-

tion requirements. If you keep your AIPG CPD log up to date, you can get a print-out of the activity for the appropriate period to assist you in filling out the other organization's forms, or sometimes, you simply submit your AIPG CPD log and it will be accepted.

In summary, I find it simpler to keep my AIPG log fairly current. I sometimes even remember to update it right after I complete a qualifying activity. Personally, I usually accumulate well over 60 CPD points per year.

Rant: Ban Utilize!

Am I the only one who winces every time I hear someone say utilize? Can someone provide me with an example sentence that demonstrates an instance where *utilize* is a better word choice than *use*? I've yet to find one. I find the use of a three syllable word where a one syllable word works just as well to be pretentious at best and possibly suggesting an attempt at obfuscation at worst. Okay, if you're trying to communicate pretentiously, then *utilize* is better than *use*. But the times most of us are intentionally communicating pretentiously are rare.²

I looked up *utilize* in *Fowler's Modern English Usage*³ and found the following comment:

utilize. If differentiation were possible between *utilize* and *use* it would be that *utilize* has the special meaning of make good use of, especially of something that was not intended for the purpose, but will serve. But this distinction has disappeared beyond recall; *utilize* is treated as a log variant of *use*.

Utilize does not make good use as a replacement for *use*, therefore not falling into the special meaning previously employed. Ban utilize from your vocabulary and encourage others to do the same.

Another Year Completed

This column marks the end of 14 years of Professional Ethics & Practices. Column 1 appeared in November 1995 and a column has appeared in every *TPG* issue since then. I could not and cannot make this column what it is without the comments received from

2. I recently rented *The Brothers O'Toole*, a 1973 western comedy that is very well done. Among the running jokes was the pronunciation of "Molybdenum," the name of the town where the action takes place. The main character, Michael O'Toole wins the "Belching, Spitting, and Cussing Contest" by acclamation following a lengthy rant using many polysyllabic words on the cultural backwardness of the citizens of Molybdenum. I recommend the movie, which is available from Netflix, for an enjoyable evening.
3. If you enjoy exploring good writing and usage and haven't encountered *Fowler's Modern English Usage*, 2nd ed., Oxford University Press, paperback with corrections 1983, then you are in for a real treat.

you, the readers. Thank you. Keep your comments coming. I also want to thank my wife, Sue, AS-001, who proof-reads each column and frequently provides useful discussion of a topic prior to its submission to TPG.

Topical Index-Table of Contents to the Professional Ethics and Practices Columns

A topically based Index-Table of Contents, "pe&p index.xls" covering columns, articles, and letters to the editor that have been referred to in the PE&P columns in Excel format is on the AIPG web site in the Ethics section. This Index-Table of Contents is updated as each issue of the TPG is published. You can use it to find those items addressing a particular area of concern. Suggestions for improvements should be sent to David Abbott, dmageol@msn.com

Continuing Professional Development

Continued from page 7

expects that one timely reminder following an audit will be sufficient to encourage the new CPG to pursue continuing education and report qualifying activities as required. If the new CPG does not complete the 3-year PDP requirements in disregard of several reminder letters, then the AIPG Continuing Education Committee will understand that the CPG cannot or will not maintain the requirements of CPG certification and recommend that certification be suspended or rescinded.

If you have any comments or suggestions regarding the CPD Program, the CPD Committee would welcome them. Feel free to contact us using our contact information located on the AIPG website.

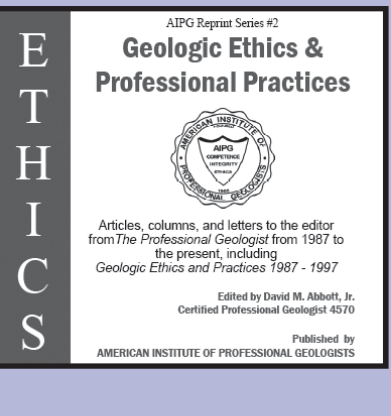
CPD Committee consists of David Palmer, CPG-09960, AIPG Secretary, CPD Committee Chair, Mark Rogers, CPG-08926, AIPG Advisory Board Representative, CPD Committee Co-Chair, Cathy Duran, AIPG Headquarters and Vickie Hill AIPG Headquarters.

Geologic Ethics & Professional Practices is now available on CD

This CD is a collection of articles, columns, letters to the editor, and other material addressing professional ethics and general issues of professional geologic practice that were printed in *The Professional Geologist*. It includes an electronic version of the now out-of-print *Geologic Ethics and Professional Practices 1987-1997*, AIPG Reprint Series #1. The intent of this CD is collection of this material in a single place so that the issues and questions raised by the material may be more conveniently studied. The intended 'students' of this CD include everyone interested in the topic, from the new student of geology to professors emeritus, working geologists, retired geologists, and those interested in the geologic profession.

AIPG members will be able to update their copy of this CD by regularly downloading the pe&p index.xls file from the www.aipg.org under "Ethics" and by downloading the electronic version of *The Professional Geologist* from the members only area of the AIPG website.

The cost of the CD is \$25 for members, \$35 for non-members, \$15 for student members and \$18 for non-member students, plus shipping and handling. To order go to www.aipg.org. Five dollars from every CD sold will be donated to the AIPG Foundation.



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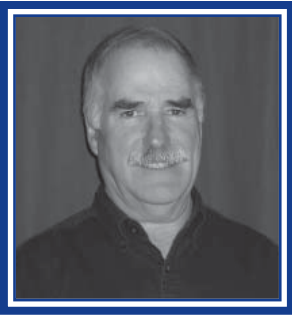
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Isn't There a Special Map for That?

William J. Stone

A picture is worth a thousand words, but only if it is the right picture. Over the years, various types of maps have been developed to show specific aspects of the regional setting. Geologic examples include structure, depth-to-top, drilled thickness, and sand-shale-ratio maps. Hydrologic examples include water table, specific conductance, transmissivity, and contaminant concentration maps. It makes sense to use the best type of illustration to convey your findings.

A uranium mine in northern Australia I once toured needed to show the local environmental agency that the water table position varies seasonally. In that area, all of the 150 inches of annual precipitation amazingly occurs in one season: *the wet* (think *Crocodile Dundee*). The point is, the depth to water, and thus the opportunity for ground-water recharge and associated downward contaminant transport, varies during the year.

To convey this, mine engineers prepared two water-table maps: one for *the wet* and one for *the dry*. In an attempt to show as much detail as possible for each of the two conditions, they employed a small contour interval (fortunately, the same for both maps). This made the maps quite crowded or, as a draftsman would say, *busy*. In short, the regulators were expected to digest and appreciate the nature of the water-level change by looking back and forth between two complex maps. As a result, it was next to impossible to get the intended message.

Alternatively, the data could have been used to construct a single map showing water-level change between the two seasons. Most ground-water hydrology textbooks cover the preparation of water-level-change maps. Briefly, there are two basic approaches. In one, the difference in water level (water level change) between the two periods for comparison is determined at each well from field data, these are plotted on a base map, and then the values are contoured. In the other approach, water-level maps (at the same scale) for two periods of interest are overlain on a light table (now done digitally) and where contours cross, the difference in values is noted. Then, these values are plotted on a blank base map of the area and contoured. A single water-level-change map for the Australian uranium mine would not only have been easier to read, but it would have conveyed the message immediately. Tip: Why make your case the hard way? Use the most appropriate type of illustration. If no conventional type works, see if you can create one that does.

Happy Holidays! Hope to see you here next year, pondering the substrate, rather than a part of it!

Dr. Stone has more than 30 years of experience in hydro-science and is the author of numerous professional papers as well as the book, *Hydrogeology in Practice – a Guide to Characterizing Ground-Water Systems* (Prentice Hall). Feel free to argue or agree by email wstone04@gmail.com.

Following is a news release from the National Ground Water Association.

(Westerville, OH – October 2, 2009) Four national organizations committed to groundwater protection have agreed to conduct a comprehensive survey of states' regulation of geothermal heating and cooling systems.

The survey, to be completed in early 2010, is underwritten by the Geothermal Heat Pump Consortium, Ground Water Protection Council, International Ground Source Heat Pump Association, and the National Ground Water Association.

Nationally, installations of geothermal heat pump systems are estimated by the federal government to have increased more than 33 percent in each of the last two years.

"With more and more boreholes being drilled to accommodate the increased demand for geothermal heating and cooling systems comes greater potential for groundwater contamination," said NGWA Executive Director Kevin McCray.

"To help ensure a vibrant geothermal heating and cooling industry, groundwater must be protected. It is important, then, to understand how states are protecting groundwater while allowing this technology," McCray said.

Geothermal heat pumps (GHP), also known as ground or groundwater source heat pumps, replace conventional heating and cooling systems, and can also be configured to heat some or all of a building's domestic hot water. Because they simply move heat to and from the Earth, instead of burning a fuel to generate heat, properly designed GHP systems can provide decades of inexpensive renewable energy.

GHP systems are comprised of three major components: the Earth connection, a heat pump, and a heating and cooling distribution system. The Earth connection can be an "open loop" that supplies well water to the heat pump, or a "closed loop" that circulates an eco-friendly anti-freeze/water solution through a closed loop of piping buried in the ground or submerged in a pond or lake. The heat pump's refrigeration cycle uses the Earth connection to move heat from the Earth to the building during winter, and to move heat from the building to the Earth during summer.

The federal government and many state governments offer tax incentives for individuals or businesses that install geothermal heat pump systems. To learn more, visit www.wellowner.org and click on "Geothermal Heat Pumps."

NGWA, a nonprofit organization comprised of more than 13,000 U.S. and international groundwater professionals-contractors, equipment manufacturers, suppliers, scientists, and engineers-is dedicated to advancing groundwater knowledge. NGWA's vision is to be the leading groundwater association that advocates the responsible development, management, and use of water.

Answers:

1. The answer is “a” or “Type I kerogen.”

Type I kerogen is high in hydrogen and low in oxygen, such as that found in fresh water algae in lakes. When it matures, it typically yields waxy oil. Type II kerogen is intermediate in hydrogen and oxygen, such as that found in marine algae and plankton. When it matures, it characteristically yields low-wax oil. Type III kerogen is low in hydrogen and high in oxygen, such as that found in land plants in swamps and the near shore marine environment. When it matures it classically yields gas. The expectation is that algal-derived kerogen will generate oil when mature and gas when over-mature. In contrast, woody kerogen is gas prone. In summary, Type I kerogen tends to be oil prone, Type II kerogen depends on the degree of maturation (oil prone when mature and gas prone when over-mature) and Type III kerogen tends to be gas prone.

Vitrinite reflectance or Ro values are a common paleothermometer utilized to evaluate the degree of thermal maturation of a source rock. In general (with some exceptions), the following apply:

- Ro values:
 - 0.5 to 1.35% - (oil)
 - 1.35 to 2.0% - (wet gas)
 - The wet gas window may start at Ro values as low as 1.0% to 1.2%.
 - >2.0% to 3.0%+ - (dry gas)
 - The dry gas window may start at Ro values as low as 1.2.
 - Much >4.0% to 5.0% + = metamorphosed.

2. The answer is “b” or the “Balcones Fault Zone.”

The Luling Fault Zone lies coastward from the Balcones Fault Zone. It mainly consists of faults downthrown to the northwest. In contrast, the Mexia Fault Zone lies eastward and southeastward of the Luling Fault Zone and is typified by faults downthrown both to the northwest and to the southeast forming a series of graben structures.

3. The answer is “c” or “diaplectic.”

Diaplectic glass is created through shock pressure from any of several minerals without passing through a molten phase and is found only in association with tektites and meteorite impact craters.

Lahars are volcanic mud flows or landslides. They consist of pyroclastic debris mixed with water typically flowing downward from the volcanic cone along stream valleys.

Maceral composition defines the components of coal. Macerals are to coal as minerals are to rock. The maceral components of coal are basically vitrinite, liptinite and inertinite.

4. The answer is “a” or “638.35 feet.” The proof follows.

In reference to the accompanying sketch:

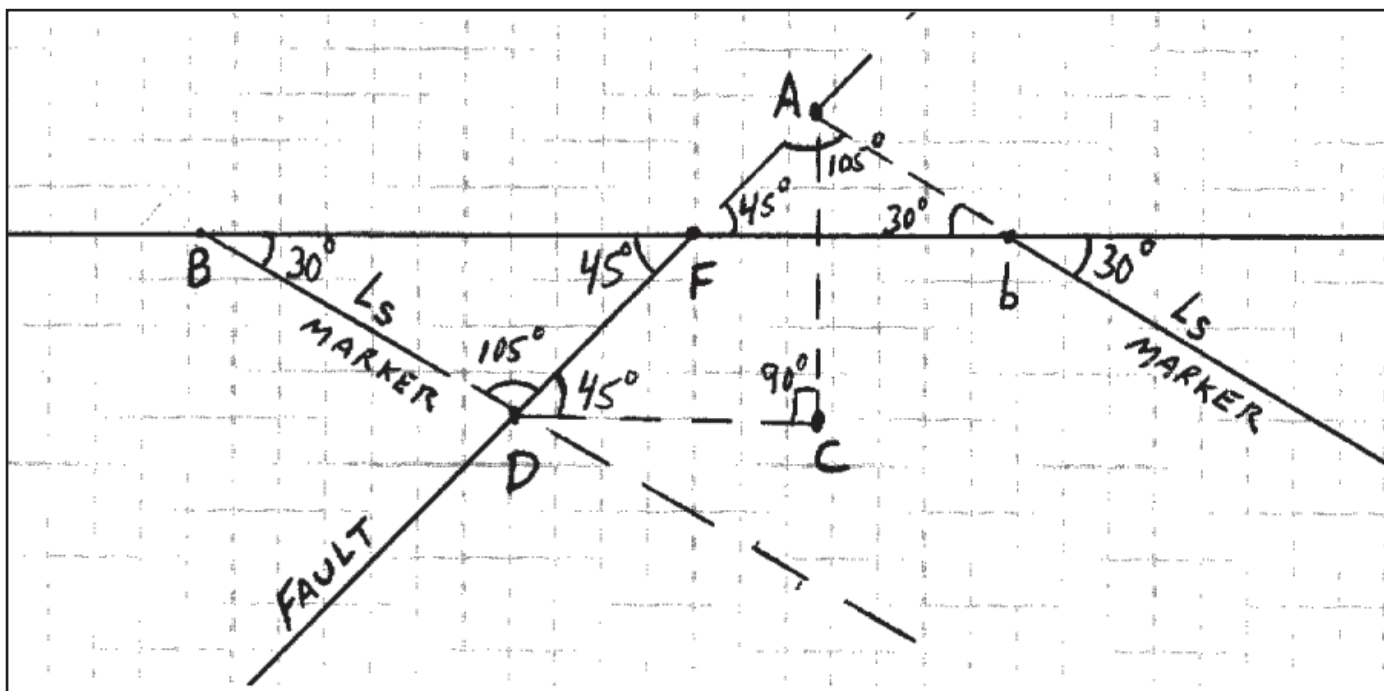
Dip slip = AD = DF + FA; Throw = AC; Fb = 671 feet; FB = 1,073 feet.

