Where In Michigan? Contest

To help promote the 2007 Annual Meeting, the Michigan Section is sponsoring a contest similar to that held by the Colorado Section several years ago (Thanks for the idea!). The rules of the “Where in Michigan?” contest are simple. The first individual to correctly identify the photograph location, geologic formation depicted, and formation age wins a Michigan geologic memento. If anyone correctly identifies all six photographs, they will win a free registration to the 2007 annual meeting (please note that if the winner has already registered, the registration fee will be refunded, so do not wait to register). In the event that more than one individual correctly identifies all six photographs, a random drawing will determine the winner.

Photo courtesy of David A. Baxter. Photograph #2

Only one entry per individual per photograph, please.
Entries should be sent to Adam Hefta via email (hefta@fitzhenne.com) or fax (517) 887-6335.

The ‘Where In Michigan?’ photograph in the last issue of TPG (Photograph 1) was of Sleeping Bear Sand Dunes. The dunes are present along Lower Michigan’s northwest coast, west of Traverse City. These dunes are thought to have formed during the last 1,500 to 2,500 years.

Congratulations to Bob Corbett, CPG-04502 for correctly identifying the photo.
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ON THE COVER - Geologist’s work under all types of weather conditions!
Top Picture: Pump Test 023 - Three spud-barges were used to drill a single production test well and multiple monitoring wells in the Hudson River.
Lower Picture: Blizzard Drilling - A cable tool rig on a spud barge installing a test well in the Hudson River during a winter storm. These photographs were taken by Jeff J. Frederick, CPG-10989.
This is my final Editor’s Corner.

My goal as Editor of TPG was simple. Get the membership involved in TPG. This included:

1. Attract student publications related to thesis and research topics;
2. Increase the number of articles submitted to TPG;
3. Improve communications with AIGP sections; and
4. Expand the use of the electronic media for TPG.

We have met most of the tasks of this goal, but work still remains to be done. The past three years have flown by! I remember working with Wendy Davison to put together the 2004 Student Issue. This issue of TPG has far exceeded our expectations and has grown in content and size over the past three years from 62 pages to 78 pages in 2005, and 94 pages in 2006. The 2007 issue will again be a great issue as we have already received a number of diverse contributions from our membership. Thank You!

There has been an increase in information from the Sections over the past few issues of TPG. This is very positive and I hope that it continues.

One of the highlights of the past three years is the increased use of the electronic media. Membership receives many notices from headquarters via e-mail and beginning this year, TPG was available online at least a couple of weeks before your copy is in the mail. Looking to the future, one way we can reduce costs is to decrease the number of hard copies of TPG sent to members. In some instances, we have reduced the number of color pages in TPG to keep costs down. We do not have to do this for the electronic version!

There have been several changes to TPG over the past three years. Most notable are the following:

1. The cover — using a TPG masthead (has evolved a couple of times);
2. The format — we have gone from a largely two column page format to a three column page format;
3. Revised and easier to read Table of Contents page;
4. Introduction of the Editor’s Corner — purpose is to introduce current issue and inform membership of new or upcoming events or programs in AIGP;
5. Section News and Letters to the Editor have been placed first to let everyone know what is happening;
6. Several new “Departments” — including Professional Liability and Risk Management by Marty Andrejko, Marketing by Duane Carey, and Test Your Knowledge by Robert Font;
7. The Student Voice column by Nancy Price has been a pleasure to read; and
8. Increased paid advertisements.

The past three years have passed much too quickly and I have enjoyed them all. I would like to thank Bill Sok for guidance and a calm point of view at times, and especially Wendy Davison for keeping the production of TPG on track. I especially want to thank all of the contributors to TPG and the Associate Editors for making my job easier. Lastly, my thanks to you, our membership, for making TPG what it is today!

Best,
Ray Talkington
Alaska Section

The AIPG Alaska Section meeting on July 31, 2006 in Anchorage was attended by more than 16 members, spouses, and guests. Discussed were ways to reinvigorate the section, create closer ties between members in Anchorage and Fairbanks, and the feasibility of hosting an Annual Meeting in this spectacular state. The primary promoter of the meeting was Marilyn Plitnik, CPG-07761. Susan Browne, CPG-08856, was selected to officially represent the Section at the 2006 Annual Meeting in St. Paul, Minnesota.

Colorado Section

The Colorado Section held a field trip to the Uravan Uranium Mineral Belt in West-Central Colorado on July 22-23, 2006.

California Section

"On Friday, September 29, Governor Schwarzenegger signed into law SB1476 (Figueroa) that continues the Board for Geologists and Geophysicists. Section 7810 of the Business and Professions Code is amended to read: "This section shall become inoperative on July 1, 2009, and, as of January 1, 2010, is repealed, unless a later enacted statute, that becomes operative on or before January 1, 2010, deletes or extends the dates on which it becomes inoperative and is repealed." This means that the next round of sunset review hearings by the Joint Committee on Boards, Commissions and Consumer Protection should begin in the fall of 2008.

An announcement was recently made that the 2010 AIPG Annual Meeting will be held in California. Section President James Jacobs indicates that this will be "a great chance to showcase our state to AIPG members from all over the country" and will reinvigorate the California Section.

Charles Nestle, CPG-09807

View to the west from the original Joe Dandy Mine ("ID") across the vast ID-6 pit and the Paradox Valley. The forested area just beyond the pit coincides with a large landslide off of the flank of the salt anticline, with the landslide deposit overlying the ore-bearing units tapped by the pit. The Uncompaghre Plateau is in the distance.
Colorado Section to Begin Awarding Scholarships

Volunteers needed to serve on the scholarship committee—Committee to establish criteria for selecting awardees, formulate the process for soliciting and review applications, and make the first selection. If you are interested, please contact Bill Bellis (gws@qwest.net) or Peter Barkmann (peter.barkmann@state.co.us). Contributions to the Rex Monahan scholarship fund—Rex Monahan planted the seed, now it is up to the membership to tend the garden! Please, please give generously! Somewhere out there are budding geologists who would greatly appreciate your gift.

Peter E. Barkmann, CPG-09524
Doug C. Peters, CPG-08274

Georgia Section

Section President's Message

We finished our spring with a field trip to downtown Atlanta and the slug test workshop with Atlanta Geological Society in May. I also attended a Savannah Area Geological Society meeting.

We have had at least four members apply for CPG certification this summer.

In July the EPD announced Dr. Jim Kennedy as the new State Geologist. I meet him recently at a meeting and I hope he can attend one of our meetings. We finished our spring with a field trip to downtown Atlanta and the slug test workshop with Atlanta Geological Society in May. I also attended a Savannah Area Geological Society meeting.
Hawaii Section

The section had a meeting at the University of Hawaii on August 17, 2006. The guest speaker was Roy Robeck, CPG-00013, USGS, Consulting Geologist(Retired Kihei, Maui) who gave a presentation titled “Adventures of a Field Geologist”.

New photos with captions courtesy of the USGS Hawaii Volcano Observatory.

Mark W. Rogers, CPG-08926

5 August 2006 - Campout flow forms several benches at East Ka'i'ilii. View is toward the southwest along the coast of Kilauea Volcano at the eastern edge of the new lava entry. Note multiple benches forming at base of screecliff, which is about 20 m tall.

30 September 2006 - Aerial view of the lava bench at East Loe'apuik, looking northeastward. The plume from the East Ka'i'ilii entry is drifting along shore toward the viewer. Silver lava at the top of the sea cliff near bench center marks the location of a brief breakout earlier in the day.

Minnesota Section

The Minnesota monthly luncheon meeting was held on September 5th in St. Paul, Minnesota. The speaker was Jim Arndt of Natural Resource Group speaking on the Hydrogeology, Pedology, and Botany of the Seminary Calcareous Fen, Carver County, Minnesota. His abstract is below.

Abstract

Calcareous fens are peat-accumulating wetlands dominated by distinct groundwater discharge characterized as circum-neutral to alkaline with high concentrations of calcium and low dissolved oxygen content. The chemistry provides environments for specific and often rare hydrophytic plants. Calcereous fens are protected and potential impacts regulated under various Minnesota Statutes and Rules. Because of their dependence on groundwater discharge, hydrologic impacts to calcareous fens can result from projects impacting groundwater far distant from the fen itself.

The presentation summarized a Phase 1 characterization of the Seminary Calcereous Fen that was performed in support of a Tier 1 EIS being prepared to evaluate alternatives proposed for a new river crossing at Trunk Highway 41 (TH 41). Topics covered included:

- Background information on calcereous fen regulation in Minnesota and on the hydrology, soil, water chemistry, and vegetation characteristics used to identify calcereous fens in Minnesota;
- The local and regional hydrogeologic context to understand calcereous fen function and characteristics at the Seminary Fen site;

Historic land use impacts to the Seminary Fen; and

Specific hydrology, soils, water chemistry, and vegetation characteristics of the Seminary fen.

Christine A. Tillem, MEM-0052
Charles C. Tiller, CPG-10811

Virginias Section

The 2006 Russ Wayland Mini-Grant was awarded to Mr. Larry G. Aaron at Chatham High School in Pittsylvania County, Virginia. Mr. Aaron's project was to use the mini-grant award to purchase a Geiger Counter to enhance his school's curriculum by demonstrating rock sample radioactivity in classroom laboratories and field trips. The Geiger Counter would also be used during the Summer Piedmont Regional Governor's School at his class called "The Great Outdoors".

Mr. Aaron plans to use the Geiger Counter:

- To teach to students the principles of radioactivity on rock samples, early model smoke alarms, lantern mantels, and other consumer products;
- To assist with surveying rocks in Pittsylvania County for evidence of uranium during his field-oriented "The Great Outdoors" class;
- To assist with student field research projects on detection of surface uranium ore and radon in and around Pittsylvania County homes; and
- As a demonstration instrument in his schools Earth Science, Environmental Science, and Physics classes.

The Geiger Counter would be used by at least five teachers that are in the science department that he chairs.

Ty Black, CPG-06103

Michigan Section

The Michigan Section held a meeting on September 21, 2006 in Lansing, Michigan. The featured speaker, Mr. Jon W. Allan, Manager of New Generation at Consumers Energy gave a presentation on Michigan's New Water Withdrawal Law, The Inside Story.
This award will benefit approximately 250 9th-grade Earth Science students each year. More students participating in Environmental Science and Physics classes as well as students in “The Great Outdoors” class and the Science and Engineering Club will also benefit from this award.

Of note, Mr. Aaron intended to use the award money to purchase a new Geiger Counter. However, Russ Wayland Mini-Grant Committee member Stan Johnson graciously donated an older, yet higher-end model Geiger Counter to Mr. Aaron for use in his classes. The model donated by Stan is a far superior model to the Geiger Counter that Mr. Aaron intended to purchase.

A message to our Section members: If you have any radioactive rock specimens that you are willing to donate to Mr. Aaron and his classes, please contact a member of your Sections Executive Committee.

A notice of the 2006 Russ Wayland Mini-Grant award to Mr. Aaron will be published in the Danville, VA Register Bee newspaper. Congratulations Mr. Aaron!

R. Todd Church, CPG-10436
**AIPG Attends NCSL**

AIPG exhibited in a combined effort with AASG (Association of American State Geologists), AAPG (American Association of Petroleum Geologists), and AEG (Association of Environmental and Engineering Geologists), GeoInstitute of ASCE (American Society of Civil Engineers), AGI (American Geological Institute) and GSA (Geological Society of America) at the annual NCSL (National Conference of State Legislatures) convention in Nashville, Tennessee. NCSL is a forum for advancing ideas in each state, across states, and on Capitol Hill; for promoting information-sharing, one-on-one and collectively; and for providing legislators with knowledge and resources. For information regarding NCSL go to www.ncsl.org. AIPG attends NCSL to represent its members and the profession of geology.

**Michigan Section Golf Outing**

**Michigan Section Golf Outing**  
*August 22, 2006*

The Michigan Section golf outing creates a networking opportunity for members and vendors to spend a day on the golf course creating the ultimate quality time. Time is spent talking about pleasure, business or a mix of both. Regardless of golfing abilities, the leisurely pace of golf lends itself to forging stronger relationships with peers, clients and co-workers. That is why so many people in business make the time to play golf.

The 2006 AIPG Michigan Section Summer Golf Outing was held on August 22nd at Majestic Golf Course in Hartland, Michigan. The Michigan Section would like to say a big thanks to the 42 golfers participating in the Second Annual Golf Outing. The golfers came from Australia, Canada, Michigan, Ohio and Illinois. The Michigan Section would also like to thank the many businesses and individuals who helped make the event a success. Our hole-in-one sponsor was iSOS/inVentures Technologies, sponsoring four holes, including a $10,000 hole-in-one contest. Our $2,500 putting contest sponsor was Prosonic Corporation. Our tee sponsors included EDR Environmental Data Resources, Ground Water Solutions, Insight Environmental Services, Terra Probe Environmental Services, Superior Environmental, West Michigan Drilling and Fibertec Environmental Services. Door prizes and goodie bags were supported by RTI Laboratories, Waste Management Inc., TCF Bank, iSOS, Layne-Northern, Job Site Services, Insight Environmental Services and the Michigan Section. Thanks to Bob Reichenbach, Craig Marlow and Pat Conway on the golf committee. A special thanks to Eastern Michigan University's AIPG Student Section for their help during the event.

Kevin Lund, CPG-10052
Chairman of the 2006 Golf Outing
Dear Editor:

The term “engineering geology” can be overdone. Witness part of this lengthy sentence in Allen Hatheway's "Landslides" story: "... his was the key paper in Edwin Eckel's benchmark editing of the first comprehensive engineering geological treatment of mass wastage of engineering geological wisdom dealing with the landslide threat."

More to the point, there is a question as to whether all problems involving superficial movement of land indeed involve "engineering geology." Moderately to steeply dipping Pliocene-age claystones are often quite unstable. When I was mapping many square miles of claystone in the eastern Ventura Basin, I had to plot landslides on my aerial photos to distinguish them from undisturbed rock. Some slides are so old that brush had grown over them, so that only their forms betrayed their origin. What was worse, some old slides had been eroded, revealing dips in claystone that were at odds with the true underlying dips. Another thing I had to beware of was soil creep. In some places that would bend the beds sufficiently to alter their dip. Observing those two phenomena was of the highest importance, but did not involve "engineering geology."

I was once hired by the vice-president of an oil company to judge the stability of a proposed wellsite in the Kincon field, forty miles west of the above area and also in Pliocene claystone. He did not hire me as an "engineering geologist," but as a field geologist who knew what ancient landslides looked like. (NOTE: I said that the wellsite would be stable.)

