FALL IN KENTUCKY!

Plan on Attending the
42ND ANNUAL AIPG MEETING

LEXINGTON, KENTUCKY

OCTOBER 8 - 13, 2005

FOR INFORMATION
www.AIPG.org
www.professionalgeologist.org
or call Tom Spalding at (502) 458-1209

Picture: Big South Fork in Kentucky
Kentucky Tourism Cabinet
THE PROFESSIONAL GEOLOGISTS

MAY/JUNE 2005

Volume 42, Number 3

AIPG 2005 ANNUAL MEETING INFORMATION

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FRONT COVER — Site of the AIPG 2005 Annual Meeting, Lexington, Kentucky.

Photos provided by Kentucky Tourism.

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

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

Located at the heart of Central Kentucky's famed scenic Bluegrass Region, Lexington is known around the world for its role in producing champion racehorses and fine bourbon. Lexington is the center of the world’s Thoroughbred horse industry and is where the top racehorses are bred, born, trained, officially registered, bought and sold, retired to stud, and buried. Countless opportunities exist for a close encounter with Lexington's beloved Thoroughbred. In the Bluegrass, you can meet previous Derby champions - or perhaps catch a glimpse of a future winner on the world's most famous and scenic horse farms. Keeneland Race Course, a beautiful park reminiscent of those in England, boasts two racing seasons annually in April and October. The 2005 annual meeting offers an opportunity to experience a day at the track. Lexington truly is the Horse Capital of the World.

Visit the home of true Kentucky bourbon..... The time-honored methods developed in the early 19th century when Lexington was a bustling frontier town are still used in our distilleries today. Labrot & Graham, Buffalo Trace & Wild Turkey distilleries open their doors and offer tours that unlock the mysteries and heritage of the United States' only native spirit.

History comes to life in Lexington and the Bluegrass Region. Once only an outpost on the fringes of our ancestors' westward expansion, Lexington quickly grew into a thriving community filled with opportunities for education, culture, business and recreation. Step back in time to life in Lexington during the early 1800's by touring one of Lexington's historic homes. Continue the trek through Lexington's history at attractions including the Gratz Park historic district; the campus of Transylvania University, oldest college west of the Allegheny Mountains; Union and Confederate Civil War sites; and Shaker Village of Pleasant Hill, a national treasure with 33 restored buildings.

Our theme of Geologic Information: Racing into the Digital Age embraces the ongoing efforts to stream line our operations and our needs for government loop into the race for digital excellence. The thoroughbred operation in the United States has been the Kentucky Geological Survey. Practitioners will sharpen their skills through attendance at AIPG 2005. Researchers, government geologists, and educators will find visionary applications and lessons to guide the future.

Our venue for the meeting, the Lexington Radisson Hotel is WIFI (wireless network) enabled turning the entire convention experience into a Campus of Progress. We hope to deliver a quality experience for those seeking digital breakthroughs, historical perspectives, and quality networking experiences.

Kentucky in the Fall is unsurpassed. Our field experiences to Mammoth Cave and Natural Bridge (just two of the 6 offerings) are rated among the most scenic drives in the nation. The Natural Bridge area in particular contains a greater concentration of natural sandstone arches than anywhere else in the world except for Southern Utah.

Thanks for choosing to visit Kentucky for the 2005 Annual Meeting and have a great time!

Tom Spalding, CPG, Co-Chair
Larry Rhodes, CPG, Co-Chair

To find out more about the conference go to the AIPG Kentucky Section Website at www.professionalgeologist.org/aipg2005.html

REGISTER ONLINE!
AIPG 2005
ANNUAL MEETING
Lexington, KENTUCKY
October 8 - 13
REGISTER NOW ONLINE
WWW.AIPG.ORG
### Program

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### Lodging

AIPG has reserved a block of rooms to be held for the meeting through September 10, 2005. The room rates are $95.00 for single occupancy and $95.00 for double occupancy. Please make your reservations through the Radisson by calling (800)333-3333 or (859)231-9000. You can find additional information about the hotel at www.Radisson.com.
Keynote Speaker

Our Keynote address will be shared between two speakers. One is from the private sector and the other from the Survey. Their topic is the dialog of the private and public sector in seeking excellence in service to the public. The speakers are recognized achievers in their respective spheres of endeavor.

Marshall Stuart Miller, native of West Virginia, graduated from WV University and began work in the Illinois basin in oil and gas with Schlumberger. He worked as a geologist in the Virginia Division of Mineral Resources where he authored several pioneering studies. After two years as a fuels geologist with Norfolk Southern's Pocahontas Land, he established Marshall Miller and Associates. Marshall Miller and Associates has grown to over 200 employees, with ten offices in 8 states with capabilities in engineering, geophysics and geology and has been recognized for 6 years by Engineering News Record as among the top 500 engineering design firms in the US.

Dr. James Cobb is the State Geologist for the Commonwealth of Kentucky. Since 1854, there have been eleven state geological surveys and Cobb's appointment marks the beginning of the "Twelfth Survey." Under Cobb, the Twelfth Survey will emphasize the creation of a comprehensive database of maps and information on Kentucky's water, fuel, environments, and mineral resources that can be used in geographic information systems (GIS) and accessible to the public on the Internet.

James C. Cobb was appointed State Geologist of Kentucky and Director of the Kentucky Geological Survey on October 1, 1999. Prior to being selected as stategeologist, he was the assistant state geologist for research. During his 20 years at KGS, Cobb received more than $4 million in funding for research and published more than 60 articles on geology and mineral resources. He is also an adjunct professor in the Department of Geological Sciences at the University of Kentucky. Cobb's scientific contributions include investigations of coal and minerals and mineral resources assessments.

These two creative forces will act in concert to challenge and answer what the needs are for geologists in this century.

Short Courses

**SHORT COURSE 1:**
Ethics

Practical Geoscience Ethics:
Elements and Examples
(Full Day)

**Date:** 10/08/05
**Time:** 9:00 AM - 5:00 PM
**Cost:** $150

Not many geo-science professionals have had formal training in the ethical practice and management of their projects, businesses or client relationships. While most recognize the obvious ethical (i.e. legal) pitfalls (do not fudge the data, invoice only for time actually spent on the work, etc.), it is more difficult to reconcile the connection between universal moral rules and the underlying tenants of the profession -- "protect public health and the environment" vs. "defend the client's interests" vs. minimize your employer's risk." This short course will define ethics and morality and offer practical examples on when and how they should come into play during our daily life and business decisions. Students will be asked to actively participate in the discussions and to provide examples of situations for review and analysis.

Presenter: David Abbott, Jr.

**SHORT COURSE 2:**
General Computer Report Writing

Using a MSWord More Effectively in the Geologic Office Setting
(Full Day)

**Date:** 10/09/05
**Time:** 9:00 AM - 5:00 PM
**Cost:** $100

This seminar deals with Collaboration, Microsoft Word, spreadsheet tools and images, databases, contact lists in email, Adobe Acrobat and maps, electronic comments, digital signatures, computer jargon. Location is Lexington Community College. Students will be driven from the conference location and given study materials. The classrooms will have PCs. Presenter, Lexington Community College.

**SHORT COURSE 3:**
The Web as a Geologic Information Toolbox

Using or Developing the Web as a Geologic Toolbox
(Full Day)

**Date:** 10/13/05
**Time:** 8:00 AM - 4:00 PM
**Cost:** $225

Conference Seminar: Post-Conference Seminar: "Geologic Information: Adapting your business strategy" Use of GIS and database tools through the internet. Morning Session using the tools now available from geologic databases. How to obtain and manipulate information now available. Afternoon Session will discuss the Kentucky Geological Survey experiences in dealing with various types of data and how to set up and distribute information over the web. Presenter: Kentucky Geological Survey.

www.aipg.org
Technical Program

The technical program will occur on Monday, Tuesday, and Wednesday October 10, 11, and 12, 2005. Topics will embrace a broad range of topics:

- Geology, Geographic Information Systems (GIS), and the Internet
- Geologic Mapping and Computer Applications
- Environmental and Engineering Geology
- Energy and Mineral Resources
- Karst and Groundwater Systems
- Stratigraphy, Sedimentology, and Paleontology
- Structural Geology, Basin Analysis, and Geophysics
- Ethics, Public Policy, and the Geologic Profession
- Geologic Outreach, Education, and Communication
- Licensure and Legislation

This year’s meeting not only incorporates our goal of highlighting geological mapping and computer applications, but also offers a forum to provide opportunities for reporting on regional geologic studies pertaining to a variety of topics. Such topics include energy and mineral resources, stratigraphy, sedimentology, paleontology, structural geology, basin analysis, and geophysics of the Appalachian Basin, Illinois Basin, Mississippi Embayment, Cincinnati Arch, and Nashville Dome. Kentucky and adjacent states are world famous laboratories for karst and groundwater systems. The region’s prominence in the study and application of environmental and engineering geology are also notable. In addition, there will be a forum for AIPG’s core issues concerning ethics, public policy, licensure, and legislation. Continuing Professional Development Credits through AIPG will be available.

In addition, the opening session will consist of student poster presentations competing for cash awards.

Field Trips

FIELD TRIP 1: The Falls of the Ohio (Half Day)

Date: Saturday, October 8
Time: 12:30 – 7:30 PM
Cost: $40.00
Limit: 47
Location: Bus pickup in front of the Radisson Lobby
Leaders: Dan Phelps (Kentucky Paleontological Society) and R. Todd Hendricks (Kentucky Paleontological Society)

The trip features a visit to the Falls of the Ohio State Park located along the northern shore of the Ohio River in Clarksville, Indiana. Here, participants will be able to view the world famous fossil beds located at this site. When water levels are low there are 220 acres of exposed Silurian and Middle Devonian age fossil beds to explore. Over 900 Devonian fossil species are recorded to date from the Falls fossil beds. Two-thirds of these species have been found to be new to science.

The Falls area is rich in history and many explorers and scientists have connections to the site. General George Rogers Clark settles here after winning the Northwest Territories during the Revolutionary War. Later, John James Audubon arrived to make at least 200 sketches of birds in the Falls area. When Meriwether Lewis and William Clark began their famous 1803 Expedition (we are currently celebrating its bicentennial) to chart the Louisiana Purchase, they departed from Clarksville. In 1846 the great British geologist Sir Charles Lyell visited the falls and observed the abundant extinct fossil corals and compared this formation to living corals in modern tropical reefs. The Falls was a natural stopping point for river travelers in those early days as the Devonian coral beds are resistant to weathering and form rapids on the Ohio River. Thus, early river travelers had to make a portage because of these rapids and the cities of Louisville and Jeffersonville were born.

FIELD TRIP 2: Geology and the Civil War in Central Kentucky: Camp Nelson (Half Day)

Date: Saturday, October 8
Time: 1:00 - 6:00 PM
Cost: $50.00
Limit: 47
Location: Bus pickup in front of Radisson Lobby
Leader: William M. Andrews Jr. (Kentucky Geological Survey, University of Kentucky)

This half-day trip will examine the links between geology and key Civil War events in the Bluegrass of central Kentucky. Our first stop will be a classic geological exposure of the Lexington Fault System and the Ordovician High Bridge Group, the oldest rocks exposed at the surface in Kentucky. The Kentucky River has eroded a narrow gorge, called the Palisades, through these rocks; our second stop will afford a good view of the Palisades and an opportunity to discuss geomorphology and the effects of the gorge on transportation history in the area. Our third stop will consider the karst geol-
Field Trips

ogy of the region, and discuss the resulting impact on a major Civil War depot at Camp Nelson. Our fourth and final stop will look at the fortifications and defenses of Camp Nelson, and discuss the role Camp Nelson played as the largest Kentucky recruiting center and training camp for African-American soldiers during the Civil War. This trip will be held on the 142nd anniversary of the Battle of Perryville, the largest and most decisive Civil War battle in Kentucky. Although this trip will not directly visit the nearby Perryville battlefield, we will provide abundant logistical, historical, and geological information for those wishing to attend the Perryville reenactment on their own the next day (Oct 9).

FIELD TRIP 3: Karst Geomorphology and Environmental Concerns of the Mammoth Cave Region, Kentucky (Full Day)

Date: Sunday, October 9
Time: 8:00 AM – 6:00 PM
Cost: $75.00
Limit: 47
Location: Bus pickup in front of the Radisson Lobby
Leaders: Michael T. May (Western Kentucky University), Kenneth W. Kuehn (Western Kentucky University), and Joe Meiman (National Park Service)

This one-day field trip will explore the geology, hydrology, and land use of the region as they relate to the Mammoth Cave system. Classic karst features will be viewed on the surface and the trip will conclude with a tour of a portion of Mammoth Cave.

Mammoth Cave is one of Kentucky’s most popular geotourism sites. With a mapped passage length exceeding 370 miles, it is the longest known cave system on Earth. The cave has developed mainly along bedding planes in the Mississippian St. Genevieve and St. Louis Limestones, units that are protected by overlying siliclastics. The combination of stratigraphy, regional bedrock dip, recharge area on the adjacent karst plain, and a regional base-level outlet in the Green River Basin all contribute to the development of the Mammoth Cave system. Mammoth Cave is not only recognized as a geologic wonder but it contains unique and fragile ecosystems as well as a rich Native American history known through mumified remains and artifacts. For all of these reasons, Mammoth Cave has been designated a World Heritage Site and an International Biosphere Reserve. Throughout the day, aspects of hydrogeology, water quality, land use, and other environmental concerns of the region will be discussed.

Participants will depart Lexington, KY and travel by bus to Mammoth Cave National Park, KY and return. The cost of the trip includes a guidebook, bus transportation to and from Lexington, any park fees, lunch at Mammoth Cave National Park and beverages. Attendees should be prepared for moderate hiking and should bring a sweater or jacket for the cave.

FIELD TRIP 4: Buffalo Trace Distillery and Jeptha Knob Cryptexplosive Structure (Half Day)

Date: Monday, October 10
Time: 10:00 AM – 4:00 PM
Cost: $50.00
Limit: 45
Location: Van pickup in front of the Radisson Lobby
Leaders: Mark F. Thompson and Donald B. Wilhelm (Kentucky Geological Survey)

The trip is scheduled as a half-day outing to the Jeptha Knob Cryptexplosive Structure, a magnificent monadnock in eastern Shelby County. Vans will carry us to this 9-square-mile disturbance that towers approximately 300 feet above the surrounding countryside, a site that many scientists suspect is an impact structure. It is not listed with the more than 170 such places on Earth because much of the accepted criteria required to define impact structures has not been observed at Jeptha Knob. Ever since W.M. Linney mentioned Jeptha Knob in his 1887 geologic report (its first appearance in scientific literature), the interpretation of its origin has been a dynamic one, and a small bottling house where the distillery’s popular “single barrel” bourbons - Blanton’s, Rock Hill Farms, Hancock’s Reserve and Elmer T. Lee - are bottled and sealed by hand. Lee Thomas (courtesy of the Lexington Convention and Visitors Bureau).
FIELD TRIP 5: Boat Trip through the Palisades of the Kentucky River (Evening)

Date: Monday, October 10
Time: 5:00 - 9:00 PM
Cost: $50
Limit: 75 people
Location: Bus pickup in front of the Radisson Lobby
Leaders: Frank R. Ettensohn (Dept. of Geological Sciences, Univ. of Kentucky) and William (Drew) M. Andrews (Kentucky Geological Survey)

The Palisades of the Kentucky River are probably the most prominent physiographic feature in central Kentucky. The Kentucky River gorge, nearly 400-ft deep in the Palisades area, was a major barrier to overland transportation, and hence, played a major role in the history of central Kentucky. This barrier remained until major engineering feats like High Bridge breached the barrier. At the same time, the river formed a major corridor for the downstream transportation of eastern Kentucky minerals and agricultural products, which the Shakers who initially developed the landing, used extensively to support their religious endeavors on the uplands above. Although coal from eastern Kentucky was transported down the river, the landing is very close to Mississippi Valley type mineral deposits that were also transported on the river.

The gorge probably owes its presence to a change in regional base level near the initiation of North American Pliocene glaciation about 2 Ma years ago, as well as to the massive, resistant limestones of the Upper Ordovician High Bridge Group which form most of the gorge. These limestones represent extensive, shallow, open-marine, platform lagoons and peritidal environments that formed across east-central United States about 460 Ma. The uppermost parts of the gorge and all transgression accompanying the Taconian orogeny. It underlies much of the central Bluegrass region and is responsible for the rich agriculture and horse industries in the region.

FIELD TRIP 6: Scenic Geology of Natural Bridge State Park and the Red River Gorge Area (Full Day)

Date: Tuesday, October 11
Time: 10:00 AM - 6:00 PM
Cost: $75.00
Limit: 47
Location: Bus pickup in front of the Radisson Lobby
Leaders: Stephen F. Greb (Kentucky Geological Survey, University of Kentucky) and Charles Mason (Morehead State University)

The trip is scheduled as a day-long outing to the scenic Red River Gorge Area in the Daniel Boone National Forest. A bus will take us to Natural Bridge State Park, one of the state's most popular parks. The park contains towering cliffs of Pennsylvanian-age conglomerates and sandstones above Mississippian carbonates. The bridge for which the park is named, is a natural span, 78 ft long, and 65 ft high. Participants will ride a chair lift to the top of the ridge and can take a leisurely hike out onto the bridge. From the bridge, participants will have the choice of riding the lift back down to the base of the cliffs or taking a moderate to strenuous hike down from the bridge to the lodge. Along the way, hikers will learn about the sedimentology of the cliff-forming conglomerates and sandstones, which were deposited in ancient braided rivers during the early Pennsylvanian Period. Participants will see how weathering and erosion shaped scenic landforms such as Balanced Rock and a cave in the limestones beneath the cliffs. A buffet lunch will be provided at the park lodge. Highlights after lunch will be a visit to Chimney Rock overlook and the gorge itself. For a glimpse of what you will see go to the virtual trip at the Kentucky Geological Survey's website, http://www.uky.edu/KGS/coal/webgeoky/fieldtrip/naturalbridge.html
Guest Trips

Self-guided tours of the historical sections of Lexington will be a feature of our meeting. Several opportunities present themselves. Fees for each are $20.00.

GUEST TRIP 1
Perryville Battlefield Re-enactment
10/09/05 — 10:00 AM to 4:00 PM

Once each year on the anniversary of the most significant battle in Kentucky, re-enactors converge on the small hamlet of Perryville. The weekend is spent in detailed recreation of the lives of soldiers in the Civil War. This is an event so crowded that we have elected to transport our guests to the site and allow them to analyze the situation on their own. Maps will be provided. Hiking will be involved. The field trip to Camp Nelson on the prior day (Saturday) will provide context and interpretation of the Perryville battlefield and the geology at the battlefield (Camp Nelson will provide a more complete section of the stratigraphy than Perryville itself). The personal and public disaster of Civil War is converted to panegyric and history in Perryville.

GUEST TRIP 2
Mary Todd Lincoln Childhood Home
10/10/05 — 9:30 AM to Noon

Mrs. Lincoln was a native of Kentucky. Her childhood home was in Lexington and the house is restored displaying facts about her life and the life of Lexington in the pre-Civil War Era. Down the street is the home of John Hunt Morgan, a Confederate General who raided Kentucky, Indiana, and Ohio.

GUEST TRIP 3
Ashland, Home of Henry Clay
10/11/05 — 9:30 AM to Noon

This is the ante bellum plantation owned by one of the great statesmen produced by Kentucky, Henry Clay. Clay’s life and the lives of subsequent owners are discussed as well as circumstances of pre-Civil War Kentucky.

Other side trips can be arranged at the concierge desk of the hotel and include Arts and Crafts Exhibits, Kentucky Horse Park, Pleasant Hill (Shakertown), and Shopping and pubs in Lexington. Many of the field trips may be of interest to guests as well.

Evening Events

Opening Session/Welcome and Keynote Speech/ Student Posters/Ice Breaker
Date/Time: 10/09/05 6:30 PM - 10:00 PM
Cost: Complimentary (cash bar)
Location: Ballroom Radisson Hotel

The Ice breaker will feature our own Bluegrass Music as we set the pace of our conference. The Keynote speech will generate much discussion and interest in the future of geology as we reap the great harvest of data stored away by our predecessors. Clearly, the Opening Session will explain the single greatest value added ideas of the conference.

Kentucky River Palisades Boat Trip
Date/Time: 10/10/05 5:00 PM - 9:00 PM
Cost: $50
Location: Dixie Bell River Boat

The Dixie Bell is a combined field trip and leisurely excursion. Visually compelling, the Kentucky River is a priceless part of the ancient heritage of Kentucky. It has inspired artists, journalists, and geologists for centuries.

Awards Banquet
Date/Time: 10/11/05 7:00 PM
Cost: $25
Location: Ballroom Radisson Hotel

Come and honor old friends and make new contacts at the Awards Banquet. The Radisson will provide renown service and cuisine as we celebrate another year of accomplishment.