From triangle AbF: $\sin 30^\circ / \sin 105^\circ = AF / Fb$; $AF = 671 * (0.5176) = 347.34$ feet

From triangle FDB: $\sin 30^\circ / \sin 105^\circ = DF / FB$; $DF = 1,073 * (0.5176) = 555.43$ feet.

Dip slip = AD = DF + FA = 555.43 + 347.34 = 902.77 feet.

From triangle ACD: $\sin 45^\circ / \sin 90^\circ = AC / AD$; $AC = 902.77 * (0.7071) = 638.35$ feet. Thus: Throw = 638.35 feet.





Welcome to Washington

Joseph J. Fiore, Jr., SA-01164

The past three weeks have been a whirlwind. As soon as I started here with AGI, I was jumping into the action. In these few weeks, I've studied legislation, watched it being formed, and attended a host of meetings and events intended to let Congress know that what we do as geologists is work on the problems they're trying to combat with legislation right now. Kudos to Linda Rowan for running a tight ship.

On my first day, it was an unexpectedly excellent welcome to feel the vibe here at AGI headquarters. The atmosphere is one of complete, full immersion, geologic business. The first part of that is the rock solid geologic decorum. Walk in past the big granitic placard and a wall emblazoned with the complete membership of our federation, and at the front desk there's a full array of geologic periodicals. Walk a few steps further and you come upon a hallway jammed with fossils, mineral samples so magnificent that they're forcing me to use the word magnificent to describe them, and geologic maps like wallpaper. It continues to progress further into a geologic vortex, until you finally reach a mighty bronze bust of John Wesley Powell upstairs. Even the stand for my computer monitor is composed of a tome called *Nuclear Wastes* put out by the National Research Council, and several copies of a Washington Emergency Management Division report presenting earthquake scenarios. In fact it's about as geologically inundated as can be while maintaining a professional office facade. The gypsum there is no facade—the building has a real heart of stone.

The second awesome thing about being at AGI is the practically ubiquitous proliferation of geologic knowledge. Granted most of you work with plenty of geologists, but there's likely plenty of other engineers and staff where you work who couldn't tell a calcite from a quartzite. And in your geology departments at school, undoubtedly there was

geologic rhetoric aplenty; but there was also a lot of white noise in the way of non-geo classes, extra-departmental friends, and beer. That's not the case here. This is an institution at which nearly every employee has an earth science background. Walking through the halls of AGI is like running the geologic gauntlet. Almost every conversation you overhear is about geology, it's unbelievable. The most casual "water-cooler" type exchanges cover geographic distribution of natural disasters, acquiring mineral resource data from belligerent nations, and what is going on at the Geological Survey. It's like walking into the US embassy in a foreign country and finding a whole hive of people who suddenly speak your language. And don't get me wrong, there's nothing bad about a little disciplinary diversity in the workplace, but there's just some cement-like bond that crystallizes between people upon the realization of mutual petrophilia.

That being said, the job itself is awesome too. Three days out of my first week here, we took excursions to hallowed scientific ground. Tuesday, a meeting at the National Academies of Science brought us into the heat of a debate amongst some of the academic leaders and top level administration at the scientific agencies. Ocean acidification: if Carbon Capture and Sequestration efforts begin to employ ocean bound reservoirs for carbon, will high concentrations of CO₂ result in higher ocean pH? Many of the subject's top researchers were in that room to discuss it, and to devise a plan for the scientific community to go about figuring out what is happening. And there was a phenomenal lunch spread. Wednesday we spent the day touring USGS headquarters, having the opportunity to speak with some awesome researchers there before sitting in for a lecture that night. Thursday saw us take a trip to the American Association for the Advancement of Science, publisher of the prolific "Science" magazine, at

a reception for their incoming Fellows. There was a great assortment of appetizers, and there, unlike the AGI office, the beer was plentiful.

The second week brought my first events at the Capitol. Wednesday had me in a congressional hearing of the House Subcommittee on Energy and Mineral Resources, discussing one of the energy bills on the floor right now. I'll get more into the legislation next time, but the hearing was interesting. I've watched plenty of hearings on C-SPAN before, (What, haven't we all? ... no? ... oh...), but you really don't get a good feel for it on television because you can still only see from the perspective of the camera. Being in the room myself, I found a few things striking. Specifically, how informal the entire process was. A particularly relaxed representative was running the meeting, which probably lent to the atmosphere, but from watching on your couch, you can't gauge how unexpectedly casual a meeting of the US Congress could be. Jokes and jabs were flying, and there was a genuinely collegial sense coming from the committee members at the front of the room. Then, after watching partisan politics dominate the national stage to an especially strong degree over the past couple of years, it was a surprise to sit in on a hearing full of moderate perspectives. The Republicans were looking for renewables, and the Democrats looking to drill. You know it's a moderate group when the Democrats are casting the first stone at the Sierra Club, and then joining the Republicans for a full bi-partisan dismissal of the Club's perspective. And frankly, the Sierra Club is one of the more moderate environmental groups. Later that week there was a briefing at the Capitol by the National Emergency Management Association, discussing the merits of mitigation efforts versus disaster response. This was another surprisingly intimate affair, with only about 25 people in attendance for the

FEMA director and one of the Louisiana Senators. Again here, the breakfast spread was impressive.

Our third week at AGI brought a big gathering of the geosciences community to us, with the organization's Leadership Forum and Geosciences Congressional Visits Day. AIPG's leaders were there in John Bognar and Bill Siok, in addition to the presidents and executive directors from a menagerie of AGI's member societies. After a host of presentations from the scientific agencies and several researchers, we had congressional visits. The government affairs program at AGI, for which I intern, exists for the very purpose of liaising between us in the geoscience community and our policy-makers. So Congressional Visits Day is just about our flagship event, because we have an abundance of geoscientists all together to speak with their own representatives, and inform them of what we do, why it's important, and that we are here for them as a resource. It's an opportunity to kill a whole heck of a lot of birds with very few stones.

It's so important for that link to exist because the science and work that we all do needs to play a role in the legislating

process. When laws are passed that don't reflect the accuracy of what our community knows, we get sloppy legislation that leads to sloppy situations later on that will have to be cleaned up. Many legislators do know how important what we do is, they just have limited experience with the science and practice of geology itself, and perhaps don't realize how explicitly funding for the USGS, NSF and other programs is tied to the very problems they're trying to solve right now. This is the federal government we are talking about, as well, and as much as they need our help in working to shape the way our society deals with these issues, they are vastly better prepared to deal with these things than lower levels of government. All of your local and state governments can without a doubt use your help. The term "woeful" was used more than once last week to describe the average state legislator's familiarity with the geologic issues they confront.

What the Government Affairs Program here works to do is act as a two way street between the policy making community and the geoscience community. One key thing the GAP program does is compact a full cross-section of the

month's geoscience policy activity into a quick, succinct read, giving you the opportunity to stay current with ease. So do check out the AGI Monthly Review, (found on the website) which packs the month in policy down into a quick easy read. And use this information to get in touch with your representatives on your own, and share with them the expertise you have in these issues they're dealing with, which at the end of the day leaves us all better off.

Joey Fiore finished his double major in history and geology at Northeastern University this past summer. He is a student of many interests. He started out as a political science major, however his childhood dream of being a paleontologist/archaeologist steered him towards geology and history in the end. His main interests lie in energy policy, and he hopes to gain a better understanding of the politics while in DC as an AGI Intern. Joey is currently writing a book on biofuels he hopes to have published in the future.

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The Movies and Risk Management

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If you are like me, you like to use quotes from the movies to crack a joke or to illustrate a point. Sometimes there is something going on that makes you think of a movie quote. Like last year, I was able to attend a speech at Lehigh University by the Dalai Lama and all I could think of was the Karl Spackler speech from *Caddyshack* "...so I got that going for me, which is good." I started thinking there are some movie quotes that can be used as risk management teaching tools. Here are a few of them:

"A man's got to know his limitations!"

This is a Clint Eastwood quote from the movie, *Magnum Force*. It's important for you to know what your firm can handle from either an expertise or capacity level. Many firms have gotten themselves in trouble by taking on jobs outside their area of technical or geographical expertise. In these situations the fact that you don't know what you don't know means that you don't realize you are in trouble until it is too late. The other issue is whether you have sufficient staff and in some cases sufficiently trained staff for the project. When I worked in consulting we had a joke that if you saw something once you were an expert, twice an authority, and three times made you a renowned authority. A good suggestion is setting up an experience matrix listing your staff and the various areas of expertise that they have. In this way you can see where the bulk of the experience and expertise lies but more importantly it can point to expertise gaps that your firm might have so that you can concentrate hiring efforts on filling those gaps.

"What we have here is a failure to communicate!"

This is a classic line from the prison warden in *Cool Hand Luke*. I've seen

a number of insurance claims where the basic cause of the claim was not necessarily a technical error but simply a communication breakdown on the project that made things go sideways. Communication means listening to the client, the subcontractor and other parties to the project but more importantly is to confirm that those parties are listening to you when you are trying to relate technical information to the parties. The most difficult part of communication is when you have to give bad news to a client whether due to a scheduling delay or a request for additional fees. It's best to have these hard conversations as soon as you can because the only thing worse than bad news for the client is the client knowing that you delayed telling them for two months. Worse would be if they found out about the bad news from someone other than you. Remember back to when you were a kid. If you broke something, you were going to get punished but the times that you tried to hide it and your parents eventually found out, the punishment was that much worse.

"Show me the money!!"

This is a classic line from *Jerry McQuire*. While I am not suggesting that you call up your client and scream into the phone like Cuba Gooding, Jr., I am suggesting that you need to pay attention to your getting paid by the client in a timely manner. In the heat of interesting technical work it sometimes gets lost that your firm is actually a for-profit operation. Make sure that the project manager knows what the contract says about payment and be sure to follow the language exactly when you have to pursue the client for payment. I will add a note of caution if things get to the point where you have to file a non-payment claim in court against the client. Filing the non-payment claim will, in most cases, trigger the client to file some type of negligence claim against your firm.

"You can't handle the truth!!"

A Jack Nicholson classic. Tell the client the truth even if it is bad news. No one likes to get bad news. That is just human nature. The client will be able to handle the truth, they may not like it but they can handle it. Don't avoid those hard conversations.

"You're going to need a bigger boat!!"

Roy Scheider's character recognized that they encountered something bigger than expected. This has applications to your project work. There was a pretty clear scope of work in *Jaws* --- kill the shark. The problem was that they didn't know just how big a shark they were going after. When one of the inexperienced field people (the sheriff) points out that they might need a bigger boat, the crotchety old project manager (the Captain) feels they can still do it. We all know how it ends, the boat wasn't big enough. There are times that you will take on a project and even with the best research and preparation you will find yourself in a situation where things are larger or different than expected. You can keep going with your original plan and hope for the best or you can take a pause, analyze the situation and decide that you need to add resources in order to complete the project successfully. In *Jaws*, things might have worked out better for Quint if he had taken Brody's advice and gotten a bigger boat.

"Mama always said life was a box of chocolates. You never know what you're gonna get."

The wisdom that is *Forrest Gump*. How many projects have you had that went exactly the way you expected them?

There is always that unexpected confining layer or contamination where there wasn't supposed to be any or that angry landowner that won't give you access to his property. It's important to be ready for these situations and have an alternate plan. This is why it is important to have experienced staff on projects or at least available for consult when these unexpected situations arise because they are going to happen. It is just a matter of when.

“Houston, we have a problem!”

This goes back to the communication issue discussed above. Be willing to admit that there is a problem whether to the project manager back in the office or to the client. The project manager may be able to talk you through a solution to the problem so that it goes away. With the client, they are going to want to know about the problem so that they can make the appropriate arrangements to deal with the problem.

“This is another fine mess you've gotten us into!”

This quote isn't so much about reducing your risk but more about a quote that

you don't want to hear in relation to one of your jobs. No job goes 100% perfect but most don't lead to claims or other issues. You want to be able to learn from your mistakes and not repeat them. In this way you reduce the chance you're going to get into another mess.

Send comments to Martin J. Andrejko, 665 Norwood Road, Downingtown, PA 19335, mjandrejko@gmail.com, phone (484) 888-6747.