Another thing I saw many times sometimes had, believe it or not, an impact on my decision on where to set up camp when I was backpacking in the High Sierra. Giant piles of angular blocks of granite lie here and there at the base of cliffs. They do not come down block by block during annual snow melt. Instead, they come tumbling down like the walls of Jericho when an earthquake hits. John Muir told about witnessing and recklessly climbing up on a brand-new one in Yosemite Valley, when the great Lone Pine earthquake hit in March 1872. I therefore never camped at the base of one of those rock avalanches, no matter how appealing it otherwise was, since I am not very good a earthquake prediction.

I would say that none of those encounters involved "engineering geology," but were more nearly related to the most ancient of geologic work, field geology.

Robert H. Paschall, CPG-00118

IN MEMORY

Robey H. Clark
CPG-00926
Member Since 1965
July 23, 2006
Amarillo, Texas

Robert L. Crouch
CPG-000963
Member Since 1965
Georgetown, Texas

Bobby D. Hager
CPG-04798
Member Since 1980
March 14, 2006
Hager Hill, Kentucky

Jean L. Lee
CPG-05108
Member Since 1976
February 2, 2006
Calgary, AB Canada

Kenneth Lovelace, Jr.
CPG-06289
Member Since 1983
August 10, 2006
Fredericksburg, Virginia

Jack Donald McClelland
CPG-05061
Member Since 1981
July 28, 2006
Fair Oaks Ranch, Texas

Sigmund D. Schwarz
CPG-07006
Member Since 1986
Bothell, Washington

Richard A. Struble
CPG-02790
Member Since 1975
December 19, 2005
Columbus, Ohio

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MEMBERS IN THE NEWS

Christopher A. Gellasch, MAJ, CPG-10964, Chief, Environmental Health Engineering Division, USACHPPM-West.

Christopher A. Gellasch returned from Afghanistan in early April after spending a year deployed. My family and I took a few trips in the German and Austrian Alps during my block leave and did some hiking. I left command of the 71st Med Det (PM) on 29 June at the end of my 3 year tour and moved from Germany to Fort Lewis, WA. Now I am Chief of the Environmental Health Engineering Division at the US Army Center for Health Promotion and Preventive Medicine—West. My division has several military and civilian scientists and engineers working at military installations on projects ranging from soil and groundwater contamination, drinking water, wastewater, air pollution, hazardous waste, and other areas.

Mark D. Myers, CPG-09697, Confirmed as Director of the U.S. Geological Survey

WASHINGTON DC—Secretary of the Interior Dirk Kempthorne today praised the U.S. Senate’s confirmation of Mark D. Myers, CPG-09697, as director of the U.S. Geological Survey. President Bush nominated Myers, an internationally recognized geologist and former State Geologist and head of Alaska’s Geological Survey, in May.

“I congratulate Mark on his confirmation and commend the U.S. Senate for its unanimous consent action today,” Kempthorne said. “Mark brings two decades of experience in geological science and strong leadership skills to his position. I have every confidence he will do an outstanding job as Director of the U.S. Geological Survey.”

As Director of the State of Alaska Division of Oil and Gas, Myers oversaw a professional staff of nearly 100 employees, including geoscientists, engineers, land managers, accountants, commercial analysts, and auditors.

As State Geologist and Director of the State of Alaska Division of Geological and Geophysical Survey, Myers managed a research organization that generated analyses and interpretations of data on geologic resources and natural conditions as well as maps and inventories of mineral and energy resources on state land. That information is used by the government, private industry, scientists, educators and the public.

Myers, an expert on North Slope sedimentary and petroleum geology, served as survey chief for field programs in the Mackenzie Delta, Cook Inlet (State of Alaska/U.S. Geological Survey, 1997), and North Slope. He also served as sedimentologist for 13 other North Slope field programs.

Myers is a past president and board member of the Alaska Geological Society; a certified professional geologist with the American Institute of Professional Geologists; a certified petroleum geologist with the American Association of Petroleum Geologists; and a licensed geologist with the State of Alaska.

He served as an officer in the U.S. Air Force Reserve from 1977 to 2003, retiring as a Lt. Colonel. Myers received his doctorate in geology from the University of Alaska-Fairbanks in 1994, specializing in sedimentology, clastic depositional environments, surface and subsurface sequence analysis and sandstone petrography. Myers earned his bachelor and master of science degrees in geology from the University of Wisconsin-Madison.

Current acting USGS director Dr. P. Patrick Leahy will continue to serve in the acting capacity until Myers is sworn into office.

The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect America’s quality of life. The USGS Headquarters and Eastern Region facility is located in Reston, VA. Central Region and Western Region offices are located in Denver, Colo., and Menlo Park, Calif., respectively.

The 10,000 scientists, technicians and support staff of the USGS are located in nearly 400 offices in every state and in several foreign countries. With a budget of more than $1 billion a year, the USGS leverages its resources and expertise in partnership with more than 2,000 agencies of state, local and tribal government, the academic community, other federal agencies, non-governmental organizations, and the private sector. Field investigations, direct observations of natural science processes and phenomena, and monitoring and data collection at the local scale are the scientific hallmarks of the USGS.

Russell G. Slayback

Russ Slayback, CPG-02305, reports that he will reach age 70 later this year and has reached agreement with LBG to retire as a principal, a director and as chairman of Leggette, Brashears & Graham, Inc., starting January 2007. Russ plans to reduce his working schedule as a Senior Consultant to the firm in 2007, to 80 percent of full time, by taking either Mondays or Fridays off, depending on the weather and client needs.

The focus of Russ's technical work has moved increasingly to water supply projects for public water supply and irrigation, including permitting of same, assisting professional engineers who understand that they do not know hydrogeology with large septic system impacts and permitting, impacts of properly-conducted blasting on bedrock aquifer systems, and peer review work for storm-water drainage plans that include infiltration to ground water. He reports
MEMBERS IN THE NEWS

that he is working more in the local areas of Connecticut and New York, with only rare opportunities for distant projects in the U.S. and abroad.

Russ will continue to be a trustee of the AGI Foundation, a trustee of the University of Texas Geology Foundation and its Advisory Committee to the Bureau of Economic Geology, a trustee of the AIPG Foundation and chairman of its Grants Committee, and Secretary of the Connecticut Board of Examiners of Environmental Professionals.

In Memory

Judy Slayback, wife of Russ Slayback, and a frequent attendee at AIPG Annual Meetings, succumbed after a 2½ year struggle with cancer of the esophagus on August 8, 2006. Recognizing from her initial diagnosis that her condition was terminal, Judy and Russ pursued an active schedule of travel together, with friends, and with their family. Highlights were an 11-day trip to western Ireland with all of the family, including four grandchildren, and a week in London last February for shows, museums and some pub crawls with our two daughters – the first time our girls had ever been away from their families.

Those who knew Judy will recognize her spirit in the following comments on the afternoon before she passed on. Judy said to me and our daughters: “I know I am dying and I’m not afraid.” She closed her eyes, as if taking a nap. A minute or so later, her big blue eyes popped wide open and she barked out: “See, I’m not dead yet!” Really captures the essence of a wonderful woman.

AIPG
2006 NATIONAL AWARDS

Ben H. Parker Memorial Award
Robert R. Jordan, CPG-01262
Yorklyn, Delaware

Martin Van Couvering Award
Richard M. Powers, CPG-06765
Lakeland, Florida

John T. Galey, Sr. Memorial Public Service Award
Richard M. Lane, CPG-06091
Suncook, New Hampshire

Honorary Membership
David M. Abbott, Jr., CPG-04570
Denver, Colorado

Honorary Membership
Myrna M. Killey, CPG-06033
Savoy, Illinois

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The following three articles were written by summer interns with the American Geological Institute's Government Affairs Program (GAP). These internships were funded through a matching grant from the AIPG Foundation, whose support AGI gratefully acknowledges.

Our three interns kept their cool during the heat wave in Washington DC this summer and deftly maneuvered the halls of Congress to cover many hot issues of great interest to the geoscience community.

Timothy Donahue, who has one more semester to complete for his bachelor's degree at Winona State University in Minnesota, arrived in mid-May. Tim came with lots of experience in government affairs, having served as the legislative facilitator of the Minnesota State University Student Association and Vice President of the Winona State Student Senate. As an intern, Tim focused on energy policy and attended many hearings on energy issues, including price gouging, nuclear energy and nuclear waste, offshore drilling and renewable energy resources. Tim also followed legislation on U.S. innovation and competitiveness. This legislation would increase funding for science and technology education and research so that the U.S. can remain competitive in the global marketplace. Tim created a Tornado Fact Sheet and updated the Drought Fact Sheet for the Congressional Hazards Caucus. Tim met with many policymakers, including Congressman Gil Gutknecht (MN-1st) (shown in the photo on the next page), Senators Mark Dayton (R-MN), Barack Obama (D-IL) and Dick Durbin (D-IL). Tim grew up in a suburb of Chicago, though he hopes to remain in Minnesota after he graduates in December. His degree will be in geoscience, public administration, and political science.

Jessica Rowland, who completed her Master's degree in geosciences from the University of Arizona over the summer, arrived a few weeks after Tim. Jessica earned a bachelor's degree in geology from Trinity University, where she was a Presidential Scholar for four years. Her Master's thesis focused on carbon and oxygen isotopic studies to understand the relationship between climate changes and early human migration in the Middle East. She is fluent in Japanese and Spanish and competent in French. As an intern, Jessica became fluent in policy-speak. She covered hearings on climate change, mining policy, and natural hazards. She helped maintain the AGI Government Affairs and the Congressional Hazards Caucus web sites. She also attended a full day workshop on "Climate Change and the Media" at the Woodrow Wilson Center for Policy. She met with many policymakers including Congressman Raul Grijalva (AZ-7th) and Floyd Des Champs, P.E., the Senior Advisor of the Senate's Committee on Commerce, Science and Transportation. Jessica is returning to the dry heat of Tucson for now, but commented that she really did not mind the damp heat of Washington DC.

Carrie Donnelly is working on her Master's degree in geology at the University of Washington. Her thesis is focused on understanding the 2004-2006 eruption of Mt. St. Helens with U-Th-Ra disequilibria measurements in lavas. Carrie received her bachelor's degree in earth and ocean sciences from Duke University. Carrie has been covering an array of policy issues including ocean policy, the status of earth science at the National Aeronautics and Space Administration (NASA), clean air issues, nuclear waste and the state of levee protection from flooding. She created a Volcano Fact Sheet for the Congressional Hazards Caucus. Carrie will be at AGI until the end of September because she started her internship in June. She will help with congressional visits by scientists and engineers on September 12-13 and hopes to meet with members of their own congressional delegation from Washington.

All of the interns had an opportunity to meet scientists, engineers;
and decision makers from several federal agencies and institutions in the Washington DC metro area. We visited the Carnegie Institution of Washington's Geophysical Laboratory and Department of Terrestrial Magnetism, the U.S. Geological Survey headquarters, the National Science Foundation and the White House Office of Science and Technology Policy. In addition the interns attended seminars and workshops at a variety of agencies, institutions and policy centers in the area and interacted with the public policy organizations of several AGI Member Societies. The interns are very grateful to the American Institute of Professional Geologists Foundation for the opportunity to experience the intersection of science and policy within the federal government.

Linda Rowan
Director of Government Affairs
American Geological Institute

Congressman Gil Gutknecht (MN-1st) with intern Tim Donahue (right)

Facing Energy Demands and Rising Costs, Policymakers Consider Nuclear Options

Timothy J. Donahue, AGI/AIPG Summer Intern 2006

An intense energy discussion has been fueled by heightening concerns about greenhouse gas emissions, the wish to reduce dependence on foreign oil and rising energy costs. Accordingly, the Congress and the executive branch are considering ways to stimulate growth in the nuclear energy sector to help alleviate some of the strain on our future resources and our environment. Nuclear energy currently generates about 20% of U.S. electricity from 103 nuclear power plants. Showing a strong commitment to nuclear energy, Congress provided some incentives for new nuclear power plants in the Energy Policy Act of 2005 (EPACT2005). The Bush Administration proposed the Global Nuclear Energy Partnership (GNEP) in their fiscal year 2007 budget request, which has also been modestly supported in Congress. Even with some incentives, however, the expansion of the nuclear power industry faces several hurdles, primarily high construction costs, high capital investment risks, and nuclear waste storage issues.

The first commercial nuclear power plant came online in Shippingport, Pennsylvania in 1959. Low operating costs and rapidly increasing energy demand encouraged the development of nuclear energy in the 1960s and through the late 1970s. The risks of nuclear power came to light after an accidental release of radioactive gas at Three Mile Island in 1979, which prompted many new safety laws regulating the construction and operation of nuclear facilities. The resulting increase in the time and cost of construction, coupled with a substantial drop in the cost of fossil fuels, made nuclear energy less competitive compared to fossil fuels. These factors caused nuclear power development to stall in the mid 1980s. A partial meltdown of the Soviet Union's Chernobyl reactor in 1986 highlighted the risks associated with nuclear power. The last reactor built in the United States became operational in 1996. No new licenses to build or operate a nuclear plant have been issued since 1979.

Congress demonstrated renewed support for nuclear energy by providing the following incentives in EPACT 2005: loan guarantees, production and construction tax credits, risk protections for investors, liability limits on potential lawsuits and the $1.2 billion advanced nuclear research center called the Next Generation Nuclear Power Project (NGNPP). The NGNPP aims to examine the feasibility of generating hydrogen with the heat from nuclear fission. In addition, EPACT 2005 includes funds for academic scholarships for nuclear physics and engineering students and grants for related research projects.

Another indication of support among policy-makers for expanding nuclear energy is the new Bush administration proposal, the Global Nuclear Energy Partnership (GNEP). This program would advance nuclear recycling technologies and share nuclear technology with developing nations to meet their growing energy demands. The developing countries would use secure partners to provide the nuclear fuel and handle the nuclear waste. The hope is that developing countries would rely less on fossil fuel-fired power plants that emit greenhouse gases.

Promoting the use of nuclear waste recycling for power generation is a major shift in U.S. policy. Improvements in safety and efficiency of recycled nuclear waste, advanced primarily by France and Japan, makes safe, clean and efficient nuclear power plants for developing countries more practical and cost-com-
petitive. Furthermore, a geological repository may be constructed in Russia to store nuclear waste. GNEP partners are the U.S., France, and Japan; India and Russia may join the partnerships in the future.

Congress has had a mixed reaction to GNEP. The Senate Energy-Water Appropriations subcommittee fully funded GNEP at $250 million as requested by the administration, however, the House cut the funding in half and focused the funds on an existing program, the Advanced Fuel Cycle Initiative. The House was concerned about starting a new program, expressed consternation about the vagueness of GNEP and raised serious questions about nuclear waste disposal.