Keeneland Racing
Date/Time: 10/12/05 11:30 AM - 5:30 PM
Cost: $50
Location: Keeneland Race Course

This is the real deal. Horse racing is a uniquely Kentucky activity. Tickets for some of the best seating at the Track will be made available. An afternoon at the races will certainly develop your appreciation for the uniquely evolved and spectacular equines of the world as seen in Lexington. The dream of winning and the thundering victories fulfilling the dream will be supplied by Thoroughbreds at their peak.

Capstone Public Outreach Presentation
Date/Time: 10/12/05 7:30 PM
Cost: Complimentary
Location: Ballroom Radisson Hotel

New this year is a fund raiser for tsunami relief. Our speaker, yet to be announced, will discuss the current needs of the Indian Ocean region at the time of the conference. The presentation with emphasize better connection between the geologic sciences and public policy making. Donations will be requested and public outreach efforts will be mounted to bring in members of the public.
# 2005 National AIPG Meeting Registration Form

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Spouse/Guest Registration includes admission to Icebreaker and Exhibits

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*AIPG Members Only  **Student Confirmation Required

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<th>Field Trips</th>
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<td>No. 1 Falls of the Ohio (10/8)</td>
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<td>No. 2 Perryville/Camp Nelson (10/8)</td>
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<td>No. 5 Palisades River Boat (10/10)</td>
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<td>No. 6 Natural Bridge (10/11)</td>
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<td>No. 2 General Computer Report Writing (10/9)</td>
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<td>No. 3 Web Geologic Information Toolbox (10/13)</td>
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<td>Keeneland Horse Racing Event (10/12)</td>
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<td>Spouse Trip 3 - Ashland: Home of Henry Clay (10/11)</td>
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<td>Women in AIPG Breakfast (10/11)</td>
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<td></td>
<td>$10.00</td>
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<tr>
<td>Ice Breaker (10/9) (Must Show Badge)</td>
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<tr>
<td>Speakers/Moderators Breakfast</td>
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<td>Business Lunch (10/11)</td>
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<td>Foundation Trustees Breakfast (10/11)</td>
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<tr>
<td>Past-President Breakfast (10/10)</td>
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Total Amount Due

www.aipg.org
National and Sectional Meetings
National Executive Committee Meeting (10/09) Attending yes / no
2005 Advisory Board Meeting (10/10) yes / no
2005/2006 Advisory Board Meeting (10/10) yes / no
2005-2006 Joint Executive Committee Meeting (10/10) yes / no

Notes
- The Field Trips and Short Courses are subject to cancellation due to lack of participation.
- Registration fees for cancelled events will be refunded to registered attendees.
- Full Registration includes Ice Breaker, Technical Sessions, Exhibits, Business Meeting,
  Student Posters, Coffee Breaks, and Registration Package.
- CEU Credits Available.

SPECIAL NEEDS/REQUESTS:

METHOD OF PAYMENT

TOTAL AMOUNT DUE $____________ 

PLEASE CHECK METHOD OF PAYMENT
- [ ] Check No. ______________ Enclosed (drawn in U.S. Dollars on a bank located in the US or Canada.)
- [ ] International Postal Money Order
- [ ] VISA  [ ] MasterCard  [ ] American Express
  Credit cards are processed in US dollar amounts only.

Card No. ___________________________ Expiration Date ___________

Print name of cardholder: ___________________________

REQUIRED: Credit Card Billing Address (street, city, state, and zip):
________________________________________________________
________________________________________________________

Authorized Signature ___________________________

Mail to:
American Institute of Professional Geologists
1400 W. 122nd Avenue, Suite 250
Westminster, CO 80234
or fax to (303) 253-9220 or register on-line at www.aipg.org
National AIPG Phone Number is (303)412-6205

Refund Policy: Refunds of 100% will be given upon receipt of a written request until September 10, 2005. Notification and full refund for field trips or social activities will be given in case of required cancellations. Cancellations for full convention registration made between September 11, 2005 and October 4, 2005 will be assessed a charge of 10% of the registration fee (to cover administration costs). NO refunds will be given for cancellations received after October 4, 2005, or for no-shows after the meeting.

I understand that submission of this registration form gives AIPG the authority to utilize any photograph taken of me at the conference for conference related publicity (e.g., photo gallery on cd, web site, TPG,...). AIPG agrees not to use my likeness for any other purpose. Please contact John Beam or Catherine O'Keefe if you DO NOT wish to have your image used.

Lodging

AIPG has reserved a block of rooms to be held for the meeting through September 10, 2005. The room rates are $95.00 for single occupancy and $95.00 for double occupancy. Please make your reservations through the Radisson by calling (800)333-3333 or (859)231-9000. You can find additional information about the hotel at www.Radisson.com.
Spring is just beginning to tease us in the Northeast and we more than welcome the change. This winter has been long, cold, and snowy and it is time for a break. There was one warming of the winter months and that was the Executive Committee Meeting in Tucson in February. The meeting was a wonderful event that was highlighted by a tour of the Tucson Gem and Mineral Show and the great hospitality of the Arizona Section. Thank you Arizona and especially Dave Palmer. I urge all who are looking for a winter break to attend the Gem and Mineral Show, volunteer at the AIPG booth, and join AIPG members and friends for an evening at El Parador.

As Editor of TPG, one of my responsibilities is to assemble for each issue of TPG geological information, technical papers, and any other items of interest for you. At times, it is necessary to canvas the membership for contributions to TPG. We have published some very interesting issues of TPG during the past year including the student issue earlier this year. So, my request is to ask you to send me your interesting geological photos, articles that may be of interest to our members that you have read in another magazine or, better still, your original contribution for publication in TPG. You can e-mail your contribution, ideas or suggestions to me or to Wendy Davidson.

Thank You

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**AIPG National Applicant Screeners Needed**

If you are a CPG Member and are interested in becoming an AIPG National Screening Board Member please contact Cathy O'Keefe at (303) 412-6205 or aipg@aipg.org

For information regarding screening applicants please read the AIPG Applicant Screening Policy on the AIPG National Website <www.aipg.org>.

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**AIPG Power Point Presentations**

**AIPG What It Stands For and The Professional Geologist**

Slide shows that explain who we are and what we do that can be presented as a continuous loop show. These continuous shows can be used by Sections and others in a variety of settings. For example, for those Sections that have meetings with a meal and speaker, the shows can be looped on the presentation screen while people are meeting. When a Section or National has a booth at a conference, the shows can be displayed on a laptop or screen.

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**AIPG Fact Sheets and Brochure**

AIPG Fact Sheets and Brochure are available on the AIPG National Website <www.aipg.org>.

- AIPG Fact Sheet 1 — What Is Geology and What Do Geologists Do?
- AIPG Fact Sheet 2 — The Value of Petroleum Resources to our National Economy
- AIPG Fact Sheet 3 — Identification and Mitigation of Geologic Hazards
- AIPG Fact Sheet 4 — Global Climate Change
- AIPG Fact Sheet 5 — Finding and Producing Petroleum Resources
- AIPG Fact Sheet 6 — Water Resources
- AIPG Fact Sheet 7 — Mineral Resources and Exploration

AIPG Fact Sheet Brochure - Geology and Geologists in Our Society

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www.aipg.org
Dear Editor:

Tom Clark ignored two important economic factors when he suggested that (1) oil companies are "just blowing steam" when they blame problems on others for not building new refineries in the U.S., and (2) new refineries should first note that I metamorphosed from being a petroleum geologist to an appraiser of oil and gas fields, and then, to my astonishment, an occasional appraiser of oil refineries. I've appraised a total of ten refineries in New Jersey and California. Now, back to refineries in the U.S.

After several years of trying, Exxon (then Humble) got a permit in the 1970s to build a refinery on the Sacramento River near the city of Fairfield. But Humble encountered so much opposition that other companies simply gave up trying. Americans want ample cheap gasoline, but when it comes to having a refinery nearby, it's NIMBY!

Regarding the second item, Mr. Clark ignored the element of "value added." Britain made several fortunes from cotton grown in India, but mills were built in England to attain the value added from converting the cotton to textiles. Japan currently imports iron ore from western Australia rather than build steel mills close to the ore deposits. So cases like this abound, with raw materials shipped to regions that have manufacturing skills and markets for finished products.

Sad to say, Mr. Clark may be right in one respect. New refineries are apt to be built in the Persian Gulf and Indonesia rather than in the U.S. because of the intransigence of American enviro-activists and because Arabs and Indonesians are wising up and want to enjoy that value added themselves. That means that petroleum products will cost the U.S. more than they do now, and we will also lose an invaluable workforce of chemical engineers and refinery technicians.

Finally, about Shell Oil's refinery in Kern County: It's equipped to process only low-gravity oil from Kern River and other nearby fields. Operating costs for refining asphaltic heavy oil are much higher than costs for refining most crude oils imported from, say, Venezuela. So Shell's decision was, once again, economic, as most decisions like that are.

Robert H. Paschall, CPG-00118

TPG "Student" Issue

Dear Robert,

Having spent over 60 years as a practicing geologist in federal, state, university, and consulting activities, I read with great deal of interest the contents of The Professional Geologist for January/February 2005. It is a great sequence of papers and I have referred it for reading to my consulting group and students.

Special congratulations to you and your staff.

Phil LaMoreaux, CPG-00880

Dear Phil,

Phil, thank you for the kind words and encouragement. The comments are highly valued and appreciated, especially since they come from you! I am passing along your note to our headquarters staff and to our 2005 Executive Committee.

Very best regards and, again, thanks!

Robert Font, CPG-03953
AIPG National President

Dear Phil,

Thank you for your very kind words about TPG. I must tell you that Wendy Davidson, our Publications Manager, and then Editor Ginger McLemore, decided that the first issue of each new year should focus on students. Since that time Wendy, Ginger, and Editor Ray Talkington have worked diligently to solicit pertinent articles, including those written by students.

I join you in awarding kudos to Wendy, Ginger, Ray, and the wonderful contributors to TPG. Thank you again, we're all very pleased that AIPG members (and others) are enjoying the special issues.

Bill Siek, CPG-04773
AIPG Executive Director

History of AIPG

Dear Ad Honkala and Gretchen Gillis,

Thank you both for your kind Book Reviews in the March/April TPG.

Gretchen you are right, preparing it was a mix of "fond memories in the retelling, and nightmarish for the sheer scope of the undertaking." What took the most time was self-inflicted—collecting 40 years of information on "Who's Who and Who Was Who in AIPG." All in all, it was a labor of love. And to think that

good friend Ad Honkala was a member of the "Magnificent Seven" who founded AIPG in 1963! Thanks again for your kind words.

Richard Proctor, HM, CPG-05091

Dear Richard,

My congratulations on your book. It was a privilege to be asked to review it. I was pleasantly surprised to see the review from Ad Honkala, whose was so prominent in the book. You and AIPG have done a wonderful service for members.

Gretchen Gillis, CPG-09693

Expected Coursework

Dear Allen:

I read with interest your article (Measuring the Profession) in the Jan/Feb 2005 edition of the AIPG magazine. Of course, I was expecting that you would state what "coursework" should one expect. As your article moved through the financial plagues of the university, I thought you might mention that geology has metamorphosed into "other science" in order to market the product. In the process, geology curriculum itself appears to be changing.

But what I would like to ask you is this:

What geology coursework should a student expect to pass as part of a geology degree? I am most interested in what your list will contain!

Thanks for your any input you can offer.

Susanna Knight, Administrator, Oregon State Board of Geologist Examiners, osbge@osbge.org

Note: See article on page 42.
LETTERS TO THE EDITOR (continued)

Dear Editor:

Allen Hatheway’s article “What should a student expect from a University Geology Department?” (TPG, January/February 2005) is outstanding, hits things right on the mark, and should be read by every student in and out of AIPG. His description of universities morphing into “businesses” is only too true. Faculty are viewed as “Profit Centers” and promoted and evaluated according. Thus mentoring of students has fallen off (no time - got to raise that money and do the research). The paradigms for faculty are “A paper a day keeps the Dean away” and “Money in, Papers out!”

Hatheway’s Tables 1 and 2 are a “must read” for students because in an easy-to-follow manner, it enables students to prioritize their focus.

As a former faculty member (University of Illinois at Urbana-Champaign) I would add a few items to Hatheway’s article:

1) What is the faculty member’s record in placing their graduates? It is surprising how variable this is. As a former placement coordinator at Illinois, I saw faculty who hardly lifted a finger (and this happens more than people realize) to those that networked their students to alumni, and telephoned contacts all over the world to place their students.

2) How flexible is the graduate faculty member in allowing a student to pick their own thesis topic? How interested are they in it? How much do they help that student raise separate funds from AAPG, GSA, and Sigma Xi for their graduate research? This is critical because many companies show preference for students who designed and picked a thesis topic on their own and raised their own funds for it (shows initiative and ability to function independently).

Or does a particular faculty member want to assign a project to staff a research grant and turn you into a clone of themselves? (It happens, particularly at the PhD level).

3) It is essential that at the first opportunity, students present papers at national and regional meetings. Not only is the abstract a publication, but people will seek you out and in the process your professional network is enlarged (and they may refer you to jobs or other opportunities). It also illustrates to a potential employer you are “involved” in your profession.

4) As the time to prepare a resume for employment comes along, it is essential to highlight one’s accomplishments (grants, fellowships, awards, results from work experiences) in a special section at the beginning. This shows a potential employer that a neutral group already thought sufficiently of your work to invest money in you.

In addition, if your resume reports your service as an intern for a company, try and assess how much money your work made for the company, and/or how much your work saved the company. Your company supervisor will show you how to do it if you ask.

5) Finally, when going to interviews anywhere, and presenting papers, students should dress like you are ready to go to work in the business district of any major metropolitan area, and speak in adult English to get your point across.

If you plug this information into Hatheway’s two tables and your thinking, you will make it!

George D. Klein, CPG-01487

AIPG Corporate Membership Program

AIPG has a membership program to better strengthen its association with companies practicing in the geosciences.

The benefits of this program are:

The corporate member may advertise its Corporate Member Status:

• The company will be listed on the AIPG website and in “The Professional Geologist” as a Corporate Member.
• Annual Corporate Membership dues include the annual dues of one Certified Professional Geologist and up to six regular AIPG memberships.
• Corporate Members receive discounts on publications and other AIPG items.
• Corporate Members may utilize AIPG’s job search/placement system at Member rates.
• Corporate Members may participate in any AIPG benefit programs.
• Corporate Membership supports AIPG advocacy on behalf of the geologic profession.

Corporate Membership Requirements

• The Corporation must be engaged in the practice of geology and geoscience and submit documentation of the Corporation’s professional qualifications.
• The Corporation must have a Certified Professional Geologist (CPG) in a position of senior responsibility who is designated as the Corporation’s representative and who is designated as the Corporation’s compliance with AIPG Corporate Membership Requirements.
• The Corporation’s practice of geology and geoscience at all locations must be conducted under the supervision and review of CPG’s.
• The Corporation will uphold the Code of Ethics and the Bylaws of the Institute.
• Cost: Application Fee: $100.00
• Annual Dues: Upon acceptance as an AIPG Corporate Member, the Corporation will submit annual dues based upon its annual revenue derived from the practice of geology and geoscience. The annual Corporate Membership fee will include Corporate dues, annual dues of the CPG designated as the Corporation’s representative and up to six regular memberships depending on corporate membership level.

Corporate Membership level

Annual Revenue - less than $500,000
Dues - $450/yr
Memberships - 2

Annual Revenue - $500,000 to 1,000,000
Dues - $750/yr
Memberships - 4

Annual Revenue - $1,000,000 plus
Dues - $1,000/yr
Memberships - 6

www.aipg.org
New From the USGS...


Available from the National Technical Information Service, Springfield, VA 22161 or available on line.

CD-ROM version will be available in May 2005 upon request to USGS Nebraska Water Science Center, 5231 S. 19th St., Lincoln, NE 68512-1271, 402-328-4100, info_ne@usgs.gov.


**other 2004-5197. NEW MEXICO.** Simulation of ground-water flow in the basin-fill aquifer of the Tularosa Basin, south-central New Mexico, predvelopment through 2040. By G.F. Huff, 98 pages.


USGS Toll-Free Information:
1-888-ASK-USGS (1-888-275-8747) or http://www.usgs.gov
High Risk of Major Tsunami in Northern Caribbean; Over 35 Million Could be Affected

WASHINGTON - The potential for devastating tsunamis in the northern Caribbean is high, say marine scientists, based on their analysis of historical data since the arrival of Columbus. Several natural phenomena could trigger giant tsunamis, they say, with effects felt in the islands of the Greater and Lesser Antilles and along the east and Gulf coasts of the United States.

Nancy Grindlay and Meghan Hearne of the University of North Carolina Wilmington and Paul Mann of the University of Texas at Austin focus on one major source of past tsunamis in the region: movement along the boundary between the North American and Caribbean tectonic plates.

Writing in the March 22 issue of Eos, the newspaper of the American Geophysical Union, they say that at least 10 significant tsunamis have been documented in the northern Caribbean since 1492, six of which are known to have resulted in loss of life. All 10 were triggered by movement along this plate boundary, which lies along the north coast of Hispaniola (Haiti and the Dominican Republic) and extends some 3,200 kilometers (2,000 miles) from Central America to the Lesser Antilles.

Previous tsunamis destroyed Port Royal, Jamaica, in 1692, killed at least 10 Jamaicans on the island's south coast in 1780, and ravaged the north coast of Hispaniola and the Virgin Islands in 1842. The most recent of the destructive northern Caribbean tsunami occurred in 1946 and was triggered by a magnitude 8.1 earthquake in the Dominican Republic. It killed around 1,800 people.

The researchers estimate that with increased populations, especially in coastal areas, some 35.5 million people are now at risk should another strong tsunami hit the northern Caribbean. They note that in addition to their own studies of fault lines along the North American and Caribbean plate boundary, other researchers have studied the risk to the northern Caribbean from submarine landslides, both in the region and as far away as the Canary Islands.

In the pre-1492 period, tsunami greater than any in the past 500 years may have occurred, the scientists say, based on their study of underwater landslides off the north coast of Puerto Rico.

Grindlay and her colleagues are planning to visit the region later this month to investigate possible linkages between groundwater flow from Puerto Rico and underwater seeps in areas where land has subsided. Such flows, or fluxes, could contribute to small landslides that might trigger tsunamis. In the future, they hope to drill into the ocean bed to determine when and how often land had collapsed in the prehistoric era.

"The recent devastating tsunami in the Indian Ocean has raised public awareness of tsunami hazard and the need for early warning systems in high-risk areas such as the Caribbean," Grindlay said in a statement. "An Intra-Americas Sea Tsunami Warning Project proposal has been approved by the Intergovernmental Oceanographic Commission, and meetings to plan implementation are scheduled for this spring and summer."

The research was funded by the National Science Foundation and the University of Puerto Rico SeaGrant program.

For further information on the Intra-Americas Sea Tsunami Warning Project, contact Donovan Gentles, Acting Deputy Coordinator, Caribbean Disaster Emergency Response Agency (CDERA): +1 246-425-0386 or donna.gentles@cdera.org.

AGU Release No. 05-09
(202) 277-7507.

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www.aipg.org
A Commonality of Purpose

Kelvin J. Buchanan, CPG-06058, Reno, Nevada

There was a recent news item in the *Drift of Things* column in the Society of Mining Metallurgy and Exploration (SME) newsmagazine which highlights the paucity of qualified people in the mining industry. The column referred to an eastern coal company sending up airplanes with banners to fly over Myrtle Beach, S.C., where coal miners often vacation; the banner promised good money and benefits for mining jobs. Granted, these banners were aimed at coal miners, but those miners have to be supervised by geological engineers, geologists, and environmental managers, to name just a few of the disciplines associated with our science. Four years ago there were no banners; the eastern coal industry was considered passé.

Rather than shrinking, our profession is expanding, but in ways that would not have been imagined thirty years ago. Think of all the disciplines and sub-sets of scientists who have geologic sciences as the core of their disciplines. Universities used to graduate geological engineers, geologists, geophysicists, and geochemists. Hydrology was not generally considered part of geology then. Look at the changes in the geologic disciplines now. Some states register five categories of types of geologists alone.

Despite all the differences in eventual work environments, most geologic professionals were attracted to the science by curiosity and wonder about nature's creations and the rocks underneath their feet. Whether it is permeability or porosity, stratigraphy or sedimentology, friability or fracturing, or simply the spectacular appearance of some minerals, all geologists share a common knowledge of rocks. Even geologists who love the profession, but are forced to leave it for various reasons, appreciate all that the profession has given them.

This appreciation for the profession was illustrated for me last month when I had the opportunity to hear Susan Miller, an author of mystery tales with a geologic twist, discuss how she purposely uses geology as part of the fabric in setting up her stories. Susan is a geologist, recently downsized from the USGS, who has used her writing skills honed in government service to create, at last count, three novels. Her first novel, *Death Assemblage*, was of special interest to me as it is set in Nevada. Although the locale is fictional, the descriptive geology is such that clues to location make identification easy to research.