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REQUEST FOR NOMINATIONS

The AIPG Awards Committee is seeking nominations for future recipients of the Ben H. Parker Memorial Medal, the Martin Van Couvering Memorial Award, the John T. Galey, Sr. Memorial Public Service Award, Honorary Membership, and Outstanding Achievement Award. The qualifications for these awards can be found below. Nominations for these awards, accompanied by supporting statement, should be sent to AIPG Headquarters, c/o Honors and Awards Chr., 1400 W. 122nd Ave., Suite 250, Westminster, CO 80234.

BEN H. PARKER MEMORIAL MEDAL

The Ben H. Parker Memorial Medal is the Institute's most distinguished award. It was established by the Executive Committee in 1969 in posthumous honor of a truly great leader, who devoted much of his life to improve the quality of geology and geologists and the services they provide. The medal is awarded to individuals who have long records of distinguished and outstanding service to the profession.

The most important criterion for this medal is a continual record of contribution to the profession of geology. A wide variety of contributions can be considered, such as (a) the education and training of geologists, (b) professional development of geologists, (c) service to the Institute, (d) leadership in the surveillance of laws, rules, and regulations affecting geology, geologists, and the public, and (e) activity in local and regional affairs of geologists.

MARTIN VAN COUVERING MEMORIAL AWARD

The Martin Van Couvering Memorial Award was established by the Executive Committee in 1979 in posthumous honor of the first president of the Institute. Martin Van Couvering made the presidency a full-time occupation for the first two years of the Institute's history. His dynamic leadership, diplomacy, and organizational abilities established the solid foundation from which the Institute has grown. Few, if any, have given so much to the Institute.

The most important criterion for the Martin Van Couvering Memorial Award is service to the Institute. As in other awards, a wide variety of contributions to the Institute may be considered. By far the most important contribution a geologist can make to the Institute is that of time. It is the contributions by individuals to the Sections, the committees, and special projects that enable the Institute to enhance the practice of geology.

JOHN T. GALEY, SR., MEMORIAL PUBLIC SERVICE AWARD

The American Institute of Professional Geologists' Public Service Award was established by the Executive Committee in 1982 in recognition of one of its primary purposes: service to the public. In 1992, it was renamed the John T. Galey, Sr., Memorial Public Service Award, in posthumous honor of our fourth President, whose long professional career was a continuum of service to both the geological and the general public.

Recognition of public service is important because so many Members have distinguished themselves and the Institute by giving expert testimony to governmental commissions and committees, and by providing geological expertise where it was needed by the public at large.

The application of geology to the needs of the general public may be in many different forms. Recipients of this award have outstanding records of public service on the national, state, or local level well beyond their normal professional responsibilities.

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Since 1984, AIPG has conferred Honorary Membership to those who have an exemplary record of distinguished service to the profession and to the Institute.

OUTSTANDING ACHIEVEMENT AWARD

The Outstanding Achievement Award was established by the 1989 Executive Committee to honor a non-member of AIPG who is widely recognized as a major contributor to the profession of geology. The award is not necessarily given annually, but only when the Awards Committee recommends an outstanding candidate to the Executive Committee for their consideration.

American Institute of Professional Geologists Nomination form for 2010 AIPG Awards

(Please check one)

- Ben H. Parker Memorial Medal John T. Galey, Memorial Public Service Award
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NAME OF CANDIDATE: _____

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RETURN TO: AIPG, Attn: Awards, 1400 W. 122nd Ave., #250, Westminster, CO 80234. Ph. 303-412-6205, Fax: 303-253-9220

DEADLINE: Completed nominations must be received by **December 15, 2009**.

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AIPG Annual Meeting field trip to the Oil Rig Site Tour. Photo courtesy of Sue Abbott

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Groundwater Sampling to Achieve Aquifer Representativeness

Nick Swiger, CPG-11237 and Jan Boll, Ph.D, P.E

Abstract

Groundwater samples extracted from screened wells must be representative of the site conditions to make accurate decisions about the site. As a result of these data needs, the minimal drawdown or low flow sampling method was developed. With this method and how it is being implemented (as a “one size fits all”), there is uncertainty where within the screened interval of a well the water being sampled originates and if the water is solely from the aquifer or mixed with well bore water. The uncertainty is further compounded with the heterogeneities in the transport of the groundwater contaminants. The objectives of this research are to determine if low flow sampling methods produce groundwater samples representative of an aquifer adjacent to a screened interval of a well and to ascertain some information on the degree of heterogeneities of transport of environmental contaminants. A 0.3 m sampling device was constructed that can be inserted into a 51 mm (2”) well to seal off groundwater from entering the device from above and below the desired sampling interval. Two wells were sampled from three different sites each with releases of petroleum hydrocarbons. To determine if the low flow method is representative of the aquifer adjacent to the well screen, a groundwater sample was collected using low flow procedures at a known depth prior to inserting the 0.3 m (12”) sampling device and collecting profiling samples. Subsequent profiling was also conducted by adjusting the pump intake during low flow sampling. Our findings suggest the actual water being sampled during the low flow procedures was from a more discrete interval (not from the entire screen length) and/or mixed with well bore water. To increase the representativeness of the groundwater samples being collected, while considering practicality, the sampling plans must be designed for specific sites and/or wells. Further, to eliminate the potential for well bore water mixing with the groundwater sample being collected, a packer type device should be utilized in wells screen beneath the surface of the aquifer.

Introduction

As environmental investigation, remediation, and risk assessments have evolved with time, so have the means and methods for the collection of data as related to site conditions. Specifically, a need to determine risk posed by the environmental contaminants has driven a need for increased accuracy and “representativeness” of the site conditions such as chemical analysis of groundwater samples. To that end, recently developed methods for minimal drawdown or “low-flow” sampling procedures (Puls and Barcelona, 1996; Barcelona et al., 2005) have been developed.

The “low-flow” or minimal drawdown sampling method, which is currently being widely adopted, use geochemical parameters to document that the water being sampled is representative of the aquifer and provides a means to duplicate groundwater sampling methods. The method utilizes a sampling device (e.g., bladder pump, submersible, peristaltic pump) to purge groundwater while monitoring draw down in the well and geochemical parameters (Puls and Barcelona, 1996; Barcelona et al., 2005). Once all parameters have stabilized (including water level), by a simple mass balance (i.e., mass being removed equaling mass coming in with no change in storage) and stable geochemical parameters ($\pm 10\%$), the assumption is made that the groundwater being sampled is representative of the aquifer (Puls and Barcelona, 1996). A limitation with this sampling method is the determination of the location where the groundwater being sampled is coming from - is the water is a composite of the screened thickness or it is water adjacent to the pump intake placement? Some modeling of the water derivation during sampling using the low flow method was conducted by Varljen et al. (2006) and determined that water was sampled from the entire length of well screen. Further, the modeling determined that the relative amount of groundwater comprising the sample was proportional to the hydraulic conductivity of the aquifer unit adjacent to the well screen. Unfortunately, the model was never calibrated or verified with actual field observations. If the water being sampled is just groundwater adjacent to the sampling device intake and there are heterogeneities in contaminant transport (which there are), the sampling may underestimate the risk posed by the contaminated groundwater. If the groundwater is a composite from the entire well screen, a well that is screened across a large portion of the aquifer has the potential of significant mixing and dilution of the sample, which again, would not yield representative results for decision making. A second potential limitation is from wells constructed with screens deep into an aquifer. In this case it would be impossible to determine if the stabilization is from the aquifer water being pumped or if the well has achieved stabilization via mixing well bore water and groundwater.

The implementation of this method in the field, however, has appeared to utilize the parameters (i.e. drawdown, pumping rates, and parameter stabilization) suggested by Puls and Barcelona (1996) exactly without regard to specific site conditions. The current implementation of low flow sampling as a “one size fits all” increases the potential for the limitations listed above. For example, purging and sampling a 0.1 m inner diameter (ID) well with a 3 m long screen completed 10 m below the aquifer surface in glacial outwash gravels at a flow rate of 400 ml/min could potentially yield less representative

groundwater samples than purging and sampling a 2.5 cm ID well with a 1 m long screen completed 1.5 m below the aquifer surface in a fine grained glacial till at the same purge rate.

Objectives

With the low flow method it is uncertain where within the screened interval water being sampled originates and if the water being sampled mixes with well bore water when using the low flow procedure as it is being used in the field. Therefore, the objectives of this research are to:

- Determine if low-flow sampling produces groundwater samples representative of aquifer conditions adjacent to a well screen interval.
- Ascertain some degree of heterogeneities in transport of groundwater contaminants.

Methods of Investigation

A discrete sampling device was built to create a “packer” that would seal off water coming into the sampler from above and below the slotted interval and produce discrete aquifer profiling data. Groundwater was sampled using the “low flow” procedures typically conducted in field practice (Puls and Barcelona, 1996). The depth to static water level was first measured from the top of the well casing with an electronic water level indication probe. If the depth of the well was unknown, the total well depth was measured using the water level indication probe. Upon completion of water level measurements and well depths, a length of polyethylene tubing was inserted into the well until the end of the tubing was submerged below the static water level and placed within the screened interval. The tubing was inserted into the well at random depth within the saturated thickness in the well screen at each site. A length of silicon tubing was attached to the upper end of the polyethylene tubing. A separate length of polyethylene tubing was inserted into the other end of the silicone tubing and the silicone tubing was inserted into a peristaltic pump. During initial pumping, a measuring cup and stopwatch were used to adjust the flow rate to approximately 250 mL/min. A sample was collected and the turbidity was measured using a HACH 2100 turbidity meter (Hach Company, Loveland, CO). Upon turbidity measurement, the effluent from the peristaltic pump was routed through a flow cell and a YSI 556 (YSI Corporation, Yellow Springs, OH) capable of reading the specific conductance, temperature, pH, dissolved oxygen (DO), and oxygen-reduction potential (ORP) of the groundwater. The flow cell was approximately 450 mL in volume, so geochemical parameters were recorded from the YSI approximately every 4 – 5 minutes to allow at least two volumes to pass through the flow cell (hydraulic detention time of the flow cell was approximately 2 minutes). Along with the geochemical parameters, the depth to groundwater was measured. Once stabilization occurred (as defined in the theory section) in both the geochemical parameters and the water level in the well, a sample was collected for turbidity measurement and samples were collected in two 40 mL labeled, pre-cleaned glass vials and preserved with hydrochloric acid. The chemical samples were collected while wearing a clean pair of disposable nitrile gloves and were immediately placed in a sealable plastic bag. The samples (inside the bag) were chilled to approximately 4°C for field preservation and shipping to the laboratory. The polyethylene tubing was marked so that upon removal, the depth below the top of casing could be measured for an approximation of pump intake depth.

Upon completion of the “normal” sampling of a well using the low flow procedures, the 0.3 m discrete sampler, connected to 13 mm diameter galvanized pipe via threaded couplings was slowly inserted into the well until it reached the bottom of the well. A length of tubing was inserted through the 13 mm diameter galvanized pipe into the sampling device (pump intake inside the sampling device). The polyethylene tubing was connected to silicone tubing and another length of polyethylene tubing and inserted into a peristaltic pump. After turning on the pump, a sample was collected for turbidity. The methods of connecting the tubing to the flow cell and YSI 556, geochemical parameters, and sample collection and preservation were as described above. The only difference in the sampling procedure was that the water level (drawdown) could not be monitored. The 0.3 m sampling device was not cleaned between each interval to minimize well disturbances. In between each well, the 0.3 m sampling device was decontaminated by washing in a detergent and water solution followed by a clean water rinse. In between each site, the 0.3 m sampling device was taken apart, cleaned using the above procedures, and the rubber “packers” were replaced.

Following the sampling using the 0.3 m discrete sampling device and analyzing the results, two wells from one site were resampled using only low flow procedures. For each well, the intake of the peristaltic pump was inserted so that it was near the bottom of the screened interval in the well. Upon stabilization of the geochemical parameters and water level (as describe above), groundwater samples were collected and the intake of the peristaltic pump was raised and the procedure was followed again. Two to three “profile” samples were collected from two wells (MW-P8 and MW-18). Upon completion of the low flow profiling, an electrical submersible pump with a variable flow rate was inserted and the geochemical parameters were monitored for stabilization while purging at 1L and 3L. Upon stabilization of the geochemical parameters samples were collected.

All samples were shipped to an analytical laboratory for chemical analysis and were accompanied by a chain of custody to ensure sample integrity. All samples were analyzed using Environmental Protection Agency (EPA) Method 8260 scan for volatile organic compounds, which includes benzene, toluene, ethylbenzene, o-xylene, m&p-xylene, 1,2,3-trimethylbenzene (1,2,3-TMB), 1,2,4-trimethylbenzene (1,2,4-TMB), 1,3,5-trimethylbenzene (1,3,5-TMB), naphthalene, and 2-methylnaphthalene (2-Methyl).

Site Descriptions

Sampling was conducted at sites known for releases of petroleum hydrocarbons with volatile organic compounds, and where the depth to groundwater was less than 6 m, equal to the approximate “dead head” pressure of the peristaltic pump curve (maximum static lift). Three sites were selected in glacio-fluvial deposits, each with slightly different hydrological and hydrogeological characteristics. Deposits are characterized as moderately to very permeable. Based on the geology of the sites/region and the site-specific geologic boring logs, contaminant migration was expected to be fairly homogeneous as the aquifer appears to consist of smaller grain size distributions (more homogeneous). A brief description of the releases, contaminants, and local geology for each site follows. Table 1 presents a summary of the sites and well codes (names) used.

Site	Well Code
1	MW-P8
1	MW-18s
2	MW-6
2	MW-14
3	MW-30I
3	MW-31I

Table 1: Summary of Sites and Well Codes.

