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ON THE COVER-Hallett Peak, located at the continental divide in Colorado shows the U-shaped valley typical of alpine glaciations. This is the view at the end of the short hike to Emerald Lake from the Bear Lake parking lot in Rocky Mountain National Park. Photo by Peter Vagt, CPG-07947.
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The American Institute of Professional Geologists (AIPG) is the only national organization that certifies the competence and ethical conduct of geological scientists in all branches of the science. It adheres to the principles of professional responsibility and public service, and is the ombudsman for the geological profession. It was founded in 1963 to promote the profession of geology and to provide certification for geologists to establish a standard of excellence for the profession. Since then, more than 10,000 individuals have demonstrated their commitment to the highest levels of competence and ethical conduct and been certified by AIPG.

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

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• Water in Mineral Processing Symposium
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SCHOLARSHIP PROGRAM

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

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

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

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

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

American Institute of Professional Geologists
Attn: Education Committee Cbr.
12000 Washington St., Suite 285
Thornton, CO 80241

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

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

Basis of Awards
Awards will be based on the content and creativity of the essays as judged by the Education Committee. The decisions of the Education Committee are final.
In 2010, average aggregated salaries for geoscience-related occupations ranged from $137,660 for geoscience-related occupations in the finance and insurance industry to $69,949 for geoscience-related occupations in state government. Salary ranges for the aggregated occupations were as narrow as $26,250 for geoscience-related occupations in the health care industry ($102,640-$76,390) to as wide as $96,960 for geoscience-related occupations in the finance and insurance industry ($179,610-$82,650).

### Maximum Salary and Industry

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Maximum Salary</th>
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<tbody>
<tr>
<td>Engineering Managers</td>
<td>$148,620 Oil and Gas</td>
</tr>
<tr>
<td>Natural Science Managers</td>
<td>$172,950 Oil and Gas</td>
</tr>
<tr>
<td>Petroleum Engineers</td>
<td>$179,610 Finance and Insurance</td>
</tr>
<tr>
<td>Mining and Geological Engineers</td>
<td>$116,280 Oil and Gas</td>
</tr>
<tr>
<td>Environmental Engineers</td>
<td>$123,320 Oil and Gas</td>
</tr>
<tr>
<td>Geoscientists</td>
<td>$132,210 Oil and Gas</td>
</tr>
<tr>
<td>Atmospheric and Space Scientists</td>
<td>$112,700 Mgmt, Sci, and Tech. Consulting</td>
</tr>
<tr>
<td>Hydrologists</td>
<td>$82,900 Federal Government</td>
</tr>
<tr>
<td>Geographers</td>
<td>$84,360 Scientific R&amp;D</td>
</tr>
<tr>
<td>Environmental Scientists</td>
<td>$95,680 Federal Government</td>
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### Minimum Salary and Industry

<table>
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<tr>
<th>Occupation</th>
<th>Minimum Salary</th>
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<tbody>
<tr>
<td>Engineering Managers</td>
<td>$88,280 State Government</td>
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<tr>
<td>Natural Science Managers</td>
<td>$74,230 State Government</td>
</tr>
<tr>
<td>Petroleum Engineers</td>
<td>$79,200 State Government</td>
</tr>
<tr>
<td>Mining and Geological Engineers</td>
<td>$76,090 Nonmetallic Mineral Mining</td>
</tr>
<tr>
<td>Environmental Engineers</td>
<td>$59,570 Information</td>
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<td>Geoscientists</td>
<td>$62,880 State Government</td>
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<td>Atmospheric and Space Scientists</td>
<td>$81,470 Information</td>
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<tr>
<td>Hydrologists</td>
<td>$66,320 State Government</td>
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<tr>
<td>Geographers</td>
<td>$53,780 Colleges and Universities</td>
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<tr>
<td>Environmental Scientists</td>
<td>$56,030 Colleges and Universities</td>
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**Geoscience Currents Discussion Webinar:**

**Salary Trends and Employment Projections for Geoscience Careers**

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- Leila Gonzales
Two Past Presidents of the European Federation of Geologists visited AIPG headquarters on September 30 after the 1st EFG/AIPG Professional Geology Grand Canyon Field Study. Starting from the left, Christer Åkerman (Sweden), Gareth Jones (Ireland), and AIPG staff.
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., 12000 Washington St., Suite 285, Thornton, CO 80241.

BEN H. PARKER MEMORIAL MEDAL

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

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

MARTIN VAN COUVERING MEMORIAL AWARD

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

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

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

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

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

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

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.

American Institute of Professional Geologists
Nomination form for 2012 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:________________________________________
Telephone:______________________________________
Fax:__________________________________________
E-Mail:________________________________________

NAME OF PERSON MAKING
THE NOMINATION: __________________________
Address:________________________________________
Telephone:______________________________________
Fax:__________________________________________
E-Mail:________________________________________
Signature:______________________________________
Date:__________________________________________

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

DEADLINE: Completed nominations must be received by December 15, 2011.
The American Institute of Professional Geologists (AIPG) has a history of effective and outstanding service to the profession of geology. From its beginning in 1963, the Institute has emphasized the role that professional geologists play in this fascinating, changing, and highly complex world in which we live.

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

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

AIPG 2011 HONORS AND AWARDS COMMITTEE

John L. Bognar, CPG, Chairman
Richard M. Powers, CPG
Daniel J. St. Germain, CPG

AIPG MISSION STATEMENT

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

James A. Jacobs, CPG 7760
2011 Recipient of the AIPG Honorary Membership Award

Jim’s foundation in geology started in Pittsburgh, Pennsylvania where he would repeatedly visit the dinosaur bones and rock collections at the local Carnegie Science Museum. He always enjoyed science and rock collecting and he entered regional science fairs in high school, winning very modest awards. He attended Franklin and Marshall College in Lancaster, Pennsylvania for a bachelors degree in geology and English. During the school breaks, he was employed at the U.S. Bureau of Mines Coal Research Station in Bruceton, Pennsylvania where he worked under many generous professional geologists (and AIPG members). At the Bureau, he learned that the thick Pennsylvanian coal seams, hundreds of feet beneath his bedroom, had been mined out decades before. He went to the University of Texas at Austin for a master’s degree in geology. After about a decade in the oil industry, exploring on the North Slope of Alaska and in California, he joined the environmental industry. For the past two decades he has run an environmental consulting and contracting firm in Northern California with his very patient wife, Olivia.

He has given papers and numerous workshops on in-situ remediation methods and laboratory bench testing. He wrote hundreds of technical abstracts, articles and co-authored two environmental science books on MTBE and Cr(VI). He is working on two more book projects currently. He teaches a class at the University of California, Berkeley Extension Program on Sustainable Practices and Green Remediation Methods. He is a Fulbright scholar, winning four teaching awards: two in Jamaica, one in Israel and he recently was awarded a final grant for India, starting January 2012.

Professionally, he has served as president or vice president of the AIPG California Section for more than fifteen years. He served for about five years on the AIPG National Screening Committee, and was on the AIPG Advisory Board for a term. He encourages others to participate in AIPG activities, noting that volunteering for the profession is a team sport. He started the UC Davis Geology AIPG Student Section and is the AIPG Sponsor.

He also serves as a director or advisor on several other professional associations. For the past decade, he has served as a publicly elected official on a community services district and a local sewer agency board. He still plays jazz guitar with a sax player and female vocalist at local clubs and venues, gives earth science cruise lectures in exotic locations with friends and family, and turns wood with his son on weekends.

Response

I was completely surprised by the announcement that I would receive the AIPG Honorary Membership Award for 2011. I would like to thank the Institute, the Honors and Awards Committee and the membership in their confidence in my abilities to help AIPG over the years. There is great personal satisfaction in serving the geology profession through the Institute. During the 22 years since joining AIPG, I have been enriched far more with friendship, camaraderie and professional knowledge than I can ever hope to repay the organization.
Through my AIPG activities, I have met numerous friends, co-authors, mentors, and even clients, illustrating the great advantages and benefits of active membership.

One reason for AIPG’s success is the level of commitment of the active members to their chosen subspecialties of geology. Upon joining the Institute, I did not fully appreciate the level and depth of geologic expertise, diversity and professionalism which is truly the strength of the membership of this organization. Regarding the future, we need to convey the professional diversity, broad scientific enthusiasm and organizational strengths of the Institute to the next generation of geoscientists.

I greatly admire those who have previously received this award, many of whom I count as mentors by example. Now I hope I can live up to the new honor. Thank you for the honor.

Barbara H. Murphy, CPG 6203
2011 Recipient of the AIPG Martin Van Couvering Memorial Award

Barbara’s interest in geology began with an earth science class in 9th grade at Friends School in Wilmington, Delaware. She also loved being outside and so it was a natural to pursue geology in college. Barbara went to Mount Holyoke College (named for the mountain) in Massachusetts and also had the opportunity to take geology classes at nearby Amherst College, Hampshire College, and U. of Massachusetts. She enjoyed field camp in Canon City, Colorado in the summer following her sophomore year. Then she spent the following summer working as a field and research assistant on the Nain Anorthosite Project in Labrador, Canada. She lived in a tent for nearly two months and was supposedly the fourth person in modern times to go to that portion of northern Labrador.

After graduating from college in 1975, she spent part of the summer traveling around the western US before working as a research assistant with John Reid from Hampshire College, as part of the volcanology group at Los Alamos labs in New Mexico. From there, she moved to Phoenix and worked at the Bureau of Land Management. She spent many days in the field researching current and historic mining activity in central and western Arizona. When that assignment ended, she went to work at a large consulting firm, Dames & Moore. The Phoenix office was fairly small at that time she started in 1977, but it grew to be one of the largest offices. Barbara was fortunate to work on a broad variety of projects ranging from coal resource evaluations in New Mexico, to major dam siting/design and flood control projects in central Arizona, to highway projects, transmission lines, landfills, mining projects, military projects, resource management plans, and major Superfund and other remediation projects. Barbara is a registered geologist in Arizona. Barbara worked at Dames & Moore until 1999 when she had the opportunity to work at a newly-formed consulting firm, Clear Creek Associates, founded by Doug Bartlett and Marvin Glotfelty. It has been a wonderful experience to work for both large and small consulting firms with dedicated professionals.

While at Dames & Moore, Barb became involved with AIPG and received her CPG in 1984. Then she began volunteering with the Arizona Section of AIPG and eventually at the national level. She has served the Arizona Section in many roles including President, Vice President, Secretary and field trip coordinator. At the National level, Barb has served several times on the Advisory Board, as Vice President and President-Elect, on the CPG Screening Committee, as chairperson of the annual meeting in Flagstaff in 2008, as the AIPG representative on the AGI Congressional Hazards Caucus, and has been an active member on several specially-tasked committees.

In her spare time Barbara enjoys travel, hiking, photography and camping. Barbara and her husband, Casey, have two daughters, Erin and Kelly. They love the out of doors and they have had many wonderful times traveling across the US and to foreign countries. Barbara feels fortunate to be associated with many wonderful people, professionally, through volunteer organizations, and socially, and to have had so many opportunities through AIPG.

Response

I would like to thank the American Institute of Professional Geologists, the Honors and Awards Committee, the Executive Director and headquarters staff, and all the members for this award. I was really quite surprised when I was doing my homework by reading through my notebook the night before the Executive Committee meeting in Tucson in February and saw my name listed in the agenda in the list of awards. It was late at night but I wanted to share the news. I called my husband, Casey, and told him about the award, what a surprise and honor this was, and how I felt so pleased. I then called my daughters, Kelly and Erin, and let them know of the award. It was also nice to share the news and my feelings with friends of mine at the meeting the next day.

There are several people that have had a significant influence on my career as a geologist. First, there was John Reid at Hampshire College and Martha Godchaux at Mt. Holyoke College. They encouraged me in a broad range of studies and research projects in college. While in college, one of my summer research projects took me to Labrador, Canada as part of the NSF Nain Anorthosite project. From a small Eskimo village, I was flown in by bush pilot to map some of the Earth’s oldest rocks. I was supposedly the fourth person in modern times to go beyond Ittilubtunwa (Eskimo for “the point furthest north to which one may walk”) to get to the field area. Another summer research project was with John Reid as part of the volcanology research group at Los Alamos labs, completing field work and studying ultramafic xenoliths. John’s enthusiasm, support, and encouragement was invaluable.

Then there are several people I worked with at Dames & Moore over the 22 years I worked there – Bill Greenslade, Gary Rogers, and Doug Bartlett. Bill introduced me to AIPG and emphasized the importance of professional organizations and being an active member. Bill, Gary, and Doug were supportive of my geology career at a major consulting firm and I...
had opportunities to work on some key projects including one of the nation’s big water projects with US Bureau of Reclamation and US Army Corps of Engineers - the alternative to Orme Dam project to store Central Arizona Project (CAP) water and provide flood control to the City of Phoenix, numerous NEPA environmental projects, several major Superfund projects, and so many other interesting projects. I really appreciated the opportunities afforded by working at Dames & Moore and learning so much from other geologists, engineers, biologists, archaeologists, public involvement, and so many others.

I also want to acknowledge Doug Bartlett (again) and Marvin Glotfelty at Clear Creek Associates. I feel so lucky to have worked with them from the start of the consulting firm of Clear Creek in 1999. They encourage and are so supportive of active participation with professional organizations. I am especially appreciative of their support of my work with AIPG.

I also am very appreciative of working with Bill Siok, Wendy Davidson, Cathy Duran, and other staff at the AIPG headquarters for so many years; and so many really wonderful people on the AIPG Executive Board and other AIPG members over the years. I value their support and friendship.

I have truly enjoyed serving AIPG, starting with the Arizona Section in 1985 and later also at the National level. I have served as an Arizona Section officer and on various committees numerous times, on the national advisory board member several times, chairperson of the 2008 annual meeting, on several national committees, as national Vice-President, President-Elect, and now I am looking forward to serving as President in 2012. As some of you know, I am not good at sitting on my hands. I enjoy working on a variety of projects and challenges and serving in various capacities. I have seen so many positive changes over the years and look forward to continuing to work for an even better and stronger AIPG.

Barbara H. Murphy

Robert Font was born in La Habana (Havana), Cuba, May 5, 1946. Family roots hail from the Toulouse area of France and the Cataluña area of Spain (around the Pyrenees). As a young teenager, Font attended Loyola Military Academy. He achieved the ranks of cadet lieutenant and cadet captain and became the school’s valedictorian in 1960. He immigrated to the USA in 1961, escaping the communist dictatorship in Cuba and becoming an American citizen. After finishing Highs School in Miami, Florida in 1964, Font moved to “God’s country,” Texas. He attended Baylor University in Waco and graduated with a B.S. degree in geology with a minor in math in 1967. In 1969 he earned his M.S. degree in geology from Baylor University with an engineering geology emphasis. From 1969-70, Font worked as an exploration geologist for Conoco. He then attended Texas A&M University in College Station, Texas and graduated with a Ph.D. degree in geology (with emphasis in engineering geology, soil and rock mechanics and tectonophysics) in 1973.