AIPG is attracting more geologic professionals to its ranks, but not all applicants are qualified to be certified professional geologists as currently defined by AIPG. However, just as the direction of Social Security is being debated, so too are the parameters of what it means to be a practicing geologist. It is imperative that AIPG track how the universities define courses that are offered; if a degree in geology does not fit the criteria issued by the AIPG, who must change? Our student adjunct membership is increasing at a rate far exceeding the membership at large. It is these students who will form the backbone of our organization in the coming years. As each month passes, the list of student adjunct membership grows, but how does the AIPG sustain this growth?

As a newly elected member of this year's AIPG executive committee, I have struggled with how to best approach the issue of sustainability of student membership. There is no one answer, but neither are the solutions legion. The AIPG must continue to grow in size and dynamism, providing mentors for the newly minted geologists who will fill our ranks. Just as important is the inclusion of student member societies in some of the decision-making of the AIPG. We have four at-large members from the state sections on the Executive Committee. It may be appropriate to consider at least one student delegate as a regular member of the committee.

When one runs for office, there is a tendency to state one's objectives in non-specific terms, lest some part of the constituency be offended. In my goal statement, I mention the possibility of merging the TPG with a sister organiza-

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Working Toward A Positive Future For AIPG

Barbara H. Murphy, CPG-6203, Glendale, Arizona

It is an honor to be nominated to the office of AIPG President-Elect! I truly look forward to the possibility of serving as AIPGs President. The leaders of AIPG have made several important forward moving decisions in the past few years and with your support, I plan to continue this important work of AIPG for our members and the geologic community.

I have been actively involved with AIPG at the Arizona Section and National levels for many years. I first became involved with AIPG early in my professional career when my supervisors at a major environmental and engineering consulting firm encouraged me to attend some of the local meetings. It proved to be a strong professional group, providing contacts and professional development, as well as long lasting friendships (and some great field trips, too). Over the years, I became more involved with the Arizona Section and was fortunate to attend several AIPG National annual meetings. From attending the national meetings and serving on the Advisory Board and Executive Committee, I gained a much better understanding of AIPG and I developed an appreciation for AIPGs role in the geologic profession and its support of geologists. I also had an opportunity to participate in a Washington, DC Fly-In and gained a better understanding of AIPGs role in shaping policy and supporting the geologic profession through national representation. From serving on the Advisory Board on several times, and as Vice President, I have seen quite a few improvements in the AIPG organization; changes that were essential for AIPG to succeed.

In the past few years, AIPG has made several important decisions to strengthen AIPG and the CPG title. These programs require our continued support to make them successful while also providing important services and support to our members. The Continuing Professional Development (CPD) program allows our members the opportunity to obtain and demonstrate current knowledge and skills in a rapidly changing world. Several states now have professional geologist registration laws that require continuing education. AIPGs CPD program is supportive of continuing education and a variety of courses are being developed in support of the program for the benefit of our members and the geologic profession.

As always, we need to continue our focus on the membership drive to gain new members and new CPGs. Increasing membership is vital to AIPG. We need to talk with geologists just entering the profession as well as students and encourage them to join and be active members. As with other professional scientific organizations, the AIPG membership is aging so new as well as younger members are important. Encourage coworkers and other geologists with whom you work to join AIPG. Invite them to a Section meeting. Membership cards are available on AIPGs web site so you can print one out, sign it, and give it to the prospective member.

I also feel we need to encourage more of our members to become actively involved at the Section and National levels. We need better communication among the Sections and with headquarters. AIPG headquarters has many resources to offer. We need to encourage members to take advantage of the AIPG web site. The web site provides a broad range of services including information on what the various Sections are doing. There are some great ideas for successful meetings. I would like to encourage each AIPG Section to energize - have interesting meetings and field trips, provide networking opportunities, meet with other professional organizations, send an informative newsletter to the Section members, make a phone call or send an e-mail.

It is important that AIPG keeps current with Federal, State, and local legislative and regulatory decisions or policies that may impact geology and/or geologists. We need to encourage the Sections to be involved and current with these issues. Headquarters can provide guidance. This is an important function of AIPG and I feel the Sections should be encouraged to be tracking issues that may have an impact on geology or the geologic profession so they may encourage their members to have input before decisions are made.

AIPG also needs to continue to promote geologists and the geologic profession at the local level. We should encourage our members to be involved at the community level by serving on boards, steering committees, commissions, or similar to provide input to make informed decisions. I know I have found it very interesting to serve on a geologic mapping advisory board for the Arizona Geological Survey and on a committee to develop the General Plan for 2025 for the community in which I live. It is a great way to know what is going on in the community and to help the committee or board make more informed decisions on issues related to geology and the environment.

Also, The Professional Geologist has realized many improvements over past years with committed editors and improved graphics capabilities. I encourage our members to submit an article and share their expertise or provide information about local issues related to geology or the geologic profession. Read TPG and provide comments to articles you read. TPG is our publication and we need to continue to support it!

I am very honored to be nominated. I have enjoyed being involved with AIPG for many years. If elected to President-Elect, I will continue the important work of AIPG in supporting those programs and services for our members and in advocating for geologists and the geologic profession.
Help Make AIPG More Powerful!

Madhurendu B. "MB" Kumar, CPG-3106, Baton Rouge, Louisiana

I feel honored to be nominated for the office of AIPG National Vice President for 2006. Being conscious of the vital roles this office plays, I welcome the possibility of serving the Institute as Vice President. I have been serving the Institute for many years in various capacities at the Section level as well as the National level. In light of my experience of such long-term involvement with the Institute, I feel prepared to confidently operate at a high level of leadership that the office of Vice President demands. If elected, I will enthusiastically fulfill the obligations as stipulated under the AIPG Bylaws; accordingly, I will maintain the liaison between the Executive Committee and Section Presidents, undertake special projects requested by the National President and assume the power and duties of the President in the event of the absence of the President.

In the course of implementing my responsibilities as Vice President, I would be committed to dedicating my efforts toward the goals set by the President Font and President-Elect Weber. The goals include the following:

- Strengthening the “practical value” of the CPG title
- Promoting our continuing professional development program
- Offering on-line short-courses
- Public promotion of our Institute and geologic profession
- Expanding professional advocacy
- Enhancing services to the membership and the public

I do subscribe to the innovative approaches of President Font and President-Elect Weber’s vision for AIPG to be the powerful national organization for all working geologists. In my view, the first and foremost goal for the present is the strengthening of the practical value of the CPG title and can be achieved by accomplishing the other goals.

Let me shed light on some aspects of the first goal.

I am proud of my CPG title which adds distinction and prestige to my professional image. The title stands for my competence, integrity, and ethics. I believe, this reflects the opinion of a great many CPGs. Of course, there are numerous other reasons why the title is a professional necessity for so many practicing geologists. Such geologists include those who are associated with Security Exchange Commission (U.S.), Canadian Ventures Exchange (Canada), Gold Mining Companies, and Federal Government agencies (e.g., U.S. Army Corps of Engineers). Additionally, those geologists who are involved in legal issues and provide testimony as expert witnesses in the court of law claim that the CPG title is very effective in establishing credibility in litigation, public hearings and legislative activities. Furthermore, the CPG title help geologists obtain job interviews, build business clientele, and secure licensure or registration in some states. Many CPGs feel that the title provides extraordinary credibility and recognition beyond that of state registration or licensure. The title is honored in the international arena of geological business. The title does carry a considerable weight in the states which have no licensure or registration requirements. On the contrary, the CPG designation is superfluous in the registry states. Ideally, the CPG title should be beneficial to geologists in all states. It is ironic that prior to the proliferation of individual state’s PG requirements, the CPG credential had a significant weight, but, currently, that weight has diminished to the point where the professional use of the CPG designation is legally prohibited in some states with PG requirements. If the current trend is allowed to continue, further devaluation of the CPG title is likely, consequently, the AIPG membership may gradually decline, perhaps, eventually approaching the brink of extinction, unless AIPG grows powerful enough to reverse the trend. How do we make AIPG powerful enough? Some of the ideas which have potential to provide effective solutions are offered as follows:

- Publicize and promote the value of AIPG and CPG as well as the geologic profession through news media, popular magazines, and other new venues.
- Implement a strong professional development program so as to benefit all geologists and geological professionals.
- Make the CPD and the passage of a written test (e.g., ASBOG) requirements for CPGs.
- Provide study guides for the geologists required to pass the ASBOG exam.
- Work with state regulators that do not require registration to recognize the CPG on equal footing to the PE designation.
- Convince the EPA to treat the CPG on a par with the PE.
- Convince registry state boards to require the registered geologists to receive yearly ethics training from the AIPG.
- Work with the registry states and have the CPG title recognized as a partial fulfillment of the requirement for the PG or RG.
- Promote the CPG credential in academia.
- Promote geologic hazards awareness at the middle school and high levels.
- Expand the services AIPG offers to the membership and the public.

These ideas and other suggestions are currently being considered by the AIPG CPG Practicality Committee under my chairmanship. Based on the recommendations of the Committee, the National Executive Committee will formulate and implement effective strategies to strengthen the practical value of the CPG title. If such efforts are successful, the CPG title will be extraordinarily powerful, and so will be AIPG. I look forward to the possibility of helping AIPG grow more powerful. If elected Vice President of AIPG, I will focus my efforts on the mission of making AIPG the powerful organization for all geologists. Let us work together and strive to succeed in our mission.
Candidate for AIPG National Vice President

Virginia T. McLemore, CPG-07438, Socorro, New Mexico

I have been asked to run for National Vice-President. I was your editor from 2001-2003 and enjoyed working with the executive committee as well as performing editorial tasks. I look forward to returning to the executive committee as Vice-President, if elected.

As geologists we are entering an exciting time for our profession—one that I have long awaited for. Commodity prices have increased over the last year and mining and petroleum exploration and production are increasing significantly. We are entering an economic "boom" that could last for a decade or more. Future production and consumption of minerals and petroleum will increase as population increases worldwide and as people demand an increasingly better quality of life. China and India will likely become major consumers of minerals and petroleum because of their large population, thereby increasing the demand for minerals resulting in an increase in price. Companies will continue to explore for new deposits in known mineralized areas. Mining and petroleum production can and should be done according to today's environmental standards. AND geologists form the core of these extractive industries as well as meeting the resulting environmental challenges and in protecting society from geologic hazards. Furthermore, there is a strong desire by society towards a sustainable economy, where mining is a temporary part of the local economy, and other, more sustainable industries are developed that will allow for continued growth of mining communities when the mine closes. AIPG and its members should be and are meeting these challenges. I became a working geologist near the end of the last "boom" in 1980, so I have been waiting for and welcome this opportunity for most of my career. Our profession and our Institute have changed dramatically since I became a working geologist, from an organization representing mostly geologists working in the petroleum and mining fields to one representing a broad spectrum of geologists working in many fields, including petroleum and mining, environmental geology, geologic hazards, geohydrology, and urban geology. All of these fields and specialties will be needed in the decades to come and AIPG needs to be on top of the many challenges facing our profession.

Our Institute, at the state level, must continue to take the lead in state certification where appropriate. We need well-defined legislative programs at the national and state levels to promote our profession and enable us as an Institute to help solve geological problems that affect the public. And, we cannot forget the challenges facing our extractive industries, mainly how to operate within new stricter environmental regulations and how to correct public misperceptions, yet provide the natural resources our industrial society requires. AIPG is on track as an active organization meeting these challenges with successful fly-ins to Washington D.C. to meet with our government agencies and legislators, increasing membership, publishing a credible news journal (TPG), by conducting exciting and technically interesting annual meetings, and other functions. But we still have many challenges facing our institution. We must maintain the momentum that past executive committees have started.

As editor, I feel that I have left my mark and I have been proud of our achievements. AIPG does not make money from their publications, yet our members look towards the TPG for peer-reviewed articles, viewpoints, and information on government affairs and ethics. We have provided this information to our members in TPG and kept the cost down by publishing TPG 10 times a year instead of 12 times a year. The membership directory is printed only for members that request it; the directory is available to all members on our Web page. This also resulted in substantial savings to AIPG. We also added new features to TPG during my tenure. The 2003 Student Issue was a success and well received and will be an annual issue. The History of AIPG by R. Proctor was edited and published during my tenure. I feel that I can accomplish similar achievements as Vice-President.

According to the Institute by-laws (section 5.3.2), the Vice President shall act as liaison between the executive committee and the section presidents as well as be ready to assume the duties of the President should misfortune occur. These are important responsibilities that the Vice-President must oversee. I have been a 4H leader since 1984, and the motto of 4H is quite pertinent here: "Make the Best Better." That is essentially what I plan to do: improve and build upon what other Vice-Presidents have done before me to strengthen AIPG, especially by communicating with the section presidents, find out what works in their section as well as what the problems and challenges are. As Vice-President not only will I assume the duties and responsibilities of the office, but I will be an active member of the Executive Committee, promote membership, and participate in AIPG activities. I am looking forward to meeting these challenges as Vice-President for your Institution!
Candidate for AIPG National Secretary

Mark W. Rogers, CPG-08926

I am honored to be nominated for the position of National Secretary for 2006 – 2007. I have served the AIPG at both the National and State levels for the past 8 years. Though never a member of the National Executive Committee, I am a current member of the CPG Practicality Committee and have kept close contact with the Executive Committee through my involvement as Section President for Alaska and Hawaii. This past year, I lead a group of dedicated CPG’s in preparing AIPG bylaws towards establishing the first ever AIPG Section in Hawaii. It would be an honor and privilege to continue serving AIPG on the National Executive Committee as Secretary, and if elected, intend to promote continuing efforts in the following programs.

Promote increased CPG value and practicality: I am working with the CPG Practicality Committee to prepare a questionnaire for distribution to the general membership. My goal would be to help the National Executive Committee bring value to the CPG title as measure of high competence, integrity and ethical conduct. To this end, I support promoting the profession of geology and the critical roles geologist play in the society by increasing public awareness in environmental hazards, educated land planning and development, construction materials, exploration and mining activities, and the responsible development of earth resources for alternative and/or renewable energy. Continuing the efforts I started in Alaska, I am currently working with the Hawaii State Legislature to establish geology registration for geologists and hydrologists in all arenas (i.e., private and commercial, public, and other government agencies). This work will continue to the local government agencies towards establishing mutually acceptable terms for all entities to recognize the CPG designation as valid as any other PG / RG designation provided by various regulatory (EPA, Hawaii Department of Health) and DoD agencies (US Navy, US Army Corps of Engineers, US Air Force) and build a “bridge” for reciprocity between states.

Promote increased participation in the CPD program: I support increased participation in the CPD program by working to make the process more “user friendly” and providing more available resources to the membership (i.e., college out-reach, and on-line seminars / short courses for CEUs). Limitations of resources are all too evident in Hawaii and some other states, so I am working with the National Executive Committee and local universities (i.e., University of Hawaii – Manoa) to bring local membership more CPD programs that were once only available on the US west coast and other states.

Increased membership: I support the continued use of the member and student categories as a means to bring in new members to AIPG. The member category is an excellent way for those geoscientists to continue their professional development until such time that they qualify for CPG status. Additionally, I encourage continued development of student sections at the university level and promotion of earth science / geologic hazards awareness at the lower age groups (middle / high school levels). As CPGs, we provide a very valuable network resource for university students as interns or for those venturing out into the job market.

The National Executive Committee has performed well on the programs noted above and my goal is to continue the momentum. As secretary, I will strive to maintain accurate records for the Institute as well as supervising the processing of Member and Adjunct applications. Additionally, I will continue to be an active member of the Executive Committee, promote membership, and participate in AIPG activities. I would appreciate your support and vote to assist in accomplishing my stated goals. Thank you.

Announcing the theme for Earth Science Week 2005: Geoscientists Explore our Earth

AGI is proud to announce the theme for Earth Science Week 2005. This year’s theme, Geoscientists Explore our Earth, will focus on careers in the Earth Sciences and on the important contributions that geoscientists make to society.

Earth Science Week Coordinator
Cindy Martinez; cmm@agiweb.org
Earth Science Week Associate
Andrea Martin; asm@agiweb.org
AGI - 703-379-2480
Candidate for AIPG
National Secretary

Richard E. Wymer, CPG-07098, Tulsa, Oklahoma

I am greatly honored with the nomination to run for National Secretary. I believe that serving on any Executive Committee at the National, Regional or State level demonstrates a tangible commitment to the goals and objectives of the Institute and its members. Any person elected to the Executive Committee must be willing to serve the membership in a way that makes them a reality. Here is my position on three proposals currently being considered by the Executive Committee:

- Strengthening the Practical Value of the CPG Title: I strongly support this initiative. This title is the banner flown by our members that tells all observers that they have met the strict requirements necessary to practice geology. State registration has somewhat undermined the value of this title and we must do everything we can to bolster the meaning of this title. I support President Font’s title confirmation/introduction letters and his creation of an ad hoc committee charged with coming up with ideas to strengthen the value of the title.

- Continuing Development Program (CPD): I believe this program is a necessary and essential component of our profession and must be done in order to strengthen the practical value of the CPG title. The proposal will facilitate sustaining the skills necessary to stay current in our chosen profession. The online educational initiative being promoted by our leadership is an excellent idea that will provide high quality, relatively inexpensive, and flexible training opportunities to our members.

- Membership: Our organization will cease to exist without the constant addition of new members. I support any initiative that will bring more members into this organization such as the student chapter initiative proposed by President Font. A larger AIPG can act from a stronger position and thus become a stronger advocate for each of its members and for our profession in general.

Although I have never served on the National Executive Committee and only attended a few statewide and national meetings, I feel confident that I can perform the duties of the office to which I have been nominated. I would appreciate your vote of support that will allow me to participate in the challenging work that lies ahead of us. Thanks!

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AIPG 42nd Annual Meeting
"Geologic Information: Racing into the Digital Age"

October 9 - 14, 2005
Lexington, Kentucky

Radisson Plaza Hotel
Reservations Worldwide
1-800-333-3333
369 West Vine Street
Lexington, KY 40507-1825
859-231-9000/859-281-3737

General Chair: Tom Spalding, CPG
(502) 458-1209
aipg2005@yahoo.com
www.professionalgeologist.org

HAVE YOU SIGNED UP A MEMBER LATELY?

REQUIREMENTS FOR GENERAL MEMBERSHIP
(Postcard size application on page 35.)

EDUCATION: 30 semester or 45 quarter hours in geological sciences* with a baccalaureate or higher degree

SPONSORS: 1 required from a CPG or Member

SIGNUP DUES: $40 (current years dues)

ANNUAL DUES: $55 plus Section dues

APPLICATION: Available on website www.aipg.org

*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.

www.aipg.org

MAY/JUNE 2005 • TPG 21
CANDIDATES FOR AIPG NATIONAL PRESIDENT-ELECT

Kelvin J. Buchanan
CPG-06058
Reno, Nevada

Statement of purpose or goals you have for AIPG:
Develop synergy with other geological organizations to promote a geologic magazine with a subscription base large enough to warrant increased advertising rates; Increase student awareness of geologic professionalism as practiced by the members of the AIPG organization as a way to increase university student chapters.

Universities Attended
University of British Columbia
Pepperdine University

Degrees Granted
B.Sc., Geology
M.B.A., Management

Employment History
Hercus Mining Company
Atjde Exploration Management
Betheim Copper Corporation
Watts, Griff & McCurt
CFAB, Inc.
Viking Minerals, Inc.
Henkel Buchanan Group
HB Engineering Group

Title
Geologist
Geologist
Exploration Manager
President
President
President
President

Dates
1971
1981
1971-1972
1973
1974-1980
1980-1983
1983-1988
1989-1990
1991-1992
1992-present

AIPG Activities
Nevada Section
Nevada Section
Nevada Section
AIPG National
AIPG Foundation
Nevada Section
AIPG Foundation
Nevada Section
AIPG National
AIPG National
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AIPG National
AIPG National

Screening Board Chairman
Vice President
President
National Meeting Treasurer
Board Member
Vice President
Treasurer
Secretary
Treasurer
President
National President Certificate of Merit
AIPG At-Large Board Member
Treasurer
Annual Meeting Chairman
Martin Van Covering Award
Vice President

Dates
1984-1989
1990
1991
1992
1993
1994-1996
1994-present
1997-1998
1999-2000
1999
2000
2002-2004
2002
2003
2005

CANDIDATES FOR AIPG NATIONAL SECRETARY

Richard E. Wymer
CPG-07098
Tulsa, Oklahoma

Statement of purpose or goals you have for AIPG:
My goal is to serve the members of AIPG to the best of my ability by being a strong advocate for the geologic profession.