At the first site gasoline was released from an underground storage tank discovered around 1990. The regional geology of the area is glacial outwash sand and gravel, horizontally stratified of varying larger grain sizes [Michigan Department of Natural Resources (MDNR, 1998)]. From the site-specific boring logs of the wells sampled, the local geology consists of fine to coarse grained sand with some fine grained gravel. At the source of the contaminant release, there was some active soil and groundwater remediation which consisted of an ozone enhanced air sparging and soil vapor extraction. The underground storage tank and some contaminated soil were also excavated and backfilled with a fairly homogeneous sand. One well was sampled in the source area at this site and one well was sampled hydraulically downgradient. Both wells were constructed with 1.5 m screens and were installed so that the screens intersected the surface of the aquifer.

At the second site is a former petroleum refinery operated from approximately 1940 to 1960. An extensive underground piping network exists at the site and the release(s) likely have come from a number of sources. The regional geology of the area is glacial outwash sand and gravel (MDNR, 1998), horizontally stratified, of varying larger grain sizes. From the site-specific boring logs of the wells sampled, the local geology consists of silty sands (fine grained sands with some silts) to coarse sands. No active remediation has occurred at the site and many sources of contamination remain. One well sampled from this site is assumed to be near a leaking pipeline (cross gradient from the site) and the other well is hydraulically downgradient from the main refining operations. One well was constructed with a 1.5 m screen and the other with a 3 m screen. Both wells were installed so that the screened intervals were intersecting the surface of the aquifer.

At the third site a leaking underground storage tank was discovered in the 1980s. The release location from this site is assumed to be a fitting on the piping that connected the dispensers to the underground tank. The regional geology of the area is fine textured glacial till (MDNR, 1998), consisting of unstratified, unconsolidated, materials of varying grain sizes. The site is also located near a surface water body that is recharging the groundwater on the lateral boundary of the site. The surface water recharge source acts to “push” or “carry” some of the contaminants vertically downward and increase vertical dispersion. From the site-specific boring logs, the local geology was sand (with no grain size description). Both wells sampled at this site were located hydraulically downgradient from the source area; however, one well is assumed to be located directly downgradient while the other is assumed to be slightly side gradient. The screen sizes on both monitoring wells were 1.5 m long and the wells were constructed so that the screens were approximately 3.5 – 5 m below the top of the aquifer.

Results

Chemical analyses from the vertical sampling intervals with the 0.3 m discrete sampling device revealed strong heterogeneities in the chemical transport paths/distribution at all sites sampled. Site 1 exhibited the most heterogeneity in the chemical distribution and Site 2 the least. At Site 2 chemical distribution appeared to be fairly uniform because releases from this single/continuous source likely occurred at least 40 years ago providing adequate time for chemical diffusion, dispersion and advection. Resampling of Site 1 to vertically profile the aquifer using only low flow sampling techniques and variable purge rates provided near identical results suggesting that during all low flow sampling the location of the pump intake is not a factor. When the sampling purge rates were increased, concentrations increased in well MW-18 and decreased in well MW-P8. A summary of concentrations of common volatile organic compounds found in groundwater samples is provided in Table 2.

Figures 1 – 9 present m&p-Xylene concentration versus depth at Site 1 – 3. This constituent was selected because it was detected in all samples analyzed, and, among the chemicals detected, is approximately the median for chemical weight and properties.

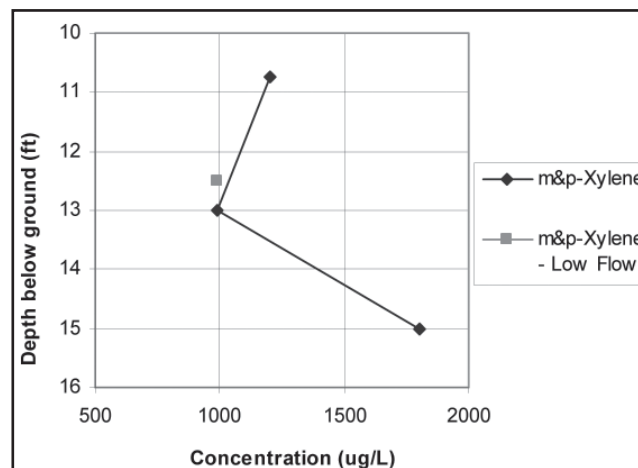


Figure 1: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-P8 at Site 1.

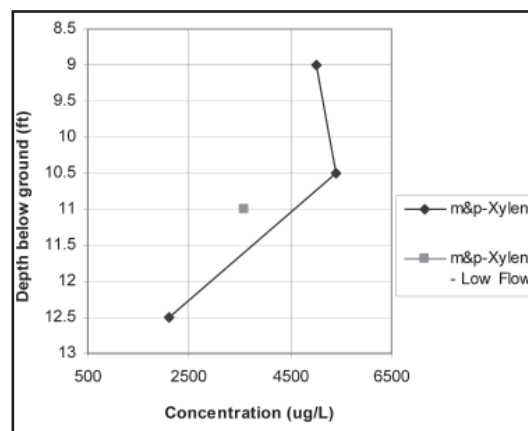


Figure 2: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-18s at Site 1.

Table 2. Summary of Chemical Analysis

Well / Sample ID	Date	Benzene	Toluene	Ethylbenzene	o-Xylene	m&p-Xylene	1,2,3 TMB	1,2,4 TMB	1,3,5 TMB	Naphthalene	2-Methyl
Site 1											
MW-P8 A	1/11/2007	<1	20	240	270	1200	200	830	210	75	20
MW-P8 B*	1/11/2007	<1	19	200	230	990	200	680	170	66	17
MW-P8 C	1/11/2007	<1	30	380	400	1800	300	1200	320	110	30
MW-P8#	1/11/2007	<1	19	200	230	990	180	610	180	62	14
AVG		<1	23	273	300	1330	233	903	233	84	22
MW-P8@11^	5/30/2007	<1	29	180	130	500	150	490	160	51	18
MW-P8@13^	5/30/2007	<1	30	180	130	640	130	570	150	46	14
MW-P8@15^	5/30/2007	<1	39	180	150	600	120	450	130	37	11
MW-P8 1L	5/30/2007	<1	23	180	110	500	150	550	170	53	22
MW-P8 3L	5/30/2007	<1	14	140	91	430	120	470	130	44	19
MW-18 A	1/11/2007	<1	57	560	1900	5000	640	1800	640	250	<1
MW-18 B*	1/11/2007	33	38	660	1700	5400	750	2200	750	270	110
MW-18 C	1/11/2007	12	11	250	430	2100	280	840	260	170	37
MW-18s#	1/11/2007	20	20	440	940	3600	490	1500	490	280	64
AVG		15	35	490	1343	4167	557	1613	550	230	49
MW-18@10^	5/30/2007	100	35	660	1500	6400	650	1800	620	260	52
MW-18@12.5^	5/30/2007	100	34	650	1400	6400	600	1700	590	220	<1
MW-18 1L	5/30/2007	99	40	750	1600	7200	720	2000	690	290	60
MW-18 3L	5/30/2007	100	40	770	1500	7200	700	1900	660	290	61
Site 2											
MW-14 A	2/21/2007	<1	<1	44	3.7	230	47	72	24	34	23
MW-14 B	2/21/2007	<1	<1	49	4.6	250	68	99	42	33	24
MW-14 C	2/21/2007	<1	<1	77	9.9	320	80	120	48	43	26
MW-14 D*	2/21/2007	<1	<1	55	7.3	260	60	87	35	33	19
MW-14#	2/21/2007	<1	<1	14	1.7	25	20	24	12	8.6	<1
AVG		<1	<1	56	6	265	64	95	37	36	23
Resample											
MW-14 A	3/20/2007	<1	<1	88	23	470	61	87	34	34	<1
MW-14 B	3/20/2007	<1	<1	84	21	440	59	83	34	33	<1
MW-14 C*	3/20/2007	<1	<1	81	20	430	56	81	32	32	<1
MW-14 D	3/20/2007	<1	<1	82	19	450	57	79	31	31	<1
MW-14 E	3/20/2007	<1	<1	72	18	390	49	69	28	28	<1
MW-14 F	3/20/2007	<1	<1	67	17	380	46	64	26	26	<1
MW-14 G	3/20/2007	<1	<1	63	16	340	44	59	25	25	<1
MW-14#	3/20/2007	<1	<1	50	13	260	40	55	22	<1	<1
AVG		<1	<1	77	19	414	53	75	30	30	<1
MW-6 A*	2/21/2007	9.7	<1	10	<1	84	19	33	19	8.2	6.7
MW-6 B	2/21/2007	9.8	<1	9.2	<1	67	15	25	15	6.8	5.2
MW-6 C	2/21/2007	4.3	<1	4.3	<1	40	11	22	11	<1	<1
MW-6#	2/21/2007	4.2	<1	3.8	<1	11	5.5	6.8	1.3	<1	11
AVG		8	<1	8	<1	64	15	27	15	5	4
Site 3											
MW-30 A	3/15/2007	110	620	150	210	480	46	150	18	<1	<1
MW-30 B	3/15/2007	95	530	150	200	510	47	160	16	<1	<1
MW-30 C	3/15/2007	120	740	270	360	890	76	260	28	<1	<1
MW-30 D*	3/15/2007	140	790	210	270	640	62	210	16	<1	<1
MW-30 E	3/15/2007	480	3000	530	800	1800	160	510	73	<1	<1
MW-30#	3/15/2007	110	600	200	280	690	59	200	21	<1	<1
AVG		189	1136	262	368	864	78	258	30	<1	<1
MW-31 A	3/15/2007	210	92	56	30	130	44	120	27	35	<1
MW-31 B	3/15/2007	340	150	78	38	180	64	160	37	54	<1
MW-31 C	3/15/2007	270	110	70	32	160	60	150	36	50	<1
MW-31 D	3/15/2007	230	80	62	27	140	52	130	33	43	<1
MW-31 E*	3/15/2007	260	60	58	17	110	34	100	24	30	<1
MW-31#	3/15/2007	270	94	66	28	150	53	140	33	42	<1
AVG		262	98	65	29	144	51	132	31	42	<1

* - Indicates the vertical profile sample that correlates with the standard low flow sample

- Standard low flow sample

AVG – Arithmetic Average of Intervals/TMB – Trimethylbenzene / 2-Methyl – 2-Methylnaphthalene

A-G Denotes interval sample collected with 0.3 m sampler

^ - Standard low flow sample with pump intake varied

1L and 3L denotes low flow sample with purge rate varied

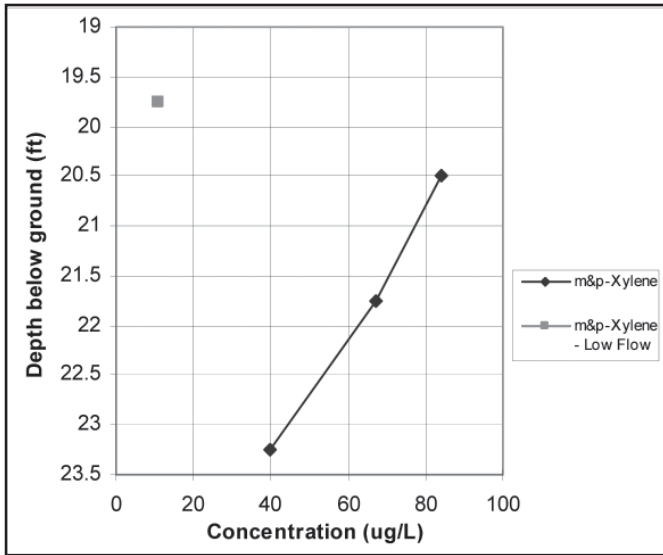


Figure 3: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-6 at Site 2.

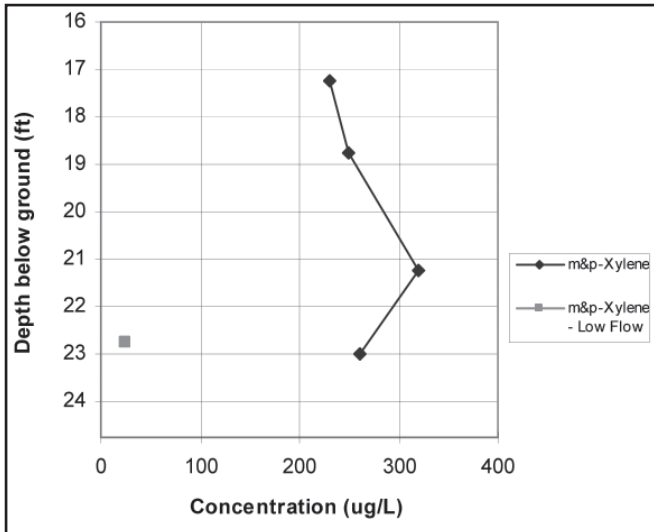


Figure 4: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-14 at Site 2.

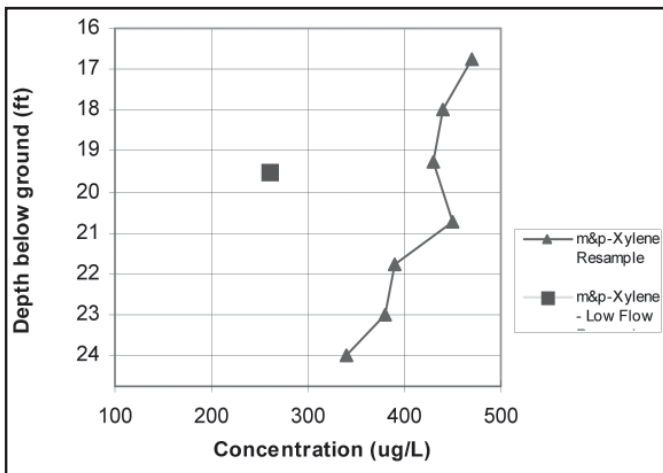


Figure 5: M&p-Xylene concentration (in micrograms per liter) profile versus depth in the resample of MW-14 at Site 2.