Font worked as a university professor (first as an Assistant Professor and later as a tenured Associate Professor) at Baylor University from 1973-81. In 1980 he earned the “Professor of the Year Award in Geophysics” as issued by Conoco, Inc. In 1981 he rejoined Conoco and worked as a Senior Staff Geologist, Project Supervisor and Area Geologist through 1987. That year Font moved to Dallas and became a partner and Executive Vice President at Strategic Petroleum Corp., where he worked through 1989. In 1990-91 Font worked as a Consultant and Project Director for Oryx Energy Company. In 1991 Font formed his own company, Geoscience Data Management, Inc.

Font became a CPG member of AIPG in 1977, inspired by his former dissertation director, Dr. Bob Berg. Font is also a “Fellow” of the GSA and member of SIPES and AEG. Font served as President of the Dallas Geological Society from 1993-94 and received the “Professional Service Award” in 1998 from the society.

Font is a Certified Professional Geologist, Certified Petroleum Geologist and a Registered Professional Geologist in Texas, Kentucky, Wyoming and Alaska. He also holds the titles of Chartered Geologist (as recognized by The Geological Society in the UK) and European Geologist.

Font is married to Hilma Johansen Font and has a daughter (Ingrid) and a son (John-Paul). He is proud of his five grandchildren, Jonathan, Madeleine, Luke, Naomi and Noelle. Font is multi-lingual and his hobbies include physical fitness, scuba diving, motorcycling, target shooting, boating, fishing and playing the guitar.

Response

I am humbled and honored to receive the Ben H. Parker Memorial Medal in 2011. When I think of the multitude of outstanding geologists who form our Institute, the magnitude of the award becomes especially significant.

I point out that my selection of a career in the geological sciences was made fairly late, dating back to my third year in college. Currently, I cannot think of any other discipline that I could have chosen that would have given me greater satisfaction than that which I have found in the practice of geology. With very few exceptions I have enjoyed my profession immensely and truly treasure the great friendships which I have made along the way.

I express my gratitude to those who selected me for this distinction. If I have earned the respect of my esteemed colleagues and dear friends, then I have certainly succeeded. On a personal note, I thank God for my wife, my special lady who has been with me throughout the years, through thick and thin, and whose positive influence has been so critical in my life.

Thanks again for this great tribute, as it is most valued and appreciated!

Robert G. Font
AIPG 2011 HONORS AND AWARDS PROGRAM

Presidential Certificate of Merit

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

Recipients of the AIPG Presidential Certificate of Merit


David M. Abbott, Jr.,
CPG 4570
Denver Colorado

For his continuing service and dedication to AIPG and its ethics program.

Robert A. Stewart
CPG 8332
Avon, Connecticut

For his skill at guiding the TPG through controversy and for his long term dedicated service to AIPG, young professionals and students.

Introduction to Well Logs and Log Analysis for New Hires

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  • Exploration techniques.
  • Integration of geophysical exploration records with log data.
  • Calculating reserves and field size.
  • Importance of economics and risk analysis.
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  • Lithologic and mud logs.
  • Electric logs.
  • Basic and specialized porosity logs.
  • Other logs and log curves used in exploration and production work.
  • Selecting log suite.
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Should I become a CPG?

Have you been thinking about upgrading your membership to CPG? If the answer is yes, What are you waiting for? To find out if you have the qualifications go to Article 2.3.1 of the AIPG Bylaws. The AIPG Bylaws can be found on the AIPG website or the directory.

The CPG application can be found on the website under ‘Membership’. Just follow the instructions. The basic paperwork includes the application, application fee, transcripts, geological experience verification and sponsors.

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AIPG/AGI Summer Interns: Rockin’ and Rollin’ in Washington DC

Linda R. Rowan, AS-0029
AGI Director of Government Affairs

The AIPG/AGI summer 2011 interns came to Washington DC to experience the slow deliberative process of the U.S. Congress and ended their semester with a little shake, rattle and roll when a Mw 5.8 earthquake popped off near Mineral, Virginia. Like Thomas Jefferson and John Quincy Adams before them, they experienced a strenuous shaking from a rare and surprising earthquake near the nation’s capital. Unlike the former presidents; however, instead of writing about what they felt in their diaries, the interns took to the web and filled out a U.S. Geological Survey “Did You Feel It?” report. Thinking the temblor was a fitting ending to their last week, the interns packed up to leave - one by land and two by plane. Then NOAA began alerting the DC area of the impending arrival of hurricane Irene by web, twitter and television as NASA sent snapshots of the massive storm from space (not quite the same as Paul Revere’s midnight ride to warn the colonists of the approaching British Army). The one by land got out a few days early while the two by plane got the last flights out of DC on the morning before the storm’s visit to the White House.

Before the two hazards rolled in, the interns experienced the hot debates and last minute compromises of a contentious summer in Congress. They followed the drawn-out process of the debt ceiling discussions. They attended hearings and events about the BP Deepwater Horizon oil spill, the Japanese nuclear power plant problems in the wake of the earthquake and tsunami, the future of U.S. nuclear power and nuclear waste disposal, the supply-demand concerns of critical minerals, the role of the Environmental Protection Agency in climate change and many other topics. They met with their congressional delegations – the senators and representatives from their home states. Beyond Capitol Hill, they visited the USGS in Reston, the National Science Foundation in Ballston, NASA Goddard Space Flight Center in Greenbelt, the Smithsonian National Museum of Natural History and the Carnegie Institution of Washington’s Geophysical Laboratory.

The American Geological Institute and the three interns are very grateful to the American Institute of Professional Geologists Foundation for providing financial support for the internships. Thanks to the AIPG Foundation, the internships really rocked their world, flooded them with new experiences, and reminded them that while some disasters are immediate, there is always time for debate and compromise within the halls of Congress.

Below are brief biographies of the three AIPG/AGI summer interns:

Victoria Bierwirth will be graduating with her Bachelor’s of Science degree in Geological Engineering with a minor in Geospatial Technology in May 2014 from the South Dakota School of Mines and Technology. Her interests in politics and natural resources led her to work in former Congresswoman Stephanie Herseth Sandlin’s field office in Rapid City and as a park guide at Jewel Cave National Monument. She came to AGI after completing an internship at NASA’s Goddard Space Flight Center.

Erica Dalman, SA-5047, is a rising senior at Grand Valley State University (GVSU), where she will graduate with a B.S. in Geology and a minor in International Business. In 2010, she participated in an ExxonMobil/GSA undergraduate field course and presented a joint geoscience education research poster at the Geological Society of America Annual Meeting. She recently completed field camp in the Republic of South Africa.

Lauren Herwehe received a B.S. in Geosciences and a B.A. in Geography in May 2011 from Pennsylvania State University. She graduated from the Schreyer Honors College and completed her senior thesis on the use of electrical resistivity imaging to model the flow of acid mine drainage. She spent a summer in Germany as a research assistant studying landscape development during the Holocene. She studied abroad for a semester in Ghana and has done research projects in West Philadelphia, Bulgaria, and India.

What Makes a National Park Awesome? The Geology of Course

By: Victoria A. Bierwirth

Traveling through the maze of passageways, appreciative of the installed lights and paved pathways, visitors step into the Formation Room. Then, absolute darkness engulfs the group to simulate how the remainder of the 155 miles of cave appears at the world’s second longest cave, Jewel Cave National Monument. An occasional drip of water breaks the silence as the group waits in natural darkness. I point out soda straws, flowstone, draperies, and other speleothems as the “oohs” and “aahs” emanate from the crowd. Everyone is intrigued by the splendor of the geology. Millions have visited the country’s national parks, monuments, and other NPS units to experience the many historical, archaeological, and geological wonders the NPS has to offer. As the
The NPS mission continues “...to promote and regulate the use of the...National parks...[by] conserv[ing] the scenery and the natural and historic objects and the wild life therein and ...provid[ing] for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” Over the past 100 years, legislators have continued to protect the nation’s public lands. The 112th Congress has demonstrated this with bills to engage the nation’s youth in becoming more involved within national parks and help restore the nation’s resources. In maintaining our national parks and creating a safe atmosphere, it is vital to understand and educate others in the geologic processes that created the stunning scenery within the NPS.

Understanding the geology of the parks is fundamental to park management, public education and public enjoyment. Park managers need to know about potential hazards such as floods, rock falls and landslides as well as resources such as water supply, soil characteristics and mineral resources to effectively manage these outstanding natural wonders. The public is hungry for information about the geology around them and need more education and outreach about the earth systems science processes in the parks.

Although the NPS has been around for almost 100 years, an NPS geologic division was just established in 1984. The Energy, Mining, and Minerals Division was the first program and focused primarily on mining claims and oil and gas development. Later in 1998, the program underwent a name and function change. The Geologic Resources Division (GRD) was established to provide geologic information about the geology of the parks for the public. The Geologic Resource Inventory (GRI) is administered by GRD and funded through the NPS Inventory and Monitoring Division; it was created in 1998 to raise awareness of geology in 270 natural resource related NPS units and provides the NPS with information for management decisions. To provide a meaningful interpretation of the National Park’s geology, the GRD identified three necessary components of the GRI - a scoping meeting, a geologic map, and a geologic report. As of June 2011, 263 of the 270 parks have completed scoping meetings, 189 parks have geologic maps, and 93 parks have geologic reports. I find it amazing that the NPS is only beginning to inventory its geologic resources after nearly 100 years, but I am heartened by the progress of the GRI to date.

Unfortunately there are not enough geoscientists working in the NPS. Of the almost 22,000 individuals employed in the NPS, only 107 work in geologic positions and this is a lower number compared to about 130 geologic positions in the 1980s. There are 270 NPS natural resource units and the 107 individuals are not evenly distributed, so many units have no geologic expertise at all. The NPS is limited in the number of geoscientists it can hire due to funding. Geoscience organizations sponsor geoscientists or geoscience students to work in the parks through programs such as Geologist-in-the-Parks and GeoCorps. I think these are excellent programs that should be continued, however, the NPS needs to find the resources to hire more full time geoscientists to help manage the parks and provide education and outreach to the public.

I have seen firsthand how the geology of the parks has inspired visitors in my park service as well as in recent activities such as geologic park icons on quarters and in advertising. The geology of the parks has been the foundation of the park service throughout history and remains the most recognized symbols of America. President Theodore Roosevelt said, “The Bad Lands [at Theodore Roosevelt National Park] grade all the way from [buttes] that are almost rolling in character to [pinnacles] that are so fantastically broken in form and so bizarre in color as to seem hardly properly to belong to this earth.” The geology of the parks continues today to captivate people through the extreme rock formations and gigantic waterfalls of Yosemite, the geysers and colorful hot pools of Yellowstone, the glaciers of Glacier National Park, the fossils of Florissant Fossil Beds, the formations of Mammoth Cave and the rock record of the Grand Canyon. As we look to the future, I know that more geoscientists are needed to manage, interpret and highlight the foundation of our national parks: the unique, unfamiliar, and ever-changing geology within the NPS.
Adapting a Nation to an Ever Changing Ocean

By: Erica M Dalman

“How inappropriate to call this planet ‘Earth’, when it is clearly ‘Ocean.’” – Arthur C. Clarke.

Oceans cover more than 70 percent of the Earth’s surface, totaling 1,338,000,000 cubic kilometers. Whether directly or indirectly, oceans affect our daily lives. The weather and climate experienced on land is directly tied to the oceans; storm systems and life-sustaining precipitation are directly fueled by warm ocean water. Even more basic, worldwide about one billion people depend on seafood for protein. For the nation as a whole, the oceans and Great Lakes are a major economic engine, contributing 2.3 million jobs, $108 billion to the gross domestic product, and $7.9 trillion to the U.S. economy. The Great Lakes boast 5,500 miles of coastline and generate $17 billion in economic output from recreational fishing alone. Additionally, the oceans hold about $8 trillion in oil and gas reserves. Though the oceans and Great Lakes are of great economic benefit, they also bring potential for great economic losses. Hazards such as hurricanes, coastal storms, tsunamis, floods and coastal erosion are recurring threats to coastal communities. The 2005 hurricane season, which included hurricanes Katrina and Rita, resulted in direct losses of about $200 billion. Whether because of the benefit they bring or the need to mitigate losses, it is critical to understand the growing importance of the oceans and Great Lakes.

The oceans, Great Lakes, and coastal regions are changing more rapidly than societies may be able to adapt. Changes in ocean chemistry, changes in sea level, changes in ice sheets and changes in coastlines are forcing communities to change the ways they use the oceans, the coasts and the Great Lakes. The changes in the oceans can have subtle effects on human activities, yet it is important to recognize them. One such activity is maritime trade, which has doubled over the past 50 years. As water temperatures rise, the cargo shipping season becomes longer, which should bring concomitant economic benefits. However, warmer lake temperatures result in decreased lake ice and increased evaporation rates, lowering water levels and actually reducing the amount that cargo ships can carry and consequently the volume of goods that can be traded. As the oceans, coasts, and Great Lakes continue to change, it is important to establish a proactive, rather than reactive, ocean policy.

The protection and proper management of the Earth’s oceans and lakes is vital not only for the ecosystems they support, but for society and, ultimately, the health of the planet. Within the past year, the United States has taken action to promote greater preservation of the oceans, Great Lakes and coasts. In July 2010, the National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes was established under Executive Order #13547 signed by President Obama. This National Ocean Policy (NOP) comes at a critical time; the global population is growing exponentially and with it comes a greater demand for ocean resources and a greater need for thoughtful management and conservation of ocean resources and coastlines.

The recognition of the power and importance of the oceans and Great Lakes is not new for the U.S. government. In 1969, the Stratton Commission published a report, Our Nation and The Sea: A Plan for National Action. This was the beginning of a long journey of evaluating the government’s role in car-
spills and controversy regarding the oil and gas industry will require greater communication between scientists and government. The NOP provides a framework for coordination and collaboration between government agencies, such as BOEMRE and NOAA, and a portal for greater communication between the geoscience community and the government.

As stated by the United Nations Environment Program director, “The world can no longer afford to delay restoring the health and wealth of the oceans. The half-billion people who depend on a healthy fishing industry, and the one billion who rely on fish as a primary source of protein, cannot wait another 20 years for the international community to act.” The immense value, whether economic, life sustaining or weather related, of the oceans, coasts, and Great Lakes cannot be ignored. The current administration is not the first to acknowledge the importance of our oceans, coasts, and Great Lakes, yet their importance in only growing. Research and observations show the oceans are changing, requiring a greater understanding of how these changes will affect our nation and its global economy. The tides are right for a more integrated approach on oceans, coasts, and the Great Lakes. If implemented effectively, the NOP can have a profound effect on the nation’s stewardship of these critical resources. Geoscientists will be important players in this team effort, as their expertise is needed to explore, extract and preserve the oceans, seafloor, coasts and Great Lakes.