Universities Attended
University of Akron
University of Alaska

Degrees Granted
B.S., Geology
M.S., Geology

Employment History
U.S. Geological Survey
Bureau of Land Management
Bureau of Land Management

Title
Geologist
Geologist
Assistant Field Manager

Dates
1976
1980-1983
1983-2000
2000-present

AIPG Activities
Ohio Section
Ohio Section
Ohio Section

Delegate for National Meeting
President
Membership Committee

Dates
2004
2004
2002-present

CANDIDATES FOR AIPG NATIONAL SECRETARY

Barbara H. Murphy
CPG-06203
Glendale, Arizona

Statement of purpose or goals you have for AIPG:
AIPG has made some good forward moving decisions in the last few years. It is important to continue to strengthen AIPG in its advocacy role for geologists and the geologic profession at state and national levels, to focus on increasing membership, and to offer assistance to the sections in providing programs and services that are important to our members.

Universities Attended

Degrees Granted
B.A. Geology

Employment History
Los Alamos Scientific Laboratory
US Bureau of Land Management
Clear Creek Associates

Title
Geology Research Assistant
Geologist
Assistant Geologist to Project Geoscientist

Dates
1975
1976
1977-1999

AIPG Activities
Arizona Section
Arizona Section
Arizona Section
Arizona Section
Arizona Section
AIPG National

Dates
1995
1995
1996-1998
1999
2002-2003
2004-present

CANDIDATES FOR AIPG NATIONAL SECRETARY

Mark W. Rogers
CPG-08926
Millinocket, Maine

Statement of purpose or goals you have for AIPG:
I will strive to maintain accurate records for the Institute as well as supervising the processing of Member and Adjunct applications.

Universities Attended
University of Idaho
University of Alaska

Degrees Granted
B.S. Geology
Graduate Studies in Environmental Science

Employment History
Idaho Gold Company
Smith-Emery Company
WestGold, Explor. and Mining, Ltd.

Title
Engineering/Exploration Geologist
Environmental/Engineering Geologist
Project Exploration Geologist

Dates
1981-86
1986
1987-98
1988-91

AIPG Activities
Alberta Section
Washington Section
AIPG National
AIPG National
AIPG National

Dates
1991-93
1993-2001
2001-2002
2002-2003
2003
2004-present

CANDIDATES FOR AIPG NATIONAL SECRETARY
Madhurendu B. "MB" Kumar
CPG-03106
Baton Rouge, Louisiana

Statement of purpose or goals you have for AIPG:
Help strengthen the practical value of the CPG title and help the AIPG grow more powerful, so as to be beneficial to all working geologists.

Virginia T. McLemore
CPG-07438
Socorro, New Mexico

Statement of purpose or goals you have for AIPG:
To assist the executive committee in increasing membership, incorporating the new corporate membership, incorporating the new Continuing Professional Development (CPD) Program, and assist active membership participation at the section and national level.

AIPG 2005 National Awardees

Ben H. Parker Memorial Medal
James W. Skehan, CPG-01505
Weston, Massachusetts

Martin Van Couvering Memorial Award
Lawrence M. Austin, CPG-05181
Grand Rapids, Michigan

John T. Galey, Sr. Memorial Public Service Award
John G. Parrish, CPG-03326
Sacramento, California

Honorary Membership
Rex Monahan, CPG-00424
Sterling, Colorado

Outstanding Achievement Award
Thomas W. Dibblee, Jr.
Camarillo, California

AIPG Members eligible to vote for AIPG National Officers are encouraged to fill out and mail the enclosed ballot or vote electronically on the AIPG National Website — www.aipg.org. All paper ballots must include the voters name and AIPG number to be valid. To vote electronically members must login to the member portion of the website and include their name and AIPG number to be valid.
The President’s Message

Robert G. Font, CPG-03953

Dear friends and colleagues:

Another key goal for us this year is to find ways in which we may promote and strengthen the “Continuing Professional Development” (CPD) program. I have no doubt that the fulfillment of CPD requirements will strengthen the practical value of our CPG title. But I also recognize that from the moment that we start promoting the fulfillment of these requirements, we assume a major responsibility toward that end. One step that we have taken to fulfill that responsibility involves the development and accreditation of online courses. This tactic also provides the AIPG with the potential of an additional source of income beyond what we can collect from membership dues. To accomplish these goals we have procured a viable system of online instruction and now need to amass enough courses to make the system effective. I, for one, consider the offering of online courses and the implementation of a strong CPD program a very important part of the future or our institute. They provide us with, both, an attractive membership service and a revenue supply.

With these thoughts in mind, I dedicate the current “President’s Message” to the topic of online instruction as it pertains to the CPD program and the AIPG.

Online Courses and the New AIPG System – History and Accomplishments:

It was about five years ago that Dr. Detlev Doherr, Dean and Professor at the University of Offenburg in Germany and I first considered the establishment of an online system of instruction for geoscience courses, to serve both the AIPG and the EFG. We needed two things:

a) An elegant, versatile and affordable computer system to house these instructional modules.

b) A prototype course.

To accomplish the goal, Dr. Doherr concentrated on the electronic side of the issue, while I worked on the development of a “model” course. To this end, I generated a unit entitled “An Introduction to Landslides and Mass Wasting.” In preparing this offering, it soon became apparent to me that some key requirements or standards should be developed that would make it easier for new courses of this type to be constructed. For example,

1) The material must be clearly conveyed and presented in an attractive fashion, in an easy-to-follow format.

2) The course must be challenging and presented in a design that would make it easy to transfer into the proper computer environment.

3) The course should be self-contained, or a stand-alone presentation, with minimal requirements concerning outside reference consultations.

In developing “An Introduction to Landslides and Mass Wasting”, every effort was made to accomplish the points highlighted above. The completed archetype course was passed along to Dr. Doherr who, in turn, configured and placed it online at the newly-established, AIPG-dedicated server residing at the University of Offenburg in Germany. The course is now officially accredited by the AIPG for CEU designation and it is currently being actively promoted in a distinct ad in the TPG.

Establishing the proper combination of elegance, versatility, ease of utilization and a design appropriate for a trouble-free transfer into the proper computer configuration were key targets to be achieved. Dr. Doherr’s expertise on the subject, the existing infrastructure at the University of Offenburg and our collaboration over several years made the desired outcome possible. Physically, the new AIPG server resides at the University of Offenburg and any “systems problems” are to be handled from that end. As it now stands, our new AIPG server allows for AIPG contributors to submit and display course material in the form of:

- Power Point slides with or without animation, as well as “JPEG” and “TIFF” files, etc.

- Word documents or text files, in general.

- Other “Microsoft Office” applications, such as EXCEL spreadsheets, etc.

- Data from other commercial software programs.

- Video and audio presentations.

In addition, the system provides functional tools to benefit the course takers, to address and include:

- Self-assessment question catalogs.
- Lab-style exercises.
- Timed tests and exams.

Therefore, our new system allows instructional data to be presented in an attractive, easy-to-use and practical format, both for the developer of the course material and for course participants, alike.

Certain key points to be recapitated and stressed at this time are the following:

1) Currently, the AIPG has available a LINUX-based, versatile and elegant system of online instruction.

2) Because of our strong partnership with the University of Offenburg, we have accomplished this for a very reasonable and relatively modest investment.

3) We have one course already available in the system, “An Introduction to Landslides and Mass Wasting.”

www.aipg.org
The next step is for us to concentrate on developing the necessary course material to make the effort and investment a success. Members of the AIPG are, thus, encouraged to develop material suitable for our new system of online instruction. Due to the wealth of talent and expertise possessed by members of our prestigious institute, this should not be a problem. Basically, it is a win-win situation for all. Our members (and geoscientists in general) can benefit from these offerings by acquiring CPD points and accumulating CEU credits that may be essential for meeting certification, registration and licensing requirements. In addition, both the course developers and the AIPG can benefit financially from these contributions.

In summary, the main challenge that we face is to develop the needed material to make this an effective vehicle for our organization. The best analogy I can come up with is this: For a modest investment, the AIPG has procured a system of online instruction that is equivalent to a beautifully-built house with many rooms. Currently, only one of these rooms is occupied (i.e., the room that contains the “Introduction to Landslides and Mass Wasting” course). But for us to profit from this investment, the remaining vacant rooms must be filled by us in the form of courses to be offered. It is up to us to take advantage of this outstanding opportunity and to make it work!

These are, indeed, exciting times for the AIPG! Jump in and help! You will be most welcomed!
Student Geologists and The Future of Associations

William J. Siok, CPG-04773

There is agreement among sister geologic associations that student participation is of critical importance to the future of all associations. You have undoubtedly noticed statistics in the last few years that demonstrate the aging demographics of membership in the majority of geologic organizations. The noteworthy aspect of these age demographics is the disproportionate number of geologists near or at “retirement”.

In consideration of these demographics, the AIPG Executive Committee and in particular President Robert Font and Vice President Kel Buchanan are placing increased emphasis upon recruiting and retaining student members. Among the challenges in attracting student members is providing an incentive which not only attracts students, but compels them to stay and become actively involved.

AIPG is experiencing success in recruiting new student members, and modest success in retaining them in subsequent years, particularly after graduation. Most geologic associations offer incentives to attract students in the first place. These incentives might include academic scholarships, expenses paid for select association annual meetings, student chapter funding, subsidized field trips, placement services, etc.

Apparently though, these enticements are not sufficient to retain all students who sign on. The value of continued association after graduation does not resonate with young geologists (and other professionals) as it once did. Also, the total number of geology students (graduates) is on the decline.

So what should AIPG and our sister societies do to retain student members? The survival of our associations depends upon students accepting active, productive, regular member status after graduation and maintaining it through their careers.

How should professional geologic associations approach the future?

It may be feasible for associations to cooperate to create multiple-association student memberships, similar to the approach being taken with technical publication subscriptions. The idea being to offer students multiple-association memberships for fees less than maintaining individual memberships.

Most associations are barely maintaining membership levels, new members are joining at approximately the same rate as members retiring. In time associations may begin to take seriously the advantages of cooperating more closely, especially for administrative purposes. Why not start the process by collaborating to create student memberships for multiple organizations during the critical undergraduate years? This is a concept which is increasingly being discussed by respective association boards, and which has long been a recommendation of AIPG Past President Robert Pankundiny, Emeritus New York State Geologist.

Over the next decade or so there must be concerted efforts, I believe, between some of our professional associations to consolidate operations in a conscious attempt to reduce administrative costs so that diminishing resources can be used more efficiently to continue providing necessary services to practicing geologists and to ensure the longer term effectiveness of our respective associations.

Maybe the future portends well?

Test Your Knowledge

Questions for this issue are:

1. A fault strikes north-south and dips 30 degrees east. A vertical well is to be drilled 300 feet east of the fault along a line perpendicular to its strike. If the ground is flat, at what depth will the well cut the fault?
   a. 105 feet.
   b. 153 feet.
   c. 173 feet.
   d. 193 feet.
   e. 203 feet.

2. A clay’s cohesive strength is 13.79 Kilonewtons per square meter. Its unit weight is 90 pounds per cubic foot. If the clay is 100% water saturated, what is the maximum height that a vertical slope-cut can stand without the need of artificial support?
   a. 9.3 feet.
   b. 12.8 feet.
   c. 15.0 feet.
   d. 18.4 feet.
   e. 20.9 feet.

Answers on page 34.
Conflict of Interest—
Bidding on Previously Recommended Work
(Column 95, Jan-Feb '05 and Column 96, Mar-Apr '05)

Ron Wallace, CPG, responded, "I agree with you that bidding on previously recommended work isn't a conflict of interest and we see this very often in Phase I Environmental Site Assessments where USTs or former USTs were located on a property and the recommendation was to conduct a Phase II assessment. After Phase II was completed and if contamination was discovered, the consultant would recommend notification to the regulatory agency and corrective action to be completed under the State UST regulations. If the owner of the USTs called me, I always recommended they get bids for the corrective action."

Larry Weber, CPG, wrote, "In your column 95, you responded quite satisfactorily to an inquiry regarding a potential conflict of interest associated with a geotechnical consultant recommending follow-up services following a geotechnical study. Having been in that type of business for over 30 years, I know this to be a common and appropriate practice. In fact, it is a practice that is often recommended for the benefit of both the geotechnical consultant and the client. While it may be easier to see and understand the benefit attributable to the consultant, since he/she may appear to be laying the groundwork for future business, there are real and substantial benefits to the client as well. Consider that the client has engaged the consultant to provide a service that goes beyond the mere submission of a report. If the consultant is truly a professional, he/she will understand his/her commitment to the project and will be obligated to recommend whatever is in the best interest of the client. The consultant often can easily and correctly see how his/her further involvement will be important as the project continues. Most geotechnical studies involve limited exploration and a prediction of subsurface conditions that will be more completely uncovered at a later time (during construction, for example). Therefore, it is appropriate and beneficial for the professional whose predictions were used in the design to be able to review the conditions as actually exposed and then confirm or adjust his/her recommendations in the light of the new data. The continuity between the exploration, design, and construction phases is often critical to the success of a project. Without such continuity there could be a tendency for the consultant to require much more extensive exploration in order to reduce the unavoidable uncertainty; but if he/she is bidding on the work initially, a proposal for extensive exploration would like cause him/her to lose the job. A more likely scenario would be for the consultant to develop a very conservative design approach, one that recognizes no opportunity for adjustments based on new information obtained during construction. The more conservative design could very easily cost the client more money than could be saved by re-bidding the follow-up services. The basic problem here is the whole perception of the role of the geotechnical consultant. A client would not change architects or structural engineers when moving from design into construction. The geotechnical consultant should be a part of the project team; and, when retained to provide exploration and design recommendations, should have every expectation that they would also be retained to provide the appropriate follow-up construction monitoring and testing services. In this way the client can be best assured of a complete and consistent approach to the geotechnical aspects of the project."

"It also disturbs me to think that someone would confuse touting one's unique professional qualifications with a conflict of interest. As professionals we should encourage clients to make consultant selections on the basis of the consultant's qualifications and ability to execute work, as well as cost. To take the position that someone's unique qualifications resulting from prior experience should disqualify them from consideration because of an unfair advantage is absurd. The end result of such twisted logic is that it would be 'unfair' for consultants to be at all dissimilar in their experience base, education, training, staff size, etc., which of course is an impossibility. In other words, a perfectly level playing field could never exist. To discount people's
legitimate and pertinent qualifications in an attempt to produce artificial 'levelness' is unwise and, to some perhaps, un-American. Professional services should not be procured by a bidding process that eliminates every consideration but price. Consultants who do not seek to constantly improve and expand upon their qualifications will fall behind. Those who do not promote or capitalize upon those qualifications will not survive in a system of free enterprise."

Conflict of Interest?—An Example of Working For and Against a Client

A foreign consulting geologist I will call Sam was retained to be part of a team that was reviewing and valuing the ore reserves of a foreign company, Firm A, that had acquired the assets of another company, Firm B, as part of the financial reporting requirements resulting from the merger of the firms. Several months later, the Firm A made a hostile bid for yet another foreign mining company, Firm C. In opposing Firm A's bid, Firm C called into question the reliability of Firm A's reserve reporting citing discrepancies between Firm A's annual reports and the valuation to which Sam contributed. Firm C assembled a team of independent experts to assist it and among those hired by Firm C was Sam. When a hearing was held on the matter, Firm A alleged that Sam, in working for Firm C, had a conflict of interest because he had worked with Firm A's confidential data during his earlier assignment. Sam denied having an impermissible conflict of interest because he had not disclosed any of Firm A's confidential information, that his work on the hostile takeover matter was based solely on publicly available reports, which included Firm A's annual reports and the report on the valuation of the merged firms on which he had worked.

What is your opinion of this situation? Could Sam ethically work for Firm C in opposing Firm A's hostile takeover having worked so recently as an independent consultant for Firm A? Assume that Sam was completely truthful in stating that he had not used any of Firm A's confidential information in working for Firm C. How does this assumption affect your view of the potential conflict of interest? If Sam were an AIPG member (he is not), should he be subject to disciplinary action? Assuming the facts are as stated, what sanction would you recommend?

I sent the preceding question to the Ethics Committee for their comments and received the following responses.

David Lipson, CPG, replied, "Sam violated AIPG Code of Ethics Rule 3.2.1, which states that 'A member shall not use, either directly or indirectly, any confidential information...which is adverse...to the interests of a client.' In this case, Firm A was Sam's client and through his client-consultant relationship Sam had access to confidential information belonging to Firm A. By agreeing to re-evaluate Firm A's reserves on behalf of Firm C, Sam created a conflict of interest because he indirectly used Firm A's confidential information while employed by Firm C. There is no way Sam could entirely ignore Firm A's confidential information present in his memory while working for Firm C. This behavior represents indirect use of confidential information that would be adverse to a client.

"If Sam were an AIPG member he should be subject to disciplinary action. If found guilty of ethical violations, I would think suspension from AIPG for a certain time period (say, one year), and a written promise not to engage in such behavior in the future, would be appropriate sanctions. However, given my lack experience in deciding appropriate sanctions for substantiated ethical violations, I look forward to reading the opinions of the more senior members of the committee."

Ron Yarbrough, CPG, responded, "This instance cited by you is about the most clear conflict of interest I have heard of. His actions are so clearly out of step with AIPG guidelines and what we stand for that he should be 'booted out' of any organizations which expects a high level (or even a low level) of professional ethical behavior."

Please contribute your views on this topic.

What Education Qualifies One as a Geologist?

The article with this title appears elsewhere in this issue. The article was initially drafted for inclusion in this column but became large enough to be a stand-alone article. Please review this and contribute your views.

Delayed Report Angers Client

(Column 95, Jan-Feb '05)

Marty Andrejko, CPG, addressed aspects of this topic in his Professional Liability and Risk Management column in the Mar-Apr '05 TPG.

Should AIPG and its Sections Advertise Jobs in Newsletters, E-mail Lists, etc.?

(Column 96, Mar-Apr '05)

Bill Sioik, CPG, commented on this topic in his Executive Director's column in the March-April TPG. Sioik notes that, "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."

Topical Index to the Professional Ethics and Practices Columns

I have prepared a topical index covering columns that have been placed on the AIPG web site in the ethics section. The index is in PDF format. The original file is in Microsoft Excel format. If you would prefer the Excel file, send me an e-mail and I will send it to you. I will update this index periodically and post the new copy on the AIPG web site. If you have suggestions on organization, please let me know.

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Full Disclosure: The Essential Element of Geologic Site Characterization

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INTRODUCTION

Practitioners are well aware of the fact that our efforts to characterize sites for construction or for any other of the wide applications of geology are nearly always confounded by the unwelcome constraint of limited time and budget. In fact, we know to be careful not to promise more than we can honestly deliver, on the basis of the client/owner’s appreciation of the critical impact of geologic foreknowledge as the basis for engineered design. And, just as critically, our full findings are essential to the contractor’s choice of construction method and bid-cost estimate to carry out the detail and intent of the project engineering staff.

Basically, we like to think that the more money spent and time allocated for site (and waste) characterization, the more accurate will be the findings, as based on the evaluation and interpretation of the results of the associated field and laboratory work.

Therein lies the “rub.”

CONCEPT of FULL DISCLOSURE

The full need for pre-design, and then pre-construction knowledge, along with reasonable predictions for time-variable conditions, can be considered essential for project success of engineered works. Site characterization data generally are only questioned in the context of four broad “if or when” potentialities:

- Detrimental effect, on quality assurance, in this current, post-1980 constraints of priced competition (“bid shopping”). This is a true concern for quality seldom is included in the owner’s procurement of professional geological services;
- The contractor being confronted with “variable” geologic conditions not otherwise to be expected in the particular geologic terrane of the project;
- When some shortcoming occurs in the performance of the completed project, or;
- When there is injury, death, loss of function, or loss of property associated with the geotechnical aspects of project functionality.

As a result of contractor suits over allegedly variable site conditions involving tunnels and other uses of underground space, this issue of full declaration of site conditions emerged in the early 1970s. This situation was thoughtfully addressed by the former U.S. National Committee on Tunneling Technology (USNCTT), housed at the National Research Council. Between 1976 and its disestablishment in 1994, USNCTT developed and issued a series of guidelines meant to bring about a reform in the nature in which geotechnical information is presented by owner to contractor (See list above). One of the pillars of these guidelines is the concept of Full Disclosure of geological and geotechnical project information.

**Full Disclosure:** The optimal state of declaration of observations, facts, interpretations and conclusions by which geologic knowledge is brought to bear on design-and-construct specifications for engineered works. Without full disclosure an equitable solution to various geologic constraints cannot be achieved and, inherently, the risk of damage to persons, property, welfare or investment may be in unacceptable jeopardy.

(Author’s definition)

WHY is “FULL DISCLOSURE” IMPORTANT?

Whenever our geologic field and laboratory work is performed for a short-term purpose, there nearly always is some potential impact on the health, safety, welfare, and property of other persons. This fact should be taught at the undergraduate level of preparation, and it certainly cannot be ignored in the arena of practice, where it becomes the sole justification for licensure.