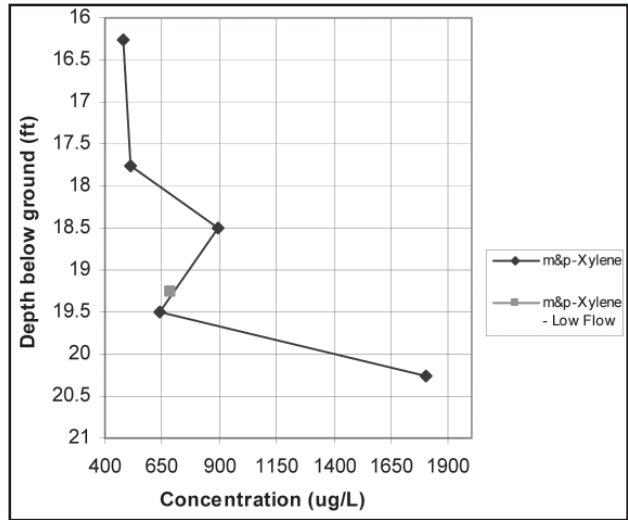


Figure 6: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-30I at Site 3.

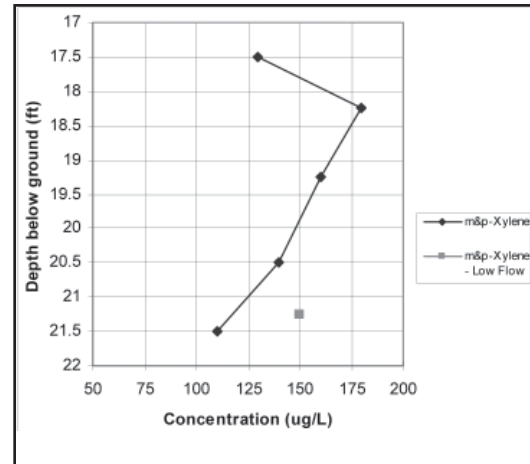


Figure 7: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-31I at Site 3.

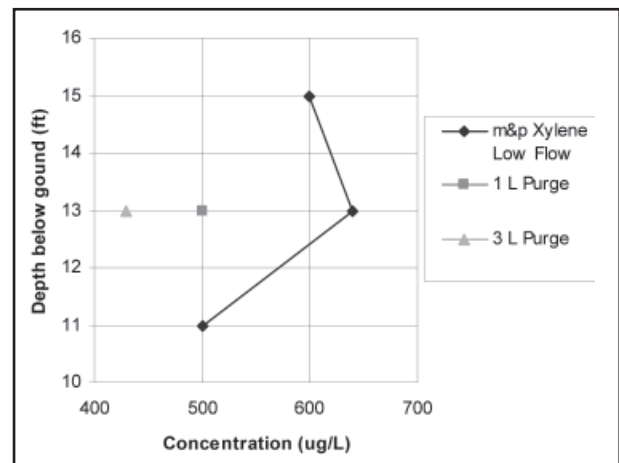


Figure 8: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-P8 at Site 1 using only low flow and increased purge rates.

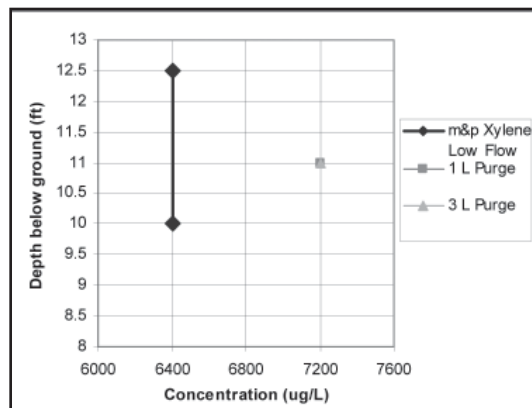


Figure 9: M&p-Xylene concentration (in micrograms per liter) profile versus depth in MW-18s at Site 1 using only low flow and increased purge rates.

Discussion

Based on the data presented in Table 2 and Figures 1-7, heterogeneity is evident in chemical transport of the groundwater contaminants [and likely the aquifer properties (hydraulic conductivity, tortuosity, organic carbon, etc.) as well]. The geology of Site 3, mapped as fine textured glacial till and with boring logs only depicting sand, appears to be fairly homogeneous. Thus, the porous medium was expected to be close to isotropic without stratigraphic layering in the deposition of glacial till. Even in these apparently “close” to homogeneous geologic materials (based on geologic logs), there appears to be much heterogeneity in the chemical distribution and transport as shown in Figures 6 and 7 and Table 2. The heterogeneities are likely caused by differences in hydraulic conductivity in the aquifer due to packing, some layering, and slightly different grain sizes (caused by slight variations in the glacio-fluvial depositional energy and different source origins). Contaminant migration in the subsurface is very heterogeneous from a multitude of different properties, which include differences in hydraulic conductivities, tortuosity, and stratigraphic layering. These heterogeneities appear to lead to varying concentration profiles in the aquifer (Figures 1-7), both vertically and horizontally, following potential preferential migration pathways such as funnel flow (Kung, 1990), and fingering (Selker et al., 1992). Making decisions about the amount (mass) and peak concentrations of contamination at many of these sites relies solely on the data collected; therefore, there is need for increased quality and representativeness of the data obtained, especially given the heterogeneous nature of chemical distribution and transport in groundwater found in this study. While Site 2 exhibited the least heterogeneity, the contaminants had been dissolved in the groundwater for more than 40 years.

In looking at the data from the resampling of Site 1 (Figures 8 and 9), using only low flow sampling for “profiling” and increasing the purge rates for sample collection to 1 L/min and 3 L/min, and the data from Site 2, it appears as if the low flow sample was mixed with well bore water. This is evidenced by the almost continuous chemical profile using low purge rates, but different concentrations with increased purge rates (lower concentrations with one well and higher with the other). This is further evidenced by the lower concentrations detected in the low flow sample compared to the 0.3 m sampler vertical profile data from Site 2 (Figures 3-5). The well bore water

would be subject to additional oxidation and volatilization of the contamination as the well, although typically sealed, is more open to the atmosphere than the aquifer.

In comparing the 0.3 m interval data (collected using the sampling device) to the low flow sample concentrations, the low flow “profile” concentrations, and the increased purge rate concentrations, the low flow sample concentrations appear to be representative of the aquifer interval adjacent to where the sample was collected at some sites and wells (Figure 1 and 6). The low flow sample concentrations also appear to be some combination of aquifer intervals adjacent to where the sample (low flow) was collected (Figure 2 and 7), possibly an even more discrete interval than the 0.3 m sampler (Figure 3, 4, and 5) could provide (i.e. less than 0.3 m), or some combination of a discrete interval mixed with well bore water. Low flow samples were not representative (composite or average) of the entire screened interval in any of the wells sampled. At Site 1, the low flow sample from MW-P8 (Figure 1) was almost identical to the adjacent interval and the low flow sample from MW-18s (Figure 2) was either a separate interval or an average of the last two intervals. For all wells at Site 2 (Figure 3 and 4), the low flow samples underestimated contaminant concentrations in the interval samples. To determine if this underestimation was caused by sampling error, MW-14 was resampled (Figure 5). Concentrations in the low flow samples after resampling were closer to the interval concentrations; however, the concentrations were still lower than in the interval samples. Concentrations in the low flow samples may have been lower than concentrations in the interval samples because the samples were taken from an even more discrete interval than 0.3 m or mixed with well bore water. Groundwater samples also may have come from an interval not shown in the 0.3 m interval samples (i.e., an interval missed when conducting the sampling). For Site 3, again, concentrations in the low flow samples were very close to concentrations in the adjacent interval (Figure 6) or very close to a combination of a few intervals (Figure 7).

To determine how much aquifer could be represented in a groundwater sampled collected using low flow (some Sites/samples appeared to be more discrete than the entire well screened interval), Darcy’s Law was applied assuming flow during the low flow purging was confined. The confined-like flow conditions could be a result of the low volume of water being removed during purging and sampling causing low aquifer stress. If the low aquifer stress is coupled with the anisotropies in the aquifer, the least resistance to flow (force balance) would be from mostly horizontal or adjacent intervals (refer to Equation 1 where the well response to pumping is a factor of both the horizontal and vertical hydraulic conductivities). If laminar flow is assumed during the pumping, there is the potential that only a very small interval is being sampled in the low flow method.

With the laminar flow assumption, the aquifer length producing the volumetric flow and the height of water in the well are independent of one another. Darcy’s Law was integrated to determine what length/thickness of aquifer might be sampled during low flow sampling.

For steady radial flow to a well, with the above assumptions and assuming confined-like flow in the aquifer, Darcy’s Law can be integrated and rearranged to estimate the aquifer/screen length required to produce the volumetric flow of water being purged (to estimate the thickness of aquifer being sampled):

$$Le = [Q * \ln (Rw/Ro)] / (K*2\pi*D) \tag{2}$$

where: Le – Effective length of aquifer

Q – volumetric flow rate

K – hydraulic conductivity

Rw – radius of sampled well

Ro – radius of influence (radius where head is equal to pre pumping head)

D – negative drawdown in well (Hw-Ho)

Various scenarios of hydraulic conductivities and radii of influences were analyzed with the specified flow rate of 250 ml/min in a 51 mm well to determine the effective length required to produce the flow rate at steady state. From the analysis, it can be observed that hydraulic conductivities greater than 0.00035 cm/sec (typically associated with fine sands/silts) under certain gradients can produce the flow rate from approximately 0.3 m of well screen (aquifer). From conductivities in the general range for medium to coarse sand (0.035 cm/sec) as little as 0.3 cm length of well screen can provide the flow when sampling with the low flow method. Table 3 summarizes the results of this analysis. This analysis suggests that a very small thickness or vertical length of aquifer could be represented during low flow sampling.

K (cm/s)	Aquifer Thickness Being Sampled (cm)								
0.000035	236.37	980.29	1644.50	4058.61	5349.75	6141.26	6713.66	7162.32	7531.34
0.000350	23.64	98.03	164.45	405.86	534.98	614.13	671.37	716.23	753.13
0.003500	2.36	9.80	16.44	40.59	53.50	61.41	67.14	71.62	75.31
0.035000	0.24	0.98	1.64	4.06	5.35	6.14	6.71	7.16	7.53
radius (cm) out of well 0.1 m drawdown is dissipated (gradient)	2.84	4.06	5.59	17.78	33.02	48.26	63.50	78.74	93.98

Table 3. Estimation of what thickness of aquifer (cm) is being sampled using typical Low Flow methods with various hydraulic conductivities and various gradients.

Limitations

In this research the water levels inside the sampling device, and in the well could not be measured when using the 0.3 m sampling device (equilibrium with the aquifer was determined by geochemical data only). By using the 51 mm ID wells commonly used for groundwater monitoring purposes and needing to isolate a discrete interval, space either inside or outside of the sampling device was limited to insert a water level indicator probe. By not measuring the water level, it cannot be determined if the water level had stabilized prior to groundwater sampling; however, there was no stagnant water inside the sampler pipe and the sampling interval was isolated with the rubber “packer”. Further, based on the aquifer conductivities and flow rates, it appears that stabilization of water levels (mass balance) was obtained. Another limitation was that the packer system created a seal that isolated water by the rubber conforming around the union pieces and well. From the design of the sampler, it was inherent that some water was surged (pushed) out of the well casing and/or screen and into the aquifer during insertion of the sampling device. From this small disturbance, there is some potential for mixing and increased turbidity from the “surge” of groundwater. Based on the chemical data, there either was not significant mixing or the water was purged and aquifer water was sampled. Further, based on both turbidity (decreased to below 40 NTUs in almost all wells) and geochemical parameters, representative samples were obtained. Finally, the geologic logging of each individual

borehole was not done by the authors so the accuracy of the logs and interpreted site geology was not determined.

Conclusions

This study shows that contaminant migration in aquifers at three sites was very heterogeneous, even inside a commonly accepted 1.5 m long well screen. Much of the methods, site characterizations, and risk assessments used today assume that the contamination profiles are constant and uniform in the aquifers as they are delineated with 1.5 m or larger well screens. In the utilization of the low flow sampling procedures in permeable aquifers, the flow appears to be mainly horizontal once steady state has been achieved (with respect to groundwater drawdown) and the sample being collected is from a much more discrete interval than the length of the well screen and to some degree, mixed with well bore water. How discrete the interval being sampled is will be dependent on well hydraulics, well construction, and the aquifer geology/hydrology. The low flow sampling procedures cannot be used to generate an accurate aquifer profile in a well casing as there will be mixing with well bore water to some degree. This well bore mixing will not allow one to obtain a vertical profile of the chemical concentrations inside a well screen using low flow

sampling alone. Further, with the flow rate used, the low flow sampling procedure has great potential for the largest concentrations of contaminants in the groundwater to be missed when sampling. Missing the contaminant masses/concentrations may yield poor decisions about risks of the contamination to human health and the environment. These problems of well bore mixing will likely be compounded with wells screened further beneath the aquifer surface.

As with all methods employed while working with the environment (especially the subsurface), the low flow sampling method has pros and cons. Caution should be used when employing the method as the method may not provide the most representative samples of the aquifer adjacent to the well screen interval. Each well and site should be considered unique and the sampling methods employed should be designed for each site and well. Further, as suggested by Vroblesky et al. (2007) and supported with this research, a packer device should be used when employing the low flow sampling methods in conventional monitoring wells constructed so that the screen is below the surface of the aquifer. The packer device would eliminate well bore mixing and false stabilization as the well bore water would be prevented from mixing with groundwater desired to be sampled.