The nuclear power industry has responded to the incentives provided by EPACT 2005. According to the Nuclear Regulatory Commission (NRC), 13 new plants are being considered for construction, and another seven license applications are possible. The NRC also approved construction of a separate nuclear material enrichment facility in June, the first in the U.S. Aligned with the objectives of the administration’s GNEP proposal, the $1.5 billion plant would produce 105,000 metric tons of nuclear fuel per year.

Despite the multitude of issues addressed in EPACT 2005, there are several security, waste disposal, and logistical concerns yet to be considered by policy-makers. There is still no permanent storage facility for nuclear waste in the U.S. The Yucca Mountain geologic repository will not receive waste until 2017 at the earliest, if at all. GNEP addresses this by promoting nuclear waste recycling and permanent storage in Russia, though these programs have not yet been approved by Congress. Nuclear recycling and trading nuclear technology has also raised concerns about nuclear weapons proliferation, especially because India, a potential GNEP partner, has not signed the Nuclear Non-Proliferation Treaty.

American Competitiveness: A Focal Point for Cooperation between Industry and Academia

Carrie Donnelly, AGI/AIPG Summer Intern 2006

By launching the American Competitiveness Initiative (ACI) in his State of the Union Address of January 31, 2006, President George W. Bush provided fresh impetus to a growing movement among science and technology experts. These experts seek to increase public support for research by associating the country’s capacity for innovation and its competitiveness in scientific and technological achievement with its future prosperity and security. The movement grew out of the economic hardships of the mid 1980’s, when a consortium of leaders in academics and industry formed the Council on Competitiveness. The council strove for two decades to communicate their concerns about America’s declining market share in innovative technologies and shrinking intellectual capital to the public. The President’s initiative and the subsequent competitiveness legislation are a triumph for this effort, and a testimony to the importance of cooperation between industry and academia. Each of these sectors, especially within the earth sciences, will benefit from increased access to funding and from a more vigorous, competitive workforce.

At a congressional briefing on July 13, 2004, Council on Competitiveness President Deborah Wince-Smith testified that U.S. investment in science and technology (S&T) is not sufficient to motivate the kinds of innovation that have traditionally given U.S. industry an edge in the global economy. Efforts by other nations to emulate America’s success in S&T innovation have resulted in stiff competition for the world’s brightest intellects, industry investment and leadership in scientific advancement. Senators Lamar Alexander (R - TN) and Jeff Bingaman (D - NM) spoke at the briefing in support of increased government efforts to enhance the country’s capacity for innovation in order to ensure its continued ability to compete on the world’s stage. At the Engineering Research and Development Symposium in May of 2005, Senator Bingaman described a recent tour of Southeast Asia, during which he witnessed firsthand the energetic construction of S&T infrastructure and concomitant education and employment of thousands of bright young scientists and engineers. This experience, combined with the insightful testimony of industry and academic leaders, prompted Senators Alexander and Bingaman to request that the National Academy of Sciences (NAS) produce a report on U.S. innovation and competitiveness. The report, “Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future,” was released in October, 2005.

The NAS report described challenges to U.S. S&T competitiveness ranging from lack of federal research funding to poor immigration policies. It contained a number of specific recommendations, which were incorporated into the ACI and competitiveness legislation in the House and Senate. The recommendations fall under three broad categories: increased federal funding for S&T research; improvements in K-12, undergraduate and graduate science education and opportunities; and improvement of the private S&T research environment.
The ACI proposes to double funding for the National Science Foundation (NSF), the Department of Energy's Office of Science (DOE-Science), and the National Institute of Standards and Technology (NIST) over the next ten years. This represents a crucial reversal of federal policy that for the past several years has allowed these budgets to stagnate or decay. All told, the increases would amount to $50 billion in new federal funding for research and development. In order to stimulate private investment in S&T, the ACI proposes to make the research and development tax credit permanent. This will allow companies to be more secure as they plan their future budgets and make the cost of doing research in the United States more competitive with costs abroad. Economic incentives alone, however, cannot entice domestic investment if the talent pool is too shallow. Therefore, the ACI advocates sweeping changes in immigration law that would make it possible to attract and retain the best minds from around the world. The initiative also requests $380 million in new federal funding for improvements in K-12 math, science and technological education.

On January 25, 2006, Senators Alexander and Bingaman were joined by Senators Pete Domenici (R - NM) and Barbara Mikulski (D - MD) in announcing the "Protecting America's Competitive Edge (PACE) Act," which consisted of three separate bills (S. 2196, S. 2197 and S. 2198). The act was generally consistent with recommendations contained in the NAS report and with the President's ACI. It also creates a new research agency within DOE, the Advanced Research Programs--Energy (ARPA-E), that would award cash prizes for outstanding scientific achievement in energy research and technology development. The PACE legislation also accelerates the ACI's timeline, doubling R&D funding over just seven years. Like the ACI, the PACE Act would streamline the visa process for foreign students and make the research and development tax credit permanent.

The most popular competitiveness legislation in the House is more restricted than the PACE legislation. The two bills that were unanimously passed by the House Science Committee on June 7, 2006 are both designed to strengthen the science and engineering workforce by improving public education and making careers in science more accessible and attractive. The "Early Career Research Act" (H.R. 5336) provides funding to DOE's Office of Science and to NSF to encourage young scientists to embark on high-risk, high-return research projects and to help universities acquire cutting-edge equipment. The "Science and Mathematics Education for Competitiveness Act" (H.R. 5358) strengthens all levels of science and technology education. Rather than creating new programs to coincide with the President's ACI, the House legislation builds on existing education programs at NSF.

The main challenge for the competitiveness legislation is that it must remain a high priority for Congress over many years, in spite of large budget deficits and the high costs of war and disasters. Keeping the spotlight on competitiveness will require continuous communication and support from industry and academia. Together they have the influence and authority to keep competitiveness at the forefront of U.S. policy and public consciousness. Maintaining this partnership will improve the stability of federal funding, facilitate scientific advancement and ensure a pre-eminent place for the U.S. in the global economy for years to come.

Is Carbon Dioxide a Pollutant?

Jessica C. Rowland, AGI/AIPG Summer Intern 2006

Despite objections from the Bush administration, the Supreme Court recently entered the debate over global warming. On June 26, the court accepted a petition to hear the case Massachusetts v. Environmental Protection Agency. The case was filed by Massachusetts Attorney General Tom Reilly, together with a coalition of 12 states, 13 environmental groups, New York City, Baltimore and American Samoa. The petitioners argue that the Environmental Protection Agency (EPA) should classify carbon dioxide as a pollutant under the Clean Air Act, and have legal authority to regulate it and other heat-trapping greenhouse gases emitted from motor vehicles. The case, which will be argued this fall and likely decided by next spring, could put new pressure on the Administration and Congress to finally act on climate change.

The Clean Air Act (CAA), enacted in 1970, established a comprehensive program for controlling and improving the nation's air quality through state and federal regulation. One of the main goals of the CAA is to attain concentrations of certain air pollutants at which there are no adverse effects on human health or the environment. In sum, the act emphasizes regulatory action to prevent harm to public health, welfare and the environment.

Massachusetts v. Environmental Protection Agency stems from an earlier lawsuit filed by Massachusetts, Connecticut and Maine in June 2003, which marked the first time that states sued the federal government over global warming issues. This earlier case argued that EPA was violating its mandatory duty by failing to regulate carbon dioxide. The lawsuit relied on a 1998 statement from EPA's counsel Jonathan Cannon establishing that carbon dioxide is an air pollutant subject to regulation under the act. A few months after this lawsuit was filed, EPA reversed its position in a memo from EPA's current counsel Robert Fabricant. Fabricant determined that carbon dioxide is not a pollutant, based on the fact that "the CAA does not authorize regulation to address global climate change." Lower courts have upheld this position on the grounds that environmental groups and states have failed to show specific injury from climate change.

Carbon dioxide emissions, which are intensifying global warming, are generated in elevated quantities by motor vehicles and industrial operations powered by fossil fuels. According to the Energy Information Administration, passenger cars, trucks and sport utility vehicles account for more than 20 percent of the nation's greenhouse gas emissions. Although Massachusetts v. Environmental Protection Agency does not specifically involve carbon releases from power plants, a court decision
declaring carbon dioxide a harmful pollutant would make it difficult for EPA to avoid regulating power plants, which account for 40 percent of U.S. carbon dioxide emissions.

Two primary questions will be explored by the Supreme Court in considering this case. The first is whether the EPA Administrator has the authority to regulate greenhouse gases associated with climate change. The second issue regards whether, if EPA does have such authority, the agency is obligated to issue emission standards for motor vehicles.

The outcome of this case will likely rely upon how the court interprets the statutory definition of a pollutant and EPA's modified criteria for carbon dioxide. The CAA broadly defines the term 'air pollutant' as "any air pollution agent...which is emitted into or otherwise enters the ambient air." There are six defined "criteria" pollutants (ground-level ozone, carbon monoxide, particulate matter, nitrous oxides, sulfur dioxide and lead) and 189 other hazardous air pollutants that are regulated by EPA.

The petitioners (Massachusetts et al) argue that carbon dioxide is a pollutant and that regulation of emissions is within the scope of EPA's authority. According to the act, EPA must prescribe standards for air pollutants in motor vehicle emissions that cause harm to public health or welfare. This provision includes the effects of pollutants on weather and climate. Emissions of carbon dioxide and consequent global warming, the petitioners argue, will no doubt "endanger public health and welfare" and cause "adverse environmental effects" due to rising temperatures, more extreme weather events and increased risks of some insect-borne diseases. Hence, carbon dioxide should be listed as a criteria pollutant and EPA should determine appropriate air quality standards.

The respondents (EPA et al) argue that EPA lacks authority to regulate carbon dioxide and other greenhouse gases. The CAA authorizes research and technology development related to global climate change, but contains no indication that Congress intended EPA to administer a regulatory climate program. The administration maintains that fossil fuel-derived carbon dioxide is not a dangerous pollutant, and that it is impossible to create national air quality standards for the greenhouse gas. Because carbon dioxide concentrations are nearly uniform in Earth’s atmosphere, the local regulatory focus of the CAA is not the appropriate structure through which to deal with this global problem.

Depending on the outcome of the case, regulation of greenhouse gas emissions could become the duty of the states or may rest on the determination of Congress. State and local officials, disappointed with the administration’s voluntary emissions reduction programs, have already begun creating international alliances and adopting policies that aim to stem greenhouse gas levels. Bill Clinton is leading an effort with 22 large cities to reduce greenhouse gas emissions and enhance energy conservation, and California Governor Arnold Schwarzenegger and British Prime Minister Tony Blair have signed an agreement that will lay the groundwork for trans-Atlantic carbon trading. States are working to set-up cap-and-trade programs for carbon dioxide and other greenhouse gases, and are demanding that utilities use renewable sources to generate energy. This array of state actions will create variable new regulations with which businesses must contend, and may lead to increased litigation between states and utilities and possible harm to the U.S. economy. Finally, although Congress has shown relatively little interest in the regulation of greenhouse gas emissions, a series of climate change hearings held this past July may mark the beginning of a movement toward the development of national policy - as opposed to state-by-state measures - that will address the issue of global warming.
Questions:

1. Which of these minerals is classified as a "sulfate" and may be used in the manufacturing of oil-well drilling fluids, glass, rubber and paint?
   a) CaSO₄·2H₂O
   b) BaSO₄
   c) Cu₂FeS₄

2. The Earth's equatorial radius has been determined to be 6,378,099 meters and its polar radius is 6,356,831 meters. To a first approximation, the Earth may be considered as a sphere with radius of 6,371,200 meters and a mass of 5.97 x 10²⁴ grams. What, then, is its approximate density?
   a) 5.96 g/cc
   b) 4.83 g/cc
   c) 5.51 g/cc

3. In seismic studies, compressional and shear wave velocities (Vp and Vs, respectively), as well as Poisson's Ratio (σ) are important properties. If (λ) and (μ) are the Lamé constants, (ρ) is density and (E) is the Young's modulus, pick the choice below that defines the relationship between \( V_p^2/V_s^2 \) and \( \sigma \), given that:
   \[ V_p = [(\lambda + 2\mu)/\rho]^{1/2} \]
   \[ V_s = (\mu/\rho)^{1/2} \]
   \[ \lambda = E\sigma/(1+\sigma)(1-2\sigma) \]
   \[ \mu = E/(2(1+\sigma)) \]
   a) \( \sigma = (V_p^2/V_s^2) - 2 \)
   b) \( \sigma = [(V_p^2/V_s^2) - 2]/2[(V_p^2/V_s^2) - 1] \)
   c) \( \sigma = 2V_p^2/V_s^2 \)

4. Which of the following radiometric age dating techniques involves a half-life of approximately 5,730 years and an effective dating range of 100 to 700,000 years?
   a) Rubidium-87 to Strontium-87
   b) Uranium-238 to Lead-206

5. Assume that the major principal stress (\( \sigma_1 \)) is vertical or perpendicular to the Earth's surface, the minor principal stress (\( \sigma_3 \)) is horizontal, and that the intermediate principal stress (\( \sigma_2 \)) is about equal to (\( \sigma_3 \)). What type/style of geologic faulting would one expect to find in the area?
   a) normal/gravity faults
   b) reverse/thrust faults
   c) strike-slip faults

Answers on Page 38
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 contributions 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.

AWARD OF HONORARY MEMBERSHIP

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.

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American Institute of Professional Geologists
Nomination form for 2007 AIPG Awards

(Please check one)

☐ Ben H. Parker Memorial Medal ☐ John T. Galey, Memorial Public Service Award
☐ Martin Van Couvering Memorial Award ☐ Award of Honorary Membership ☐ Outstanding Achievement Award

NAME OF CANDIDATE: ____________________________
Address: ______________________________________
Address: ______________________________________
NAME OF PERSON MAKING
THE NOMINATION:
Address: ______________________________________
Address: ______________________________________
Signature: ____________________________

Supporting Statement (In brief here, please submit detailed letter of support): ____________________________

Telephone: ____________________________
Fax: ____________________________
E-Mail: ____________________________

Telephone: ____________________________
Fax: ____________________________
E-Mail: ____________________________

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, 2006.

16 TPG • NOVEMBER/DECEMBER 2006 www.aipg.org
Most people are not fond of long good-byes, so I will attempt to keep this short and to the point. I want you to know how much I have enjoyed the privilege of serving as your president for 2006. It will forever be a highlight in my career and will provide for many warm and cherished memories in future years. But, of course, there is more to come (I hope); and I will expect the memory chest to get quite full before the years cause me to look more behind than ahead.