Full disclosure represents the thin buffer of protection for all of us who go out into the field. The means here do indeed suit the ends. Full disclosure therefore:

- Forms the basis for discretionary decisions by the owner-client, whose trust in our findings, conclusions and recommendations helps move geoscience and geotechnically-based construction projects forward;
- Constitutes much of the physical description of the construction or other alteration of the land that will be subject to review by the legal and environmental permitting.
- These reviews are now widely required by government, in the interests of public health, safety, welfare, and property.
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- Is the apparent substance of the physical geologic (and hydrologic) site conditions that must be considered and met, for whatever engineered design is necessary for the client/owner to move to selection of a contractor to carry out the physical attainment of the goals?

- Equates to the highest degree of known pre-construction truths about the site, but only when attempts are made to identify risks of all sorts and to quantify such for the means of direct comparison with other threats recognized by parties to the project;

- Provides the fundamental basis for the owner's agent to formulate a cost estimate, and for the contractor to compile a competitive award for the construction actions necessary to carry out the letter and intent of the contract documents;

- Represents the basis for operation and maintenance of the subject facility or project, once completed by the contractor, and turned over to the owner;

- Constitutes the physical conditions by which the subject activity or operation is judged to be in compliance with appropriate governmental controls exercised mainly in the name of public health, safety, welfare, and common public access and property; and

- Serves as the basis of underlying geotechnical conditional facts in the event of such damage or failure of the project as affects the public interest or, through the court system, redressing attendant personal injury or loss.

That, to me, is a powerful assignment and it constitutes, for each of us, a huge degree of personal and professional responsibility. And, though not the subject of this article, full disclosure now is generally and sadly impacted by the obdurate practice of owner bid-shopping for professional services. But, first and foremost, the seat of associated liability rests with the interests that select and engage geoscience professionals for the conduct of work performed in the client's interests.

**DISCLOSURE as a REASONABLE CONDITION**

In the professional pursuit of geology as an applied science, or, in the case of geological engineering, as the geoscience element of professional engineering, "disclosure" represents a state of declaration between parties engaged in some sort of mutual construction or other physical construction effort.

"Disclosure," in this context, involves the generation of geologic facts and interpretations essential to the completion of subsequent engineered design. It is a fundamental precept that "other parties" to the project, generally the owner and the engineer of record, will then prepare some form of specifications and drawings for use by the third party to the project, the contractor. As with all professional geologic endeavors, our work mainly is involved with replacing degrees of uncertainty with improved states of site-relevant knowledge. At its optimum, as a result of geologic training, background and experience on the part of the geoscience consultant, our efforts should represent a greater degree of certainty related to completion of the project.

Along with the certainty represented by our work product, comes a general reduction in "uncertainty" and with that reduction comes a concomitant reduction in "risk."

So, it is not hard to visualize that our work has a considerable fundamental value, given in exchange for our fee. This value is embodied in our disclosure of certain site conditions that, if approached from ignorance or a lower level of developed knowledge, will likely encounter conditions which the design engineer is not been able to consider or otherwise meet in terms of design. It also follows that the contractor would have been placed in a situation of less than optimal knowledge about the characteristics of the site influencing the cost and scheduling of the construction effort. Table 1 indicates some of the detrimental results of not being funded to provide full disclosure.

**WHEN the OWNER CHOOSES not to EMBRACE FULL DISCLOSURE**

About now you are coming up off your chair and wanting to scream out the fact that many clients and owners are primarily interested in obtaining the cheapest site or site and waste characterization and not the "best" product from the most qualified geologist.

Let us look at several of the downsides resulting when the owner does not wish to support full disclosure, or, worse yet, when the owner attempts to conceal or otherwise constrain the measure or product of our work necessary to deliver full disclosure.

There are no strict prescriptions that our clients are or should be compelled to seek all elements of geologic knowledge sufficient to constitute a full disclosure of the geologic elements of site (and waste) characterization. We, however, as ethical members of our profession, should bear in mind that the obligation of full disclosure does bind us ethically to disclose all geologic information as is discernable in the course of carrying out our assignments.

At the same time we should advise our clients and potential clients as to what constitutes an appropriate scope of work.
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Table 1
Some of the Potentially Injurious Results of Non-Disclosure

<table>
<thead>
<tr>
<th>Result</th>
<th>Basis</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor not provided with some of the essentials to plan and conduct construction</td>
<td>Contractor not generally held responsible for dealing with geologic conditions not normally understood to be present in the applicable physiographic province</td>
<td>Unanticipated difficulties in: Excavation Maintaining ground stability Dealing with earth material properties Managing perched or unusually high ground water Results in increased effort and/or extended scheduling; hence increased costs</td>
</tr>
<tr>
<td>Design engineer does not anticipate bearing and stability issues associated with foundation loads of engineered works</td>
<td>Offending conditions of stratigraphy or geologic structure may not be encountered, detected, or otherwise recognized and reported in the site characterization effort</td>
<td>Design does not adequately accommodate project loading conditions as such affect the state of host ground or foundation materials; hence deformation occurs in the foundation and affects the appearance or performance of the constructed works</td>
</tr>
<tr>
<td>Engineered mitigation falls short of the degree of prevention necessary to prevent injury to people or to property</td>
<td>Incomplete definition of the three-dimensional bounds and characteristics of problem-oriented masses of earth materials optimally requiring design attention or contractor anticipation.</td>
<td>Engineered design may not encompass the full, mobilized body of earth materials and therefore does not sufficiently meet, reduce, resist, or overcome the destabilizing forces Result: Project malfunction in terms of operational performance, with personal or property injuries</td>
</tr>
<tr>
<td>Hazardous wastes remain in place at the site of brownfield or other land uses following environmental remediation</td>
<td>1) “Hot Spots” of leachable or transport-susceptible toxic wastes remain undiscovered in the ground untreated for their detrimental impact; and/or 2) Geologic “pathways” for contaminant transport go undiscovered</td>
<td>Human and/or environmental receptors come into contact with the wastes or their emissions or lichages, suffering degradation of health or diminution of natural resources, both legally actionable under North American environmental law</td>
</tr>
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DEFACTO PENALTIES for FAULTY, PARTIAL or NON-DISCLOSURE

The point that I want to make in this article is that anything less than full disclosure automatically devalues, or, worse yet, invalidates all or portions of the end effect of site-related geologic field or laboratory work. In this case, full disclosure may be thwarted either in a pre-mediated manner by the client, or, possibly, through incompetence on the part of the selected geoscience professional. Either way, the result is the same, degradation or avoidance of the truths necessary to solve a geologically-based problem or to meet a geologically-based condition that may injure someone or their interests. When the truths are not discovered and disclosed, then some sort of injury generally follows.

MATHEMATICAL APPROXIMATIONS are PARTICULARLY SUSCEPTIBLE

Perhaps the fundamentally most-vulnerable victim of non-disclosure or partial disclosure are mathematical approximations of ground conditions, especially those related to risks associated with various forms of former landuse. This important flaw in applied mathematical analysis frequently is overlooked. Stated simply, the old saying about computer analysis applies here; “Garbage in – Garbage out!”

In fact, it is the author’s opinion that mathematical approximations should be doubly evaluated by peers to detect the absence of geologic factors that, influence, if not control, the accuracy and reliability of the mathematical analysis. Those of us who have matured through expert testimony and litigation support, should know that it is always necessary to regard opposing testimony, such as is based on mathematical approximations, as potentially geologic flawed by way of its assumptions. Such approximations demand close and careful inspection and review in terms of geologic reality and basic applicability. Stated another way, it is the author’s experience that environmental arguments related to the fate and transport of toxic wastes typically are geologically flawed beyond a reasonable doubt. When closely examined by the court the base assumptions are often downright fictional or, at best, basically inapplicable to the claim for which they have been developed in support.

DETECTING and DEALING with FLAWED DISCLOSURE

One of the objectives of this article has been to simply memorialize the concerns that applied geologists should have for professional geologic work product that is somehow flawed with respect to disclosure of geologic elements of characterization. We intrinsically know what to ask from our clients in terms of scope of work authorization, but we also know that seldom are we afforded all that we feel is necessary in order to achieve full characterization of a site. This brings us essentially to six levels of awareness with respect to Disclosure. They are, from the top, down, in increasing degree of flawing:

1) Full Disclosure supported by the client, in terms of providing a Scope of Work adequate to appropriately characterize a site (and its wastes, if applicable);
2) Reduced Scope of Work, in which some elements of site characterization may go undetected, yet Full Disclosure of discovered elements is adhered to;
3) Inadequate Scope of Work, resulting in a flawed Site Characterization

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and thereby constituting some elements of Non-Disclosure.

This flawed nature may or may not be premeditated, yet the undisclosed site facts may lead to degrees of shortcomings in the related engineered works or unwarranted injury to people or damage to property;

4) Premeditated Inadequate Scope of Work by the owner. Here the owner expects that such will incorporate a degree of Non-Disclosure will support the owner’s plan for increased profit.

5) Deliberate Non-Disclosure by the characterizing geologist, in response to the needs or directives of the client. Here the client wishes to escape the obligations and/or costs associated with dealing with the truth of site characterization; and

6) Inadvertent Non-Disclosure by the characterizing geologist. This condition may be due to some degree of lesser competence in the conduct of duties related to observation, recording, evaluation, interpretation and summarization of field or laboratory data.

We should not be complacent in our need to recognize and overcome potential mistakes related to disclosure of this category.

SUMMARY

“Full disclosure” is a term of practice in which parties to contracts involving construction, resource recovery, environmental remediation, mitigation of geologic constraints (hazards), and other physical land uses, choose to seek and utilize appropriately-funded competent professional geologic counsel and advice. The professional geologist is a prime participant, whenever surficial or subsurface geologic conditions are to be considered important to the safe and environmentally appropriate use of the land. In the effort to bring site geologic truths forward for consideration of all parties, those same parties have fundamental responsibilities in funding, seeking, evaluating and declaring actual or predicted geologic conditions affecting the satisfactory construction, operation and performance of the project. These essential elements of geological information can only be provided by qualified and project-competent professional geologists who are given adequate time and funds to detect, define, and report the full measure of those observed or predicted site characterization conditions.

REFERENCES


Allen Hatheway (allen@hatheway.net) is an early-retired Professor of Geological engineering who has practiced for 44 years, in his native Los Angeles, and at San Francisco, Boston, and in Missouri. He has served his profession as a teacher, soldier, public servant, and consulting firm staff and partner. he is professionally licensed as Geologist and/or Engineer in several states (AZ, CA, MA, ME, and MO), but swears that his formal education has been strongly tempered in the School of Hard Knocks. He serves as one of AEG’s ambassadors to AIPG, as an Honorary Member (2002) and past president of the former (1985). He and wife Dina split their time between Big Arm, Montana and Rolla, Missouri.

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Ethics and Risk Management

In any profession, the code of ethics can be used to form the basis of risk management program. In this column, I want to focus on the Canon 2. Obligations to the Public.

Canon 2 states that “Members should uphold the public health, safety, and welfare in the performance of professional services, and avoid even the appearance of impropriety.” The National Society of Professional Engineers (NSPE) publishes the decisions of their Board of Ethical Review (BER) and I would like to use one of their decisions to illustrate the connection between ethics and risk management in regard to Canon 2. In BER Case 98-9 the basic facts are as follows:

- Engineer realizes, post-construction, that design calculation error was made;
- Error could lead to failure in severe wind conditions;
- Engineer advises architect and client of problem;
- Works with architect, client, and City to devise remedial plan;
- Client and architect want to keep secret;
- Engineer agrees to keep problem secret;
- City engineer does not want to keep secret but goes along.

The BER found that it was not ethical for the engineer to maintain the secrecy requested by the client and the architect. It was also found that it was not ethical for the City engineer to maintain secrecy. The design error was clearly impacting public safety, yet the players involved wanted to keep things quiet.

Now lets look at the risk management implications of this scenario. Initially, the engineer was acting ethically and with a good risk management approach when he 1) acknowledged design error before a major loss and 2) worked with the client, architect, and the City to correct the problem. If you notice a problem on one of your projects you should investigate the impact of that problem. Remember that the safety of the public comes first. The initial steps taken by the engineer were the right ones. His willingness to work with the client and architect is good practice. It is always better to deal with a problem early before things turn adversarial.

It could be argued that acknowledging a mistake is going to result in claim. Well, the mistake was made. Catching it early is going to hopefully reduce remedial costs especially legal fees. Ignoring the problem, whether or not there is a catastrophic failure of the building, is going to result in considerably more costs, especially legal fees. Where the engineer fell down was agreeing to maintain the secrecy. This now goes beyond negligence and into the realm of willful misconduct. Let us say that the secret was kept until the building collapsed which might have killed or injured any number of people and might also cause business interruption issues for the building tenants. When a claim gets into the realm of willful misconduct, your professional liability policy is not going to help as it only responds to claims of negligence. There is also the possibility that criminal charges will be brought against the parties involved. Again, the professional liability insurance policy is not going to respond.

The Carvahlo v. Toll Brothers case that I had discussed in Column 3 has both ethical and risk management implications under Canon 2. The basic facts of the case are:

- Site worker killed in trench collapse;
- Engineering representative on-site daily;
- Engineering firm had stop work authority;
- Not contractually responsible for health and safety;
- No trench box used on day of accident;

ANNOUNCEMENT -- VOLUNTEERS NEEDED FOR TWO COMMITTEES

Dear friends and colleagues:

We are seeking volunteers to participate and work on two important committees that we are now forming. The first is the Geohazards Information Committee, with the purpose of interacting with some of our sister societies, so as to inform the general public of the importance of geological knowledge in the mitigation, prediction and prevention of "natural disasters." The second is the Geoscience Curricula Evaluation Committee, with the goal to analyze and document the latest changes in the education requirements that relate to geoscience degrees nationwide and how these relate to CPG certification prerequisites.

If you are interested in serving, please contact our headquarters' staff at (303) 412-6205 or aipg@aipg.org.

Robert Font
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- Firm representative knew trench was unstable based upon collapse the prior week; and
- Did not exercise duty.

It is not known whether or not the field representative from the engineering firm was a member of an organization which had a code of ethics. For the sake of argument, let us say the individual was a member of AIPG. From the information available, it could be argued that the individual violated Canon 2 in that they were not upholding the safety of the public because the individual was aware of the unsafe condition and did nothing to get the contractor to correct the condition.

I want to comment further on Standard 2.2 which states that "Members should be accurate, truthful, and candid in all communications with the public." and more specifically focus in on Rule 2.2.2 which states "A member shall not issue a false statement or false information which the member knows to be false or misleading, even though directed to do so by an employer or client." This most commonly comes into play when being hired as an expert witness. I had a construction law textbook which pointed out that lawyers are not hired to find the truth, their job is to represent their client's interests. This is not to say that they are lying but they put forth a version of events that represents their client's interests in the best light. If you are asked to be an expert witness, the facts that you gather may not support your client's position. You have to gather and analyze the data and develop a technically defensible argument from that data. You cannot be tainted by what your client may want the data to show unless it involves geophysics (only kidding). This might result in your losing the job, but at least you know you were doing the right thing. Do not let client pressure manipulate you into providing a questionable conclusion. If you are, you might later be found negligent in your analysis or worse, willfully negligent where again there would be no coverage under your professional liability policy.

Answers to Questions on Page 26

1. The answer is choice "c" or 173 feet.

   In this case:
   \[ D = s \tan \alpha \]
   where \( D \) is the desired depth, \( s = 300 \) feet and \( \alpha \) is the dip angle equal to 30 degrees.

   Thus,
   \[ D = 300 \text{ ft (tan 30°)} \]
   \[ D = 173.21 \text{ feet.} \]

2. The answer to the question is choice "b" or \( H = 12.80 \) feet.

   It can be proven mathematically (see below) that the maximum height that a vertical slope can stand, in clay, without the need of any artificial support is:
   \[ H = 4c/\gamma [\tan^2 45° + \phi/2]^{1/2} \]

   Since the clay is saturated, it behaves as if the angle of internal friction \( \phi \) is zero. In this case,
   \[ H = 4c/\gamma. \]

   Then,
   \[ c = 13.79 \text{ kN/m}^2 = 288.02 \text{ lb/ft}^2 \]
   \[ \gamma = 90 \text{ lb/ft}^3 \]
   \[ H = 4(288.02) \text{ lbft}^{-2}/90 \text{ lbft}^{-3} \]
   \[ H = 12.80 \text{ feet.} \]

   Proof:
   \[ s = c + \sigma_n \tan \theta \]
   \[ \sigma_1 = \sigma_3 \tan^2 (45° + \phi/2) + 2c \tan (45° + \phi/2) \]
   \[ \tan^2 (45° + \phi/2) = N_\phi \]
   \[ \sigma_1 = \sigma_3 N_\phi + 2c N_\phi^{1/2} \]
   \[ \sigma_2 = \sigma_v \quad \text{and} \quad \sigma_3 = \sigma_h \]
   \[ \sigma_v = \sigma_h N_\phi + 2c N_\phi^{1/2} \]
   \[ \sigma_v = \gamma z \]
   \[ \gamma z = \sigma_h N_\phi + 2c N_\phi^{1/2} \]
   \[ \sigma_h N_\phi = \gamma z - 2c N_\phi^{1/2} \]
   \[ \sigma_h = \gamma z/N_\phi - 2c N_\phi^{-1/2} \]

   If \( z = 0 \) (at the surface)
   \[ \sigma_h = -2c N_\phi^{-1/2} \text{ (tensile stress)} \]

   At what \( Z_0 \) will \( \sigma_h = 0? \)
   \[ 0 = \gamma z/N_\phi - 2c N_\phi^{-1/2} \]
   \[ \gamma z/N_\phi = 2c N_\phi^{-1/2} \]
   \[ z_0 = (2c/\gamma) N_\phi^{1/2} \]

   At \( z_0 = (2c/\gamma) N_\phi^{1/2} \) then \( \sigma_h = 0 \)

   At what maximum height "H" will a vertical slope remain stable?

   Say the total pressure on the slope is \( \sigma \). Then, we integrate (from zero to \( H \)):
   \[ \sigma = \int \sigma_h \text{dz} \]
   \[ \sigma = \int (\gamma z/N_\phi^{-1} - 2c N_\phi^{-1/2}) \text{dz} \]
   \[ \sigma = (1/2) \gamma H^2 N_\phi^{-1} - 2cH N_\phi^{-1/2} \]

   If \( H = 2Z_0 \) or \( H = (4c/\gamma) N_\phi^{1/2} \), then \( \sigma = 0 \)

   So the max height of clay slopes is:
   \[ H = (4c/\gamma) N_\phi^{1/2} \]

   In saturated clays where \( \phi = 0 \), then
   \[ H = (4c/\gamma) \]

Send comments to: Martin Andrejko, Zurich North America, One Liberty Plaza, 165 Broadway, 31st Floor, New York, NY 10006, e-mail: martin.andrejko@zurichna.com.
Tristan H. Jones, SA-0433

In the field of geology obtaining a master’s degree is becoming increasingly necessary for those who wish for an advantage in the job market and those who have a desire to continue learning. With all of the excellent geology programs that are available to choose from, how does one go about making the decisions that will lead you to the school that is best for you? There are many things to take into consideration, but with proper attention, most people should be able to find a school to fit their needs perfectly.

The key to finding a graduate school is to start looking early. The most important things to consider include the school’s cost and location because these are the factors that usually determine whether or not you will be able to attend. It is very important that you also consider the type of research you are interested in doing, advisors that you might be interested in working with, and the learning environment you work best in. These are the things that will determine the quality of the experience you have while in graduate school. Some people would also argue that the reputation of the school you attend is also important, though this is probably more of a factor for students working towards a doctorate than for someone working only on a master’s degree.

When trying to determine the cost and location of your prospective graduate schools, make sure that you include not only the cost of tuition and fees, books and supplies, but take into consideration the cost of living that your prospective school is located in. This may seem simple, but students frequently change locations between their undergraduate and graduate work, and the cost of living can be very different. While it is common for graduate students to be supported by a grant or assistantship, this is not always the case and should be taken into consideration before your financial aid is arranged. When looking at a location, also consider the type of environment you are interested in. Whether you enjoy freezing winters or desert summers, small town atmosphere or bustling city, your location can have a large affect on how much you enjoy your experience. If you are more comfortable in your environment, you will find it easier to live and work, and it will relieve an added stress to your life. The internet and the library are probably your best sources for this information.

Speaking with people at the institution you are interested in can be an extremely helpful way to learn about the school as well. This can be done through research on the internet, followed by phone calls and/or emails. If you are interested in meeting people from the school in person, a great place to do so is at a geologic conference. AIPG and GSA as well as many other organizations host annual regional and national meetings which can be great places to meet faculty members or representatives from the school you are interested in. These meetings can be set up individually, or you can visit the school’s booth or table if one is available. Often these people can also give you a good idea of the learning environment in the department you are interested in. It is also helpful to speak with graduate students already attending your future schools. They can give you insight into the professors, the department, the facilities, and the community from a student’s point of view.