Developing Alaska’s Oil and Gas Resources: How Should the U.S. Proceed?

By: Lauren Herwehe

For the past half century, lawmakers have disagreed over when and where to allow oil drilling in Alaska—a several hundred billion dollar question with no simple answer. In the wake of the largest oil spill in the history of the United States the debate has become hotter than ever. The BP oil spill stalled oil and gas development in Alaska, particularly in the offshore, and policymakers are grappling with how to advance development. On one hand, Alaska has one of the most fragile, unique, and diverse ecosystems in the country—a vulnerable environment that could easily be devastated by hasty development. On the other, further developing Alaska’s oil resources could reduce reliance on imports, reduce oil prices, spur economic growth and provide government revenues. Furthermore, experts say that slower flow in the Trans-Alaska Pipeline System (TAPS) in recent years is leading to more corrosion and clogs, decreasing the lifespan of the pipeline. It is critical that lawmakers reach a compromise that facilitates economic growth while protecting the environment. This compromise must be supported by a comprehensive policy that accounts for the challenges posed by the harsh Arctic environment, implements lessons learned from the BP and Exxon Valdez oil spills, addresses concerns about the permit process, and provides a firm course of action for the coastal plain of the Arctic National Wildlife Refuge (ANWR).

There is no question that the oil and gas resources within Alaska are enormous. With an estimated 27 billion barrels of oil and 132 trillion cubic feet of natural gas, Alaska’s Outer Continental Shelf (OCS), including the Beaufort and Chukchi Seas, Cook Inlet, and the North Aleutian Basin, provides the second largest oil reserve potential in the U.S., superseded only by the Gulf of Mexico. Set aside as an emergency oil sup-

ploy in 1923, the National Petroleum Reserve-Alaska (NPRA), consisting of 23 million acres of land along the North Slope of Alaska, is estimated by the United States Geological Survey (USGS) to contain 900 million barrels of oil and 53 trillion cubic feet of natural gas. Established in 1960, ANWR consists of 19 million acres of federally protected land along the North Slope of Alaska where oil and gas production is prohibited. The USGS estimates that drilling in ANWR could provide about 10.4 billion barrels of oil. Most controversial is the 1.5 million acre coastal plain of ANWR, referred to as the “1002 area.” This area was delineated in section 1002 of the Alaska National Interest Lands Conservation Act of 1980 in which Congress deferred a decision on future management of the oil reserves there and stated that development could only occur with congressional authorization.

Before the BP oil spill, the Obama administration supported drilling in the Chukchi and Beaufort Seas and, to a lesser extent NPRA, but in the wake of the BP spill the administration has been cautious in allowing offshore drilling development, initiating a six-month moratorium on deepwater drilling in 2010. The resources are vast in these regions but the consequences of development are equally huge and critical steps must be taken before any drilling occurs in the region.

Legislation governing oil and gas development and spill response in Alaska must address the challenges of working in an Arctic environment. The cleanup efforts for the 1989 Exxon Valdez spill were complicated by harsh conditions and the remote location of the Prince William Sound. The National Commission on the BP Deepwater Horizon Oil Spill released a report in January 2011 outlining similar complications that would hinder a response to another oil spill in Alaska, particularly in the Chukchi or Beaufort seas. These bodies of water lie north of Alaska and are subject to an even harsher environment than the Prince William Sound. The report noted that these northern seas are covered by ice for eight to nine months per year and experience extreme cold, winds, fog and extended darkness. Cold ocean temperatures and ice could cause oil spilled in the Arctic Ocean to coagulate rather than evaporate. The report added that Arctic ecosystems are diverse and poorly understood—compound the devastation that a spill could cause. The Coast Guard, which is responsible for oil cleanup, has no dedicated Arctic oil spill contingency plan.

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spill response, has only one vessel in the Alaska OCS region, making the U.S. highly unprepared for a spill.

The Oil Spill Pollution Act of 1990, which sets a cap on oil spill liability at $75 million and outlines response authority, should be amended to ensure faster and more comprehensive response to oil spills. This law, passed in response to the Exxon Valdez oil spill, largely governs oil spill response in the U.S. While BP has said that their payments will exceed the cap, it is uncertain whether liable parties will do the same in future oil spills. Additionally, the case against Exxon Mobil dragged on for over two decades before affected parties were compensated. In June 2008, the Supreme Court decreased the punitive damages award against Exxon Mobil from $5 billion to $500 million. In the spring of 2011, the case was opened yet again when a University of Alaska professor pressed for action on a compensation claim filed in 2006 by the government. The two decades that the case has lingered in the U.S. justice system has led many legislators to press for swifter action with the BP spill but as of the August congressional recess, no legislation regarding oil spills has been approved by Congress. As oil and gas development intensifies, it is essential that legislators amend the Oil Spill Pollution Act to make short-term response prompt and efficient and ensure appropriate compensation for losses.

Beyond spill response, legislation should ensure that the permitting process for drilling in Alaska is efficient. Those involved in granting permits should be cautious and deliberate; however, the process should not waste time and resources through inefficient bureaucracy. A particularly controversial permitting case has been that of Shell Oil Company. Shell purchased leases for drilling in the Chukchi Sea in 2008 and, after investing $3.5 billion into the area, the company has still not been granted all of the necessary permits to drill. Senator Lisa Murkowski (R-AK) and Representative Cory Gardner (R-CO) introduced companion bills in June of 2011 to modify the Clean Air Act to expedite the permitting process for Shell. The Obama administration took a step toward addressing permitting issues by assembling an interagency team to coordinate and expedite Arctic permitting in July of 2011. Demonstrating increased willingness to loosen regulations after the offshore moratorium, in August 2011 the Department of the Interior granted permits for Shell to drill four exploratory wells in the Beaufort Sea in the summer of 2012. It appears that the administration is serious about addressing the efficiency of the permitting process and slowly reversing the moratorium.

Finally, Congress should decide on the future of the 1002 area of ANWR. Senator Joe Lieberman (I-CT) and Representative Ed Markey (D-MA) have sponsored bills to ban drilling in the 1002 area of ANWR in every Congress since 1989 and 2001 respectively. On the other side of the political spectrum, Representative Don Young (R-AK) introduced a bill in January of 2011 that would open the 1002 area to drilling. With more compromise in mind, Senator David Vitter (R-LA) and Representative Rob Bishop (R-UT) introduced companion bills in March of 2011 that would allow drilling in the 1002 area with revenues placed in a trust fund for renewable energy development, provided that the federal budget is balanced. This program is similar to other proposals made by House Republicans. The controversy over the 1002 section of ANWR has been drawn out for over three decades and it is time for Congress to make a decision.

The expertise and opinions of geoscientists on the development of Alaska’s resources is critical. A comprehensive oil and gas policy requires understanding Earth’s processes from resource identification to environmental clean-up. Geoscientists are in a unique and essential position of understanding oil and gas development, natural resource management, and a changing climate. Petroleum development in Alaska should be supported, but only if such development occurs after deliberate and careful planning. Geoscientists should play an informative role in helping Congress consider legislation that promotes economical, sustainable, and environmentally sound oil and gas development in Alaska.
The January/February TPG is the Student Issue. Individuals and Sections are encouraged to purchase extra copies of the Student issue to provide to Universities and Colleges with Geology Departments. This is a good way to generate interest in a student chapter.

The cost of the Student Issue is being discounted from $4.00 to $3.00 for quantities of 10 or more. Amount due ($3.00 x Quantity) + Shipping and Handling.

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Southern New England continues to recover from the exceptional northeaster that hit on October 29-30, twenty years to the day after the Perfect Storm of 1991 hammered coastal New England. Northeasters are not rare at this time of year, and Connecticut often sees snow in small amounts that rarely last. This year’s storm, however, delivered a staggering 20 inches of heavy, wet snow to the Hartford area at a time of year when most hardwoods have yet to drop their leaves. Although local forecasters warned of significant damage and power outages due to broken trees falling on power lines, nobody was prepared for the unprecedented statewide destruction of the power grid, least of all Connecticut Light & Power (CL&P), which had barely recovered from Hurricane Irene only two months earlier. Over 800,000 customers were out of power following the storm.

The snow started on Saturday afternoon, and continued through Sunday morning. Earlier on Saturday we had spoken to our son, who, we thought, was en route from a naval base in San Diego to his permanent posting in Little Creek, Virginia. He surprised us by detouring and walking in the door completely unexpected in the middle of the storm, having driven through bad weather across Pennsylvania, New York and western Connecticut. We lost power by 4 p.m. Saturday, and didn’t regain it for nine days. For me, sleep on Saturday night was impossible listening to the frightening, continuous crack-and-thump of trees breaking and hitting the ground. We took three damaging hits to the roof — my wife and son slept peacefully through it all. Saturday night was utterly dark, except for the occasional glow from nearby transformers shorting out.

Sunday morning revealed our cul-de-sac to be completely blocked by downed trees and power lines. We mobilized a neighborhood chain saw squad to clear our street of the oaks and white pines broken or uprooted by the snow stuck to the foliage. I’ve been grousing about buying a snowthrower for a few years and finally bought a used machine on the Friday before the storm. The timing was good, but in retrospect I should have bought a portable generator. My brother-in-law owns a small tree service in New Hampshire, and luckily was able to spend a day doing triage on the more severely damaged and downed trees in the yard.

A quick reconnaissance showed that our town of Avon was devastated. The town estimates the storm resulted in 100,000 cubic yards of downed branches and brush, all of which must be removed to allow for snowplowing. Avon and surrounding towns in the Farmington Valley were efficient in opening the local schools as emergency shelters for water and hot showers. CL&P’s response was poor and their corporate communication inept. Despite clearing our road immediately following the storm, we didn’t see a utility truck until the following Thursday. Eventually line crews and tree services streamed in from nearly every state east of the Rockies. Our power was finally restored by a crew from Muskegon, Michigan, liberally supported by our basket of Snickers bars leftover from a Halloween that didn’t happen.

The storm was followed by 10 days of glorious autumn weather — mild days and cool nights, and the little foliage still on the trees was still colorful. We kept the house heated with our EPA-compliant wood stove, burning last year’s oak and maple in lieu of #2 heating as the furnace sat idle (sort of like cap-and-trading fossil energy for sustainable energy). The stove was excellent for slow-cooking casseroles. Our emergency response materials were adequate — candles, batteries, etc., along with a Coleman two-burner Model 4M, made in Canada, which has been our camp stove for three generations since my parents first took me camping to Cape Hatteras as a child in 1960, from our home in Toronto.

An unfortunately predictable degree of price gouging and scamming followed the storm. Motels with uninterrupted power instantly boosted rates when the severity of the power outage became clear. The story was the same with chain stores bringing in portable generators from out of state, if you could find one. The Avon police patrolled for drifters seeking down payments against future tree removals that would never happen. Although traffic signals were disabled for nearly a week, the better side of human nature prevailed at most intersections, making for a generally safe if slow commute. CL&P focused on getting the grid re-energized along main roads to allow grocery stores, gas stations, laundromats, and retailers to open for basic needs.

Many employers were completely unprepared for a prolonged power outage. Buildings were locked out, file servers were inoperable, and corporate IT kluges were problematic. Local wi-fi hotspots at Barnes and Noble and Starbucks were overwhelmed by local users, exhausting bandwidth and reducing the pace of work to a crawl. We heard from friends as far away as Ohio and Ontario who had seen TV footage of Avon on their local network. In terms of property damages, our personal circumstances were not unique. Around the state, there was only one fatality due to the storm, a motor vehicle accident. Post-storm, there were many incidents of carbon monoxide poisoning due to improperly vented cooking and heating devices.

Life has gradually returned to normal, although repairs and cleanup will continue for months. The towns and state are taking stock of the damage, and the governor has hired an outside consultant to assess CL&P’s response. Since June, New England has experienced significant tornadoes (June 1, Springfield to Worcester, MA), the Mineral, Virginia earthquake, felt throughout our area, with minor damage (August 23), the regional destruction wrought by Hurricane Irene, (August 28), and the latest northeaster. With my last column as AIPG’s editor, these events stand as a vivid reminder our infrastructure’s fragility, and the value of basic emergency planning.

Robert A. Stewart, CPG-08332
1. In this crystallographic system, the “a”, “b” and “c” axes are of unequal length and at right angles to each other, with mineral examples including (Mg,Fe)$_2$SiO$_4$ and BaSO$_4$:
   a. Tetragonal
   b. Isometric
   c. Orthorhombic

2. Which of the following statements should be considered erroneous?
   a. The viscosity of magma is inversely proportional to its temperature.
   b. A relationship exists between magmatic viscosity and a volcano’s eruptive style.
   c. The viscosity of magma is inversely proportional to its silica content.

3. The relative magnitude of a flood is “7” and records are kept for 60 years. What is the probability of recurrence of a similar flood?
   a. 21.4%
   b. 11.5%
   c. 7.2%

4. A lithologic unit of interest strikes N-S and dips to the east at 30 degrees. The top of the rock unit is seen at an outcrop along a hillside which slopes 10 degrees in the direction of dip. Our client owns land in the area and could drill a vertical well at a point one-quarter mile (slope-distance) from the aforementioned outcrop. At what depth would the well be expected to hit the top of the bed?
   a. 1,035 feet
   b. 525 feet
   c. 237 feet

**Answers on Page 34**
This is my final article as AIPG President. I hope you have enjoyed reading these as much as I have enjoyed their preparation. Our professional practice and geology, as a whole, lend themselves to many topics. I never fail to come across some aspect worthy of discussion. The week preceding this article was no different.

Those of us on the east coast of the U.S. were jolted this past week (August 23rd) by a 5.8 magnitude earthquake (epicenter in Virginia). The geologic community was notably energized by the event, but many in the public were not amused. Although the effects may turn out to be relatively minor, the Washington Monument received some damage of unknown severity as of the time of this writing. We would hope that this event will be a clear message to those in our Capital that support for the geosciences is important to the well-being of society. Unfortunately, a lack of a scientific literacy opens the door to “Failures of Common Sense”, as I discussed in a previous President’s message. For example, a few individuals have speculated that the earthquake was caused by hydrofracturing for unconventional shale gas development. This is likely an intentional use of an opportunity to impugn hydrofracturing. However, others simply lack an understanding or appreciation of science. For example, an individual, who is the direct supervisor of a CPG colleague of ours, professed this to be another sign of the “end of times” that is consistent with a creationist point of view. These examples are only a hint of what we face.