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Industry is Not the Enemy

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Recently, GSA Headquarters staff and officers have received what seems to be an increasing number of complaints from our members regarding our associations with industry, particularly the resources industry. I don't want to paint with too broad a brush, but the gist of some of these remarks seems to be that these industries are inherently evil and that GSA should have nothing to do with them. The opinion seems to be that, by associating themselves with GSA, these "dirty" companies are attempting to "greenwash" themselves. Recently, this was discussed within the Executive Committee, and we are in agreement that these complaints represent a disturbing trend that threatens both the Society and, indeed, our entire profession. Thus, it falls to me, as your president, to explain why and to ask that you make yourselves more aware of how industry operates and how our association with industry has been and should continue to be beneficial to us, to industry, and, ultimately, to society.

In some ways, I'm finding it hard to devolve some of the issues, because in a very real way, industry is part of us, regardless of sponsorships, advertisements, and booths in the exhibit hall at the annual meeting. It's a little like saying that I'm going to analyze the functioning of an arm independent of the health of the rest of the body. But here are some observations:

1. Many GSA members work for companies, both private and public. You know a lot of them. Ask them sometime about how they like their jobs, how they feel about working for industry. You might be surprised at the answer. A friend of mine, an engineer and project manager, works for one of the largest oil companies. She is proud of the company and its approach to business around the world, the way it respects the world's many cultures, offering both goods and financial assistance in natural disasters, supporting education, and being circumspect in looking for and delivering on ways
 2. Most of the largest companies, which seem to be the objects of much of the ire, are public companies. The petroleum industry is currently running an advertisement that many of us might not like, but which is accurate: very large portions of these companies are owned by members of the public, including GSA members. Those of us with retirement savings in diversified stock funds own parts of these companies and have benefited from their profits. Indeed, in the current financial crisis, the resource industries are keeping our funds from sliding even further—we will be that much less dependent on our fellow taxpayers for our well-being in retirement, so that scarce tax resources can be used to help those who are truly in need.
 3. A large proportion of our students end up working in industry. The just-released report by the American Geophysical Institute (AGI) on geosciences employment sectors indicates that 21% of recent M.S. degree recipients and 3% of recent Ph.D. recipients work in the petroleum industry, and the demand for such workers is only going to increase over the next 25 years (AGI, 2009). If we wanted to have good graduate programs, but somehow could take only students who were committed to working just in academia or government, not only would we be
 4. The sponsorship agreements that GSA signs with companies are of great benefit to the Society. Yes, these companies get their names on things, but the benefit accrues mostly to the science and allows GSA to offer services at a lower cost to its members.
 5. Our civilization is based on the use of natural resources and will continue to be dependent on them for a very long time. Our responsibility is to make sure that we continue to develop means of extraction that are less environmentally damaging and means of remediation that are more effective. We are the best-qualified people to do this, and our students are the best ones to carry these methods into the companies that do the work. The demand for resources will not go away, and the companies will not stop meeting that demand
- limiting our students' options, we would be limiting our own programs. Moreover, when our students do go into industry, they don't undergo personality changes to become evil, and we don't shun them, either. Every company, including the big ones, is the sum of its employees. There is no independent entity apart from the people in the company. Indeed, if we have taught our students well—that is, if we have taught them to be honorable and ethical—the fact that they go into industry should be heartening in two ways: (a) we've sent honorable and ethical employees to that company, and (b) the company has hired honorable and ethical people who have perhaps the best chance of heading off potential corporate misdeeds because they can work from within. Sure, those students might hold low-level positions at first, but they will work their way up. Meanwhile, they are making good salaries—the best in the geosciences—and saving for their own retirements, all of which benefit the national economy now and in the future.

just because some parts of the process offend our sensibilities. It is our responsibility to make sure that the demand is met as safely and responsibly as possible.

Do all the employees of companies behave honorably and ethically? No, and we have seen the scandals. But I want to make a few additional observations. First, we only hear about scandals in big companies for the very reason that if it happens within a big company, it's news—everything, including the amount of money involved, is scaled up. But small companies are just as susceptible—arguably more so because of the lower level of scrutiny—to corporate misdeeds. There is nothing inherently bad about big companies. They're just big. Second, we hear about these things, and the miscreants are caught and punished. If ever there were a glass-half-full situation, it's this. Third, our students who are now employees don't like it any more than we do; when they reach positions of power within their companies, they can influence the corporate decision making. Fourth, those who hold mutual funds in stocks benefit from the success of large companies. We can hold the feet of our fund managers to the fire to do their due diligence in ensuring that corporate management is honorable and ethical. Our collective power as stockholders is enormous. Just ask those companies who have run afoul of Calpers (managers of the enormous California public retirement system) or CREF (College Retirement Equities Fund, in which many professors have their 403[b]s)! Finally, no institution is immune. Universities have had scandals. Even GSA had its own corporate scandal a few years ago, and only in the last couple of years can we say we've fully recovered and set into place the structure that will prevent such an occurrence again. Does that mean universities and GSA are evil? No, of course not.

Like most of you, I'm not particularly happy with CEO compensation and the wage gap, but, again, our power as stockholders and our students' power as employees can change things—these are already matters of intense debate in the business world, and we are beginning to see some deliberate changes. In the meantime, dissociating ourselves from industry would be like throwing the baby out with the bathwater. The energy some of our members put into excoriating the association with our colleagues in industry is misplaced and should be directed

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toward making sure that the managers of companies honor their obligation to behave well.

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Practical Business Considerations in the Implementation of New Jersey's New Licensed Site Remediation Professional Law

An Interview with Daniele Cervino, Esq., Senior Vice President and General Counsel and Robert P. Blauvelt, CPG-06508, PG, CHMM, Senior Vice President EWMA – Parsippany, New Jersey.

New Jersey has recently joined the growing list of states that are seeking to streamline the regulatory approval process associated with the cleanup of sites where releases of oil or hazardous materials have occurred. With a reputation as one of the most environmentally protective places to do business, AIPG recently discussed how this bold new regulatory program will affect business and environmental consultants with two long-time New Jersey based environmental practitioners: Daniele Cervino, an Environmental Attorney, and Bob Blauvelt (CPG-06508) a Senior Vice President of the environmental consulting and remediation firm EWMA.

AIPG: Can you briefly describe what this program is all about and why it is being implemented?

Blauvelt: Over the past 20 years or more, New Jersey has developed a system of complex, interconnected, and highly prescriptive environmental rules, regulations and policies. Unfortunately, the State Legislature has often lacked the political will or financial discipline to provide the New Jersey Department of Environmental Protection (NJDEP) all the resources it has needed to fully manage and efficiently implement what has become one of the more ambitious and all-encompassing environmental programs in the United States. As a result, with over 20,000 cases backlogged and more being added every year, with many case managers reduced to a four-day work week, and response/approval times

stretching up to several years, the Site Remediation Program (the group within the Department bearing the brunt of the work load) was under great stress. It had reached a point, amplified by the current economic meltdown, where major redevelopment and community improvement activities were often delayed to the point of non-viability.

Enter the Site Remediation Reform Act (SRRA), which was signed into law on May 7, 2009. The centerpiece of this act is the establishment of the Licensed Site Remediation Professional (LSRP) program. Once fully in place, the LSRP will be able to issue a certification, on behalf of the State of New Jersey and upon which a responsible party (RP) and others can rely, that determines a cleanup of a release of oil or other hazardous substances is complete. This certification, called a Remedial Action Outcome or RAO, essentially replaces the once highly sought after No Further Action (NFA) letter formerly issued by NJDEP. The SRRA specifically states that an LSRP's RAO has the same validity as a Department approval.

AIPG: How does the LSRP program compare to similar initiatives in other states?

Blauvelt: Connecticut, Ohio, and Massachusetts have similar programs where licensed professionals have the authority to act on behalf of the state regulatory agency to direct and eventually approve a site remedial effort. In these states, as in New Jersey, the licensed professionals have no policy-making authority and are directed through the process by state established guidelines. Ohio's Voluntary Action Program is tailored more towards large scale redevelopment and remediation projects.

Connecticut's Licensed Environmental Professional (LEP) program has had difficulty in gaining traction with the regulated community because of the unwillingness of that State's regulatory bureaucracy to fully embrace it, hence LEP's advice is very conservative and client conflicts typically result.

The Massachusetts Contingency Plan (MCP) Licensed Site Professional (LSP) program has turned out to be very successful, despite periodic challenges by intervenor groups, and is the one New Jersey has most closely modeled its own program. But one of the keys to Massachusetts success is the greater flexibility afforded under the MCP in reaching performance (i.e., risk) based standards. NJDEP has long shunned site specific risk based closures and relied instead on very rigidly enforced, one-size fits-all cleanup standards. How much flexibility the LSRP will have to rely on their own assessment of what level of risk a site may pose remains to be seen and will be one of the key measures of the success or failure of New Jersey's regulatory reform effort.

AIPG: How complicated is the application process and does being a CPG help?

Blauvelt: To get the program started, NJDEP will issue temporary licenses to those individuals who meet certain minimum requirements. These include a Bachelor's degree in physical sciences or engineering, eight years of full-time remedial experience (including at least 5,000 hours in New Jersey over the preceding five years), attendance at a mandatory NJDEP site remediation basics course within the past three years, and Hazwoper training pursuant to 29 CFR 1910.120. NJDEP recently posted a draft

application (<http://www.nj.gov/dep/srp/srra/lrsp/application.htm>) that provides more details regarding these and other temporary license requirements. Within three years (by May 7, 2012) NJDEP is to have the permanent license program in place. The permanent licensure program will include a test, which NJDEP plans to have developed by a professional testing organization.

An interesting note regarding the temporary program is that individuals that do not have a Bachelor's degree can apply for and obtain a LSRP Underground Storage Tank (UST) only temporary license. This license will allow those individuals, which must have more years of experience in lieu of the Bachelor's degree, to oversee remedial work on releases associated with regulated and unregulated underground storage tanks. When the permanent licensee program is rolled out, the LSRP-UST only temporary licensees will have one chance to pass the test. If they do not, then they must meet the full educational and experience requirements for an unrestricted LSRP license. There are no provisions within the license program for grandfathering of professional engineers or other licensed professionals, including CPGs.

AIPG: Won't LSRPs be under tremendous pressure from their clients to issue RAOs as quickly and cheaply as possible?

Blauvelt: It is clear that once fully implemented the SRRA will significantly alter the consultant-client dynamic. But, as described below, the LSRP's primary obligation is no longer to protect the client or the client's business interests. The real question that needs to be asked (and which doesn't have an obvious answer) is how will the LSRP balance the demands of a client to move the remedial effort forward cost-effectively while still maintaining his or her legal and moral license obligations? If the LSRP implements a remedial approach that is too conservative (i.e., costly), the client will either not be able to fund the project or will go shopping for another LSRP. This has been proven to be the case in Connecticut. If the remedial approach deviates too far from established or generally accepted guidelines, the LSRP runs the risk of disciplinary action as a result of a NJDEP audit or complaint from a third party. This will be a significant issue, especially in the early years of the program, as economic pressure from the marketplace and regulatory

demands from NJDEP seek equilibrium. Under the program all temporary LSRPs will have one case audited.

AIPG: What do potential clients need to know before retaining a LSRP?

Blauvelt: The SRRA is clear about the LSRP's obligations: "A LSRP's highest priority in the performance of professional services shall be the protection of public health and safety and the environment." This unequivocally requires that the public's health and safety be held paramount, not the client's business interests. The LSRP will, in effect, be acting as an agent of NJDEP and must ensure that all remedial actions taken at a site are in compliance with existing regulations and are fully protective of the State's inhabitants and the air, water, and soil they may come into contact with. While there may be some flexibility in what guidelines can be used by a LSRP in making a "fully protective" determination, in general most licensed professionals will default to those already in use by the Department such as the Tech Regs, the soil cleanup standards and the ground and surface water quality standards.

In addition, LSRPs have a statutory obligation to report any evidence of a release. This could be problematic for clients that are conducting pre-sale environmental due diligence. Such release reporting may adversely affect the nature of the transaction, especially when the work is being done for a potential buyer. LSRPs also will be required to file with NJDEP (who will post them on a yet-to-be developed website) all materials relied on in developing a RAO. This level of disclosure could compromise important business priorities or relationships (e.g., insurance claims) not related directly to site remedial activities.

Many of our clients are considering contractually requiring that a LSRP not be involved in their project unless specifically requested. In some cases, clients may wish to retain a non-LSRP to perform the remediation, and involve a LSRP from another firm only in an oversight capacity; although the cost implications of this type of arrangement could be significant.

AIPG: How will the LSRP program affect the business community in New Jersey and the geologists,

engineers, and scientists who work there?

Blauvelt: Clearly, the SRRA and the LSRP program will be good for New Jersey businesses and neighborhoods. Site cleanups will be done much faster and property returned more quickly to productive use without compromising public health or environmental quality. Property owners from the unused corner gas station to the rusting chemical plant will now be able to plan for and implement a cleanup schedule that is much more consistent with their redevelopment needs. Communities can look forward to having unsightly and sometimes dangerous eyesores replaced with land uses more in tune with their local character. While there will be some settling in difficulties, I think the LSRP, in connection with an improving national economy, will help revitalize New Jersey's urban areas. However, clients who want to slow the process down and wait for years to implement remedial activities will now be forced to move their mothballed sites along.

AIPG: How will existing cases be handled and when must a case be under LSRP oversight?

Cervino: Section 30 of SRRA dictates that any party conducting a remediation initiated 180 days after enactment must use an LSRP. Any remediation initiated prior to enactment has three years before obligated to use an LSRP. Of course NJDEP can assert direct oversight over a case at any time.