Do not only research the schools and the programs that they offer, but also the faculty who work at those schools. Many times a department’s web page has a lot of information about each faculty member and what their research interests are. If you have any idea what you would like to work on for your own research project, finding a faculty member that you can easily work with will be very helpful. Begin conversing with the faculty members that you are interested in working with well before beginning your time at the school. This will help the faculty member to recognize your name which will be helpful if you wish to work with them in the future.

The perfect graduate school is a difficult thing to find because it is different for everyone. The perfect mix of cost, location, environment, facilities, research, advisor, and reputation need to balance in the right proportions. There are hundreds to choose from all across the world. It can be a grueling process sometimes, but if you spend the time and exert the effort, finding the perfect school will pay off.

Tristan Jones can be contacted at jones1th@cmich.edu.

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Fieldwork: It May Be More Important Than You Think

Nancy Price, SA-0382

Learning how to do field work is one of the most important activities that you should learn as a geology student. Fieldwork is a vital part of any geology student's curriculum and is applicable no matter what field of geology you may want to enter into when you graduate. Many of the contributors for the previous student issue of TPG touched upon this, and I feel that it is necessary to expand on the topic.

Learning geology from the textbooks and in the classroom is a great way to learn the basics, but the geology as encountered in the field is not as clearcut and controlled as it may be presented in pictures or in carefully crafted laboratory exercises. Perfect textbook examples of geologic occurrences are more often the exception than the rule. In order to gain a more accurate understanding of the geology of an area, some experience in the field is necessary. To illustrate this concept, consider the education of the aspiring doctor. Medical students have to spend hundreds of hours working in a hospital before they can be considered a practicing professional. They are given the chance to see all the different types of medical cases that could arise while at the same time developing expertise in how to care for their patients confidently. With this in mind, would you want a doctor to operate on you if the only experience he or she has had with medicine is through textbooks and journal articles? The situation is no different in the field of geology. Fieldwork gives a student the experience to be a practicing geologist that can have the expertise and confidence to create quality work.

Knowing that having experience in the field is important, professors would incorporate more field experience into their classes and laboratory exercises, right? Well, that, actually, is not so often the case. Doing fieldwork with students can be time consuming, legally precarious, and expensive. Some professors may find that they cannot spare the extra time to incorporate field experience into a class. Others may find that they do not want to deal with the legal uncertainties involved with taking students out into the field where anything can happen. Then there are the funding shortages that many schools, particularly state institutions, are experiencing. An administrator looking to slim the budget may see an excursion into the field as an extraneous trip that can be cut instead of a necessary part of learning. Whatever the reason, more emphasis is being placed on attending field camp as the best way to learn how to do geology in the field rather than incorporating it someway into every class.

Although I am sure that there are many comprehensive field camps out there, the fact remains that there is only so much that a student can learn in six weeks. In fact, if you have never done fieldwork before, the whole situation can really be rather traumatic. The first time that I did a real mapping project I just could not get it. Comprehensively thinking of things on such a large scale was a difficult concept for me to grasp at first. I am just lucky that my undergraduate field course spanned an entire semester and that many of my other classes also included fieldwork. The more time I spent in the field, the more skilled I became and the more I was able understand. This type of curriculum where there is constant exposure to fieldwork should be the norm and not the exception.

Well, then, you may be asking yourself, "What am I to do to gain experience in the field?" First, don't simply rely on your classes to supply all of your learning experiences. It may be up to you to make sure that you have had enough experience working in the field. To get you started, here are just some of the ways to gain experience in the field:

1. Take a field class:
A field class is a great way to learn all of the basic field techniques, such as geologic mapping and structural analysis. If your school does not offer a field class, you should sign yourself up for a summer field camp through another institution. It would be well worth the time and money.

2. Work with a professor on his or her research:
If there is a professor at your school that is working on a field project that interests you, ask him or her if you could help out. The chances are good that the professor would say yes. Perhaps you could make it part of an independent study project or just volunteer for the experience. The work would give you time in the field with a professional as well as any experience with the equipment or technique that the professor may be using.

3. Do a summer field internship:
Whether you are working through an REU program or volunteering for a drilling company, any field-based experience that you would gain would be more than you could ever get from a class. This is the best way to develop a sense of comfort in the
field while being around supportive people to guide you.

4. Go on a geology vacation:

Find an area that you would like to learn about geologically and go there. It would probably be best to do a little research on the area first so that you have an idea of what is going on geologically before you get there. I have found that I have learned more than I expected on geology trips where I can learn and have fun at the same time.

Since people learn best by doing, the more field experience you may have the better off you are. Extra field experience also can give you a boost when it comes to future opportunities. Future employers and graduate schools love to see field experience on your resume or application. It shows that you have an edge over someone else who may not have such skills. Professionals would rather work with someone who knows what they are doing than someone that still has to be trained or is uncomfortable in the field.

Finally, before you embark on your first field excursion, here is some advice. Invest in a good pair of comfortable waterproof field boots and some rain gear. If you ever get caught out in the field on a rainy day, you will be happy you made the purchase.

If you have any ideas, questions, or comments about this article, the upcoming article, or any other issues, please feel free to contact me via email at: small.fzy.mamm@yahoo.com.

Next article: Field work and the Student.

STUDENT APPLICATION FORM

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Application for Affiliation as a Student Adjunct

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I certify that I am a member of the faculty of the ________________________ department at ________________________, with the rank of ______________________, and that the statements made by the applicant in this application are true to the best of my knowledge or belief. I am ____/am not ____ the applicant's faculty advisor.

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OH-Stephen E. Betts
63 Linda St, Tallmadge, OH 44278
TX-Hughbert A. Collier
741 W. College St., Stephenville, TX 76401
AK-Richard M. Flanders
1870 Becker Ridge Rd., Fairbanks, AK 99709-2709
WA-Edward E. Gates
6611 W. Benhill Rd., Spokane, WA 99208
NV-Nicole J. Goralick
ATC Associates, Inc., 104 E. 25th St., 8th Flr., New York, NY 10010
PA-Peter R. Lamont
98 Terrace Dr, #13, Edinboro, PA 16412
CO-Leah E. Mach
8143 Briar Ridge Drive, Castle Rock, CO 80108
WY-Robert D. Maxwell
1429 Bonnie Brae, Casper, WY 82601
CO-Donald E. Ranta
309 Parkview Ave., Golden, CO 80401
CO-Robert M. Schlosser
2750 Sierra Vista, Grand Junction, CO 81503

Applicants Upgrading to CPG

SC-Stephen C. Godfrey
Godfrey & Associates, Inc., P.O. Box 863, Blythewood, SC 29016
NM-John F. Kennedy
301 N Roadrunner Pkwy, Apt 304, Las Cruces, NM 88011-9502
NJ-Timothy C. Kinsella
Birdsall Engrg., Inc., 611 Industrial Way West, Eatontown, NJ 07724
CO-Timothy R. Petz
498 Snowberry Ct., Golden, CO 80403
AK-Michael R. Reinhart
Alaska Earth Sciences, Inc., 11401 Olympia Ln., Anchorage, AK 99515
CO-Paul A. Ross
1699 Taft Street, Lakewood, CO 80215

New Certified Professional Geologists

MI-Kevin L. Larr CPG-10864
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NC-Kim G. Kroeger CPG-10872
7313 Chicona Ct., Raleigh, NC 27615
NV-Larry Schutz CPG-10874
5249 Olfenhaus Dr., Winnemucca, NV 89445
NV-Tommy B. Thompson CPG-10875
2206 White Fals Dr., Reno, NV 89505-3163
AK-Christina L. Lively CPG-10876
PRA, 3601 C Street, Ste. 822, Anchorage, AK 99503
NJ-Richard J. Keimelere CPG-10879
42 E. Centre St., Woodbury, NJ 08096

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2125 Aldah Drive, Tucker, GA 30084
NV-Brian O. Goos MEM-0767
559 West Silver Street, Unit 304, Elko, NV 89801
WV-Jeffrey M. Bray MEM-0768
RR2 Box 385, Lewisburg, WV 24901
Mi-Thomas L. Herrick MEM-0769
369 Craven, Franklinmi, MI 49734
TN-Daniel J. Hurst MEM-0770
417 Robertson Dr., Smyrna, TN 37167
AK-Roland L. Boehne MEM-0772
PO Box 671363, Chugiak, AK 99567
AK-Jeffrey O. Keener MEM-0777
NordWand Enterprise, P.O. Box 82811, Fairbanks, AK 99708
NY-Barbara J. Tewksbury MEM-0778
Hamilton College, Dept. of Geology, Clinton, NY 13323
TX-James R. Whittington MEM-0779
207 Trailwood Lane, Texarkana, TX 75501
OH-Timothy B. Chiyik MEM-0780
225 West Highland Rd., Twinsburg, OH 44067
OH-Charles E. Martin MEM-0781
Kerron Environmental, 156 Starllte Dr., Marietta, OH 45750
VA-Cheryl T. Pruiett MEM-0782
Applied Environmental, Inc., 11800 Sunrise Valley Drive, Suite 1200, Reston, VA 20191
OH-Dennis W. Yingwro MEM-0783
4952 Kelso Lane Apt. 4, Cincinnati, OH 45227
Mi-Patrick R. Lautsch MEM-0784
AKT Peerless Environmental Services, 214 Janes Avenue, Saginaw, MI 48637
Mi-Bradley R. Hoare MEM-0785
Earth Tech, Inc., 5555 Glenwood Hill Parkway SE, Grand Rapids, MI 49508

New Student Adjuncts

OH-Andre C. Krawiec SA-0667
1189 Beall Ave. #C2038, Wooster, OH 44691
Mi-Elliot Andrew Jagielecki SA-0658
605 E. Bollows St., Mt. Pleasant, MI 48858 UNITED STATES
VA-Amanda N. Hughes SA-0669
P.O. Box 4688, Lexington, VA 24480
CO-Christopher Dorin SA-0671
Western State College, 600 N. Adams St. CPO 6347, Gunnison, CO 81231
MN-Dylan J. Blumentritt SA-0672
University of Minnesota - Twin Cities, 310 Pillsbury Drive SE, Minneapolis, MN 55455

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What Education Qualifies One as a Geologist?

David M. Abbott, Jr., R. Lawrence Davis, Fred L. Fox, John T. Howard, Perry H. Rahn, Michael W. Ruddy, Dean T. "Ted" Wilton, and Ronald E. Yarbrough

Introduction

Does an applicant for AIPG Certification need a degree in geology or is completion of the required amount of appropriate course work sufficient to meet the education requirement? This issue comes up periodically before the Section and National Screening Committees and problematic cases are passed on to the Executive Committee for their consideration. The question also applies to government licensing and other peer-review certification programs, both in the US and internationally. Because the earth science profession and degree requirements at colleges and universities and the contents of courses change over time, it is time to re-examine the education requirements for AIPG certification, something that should be done every few years.

This article began as one of the topics in the "Professional Ethics & Practices" column. An early draft was sent to the Ethics Committee for comments and the listed co-authors responded. The length of the discussion and its importance to AIPG as a whole prompted conversion of the separate article you are reading, although its style remains that of the PE&P column.

AIPG's Education Requirement

The AIPG's Bylaws' Section 2.3.1 (1) contains the education requirement for certification and states, "a baccalaureate or higher degree in a geological science, and a minimum of thirty-six semester hours or fifty-four quarter hours in geological sciences as recognized and approved by the Executive Committee; and at the discretion of the Executive Committee; acceptable continuing education to demonstrate a currency with technical, regulatory, and economic factors affecting the profession." The last clause allows, or at least has been consistently interpreted to allow, the Executive Committee to override the specified requirements in cases of otherwise deserving applicants, a right that has been exercised in appropriate cases in the past.

Discussion of the Need for a Degree

John Howard expressed the following opinion in answer to this question, "Where the applicant does have sufficient hours to qualify for a degree in Geology or Geoscience, but does not have a degree, the applicant violates the membership requirements of our bylaws. Understandably, this is a technicality, but we cannot and should not begin to make exceptions of this sort on our membership requirements. I have been a member of the Missouri Geology Registration Board since 1998 and have seen many similar cases. To date, we have not granted a license in MO for having a similar situation, simply because the Missouri statute, like the AIPG bylaws says that the applicant must have both the minimum hours of geological science and a degree in geology/geological sciences. To make exceptions of this magnitude would open the door for anyone who has the bare minimum of geological course work and a degree other than geological sciences to presume that they can be qualified for licensure and/or certification by the Institute. You must ask yourself the following question; 'Does a degree in environmental science with 36 hours of geology make someone proficient enough in geology to warrant the title CPG?'"

"Secondly, I have to ask myself, if an applicant could not receive a degree in geology from a named university, why did he/she pursue the course of study? It seems to be a gross error on his/her part to not seek a degree from an institution that would confer on him/her a degree rather than simply credit him/her with the hours only. Finally, I would agree with the National Screening Board Member's assessment that his behavior in calling himself a geologist may border on unethical. As we saw in our recent interaction and dealings with the Arizona Geology Board, even those of us who have degrees come under scrutiny and are in violation of state licensure laws. I recommend that we deny the applicant CPG status on the basis of lack of educational experience and recommend that he pursue a formal degree in geology. My Asst. Attorney General for the Missouri board would tell me that it isn't our job to make a suggestion to him for why we are denying him the certification/license, however, to be truly professional about the matter, I think we do owe the applicant more than the standard denial letter."

Other members of the Executive Committee believe that meeting the course requirements set out in the CPG requirements is sufficient for meeting the education requirement, that a degree in the geosciences is not required, and thus voted to certify the applicant in question. What do you think? Should a degree in the geosciences be required in addition to the minimum course requirements? If so, must the degree major be "geology," and/or "earth science," and/or "earth and environmental sciences," or what? Does a Bachelor of Arts degree in geology qualify, or is a Bachelor of Science degree required? Personally, my undergraduate degree is an Artium Baccalaurei in earth science, because the AB was the only undergraduate degree offered.

Fred Fox replied, "In the Fox Tradition, it's simple. One must have both the degree and the credit hours,

1. This discussion is focused solely on the education requirement for certification and not on the equally important experience requirement, which present the Screening Committees and Executive Committee with its own problems.
2. In the particular case Howard was commenting on, the university in question has a policy against awarding multiple degrees of the same type, such as a BS, degree even where the requirements for multiple majors have been met. A statement from the university confirming this policy was included with the application being considered.
WHAT EDUCATION QUALIFIES ONE AS A GEOLOGIST?

as well as the experience. I know lots of (well, several) engineers who like to play geologist, and they're bad cases. (I, on the other hand, who am qualified to play engineer because I were one) make a lousy engineer—geologists think differently.) AIPG tried once before to soften the requirements, and I quit in protest. It's not a good idea to make it easier. In fact, I'm in favor for making it tougher, in spite of the fact that I probably couldn't pass the tests at this point in life. It's OK being a grandfather when you in fact are one. The stuff that I know can't be taught—it has to be experienced.

"Further, an Ed.D. is not the same as a Ph.D in a given science. Gotta have the credits and experience, no matter how many degrees you have. My MBA does not make me a better scientist, although it does make me a better geologist by virtue of the things I've learned relative to dealing with people (including clients). However, it's not the same as a MS in geology. In my case it's better, but in others' cases it may not be.

Michael W. Ruddy commented, "Setting aside the politics and academia, AIPG's qualifications should remain as such, as you presented. We all had to qualify for the status of CPG in the same fashion (most all of us), i.e., with a degree in geology, no less than thirty-six hours or fifty-four quarter hours in the geological sciences. Additionally, three professional references with at least one being a CPG through AIPG. Our applications were kept on file for six months at AIPG Corporate with subsequent review and issuance of CPG status once it was made certain that we not only met the educational requirements, but our reference support and experience were proven just the same. I believe this process took slightly longer than one year to be issued the CPG status. If AIPG accepts anything less, to boost membership, then the founders of AIPG whom pioneered this organization as well as all CPGs, should question the integrity of representation through AIPG. Various levels of membership have been established for those that do not have the proper education or qualifications for CPG status and I see nothing wrong with this. However, anyone achieving the CPG status without completing the educational and professional requirements, should make active CPGs question the direction of our organization. Yes, there are some out there that qualified and retain CPG status that should not but sooner or later the industry will correct this manner, primarily through State Certification as a Professional Geologist/Registered Geologist, when required."

"I am not going through the 'nitty gritty' details of comparison through academic or professional requirements, since most all of the other Ethics Committee members have. Speaking on behalf of a CPG with AIPG, I expect AIPG's Screening Committee and Executive Committee to uphold the educational requirements along with the professional requirements without problematic cause."

Ron Yarbrough stated, "This is an excellent series of questions, one that our science has been facing for many years. Engineers even have the same type of questions. Other fields are always attempting to 'intrude' into the earth sciences. I taught for 32 years in a geology/geography dept, and an in an earth science department. Back in the 1960s, when there were many jobs in geology, many people tried to sneak through the requirements of the liberal arts college by enrolling in Education and obtaining a minor or almost a major in our science and passing themselves off as geologist. The department had to stop it, because it was causing us problems with future employment for students. They just said that a BS or BA in geology was required, period. The only difference in most BA and BS requirements is some more liberal arts courses and more language; the geology major and minor requirements were the same."

"Another odd experience occurred when the 'environmental movement' occurred and departments began to offer graduate degrees in environmental management, environmental studies and environmental science. We made a mistake and offered only environmental studies at the graduate level and I had to go into a 500 level course and teach young people who had not ever had a chemistry course. There were many heated discussions between those of us in the science building, and the other participants in the program (political science, English, even a philosophy course (may the lord help us) about requiring prerequisites for our courses in the sciences). The soft sciences were again upset, because they knew that most of the jobs were in the sciences. We finally split the programs into environmental studies and environmental science."

"The AIPG requirements should be a geology or earth science degree (just look at the transcript—one can pick out the 'touchy/feely' courses as not meeting normal requirements). AIPG recognizes that a member must be a professional in the geology field and have the 'normal' required courses, a BS or BA, have professional experience and be recommended by our colleagues. We should not lower our standards to where our graduates cannot be registered in their respective states."

Larry Davis commented, "Let me say at the outset that I have both an A.M. and an A.B. degree in Earth Sciences. That is because Washington University automatically gives "artium" degrees to everyone who graduates from a department in the College of Arts and Sciences. Obviously to demand a "Science" (or Scientiam?) degree is unreasonable.

"My concern here is that it is perfectly possible to get a 'geology' degree from a geography department, especially outside of the United States. For example, my speciality is geomorphology and in most countries I would do that degree in a physical geography department. It seems unreasonable (never mind for a moment what our Bylaws say) to deny certification to someone who meets all of the other requirements but whose degree 'lives' in a geography department. But, is this a 'geological science' under our regulations? The same might be said of some Environmental Science degrees (not environmental studies)."

"Now, this one really bothers me: John Howard said, 'Secondly, I have to ask myself, if an applicant could not receive a degree in geology from a named university, why did he/she pursue the course of study? It seems to be a gross error on his/her part to not seek a degree from an institution that would confer on him/her a degree rather than simply credit him/her with the hours only.'

"How many of us actually went to school knowing what we would major in? John you're asking way too much of an 18 year old and it is unreasonable to ask them to think that far ahead. Do we penalize them because they fell in love and pursued a field at the 'wrong' school?"

"Personally, my feeling is that the 'name' on the degree is not particularly relevant, especially considering all of the trendy (and not so trendy) 'marketing'-type stuff that is going on in academia today. What counts are the references, the course work and work experience (reminds me of an old Maine joke I know that has a line in it about 'O'we've always thought that experience was the best teachah.' I feel that the evaluation must
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be done on an individual basis using all of these tools. After all, there are plenty of people out there with ‘real’ geology degrees who should not be trusted with a rock hammer let alone with someone’s health and safety.”

Ron Yarbrough replied to Davis’ comments with the following, “Dr. Davis, I read your message. I agree with most of it—except—today most Geography (earth description, not earth study) Departments in the USA have few physical geography courses like those in Europe. I came from an old Geology-Geography Dept. The head of the Geography section was a geologist, thus, we had a strong physical geography program, but that was 40 years ago. My Earth Science Department, at Southern Illinois University-Edwardsville, was made up of geographers and earth science (geology, soil science, meteorology, space science). The geographers had to take only one physical geography course (I taught it for 30 years). The new geography departments, in the main, teach -economic geography, urban geography, regional geography, and social geography. As you might guess, we did not get along well! I gave up on the American Association of Geographers many years ago because their publication had few articles that I was interested in. I also taught geomorphology and I had few students from the geography section of my dept. These discussion should assist our AIGP to make some value judgments as to whom we accept in our organization.”