One of the more rewarding experiences that I was allowed to enjoy as president was the presentation of the AIPG’s awards at the St. Paul annual meeting. When I was younger and attending my first few awards banquets (yawn), I was, as a confession, a bit bored with the process. Let us credit that to my earlier unenlightened insensitivity to the meaningfulness of such things. With added years and insight, it has become clear to me that we, as a group of professionals, need to recognize, in a very special way, those who work extra hard when they are tired, those who do the right thing when the right thing is hard to do, those who stand up when standing up makes you a bigger target, and those who volunteer to take up the slack because someone has to. As a favor, take the time to read the citations for this year’s recipients and reflect on the generous spirit of service that distinguishes those individuals. We can learn from, be inspired by, and be challenged by these people. It is to our benefit that we recognize their accomplishments.

At the St. Paul meeting, I presented a draft of a Strategic Plan aimed at clarifying the purposes and goals of AIPG over the next 5 years. The Plan, while still in need of tweaking and ratification by the executive committee, seeks to identify several principal objectives for the institute. It also lists specific goals and activities designed to accomplish those objectives. I hope that it will serve to strengthen and organize our efforts as we pursue the mission of AIPG. The Plan will be published soon.

In closing, I want to congratulate 2007 president Kel Buchanan and the other incoming officers and advisory board representatives on the Executive Committee. We have strong leadership, and you will want to “stay tuned” to the work being done because there are some exciting things ahead. To all who worked on the standing committees and in the executive committee during the year 2006, thank you for your willingness to devote the time and attention needed to continue the important work of AIPG. Further, I could not tell you enough about how our staff at the Denver office helps this diverse group of volunteers called the Executive Committee get organized and get things done. They are wonderful - and indispensable. Lastly, nothing in this organization is more meaningful to me than the friends and colleagues that I have come to know and appreciate. It is because of you that I look forward to working for our profession as a member of AIPG.

Sincerely,
Larry

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slbishop@geoscienedm.com,
or visit our website at:
www.geodm.com Robert Font, Ph.D., CPG, PG, EurGeol - Author
AIPG Evolution is Not a Theory

William J. Siok, CPG-04773

My commentary will not be controversial. I want merely to apprise you of some changes which are occurring within our organization, and they are evolutionary.

AIPG, as you know, was established to provide a credible credential for the practicing geologist. This objective continues to be a significant part of AIPG’s mission. Changes in the professional realm of the practitioner have resulted in newer generations of geologists demanding different approaches to credentialing. At present, twenty eight states have some form of statutory licensure. The legislated right to practice embodied in the laws of these 28 states has had a significant impact upon our profession, including the questioning of the need for other, non-legislated credentials.

The intent here is not to delve into apologetics, but to comment on AIPG institutional changes designed to augment existing registration laws. For many reasons which I will not attempt to list, geologists, including many holding a license to practice in multiple states, continue to value and seek AIPG certification.

Many others do not appreciate the value of AIPG certification and choose instead the general "Member" category of membership in AIPG. This is happening with regularity, and of course their contributions of time and energy are welcome and appreciated.

Does this mean AIPG should abandon its established place in the world of professional associations, in particular offering a credential for properly qualified professionals? The answer is clearly "no".

The evolution occurring within AIPG is in the broadening of its original goals. AIPG raison d’etat is no longer confined merely to granting of a professional credential, but to improving its advocacy role for all practitioners, to establishing a clearinghouse for continuing education through distance learning, and in working to develop means of facilitating inter-jurisdictional mobility of credentialed practitioners domestically and internationally.

AIPG’s credential, CPG, continues to be crucial for many resource and energy geologists particularly. For geologists who do not especially feel a need for the CPG, AIPG is nevertheless an organization where all practitioners can find colleagues and mechanisms addressing issues directly affecting the workplace and the geologist’s role in the economy, both domestically and internationally.

History shows that AIPG has evolved in many ways.

In its journey to one-half century of service to the profession, AIPG has undergone numerous changes. Some have been cultural (Have you seen the group photographs of AIPG Charter members at the founding convention, in which they are all wearing two or three piece suits?), others have been procedural, but none have substantially deviated from AIPG and its original mission.

Members today enjoy many more services than the Institute was originally able to provide. Vibrancy and survival of the organization demand a continual search for additional and better services, new ideas, and the ability to change in response to markets.

One thought to keep in mind, AIPG was created to serve its members. You are the ones who set AIPG’s direction and through your voluntarism make it happen. Your responsibility to AIPG is to make your opinion known and to actively work to assure that the changes to AIPG are what you wish to see.

Members of AIPG are its past, present, and future. Your active involvement on the section or national level will insure that AIPG continues its evolution into an ever more effective institute.
Good News About the ASBOG® Exam (Column 104, July/August '06)

I received a note from a CPG who asked that his name not be printed regarding my experience with the ASBOG® examinations, particularly my “taking” of the professional practice examination cold turkey. My correspondent has been practicing hydrology for over 25 years and took the ASBOG examinations in March 2005, passing both parts. He had attended an independently prepared course offered to review the broad topics that are covered in the ASBOG examinations in January 2004 and spent only an afternoon and evening reviewing material prior to taking the examinations a year later; he therefore felt that he had taken it pretty much cold turkey as well. He noted that a colleague with similar experience, who took the same review course and who bought or borrowed numerous textbooks and studied diligently during the evenings for nine months, received similar passing scores. My correspondent’s observation was, “the documents in the review course helped, but it is possible to pass the tests without studying for excessive amounts of time. Most of the material in the review course was on-target regarding possible question areas and definitely helped, and I would recommend attending. My fellow hydrogeologist’s observation was he studied too much, and he thought he would have done almost as well by reviewing just the course review documents.”

I responded to the foregoing by restating my opinion that there is a good deal of fear on the part of those of us who have been out of school for a couple of decades or more that we won’t be able to pass the ASBOG examinations without putting in the effort that my correspondent’s colleague did, something most of us have neither the time for or the interest in committing. My correspondent agreed, stating, “I was very apprehensive, as were my fellow co-workers who took the tests, but had been out of school for 20+ years. I had heard a horror story (about how hard it was) directly from a person who had just received his PhD in Geology from a major university (and who was an adjunct professor), but he failed both tests. What I noticed at the time of my test was that most of the professionals taking the test (at least the March 2005 administration where he took the test!) were fairly young (probably less than 35), and many were repeat takers having failed the first time. It would be interesting to evaluate the test performance per experience level (X number of years) and educational level (BS, MS, or PhD), as well as per geological specialty area. I can say my sense was that the test I took was slanted towards hydrogeology (my specialty), but I felt the reason I did well was mainly due to my professional experience and not because of studying. My view is that experience plays an important role in whether or not you pass the test, especially as it related to the past tests that were slanted more towards the hydrogeology profession.”

As I noted in column 104, J.L. Warner, S.P. Warner, and A.L. Tolman published “ASBOG examinations: a retrospective analysis of passing rates for first-time for the ASBOG examination is being considered. Analysis of such information could provide some interesting insights. Regarding the academic geologist, I wonder if he or she was so specialized or was primarily lab-oriented, which potentially could explain why this particular individual did not pass the examinations on the first try. As for the younger geologists who were taking the examination for the second time, is the changing academic environment that is de-emphasizing field geology and increasing the amount of environmental studies materials (without necessarily including the underlying science), changes reflecting student (and professorial(?)) interests and academic administration (costs, students signing up for courses, etc.) contributing to the failure rate for younger geologists? My own experience with the Practice of Geology (PG) examination and my correspondent’s experience with both examinations suggest that being able to work out realistic geologic practice-based examination questions is an important factor in being able to pass the examinations.

The experiences with the ASBOG Examination related above prompted me to ask if statistical data on the scores for ASBOG Examinations was available. Sam Christiano, ASBOG’s Executive Director, provided me with the following summary data for the October 2005 and March 2006 ASBOG examinations:

<table>
<thead>
<tr>
<th>ASBOG Examination Statistics</th>
<th>October 2005</th>
<th>March 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG examination passing score</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>FG examination standard deviation</td>
<td>13.8</td>
<td>14.8</td>
</tr>
<tr>
<td>PG examination passing score</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>PG examination standard deviation</td>
<td>9.7</td>
<td>10.6</td>
</tr>
</tbody>
</table>

The information provided indicates several points. First, there are more questions on the Fundamentals of Geology (FG) examination than there are on the Practice of Geology (PG) examination. Second, the standard deviations show that many of those who did not pass came within a few questions of doing so. This is particularly true of the PG examination, where the average scores

1. Ms. Christiano also reviewed the draft of this discussion and provided a variety of helpful suggestions.
were higher in relation to the passing score than the FG examination scores. Although the standard deviations for the FG examination are greater than those for the FG examination, they are about the same when considered as a percentage of the average score (about 17.5%).

Third, the scores for the FG examination may indicate that the educational preparation received by many of those sitting for the FG examination does not prepare graduates with the foundation needed for the practice of geology.

AIPG is aware that the geoscience coursework of recent earth sciences graduates does not entirely match the coursework taken by those who graduated 20 years ago. This awareness is prompting study of the basic educational requirements for the CPG. It is also interesting that despite the continued dropping of field geology by many departments, those who are hiring geoscientists look for field experience in making hiring decisions. Are colleges and universities doing an adequate job of preparing geoscience majors for the profession? Is a four-year geoscience degree sufficient anymore? Perhaps the school one attends and the courses one takes do make a difference.

Most geoscientists whom I have heard express an opinion believe that an MS is required for advancement in the profession beyond being an entry-level technician. Yet, both AIPG and the ASBOG Member Board states retain the four-year degree as the required educational level. Would it be appropriate to raise the educational requirement for AIPG certification to the Masters level? Please contribute your thoughts on these matters.

Should a County Employee Write a “Remoteness” Letter?

A CPG who is employed by a county government in a capacity that does not involve the examination or valuation of mineral properties asked if he could ethically write a “remoteness” letter. A “remoteness” letter is a professional opinion that a particular tract of land is so remote from known occurrences of valuable minerals (including oil and gas, industrial minerals, etc.) that there is essentially no likelihood that valuable minerals will ever be discovered on or exploited from the tract. Such letters are required by the IRS when the owner of the tract’s surface wishes to donate the land to a county as open space but the mineral rights are owned by someone else, including the federal government. Such tracts are not uncommon in western states. The purpose of the “remoteness” letter is to assist the IRS in determining the value of the tract and that the tract will not subsequently be exploited for its minerals.

The question asked is whether there is a conflict of interest if the CPG were to prepare such a letter. I am assuming that there is not a rule explicitly prohibiting the geologist from accepting the assignment—if this assumption is wrong, please let me know. The CPG told me that he should accept the assignment to examine the tract for its “remoteness” that his position with the county would be disclosed, which complies with Standard 3.1 of the AIPG Code of Ethics. But in this case, is disclosure sufficient to mitigate the conflict of interest in the eyes of the public? The county would benefit if the tract were donated as open space. Would the CPG’s employment with the county be viewed more favorably if he prepared a favorable “remoteness” letter even though his duties for the county have nothing to do with the examination of mineral values? What would you advise this CPG to do?

Blatant Misuse of the CPG Title

A serious ethical situation came to the Institute’s attention and I wrote the Ethics Committee the following generic summary of the situation asking for their opinions about what should be done, “The Institute has learned that a prominent geologist who is known for advocacy of professional ethics and for debunking the poor science and practice of others has been publishing papers identifying himself as a CPG when in fact he has never been a member of AIPG at any level. Nor is the individual a member of the AAPG’s Division of Professional Affairs, whose ‘Certified Petroleum Geologist’ title is also abbreviated CPG.

“Normally, when the Institute learns that someone falsely claims CPG status, usually in a report or correspondence, the individual is sent a letter requesting that the individual cease and desist from using the CPG title and noting that ‘Certified Professional Geologist’ is an AIPG trademark. However, this case is significantly more blatant. Indeed, when first, somewhat indirectly, asked about the use of the CPG title, the individual attempted to bluff the issue aside.

“Because the individual is not an AIPG member, we cannot employ the Disciplinary Procedures. We can create a file flagging the individual’s name should an application for membership be received. We also could file a complaint the states with whom the individual holds a PG license, although whether any action would taken is unknown.

“Do you have any suggested actions that the Institute could take?”

I received the following replies.

Larry Davis, CPG, “Yikes! I would first write this individual a very sharply worded letter telling him to cease and desist. Depending on his response I would either warn him that we would go to the state boards with a complaint should he use the designation again (if he is contrite) or actually do it (if he more or less thumb his nose at us). If he’s really nasty about it, a threat to expose him might be appropriate. We need to protect our good name and our designation if it is to be worth anything at all.”

“I’m very interested in hearing what others think about this one. My back is obviously up.”

Ted Wilton, CPG, “Clearly, this is a very disturbing issue, because the individual seems to know that he was doing something wrong, and as David has stated, the individual has been an advocate for professional ethics.”

“Before we move forward, if anything at all is contemplated, more investigation is needed. I am a ‘Certified Professional Geologist’ as defined by the State of Alaska, so there might be a minor chance that our objections may not be valid (although I doubt it). I cannot place my hands on the Alaska regulations, but the ‘CPG’ identification may be valid for those of us certified in the State (by the way, what are Indiana licensed geologists?).

“If additional research indicates that the individual is falsely using the ‘CPG’ tag we really need to do something. At a minimum a ‘cease and desist’ letter would be in order. Legal action would likely be our only other remedy, but I am not sure if that is justified, and we likely cannot afford it.”

“I will be interested to read the thoughts of the other Committee members.”
John Rold, CPG, “This piques my interest as the first I’ve heard of a case like this. Do we have documentary proof that he is misusing the CPG title? Just once? Ongoing usage? Are there any states or Canadian provinces who use the title of ‘CPG’ as in C____ P____ G____?”

“Does AIPG or AAPG have a copyright on ‘CPG’? I seem to remember that this copyright matter came up many years ago when AAPG began to certify their members of the Division of Professional Affairs as Certified Petroleum Geologists.”

“At the very least the AIPG president or Ethics Committee Chairman should send him a formal letter telling him to cease and desist usage of the title and that if he does not we would take legal action.”

“Even though we may not be able to discipline nonmembers, there may be other avenues. I assume he is a member of AAPG. They should be even more concerned than we are and they could take disciplinary action. As I remember it their ethical requirements for practice and membership in the Division of Professional Affairs (Certified Petroleum Geologist-CPG) are essentially the same as the Code of Ethics and ethical requirements for AAPG membership. Maybe this is an opportunity for cooperation with AAPG to address this problem. If the man is licensed or certified by any other state or Canadian province they also should be notified of the problem.”

Macklin Armstrong, CPG, “Regarding the individual using the ‘CPG’ title, I am now looking at my pocket card from the Commonwealth of Virginia Board for Geology. It says Certified as a Professional Geologist. However, to my knowledge, geologists registered in Virginia use the title ‘P.G.’ My North Carolina and South Carolina pocket cards say Licensed Geologist.”

“If ‘Certified Professional Geologist’ is an AIPG trademark, then a cease and desist letter is appropriate for the matter. However, the individual may claim to be a ‘Certified Professional Geologist’ in a state such as Virginia like me or in Alaska like Ted Wilton.”