AIPG: In what instances will NJDEP assert direct oversight on a case?

Cervino: NJDEP must assert direct oversight in the following instances: (a) if a Responsible Party (RP) is issued two enforcement documents during any five year period after enactment; (b) if a RP misses any mandatory Administrative Consent Order or Court Order deadline; or (c) if the site has been in the system for 10 years prior to enactment and a complete Remedial Investigation (RI) for the entire site is not completed in five years.

There are other cases in the law where NJDEP may assert oversight. They include chromate sites such as those in Jersey City, and sites where sediments are contaminated with PCBs, dioxin, mercury or arsenic such as Berry's Creek or the Passaic River.

Under direct oversight, NJDEP selects the remedy, establishes the amount of a trust fund and approves disbursements from the fund.

AIPG: What cases are not appropriate for LSRP oversight?

Cervino: Certain cases where NJDEP shall or may assert oversight are discussed above. Also in cases of pre-acquisition due diligence because of the LSRP's duty to report certain discoveries of contamination as my colleague outlined.

AIPG: How does this law affect the ISRA process?

Cervino: A party will no longer be required to obtain a Remediation Agreement to close a transaction prior to full ISRA compliance. The LSRP will be able to issue a Remediation Certificate pursuant to Section 34 of the SRRA and will also be able to establish the amount of the remediation funding source and approve any draw downs. This process will certainly speed transactions. Pursuant to Section 43, letters of credit are once again an allowable form of remediation funding source.

AIPG: When will implementing rules be available?

Cervino: NJDEP is expected to publish interim rules in six months. They will not be subject to public comment and will be effective for 18 months. They will expire May 7, 2011. Proposed rules are expected within 12 months and adopted by May 7, 2011.

For now the Technical Requirements for Site Remediation will serve as the minimum standards. NJDEP has issued very little guidance on its website, but has undertaken a significant outreach program to all sectors of the regulated community. NJDEP will not establish a database of variances granted.

AIPG: What effect does the Executive Order #140 signed by Governor Corzine have on the program?

Cervino: To address the concerns of the environmental organizations, Governor Corzine issued an Executive Order the day of his signing of the law. It includes auditing cases with sensitive populations, requires preparation of guidance documents for NJDEP direct oversight cases, requires the auditing of at least

one submittal by each LSRP during the temporary licenses process, requires preparation of an annual report, mandates the issuance of technical assistance grants, and requires electronic posting of submittals where technically feasible.

AIPG: Can a RAO be rescinded and, if so, under what circumstances?

Cervino: Yes, a remedy approved by an LSRP can be invalidated if it is not protective of human health, safety and the environment (Section 22). A RAO can be audited and reopened for three years.

The RAO can be audited after three years pursuant to Section 25 of the SRRA if undiscovered contamination is found on a site; the Board conducts an investigation of the LSRP, or the LSRP has his or her license suspended or revoked by the Board.

AIPG: I understand the new law contains a significant number of additional new regulatory requirements. What are they?

Cervino: NJDEP is required, pursuant to Section 47 of the SRRA, to establish presumptive remedies for sites to be developed for residential, certain educational uses and child care facilities in one year. The law contains prohibitions on these types of developments on landfills. Guidance is expected to be posted by NJDEP in three months. There is a trend towards remediation of these sites to unrestricted use.

A new permitting program is mandated in Section 19 for the operation and maintenance of such permanent remedies such as engineering and institutional controls including deed notices and classification exception areas. These permits may require the posting of financial assurances for O&M costs and will be in the form of general permit and Permits by Rule.

The Statute of Limitations (SOL) for certain natural resource damage claims have been significantly extended. The new SOL will be three years after the completion of the remedial action for all media at the entire site.

Section 28 of the law also establishes stipulated mandatory timeframes for the performance of investigation and remedial activities and submittal of reports, including receptor evaluations, Preliminary Assessments, Site

Investigations, Remedial Investigations, Remedial Actions, and the establishment of interim remedial measures for immediate environmental concerns.

AIPG: How do you see insurers and lenders reacting to the new program?

Cervino: The affirmative obligation to remediate will serve as the government requirement hurdle to obtaining insurance coverage under old general liability policies and new environmental insurance products. Historically, insureds need to enter into a Memorandum of Agreement or obtain a written directive to show carriers an obligation to remediate. Section 30 of the new law contains an affirmative obligation to remediate a discharge of a hazardous substance.

Time will tell as to whether lenders will accept RAOs. Section 31 of the law does grant sites a Covenant Not to Sue, the crucial part of a No Further Action letter, by operation of law. NJDEP has advised it is having difficulty involving lenders in the stakeholder process. They seem to have accepted the inability to obtain ISRA Letters of Non-Applicability so it will be a matter of educating the lenders on the process.

AIPG: Will this program affect the cost or availability of professional insurance?

Cervino: Many parties are concerned that errors and omissions premiums will increase due to the increased liability of LSRPs. Carriers underwrite the volume and type of work consultants perform in calculating premiums. Eventually the premiums may increase. LSRPs may also have to obtain their own errors and omissions insurance above and beyond what the company provides. An individual \$1 million professional liability policy premium could run \$3,000 to \$5,000 per year.

AIPG: Will the SSRA achieve its goals of streamlining site cleanups while continuing to protect public health and the environment?

Cervino: The long term consequences of the SRRA cannot be predicted with certainty, but the short-term implications are undoubtedly positive. The amount of positive interest we've seen from clients, the overwhelming energy

Continued on page 60.

Arizona Section

Arizona Board of Technical Registration (AzBTR)-Erick Weiland, RG/CPG-06892 has recently been appointed by the Governor of Arizona to fill the AzBTR seat occupied by Dawn Garcia (RG/CPG-08313) for a two year appointment (ends June 2011). Dawn has served the geologists and public of Arizona since 2005. Thank you Dawn for your efforts and time in support of this very important activity and the geologists of Arizona. As the geologist on the AzBTR, Erick will also represent Arizona on the Association of State Boards of Geologists (ASBOG) in the development and administration of the Geology test for registration. You may know that Arizona was a key State in the initial development of the ASBOG test and getting ASBOG off the ground. ASBOG now administers the national test in 29 States. However, many of you may, or may not, know that AIPG played a critical role in the development of the early tests (mid-80s) and many of our members have been major contributors to ASBOG over these past years. Ralph Weeks (RG/ MEM-1559), Frank Turek (RG), Bill Greenslade (RG/CPG-02505), and Dawn Garcia (CPG/RG) have all represented Arizona on AzBTR and ASBOG in the past. AIPG members have played an important and distinguished role to our profession for many years. Congratulations to Erick on his appointment to the AzBTR.

Georgia Section

Student Tools-AIPG at the National level and in our Section offers many resources to our student members, which most probably don't know about. Students are able to place their resume on AIPGs' web site for free. That way you get maximum exposure across the country. Also on AIPGs' web site is an online publication on "Reflections on a Geological Career" that walks you through a resume to landing your first job. It also covers employment in different areas of geology.

At our Section level we have offered demonstrations of air rotary, hollow stem auger drilling, and geoprobe drilling. We even put a notebook together for the students on proper soil description techniques and typical forms used in the field. For the students with a basic hydrogeology class we have offer Fate and Transport Groundwater Modeling that is used by consultants in the

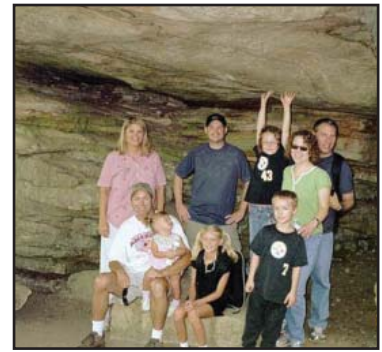
Underground Storage Tank Program. Two or three times a year we try to visit active remediation sites in order to discuss the problem at the site (soil and groundwater conditions) including potential sensitive receptors and the solution picked to actively clean up the contaminants. We've had other interesting visits to landfills, geotechnical laboratories, and geophysical demonstrations. These are all opportunities we have offered to students in order to give them an idea of what job are available in geology and to see the type of work they may be doing some day. Also you can show you are active in a professional organization on your resume and this may be the difference on who gets the job.

In the minutes of the last PG Board meeting there was discussion in letting students take Part 1 before graduation. I emailed the state geologist, Jim Kennedy, and he said they received applicants that were seniors majoring in geology and each had taken and passed the required number of hours specified in the rules. As such, the board felt that they met the qualifications to take Part 1 of the exam. Also in the minutes was the possibility of ASBOG administrating the PG tests some time in the future. Besides having the tests in Macon there may be satellite locations, which will help students in travel. There has been no decision or details yet.

Last Meeting-On Saturday July 25, 2009 a small group went to Cloudland Canyon State Park. The weather was hot but we were able to get one of the shelters for lunch and during the hike we were in the shade most of the time. We did spend some time discussing the general geology of the Valley and Ridge of Georgia. This is the third year in a row where we have had a family outing with our members. We hope to continue these but it would be more fun if we had more participation.



Cloudland Canyon waterfall. Photo by Kelly Adams.



Group picture at Cloudland Canyon.

Illinois-Indiana Section

Geology Intern Bill Passes-The geologist intern bill (House Bill (HB) 888) was signed by Governor Quinn on August 25, 2009 and is now Public Act 96-666. The Geologist Intern amendment to the Geologist Licensing Act met key milestones: it passed the House on March 27, 2009 (the vote was 105-1-0), then the Senate with two amendments on March 19, 2009 (the vote was 58-0-0), and the two Senate amendments were passed by the House on March 28, 2009 (the vote was 116-0-0). More information can be found at this link: <http://www.ilga.gov/legislation/publicacts/fulltext.asp?Name=096-0666&GA=096>.

The purpose of the Geology Intern bill (HB 880) is to modify professional geologist legislation to allow candidates for licensure to take the Fundamentals of Geology (FG) portion of the examination right after graduation or in the final semester immediately before graduation. New candidates for licensure will not have to wait four years after graduation in order to take the ASBOG Fundamentals of Geology examination. The Board of Licensing is expected to address rule making under the Act at their November 2009 meeting.

Illinois schools may utilize the FG examination, if they so choose, as an exit exam as is done in Mississippi and Kentucky. Currently, there is no system of accreditation for geology departments, but the exit exam method allows them to self-evaluate their programs by seeing how their students perform on the several domains, or broad topics, within the FG examination. The students are required to take the exam to obtain their degree, but they do not have to pass the exam. If they do pass the exam, they are one step closer to being licensed.

South Dakota Section

The AIPG South Dakota Section 2009 summer field trip occurred on August 22nd, 2009. The trip focused on the hydrogeology of the east-central Black Hills, and we enjoyed a beautiful day while learning about the geology of the area and hiking through a stream-flow loss area along Boxelder Creek. Topics addressed on the trip included historical flood information, septic tank issues, local geologic formations, major unconformities, an EDB plume near the town of Nemo, springs and loss zones in karst terrain, dye tracing information, observation well and stream gauge data, and municipal water well information.



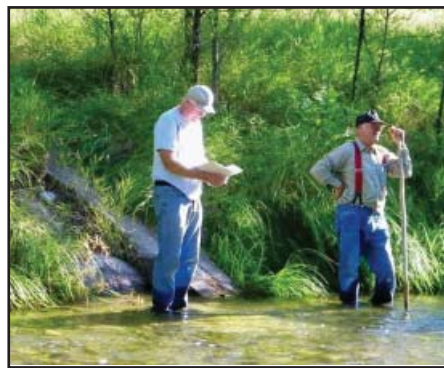
Larry Putnam, U.S. Geological Survey, discusses stream flow information with field trip participants at a weir along Rapid Creek.



Dr. Perry Rahn discusses the "great unconformity" at an excellent exposure northwest of Rapid City, SD. Flat-lying strata of the Cambrian Deadwood Fm. overlie nearly vertical Precambrian metasediments.



Field trip participants hike through a dynamic reach of Boxelder Creek where streamflow loss zones and springs occur within karst limestone of the Pahasapa (Madison) Limestone.



Larry Putnam (left) and Perry Rahn (right) discuss historical streamflow information for Rapid Creek with field trip participants.

Northeast Section

Satisfaction of Career-Kurt Stokes, CPG-07934, President, Northeast Section AIPG. While attending our successful Northeast Section Spring meeting in New York City on May, I was speaking with a colleague about balancing work demands with multiple life demands outside of work and how that could be a struggle. He mentioned to me how a younger staff geologist wanted to attend our Spring meeting but couldn't because he had five reports to "get out the door" and hence was stuck in the office. My colleague joked that he was this staff geologist's supervisor, and had advised him it was OK to attend, but the staff geologist felt committed to issuing the reports to the clients. It made me recall similar times earlier in my career where I passed on attending professional functions to meet work demands.

I then got to thinking about my career overall, twenty five years in the making,

and how my priorities have changed over time. Early in my career learning as much as I could technically was a key priority to me. And yes there was so much to learn in this new and exciting hydrogeology field. Also proving my value to the company and to clients was important, as was moving up the career ladder and taking on more management responsibilities, in addition to technical responsibilities. As I mentioned, I recall at this time passing on a few AIPG NE Section meetings, and other professional functions, while "hard at work". I realized that in the past I was just like that young staff geologist I described, who passed on the Spring meeting, due to work commitments. I struggled like he did, and perhaps like you have, with meeting work, professional, and life's demands. Other life milestones came about, marriage, children, acquiring a PG from the State of Maine, career promotions, headaches, and the list goes on. I think we have all been there.