Ted Wilton commented as follows. “I feel that there is merit in the discussions of John Howard, Fred Fox, Michael Ruddy, Ron Yarbrough, and Larry Davis. Each has brought some worthwhile points to the discussion. I am in particular agreement with Larry Davis’ comments, and what I interpret as the underlying theme in his contribution—evaluate the educational foundation of the applicant, evaluate the experience and competence of the applicant, and evaluate the ethical performance of the applicant before judging if the candidate is qualified to be a CPG.”

“In a potential CPG loss of a scientist if he/she did not attain a passing grade in the final (third semester) of Calculus, but successfully completed a rigorous geological education program? What if he/she did not complete the Sound and Optics course in the Physics Department, but successfully completed the stringent geology course work? Some of the commentators would say that the candidate is not qualified as they interpret the bylaws. By taking such a strident position, we completely disregard the recommendations of the sponsors, who attest to the level and duration of experience (performance) of the applicant, as well as the level of technical and ethical competence.”

“The merits of the educational foundation are very important. And, the professional and technical competence factors are important as well. Like many of the commentators, I cannot endorse the application of an individual whose educational background is based upon (in the language of my son) ‘geology for poets’. But I am not sure that we are dealing with this here. And, in many (most?) cases, the natural selection process of eight years of meaningful professional experience will weed these folks out of the profession.”

“We have to rely, in part upon the testimony of the sponsors, and we must rely on our screening boards to make the proper evaluations. We must rely on them to level the educational evaluation. As an example, many years ago I had an entry-level geologist work for me. He had a B. S. degree in Geology from a respected private university in New England. His course work in geology included only the following: Physical Geology, Historical Geology, Mineralogy, Structural Geology, Alpine Geology, and Senior Thesis. Clearly, he would not meet AIGP’s qualifications because of the lack of course work, but he holds a Bachelor of Science degree in Geology and has met part of our criteria.”

“This discussion, while well intentioned and important, reminds me of an incident several years ago, where a member of a learned society passed away, and a debate ensued about the appropriateness of the society publishing an obituary for the member. The member was an accomplished geologist, highly regarded by his peers and competitors, and was a highly placed member of a major firm’s technical staff. The rub was the individual had not completed his final semester of formal education, and did not receive a degree (of any sort).”

“In summary, I urge some caution in disqualifying candidates automatically because the degree does not immediately say ‘Bachelor of Science (of Arts) in Geology’. Look at the foundation course work, and the experience. If the individual meets that test, his/her sponsors attest to technical proficiency and skill then they should be considered for Certification. And, if they in fact meet those criteria, I do not believe that they are unethical in claiming to be geologists.”

Perry Rahn contributed the following observations, “I’m having trouble coming up with a strong opinion one way or the other concerning course work requirements. Let me present 3 points to consider (from my own personal experience):

(1) We had an excellent mineralogist in our department who had no formal training in geology. I don’t think he ever had a college course in geology. Yet he taught himself about minerals and became an world-renown expert. He co-authored a book, Encyclopedia of Mineralogy. The administration at my school refused to recognize him because he had no degrees. He never made ‘assistant professor.’ This whole episode makes me think that calling yourself a geologist, mineralologist (or even a physicist or chemist for that matter) is not because you have taken certain courses in college.

The engineering profession has a different view of things. The National Society of Professional Engineers has a rigid procedure in order to become a ‘Professional Engineer.’ To become a PE you must first be enrolled in a college engineering program (subject to state by state rulings), and then pass a very rigorous exam called ‘Fundamentals of Engineering.’ Later, after working a number of years, your must pass the ‘PE’ exam. Then you can become a PE. (Note: as I recall only about 10% of USA engineering graduates actually become PEs.)

(3) A trial lawyer may line a geologist up as an expert witness. The opposing lawyer will critically examine his credentials prior to his being allowed to testify. Most courts would not recognize a person posing as a geologist if he had inappropriate credentials.”

Rahn’s observations make a couple of important points. First, a lot of licensing requirements are based on the requirements for engineers and similar professions. Originally, graduation from an accredited school was all that was needed, or one could learn by doing. The exams were developed to deal with both the multiplication of schools and variations in curricula and with those who learned through experience. The second
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point is the *voire dire* examination of proposed expert witnesses. While not a perfect system, it is designed to allow expert testimony only by those with appropriate qualifications and experience, which may or may not involve degrees, etc.—being a CPG never hurts when you are answering the questions.

**What Next?**

The foregoing discussion makes clear that there are strong feelings about the need for a degree as part of the education requirement for certification or licensing. No one has addressed the number of hours required but whether a degree is required and its title clearly matter to some. As the discussions point out, the title of a degree can present problems. Personally, I believe that not only should the number of required semester or quarter hours be part of the education requirement, but that a list of basic required courses or topics should be included as well, courses such as mineralogy, structure, stratigraphy, field geology, etc. AIPG published a pamphlet, *Education for Professional Practice* (1991), that describes the basic course work in the geosciences and other subjects providing the fundamental foundation for a successful geoscience practice. Yet such course specification, which the Screening Committee looks for in examining an applicant’s transcript can present problems. What is covered in a particular course? The physical and historical geology courses that most of us took no longer covers what they once did in order to include more earth systems and environmental topics. The result is, I am told by my faculty friends, is that a number of topics previously covered in physical geology now have to be covered in the 200 and 300 level courses, which necessarily reduces the amount of time devoted to topics formerly covered in these courses. Ron Yarbrough’s and Larry Davis’ comments provide relevant examples. Then there is the old debate over whose field course is good and whose is not. During my first year of graduate work at the Colorado School of Mines, this issue was resolved (at the time, 1972) by requiring all graduate

students, including those who had taken field geology at CSM as undergraduates, to take a 3-week graduate field geology course. What about courses in the use of geoscience-related computer programs: drafting, modeling, geostatistics, etc.?

PE&P column 22 (Sept. ‘97) reported a related observation that was made by Seena Hoose of the California Board of Registration for Geologists & Geophysicists who presented a poster at the 1997 Ethics in the Geosciences conference documenting the declining pass rate on California’s exam over the years. Hoose attributed the decline to lack of basic training in geology on the basis of examination of the transcripts submitted with applications. She described an increasing number of “geobasket weaving” degrees whose holders lacked basic field, structure, mineralogy, stratigraphy, and similar training. Such courses are so fundamental to all fields of geologic practice.

When I was an undergraduate at Dartmouth College in the late 1960s, an Earth Science major would be awarded to anyone who completed 4 upper level earth science courses and 4 additional upper level science courses that made sense for the student’s career plans. One classmate was a pre-med student who was interested in earth science but did not intend to pursue a career in the field. Although he has an earth science degree from a recognized institution, he does not meet AIPG’s education requirement. Those of us who were planning a geologic career exceeded the minimum major requirements by taking far more upper level earth science courses in addition to upper level math, chemistry, and physics courses. And most of us went on to graduate school. Clearly, having a degree with a geoscience major is not sufficient to meet the education requirement. Also, I would suspect that most CPGs have far more than the minimum number of required hours. While there must be a minimum requirement, those who barely meet it may encounter concerns about the coverage of their courses during Screening Committee review.

This is an important topic—what should the education requirements for AIPG certification be and how do we specify them in the Bylaws and the application forms. Should Section 2.3.1 (1) of the Bylaws be changed, and if so, in what way? Should *Education for Professional Practice* or an updated version thereof be cited as a guide to the required education requirement? Please contribute your thoughts to David Abbott, dmageol@msn.com, for possible inclusion in future PE&P columns. While the AIPG Executive Committee will make the ultimate decision, President Font appointed a committee to study the issue and make recommendations headed by Bob Corbett. If you are interested in serving on such committee, please contact Bob Corbett, rcorbet@ilstu.edu.

Finally, as noted in the introduction and by John Howard’s comments at the beginning of the article, the question of degree and/or course work also applies to government licensing agencies and other peer-review certifying organizations. The question extends beyond the US as professional credentials from designated organizations increasingly become requirements of international practice. AIPG Certification is now recognized in Canada (National Instruments 43-101 and 51-101), Australia, and AIPG is a vetting organization for the European Geologist title. Your comments are needed.

**About the authors**

David Abbott is a consulting geologist, the current AIPG National Secretary, Chairman of AIPG’s Ethics Committee, and compiler of the “Professional Ethics & Practices” column. John Howard is a consulting geologist, was a member of AIPG’s 2004 Executive Committee, and a member of the Missouri Geology Registration Board. Larry Davis, an active professor, Fred Fox, a retired consulting geologist, Mike Ruddy, an active consulting geologist, Ted Wilton, a mining company geologist, and Ron Yarbrough, a professor emeritus, are all active members of the Ethics Committee. All are CPGs.

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3 *Education for Professional Practice* is available for free under publications at http://www.aipg.org/StaticContent/anonymous/Pubs/listof-pubs.htm#Education%20for%20Professional%20Practice, accessed 01/14/05. Bob Corbett, chairman of the committee responsible for this pamphlet, told me that the committee specifically avoided recommending a “cookie cutter” course list because of varying contents of a course between schools and over time within the same school.

4 For those interested, I have my father’s exam review questions for the Historical Geology class he took at the University of Nebraska in 1936, which reveal significant differences in the covered topics (and answers to some questions) between then and now. For example, the most important economic products of each geological period were part of the syllabus; one such question was, “Tell of the climate, life, and economic products of the Mississippian.” Let me know if you would like a copy.
Hydrogeology of Clayton Valley Brine Deposits, Esmeralda County, Nevada

Danny Zampirro, CPG-10258

Abstract

This paper seeks to define the geology and character of the aquifers in the Clayton Valley brine field, Esmeralda County, Nevada. Six aquifers are recognized in this closed basin playa in west-central Nevada. These are the sources of the lithium reserves and resources of Chemetall Footec, Silver Peak Operations, Nevada. Lithium-rich brine resides in confined to semi-confined hydrologic units within the playa region.

Several hundred exploration borings as deep as 2000 feet have been drilled since 1964 seeking brine for production purposes. Approximately 200 production wells over the years have supplied brine to an extensive pond system for the purpose of concentrating the brine by solar evaporation.

Clayton Valley is a graben structure that has enhanced the accumulation of pluvial and interpluvial sediments, the precipitation of evaporites, and accumulation of lithium-bearing brine. Extensive faulting has created hydrologic barriers as demonstrated by brine and water samples taken from boreholes on either side of these faults. Basin depth has been determined from seismic surveys to be several thousand feet.

Seismic and gravity surveys reveal numerous horst and graben features in a gently synclinal, deepening basin to the east-southeast. In the southern and western sections of the playa, a regional system of subparallel grabens and sedimentary basins is not as pronounced as in the northeast. Each of these areas has its own unique characteristics and is tapped for production.

Introduction

Lithium brine is extracted from aquifers within the closed basin of Clayton Valley, located in the west central region of Nevada, approximately 50 miles east of the Sierra Nevada, within the Basin and Range province (fig. 1). Interest in potassium minerals led Leprechaun Mining and Chemical to many playas of the western United States. Chemical analysis of Clayton Valley sediments revealed abnormally high lithium, potassium, and sodium chloride concentrations. In 1964, Foote Mineral Company acquired the mining rights and began to develop the playas for the express purpose of producing lithium carbonate from brine. Production from the carbonate plant began in 1966. Initially, only a few production wells were constructed in the central region of the playa. Target production was from a marker aquifer soon to be known as the Main Ash Aquifer. This aquifer, which occurs throughout the playa, has been the largest and most productive horizon.

Production wells currently tap six aquifers that yield brine to various areas of the playa. 

Regional Hydrogeologic Setting

Basin and Range topography is represented in this western Nevada valley as a basin that is closed topographically and does not exhibit typical northeastern-southwest linear horst and graben valleys seen in much of the rest of the state. The Angel Island and Paymaster Canyon high angle, normal faults act as hydrologic barriers along the southeastern playa edge near Angel Island. The Angel Island Fault intersects the Cross Central normal fault (fig. 1).

Stratigraphic impediments occur around much of the rest of the playa, isolating it from significant freshwater recharge and dilution. Groundwater flow barriers have created the ideal environment for the accumulation of the brine reserves being mined today. Basin sediments accumulated in a low-energy lacustrine environment where evaporation and precipitation ratios controlled the deposition of either significant amounts of saline minerals or of detrital sediments. Increases in total dissolved solids (TDS) generally correlate to increases in lithium values. Hydrologic recharge in the form of underflow into the basin is occurring from the northwest, where geomorphic highs surrounding the basin are at their lowest, and minor dilution troughs are known to exist. Recharge may also be entering through Paymaster Canyon. Recharge to the confined and leaky confined aquifers that comprise...
Figure 1. Generalized geology in the Clayton Valley area (modified from Price and others, 2000, and Albers and Stewart, 1972).
this valley may be partially sustained
by percolation along range-front faults,
growth faults, fault creep zones, and
associated paths of deep percolation.
Brine temperatures typically do not
exceed 80°F. Basin deepening in the
northeastern playa sector is illustrated
in numerous borings through marker
beds, particularly the Main Ash Aquifer,
which strikes along a northeast-south-
west trend dipping at approximately 30°
to the southeast (fig. 4).

Two aquifers, the Main Ash and Lower
Aquifer System, are largely composed of
air-fall and reworked volcanic ash, which
serve as reservoirs for the brine but
not as the primary source of lithium.
Lithium supply source is probably from
lithium-rich rhyolitic tuff on the eastern
margin of the basin (fig. 1; Kunasz, 1974;
Price and others, 2000) and possibly from
deep-seated geothermal water flow that
may have conducted lithium-rich water
from the magma chamber source for the
tuff. Basin filling sediments are largely
illite, smectite, and kaolinite clays in
order of predominance (Kunasz, 1970),
with lenses of silt, sand, and gravel
deposited during pluvial and interplu-
vial events. Ash beds of varying contin-
uitv are interlayered with these detrital
sediments (fig. 4) as well as chemical
sediments such as gypsum, calcium car-
bonate, and halite. In addition to the two
ash aquifers, other aquifers are in beds
dominated by tufa, gravel, salt, and silt
ggrading to sand and gravel.

Aquifers

The presence of six aquifers is revealed
by data accumulated over the past 41
years from exploration holes, production
wells, geochemical analysis, pumping
tests, and seismic, gravity, and magnetic
surveys (fig. 4):

- Lower Gravel Aquifer (fig. 5)
- Lower Aquifer System (figs. 5 and 6)
- Main Ash Aquifer (figs. 5, 6, and 7)
- Marginal Gravel Aquifer (fig. 5)
- Tufa Aquifer (fig. 5)
- Salt Aquifer System (fig. 5)

Pumping tests and records from con-
tinuous production pumping have shown
evidence for conductivity between cer-
tain aquifer systems. Brine salinity in
production wells varies from 40,000 to
170,000 mg/l TDS with corresponding
specific gravity varying from 1.025 to
1.21. Lithium values well in excess of 400
ppm have been pumped from the basin
and Davis and others (1986) report
economic grades in the range of 230 to
300 ppm. Recharge to the aquifers is at
a lesser rate than depletion by approxi-
mately a one-to-two margin. Declines
in lithium values are caused by fresh
water recharge and can be correlated
to specific pathways of dilution by fre-
quent brine analysis over the entire well
field. The magnesium/lithium ratio is
relatively low, facilitating the economic
separation of the magnesiun before final
processing.

Seismic surveys (figs. 7, 8, and 9)
indicate that basin downdrop is on the
order of 4,000 feet, creating a structural depression for the accumulation of infilling sediments and brine. Confined to semi-confined aquifers are defined by their artesian characteristics, with levels rising from tens of feet to approximately 200 feet above the top of aquifers. Static brine levels range from 70 to 400 feet below the surface of the playa. The unsaturated zone consists largely of clay, silt, and sand with local halite and gypsum interbeds. Vertical migration within the playa is generally considered to be negligible due to the thickness of the clay sediments of very low hydraulic conductivity. However, geophysical surveys indicate interbasin faults may exist, creating potential pathways for limited vertical migration of fluids. Aquifers are discussed below in order of formation during the evolution of the basin as is currently known.

Geophysical work and exploratory borings have defined the bedrock and lacustrine sediment contact as well as aquifer locations in the Clayton Valley. Drill-hole data has identified the Lower Gravel Aquifer (LGA), which consists of gravel with sand and silt matrix interlayered with local clean gravel. Gravel clasts are of limestone, dolomite, marble, pumice fragments, siltstone, and sandstone. The LGA has high transmissivity calculated from airlift volumes and production rates and has lithium concentrations sufficient to enhance ore reserves significantly when developed further. Currently, one partially penetrating well is producing from the LGA at a rate of 300 gpm. Two other deep wells have recently been constructed in this aquifer with data pending further work.

Existence of the LGA is shown to thicken towards the north-northeast (fig. 5). Known thickness varies from 25 to over 350 feet. Brine migration down dip may yield higher specific gravity fluids deeper in the basin due to brine density differential. The LGA has not been drilled in the deepest area of the basin.

Above the LGA are the Lower Aquifer System (LAS) ash beds, which are moderately continuous throughout the playa north of the Cross Central Fault (figs. 1 and 5). Individual ash beds occur in localized to areally extensive units. Brine from this system is typically high in lithium concentration and contains about 160,000 TDS. The LAS ranges from approximately 350 to 1,100 feet below ground surface, and is below the Main Ash Aquifer marker bed (figs. 4 and 6). Permeability is limited due to narrow lenses of ash of lesser depositional continuity. An inferred origin for some of the thinner lenses of the LAS may be as pluvial events carrying reworked ash, possibly from peripheral highland areas into the lake environment. Alluviation of ash from a single event of ash deposition in the highlands over the extended time indicated by the thick host sequence is unlikely. Therefore, the ash beds probably represent multiple eruptions. Basin subsidence coincided with pluvial deposition over several hundred vertical feet north of the Cross Central fault. With the exception of a small area near Angel Island (fig. 5), the LAS is not present south of this fault, indicating non deposition or subsequent erosion there, and relatively rapid sedimentation north of the fault. Isolithium values in this aquifer system (fig. 10) indicated that the intersection of the Cross Central and Angel Island faults somehow controlled lithium concentration in the aquifer.

Production began in 1966 from the Main Ash Aquifer (MAA), which varies in thickness from 5 to 30 feet (fig. 5). Thicker sequences of ash coincide reasonably well with interbasin depressions also indicated by the overlying Salt Aquifer System (fig. 5). Particles in the ash range in size from submicroscopic to welded fragments of several inches or more. Depth to the MAA ranges from 200 feet in the southwest to over 750 feet in the northeastern playa, where down-dropping of the hanging wall, or bedrock, has exceeded that of the southwestern playa. Sedimentation in the east likely exceeded that to the west as indicated by the thickening of clay units eastward as detected by gravity and seismic geophysical analysis. Continuity of the MAA throughout the northeastern area of the Clayton Valley playa makes it an excellent marker bed. This aquifer is characterized by moderate transmissivity and yields. Salinity currently ranges from 80,000 to 95,000 TDS.

The Long Valley caldera eruption and ash coverage from the Bishop Tuff 760,000 years before present is well documented (fig. 11). No other Quaternary eruption of great volume is known to have occurred nearby. Smaller events at Lassen Peak/Brokeoff Mountain 400,000 years before present and Mt. Mazama (Crater Lake) approximately 6,800 years before present are less likely to have deposited as much ash in Clayton Valley. Assuming that the Bishop Tuff is the most plausible source of the MAA, sedimentation in the western playa is estimated at 0.003 inches per year. Thicknesses in the eastern playa indicate a sedimentation rate of as much as 0.012 inches per year.

Marginal Gravel Aquifer (MGA) wells have been exploited over the past twenty four years to supplement production with high volume, low salinity brine (40,000 TDS) from the silt, sand and gravel of the linear growth-fault system bordering the playa known as the Angel Island and Paymaster Canyon Fault system (fig. 5). It is along this east-northeast-trending fault system that the majority of basin drop and displacement has occurred. The gravels were presumably eroded from the bedrock in the footwall of the fault and shed down onto the hangingwall. This growth-fault material and contained brine along the playa side of the fault system is partly
Figure 5. Isopachs of the Lower Gravel Aquifer, Lower Aquifer System, Main Ash Aquifer, Marginal Gravel Aquifer, Tufa Aquifer, and Salt Aquifer System (thickness in feet, superimposed on outlines of brine ponds and pertinent fault systems).
constrained by the gravel-playa clay interface. Borings to the southeast of this fault zone and up slope contain large volumes of fresh water. Therefore, it is believed that this fault system serves as a major hydrologic barrier that effectively preserves the integrity of the brine field from dilution.

The Tufa Aquifer (TA) is in the northwest sector of the playa. Limited production and exploration holes indicate a ring-like tufa or travertine formation that thickens towards its outside edges (fig. 5). Whether submarine vents seeping fluid into the ancient lake or surficial hot spring terraces composed of CaCO₃ formed these features has yet to be determined with certainty. The TA has a moderate to high yield potential. Production from this small, localized aquifer is at moderate rates, with relatively low salinity (40,000 TDS). Historical values have been on the order of 100,000 TDS, indicating that brine extraction is enhancing fresh water migration into the region from the north-northwest and possibly from Paymaster Canyon to the northeast. Pumping tests and production data have shown hydraulic connection with the Main Ash Aquifer.