Science is steadily losing its grip in some segments of our society for one reason or another. New York is a poignant example of loss of support for the geosciences due to the inconvenience of science to a very powerful environmental advocacy. I introduced this subject in my previous article “Failures of Common Sense” in which I described how the State Geologist of New York was under attack for expressing a public opinion that gas development in the Marcellus shale can be accomplished safely using hydrofracturing techniques. The attack has continued as demonstrated by the following plea from the State Geologist that we received subsequent to my last article: “The NY State Museum (NYSM) has been a center of scientific expertise in NY since 1836 when the Geological Survey (oldest in the nation) was formed. We have scientific expertise in the fields of biology, anthropology, and geology. The New York State Museum is part of the New York State Education Department. We are currently under an assault from within the Education Department and the Department of Budget who seem committed to eradicating the science staff here. They don’t really understand what we do and the services we provide as they are quite different from the main focus of the Education Department. Our group has built and maintained ESOGIS – our online subsurface geological database that many of you use, and done basic research on the Marcellus, Utica, Trenton-Black River and other gas plays here in NY. Most of our work and our colleagues’ work is funded by federal and private sources such as the Department of Energy, National Science Foundation and the US Geological Survey at little cost to the state. I have brought in enough outside funds to keep five employees going for the last 8 years. My colleagues do similar sorts of work in their areas of expertise. They have brought in enough federal and private money to keep tens of other staff positions funded. In other words my colleagues and I are creating jobs here in New York as well as providing important services to the state. ….. We ask for your support. Our leaders don’t really understand the value of what we do and why it is important to the state that we continue to do it. Another round of layoffs would likely be the end of the NY State Geological Survey, ending a proud history of more than 175 years. We ask for your help to educate our officials and to write a letter of support…. asking for the preservation of the Geological Survey and the New York State Museum Scientists and Science Service. Thank you for your time and consideration.”

It is troubling enough to see the decline of science in New York, but it becomes alarming when you realize that this attack coincides with a move by the New York State Attorney General to subpoena several major gas companies “seeking information on how they calculate their natural gas reserves and how they represent their profitability”. He also requested information from Chesapeake Energy Corp, who is a major developer in the Marcellus shale, on “how it discloses environmental risk”. One can only wonder where the New York State Attorney General is getting his technical support. One need not speculate about his motivation given his public statements against horizontal drilling and hydrofracturing.

I will leave you with these thoughts and encourage you to educate the public and elected officials on the use of sound science. Thanks for the opportunity to serve you this past year.

1. September/October 2011 Issue of TPG.
Geologist Seeks Donations Of Old Color Maps

Geologist seeks donations of used, old, outdated color geology or topo maps for arts and crafts projects for disabled young adults. We as geologists find beauty and order in geologic maps. The swirl of colors on maps, the colored stripes on cross sections, the interesting patterns, the color diagrams attract the eyes. Others outside the profession might see art as well. The color maps and cross sections will be used in various craft projects, and the geology theme will hopefully be used in an artistic way. The participants are high functioning autistic individuals. Since the color maps will be used for their visual appeal, the accuracy of the maps is completely irrelevant. With outdated color maps, you can now give new life to old maps. Jim will provide FedEx labels for those seeking prepaid shipment. No rush, please send the maps to Jim Jacobs, 707 View Point Road, Mill Valley, CA 94941; tel 415-381-5195; email: jimjacobs@ebsinfo.com Thank you.

PROFESSIONAL MEMBER APPLICATION

American Institute of Professional Geologists
Professional Member Application
Sign up Online – www.aipg.org
12000 N. Washington Street, Suite 285, Thornton, CO 80241 – (303) 412-6205 - aipg@aipg.org

Professional Member Dues (Membership is activated upon receipt of dues.)
If you apply: Dec – Mar = $100; Apr – Jun = $75; Jul – Sep = $50; Oct – Nov = $25
Payment: □ Enclosed □ Bill Me

Last Name: First Name: MI: Suffix:

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Preferred Mailing Address: □ Home □ Business Male □ Female □ Year of Birth:
Street:
City: State: Zip: Country:

Work Ph: Home Ph: Cell:

Email: Yr Highest Degree Awarded:

Geological Degree: □ BA □ BS □ MA □ MS □ PhD University:

I am a State Licensed PG in the following State(s):

ATTESTATION: I attest that I meet the requirements for AIPG Professional Member (30 semester hours/45 quarter hours in geological sciences with a BA or higher degree) and agree to abide by AIPG Bylaws and Code of Ethics.

Applicant Signature: Date:

HEADQUARTERS USE ONLY
Amt: Date Rcvd: Mbr #:
Draper Aden Associates Selects New Principal

Draper Aden Associates is pleased to announce Michael G. Lawless, CPG-09224, P.G. has been chosen for the leadership position of Principal of the Firm, the first selected since 1996.

“Mike has been an outstanding asset since he joined the firm and has made significant contributions toward achieving the company’s Vision,” said Jeff Lighthiser, P.E., President and CEO. “He has continually demonstrated exceptionally strong technical skills, is widely acknowledged throughout the region as an expert in environmental issues, has demonstrated a unique ability in providing unrivaled excellence in client relationships and demonstrated leadership skills that have set him apart.”

Mike Lawless, Vice President, Senior Associate, and Environmental Division Manager, has been with the firm for 15 years and has 25 years of professional experience. He is past National President of the American Institute of Professional Geologists (AIPG) and president of the Virginia Chapter of the AIPG. Mike has served on Draper Aden Associates’ Board of Directors for three years.

Mike has his professional licensure in Virginia, North Carolina and South Carolina. He holds a B.S. in Geology from Bates College and an M.S. in Geology from Old Dominion University.

“Throughout his career Mike has set the standard for client service and satisfaction, said Bill Aden PE, Co-Founder and Chairman of the Board of Directors. “His inclusion as a Principal recognizes those qualities and his significant professional contributions to Draper Aden Associates.”

AGI Announces New 2012 Executive Committee Members.

The American Geological Institute (AGI) welcomes three new Executive Committee members: Sharon Mosher, President-Elect; Michael D. Lawless, CPG-09224, Treasurer; and John G. Parrish, CPG-03326, Member-at-Large.

Sharon Mosher is the Dean of Jackson School of Geosciences at The University of Texas at Austin. Dr. Mosher’s other leadership roles include President of the Geological Society of America (2001), chair of the Council of Scientific Society Presidents (2004) and a founder and past chair of GeoScienceWorld (2004-2006).

She is also an honorary fellow with the Geological Society of London and was awarded the Association for Women Geoscientists’s Outstanding Educator Award in 1990.

Michael Lawless, CPG-09224, AGI’s incoming Treasurer, is currently Environmental Division Manager at Draper Aden Associates, where he has been employed since 1996. Mr. Lawless is active in the American Institute of Professional Geologists, served as its national president in 2010, and is the current Virginia Section president. He also serves on Virginia’s State Water Supply Plan Advisory Committee.

John G. Parrish, CPG-03326, State Geologist of the California Geological Survey, will serve as an AGI Member-at-Large. Prior to his assuming the position of State Geologist in 2005, he was the Executive Officer of the California State Mining and Geology Board (1994-2005). Prior to that he had a 20-year career in the petroleum industry. He is an active member of the American Institute of Professional Geologists and was their 2005 John T. Galey Sr. Memorial Public Service Award recipient.

The new members of the AGI Executive Committee will be installed during the Geological Society of America Annual Meeting in Minneapolis, Minnesota.

Tex Gilmore to serve on North Carolina Mining Commission

Dear Tex:

I am pleased to confirm your appointment to serve as a member of the North Carolina Mining Commission. Your appointment is effective immediately. Your term will expire on June 30, 2017.

Your board or commission is covered by the State Ethics Act. As a result, you must participate in ethics training within six months of your appointment and every two years thereafter, and you will be required to file a Statement of Economic Interest by April 15 of each year.

I am most grateful for your willingness to serve the great State of North Carolina. Your leadership and commitment are critical to this Commission as a part of our efforts to strengthen our communities and improve the quality of life for our citizens.

Sincerely,
Beverly Eaves Perdue
Governor

Ivan, K. “Tex” Gilmore, CPG-06039, has been a member of AIPG since 1982. He received the John T. Galey Sr. Memorial Public Service Award in 2007.

IN MEMORY

Merrill J. Reynolds
CPG-01894
Member Since 1969
Disney, Oklahoma

Michael F. Yarussi
CPG-04761
Member Since 1980
October 31, 2010
Flower Mound, Texas
The 1st EFG/AIPG Professional Geology Grand Canyon Field Study & International Comity

The 1st EFG/AIPG Professional Geology Grand Canyon Field Study began as a somewhat abstract concept during the AIPG Annual Convention in Flagstaff, Arizona in 2008. European Federation of Geologists Past President Gareth Ll. Jones (Ireland) and I were on an afternoon round-trip geology hike down the South Kaibab Trail. While enjoying the geology and astounding scenery of the vista, we discussed the prospect of organizing a joint EFG/AIPG geology hike cum field study from north rim to south rim across the Grand Canyon. It wasn’t until early in 2011 that the plans for accomplishing the trek were essentially cast in stone.

In late September of this year, an international group of four individuals, three geologists and a linguist specializing in Slavic languages, set off from the North Rim. (While the three of us geologists were delighted by the descent through time and enthusiastically engaged in frequent stops to examine and discuss the rock formations, our linguist colleague sometimes had to feign interest.)

The group consisted of Gareth Ll. Jones from Dublin, Ireland, Christer Åkerman and his wife Karina (linguist) from Uppsala, Sweden, and the author. Christer is likewise an EFG Past President.

This group typifies the international bonds created between professional geoscience organizations as a result of years of cooperative efforts to establish credentials which attest to the geoscientist’s training, competence, and ethical comportment. The Grand Canyon Field Study is merely the offshoot of decades of collaborative work to promote the profession within our respective countries and internationally.

It is not intended here to delve into details of the field study, but merely to emphasize again the importance of the relationships formed on the personal and organizational level which contribute to the ability to practice our profession internationally. The EFG (http://www.eurogeologists.eu/) is a confederation of the primary geologic organizations from individual European countries dedicated to formal recognition and promotion of the profession through Europe, and to promotion of international comity of credentials.

The title issued by EFG, EuroGeologist, is reciprocal with the AIPG credential, Certified Professional Geologist, and of significant value to AIPG CPGs working in Europe.
I asked people at the Annual Meeting in Bloomingdale about topics they would like to see discussed in this column. The following discussions on common morality and report ownership were suggested. These topics and related issues have been discussed before, but not all of you have been reading this column for the past 15 years, so repeating some topics is warranted. As always, I’d appreciate receiving your comments on these and any other topics you’d like to see discussed.

Common Morality–Deciding What to Do

In column 55 (June ’00), I reviewed Bernard Gert’s Morality: Its Nature and Justification (1998, Oxford Univ. Press, 408 p.). I find that Gert’s exploration and explanations of common morality provide a fundamental and realistic basis for moral and ethical analysis for examination of the more difficult or contentious issues presented in this column. Gert has published a much shorter and refined version of his ideas in Common Morality–Deciding What to Do (2004, Oxford Univ. Press, 179 p.). Everyone who is serious about the study of morality and ethics, professional or otherwise, should read this book.

Gert maintains that common morality is a system of informal rules, ideals, and procedures that are recognized by all societies we know about, and “is the moral system that thoughtful people use, usually implicitly, when they make moral decisions and judgments.” Gert does not claim to have created or developed common morality. Rather, Gert has provided a detailed description of something that previously existed. Gert maintains that his “detailed description of common morality provides a framework that all parties to a moral dispute can accept, even though they may disagree with each other on what morally ought to be done in a particular case.”

Perhaps Gert’s most fundamental observation is that a complete moral theory should not and cannot result in unique answers to every moral question. Failure to accept that unique answers are not possible is among the reasons that ethical systems advocated by such philosophers as Kant and Mill are incomplete and impractical.

Gert points out that the lack of unique answers to moral questions stems from four unsurvivable different factors.

1. The scope of morality; that is, who is covered by the moral rules? Gert points out that differences in opinion about if and when fetuses are covered by the moral rules are at the heart of the debates over abortion. Similarly, the more extreme animal rights activists who believe that all animals, or at least all mammals should be covered by the moral rules, do not represent a common view and so most of us have no moral qualms about eating meat.

2. The ranking of harms and benefits resulting from taking a particular course of moral action differs. The changes in airport security procedures, etc. following 9/11 with the consequent loss of personal freedom in order to increase the public’s safety are an example.

3. The harmful and beneficial consequences of the violation of a moral rule being publicly allowed when the moral analysis is based on ideological views that are not open to empirical investigation. The debates over creation science and similar alternatives to evolution are of this type.

4. “The interpretation of a moral rule, such as whether turning off a respirator of a ventilator-dependent patient who has refused further treatment counts as killing.” Recognition that common morality does not provide unique answers to all moral questions can allow those on opposite sides of an issue to mutually respect the legitimate moral position of those on the other side and this can help in arriving at solutions. Gert points out that a consequence of the inability of morality to uniquely decide such questions is one of the reasons that government and legal systems, which are devised to provide unique answers, are necessary. For example, in the discussion of whether contingency fees should be allowed for expert witnesses (column 93, Sept/Oct ’04), Bill Greenslade, CPG-02505 noted that the argument that such fees allow those with little financial means access to experts vied with the potential for encourag-

1. Download the topical index to these columns from the AIPG website to see a full listing of discussions under the topic heading “reports.” Copies of specific columns can be obtained either by purchasing the Geologic Ethics & Practices CD or by downloading the appropriate issue of The Professional Geologist from the AIPG website under publications.

2. I distinguish between morality and ethics by classifying as “ethics” formally adopted statements like AIPG’s Code of Ethics. Morals are generally known and followed, but informal principles.
ing biased testimony in the Arizona Board of Technical Registration’s (BTR) debate. The BTR’s decision to prohibit the acceptance of such fees legally decides the question even though some feel that this was an incorrect decision.

Gert recognizes that common morality’s failure to provide unique answers to all moral questions annoys some people. But he maintains that allowing people of differing views to respectfully talk to each other can help eliminate dogmatism and relativism. As Gert notes, “The most persuasive argument in favor of ethical relativism, the view that equally informed rational persons need not agree on the answer to any moral question, is the falsity of the view that all equally informed rational persons must agree on the answer to every moral question” (emphasis in the original). The universal agreement on a question required by either view proves them both false.

Gert observes that while common morality is complex, its complexity, like that of the grammar of a language, does not prevent it being understood by all rational people, even if the details of the system are not explicitly reviewed every time a moral decision is made, just as those fluent in English can use the future pluperfect even if they never learned, or forgot, the formal definition of that tense.

Common morality includes moral rules and moral ideals. Moral rules and moral ideals are frequently mixed together, as is the case with the AIPG Code of Ethics and most professional ethics codes and statements. Yet the distinction between moral rules and moral ideals is critical because only moral rules can be violated. Gert’s description of common morality also includes a two-step procedure, again generally used implicitly, for determining whether a particular violation of a moral rule will be allowed.