Perry Rahn, CPG, “My response is aligned with that of Larry Davis who suggested we write to this individual and tell him to get squared away. Ask him to explain why he calls himself CPG. I’d like to see what his formal response is.”

Marty Andrejko, CPG, “I did a quick google search for ‘certified professional geologist’ and one of the hits lead me to the following site: http://www.ogsconsult.com/. The individual listed on this website, Leighton P. Young, Jr. does not use ‘CPG’ on this page but lists himself as AAPG Certified Petroleum Geologist, a Certified Professional Geoscientist in Texas (note that Texas actually uses the title ‘Licensed Professional Geoscientist’) and a Certified Professional Geologist in Wyoming. Mr. Young is also an AIPG member. The point I am trying to make is that it appears that he has made an error in terminology with both his Texas and Wyoming licenses.”

“Also check http://www.aapg.org/business/candidates/05_06/treasurer. cfm. Ms Martinson classifies herself as a Wyoming Certified Professional Geologist and she is employed with the Wyoming GS yet she appears to have made a terminology error. Is it possible that the prominent geologist has simply made an error in terminology? I also have concerns that we are reacting to his answer after being asked ‘indirectly’ about his use of CPG. I don’t think we can render a decision on an answer to an ‘indirect’ question.”

In response to some of the preceding comments, I sent the Ethics Committee a message noting that the individual in question was not only using “CPG,” he was including the CPG number assigned for many years to an AIPG member.

Ted Wilton, CPG, (second comment) “Your most recent message indicated that the individual in question used the CPG designation, and someone else’s number. If this person is not a CPG from another jurisdiction (with his corresponding license number) this would, indeed, constitute a very serious ethical breach that should be dealt with. That would indicate a deliberate effort to deceive the public and the profession. While I do not have any quick solution, it would be a most serious problem.”

Rima Petrossian, CPG, “I agree that initially sending a certified letter to the individual asking him about his claims is appropriate. I also think that upon receipt of the reply, if there is one, we can act depending upon the reply.”

“The reply to the AIPG claim of the individual using another’s number could be denied or refuted by this individual. If we have justifiable evidence counter to the individual’s denial, then we could send copies of the correspondence explaining the violation to whatever board or state that this person is certified under. If the person admits it but continues to use the certification number, although highly unlikely, then there is very little legal recourse as I see it from AIPG, but I am not a lawyer. If the person does not answer at all, this is also difficult because we then have no evidence one way or another from this person.”

“At best it would seem the person could cease and desist their claims of having a certification after receiving a certified letter from AIPG. Could the individual whose number is being used bring a lawsuit against this person? Would we recommend that as an alternative?”

“If there is no certification in any way of this person by any authorized body, an expose to the local papers (where the person practices) might be justified as a means of exculpating the AIPG of certifying or supporting in any way a deceitful geologist. The means (an expose) justify the ends (public exposure of wrongdoing) but this person might decide to bring a defamation suit against AIPG and might win the sympathy of the public (I am being extreme here but it might be a consideration). Due to the AIPG responsibility to the person whose CPG number this individual is illicitly using, the AIPG membership, and the public, I believe the AIPG must move forward and act on this matter officially. This move is in order to retain the value of the bestowal of the CPG certification and trust of the membership.”

Mike Ruddy, CPG, “I have gone over what you presented, along with responses from others. My perspective and recommendations: First of all, this person carries no hint of ‘prominence’ in any measure. This is not something both organizations should take lightly. Several scenarios may result as a result of this person’s employer.”

“If employed through a private business, professional practice: if is this the case, this person should be fired (AIPG can’t do anything, other than contact this person’s employer to tell them what they may already know) and legal action against this person’s fraudulent activities, by the employer and, any clients the person is involved with. Perhaps the employer may want to consult with both organizations (AIPG & AAPG) since this does involve fraud of the use of CPG status. Since this person tried to ‘bluff the issue aside’ as you state, that is even further proof that this person is knowingly using the CPG title of both organizations.”

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"If this person is employed academically, through a University or the like, these actions impact professional academic colleagues, students, peers and the reputation of the institute. If this person is employed in this role, what kind of lesson will be learned by students of this person (if applicable)? This could be a very severe infraction that would need immediate legal action. Both organizations could also be a liaison, if this is the employment scenario, to better the reputation and respect of both organizations. The audience (academia, students...) could be utilized to provide a large distribution list to ‘broadcast,’ if you will, the seriousness of this person’s actions.”

“If this person is Self Employed or owns a business. These actions would place everyone into a situation where their own positions and reputations are at stake. There may be some that know of these actions, and some not. If so, the one’s that are aware, but not saying anything, ethically, are just as guilty as this individual. This would be a tough nut to crack since the legal implications could shut the business down (if this is the situation).”

“The bottom line is that this person should be thoroughly investigated with swift legal actions to follow. With your statement of prominence, advocacy of professional ethics and for debunking the poor science and practice of others has been publishing papers, this makes the consequences of this persons actions flow out to many directions effecting the reputation(s) of both AAPG and AIPG, and more.”

“In any case, after assuring these actions, this person should be stripped of all licensures, publication privileges, any professional memberships and more. A fully written apology confessing the truth should be established through legal counsel (not his) with a statement worded precisely, that these actions are not to tarnish the respect, reputation and ethics that both organizations abide by. I highly recommend that both AIPG and AAPG become involved to a limited extent, with an investigation to verify this person’s actions, and follow up, accordingly.”

“By the time any investigation gets underway, by any party, I would think that most every state requiring professional licensure will already be aware of these actions, thereby lessening efforts of AIPG & AAPG in contacting the state agencies individually. When concluded and verified, I believe AIPG and AAPG should take a stance on our professional ethics code and not back down in being involved as a “professional” organization in the proceedings of assistance.”

“Ruddy’s follow-up message, “I did not get the e-mail, updating your information on having documented, repeated use of this person using a CPG’s number. Initially, I thought it was only the CPG issue without the number. I don’t know where this update you sent went, but I just now received it after being out of town for the past week. This being, only adds more fuel to the fire. If I were the CPG that has this number, I would find out just whom this person is and file a lawsuit. This person not only put AIPG’s and AAPG’s reputations on the line, but the reputation and profession of this individual. Just how stupid is this person thinking he/she could get away with all this? If the CPG member holding this number takes legal action against this fraudulent person, I would expect AIPG to back him/her up in all regards. My question is how long has this number been used before AIPG found out, or how long has AIPG know this was going on? My recommendations are slightly more stringent now that I know an AIPG CPG Member number was being used.”

Fred Fox, CPG, “I don’t believe that someone would have the brass to do what’s reported. Whatever organization(s) this fellow belongs to should be notified officially that he is unethical and therefore unprofessional, and whatever cards he carries should be summarily nullified. Further, the person whose number he stole should sue—the suit should be financed by AIPG” emphasis in the original.”

The Institute has sent a certified, return receipt requested letter to the individual specifically asking for an explanation of the use of “CPG” and a number belonging to another.
Personality and Human Characteristics of Aquifers

Harry E. LeGrand, CPG-02719

Listen carefully to what the aquifer is trying to tell you. Not all is learned in books and with computer programs, you must spend time in the field to understand how and why an aquifer works.

Editor

Aquifers like to be treated with respect. If they are abused, they can be contrary, and the ground water can be spiteful. They would admit these charges if they were allowed to speak.

Most people do not think seriously of the valuable ground water and the water-bearing formation that is in the ground beneath their feet. Aquifers have a range of personalities and characteristics. They can be kindly or unkindly. What is behind the hostility? Let us have a conversation with ground water and the aquifers.

Humans argue about good and bad features of ground water and the behavior of aquifers. Points of view differ widely while total understanding and communications are less than perfect. The aquifers want to express themselves, but they are left out of the discussions and communications.

Aquifers are talking but do we listen?

Is there something we are missing?

The personality and human characteristics of aquifers can be expressed usefully in metaphorical language. Ascribing human feelings and sensibilities to nonhuman beings, objects, or phenomena is known as anthropomorphism. This approach tends to provide a different perspective and represents a useful picture language. For example, the well beckons and invites the surrounding relaxed ground water to its pompous pump.

Aquifers try to serve humans in helpful ways, but these water-bearing systems can be undesirably stubborn, resulting in problems that collectively run into billions of dollars. Aquifers can readily resist some human actions. An attitude or light-hearted philosophy that maintains that inanimate objects are hostile to humans is called resistentialism. It involves seemingly spiteful behavior from these objects or phenomena. You drop the toast and it hits the floor jelly side down. Humans feed aquifers with wastes here and there, and in return the aquifers give contaminated water back in dispersed form that is difficult and costly to manage. In some cases, over-pumped aquifers give brackish or undesirable water of poor quality to well supplies. Ground water can bite back in many ways.

As an aquifer, I abide by nature's wishes and not by human wishes and expectations. Government agencies try to protect me, of course. Yet, I developed my characteristics and special patterns long before the regulatory agencies were formed. They try to make me behave in regimented ways that they have devised. I have my own creed and will continue to behave as nature has taught me, regardless of human demands. Humans should try to understand better how I operate and then apply proper rules-of-thumb procedures and generalizations that apply.

Like the human body, I have many parts, features, and characteristics that act together in hidden ways. The ground-water specialists probe and examine me with test wells and monitoring programs. In similar ways to blood pressure tests, they may check my inner system and patterns of fluid flow. In some cases the costs are very high. I do not try to simplify things. I tease humans with various complexities and drive mathematical-oriented specialists wild, but they pretend to make me simple and play with me in idealized ways. I am never perfect in all respects. I have as many flaws and complex side-effects as many human medicines.

Humans appreciate my great usefulness in providing potable water to wells for many people and my ability to furnish water to creeks and rivers to maintain surface water supplies. Yet, when abused I can fight back and be spiteful. As with the human body, I can get sick and weak. Already there is a wide variety of problems which shall be even more critical in the years ahead. We have had communication problems in the past, but I am willing to talk with you.

I am not easily adaptable to human regulations but I will behave with my own deliberations. (The aquifer creed)

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Contract Language

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In my last column, I discussed the issues with a contract from a state agency. In this column, I will be discussing a contract from a Fortune 500 size company. As was done last month, the names have been changed to protect the guilty. Also, I am not an attorney nor do I play one on television. This column should not be construed as legal advice. You should contact a competent attorney in your jurisdiction for legal advice in regard to contracts.

Contract between Buyer and Seller

The opening paragraph discusses the agreement as being between the Fortune 500 Company, “the Buyer”, and the design professional, “the Seller”. Usually the word “Seller” is not applied to design professionals or consultants. Service providers are not usually thought of as “sellers”. This is just a hint of the issues to come with this contract.

Time of Completion

“Work to be performed under this Agreement shall start XXXX and Seller shall work the necessary hours with sufficient facility and personnel to complete the entire Work in accordance with the Construction Documents on or before XXXXX.”

What does “sufficient facility” mean? Nebulous phrases like this create issues if things get into court and the lawyers argue over what this actually means. Also the use of the word “Work” to describe the professional services creates concern over the lack of understanding on the part of the client as to the difference between professional services and contracting services. “Work” is more typically associated with contracting services.

Time and Delivery

“Time of delivery of the Work shall be of the essence”. As I pointed out in my last column, this simple sentence will require you to strictly adhere to the schedule with limited opportunity to present arguments as to why you were not able to meet the schedule. If this sentence is removed from the contract, you would at least have the opportunity to present arguments.

Dispute Settlement

“In the event of disputes, controversies, or claims arising out of or relating to this Agreement, both parties agree to seek an amicable settlement. If an amicable settlement can not be negotiated then any dispute, controversy, or claim shall be submitted to mediation under the American Arbitration Association (AAA) mediation rules.”

I was struck by this wording where if the parties can not reach an amicable settlement then they should pursue mediation. Mediation would seem to require the parties to actually cooperate. If they already were cooperating, then mediation wouldn’t be necessary.

The contract then goes on to suggest that if mediation doesn’t work that the parties would then go to binding arbitration in accordance with AAA rules. The issue with binding arbitration is just that… it is binding. If you get an unfavorable ruling from the arbitrator, you have no recourse for appeal. With non-binding arbitration you will at least have the ability to appeal. Also arbitration does not follow the normal rules of discovery etc. that are followed in court.

Indemnification

“Supplier shall indemnify, defend and hold harmless Buyer and each of Buyer’s subsidiaries and affiliates, and their respective customers, employees, officers, directors, successors and assigns, from and against any claims, including Buyer’s claims...”

The good thing is that the clause does not say “any and all”; it just says “any”. The bad thing is that the Buyer is asking for indemnification from their own claims. Apparently the Buyer thinks that they need protection from themselves.

This indemnity is expected to include any “…breach by Supplier or any of its employees or subcontractors of any provision of this Agreement”. The use of the word Supplier is inappropriate for the technical professional. Also, unless the breach is tied back to professional negligence then the insurance policy will not provide coverage of the breach of contract.

Insurance

The contract is requiring the insured to maintain professional liability coverage “for three years after completion of the Work”. As I had discussed last column,
the design professional cannot guarantee that they will be able to maintain this coverage for the time requested. This is due to potential changes in the insurance market due to unavailability or unaffordability of limits and coverage.

The Buyer also wants 30 days notice of cancellation or material change in the insurance coverage. The issue here is what is the definition of “material change”? It could be something as simply as the insured requesting lower limits. But it could also mean that the insurer would have to give 30 days notice prior to posting a claim reserve or making a claim payment on the policy because that would impact the available limits. Some might consider this a material change.

Most Favored Customer

“During the Term of this Agreement, Seller shall not sell or offer to sell Work on terms (including without limitation pricing, warranty, delivery, and payment) more favorable than those in this Agreement. If Seller offers similar Work to a third party on terms that are more favorable then Seller shall offer Work to Buyer on terms and conditions at least as favorable as those offered to such third party”

This was the first time I have seen this language in a services contract. Basically the client is asking that they get the best price offered by the Seller. This further strengthens the point that this contract is more appropriate for a vendor or contractor. The cynical side of me wonders how the Buyer hopes to find out what the insured charge their other clients for their services. Even if they find out what gets charged, the scope of work for the other client will not be the same as that provided for the Buyer so it will be really difficult to determine.

Ownership of Work Product

“All work product including but not limited to computer files, concepts, designs, discoveries, drawings, inventions, models, plans, programming, schedules, specifications, technical documentation, software, or source code ("Work Product") produced in connection with the performance of Seller’s obligations under this Agreement are and shall remain the property of Buyer whether the Work is executed or not. Seller permitted to retain copies of such Work Product.”

This clause is absolutely unacceptable. Firstly, a design professional provides instruments of service not work products. If these are considered to be products then it is possible that product liability theory could be applied and the client would only have to prove a work product was defective. This is much easier to prove than professional negligence.