In the northeast playa, the aerial extent of the Salt Aquifer System (SAS) is somewhat continuous in its occurrence (fig. 5). Vertically, lenses of salt vary from fractions of an inch to approximately 70 feet in thickness with inter-

Figure 6. Generalized cross-section of the Main Ash and Lower Aquifer System, looking north (depths in feet below the playa surface, modified from a figure drafted by M.W. Hardy, 1993).

Figure 7. Structural contours of the top of the Main Ash Aquifer (depth in feet below the playa surface).

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Figure 8. Seismic line 2, looking northeast, potentially identifies aquifers in cross-section along basin dip (interpreted depths in feet).

Figure 9. Seismic line 4, looking northwest, potentially identifies aquifers along the general strike of the basin lithology, and indicates a gently asymmetrical character. Interpreted depths in feet.
beds dominantly of clay, some silt and sand, and minor amounts of gypsum, ash, and organic matter. In addition they contain some caverns. Salt was likely precipitated in lowland standing water by the concentration of minerals through evaporation during contemporaneous subsidence of the basin. Typically less than 600 feet in depth, the SAS provides moderate to high-grade lithium brine at moderate yield rates. Transmissivity varies with depth; deeper salt beds are more compact and less yielding than upper lenses. The moderate pumping levels and the relatively high lithium concentrations make this a viable, economic, and intriguing aquifer.

**Summary**

Lithium brine at Clayton Valley resides within six economic yet potentially interconnected aquifer systems. The aquifers were created through structural and stratigraphic controls, which were significant in both isolating higher grade brine and in the creation of aquifers within individual and collective aquifer systems. Some aquifers, such as the LAS, are relatively isolated, with production wells showing no interference on neighboring wells drilled into adjoining aquifers. In other systems, such as the TA and MAA, pumping data that indicate interference indicate a connection. In a low-energy lacustrine environment, few sedimentary layers may be sufficiently porous for use as aquifers; however, Clayton Valley has numerous ash layers (MAA and LAS) or lenses that act as ore-bearing aquifers along with chemical sediments (SAS and TA).

Production from all six of the aquifers continues on a regular, full-time basis. Shallow aquifers (SAS) have a high-grade, moderate production rate with a low cost per pound ratio. Deeper aquifers such as the LGA or the peripheral MGA are of lesser grade and cost more to produce, but their high volumes help to sustain production from the pond system. Depletion of the aquifers through production exceeds recharge by a factor of 2. Specific dilution pathways cause a progressive decline in lithium concentration. Proper management of the well field demands close attention to changes due to pumping from such a complex system.

**Acknowledgments**

I would like to thank Clifford B. Loundagin, General Manager of Chemetall Foote Corporation for his insights, discussions, and perspectives contained in this paper, which would not have been possible without his assistance. I thank Mike Hardy for his earlier work, Thor Kunasz for exhaustive research and advice, and other past and present employees of Chemetall Foote for filling the files with so much useful information. I thank Steve Castor, Nevada Bureau of Mines and Geology.
Hardy, M., and Loundagin, C.B., various internal documents, Cyprus Foote Mineral Co., 1993 etc.

References

Figure 11. Possible sources of ash aquifer materials comprising the Main Ash Aquifer and Lower Aquifer System.
MEMBERS IN THE NEWS

Michael Bell, CPG-10451, has been elected Vice President of the Environmental Banker's Association. See www.envirobank.org for information.

Major Christopher A. Gellasch, MEM-0071, commands the 71st Medical Detachment (Preventive Medicine) at Grafenwoehr, Germany and will deploy this spring with this unit to Afghanistan in support of Operation Enduring Freedom 6. They will be responsible for monitoring drinking water, food, industrial hygiene, pest surveillance and control, and environmental sampling for deployed forces. Chris will also be working on a survey of the drinking water wells used by Coalition forces in numerous base camps.

"Based on research conducted while teaching Geology at the US Military Academy at West Point, I recently had two papers published. The first is a chapter on military uses of groundwater in a book on military geography and geology. The second is a paper in Northeastern Geology and Environmental Sciences on the Geology of the West Point area." Here is the info:


Michael Palleschi, CPG-08978, reports that the New York State Department of Health (NYSDOH) is revising the Standards for Water Wells (10 NYCRR Appendix 5-B). The proposed standards apply to water supply wells "used for drinking, culinary and/or food processing purposes." Both individual and public water supply wells are addressed in these standards.

The Hudson Mohawk Professional Geologists' Association (HMPGA) formed a committee to review and comment on the proposed standards released by the NYSDOH in August 2004. The comments received by the NYSDOH have been used to revise the proposed standards. The revised standards will soon be posted for public comment on the NYSDOH website under "Proposed Rulemaking" at www.health.state.ny.us/regulations/.

Paul Putzier, CPG-07798, was announced as Senior Project Scientist of STS Consultants, Ltd. Putzier has over 20 years of experience conducting hydrogeologic and environmental investigations relating to assessment of soil and groundwater quality and contamination problems.

Putzier specializes in soil and groundwater assessment and remediation, environmental hydrogeology, contaminated sediment evaluations and property transaction due diligences. He received his bachelor's and master's degrees in Geology from the University of Wisconsin and the University of South Florida, respectively. Putzier is a registered Professional Geologist in Florida, Minnesota and Wisconsin, and a Certified Professional Geologist. He is a member of the American Institute of Professional Geologists - Minnesota Section, Minnesota Ground Water Association, Wisconsin Ground Water Association and Minnesota Environmental Initiative.

Headquartered in Vernon Hills, IL, STS is an engineering consulting firm offering an integrated package of services in geotechnical engineering, environmental management, and construction technology.

John H. Talley, CPG-08158, has been appointed by Governor Ruth Ann Minner and Secretary of the U.S. Department of the Interior, Gale A. Norton, to serve a two-year term as Delaware's representative on Interior's Outer Continental Shelf Policy Committee. The Committee gives policy advice to the Secretary, through the Director of the Minerals Management Service, related to discretionary functions of the Bureau under the Outer Continental Shelf Lands Act and related statutes; appointed by Governor Minner to serve on the Task Force on Surface Water Management which was created to study and develop recommendations related to flooding and drainage problems in Delaware.

Andy Tolman, CPG-04474, is this year's President of the National Association of State Boards of Geologists (ASBOG). ASBOG is the developer and keeper of the National Examination for Geology Registration, with members in 29 states and Puerto Rico. ASBOG is working cooperatively with AIPG on international licensure issues and continuing education. Andy's major project for the year is implementing the results of the latest Task Analysis for the practice of geology, which will be reflected in this fall's examination. If you have feedback on geologist licensure issues, let him know at: andrews.l.tolman@maine.gov.

Stephen M. Testa, CPG-00464, is the American Geological Institute's 2005 President. Testa is president and founder of Testa Environmental Corporation in Mokelumne Hill, California.

For the last 25 years, Testa has worked as a consultant in the geosciences including geology, hydrogeology, engineering, and environmental geology, as well as hazardous waste management. He has been involved with hundreds of projects concerning subsurface hydro-geologic site characterization, such as for nuclear hydroelectric power plants and above- and underground storage tank sites. He is also active in numerous projects involving water quality assessment, remediation of soil and groundwater, mine reclamation and hydrocarbon recovery. Internationally, Testa has developed lake mitigation strategies for the Republic of the Philippines in response to the volcanic eruption of Mt. Pinatubo, metal-contaminated soil strategies in Eastern Europe and groundwater resources in Yemen.

As the author of 11 books and more than 90 technical papers, Testa's expertise has been sought by a number of national law firms for technical assistance, litigation support, and testimony. He is a member of numerous AGI member societies including the American Institute of Professional Geologists, for which he served as president in 1998. He also belongs to the Association of Engineering Geologists, the Geological Society of America, and the American Association of Petroleum Geologists where he formerly served as editor-in-chief of its peer-reviewed journal Environmental Geosciences.

Testa has conducted several workshops on various environmental aspects of the subsurface presence of hydrocarbons, and has taught courses in hazardous waste management, geology and mineralogy at California State University at Fullerton, as well as petroleum environmental engineering at the University of Southern California. He also serves as a consultant and mine inspector for the California State Mining and Geology Board.

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MAY/JUNE 2005 • TPG 55
California Section
March 16, 2005: To the members of AIPG - California Section

CCGO Special Report To Members: Geology Licensure Not Out Of The Woods Yet

Thank you for being an Organizational Member, and for your ongoing support of CCGO. This is a special report to keep you up to date on CCGO activities and the current threat to abolish the Board for Geologists and Geophysicists (BGG).

In the winter of 2004-2005, more than 20 Californians lost their lives to landslides, and millions of dollars in property damage occurred. As licensed professionals, we know how the public benefits from the proper application of our expertise, and we know that in some cases lives and property could have been saved.

Preventing re-occurrences of these tragic and costly events will require sound professional practice by well-qualified (licensed) geologists. Yet licensure is always under attack from both sides of the political aisle, and from self-styled consumer advocates who do not understand its value to society. CCGO’s job is to bring rational arguments in favor of strong, board-administered, licensure to the attention of those who need to hear them. In 2004-2005 CCGO:

- Monitored the rapidly changing anti-licensure scene. CCGO Evaluated the California Performance Review (CPR). We were the first with a balanced analysis posted on our web site http://ccgo.org.
- Provided written testimony to the Little Hoover Commission hearings on the California Performance Review and the Governor’s Reorganization Plan 1.
- Monitored the legislative Sunset Review hearings on the Board for Geologists and Geophysicists.
- Met with Charlene Zettel, the new Director of the Department of Consumer Affairs, to present our views on the value of a strong, independent board-administered licensure law.
- Exchanged ideas with four legislators, top staff of the California Geological Survey, and the Executive Officers of the Board for Geologists and Geophysicists and the State Mining and Geology Board during our annual visit to Sacramento on March 2.

The board elimination aspects of the CPR and the Governor’s Reorganization Plan I met resistance from the concerned professions and from the Little Hoover Commission. The Governor withdrew his proposal to eliminate 88 boards and commissions, pending further study. It seems that the main threats to the continuation of the Board for Geologists and Geophysicists, and thus to the continuation of meaningful licensure for geologists, have dissipated. Senator Liz Figueroa, Chair of the Senate Committee on Boards, Commissions, and Consumer Protection, has introduced SB 228, a bill that extends the life of the Board for Geologists and Geophysicists for an unstated time (the blanks are there to be filled in with “zeros” or with several years of extension). Yet significant risks remain. Why? Because we are now about to enter Phase 2.

Here’s the rub: SB 228 is a simple bill extending one board. The Governor could easily veto this bill to demonstrate commitment to his anti-board ideology. It is a safe veto from the ideological standpoint, buying him more votes than it will cost, because we geologists are a small group. If the Governor vetoes SB 228, the existing sunset law becomes effective and the board will be terminated.

In the face of these prospects, CCGO has its work cut out for it. We are retaining a lobbyist for advocacy services, and we are developing a two-pronged program. If the bill proceeds as a solo bill extending only the BGG, we must be able to present convincing arguments for approval to those who influence the Governor’s decisions. Our best hope, however, is to convince the legislative powers to meld this bill into an omnibus bill that will have the support of many organizations, so we benefit from their lobbying efforts while we do our lobbying. This is critical work. CCGO is committed to spending the assets necessary to do the job, and the cost will be considerable. We also anticipate a need for letters from individuals to their legislators after the treatment of SB 288 becomes clear. We will keep you informed, and we hope we can count on your support.

An updated Fact Sheet highlighting our accomplishments is posted at our website, http://ccgo.org. Go there also to review our progress reported in Spring 2005 Highlights. CCGO wants to work for you; please let us have your comments and suggestions.

Jason Preece, President, CCGO
Jane Gill-Shaler, Executive Director

Georgia Section

The section held a field trip on March 9, 2005, in Stone Mountain where Bill Murdy with MACTEC showed us their remediation system that has six horizontal wells for vapor recovery and five horizontal wells for total fluids. The weather was great and several members went to a nearby restaurant with some of our student members from GSU. We hope to have more of these in the future and it is a great place for students to meet working professionals.

Bill Murdy discussing remediation system.

The Georgia Section held a field trip on April 9th in Rabun County (Clayton, Georgia) to view some of the waterfalls and discuss the blue ridge geology. The first stop was at Black Rock Mountain State Park where everyone ate lunch and was given an overview of the geology. From there a visit to Holcomb Creek Falls and Ammons Falls, which are on the SE side of town. Then driving SW of Clayton to Crow Creek Falls and Minnehaha Falls. Two additional falls are located on National Forest land and Tallulah Gorge State Park is nearby.

One of the trip leaders, Kell Adams at Ammons Falls.

Kentucky Section

Larry Weber, AIPG President-Elect, attended the Kentucky Section Spring Field Trip and Awards Banquet on April 23, in Florence, Kentucky. The field trip was an exploration of deposits and landforms related to pleistocene

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glaciations in and near the Northern Kentucky-Cincinnati Region. Field trip leaders included: William Andrews, Kentucky Geological Survey; Rick Bullard, Northern Kentucky University; and John Rockaway, Northern Kentucky University.

**Minnesota Section**

The Minnesota Section offered the seminar "Ice and Rocks - Baffin Island and Sweden", presented by Professor Peter Hudleston of the University of Minnesota Department of Geology and Geophysics at its 7th Annual Spring & Seminar on April 28, 2005.

**Oklahoma Section**

PROFESSIONAL GEOLOGIST LICENSING BILL – HOUSE BILL HB1972

Presented by Joe Foster

Discussion of HB1972 centered on changes to be made to HB1972 wording due to typographic errors and the need for clarification. The sections of the bill where the changes were to be made are the grandfather clause to waive the exam, the right of geologists to use professional designations as long they do not represent themselves as licensed professional geologists (PGs) by the State of Oklahoma, and changing the effectiveness date of the legislation from July 1st to November 1st.

Joe indicated that he had scheduled a luncheon appointment with the House committee chair, Dennis Adkins, on Wednesday, February 18th and needs Tulsa AIPG Excom members to attend. (Note: Michael McGowan and Kurt Lampi attended this meeting in Oklahoma City.)

Rick Wymer motioned and Joel Nelson seconded the motion that the Oklahoma Section of AIPG would provide up to $2,500 in funding to reimburse HB1972 legislation committee members and other individuals invited by the committee for lunch and travel costs in the lobbying effort for this bill. The motion passed.

Two Oklahoma City based petroleum companies, Devon and Chesapeake (OIPA), are opposing the legislation. Dennis Adkins indicated that should these companies continue to oppose HB1972 during the February committee review time period, he would not introduce the bill into committee for review. (Note: HB1972 has been with-

**South Dakota Section**

The South Dakota Section meeting held joint with the 17th Annual Environmental and Ground Water Quality Conference was held in Pierre, South Dakota on March 16-17, 2005. The meeting was well attended and speakers included AIPG Executive Director, Bill Siok.

At the meeting Derric Iles, South Dakota State Geologist, was presented with the second J. P. Gries Geologist of the Year Award.

Special thanks to Tom Durkin, South Dakota Section President and Gary Haag, South Dakota Section Past President.
The AIPG Executive Committee meeting was again held in Tucson, Arizona on February 11, 2005, concurrently with the 2005 Gem and Mineral Show. The day before the formal meeting a number of the members were invited by David Palmer, President of the Arizona Section and advisory board representative, on a field trip to Kartchner Caverns State Park. Discovery in 1974, Kartchner Caverns, was purchased by Arizona State Parks and the development of the Park began in 1988. Still virtually pristine, the state park was opened on November 12, 1999. The massive limestone cave has 13,000 feet of passages and two large rooms and offers two separate tours. To protect the environment the cave was built with airtight refrigerator doors and chambers that the public would go through. No photographs were allowed.
From there we drove to Tombstone where we had a few hours to roam the streets. A few of us stopped in the Crystal Palace Saloon, considered one of the most luxurious saloons in the West. The Bird Cage Theatre was considered the wildest place in the west. It opened in 1881 and for nine years it never closed its doors, operating 24 hours a day. During this period, 16 gun and knife fights took some 26 lives. There are still 140 bullet holes through-out the building, marking the ceilings, walls, and floors. The longest single poker game in history was played in the basement gaming area.

The 2005 AIPG Executive Committee members present at the Tucson meeting were President Robert Font, President-elect Larry Weber, Past-President, Bob Corbett, Vice-President Kelvin Buchanan, Secretary David Abbott, Treasurer John Bognar, Editor Ray Talkington, and Advisory Board Representatives Dan St. Germain, David Palmer, Ron Wallace, and Jane Willard. Also present were AIPG Executive Director Bill Siok and Membership Services Manager Catherine O'Keefe.

**National Executive Committee**

The Executive Committee took the following actions:

- Approved Tennessee and Virginias Section Bylaws as amended
- Bob Corbett will head a committee to review the education requirements for Certification
- The elected officers gave reports. President Font outlined his five goals: (1) Strengthening the "practical value" of the CPG title. An ad-hoc will have a final report in May on their recommendations. (2)

Promoting our continuing professional development (CPD) program. Wants to make the program attractive and worthwhile where CPG members that participate and fulfill the CPD requirements will receive a number of discounts. (3) Starting our online education. The AIPG "server" is online and there is one course that can be taken now on "Introduction to Landslides and Mass Wasting". We need additional courses online. One idea was to have a series of the regional geology of the United States. (4) Promote the Institute in the eyes of the public. A new release of the "Citizen's Guide to Geologic Hazards" is planned. Would like to work with the major publications such as Time, USA Today, Newsweek to publicize what geologists do and the value of geology to the public. (5) Add student members. Would like to solicit donations from corporations and AIPG members to sponsor student members.

- The 2005 AIPG Awards recipients were approved as recommended by the Honors and Awards Committee.
- The Nominating Committee presented the slate of candidates for 2006 and they were approved.

An ad hoc committee met with Arizona Board of Technical Registration Executive Director Ronald Dalrymple and Board member Bill Greenslade. The ABTR considers it to be a violation to use the phrase "Certified Professional Geologist" without holding an Arizona license. There will be more discussions.

- Georgia Section requested the formation of a student chapter at Georgia State University.
- South Carolina's governor is again trying to eliminate the Geology Board.

The Executive Committee was invited to attend a dinner with the Arizona Section and the guest speaker was Susan Cummins Miller, former USGS geologist and current mystery fiction writer.

Saturday morning the Executive Committee attended the annual business meeting of the Arizona Section and in the afternoon went to the Gem and Mineral Show.
A Correlated History of the Universe

This folded map fits in a shirt pocket and also includes the new "A Correlated History of MATTER". The detailed natural history timeline is extended back to the big bang and additional reference material for geology, astronomy, mineralogy, meteoritics, chemistry and physics has been added.

A Correlated History of Earth

"A Correlated History of Earth" is a full-color educational wall chart documenting 4.5 billion years of earth's natural history. Each column is a timeline from ancient times to recent.
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Easily create cross sections, boring logs, fence diagrams, solid models (plume), stratigraphic and lithologic models, surfaces, contour maps (e.g. elevations and thickness), geotechnical models (e.g. cohesion, compaction, shrinkage, etc.), volumetrics, projected sections, Piper and Stiff diagrams, stereonets, rose diagrams, ternary diagrams and much more!

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Environmental • Mining • Petroleum

RockWorks Training Classes - call x108 for details
RockWorks with an Introduction to LogPlot:
June 13-14, 2005 (Denver, CO)
Late September 2005 (Northeast USA - TBA)

ROCKWARE® Visual Seismic
New Version 3.0

New to RVS 3.0
- Load GPR Data
- 2D Interpretation Window
- Enhanced Manual Picking Tools (Peak, Trough & Zero Tracking)
- Create 2D Horizon Surfaces
- Interpolate 3D Horizon Surfaces
- Digitize Fault Traces on 2D Data
- Well Editor

RVS Features
- Use ten different Seismic Viewing Objects to highlight structures & amplitudes
- Import TIFF & DXF files for geographical references
- Use multiple independent windows & volumes to visualize data
- Auto detect or manually pick horizons
- Digitize faults traces in 2D & 3D
- Evaluate depositional history with volume flattening & horizon sculpting tools
- Export Horizon Surfaces for contouring

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LogPlot
An easy-to-use boring log plotting software program with almost unlimited flexibility in log layout. Plot a single page boring log for shallow borings, or a multiple page/continuous well log for deep wells.

Creating a log plot is simple
1. Select Log Design
2. Enter/Import Your Data
3. Compile & Display Your Graphic Log

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LogPlot has been widely used in the environmental, petroleum, geotechnical and mining industries since 1983.

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