Gert’s moral rules are:
1. Do not kill.
2. Do not cause pain.
3. Do not disable.
4. Do not deprive of freedom.
5. Do not deprive of pleasure.
6. Do not deceive.
7. Keep your promises.
8. Do not cheat.
9. Obey the law.
10. Do your duty.

Gert notes that the first five rules could be collapsed into “Do not cause harm” and the second five into “Do not violate trust” but notes that doing so results in a lack of specificity that impedes the utility of the system. For those who object to the negative “Do not” of most of the rules, remember that it is far easier to list what is prohibited that to list what is allowed, i.e., all other actions. Violation of a moral rule generally results in punishment of the violator if the violation becomes publically known, unless the violation is a recognized exception to the moral rule.

Having listed the basic moral rules that all moral agents (generally but not exclusively rational adults) are expected to follow with respect to all persons covered by the moral rules, it is also clear that there are generally recognized exceptions to the moral rules. For example, self-defense is an almost universally allowed exception to the “Do not kill” rule. Likewise, most people permit surgeons to cut them open because they believe that greater harm will be avoided by the temporary harm resulting from surgery. The two-step process for determining whether a particular violation of a moral rule is justified will be discussed below. But first, a description of the moral ideals is needed.

Moral ideals are intentional actions that “avoid, prevent, or relieve the suffering of harm of someone protected by the moral system.” Most types of charity work qualify as acting on a moral ideal. Unlike moral rules, there is no need to provide detailed descriptions of moral ideals. Further, while people are encouraged to engage in actions that embody moral ideals, there is no requirement to do so and no punishment for not doing so, a significant difference from the requirement to follow the moral rules. Gert also points out that there is also a distinction between moral ideals, which seek to lessen harms suffered from utilitarian ideals that aim at increasing the amount of goods or benefits, although the distinction is not always clear.

Another characteristic of moral ideals is that it is not possible to achieve the ultimate goal of the moral ideal. For example, while one can contribute to a local food bank, no one of us can relieve all the hunger in the world. Even when we participate in a collective effort to support the local food bank, for example through a religious organization, we still have difficulty meeting even the local need let alone the needs farther away. Further, we are allowed to choose which morally ideal actions we engage in. Unlike moral rules, which should be observed impartially for all people, we can be partial in selecting both morally ideal actions and for whom those actions will be done. For example, I can choose to support AIDS education efforts and not similar efforts for heart disease. Or professionally, I can choose to contribute to the AIPG Foundation rather than similar foundations connected with other professional societies.

Now return to the two-step process for determining whether a particular violation of a moral rule is justified, one of the fundamental features of common morality. As explained above, we all recognize some exceptions to the moral rules such as willingly undergoing surgery that causes pain to avoid a greater harm of some sort. When everyone, or almost everyone, accepts a particular kind of violation, that violation is strongly justified. When there is disagreement about whether a violation should be allowed, for example, whether capital punishment is an allowed violation of the “Do not kill” rule, the violation is weakly justified.

The first step in the two-step process for justifying violations of a moral rule is using the morally relevant features of the violation to describe the act. Gert provides a 10-item list for identifying the morally relevant features.
1. Which moral rule is being violated?
2. What evils or harms (including their kind, severity, and probability; the length of time they will be suffered, and their distribution) are (a) being caused by the violation, (b) avoided by the violation, or (c) prevented by the violation?
3. What are the desires and beliefs of the person toward whom the rule is being violated? For example, a patient consenting to an operation.
4. Is the relationship between the person violating the rule and the persons toward whom the rule is being violated such that the former sometimes has the duty to violate the moral rules with regard to the latter independently of their consent? For example, parents reasonably disciplining children or governments imposing some restrictions on their citizens.
5. Which goods or benefits (including kind, degree, probability, duration, and distribution) are being promoted by the violation?
6. Is the rule being violated toward a person in order to prevent that person from violating a moral rule
whose violation would be (a) unjustified or (b) weakly justified?
7. Is the rule being violated toward a person because that person violated a moral rule (a) unjustifiably or (b) with a weak justification? This point is critical when discussing punishment for the violation.
8. Are there any alternative actions or policies that would be morally preferable?
9. Is the violation being done intentionally or only knowingly? Lying is always intentional while withholding information may only be knowingly deceiving. While sometimes there is a difference between intentional action and a knowing action, in most cases either alternative is morally unacceptable.
10. Is the situation an emergency such that people are not likely to plan to be in that situation? For example, when sufficiently large numbers of people have been injured to overwhelm available medical facilities, doctors are permitted to abandon those with a small chance of survival in order to treat those expected to survive.

Gert points out that the point of the foregoing list is to help identify the morally relevant features and facts of the situation. Once these have been identified and agreed upon by all concerned parties, then arriving at a moral consensus may be easier, or at least the specific reasons for disagreement will have been identified.

For example, I earlier noted that most of us grant an exception to the "Do not cause pain" (and perhaps other rules) in the case of surgery. But I can think of two types of objections to surgery. One is the case of those who decide that surgery or other "heroic" procedures that will add a few more months of life due to temporary abatement of a terminal illness are not warranted. This case involves the relative rankings of harms and benefits. The other is the case of those whose religious faith objects to such procedures. This is another example of the third type of unresolvable difference discussed above.

The second step of the two-step process is estimating the consequences of everyone knowing that kind of violation is, or is not, allowed. Gert expressly uses "estimated" in this step because accurate determination of the consequences is not always possible. When all agree that a particular kind of violation should or should not be allowed, the decision is strongly justified. When there is disagreement, particularly by a significant number of people, then the decision to allow or disallow the violation is weakly justified.

The foregoing is a brief summary of Gert’s explanation of common morality. I urge everyone to read the book, which is itself a summary of Gert’s Morality: Its Nature and Justification (1998) that more serious students of morality will want to read as well. I believe that common morality provides a required and firm basis for the exploration of professional ethics. The ideas and procedures that Gert makes explicit in his books underlie, usually implicitly, the discussions in this column.

Report Ownership—Data and Opinion

Our reports have two components, the data collected and analyzed and our conclusions and opinions resulting from the study of the data and its analysis. When the data are provided by and/or paid for by the client, most would argue that the data belongs to the client; see Rule 3.2.1 below. The author(s)’ opinions and conclusions are the author(s) and the author(s) have legal liabilities for incompetent or unprofessional work. While liability is usually not an issue, it should not be ignored.

In column 23, referring to a topic in column 21, Peter H. Dohms, CGP-07141, stated, “I disagree that the report is or should be the property of the client. ‘Professional reports are ‘instruments of service’ and traditionally have remained in the ownership of the consultant. In the new ASFE Contract Reference Guide, 3rd ed. (published by ASFE and co-sponsored by AIPG, in August 1997)3, a model clause dealing with ownership of instruments of service reads, Plans, specifications, reports, boring logs, calculations, field data, field notes, laboratory test data, estimates, and similar documents and materials (other than samples) prepared by or for CONSULTANT as instruments of service are CONSULTANT’S property. CONSULTANT shall retain these instruments for (xx) years following submission of final project deliverables, during which period CONSULTANT’S instruments of service will be made available for CLIENT’S review at any reasonable time.

“The principal reason for a clause of this type may arise in the type of case discussed in your column [21]. Unauthorized reuse of your instrument of service is impossible to control in the absence of such a provision in your contract. In the experience of the preparers of the ASFE Contract Reference Guide, unauthorized reuse of professional reports (sometimes many years after the fact) has the potential for litigation nightmares.

“Also, and almost of equal importance, if you transfer ownership of your instruments of service to others, this could result in their being construed as ‘products.’ Such an interpretation in court could result in your work being judged on the basis of the much more strict doctrines of ‘product liability’ (as opposed to ‘professional liability, which is judged on the basis of the ‘standard of care’). With product liability, it is only necessary to prove that there was some sort of defect in the ‘product,’ not that there was negligence in its preparation. A product defect is much easier for a lawyer to prove than professional negligence!”

The seemingly small point of word choice between “professional services” and “work product” potentially has tremendous legal and consequent economic impact. While I have not personally been involved in a case where the distinction between “professional services” and “work product” was the issue, I have a good deal of experience with the similarly important distinction between “resources” and “reserves” in the natural resources business. I can assure you based on those experiences that such distinctions in word choice are not trivial.4

When a client requests a report, the client expects that it will be able to use the report for the client’s purposes, including control over the distribution of the report. This is particularly true when the report includes information obtained by the client and/or was obtained and prepared for the client’s exclusive economic benefit. These observations give rise to the common view that the report

3 The ASFE is the Associated Soil & Foundation Engineers, "professional firms practicing in the geosciences."
4 This paragraph comes from Column 85.
is the client’s property. These considerations are evident in the following three rules from the AIPG Code of Ethics.

Rule 3.2.1—A Member shall not use, directly or indirectly, any confidential information obtained from or in the course of performing services for an employer or client in any way which is adverse or detrimental to the interests of the employer or client, except with the prior consent of the employer or client or when disclosure is required by law.

Rule 3.2.2—A Member who has made an investigation for an employer or client shall not seek to profit economically from the information gained without permission from the employer or client, unless it is clear that there can no longer be a conflict of interest with the original employer or client.

Rule 3.2.3—A Member shall not use his or her employer’s or client’s resources for private gain without the prior knowledge and consent of his or her employer or client.

However, the professional geoscientist also has an interest in the report. The report contains the professional’s observations and conclusions, for which the professional is liable. The client cannot change the professional’s report and still maintain that it is the professional’s report. Because there are a few clients who indeed do alter or misuse professional reports, professionals should keep copies of their reports and appropriate supporting data. Including a paragraph like the one Dohms quotes in the contract covering the work helps clarify this issue for a particular job. The professional should also have a clear understanding of the use(s) of a proposed report, should state that understanding in the report, and state in the report whatever limitations on use, etc., are appropriate. These concepts underlie the following Rules from the AIPG Code of Ethics.

Rule 3.3.2—A Member shall not give a professional opinion or submit a report without being as thoroughly informed as might be reasonably expected, considering the purpose for which the opinion or report is requested.

Rule 2.1.1—A Member shall not knowingly participate in any illegal activities, or knowingly permit the publication of his or her reports, maps, or other documents for illegal purpose.

Let’s look at some examples to illustrate the foregoing points. First, consider the report prepared for a client recommending that an oil prospect be drilled. This is a fairly common type of report and can include basic information obtained from public sources, from the professional geoscientist’s personal store of information, and confidential information obtained from the client. This information is interpreted by the geoscientist to arrive at the conclusions, which in this case support the drilling of the prospect. The report is written knowing that it will be used for promotional purposes and appropriate language is used for the intended readers (potential investors) and appropriate cautionary statements are included. So we have a report with potentially diverse data sources, including information from the client, which is the client’s to control. And the interpretations and conclusions are the geoscientist’s.

Now the report may be part of the information used to make a private, confidential bid to obtain the prospect or it may be used as part of a public effort to raise funds. The difference affects how the client will distribute the report. This is the client’s decision, not the geoscientist’s.

I received a call from a geologist several years ago who had written two such reports for the same client. The first venture was successful and the geologist appreciated being asked to work up the second prospect. About two weeks after submitting the second report, the geologist called the company to request and subsequently received a copy of the offering materials for the second prospect. He discovered that a reserve estimate had been added to his report and included in the offering material. Clearly, this was a case where the client’s misuse of the geologist’s report justified the geologist’s calling attention to the problem. Indeed, had the geologist not done so as soon as he learned of the misuse, he may well have become liable to the investors. And this clearly supports the view that the geologist retains an interest in the report and its uses.

Now let’s change the situation a bit. The geologic report recommends drilling the prospect. Assume the client is a public company and it issues a press release containing the following language:

The Company’s decision to drill the Hoot Owl prospect is supported by an independent report prepared for the Company by (consulting geologist’s name). The Company believes that the Hoot Owl prospect will be the next Spindletop Field, if not the next Prudhoe Bay.

The press release accurately states that the consulting geologist is independent and supports drilling the prospect. However, the geologists’ report makes no mention of either the Spindletop Field or Prudhoe Bay; indeed no potential ultimate field size or reserve estimates are in the report. Do you read the press release as inferring that the consulting geologist agrees with these company projections? What, if anything, should the consulting geologist do in this situation? What are the liabilities of acting or not acting?

In column 33, Ted Wilton, CPG-01669, asked for a discussion of “personal files” and the ownership of the data. Many of us know of others (or we ourselves) who have files containing information that was developed as a result of either a contract assignment or as part of our ongoing obligation as an employee of a firm. Do we have the right to (1) keep a copy of the information, or (2) use it at some later time to develop exploration targets. I would say that if the work was paid for by a client, that the client’s permission would be required before the data could be used for another purpose.

What if the client is no longer in business? Or, more fundamentally, do we even have the right to keep copies of reports that we generate? What do you do if you have either an employee or a consultant working for your firm, who may be using information developed for so-called personal files? How do you handle a situation where this may be going on, but you do not have direct involvement (you are not supervising the consulting geologist do in this situation)?

Wilton asks about a fairly common situation. Wilton also notes that permission from the employer or client, for example in the case of farming out a prospect, is one common and ethical way of dealing with the problem. While Canon 3 of the AIPG Code of Ethics explicitly requires protection of an employer’s or client’s confidential data, as Wilton asks, what happens when the employer or client either ceases to exist (including direct successor’s in interest), or ceases to be interested in the property in question?

In column 36 Peter K.M. Megaw, CPG-10227, responded to Wilton’s earlier comments on this topic, “It seems to me patently obvious that we not only have the right to keep a copy of everything we generate, but we have an obligation to ourselves to do so. Only
by keeping a copy of what we produce can we protect ourselves from someone lifting items out of context, deleting data that don’t fit the client’s objectives, or outright rewriting of our work (easier to do with sophisticated computer gear than we’d like to believe). Knowing that you have an original copy often obviates this problem as potential ‘editors’ know the true version is out there.

“Fundamentally, geologic exploration is a data-based enterprise, with properties attracting attention for different reasons at different times, often decades apart and with the property in varying conditions. Historic data can be tremendously useful and may even save lives if now-concealed hazards exist. It seems extreme to suggest that one eschew use of ‘personal-file’ data generated 50 years ago when a now-inaccessible mine was last in production—but what about 25 years ago, 10, or 5? Where do we draw the line? Is there a legal statute of limitations that can be applied?

It is of course best to establish ‘use of data’ questions before commencing work. Clients frequently present Work Service Contracts with nebulous Confidentiality language, and it is in our best interests to clarify this as much as possible, in order to limit our liability over time. Data inevitably will leak out, and it is often tempting for the client to believe the worst of an outsider rather than a former employee now working for another company. It also protects us somewhat should one of our own employees depart, illegally taking copies of files with him/her. It thus makes sense to establish a specific time limit [for data retention]. But even when this has elapsed, it is courteous to ask the former client’s permission to use the data—if the client still exists.