An even bigger issue is that the design firm is not being permitted to keep copies of their work product. In the event of a claim by the Buyer, the design firm would have to depend on what was in the Buyer’s files to assist in defending the claim. Some documents that might provide support for the insured’s case might mysteriously disappear or might have been altered from what the insured originally provided. This is not in the insurer’s best interest.

This section of the contract also transfers ownership rights of the work product to the Buyer. There is nothing in the contract that limits the Buyer’s use of this work product. The Buyer could reuse it for whatever they like and there is no indemnification being provided to the insured for unintended reuse of the work product.

Termination

This section of the contract is one-sided in that it only outlines the criteria by which the Buyer can terminate the agreement, include the Buyer’s convenience. It does not give the Seller any rights to terminate the agreement.

Warranty

“Seller warrants that all goods and services sold hereunder or pursuant hereto will be free of any claim of any nature and by any third person and that Seller will convey clear title thereto to Buyer.

Seller warrants and represents that all goods and services sold hereunder or pursuant hereto will be of merchantable quality, free from all defects in design, workmanship and material, and will be fit for the particular purpose for which they are purchased, and that the goods and services are provided in strict accordance with the specifications, samples, drawings, designs, or other requirements (including performance specifications) approved or adopted by Buyer”

This warranty is really meant for goods not design services. The second paragraph implies that the designer is guaranteeing their services. There is no mention of standard of care which is what a designer is typically measured against.

Concluding comments

This Buyer seems to have taken their standard vendor/contractor contract and have tried to apply it to professional services. It really does not work very well and creates all sorts of problems for the design professional. Beyond that issue, several parts of the contract are uninsurable. This is when the design professional has to make a business decision because they will be on the hook for the non-insurable.
No-Cost Public Relations Ideas

Duane A. Carey, CPG-10305

If you are like most small business owners, you do not have a marketing plan. Maybe you plan to do some marketing, but that is not a marketing plan, now is it? So here is my challenge to you: as we close out 2006, resolve to start the new year with at least a minimal plan — even if it's written on a beer-soaked bar napkin stained with Buffalo-wing sauce. At least you will have thought about some of the important issues.

Marketing plans include lots of important content regarding strategy, competitive analysis, etc. For the purpose of this exercise, however, we will focus on a Marketing Communications Plan. Simply put, this is the plan to "get the word out" about your business. It should contain ideas from each of the five topic areas that fall under the Marketing Communications Umbrella, as my firm calls it. These topic areas include Public Relations & Promotions, Customer/Client and Referral Source Relations, Collateral, Advertising, and Direct Selling.

In a future article, we will explore each of these areas in detail, with some specific recommendations for the geology or engineering firms. For now, however, let us look at some Public Relations opportunities that are either free or low cost, but can provide a lot of potential exposure for your business. Consider the following questions:

- **Is your organization represented on at least one non-profit board of directors?** (Involvement in your local AIPG section is a great example). Do your clients and referral sources know of this participation?
- **Do you send press releases to tell the world about your charitable work, awards, community events, business expansion, new hires, key accounts, or new contracts?** Each of these milestones is an opportunity to get your name out. Consider trade journals and website, as well as local business newspapers, which are read by the broader business community. I guarantee that you will be the only firm listed under the Geology, Environmental Engineering, etc. categories when you send in a new-hire press release to your local business journal.
- **Have you written any educational brochures that can be distributed to the press and schools?** Are they also posted on your website? For example, if you are a hydrogeologist in a drought-prone area, create an informative piece on droughts. If you know something about earthquakes, do a piece on the New Madrid or San Andreas faults. Do not assume that documents from your state agency will fill this void — educators and media folks will be happy to have a local business person they can call to learn more about these issues. Just be sure that it is not self-serving; stick to the facts and make it useful to the reader. The exercise will help position you as an expert.
- **Have you had at least one educational article or interview in the media in the last six months?** If so, have you ordered reprints to hand out to clients and/or mail or email to your list of contacts? Have you placed a pdf of the article on your website? If your firm does litigation support, do you write a recurring article on your area of expertise in a newsletter focused on the lawyers who specialize in that area of law? If you do geotechnical testing, do you contribute to journals focused on the construction industry?
- **Have you been a speaker or panelist at an event in the past 6 months?**
- **Do you have a mechanized system for staying in touch with clients, prospects, and referral sources on a regular basis?**

- Do you quickly respond to referral sources with a hand-written thank-you note and perhaps a gift certificate for their favorite restaurant? Do you then make sure that the referred client is treated like the most important client you have, so that the referral source looks like a hero and is more than happy to refer to you again?
- **Are you working on a project that utilizes cutting-edge procedures or methods that are considered friendly to the environment?** Or are you cleaning up a contaminated site to turn it into a renewed public use? The media and general public love feel-good environmental stories. Are you informing them of your work?

If you answered no to these questions, it is time to get to work. Most of these cost you some time, but no out-of-pocket costs. Resolve to put on your public relations hat for an hour each month. Consider what you have recently done and the work you will be doing in the coming weeks. If you just think about it for a bit, you will think of plenty of items that are worthy of coverage in some venue. Many of your ideas will get turned down, but if you consistently communicate with the media and outside public, you will expand the universe of people who recognize your name and will pick up the phone when they might need your services.

Duane Carey is President of IMPACT Marketing & Public Relations in Columbia, Maryland. He was a consulting hydrogeologist for 11 years prior to launching a marketing consulting firm in 2003. He earned his MBA at Johns Hopkins University (JHU), and is a Certified Professional Geologist (#10305) and past President of the Capitol Section of AIPG. In late 2005, he took over the helm of IMPACT, which was founded in 1990 by one of his professors at JHU. He can be reached at 410-312-0081 or duane@MilkYourMarketing.com
August 25, 2006

SAY YES TO MICHIGAN!

Dear AIPG Members:

October 2007 will be the first time that the AIPG Annual Meeting has been held in Michigan. The 44th Annual Meeting will be held on October 7 through October 11, 2007 in Traverse City, Michigan.

The meeting location will be the newly refurbished Park Place Hotel in downtown Traverse City. The Park Place Hotel has 140 rooms in addition to conference space, the Beacon Lounge, and Minerva’s Restaurant.

The program includes field trips to Northern Michigan’s Marquette Iron District, Mackinac Island, Sleeping Bear Sand Dunes, and local quarries. Several short courses will be offered, including the Geology of Michigan, Low-Flow Groundwater Sampling Techniques, Mining Issues in Northern Michigan, and Ethics in Geology. Social events include trips to several wineries near Traverse City, an evening at the Dennos Museum, the awards reception, and a golf outing. Full details of the meeting are available on the Michigan Section website, www.aipg.mi.org.

Our technical program will emphasize the meeting theme, “Geology: The Foundation of the Environment and Resources,” and will underscore the importance of the many facets of geology in our everyday lives.

The meeting will be held during the peak of the fall color season in Traverse City, and the field trips and social events will provide plenty of opportunity to see the incredible color of northern Lower Michigan.

Make plans now to attend the 44th Annual Meeting of AIPG in Traverse City. Registration for the meeting is now open. Register early to take advantage of lower pricing and assure yourself a place on the field trips. As Chairman of the 2007 Annual Meeting, and on behalf of the planning committee, I hope to see all of you in Traverse City in 2007!

Sincerely,

Adam W. Heft, CPG 10265
2007 Annual Meeting Chairman
CALL FOR PAPERS

The American Institute of Professional Geologists
Michigan Section

44th ANNUAL MEETING
TRaverse City, MICHIGAN
OCTOBER 7 - 11, 2007

You are cordially invited to attend the 44th Annual Meeting of the American Institute of Professional Geologists hosted by the Michigan Section of AIPG in Traverse City, Michigan, October 7 - 11, 2007. The theme of this year's meeting is "Geology: The Foundation for the Environment and Resources."

The 2007 meeting not only incorporates our goal of highlighting the role of geology in defining, protecting, and sustaining our environment and its resources, but also offers a forum to provide opportunities for reporting on regional geologic studies pertaining to a variety of topics. Such topics include energy and mineral resources, stratigraphy, sedimentology, paleontology, structural geology, basin analysis, and geophysics in any of the diverse geologic regions of North America. The Michigan Basin is famous for the Great Lakes, a rich mining history, unique minerals, petroleum resources, Paleozoic fossils, Quaternary glacial deposits, sensitive dune and aquatic environments, and some of the oldest macroscopic fossils in the world. All of these areas provide many opportunities for thoroughly interesting study.

In addition to technical presentations, there will be a forum for AIPG's core issues concerning ethics, public policy, licensure, and legislation. The Technical Program Committee encourages you to participate in this informative meeting by contributing a written abstract for an oral or poster presentation.

We will consider abstracts of up to 250 words for all papers related to the general meeting theme, to an area of geologic study, or to AIPG's core issues. The Deadline for submitting an abstract is July 30, 2007.

To submit or discuss abstracts, contact:
Eric E. Wallis, CPG - Technical Program Chair
Ewallis@comcast.net

Design the 2007 National Meeting T-Shirt

Beginning immediately, we will hold a contest for the design of a T-shirt for the meeting. It should have the meeting information and theme. We may include a sponsor logo on the sleeve or back. The best design will win a free registration to the 2007 National Meeting. The deadline for submittals for the T-shirt will be February 15, 2007. The winner will be acknowledged in the program book. Entries should be sent to Adam Hefta at hefta@fitzhenne.com or faxed to (517) 887-6335.
Playing Nice, 
In the Real World

Nancy Price, SA-0382

College is a unique and peculiar place to spend four years. People are generally kind to one another and it is easy to make friends. On-campus housing forces you live in a more “cozy” atmosphere than you may have been used to, which can lead to a rare social openness not common elsewhere. College is where you learn, so mistakes are often made, people get insulted, social groups are disrupted, but in the end it is tolerated or forgiven because everyone is learning. Ignorant comments and naive behavior are more easily forgiven (esp. if you are a lower classman) because you just don’t get it yet. Professors and staff know who you are, care about where you are going, and, oftentimes, are friends as well. Intellectual, political, or religious discussions can pop up between two classmates on a street corner. The sun is shining, the birds are singing, and everyone is happy.

It is easy to get used to the social bubble that is college. It is really easy to think that that is the way that everyone in the real world behaves and it is not entirely pleasant to realize that the majority of them really do not. The personal growth learning curve for much of the population flattens out significantly after college. As people learn more about what they want out of life, they get comfortable, or “set in their ways”. Opportunities for growth become few and far between so that when they do occur people tend to respond with minds that are less open and in ways that may not even be remotely mature. The result can be a situation blown out of proportion that could be drawn out for longer than it reasonably should. Therefore, before you go out into the real world, be it for a new job, graduate school, or even just for a summer’s internship, it is a good idea to consider how you are going to interact with those around you.

In the real world, it is best to keep a healthy level of separation between work and pleasure. I am not referring to keeping the blow by blow account of last night’s date to yourself (although that is probably a good idea). I am rather talking about the idea that not everyone at work is your personal friend. In college, you can easily make friends out of people in your classes. The line between someone in your class and someone who is your friend is thin. The real world tends to be a little more black and white. Being friendly at work is important for creating a good working atmosphere, but don’t be disappointed when someone at work does not consider you a close friend just because you work together and chat everyday. It is possible to find a good friend in someone at work. Just be sure to learn the difference between a friend from work and a work-related acquaintance and respect that difference.

College is also very good at making you think that everyone in the world is just like you. Sure there is diversity at college (different languages, different nationalities, etc.) but when it really comes down to it, the majority of people you are grouped with are people in their late teens-early twenties who are part of the dating scene, unmarried, healthy, and still living with their parents. You probably are not experiencing a divorce, buying a home, or fighting a life-threatening disease. Retirement or even saving for it is the furthest thing from your mind. Everyone is at a different place in his or her life and when you are out in the real world you need to be considerate of that and respect that. This could mean being helpful when someone goes on maternity leave, but it can go so far as recognizing the marriage commitments of others by keeping your flirting habits at bay until you are out of the office. Also, watch what you say and how you say it. Not everyone has the same religious beliefs or political views as you do and what you may think is an innocent comment may be highly insulting to someone else.

Another funny thing about the real world is that older, seemingly more mature people are not as well-adjusted to life as you may think. I had to take off my rose-colored glasses to figure that one out. There are people out there who do not like themselves, who are lazy and unproductive, or who are jealous of the success of others. It is not your responsibility to fix these people, but you do have to be aware of them and at times deal with them. Unlike in college where you can be liberated from troublesome students or even professors at the end of each semester, you may be working with these types of people through a span of years. I find it best to identify these personality types early and then adjust how you interact with them so as to minimize any potential alterations in the future. For example, graduate school is a place where there is a high level of collective anxiety that is hard to cope with. The majority of students are simply worried about whether or not they are doing a good job or where next year’s funding is coming from. A few students, however, place their sense of personal self worth into their work, far beyond a simple sense of pride in a job well done. These are the types of people that will become personally offended and angry beyond reason when you criticize their work or would even undermine another colleague to come out on top. When I encounter these types of people, I either ignore them and their comments...
or handle them delicately by watching what I say or how I say it. Of course, the majority of people are very decent and mature, but it takes only one bad person for a good situation to turn sour.

Dealing with social situations in the real world is different from person to person and work place to work place. As you get out there and learn from the people around you, you will develop your own way of fitting into the workplace. Two rules that I always like to stick to are: 1. always maintain a sense of professionalism in all dealings and 2. strive to take the moral high ground. Being professional from the start helps you to keep relations neutral until you have decided if you want to become more personal. This can help prevent unintended misunderstandings between colleagues. Being professional also includes treating everyone with a basic level of respect so that you can keep from inadvertently insulting those with fragile egos and prevent yourself from disrupting the social hierarchy before you have a chance to understand it. Taking the moral high ground refers to making decisions in social situations that others will not make, either out of pride or stubbornness. This could include apologizing first or giving in on an argument. A lot of times if there is a bad situation, no one wants to make the first move so usually no one does. The bad situation then gets worse and life in the workplace becomes unpleasant. If you are the one to break the tension and act mature, others may realize how poor their behavior was and follow your example. The problem is resolved before it has a chance to explode.

Finally, in college, you are led to believe that there are people looking out for you. Professors want you to pass their classes so many of them work with you in any way they can to help you get a good mark. Academic advisors help you pick out classes and make sure that you have completed all the requirements for graduation. In the real world, there is no one there to make sure that you are reaching your goals. You have to take care of things yourself. This means figuring out what you want to gain from a given job, internship, or graduate appointment and going after that. It also means knowing when to stay and when to leave a job. If you are not happy in a given position or if you feel as though you are ready to move up the professional ladder, your boss is not going to have the course laid out for you. In fact, if you are good at what you do, he or she may pressure you to stay. Just remember to keep your own goals in mind when making decisions because chances are that no one else will.