But then maybe twenty years into my career, and at a more mature stage in my life (or so I think), my priorities with regard to my career and my profession started to shift. There were some triggers to the shift, for example, and I'll describe them anecdotally. One was my attendance at a Long Island Association of Professional Geologists meeting perhaps eight years ago. While there I realized there was a whole new younger generation of geologists coming up the ranks. I was one of the "old men" in the room (full of great experience of course). Another was a prodding to become more active in the NE Section of AIPG from Bob Blauvelt, CPG-06508, whom at the time I worked with, and Dennis McGrath, CPG-08578, whom I conversed with at Section meetings. In 2004 I watched from afar as the NE Section planned the National meeting in Saratoga Springs, NY, and I'll admit at that time it gnawed at me. But then I made the commitment to attend that meeting no matter what other work or life demands there were. Boy was I glad I did. It was a great meeting. I met other members of the Section, inclusive of the current Section President at the time, Dan St. Germain, CPG-07858, who challenged me to get more involved.

I then realized there was more to this profession than being a technical wiz, or reaching the career milestone of "Principal". I realized it was time to give something back to the profession: to volunteer time and effort; to seek out and

socialize with professional colleagues; recent graduates; newly employed geologists; professors; regulators and other people.

I also realized one should think about a balance to one's career, to mix in outside commitments such as coaching youth sports for example, or being active in your community, giving a talk on geology at your local elementary school, or similar altruistic functions.

It's about being a well rounded person who just so happens to be a geologist too. Maybe my lessons learned can open the eyes of the younger geologist to a more rounded career and life. Perhaps my experienced veteran geologist colleagues can take a moment to smell the roses and give back to the profession, to life, your community and your family. Kudos if you already have done so.

I recall Russ Slayback, CPG-02305, speaking to a similar theme years, if not decades, ago. Russ, I maybe didn't listen that well then, but somehow your message did sink in, and hopefully I am living it. I ask the seasoned geologist and the new graduate to take a moment to listen too. Because in my opinion the best geologist is a well rounded one. A geologist who also makes it a priority to see the big picture of our profession. It's when we collectively have each other's back as professionals, with an eye towards our community and the younger generation, we will all succeed as human beings. Isn't that what really matters anyway?

NEAIPG Spring Meeting was A Geologic Walking Tour Of Central Park, New York City, led Dr. Charles Merguerian, Hofstra University, Wednesday, May 20, 2009. What a time we had....To cool our heels a bit after the subway ride and walk from the Excom meeting at URS to Central Park, our ever thoughtful President, Kurt Stokes, arranged for a quartet to serenade us while we waited for the good Dr. Charles Merguerian to arrive! Kurt also arranged for probably one of the finest sunny Spring days of the year. Kudos Kurt! A significant crowd of over 40 eager participants soon gathered in short order, Dr. Merguerian arrived, with brand new field guidebooks to pass around to everyone entitled "Duke Geological Laboratory, AIPG—Trips on the Rocks, Geology of Southern Central Park, New York"! The talking, and walking through the park soon commenced. Dorothy Richter was soon wrapped up in the geology of Central Park. The talk focused on the metamorphic bedrock of

the Taconic Sequence and on the glacially eroded features on the bedrock surface. Glacial striae were readily visible in many of the outcrops. Now, this group of 40+ originally thought they were lining up for a two-for-one Nathan's Famous deal, but soon found out that the "hot" topic was more about some cooked rocks, specifically the middle unit of the Manhattan Schist (Waramaug or Hoosac Formation equivalent) which is beneath the Cameron's Line overthrust and the Hartland Formation (which composes the upper, overthrust sheet). Dr. Merguerian discussed how the Manhattan schist is actually composed of various schist units previously lumped together as one. And who's the guy looking down and reading emails? Dr. Merguerian was soon down on an outcrop dutifully demonstrating the complex multiple folding events that have left their mark on the park. It must have been a bit strange for some of the Park regulars to see a group of seemingly normal folk unusually interested in the ground beneath their feet, but then again, this is New York City and maybe they didn't notice at all. City skyscrapers tower above a fault zone in the park, while intensely folded basement rock prompted conversation as to its origin.

The intensely sunny and beautiful day, coupled with the stimulating conversation soon resulted in intense thirsts and hunger pangs. The group headed for a brisk walk to the West Side to refuel (lead by our surprisingly fit President Stokes). The destination was Carmines, where excellent family style Italian dishes were served along with plenty of vino to wash it all down! The dishes did not last long on the tables.



Can our eagle-eye readers spot our illustrious Secretary—Tom West?

Wisconsin Section

The Wisconsin Section held its Annual Geology Field Trip on May 30 and 31, 2009, in beautiful Door County, Wisconsin. We were graced with per-

fect early summer weather. Dr. Jack Travis, Professor Emeritus from the University of Wisconsin-Whitewater, lead the trip. Jack retired to the Door County peninsula and spent a lot of his time investigating the area's geology and scenic beauty.

The field trip headquarters was the Stone Harbor Resort in Sturgeon Bay. Starting bright and early on Saturday morning, the group headed up the east side of the peninsula along Lake Michigan. The first stop was at the site of a former shoreline bank collapse along Frog Town Road, an example of storm wave erosion along the Michigan shoreline. Naturally occurring water level changes in Lake Michigan, which occur on an approximate 10-year cycle, resulted in dramatic undercutting and erosion of the banks in this area. The next stop was at the Ridges Sanctuary, viewing Pleistocene beach levels. On a botanical note, the group viewed areas of dwarf lake iris, a miniature iris that grows only in the Great Lakes Region, and in Wisconsin only in Door County. It occurs near to shorelines on sand or in thin soil over limestone rich gravel or bedrock. The group then visited Sister Bay, where there were two stops pointing out the perils of development on springs, and how important it is to have a good wetland delineation prior to development of an area. The next stop was at Newport State Park, where the group searched for coral fossils in the dolomite outcrops along the shoreline near the Lynd Point Trail. The group paused at the park for a box lunch, and lunchtime entertainment was provided by the local wildlife as we watched a porcupine amble through the picnic area – until he noticed our group and took off for the woods.

After lunch, we viewed a dramatic example of zebra mussel infestation. The mussels transformed a former sand and pebble beach at a county park into a beach thick with zebra mussel shells. Outcrops along the shoreline showed the development of solution cavities in the dolomite. The next stop was at Ellison Bay Bluff County Park for a view of the geologic column along the bay side of the peninsula and a view of the impressive Niagara Escarpment. After enjoying the dramatic views of Green Bay from the top of the bluff, the group headed down to view several sites along Mossy Cliff Trail. These stops highlighted the perils of building in karst topography, with large impressive homes built along the edge of the bluff. When viewed from the

bottom of the bluff, it was evident that the homes rested on bedrock riddled with solution cavities and caves.

Dinner at the Stone Harbor Resort overlooked Sturgeon Bay, and the group was entertained by a lively and informative presentation on caves in Wisconsin by a local geologist and caving expert.

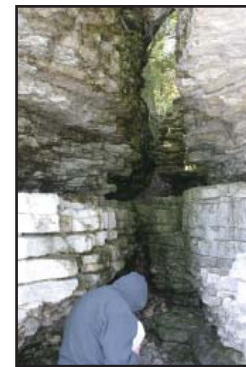
On Sunday morning the group headed out again, with the first stop at Old Stone Quarry County Park just outside of Sturgeon Bay. Dr. Maureen Muldoon, of the University of Wisconsin – Oshkosh and formerly of the Wisconsin Geological and Natural History Survey, explained the stratigraphy of quarry. Dr. Muldoon conducted extensive research at this location and throughout Door County, to integrate stratigraphic, hydrogeologic, geophysical and fracture mechanical data into an understanding of the effect of the geology on groundwater flow in this area. An understanding of the flow in this area is critical, because the soil cover is thin and most of the peninsula is underlain by dolomite bedrock. Only two communities, Sturgeon Bay and Sister Bay, have municipal water systems. The remainder of the peninsula is dependant upon private wells and due to increased development, the demand for clean water is rising yearly – and getting more difficult to satisfy.

The next stop was at Eagle Bluff Lighthouse in Peninsula State Park, one of the most visited state parks in Wisconsin. Here the group reviewed the geologic column, and viewed the beauty of Green Bay from the lighthouse grounds. After leaving the park, the group stopped at Bear Cave, a sinkhole that has formed on private land just south of the Village of Fish Creek. This is just one example of the many small caves that are present in the area, most of which still need to be excavated and explored. The next stop was south of Sturgeon Bay at Bay Shore County Park, where the group had a chance to check out Alexandrian strata exposed along a road cut through the Niagara escarpment. The last stop was at Wequiock Falls, a scenic waterfall in Brown County, as the group worked their way south along the peninsula, and home.

For more information about this field trip, or a copy of the field trip guidebook prepared by Dr. Jack Travis which explains each of the stops in more detail, please contact Dr. Jack Travis or a Wisconsin Section officer.



Jack Travis and Jack Ford discuss regional geology, Peninsula State Park Lighthouse.



Solution cave in dolomite, Lake Michigan shoreline, Northport.



Maureen Muldoon and Jack Travis discuss stratigraphy of Old Stone Quarry Park, Sturgeon Bay.



Zebra Mussel Shell Beach, Northport.



Rare wild dwarf iris, Newport State Park.



Looking for fossil corals, Newport State Park.



Bear Cave, a karst solution cave, just south of Fish Creek.





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Continued from page 54.

that the members of the newly formed LSRPA Association (<http://www.lsrpa.org/>) are investing in making sure that New Jersey's environmental professionals have the tools needed to lead their clients through the process, and the strong commitment by the Department (under the leadership of Irene Kropp) all bode well for the success of the program. The stakeholders recognize its value, now it's up to all of us to make it work.

Ms. Cervino and Mr. Blauvelt are with EWMA's Headquarters Office in Parsippany, NJ. Ms. Cervino is an environmental attorney and is also Of Counsel to the law firm of Golub & Isabel, PC. Mr. Blauvelt is responsible for the safe technical and financial performance of EWMA's site assessments and is a Licensed Site Professional in Massachusetts and a Licensed Environmental Professional in Connecticut.

Submitted from the AIPG NE Section newsletter.

Book to purchase from the AIPG store.

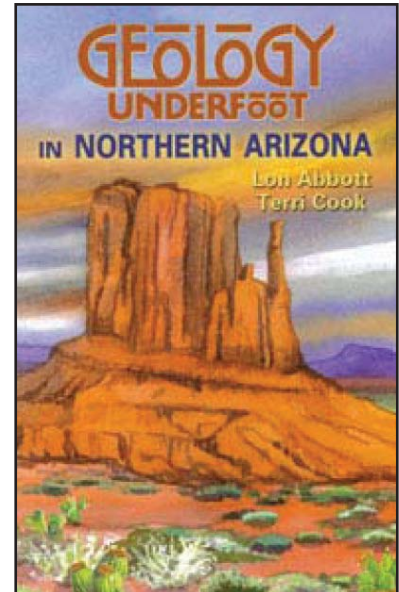
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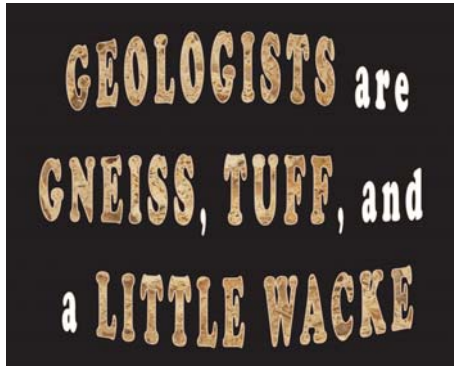
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(L-XL) / 16.00(XXL)



**Promotional Items
 Briefcase and Blue Travel Mug
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 pick and gavel logo, durable 600 denier poly-
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 Colors: Black, Hunter, Navy, Red, Royal



TRAVEL MUGS
 Translucent Blue
 16 oz. Price: \$7.50
 Stainless Steel
 16 oz. Price: \$9.50

CAP - Velcro
 closure.
 Embroidered AIPG
 spelled out with
 pick and gavel.
 Colors: black, tan,
 royal blue, and
 white with blue bill.
 Price: \$12.75



**CHECK OUT OTHER GREAT ITEMS
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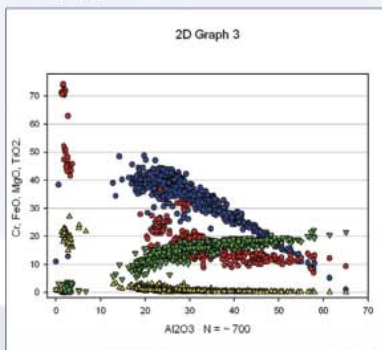
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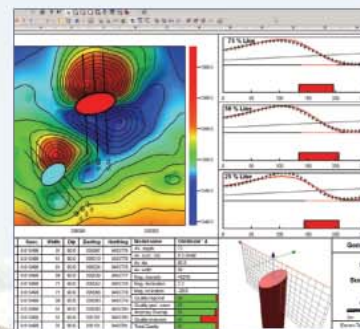
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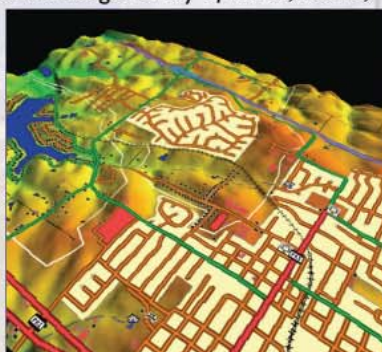


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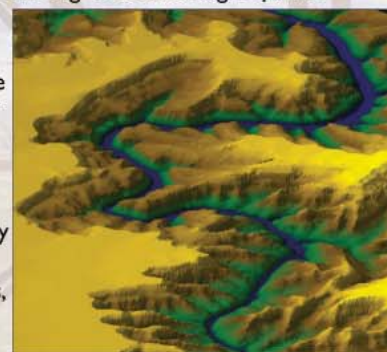
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