“The question of whether data developed for a particular client is reusable if the client company has disappeared is likely to become an issue for many as the latest downturn in exploration and mining takes its inevitable toll. 5 If there truly is no successor in interest, I would argue that one is free to use the data as one sees fit—although allowing a suitable ‘mourning’ period might be proper. Unfortunately, this still leaves open the question of how you prove that no successor in interest exists.

“Corollary questions:

1) Do you have the right to use data if the client left you partially unpaid for a job, prior to disappearing or being absorbed into a new company that refuses to acknowledge your invoice?

2) Is it ethical to use data generated for an existing mining company that has been made public by donation of personal files to a manuscript library—if the company involved was not consulted regarding the donation? The question boils down to inheritance of Confidentiality—are we required to have our heirs return our personal files to the companies that paid for them? This would seem both impractical and unlikely to happen—perhaps another reason to back a ‘statute of limitations’?

3) What about data in personal files reflecting potentially serious environmental hazards that may have significant public health implications? At what point do these pass from recognition and recommendations made to the client, to matters of public concern if the client has ceased to exist or has clearly chosen not to address the problem?”

Megaw makes some very good points. As the generators of the information in a report, that is the conversion of data into an interpretation, we acquire an ownership interest. Peter H. Dohms, CPG-07141, addressed this issue and made reference to the ASFE Contract Reference Guide, 3rd ed., in column 23; see above. Dohms even included a suggested contract paragraph. As for a “legal” statute of limitations when specific contract provisions do not exist, this is a good question for a lawyer. As with most legal questions, the answer probably depends on a number of things, like your legal address and your client’s.

I’m struck by Megaw’s advocating keeping copies and then his remarks about one’s own employees departing with “illegal” copies. If the employee was responsible for part of the work, why shouldn’t the employee keep a copy just as the company does? While the specific answer may depend on specific employment contract provisions, the general principle seems to contradict the main position Megaw advocates. Any further thoughts on this issue?

Please contribute your thoughts on Megaw’s very good corollary questions. Regarding question 2, suppose that the company makes the donation making the information public and the released information includes a description of a proprietary process you own. What do you do?

Martin Andrejko, CPG-08512, addressed the report ownership question in his column 17 (Nov. ’06) on “Contract Language.” Andrejko’s column discusses a contract that contained a variety of contract provisions that were inappropriate for the consulting firm (Buyer) that was asked to accept the contract. Specifically, one provision stated that all “work product” including data and interpretations were to remain the client’s (Seller’s) property. Andrejko states, “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 insured’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.”

5. Column 36 was published in November 1998. There have been upturns and downturns since then and such swings can be expected to continue.

6. Andrejko’s column along with all other articles published in The Professional Geologist that are referred to in PE&P column are also collected on the Geologic Ethics & Practices CD and their titles and publication information are on the PE&P index.xls file, which is updated following the publication of each column.
In summary, a geoscientist’s reports, including the data used for the report (the instrument of service) are, or should be, the geoscientist’s property. However, the geoscientist also has the ethical obligation to keep the client’s confidential information confidential except where permission to use that information has been granted as required by Rules 3.2.1, 3.2.2, and 3.2.3 of the AIPG Code of Ethics. As pointed out by Doehms and Andrejko, the contract covering the work should explicitly state this and the ASFE Contract Reference Guide provides an example contract clause.

And finally, an additional question: what is the difference between using “best efforts” and “good efforts” in conducting your work? This is a question I know nothing about and would appreciate contributions from those of you who do as I suspect there is an important difference. How does one distinguish between “best efforts” and “good efforts”?  

### Failures of Common Sense

**Sam Gowan’s**, CPG-07284, President’s Message in the Sept/Oct ‘11 TPG describes a frightening example of press bias, namely the willingness to ignore science and promote the views of the scientifically ignorant but politically popular, in this case the Marcellus Shale gas play and fracturing. Hydraulic fracturing (fracking) has been used with increasing sophistication since the early 1970s. This is not the only recent example of the scientifically ignorant but politically popular. In contrast, the reporting of the CERN Season’s Stupid column, in the Sept/Oct ‘11 TPG provides another example the common rush to blame water quality problems in a domestic well to the nearest perceived source of industrial pollution without looking for alternative sources.

As Gowan’s message reminds us, be careful what you read or hear in the news media, especially about politically charged subjects. I wouldn’t be surprised to learn that the situation described by Stone resulted in adverse press for the neighboring industrial facility.

### ASTM Standards and GPR Surveys

The discussion “Does a GPR Survey for Environmental Due Diligence Need Documentation?” in column 134 (Jul/Aug ‘11) included a comment from Richard A. Hoover, CPG-05996, of the ASTM D-6432 Standard Guide for Using the Surface GPR Method for subsurface Investigation. Hoover commented on the ambiguity in the Standard about data presentation, and expressed his view that “it is very difficult to review a GPR report without data.” This prompted my comment that sometimes ASTM Standards aren’t all they are held up to be.

**James H. Williams**, CPG-0374, has provided his experiences with the ASTM and karst terrains. “My first encounter with ASTM is years ago, mid 1960s. We were starting our soils lab and using ASTM standards for that purpose. While doing so, I also was using some standard guides to assist as we were developing our engineering geology procedures. At that time, the standards, the ‘must follow’ ASTM procedures were clearly distinct from suggested guidelines. In our state survey [Missouri Geological Survey] work gradually drifted away from ASTM as other priorities developed.

“In the mid-1990s; however, there was a sudden return. This came about when a University of Missouri professor came to my office worried about ASTM standards being developed relative to the definition of karst. This as a standard was clearly so far off base would be called an out in any ball game. Proposed karst definitions included the presence of carbonate bedrock, crack dimensions greater than, as I recall, something like one-half inch, and other similar common rock physical properties. These were being proposed in such a fashion that site and local area conditions were ignored. Some of those making such proposals were known to me, college pros and consultants specializing as expert witnesses for opposition groups relative most anything including various types of waste disposal sites. The proposed ASTM standard would greatly assist their cause.

“I soon learned of the need to become an ASTM member and especially the Soil and Rock committee. ASTM being composed mostly of engineers was prone to like anything that could be measured regardless of other uncertainies. However, this committee had, and remains, one with a mix of geologists, hydrogeologists, and engineers with geologic knowledge. As those of us having karst standards concerns kept at it, the proposed karst standard eventually collapsed in ASTM. At this same time; however, the precision mania was still there. Examples included how to set up a drill rig, again a standard, theoretically a guide, but no indications in the guide it was anything but the intent of a standard. I need to mention in all this that I was using my AIPG Certification and with big support from National in the 1990s, to bolster my concerns being expressed in the committee meetings. This is another example of the AIPG membership benefits.

“During this period, I was proposing a caveat, and had the support of many, to make a clear distinction between a standard and a standard guide. That caveat was added to standard guides and included judgment plus recognition
of changing site conditions, no two sites are alike. Using professional judgment options was acceptable within the framework of a standard guide. I left ASTM some six years ago and do not know if this continues. In behalf the slow-moving ASTM ship, ASTM did indeed make significant course changes. Also the membership work allows members to contribute much to their profession plus learning much about associated professions and their needs and concerns.

“My point concerning those mentioned in the column, both parties may be correct within the framework of a standard guide. The differences that exist may be played out, as is often the case, how commonly such procedures are used by one’s peers. One needs to be careful about using an ASTM guide as a prop and not for what it is intended, as a guide.”

Professional Employment and Ethics

Executive Director William Siok’s, CPG-04773, column in the Sept/Oct ’11 TPG addresses the issue of whether the TPG and Section newsletters should accept ads containing job openings. As Siok noted, this is a subject I’ve been asked about before; see “Should AIPG and its Sections Advertise Jobs in Newsletter, E-mail Lists, etc.?” in column 96 and Siok’s Executive Director’s column, both in the Mar/Apr ’05 TPG. As Siok points out in his most recent column, “AIPG and the Executive Committee have always supported the use of AIPG’s resources to provide all members with access to as much useful information about career opportunities and job openings as possible.” My column 96 discusses this topic in detail and includes comments from several members of the Ethics Committee on the subject.

As far as I know, the only ones objecting to job ads in AIPG newsletters are employers who fear they might lose employees. As I noted in column 96, these employers may be better off when a dissatisfied employee leaves and, in any case, should look into the reasons for the departure. Maybe the employer needs to make some changes as well so that employees will stay. Looking at new positions is something we all should do from time to time for a variety of reasons. The result of looking can be that the employee decides that the current position is the best alternative.

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Geologic Ethics & Professional Practices is now available on CD

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

AIPG members will be able to update their copy of this CD by regularly downloading the pe&p index.xls file from the www.aipg.org under “Ethics” and by downloading the electronic version of The Professional Geologist from the members only area of the AIPG website. The cost of the CD is $25 for members, $35 for non-members, $15 for student members and $18 for non-member students, plus shipping and handling. To order go to www.aipg.org.
AGI Accepting Applications For 2011 Award For Excellence In Earth Science Teaching

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

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The award is named in honor of Dr. Edward C. Roy, Jr., who was a strong and dedicated supporter of earth science education. He served as President of AGI, chaired the AGI Education Advisory Committee, and received both the Ian Campbell Medal and the Heroy Distinguished Service award. In addition, he served as the Gertrude and Walter Pyron Distinguished Professor of Geology at Trinity University, as Dean of the Division of Sciences, Mathematics, and Engineering, and as Vice President for Academic Affairs. Roy was also appointed Chair of the Texas Earth Science Task Force by the Commissioner of the Texas Education Agency.

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

AIPG Section Websites

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

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Hydraulic head is the elevation of the static water level associated with a given depth in the saturated zone. Head decreases with depth in recharge areas and vice versa in discharge areas. Vertical flow direction is determined by measuring head in two adjacent piezometers, installed at different depths. A piezometer is a cased well that is open (or narrowly screened) only at the bottom and is tightly sealed along its length. In the casing-advance drilling method, temporary casing is emplaced right behind the bit during drilling to prevent cave-ins. A single borehole being drilled by this method may serve as an infinite set of piezometers, provided there is no open hole when static water levels are taken at different depths. Such measurements provide a good profile of head from a single bore.

A modeler, anxious for head data, once visited a deep, air-lift, casing-advance well I was working on and asked for the water level (the site geologist had a field book full of them!). Under ideal conditions a head value for the current bore depth could have been determined, if that was really desired. It didn't seem to be. I pointed out that not all water levels measured during casing-advance drilling represent static conditions or true head. I advised against using such measurements and offered to provide a representative head profile once I’d reviewed the available data (after all, we were still drilling).

Useful head values can be obtained by screening spurious water-level measurements with respect to three conditions: (1) the amount of open hole at the time of the reading (Was the temporarily cased borehole acting as a true piezometer?), (2) the pre-measurement drilling activity (Was it particularly disruptive of water level?) and (3) the time elapsed between that activity and the water-level measurement (Was it long enough to permit the water to recover to a static level?). When I applied this screening process to the miscellaneous water levels measured during casing-advance drilling at the site, it yielded heads that declined with depth, as was appropriate for its location in a recharge area. Furthermore, my head profile essentially matched one made later from data collected by transducers installed in multiple isolated screens in the completed monitoring well. The procedure should be useful anywhere that head values are required from deep wells drilled by the casing-advance method. Tip: A casing-advance bore is an infinite set of piezometers, but only careful screening of water-level data taken during such drilling can yield true hydraulic heads.

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

START AN AIPG STUDENT CHAPTER TODAY!
The AIPG Student Chapter Manual is available on the AIPG National Website at www.aipg.org or contact National Headquarters at (303) 412-6205
A couple of weeks ago my parents drove me from the Birthplace of Lincoln through the Boyhood Home of Lincoln into the Land of Lincoln to begin my life as a grad student, characterized by an absence of portraits of Lincoln (paper and coin) in my wallet and an ever decreasing amount of virtual Lincolns in my bank account. I knew (at least, really hoped) that graduate school was different from undergrad. For one, I was making the move from a tiny college in northern Ohio where everybody lived on campus to a good-sized state school in southern Illinois where I’d be in a house with a real kitchen and a roommate that actually wasn’t a student. I was looking forward to a change in pace, climate, culture, and terrain. Academically, I would now be just a “geologist”, no longer doubling up the focus with the living stuff, at least on paper. I promised myself I would not acquire all of the obligations I managed during undergrad but would instead treat everything school-related as a job (my only one), not my entire life. I soon realized that this won’t be a hard promise to keep, and in only a couple of weeks I have made some surprising and important observations:

Observation 1: There are LOTS of bikes here. Nice ones, too.
Observation 2: Southern Illinois is not flat, at least south of Carbondale. Talk about a glacial maximum!
Observation 3: Water towers can take on interesting shapes and colors.
Conclusion: Bikes + hills (especially ones called “smiley face” because of the smiling water tower on top, see Observation 3) = lots of fun
Observation 4: There is an Army Corps of Engineers flag hanging upside down in my grad student office…
Observation 5: When introducing myself to a group of people, I mentioned that I was studying geology and one of the guys responded, smiling, with “well, I don’t get along too well with geologists. I’m in mining engineering.”

Conclusion: Apparently, geologists and engineers get along about as well as some professional geologists and academic geologists. I haven’t decided which relationship makes less sense.

Observation 6: There were news reporters in my lab a couple days ago. And more to come.
Observation 7: See Observation 4.
Conclusion: Whatever my project ends up being, chances are it will actually matter to non-geologists (definitely a good thing!).

Observation 8: I have a yard.
Observation 9: The growing season here is apparently pretty long.
Conclusion: Fall garden!!!
Observation 10: There are some sweet people in grad school.
Observation 11: My roommate has lots of really cool pets.
Observation 12: There’s a lot of climbing here?!?
Observation 13: My inclination to procrastinate is inversely related to how busy I am.
Observation 14: I’m not too busy, yet.

Conclusion: No, I haven’t finished revisions on that paper, sent those cards, responded to that e-mail, or made those reservations. I’ve been too busy trying to figure out when I’ll be able to afford climbing shoes, playing with dogs, watching kittens wrestle, visiting horses, digging in the dirt, going for long bike rides, hanging out with new friends, and finding things to do that don’t involve looking at a computer screen or (need I say?) require too many portraits of Lincoln or Washington.

On a more serious note, the decision to come here was not an easy one. I received all sorts of advice on grad school, from when I should go (right after undergrad vs. taking time off), whether to get a Master’s or go straight for the PhD, how to manage my time, what to get involved in, what opportunities to take advantage of, how to get a job afterwards, what to expect from my advisor, and many other topics. Everybody has their opinions and advice. The next issue of TPG is the annual student issue, which will come out right in the middle of application deadline season when students are weighing options and thinking about their futures. If you have any advice, experiences, or thoughts concerning graduate degrees and post-graduation jobs, this would be a great opportunity to share it. Should a recent grad get work experience before grad school? What degrees are you looking for in new hires? Do you know of any particularly good programs for your field? Do you only hire traditional “geology” majors, or do you look for a variety of backgrounds in your company? Any “I wish I had…”s? Let us know! What to do after graduation is, of course, a very stressful decision and it doesn’t feel possible to have enough information. We’re overloaded with advice, why not add to it?
Answers:

1. The answer is choice “c” or “orthorhombic” system, where \( a \neq b \neq c \) and where the axes intersect at \( 90^\circ \). Olivine \([\text{Mg,Fe}_2\text{SiO}_4]\), a silicate of iron and/or magnesium, and Barite, or barium sulfate \((\text{BaSO}_4)\), constitute mineral examples of the orthorhombic crystallographic system.