Of course, do not worry. Sit back and put your feet up. You are not there yet. Make friends with the guy next to you in class or have a debate about politics with the girl in front of you in the lunch line. Get coffee with your favorite professor. In other words, enjoy the bubble for as long as you have it. Just remember that no matter how much you know about geology, you still have to make it through the interview and it is a different world outside of the bubble.

If you have any ideas, questions, or comments about this article or any other issues, please feel free to contact me via email at: nancyaprice@yahoo.com.
Applicants for certification must meet AIPG’s standards as set forth in its Bylaws on education, experience, competence, and personal integrity. If any Member or board has any factual information as to any applicant’s qualifications in regard to those standards, whether that information might be positive or negative, please mail that information to Headquarters within thirty (30) days. This information will be circulated only so far as necessary to process and make decisions on the applications. Negative information regarding an applicant’s qualifications must be specific and supportable; persons who provide information that leads to an applicant’s rejection may be called as a witness in any resulting appeal action.

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The Return of
Tyrannosaurus Rex
Reminiscences of a Hydrogeologist

Wayne A. Pettyjohn, CPG-02749

As one reaches their twilight years they begin to reflect on the past and wonder what the future holds for their profession. My ground-water work began more than 40 years ago as a project chief with the Ground-Water Branch, Water Resources Division of the U.S. Geological Survey. At that time nearly all ground-water investigators received their original training with the USGS. In this regard I am reminded of the title of Jimmie Doolittle’s autobiography, I’ll Never Be So Lucky Again.

Much of the hydrogeologic education we received at that time was in the school of hard knocks. For the most part, our text books consisted of several of the classic Water-Supply Papers, as well as Ground-Water Notes, which was a notebook of selected articles written by Survey authors. Many of us were sent to the field with little, if any, knowledge of procedures required to adequately conduct a ground-water investigation. Despite our mistakes and the long paths we sometimes took, we learned as we worked. I was enlightened to a considerable extent by the drillers with whom I was associated. Even though “in charge” I was clever enough to let them do their job because they knew what needed to be done and how to do it, and I did not.

Fortunately, I had previously mapped several geologic quadrangles, and this was a great help.

Several District Chiefs were not only capable administrators, but exceptionally fine teachers as well. They encouraged their staff to learn, think new ideas, try different things, and develop better techniques. In addition, we could discuss our projects with any one in the Survey, and many of these early Giants of Hydrogeology provided helpful hints, encouragement, and the benefit of their experience and expertise. What more could one ask for? After many months with the Survey, and if time and space permitted, one might have the opportunity to attend the month long Ground-Water Shortcourse, which was held at the University of Arizona. This was a marvelous experience that clearly showed the interrelation of the various parts of the hydrologic cycle, and why one needed to consider more than just the ground-water.

During our investigations we did geologic mapping, measured water levels, installed test holes, conducted and analyzed aquifer tests, collected water samples, drew maps, and wrote reports, among many other things. Most of our calculations were made on the basis of Darcy’s Law. Since neither computers nor hand-held calculators were available, our models were all of the mental type. We got cold, hot, hungry, tired, and dirty. It was exciting and exhilarating work. Everyday could be a challenge, what a magnificent way to start a career.

Our reports were certainly lightweight with regard to water quality, but they were generally strong in fundamental principles, although by today’s standards we were not very sophisticated. Our reports were written and rewritten many times because of the extensive report review procedure that was followed by the Survey. “Suggestions To Authors Of Reports Of the U.S. Geological Survey” was required reading, and it had to be followed. If something was not clearly stated, an interpretation was questionable, a map was not drawn correctly, or thinking was fuzzy, the reviewers, in a manner that left little doubt but that more work was required, mentioned it. Probably a significant Survey budget item was for red pencils.

Not only were our thinking, interpretations, conclusions, and writing skills critically examined, but geologic terminology and graphics also were carefully considered. Draft water-level maps, for example, included the data on which they were based so that the reviewers could see why the contours were drawn as they were, that the data made sense, and that each drawing was technically correct.

All of the reviewer remarks and the reports returned for revision were, to say the least, hard on the ego, but it made us think more clearly the next time. It provided an exceptionally fine method for learning, and in essence a much better, technically correct report. I would be less than honest if I did not admit that I took exception to some of the remarks and changes. But in the long run, this process probably taught me more about writing and hydrogeology than any thing else, other than the experience gleaned in the field.

Considering the body of knowledge and the approach used years ago, our education and procedures nowadays probably would be considered as a reflection of the Age of Dinosaurs. There is some truth in this assertion. On the other hand, perhaps there are still a few things that may be learned even from a dinosaur.

During the past several years much of my time has been spent reviewing projects and reports. A good share of these, in one way or another, are involved with legal actions in which large sums of money may be at stake. I find much to be discouraging, and this may be related to the tremendous increase in the number of ground-water investigators that have appeared in the work force over the past 20 years or so. Although
a majority of these individuals have an immense reservoir of expertise in their own right, many have little or no training in geology, ground-water hydraulics, inorganic geochemistry, or report writing. Although perhaps well versed in microbiology, computer programming and manipulation, or the chemistry of organic compounds, something is missing. To my way of thinking the lost link is the concept of fundamental principles of ground-water flow and mass transport. We have become so sophisticated that Darcy’s Law no longer appears to have a place in our 21st Century investigations and interpretations.

As a consequence, many different types of maps are now exclusively computer generated by a machine that has no capacity for thought. Not uncommonly the hydraulic gradient and water-level maps are based exclusively on well location, while well depth and construction are ignored. Ground-water recharge, if considered at all, is frequently postulated to be uniform throughout each year, representing 5, 10, or 20 percent of precipitation, regardless of conditions. Furthermore, precipitation is assumed to be the same year after year, but the installation of a rain gage is rare. Stream discharge data and analyses are inconsequential mysteries, Darcy’s Law is disregarded, and even simple mass balance calculations are infrequent. Horizontal and vertical flows, both of which are essential to an understanding of the ground-water system, are almost never present. Photographs of the riverbed or potentiometric surfaces are rarely presented, and many that do appear are based on short-term, quarterly or annual measurements only. In many cases it is assumed that the entire volume of a spill instantly reaches the water table of the aquifer where it is both immediately and thoroughly mixed with the water in storage throughout the entire saturated thickness...regardless of the subsurface conditions. These are just a few of the topics that could be mentioned.

These shortcomings and misconceptions make realistic interpretations difficult or impossible, and certainly costly for the client...not to mention the embarrassment that might result during a deposition or trial. It does not have to remain this way. A solution might be to return to some of the approaches used by the dinosaurs, that is, attention to both detail and basic principles.

On the other hand, there is little value in spouting negative remarks or criticism unless one reflects on the underlying cause for concern and offers at least a partial solution. After discussions with a considerable number of older colleagues, none of whom disagreed with my general thesis, one motive continued to be voiced. The greatest number of practicing hydrogeologists today are employed with consulting firms where profit is the driving force. The concept of billable hours is paramount, and there is limited time available for detailed report writing, critical review, and modification. There is certainly some truth in this allegation, but “billable hours” is not entirely to blame.

Whatever the cause, there must be a solution. Again, to my way of thinking, hydrologic investigations, interpretations, and report writing could be substantially improved by additional education. Certainly many opportunities are available, and these range from conferences and formal course work to home study. Professional groups offer many short courses, and papers are available through universities, various governmental agencies, and private enterprise. These, however, can be quite expensive, both in time and money, and it would appear that the general trend is to devote no more than a few minutes to fundamental concepts. Perhaps it is assumed that everyone understands the basics, but this may be a significant misconception.

Another educational alternative or supplement is field study. One could discover a great deal by examining several of the classic Aquifer Supply Papers and USGS Professional Papers. They may be old and perhaps to some extent, but they are full of the techniques, and crucial concepts.

Other than some of the technical aspects of our profession, a few other things have changed me in the years since ground-water became generally popular. Three in particular include integrity, character, and justice. These terms can be defined in several ways, but the simple approach is to equate integrity with honesty, character with moral strength, and justice with fairness.

In my work as an expert witness I have come across a number of interesting cases and equally interesting witnesses. And this is where the rub comes in. It seems to me that one of the most popular pastimes in the United States today is suing someone. Although more than adequate justification exists perhaps even in the majority of cases, for others the driving force seems to be greed, the chance to obtain something for nothing, revenge, ignorance, or contingency fees. In other cases the goal seems to be an opportunity to escape responsibility.

In cases such as these, are we, the experts, searching for the truth or the excuse? Should one character and integrity permit him or her to knowingly help someone to escape their responsibility for a wrong or to take advantage of someone? Should one provide an alternative to a cause and effect only to muddle the water when we know the idea is incorrect? I think not, but this is only my opinion, an opinion that is based on my own personal character, idea of integrity, and my concept of justice. Certainly many disagree with my notions, but that is their right.

Very likely many of us have been involved in cases where our client came out on the short end of the stick and justice clearly did not prevail. Although neither the first nor the last time, this happened to one of my clients several months ago. For weeks I was extremely angry at the attorney on both sides for their settlement agreement, at the testimony of the opposing expert witness, and at the American legal system in general for its apparent lack of justice. While complaining to one of my attorney friends, I received some sage advice when he said, “Son, if you want to get screwed, you go to court. If you want justice, you go to a bondsman.”

Proper of notice is at all is the old cliché, “Which came first, the chicken or the egg?” Anyone who has ever taken a course in historical geology is well aware that dinosaurs hatched billions of years before chickens ever evolved.

Wayne Pettyjohn retired as Head, School of Geology, Oklahoma State University in 1995. For several years he was a professor at The Ohio State University and previously served with the U.S. Geological Survey. Wayne spent some 40 years as a hydrogeologic consultant and expert witness. He obtained a Ph.D. from Boston University and was admitted to the North Dakota bar in 1968. He is a recipient of the Ben Parker Memorial Medal. Since retirement he has become a military historian specializing in World War I and the U.S. Marine Corps. Semper Fi. wpettyj@aol.com, 405-372-1981.
Answers

1. The answer is “b” or BaSO₄, or Barite.
   Sulfate minerals contain the complex sulfate ion (SO₄)²⁻. Barite, BaSO₄, is a sulfate mineral (orthorhombic system) with a non-metallic luster, a hardness of 3.0 and a white streak. It occurs in the form of colorless, white, red, brown, yellow and blue plate crystals, or in massive form, or in rose-like shapes. It exhibits cleavage and has a specific gravity of 4.5. Due to its high specific gravity and other properties, barite is generally used in the development of oil-well drilling fluids and may be utilized in the manufacturing of paint, rubber and glass. Barite is also used as filler for paper and textiles and is an ore of barium.

Gypsum, CaSO₄·2H₂O, is also a sulfate mineral (monoclinic system) with a non-metallic luster, a hardness of 2.0 and a white streak. It is typically colorless to white in appearance and exhibits cleavage. It has a specific gravity of 2.3. Gypsum is generally used in the development of plaster-of-Paris, wallboard, drywall, as a retarder in Portland cement and as an art-sculpture medium (alabaster).

Bornite, Cu₄FeS₄, is a sulfide mineral of copper and iron (isometric system) with a metallic luster, a hardness of 3.0, a dark grey to black streak and an iridescent copper-red, blue or purple color on fresh surfaces. It has no visible cleavage and a specific gravity of 5.1. As it is an ore of copper, it may be used in the development of pipes, coins, electrical circuits, ammunition, brass or bronze.

2. The answer is “c” or 5.51 gm cm⁻³.
   The proof follows:
   \[ M = 5.97 \times 10^{27} \text{ grams} \]
   \[ D = M/V \]
   \[ V = (4/3)\pi R^3 \]
   \[ V = (4/3)(3.1416)(637,120,000 \text{ cm}^3) \]
   \[ V = 1.083311 \times 10^{27} \text{ cm}^3 \]
   \[ D = (5.97 \times 10^{27} \text{ grams})/(1.083311 \times 10^{27} \text{ cm}^3) \]
   \[ D = 5.51 \text{ gm cm}^{-3} \]

3. The answer is “b” or \( \sigma = [(V_p/V_s)^2 - 2] / 2[(V_p/V_s)^2 - 1] \). The proof follows:
   \[ V_p^2 = [(\lambda+2\mu)/\rho] \]
   \[ V_s^2 = (\mu/\rho) \]

4. The answer is “e” or Carbon-14 to Nitrogen-14.
   The parent Carbon-14 isotope yields the daughter Nitrogen-14 isotope as a result of radioactive decay. The half-life of the parent isotope has been determined at 5,730 ± 30 years. The effective dating range of this technique has been determined to be from 100 to 70,000 years. The Carbon-14 to Nitrogen-14 method may be used to determine the “absolute age” of organic matter (wood, bone, flesh, shell, etc.). The technique may also apply to carbon in CO₂ dissolved in groundwater, deep layers of the ocean and glacial ice.

The parent Rubidium-87 isotope yields the daughter Strontium-87 isotope as a result of radioactive decay. The half-life of the parent isotope has been determined at 47 billion years. The effective dating range of this technique has been determined to be from 10 million to 4.6 billion years. The minerals muscovite, biotite, K-feldspar as well as whole igneous and metamorphic rocks may be used for dating purposes and “absolute age” determination using the Rubium-87 to Strontium-87 method.

The parent Uranium-238 isotope yields the daughter Lead-206 isotope as a result of radioactive decay. The half-life of the parent isotope has been determined at 4.5 billion years. The effective dating range of this technique has been determined to be from 10 million to 4.6 billion years. Uraninite, pitchblende and zircon may be used for dating purposes and “absolute age” determination using the Uranium-238 to Lead-206 method.

The answer is “a” or normal/gravity faults.

Shear fractures develop with a predictable geometry to the major and minor principal stress axes (σ₁ and σ₂, respectively). Field observations of naturally-deformed and fractured rocks, rock deformation experiments in the laboratory and the Coulomb-Mohr fracture criterion illustrate that shear fractures form at angles of about 30 degrees to the σ₁ direction and about 60 degrees to the σ₂ direction, extending in the direction of σ₃. Since in this case σ₁ is vertical, any displacement: along a shear fracture plane will be such that the hanging wall moves down with respect to the foot wall. This defines a normal or gravity fault.