In the “tetragonal” system, \( a = b \neq c \) with the axes intersecting at right angles. In the “isometric” system, \( a = b = c \) and the axes are also at right angles to each other.

2. The answer is choice “c” or “The viscosity of magma is inversely proportional to its silica content”, as this statement is erroneous.

As temperature increases, the viscosity of magma tends to decrease, as higher temperatures force atoms apart increasing fluidity. Increasing temperature will lead to greater amounts of liquid and a low percentage of crystallized solid minerals. Dissolved gases also increase fluidity.

An increase in silica content makes the magma more viscous, so the relationship between viscosity and silica content is directly proportional. As the silica content increases, silicon-oxygen tetrahedra will develop chains and sheets and result in the packing of atoms into closer arrangements. This process makes flow more difficult.

There is a distinct and direct relationship between the viscosity of magma and a volcano’s eruptive style. Lower viscosity magma is generally associated with more fluid eruptions such as the Icelandic and Hawaiian styles. In contrast, a viscous magma is related to explosive eruptions, where pressure from gaseous components builds up drastically. Strombolian, Vulcanian, Vesuvian, Plinian and Pelean eruption styles are connected to higher viscosity magma.

3. The answer is choice “b” or “11.5%”.

The “probability of recurrence” (\( P \)) and “recurrence interval” (RI) are given by:

\[
P = 100 \left[ \frac{m}{n+1} \right]
\]

\[
RI = \frac{(n+1)}{m}
\]

In the above equations, “\( m \)” is the relative magnitude of the flood and “\( n \)” is the number of years over which records are kept. In our example:

\[
P = 100 \left[ \frac{7}{(60+1)} \right]
\]

\[
P = 11.5%.
\]

4. The answer is choice “b” or about “525 feet”. The proof follows:

Let \( sa \) = slope angle, \( dt \) = true dip angle, \( AB \) = the slope distance between point A (outcrop) to point B (well’s drill site), \( d \) = depth to calculate, \( x \) = horizontal distance between A and B and \( y \) = vertical drop between A and B. Then:

\[
\sin sa = \frac{y}{AB}
\]

\[
y = AB \sin sa
\]

\[
\cos sa = \frac{x}{AB}
\]

\[
x = AB \cos sa
\]

\[
\tan dt = \frac{(d+y)}{x}
\]

\[
d+y = (x)(\tan dt)
\]

\[
d = (x)(\tan dt) - y
\]

\[
d = (AB \cos sa)(\tan dt) - AB \sin sa
\]

\[
d = AB \left[ (\cos sa)(\tan dt) - \sin sa \right] \quad \text{(equation 1)}
\]

Since \( AB \) = one-quarter mile = 1320 feet, then equation 1 becomes:

\[
d = 1320 \left[ \cos 10^9 \ast \tan 30^9 - \sin 10^9 \right]
\]

\[
d = 525.36 \text{ feet}.
\]
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Applicants for Certified Professional Geologist

FL William Szary
IL Victoria Broomhead
NM Steven Pearson
NV Graham Kelsey
NV Kim Craig
TX Melissa Hill
Canada Stephen Hedberg
Mexico Manuel Leonardo Padilla-Palma

Applicants Upgrading to CPG

AZ Hall Stewart MEM-2091
CO Brian Alers MEM-2108
FL Robert Baker MEM-1006
NV Christopher Shaw MEM-2109
NY Michael Grifasi MEM-2101
PA Robert Fargo MEM-1711

New Certified Professional Geologists

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CO James Piper CPG-11443
CO Edwin Ulmner CPG-11442
CO Erkhembayar Munkhtogoo CPG-11441
CO Eileen Dornfest CPG-11440
CO Robert Fishburn CPG-11439
CO Joe Brinton CPG-11437
CO Patrick Hollenbeck CPG-11436
CO Paul Hohbach CPG-11432
MA William Williams CPG-11435
MI Jon Hirschenberger CPG-11453
NV Mark Abrams CPG-11451
NV Melissa Mateer CPG-11448
NV Sergei Silaev CPG-11447
NV John Lukens CPG-11431
NY Steven Trader CPG-11452
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IL Edwin Whitmer MEM-2111
IN Philip Ames MEM-2103
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KS Joel Davidson MEM-2093
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MO Vincent Journey MEM-2110
MO Mickey Cruse MEM-2105
NJ Donald Campbell MEM-2113
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NV Erin Orozco MEM-2100
NY Karla Miranda MEM-2114
NY Michael Grifasi MEM-2101
SC Shaun Malin MEM-2099
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WA Nicholas Allmendinger MEM-2097
WA Timothy Kingsley MEM-2097
WI Patrick Allenstein MEM-2098

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CT Kathy Sequino AS-0071
IL Daniel Rogers AS-0069
MI Rodney Johnson AS-0072
NC James Holley AS-0070
NC Thomas Glover AS-0073
TX John Giardino AS-0074

Upgrade from Student Adjunct to Associate Member

IL Davis Warren AS-0068

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CA Melanie Lourme SA-3178
GA Randy Butler SA-3136
GA Donald Osborne SA-3137
GA Salvador Espinosa SA-3138
GA Alex Brown SA-3139
GA Jonathan Primm SA-3140
GA Na Hyung Choi SA-3141
GA Jordan Carney SA-3142
GA Rachel Cheatham SA-3143
GA Patrick Harold SA-3144
GA Holly Herrin SA-3145
GA Leonard Hogan SA-3146
GA Leanne Hancock SA-3147
GA Landon Woodall SA-3148
GA Austin Brown SA-3149
GA Christopher Cameron SA-3150
GA Meredith Cole SA-3151
GA Laura Quirk SA-3152
GA Robert Wilson SA-3153
GA Emily First SA-3154
GA Kristin Overby SA-3155
GA Lauren Graham SA-3156
GA Thear Fraley SA-3163
GA Melissa Ragan SA-3164
GA Anna Menser SA-3174
GA Joelle Freeman SA-3177
IL Clinton Koch SA-3162
LA Emma Caverly SA-3176
MO Kyle Hughley SA-3160
MO Christina Orrick SA-3157

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Water Resources Development Challenges in Northern Uganda

Barney P. Popkin, CPG-06547

Introduction

Uganda, “the pearl of Africa,” is a fertile, water-rich and land-locked former British colony in East Africa, and about the size of Oregon. It is west of Kenya, east of the Congo, south of Sudan, and north of Rwanda and Tanzania (Figure 1). About 82% of the country’s 241,038 square kilometers is land and the remaining 18% is water. Northern Uganda generally consists of the area north of the Victoria Nile River branch. This article discusses water resources development challenges in Northern Uganda.

Demographics

Uganda’s 35 million people are culturally and tribally diverse. Nationally, there are over a dozen ethnic or tribal groups and over half-a-dozen religious groups although the country is primarily Roman Catholic and Protestant. Ethnically the country is primarily Baganda and Banyakole; however, the north is dominated by the Acholi who are Christian, many of whom are internally displaced persons (IDP) or descendants of IDPs from long-term conflicts. Accurate demographic trends are unknown, but it is likely one of few countries with a declining population despite a high birth rate. This net decline is a result of numerous factors, including recent civil war and ongoing tribal conflicts, with waves of refugees moving in and out of the country in response to internal civil unrest as well as strife next door in Sudan; high infant mortality and incidence of HIV/AIDS; food, water-borne illnesses (malaria, typhoid fever, diarrhea and sleeping sickness, etc.; poor sanitation; and, animal contact (plague, rabies, snake bites), all of which lead to a high death rate at young ages. The average life expectancy in Uganda is only about 53 years. Less than 15% of the population is urban, yet the annual rate of urbanization growth is about 5%.

The major populated districts in Northern Uganda are Gulu, Kitgum and Pader, with an estimated urban or rural growth center population of about 155,000, 60,000 and 14,000 respectively (Wikipedia, 2011). The rural populations are unknown but likely to be significantly. Over 50 to 80 percent of the IDPs have returned to their rural villages from the urban centers which housed them during past conflict times, meaning the urban centers in Northern Uganda have been losing population from IDP returns. Because of decades of warfare and internal conflicts, IDPs and other refugees tend to be suspicious of each other with little community cohesiveness and public cooperation. A culture of poverty, low work ethic, and donor, government, and non-governmental organization (NGO) dependency prevails in the north, which challenge community and public water development programs.

Climate

The climate is tropical. It is generally rainy with two dry seasons (December to February, June to August), and somewhat semiarid in the northeast. There have been recent periods of prolonged drought throughout the country, yet heavy rains and accompanying landslides and flooding are common.

Topography and Geology

Uganda is part of The Great Rift Valley (Figure 2). The country is mostly a fertile plateau with many rivers and lakes, a rim of mountains, and well-drained rivers with large lakes and wetlands. Lake Victoria in the south is a major water source to the Nile River system. Its lowest point is at Lake Albert in Western Uganda at 621 meters above mean sea level (MSL); its highest point is at Margherita Peak in Southwestern Uganda on Mount Stanley at 5,110 m above MSL.

Regionally, Northern Uganda is dominated by Precambrian (Archean) crystalline rocks of the African plate, dating to 2,500 Ma. This basement complex is mainly granitic metamorphic rocks. Mineral occurrences include asbestos, graphite, kyanite, garnet, talc, feldspar, kaolin, clays and stone for aggregate. Copper, cobalt and gold occurrences are also present. Rift areas chiefly consist of Tertiary to Quaternary carbonate and clastic sedimentary rocks and volcanic rocks. Locally, fractured limestone is an important aquifer. Deep lateritic soils are common.
across the landscape. There is a large, untapped capacity for hydropower production associated with the Nile River system.

Hydrology and Water Budget and Water-Related Environmental Concerns

The total renewable annual water budget is about 66 cubic kilometers, while the annual water use is about 0.3 cu km/yr. Fresh-water withdrawals are estimated at 43% for domestic use, 17% industrial use, and 40% for agriculture (CIA, February 2011). Water-related environmental concerns include: draining of wetlands for agricultural use; deforestation; overgrazing; soil erosion; water hyacinth infestation in Lake Victoria; and poor waste disposal practices which contaminate freshwater resources.

Water Resources Management

There is no national programmatic water-resources management or integrated water resources management scheme, but the Ministry of Water and Environment (MWE) promotes guidelines and empowers Local District Governments (LDG), Town Councils (TC) and Regional Growth Centers (RGC) to manage the water resources in its geographic area.

Water Sector Context

It is important to understand the cultural context of the water sector in Uganda to plan effectively for water development. Briefly, in the Ugandan water sector, donors usually collaborate with the MWE to plan the project through MWE with MWE's blessing, or, MWE turns the project over to the National Water and Sewerage Corporation (NWSC) to implement through NWSC’s procedures. Departures from these proven, time-tested and government-preferred protocols, even if to avoid the infamous Ugandan corruption issues within the established water sector, invariably lead to project delays.

Another cultural factor is that the Acholi largely feel neglected by the central government. This is because government soldiers failed to give them protection when the Lord’s Resistance Army (LRA) carried out their raids. Some historians even claim the government was intentionally prolonging activity. There is a variety of water sources available to everyday people in Northern Uganda: river water, springs, and rainwater from rooftop harvesting, especially during the wet winter and spring seasons; groundwater from hand-pumped boreholes, bucket-extraction from shallow hand-dug wells, boreholes equipped with motorized pumps; and less commonly, public kiosks, public piped-water distribution systems to yards and household connections, and vendor-supplied, shop-bought bottles, or otherwise hand-delivered water (Figures 3-5). Because of generally abundant rainfall, crop irrigation is not common.
the war for political reasons (Green, 2008). The Ugandan army has failed to defeat the LRA, which is still active in the Central African Republic and the Democratic Republic of the Congo. Northern Ugandans and IDP are therefore suspicious of institutions that represent the central government, such as LDGs and TCs. All this translates into a reluctance to be involved in community projects such as water, and even encourages vandalism and sabotage. In order to change these attitudes so that people can truly benefit from a project and also participate in its success in the long term, it is necessary to carry out specific activities to overcome the reluctance for public participation, such as repeated community mobilization activities with follow up monitoring to emphasize positive results. In addition, it is necessary to improve communication and transparency between consumers and the government, and between consumers and the water management entity.

Roles of Government, Donors, NGOs and Technical Capacity

The MWE is the nominal owner of the country’s water resources. From the capital city Kampala, the agency is responsible for central administration and planning of its water resources. It operates through its Directorate of Water Developments (DWD) for urban and rural water development. The National Water and Sewerage Corporation, a quasi-governmental organization under the MWE, is the country’s main water utility. It manages 23 urban water systems and has an External Services Unit (ESU) which provides several key services such as water project monitoring and evaluation, and training to private and small TC water operators.

The MWE prefers donors to work through its water Sector Wide Approach (SWAP) which allows the ministry to prioritize projects and fund them. Without MWE’s explicit or implicit cooperation, there are delays in project implementation if the project is large enough to provoke Ministry scrutiny. Although it is “strictly prohibited” for Ugandan government officials to own and promote companies in their areas of expertise, the practice is widespread and favoritism, cronyism, and nepotism are common in Uganda’s water sector.

Nonetheless, a clever donor, NGO and community umbrella organization working in the water sector can work efficiently and inexpensively if it can keep out of government scrutiny by various mechanisms and scales of services.

Uganda has LDGs which oversee water projects in its districts. There are 80 districts in Uganda, and three in the north – Gulu, Kitgum and Pader. In addition, where there are populated communities, they can be formally classified as either RGCs, or Towns. Within Towns, there are local council sub-areas. RGCs typically have water supplied, operated or contributed by donors, NGOs and community organizations who work with local people to manage their water resources. Often, the water is free or very low-priced to the user as it is large enough to provoke Ministry scrutiny. Although it is “strictly prohibited” for Ugandan government officials to own and promote companies in their areas of expertise, the practice is widespread and favoritism, cronyism, and nepotism are common in Uganda’s water sector.

Nonetheless, a clever donor, NGO and community umbrella organization working in the water sector can work efficiently and inexpensively if it can keep out of government scrutiny by various mechanisms and scales of services.