![This particular stress orientation leads to the development of normal or gravity faults.](www.aipg.org)
Estimating Water Yield in New Mexico’s Rio Chama Watershed, a Data-Poor Semi-Arid Mountainous Setting

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David Morgan, 901-J W. San Mateo Rd., Santa Fe, NM 87505
William Stone, PhD, 1090 Ranchero Road, Bosque Farms, NM 87068

Abstract

Estimation of water resources is essential for watershed management and regional water planning, both of major importance in the semi-arid western United States. Unfortunately, professional geologists and other scientists are often faced with the dilemma of estimating water yields in tributary basins from very limited sources of data. The objective of this study was to estimate a range of water yields for ungauged tributaries in the Rio Chama watershed of Northern New Mexico. A regression model, based on area, mean winter precipitation, and slope of tributary basins originally developed by Hearne and Dewey, was modified to provide estimates of probable ranges of water yields for ungauged tributaries in the Rio Chama watershed. The yield estimates compared favorably against the total water yield of the watershed calculated using an independent method. This case study in water resource estimation may serve as a practical approach to estimating water budgets for other watersheds that have similar physical characteristics and data constraints.

Keywords: watershed management, planning, water balance, watershed, water yield

Introduction

The State of New Mexico is conducting water planning in 16 regions to quantify and manage water resources. Planning efforts are overseen by the New Mexico Interstate Stream Commission and funded by the Commission and local entities. In an ideal world, professional geologists and other scientists tasked to carry out the planning efforts, would have at their disposal gaging stations on major tributaries, groundwater monitoring within the different aquifer systems, evapotranspiration stations, climatic monitoring stations, and return flow stations. However, in the real world, hydrological data are often very limited. The amount of data available is an important factor in selecting an approach for estimating water yield or other hydrologic parameters to most effectively characterize water resources.

We estimated water yield using two approaches. The first approach utilized the basic water budget method for the Rio Chama watershed that assumes all inflow to the watershed will leave the watershed as either water yield or evapotranspiration. Water yield for the entire Rio Chama watershed may be quantified reasonably well using available data. However, it is difficult to quantify water yield for the individual tributaries in the watershed because few have ever had gaging or climatic monitoring stations. This paper summarizes the second approach, which is an adaptation of a multi-regression model developed by the United States Geological Survey (Hearne and Dewey, 1988), to estimate a range of water yields for ungauged tributaries in Northern New Mexico. To check the accuracy of our approach, we compare the sum of the water yields of the individual tributaries using the second approach to the water yield estimated for the entire watershed using the first water budget approach.

Regional Site Description

The Rio Chama watershed straddles the New Mexico/Colorado border and covers approximately 3,157 square miles.
Elevations in the planning region range from 11,410 feet at the top of Brazos Peak to 5620 feet at the confluence of the Rio Chama and the Rio Grande. The tributaries within the watershed provide the only surface water supplies available, except for water imported by the San Juan-Chama project. San Juan-Chama water is diverted into the Rio Chama but for all practical purposes is not available for use within the region. The Rio Chama has thirteen tributaries large enough to support any appreciable irrigated agriculture: Cañones Creek, Rio Brazos, Rito de Tierra Amarilla, Rio Nutrias, Rio Cebolla, Rio Gallina, Rito de Canjilon, Rio Puerco de Chama, a second Cañones Creek, El Rito, Rio del Oso, Abiquiu Creek, and Rio Ojo Caliente (which itself is fed by the Rio Vallecitos and the Rio Tusas) (Figure 1).

\[ ET_{\text{tot}} = \text{total evapotranspiration (including water-surface and riparian evapotranspiration)} \]
\[ dS = \text{change in reservoir and ground-water storage} \]

Water yield in this analysis is defined as water potentially available for human diversion as either ground water or surface water. The water-budget analysis for the Rio Chama included both surface runoff and ground-water recharge together because insufficient data exist to reliably separate the two yield components without double-counting. Water probably cycles repeatedly between the surface and subsurface before leaving the watershed, making it difficult to reliably separate surface- and ground-water components of a water budget.

The water budget for the entire Rio Chama watershed was based on data for inflow and outflow components, with \( ET_{\text{tot}} \) assumed to be the difference between these known components. It was assumed that there was no ground-water inflow to the watershed, and trans-basin diversions from the San Juan-Chama Project were kept separate from native water in the budget, leaving precipitation as the only native water inflow. It was assumed that there was no net long-term change in ground-water storage based on trends in water levels with time in wells in and adjacent to the watershed. This approach provided estimates of water-budget parameters for the entire Rio Chama watershed (Rio Chama Regional Water Plan, 2006):

\[ P = 3,270,000 \text{ acre-ft per year}; \]
\[ I = 0; \]
\[ Y = 418,000 \text{ acre-ft per year}; \]
\[ ET_{\text{irrig}} = 2,852,000 \text{ acre-ft per year}; \]
\[ dS = 0. \]

**Approach 1 - Water Yield for the Entire Watershed**

The first approach to estimate water yield utilized the basic water budget method for the entire Rio Chama watershed, using a simple equation:

\[ P + I = Y + ET_{\text{irrig}} + dS, \] (1)

where

\( P \) = precipitation

\( I \) = inflow of surface water and ground water

\( Y \) = water yield

**Approach 2 - Water Yield for Individual Tributaries**

In the absence of measured streamflow data, we estimated the unaged tributary flow using a model developed by Hearne and Dewey (1988) for neighboring New Mexico tributaries. The model uses a multi-regression of known data for area, mean winter precipitation (for October to April), and slope for 16 tributary basins to derive known stream flows for the basins. The mean winter precipitation used in the model was determined from a map constructed using data for 1931-1960. The stream flows used in the model were mean annual flows for the period of record for each stream to 1980. The correlation coefficient for the logarithmic regression of the model was 0.96. The annual water yield (Q), in cubic feet per second, was estimated by the regression equation given by Hearne and Dewey:

\[ Q = 1.074 \times 10^{-5} A^{1.216} P_{\text{w}}^{0.749} S^{0.535} \] (2)

where

\( A \) = area of the tributary (square miles)

\( P_{\text{w}} \) = mean winter precipitation (inches)

\( S \) = slope of the tributary (feet per mile).

As the tributaries of the Rio Chama watershed share similar physical properties to those used by Hearne and Dewey, their model seemed to be appropriate for predicting water yield in the unaged tributaries in the Rio Chama watershed. The tributary basins used in the model and in the Rio Chama watershed are characterized by low precipitation, underlying rocks of low permeability, negligible recharge, and good surface water/ground water connection. One of the 16 tributary basins in the Hearne and Dewey model, the Rio Ojo Caliente, is located within the Rio Chama watershed. Stream flow out of these tributary basins in the model and in the watershed was assumed to represent the water yield of the basins.

In applying the Hearne and Dewey model to the Rio Chama watershed, we used the best available data as inputs for area, slope, and mean winter precipitation. The areas of the tributary basins in the Rio Chama watershed were determined by counting squares on an overlay of a 1:250,000 scale map. The slopes of the tributaries in the watershed were calculated as done in the Hearne and Dewey model. That is, the altitude difference, in feet, was divided by the length of tributary channel, in miles, between two points along the tributary stream channel. These two points were located upstream along the channel 10% and 85% of the distance from the confluence of the tributary with a larger stream.

Because no mean winter precipitation data are available specifically for tributary basins in the Rio Chama water-
shed, we estimated this parameter by developing a linear-regression model that correlates mean winter precipitation fraction and mean elevation. The fraction was then multiplied by the estimated total annual precipitation for each tributary basin. Annual precipitation area was estimated by counting squares on a precipitation map using an overlay of a 1:250,000-scale map. The total number of squares in each isohyetal band in each tributary watershed was multiplied by the average precipitation in that isohyetal band to obtain precipitation volume.

The regression analysis was based on data from 18 weather stations in and adjacent to the Rio Chama watershed (Kunkel, 1985). The fraction of winter precipitation reported from these weather stations was correlated with the known elevations of the stations. The correlation coefficient for this linear regression was 0.77 (Figure 2). The mean elevation for each tributary in the Rio Chama watershed, the independent variable in the correlation, was then

\[ Q = 1.074 \times 10^{-5} A \cdot 216 P_{\text{ave}} \cdot 2.749 \cdot S^{0.13} \]

Some of the predicted values are higher than observed values (or computed stream flows) from the few gaged tributaries, and some are lower than observed values (Table 1).

It is clear that the greatest source of uncertainty in using the Hearne and Dewey model is the estimate of mean winter precipitation. As shown in Figure 2 the linear-regression curve for mean-winter-precipitation fraction and elevation has a best-fit or correlation coefficient of only 0.77. The correlation has a mean standard error (or scatter from actual values) of 12.3% for the 95% confidence interval. The uncertainty arises in that the Hearne and Dewey model is very sensitive to mean winter precipitation since it is taken to nearly the third power in the equation.

**Discussion**

In view of these uncertainties and the discrepancies between predicted yield and observed runoff values, where resulting values were used in the Hearne and Dewey equation. Column five of Table 1 shows the predicted water yields where the winter precipitation fraction (using the best-fit line) was multiplied by the average annual precipitation and used as P in the Hearne and Dewey equation. Columns six and seven of Table 1 show the predicted water yields where the winter precipitation fraction minus and plus the mean standard error, respectively, were multiplied by the average annual precipitation and used as P in the Hearne and Dewey equation. The estimated range of water yields, predicted from the Hearne and Dewey model, can be compared with the observed water yields based on actual stream-flow data where they are available (column eight of Table 1). Estimated water yields based on observed data generally fall within the range of predicted water yields.

The observed stream flows in the northern part of the watershed, and generally at higher elevations, trend toward the high end of the predicted range of water yields. This includes the four upper tributaries of the Chama River that make up flows measured at the La Puente gage. Observed stream flows in the southern part of the watershed, generally at lower elevations, trend toward the low end of the predicted range of water yields. This includes El Rito and the two tributaries that join to form the Rio Ojo Caliente and are measured at the stream gage at La Madera. The observed stream flow for Canjilon Creek is significantly lower than the range of predicted water yields. However, observed stream flow for this tributary is based on limited data from only one year (1913), which was relatively dry. Additionally, the Canjilon Creek stream gage is believed to have been located some distance upstream from the mouth of the creek, so that a significant fraction of streamflow from the total contributing watershed area was not measured by the gage.

**Conclusion**

A modification of the model developed by Hearne and Dewey (1988) proved to be a useful approach for estimating water yield in ungaged tributary basins in the Rio Chama watershed in New Mexico. The water-yield values predicted using the model do not, however, represent the actual or observed values. We determined an approach to estimate a range of values, based on the uncertainty of the data; this provided reasonable esti-
Table 1
Predicted water yields for tributaries in the Rio Chama watershed. Lighter shade represents predicted water yields at the low end of the range that compare well with observed streamflows lower in the watershed. Darker shading represents predicted water yields at the high end of the range that compare well with observed streamflows in the upper watershed.

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</tr>
<tr>
<td>Río Brazos</td>
<td>63</td>
<td>21.7</td>
<td>80.5</td>
<td>9,847</td>
</tr>
<tr>
<td>Rito de Tierra Amarilla</td>
<td>179,015</td>
<td>125,053</td>
<td>243,858</td>
<td>257,700</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>219,061</td>
<td>153,027</td>
<td>300,855</td>
<td></td>
</tr>
<tr>
<td>Tributaries between La Puente and Río Ojo Caliente (no gage for multiple tributaries)</td>
<td>366</td>
<td>17.5</td>
<td>58.7</td>
<td>33,765</td>
</tr>
<tr>
<td>Horse Lake etc.</td>
<td>114</td>
<td>20.1</td>
<td>55.4</td>
<td>12,760</td>
</tr>
<tr>
<td>Willow Creek</td>
<td>119</td>
<td>18</td>
<td>85.2</td>
<td>12,653</td>
</tr>
<tr>
<td>Río Nutrias</td>
<td>124</td>
<td>15.8</td>
<td>59.3</td>
<td>6,745</td>
</tr>
<tr>
<td>Río Cobolla</td>
<td>154</td>
<td>17.9</td>
<td>156.3</td>
<td>26,828</td>
</tr>
<tr>
<td>Canjilon Creek</td>
<td>144</td>
<td>18</td>
<td>125.7</td>
<td>19,098</td>
</tr>
<tr>
<td>El Rito</td>
<td>278</td>
<td>17.8</td>
<td>81.2</td>
<td>30,256</td>
</tr>
<tr>
<td>Río Gallina</td>
<td>214</td>
<td>21.1</td>
<td>132.1</td>
<td>44,961</td>
</tr>
<tr>
<td>Río Puerco de Chama</td>
<td>82</td>
<td>24.5</td>
<td>225.3</td>
<td>31,995</td>
</tr>
<tr>
<td>Cañones and Polvadera</td>
<td>75,941</td>
<td>53,049</td>
<td>104,296</td>
<td>51,000</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>19,322</td>
<td>13,812</td>
<td>23,134</td>
<td></td>
</tr>
<tr>
<td>Río Ojo Caliente tributaries above la Madera gage</td>
<td>175</td>
<td>22.7</td>
<td>100.2</td>
<td>44,209</td>
</tr>
<tr>
<td>Río Vallecitos</td>
<td>198</td>
<td>20.8</td>
<td>71.3</td>
<td>31,732</td>
</tr>
<tr>
<td>Río Tusas</td>
<td>75</td>
<td>19.9</td>
<td>231</td>
<td>8,794</td>
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<tr>
<td>SUBTOTAL</td>
<td>447</td>
<td>15.6</td>
<td>44</td>
<td>17,700</td>
</tr>
<tr>
<td>Lower and unnamed Tributaries (no gage)</td>
<td>40,490</td>
<td>28,285</td>
<td>55,609</td>
<td></td>
</tr>
<tr>
<td>TOTAL PREDICTED YIELD</td>
<td>514,508</td>
<td>359,414</td>
<td>706,619</td>
<td></td>
</tr>
<tr>
<td>TOTAL PREDICTED YIELD USING WATER BUDGET ANALYSIS</td>
<td>418,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Periods of Record: Río Chama above Cañones Creek is 1913-1915; La Puente is 1955-2000; Río Brazos is 1913-1915; Willow Creek is 1943-1970; Canjilon Creek is 1913; El Rito is 1931-1935; Río Vallecitos is 1913-1914; and Ojo Caliente is 1982-2000.

2. La Puente gage measures flow from four tributaries.

3. Estimated water yields are the sum of the observed stream flow and estimated irrigation depletions.

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www.aipg.org
and Fred Vigil (Rio de Chama Acequias
Association) for their assistance through-
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Kunkel, Kenneth E., 1985. Temperature and Precipitation
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Locations. New Mexico Department of
Agriculture report.

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ing, evaluating contaminant transport,
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sional interests primarily focus on eco-

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at present.

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regional drilling program at Los Alamos
and presently consults independently
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issues. His research interests include
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en and the hydrologic cycle in arid
lands. Dr. Stone is the author of numer-
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Hydrogeology in Practice – a Guide to
Characterizing Ground-Water Systems
(Prentice Hall, paper).

Reviewed by AIPG Associate Editors:
Scott A. Tiller, CPG-10016 and Dale H.
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