Lessons Learned

There were many lessons learned from stakeholder interviews, beneficiary focus groups, document reviews, and analysis of the water sector in Northern Uganda during May and June 2011. The main points are summarized below:

Key Role of Communities

In the water sector of much of Africa, including Northern Uganda, the importance of community involvement, commitment, mobilization and outreach cannot be over-emphasized (Figure 6). While in many developing countries, it is sufficient to promote payment of water bills, water conservation and even integrated water resources management through reduce, reuse and recycle or sequencing campaigns, in Uganda, it is necessary to gain the trust and enlist the active support of beneficiaries or water users. Otherwise, imposed water projects will be vandalized, neglected, mocked and non-sustained.
• Project design needs to be based on reliable data and reflect conditions on the ground
• Project design needs to explain concepts and terms that are particular to Uganda, such as “gazetting”, urban/rural distinction and institutional factors such as the need for a Memorandum of Understanding (MOU) between donors and the MWE for large projects
• Need to have professionals with the right technical backgrounds in key positions both in the donor or sponsor and implementing contractor teams
• Expertise can be sub-contracted, however without the right qualifications in key staff the impact is limited
• Project implementation needs to be flexible and adapt progress to conditions on the ground
• If the project is difficult to implement in its original form, the contractor needs to work with the donor or sponsor for the necessary modifications early
• Project management needs to be proactive and conduct activities even if progress is slowed down by external factors
• Better supervision by the donor or sponsor project managers to (1) provide direction and oversight to contractors, (2) facilitate contract modifications to reflect realistic assumptions and practical project design, (3) establish achievable milestones; (4) insist on staff replacements if necessary and a local operating office; (5) improve communications, coordination, cooperation, monitoring and evaluation; and (6) move the project along in a timely manner.
• Involving stakeholders and beneficiaries means giving them responsibility and asking for commitment
• The management approach by the contractor must emphasize community engagement and commitment, which is crucial for sustainability
• Local stakeholders need to be given sufficient information such as manuals and contacts to suppliers in order to be able to maintain infrastructure

Recommendations

Donors, NGOs and community action groups should assure that water sector projects are designed, executed, and evaluated by experienced, pro-active professionals in water utilities, through independent, transparent and timely peer review and quality assurance/ control processes, similar to that required in the United States for water utility projects.

Because of the poverty in Northern Uganda, low-cost kiosk water and subsidized household and yard connections are very attractive to potential water customers and should be promoted. The demand for kiosk and connected water is high and should be subsidized for the foreseeable future to benefit the communities.

Project managers have significant authority and should be trained to use it to correct poor performance by contractors, and encourage a committed and responsive work ethic.

To facilitate timely water sector interventions in Uganda, donors, NOGs and community action groups should consider working directly with MWE, NWSC and community-based umbrella organizations to develop the project design, check its assumptions and implement the project successfully in the Ugandan context. In general, community-based organizations can undertake small-scale water projects faster than large agencies.

Going forward in Northern Uganda water projects, a comprehensive, professional assessment and design for water services should be initiated, emphasizing output-based aid (Azuba et al., 2010) and incentive-based compensation packages for private operators for large TCs and community operators for RGCs and small TCs.

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Mr. Popkin is an international consultant with over 40 years of experience in the US and abroad in water, wastewater, solid and hazardous waste, and environmental management. He is a former USGS Hydrologist and USAID Foreign Service Officer. He is an alumnus of the University of California; University of Arizona; Texas A&M; New Mexico Tech; and New York University. Mr. Popkin is an Affiliate/Visiting Scientist in the Department of Hydrology and Water Resources Administration, University of Arizona, where he completed his MS in Hydrology.
WATER RESOURCES DEVELOPMENT CHALLENGES IN NORTHERN UGANDA

4th International Professional Geology Conference

January 22-24, 2012

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By special arrangement with the Association for Mineral Exploration British Columbia (AME BC) 4IPGC will coincide with Mineral Exploration Roundup 2012 and those who register for 4IPGC will be able to then register and attend Roundup at no extra cost. Once part of Roundup, there are many excellent short-courses, fieldtrips and additional social events on offer at attractive Roundup prices.

Vancouver, Canada’s gateway to the Pacific and host of the spectacular 2010 Winter Olympic Games is an ethnically-diverse, outdoors focused city, surrounded by water and mountains.

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- is western Canada’s annual mineral exploration conference. Now in its 28th year, the “Roundup” has become a major international technical gathering of mineral exploration geoscientists from around the world.

Roundup 2011 saw an attendance of over 7000 delegates from far and wide for a 4 day technical program, together with fieldtrips and short-courses. 2012 marks the centennial of AME BC and the upcoming Roundup promises an event with even more impressive offerings.

4IPGC Program at a Glance

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4IPGC Plenary and Technical Sessions - extending over two and a half days the program will cover a wide range of broad topics relevant to professional geoscientists across all disciplines:

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- Geoscience Practice – Environmental Responsibility
- Practice Skills, Competencies and Capacity for Sustaining a Global Profession
- Geoscience in an Interdisciplinary World
- Serving Society – Effective Public Engagement

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Colorado Section

Field Trip Report: Members of the Colorado Section AIPG were treated to a great day of geology and breathtaking scenery in southwest Colorado’s San Juan mountains on Saturday August 13. The field trip, with a group of 27, was led by Rob Blair (Professor Emeritus, Fort Lewis College), Jeff Brame (consulting petroleum geologist), Mary Gillam (consultant and Adjunct Professor, Fort Lewis College), David Gonzales (Professor and Geoscience Department Chair, Fort Lewis College), and Ed Heath (independent geologist), all residents of the region.

The trip started on the outskirts of Durango, CO with an explanation by Jeff Brame of the Mesozoic sedimentary units in the region and their respective energy resources. Durango sits on the northern margin of the San Juan basin with the sedimentary section dipping southward into New Mexico.

At a spot overlooking the Animas River valley, Mary Gillam gave an overview of the region’s Quaternary geology with a description of glacial advances and retreats and the moraines upon which lie parts of the city of Durango. Rob Blair led a discussion of the Paleozoic rocks which are well exposed north of Durango. David Gonzales pointed out the La Plata Mountains northwest of Durango and gave an explanation of historic gold and silver production from mineralized veins, breccias and replacement zones associated with Tertiary stocks. Like many occurrences in this part of Colorado, the majority of ore is associated with telluride minerals. Interesting, too, is the occurrence of minor platinum and palladium in some of the deposits in the La Platas.

As the trip progressed north along Highway 550 and toward the core of the San Juan Dome, we drove through exposures of the Pennsylvania-Permian Cutler Formation and Hermosa Group (both redbed units representing clastic detritus from the ancestral Rocky Mountains). A quick rest stop at the Purgatory ski area allowed for an overview of San Juan Mountains Precambrian geology including the Twilight Gneiss which underlies the spectacular alpine scenery of the Twilight Peaks and Needle Mountains. This was followed up by a couple stops along the highway to get a closer look and explanations of the Precambrian Uncompaghre and Irving Formations. Also in this area, exposures lower in the Paleozoic section are evident as roadcuts of Mississippian Leadville Limestone.

In Silverton, lunch was hosted in a Victorian house owned by the Mountain Studies Institute which uses it as a base of operations for various field studies in the San Juans. During lunch, Silverton resident and geologist Scott Fetchenhier gave the group a very interesting historical synopsis of the Silverton area including its mining history.

After lunch a stop was made to view ferricrete exposures along Cement Creek. This led to further discussion of the regions mining history and environmental impacts (both natural and anthropogenic). Trip participant Carol Russell, who works with EPA and has done work in the region, gave insights into some of the issues and challenges posed by these impacts.

On the way out of Silverton the group stopped at the Champion Mine, one of the region’s numerous gold-silver mines. Here, epithermal mineralization occurs dominantly as telluride minerals hosted by breccia zones along the contact of a Tertiary stock. David Gonzales described the Tertiary geology of the San Juans, including caldera formation as well as a thought-provoking potential link between the San Juan volcanic field, the Zuni volcanic field (New Mexico), and the Rio Grande Rift.

From Silverton, the trip followed the same route back to Durango with additional stops to view, among other things, rock glaciers and the Coal Bank sill which features kinematic indicators showing direction of emplacement.

After returning to Durango, participants made their way to the Bar-D Chuckwagon for dinner. The evening there also featured a very well-performed cowboy music show.

Many thanks go to the field trip organizers for putting on a well thought-out and fun day which featured discussions involving numerous geologic subfields from Precambrian to Holocene to environmental geology as well as energy and mineral resources.

John Read, CPG-10722
Section President

Georgia Section

Drilling Demonstration at Sierra Piedmont: We had a great time at Sierra Piedmont’s office although it was pretty warm outside after a few hours. Sierra Piedmont cooked hamburgers and hotdogs for everyone. Jim Fineis, president of Atlas Geo-Sampling had his crew install a monitoring well on-site. We instructed the students in proper soil description, soil sampling, well development, and two types of well purging and groundwater sampling. To have over 50 students attend I’d like to thank our two student chapter presidents: Semir Sarajlic, SA-1891, from Georgia State and Josh Poole, SA-1838, from West Georgia. Also we had two faculty advisors.
Seth Rose from Georgia State and Randa Harris from West Georgia. From Sierra Piedmont
I’d like to thank Scott Pate, Robert Mangum, and Katherine Neder. Robert can really cook up a hamburger. You can’t pull off these types of activities without the help of some of our members. I’d like to thank Eric Lowe, Yo Sumartojo, Jim Ashworth, Duane Fulton, and Pat Baird. This is the fifth site that Jim Fineis has drilled for us and none of this would be possible without his help. For this I give a big Thank You.

Ron Wallace, CPG-08153
Section President

Ohio Section

Ohio Section Annual Meeting Dinner Presentation-November 10, 2011, with Dr. Patrick Leahy, CPG-10507, National Executive Director, American Geosciences Institute.

Challenges and Strategies for the Future Global Geoscience Workforce A critical question facing the geoscience profession today is: “Who will be the geoscientists in the future to address the challenging societal questions that all nations face?” Mitigating geologic hazards, supplying society with adequate earth resources, while at the same time maintaining a sustainable and healthy environment are becoming more challenging for humankind. The knowledge and insights provided by geoscientists play a critical role in crafting strategies to address these increasingly complex issues.

For the last few decades, the profession has faced a crisis in student interest. There are many causes, including student and parental perceptions relative to the rigor of the geosciences, concern about long-term employment opportunities, and a general lack of interest in science and mathematics. At the same time, there is a generational shift in the geoscience workforce. The baby boomer generation is leaving the workforce in all sectors providing opportunities for replacement by a younger generation. The American Geosciences Institute (AGI) expects in the U.S. alone, that given expected graduations rates in the geosciences, the demand will outstrip supply by approximately 150,000 to 200,000 positions in the geoscience workforce within ten years. Although some suggest that non-U.S. trained geoscientists can fill this gap, AGI, as part of an international task force on workforce, suggests that this notion may not be fully accurate. The demand for geoscientists in the developing world will increase and compete for the global supply of geoscientists.

The solutions to these problems require a comprehensive understanding of both the supply and demand of the geoscience workforce as well as an understanding of the dynamics of

Adam Heft, CPG-10265
Section Newsletter Editor
Biography

In March of 2007, Dr. P. Patrick Leahy was named Executive Director of the American Geological Institute (AGI) of Alexandria, Virginia, a nonprofit federation founded in 1948 of 50 geoscientific and professional associations that represent more than 120,000 geologists, geophysicists, and other earth scientists. Prior to his current position, Dr. Leahy served as Associate Director for Geology at the U.S. Geological Survey where he had responsibility for Federal basic earth science programs, which include worldwide earthquake hazards monitoring and research, geologic mapping of land and seafloor resources, volcano and landslide hazards, and assessments of energy and mineral resources. In 2005-2006, Dr. Leahy served as acting Director of the U.S. Geological Survey. Dr. Leahy retired from the U.S. Geological Survey after 33 years having served in various technical and managerial positions. He has authored or co-authored more than 70 publications on a wide array of earth-science topics. Dr. Leahy was born in Troy, New York. He holds undergraduate and graduate degrees in geology (1968) and geophysics (1970) from Boston College. He received his doctorate in geology (1979) from Rensselaer Polytechnic Institute where he specialized in regional ground-water studies and hydraulics. He is both a certified professional hydrogeologist and professional geologist.

Dr. Leahy is a Fellow and Trustee of the Geological Society of America and a member of the American Geophysical Union, the American Institute of Hydrology (Former President), International Association of Hydrogeologists (Former U.S. President), Sigma XI, the American Association for the Advancement of Science, the American Association of Petroleum Geologists, the National Ground Water Association, and the Geological Society of Washington. Dr. Leahy is also a commissioner for the United States Commission for the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Dr. Leahy was the recipient of the 1996 Boston College Alumni Association Award of Excellence in Science, the 1995 Alumni Association Fellow in Science for Rensselaer Polytechnic Institute, the 1996 Department of the Interior Meritorious Service Award, and the 2006 Department of Interior Distinguished Service Award, and he was recognized by President George W. Bush in 2003 with a Meritorious Senior Executive Award and again in 2007 as a Distinguished Senior Executive. Dr. Leahy received the Khan Medal (the highest award for a non-Afghan citizen awarded by Afghanistan) from President Hamed Karzai. His most recent award was the 2009 John T. Galey, Sr., Memorial Public Service Award from the American Institute of Professional Geologists.

AGI to become the American Geosciences Institute

Alexandria, VA - The American Geological Institute (AGI) is announcing that as of October 1, 2011 it is formally adopting the name the American Geosciences Institute. AGI has a rich history of nearly 65 years as the American Geological Institute providing support to the profession and the public through a wide array of programs in the geosciences. In the past several years, AGI has grown to 50 Member Societies, reflecting approximately a quarter of a million geoscientists in the United States alone. The disciplinary diversity of these societies has broadened as well, including space scientists, geographers, geophysicists, soil scientists, hydrogeologists, paleobotanists, educators, geobiologists, geoscientists involved in human health, and information specialists. AGI, as federation of these 50 Member Societies, is evolving to represent the integrative nature of geoscience across these fields.

“To understand the Earth and its workings, many aspects of the geosciences are required, by changing to the American Geosciences Institute, AGI is recognizing the inherently integrative nature of our profession and as a way to celebrate the robust nature of the profession and practice today,” says P. Patrick Leahy, AGI Executive Director.

The American Geosciences Institute is a nonprofit federation of 50 geoscientific and professional associations that represents more than 250,000 geologists, geophysicists and other earth scientists. Founded in 1948, AGI provides information services to geoscientists, serves as a voice of shared interests in the profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role the geosciences play in society’s use of resources, resiliency to natural hazards, and interaction with the environment. Find more information on AGI at http://www.agiweb.org.

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*As defined by the American Geological Institute, a geological science is any of the subdisciplinary specialties that are part of the science of geology, e.g., geophysics, geochemistry, paleontology, petrology, etc.
ANNUAL MEETING PHOTOS

James Adamson presents award to student poster inner Karel Waska, SA-3130.

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