Not Just Software... RockWare.
For Over 28 Years.

RockWorks®
Downhole Data Management, Analysis and Visualization
- Streamlined well manager includes:
  - Deviated survey data
  - Lithology
  - Stratigraphy
  - Permeability, porosity, etc.
  - Downhole Geophysics
  - Oriented fractures
  - and more
- Interactively pick formation tops from raster e-logs
- Generate well logs, cross-sections, fence diagrams and stratigraphy models
- 2D (e.g. structure, isopachs) and 3D (porosity/permeability) contouring and volumetrics
- Full range and township support

$3,000

LogPlot®
Powerful, Flexible, Easy-to-Use Borehole Log Software
- Dozens of templates available or design your own in the drawing-style log designer window
- Tabbed data sheets
- Import/Export data from LAS, Excel, RockWorks
- Paginated and continuous logs at any vertical scale
- Export to a variety of formats
- Free viewer can be distributed to clients

$699

RockWare GIS Link 2®
Connecting RockWorks and ArcMap
- Load RockWorks well locations as an ArcMap layer
- Pick profile, section, and fence diagram locations in ArcMap, generate the diagrams automatically in RockWorks
- Create contour maps of formation tops and isopachs, surface elevation
- Generate strip logs

$349

Visual Modflow™
3D Groundwater Flow, Heat and Contaminant Transport Modeling
- Interfaces to MODFLOW (2000 and 2005), MODPATH, MT3D (MS and 99), RT3D, PHT3D and SEAWAT
- Automatic calibration and sensitivity analysis using WinPEST
- Superior 3D graphics using the 3D-Explorer
- Zone Budget, Multi-Node Well, Stream Routing, LAK3 and ETS1 Packages
- Pumping optimization using MG0

Standard, Pro and Premium versions available

Call for pricing

Free trials for most of our products available at www.rockware.com

Follow us on:
Facebook  Twitter  YouTube

RockWare®
Since 1983

303.278.3534 • 800.775.6745
RockWare.com
Inside This Issue

AIPG 2011 Annual Meeting Edition
- Welcome Letter
- Meeting Program
- Field Trips
- Social Events
- Sponsorship Opportunities
- Registration Form
- Exhibitor Opportunities
- Features
  - AIPG National Officers-Candidate Articles and Biographies
  - Official Mail-In Ballot
  - Message from AIPG President Sam Gowan
  - AIPG 2011 National Award Recipients
  - 2011 February Executive Committee Meeting Photos
- Peer Reviewed Article
  - ASR Using Sodium Bisulfide Treatment for Deoxygenation to Prevent Arsenic Mobilization
  - Mark S. Pearce and Mike Waldron
- AGI Welcomes New Associates
- AGI's Earth Magazine
- Geoscience Currents
- AGU News Release
- Rare Earths-What’s All the Fuss?
  - Jim Burnell, MEM-0205
- SME Convention Photos

ON THE COVER-This photograph shows a vein of massive barite in Archean syenite on the shore of Browning Lake, near Matachewan, Ontario. The barite was mined for use in drilling mud and as an extender in paints and other applications. Barite veins are common in the Matachewan area, and are general perpendicular to fault-controlled lakes. Glacial erosion (right to left) has eroded a depression in the soft barite on top of the hill. Barite ore (white) is stockpiled in the foreground in front of the adit. Photograph by Bob Stewart, CPG-8332, summer 1984
AIPG National Executive Committee

PRESIDENT - Samuel Gowan, CPG
Alpha Geoscience, Inc.
O: (518) 348-6995
sgowan@alphageoscience.com

PRESIDENT-ELECT - Barbara H. Murphy, CPG
Clear Creek Associates
O: (480) 659-7131
bmurphy@clearcreekassociates.com

PAST-PRESIDENT - Michael D. Lawless, CPG
Draper Aden Associates
O: (540) 552-0444
mlawless@daa.com

VICE PRESIDENT - J. Foster Sawyer, CPG
SD School of Mines and Technology
O: (605) 394-2462
foster.sawyer@sdsmtd.edu

SECRETARY - Adam W. Heft, CPG
Parsons Brinckerhoff
O: (605) 394-7400
heft@pbworld.com

TREASURER - Robert W. Gaddis, CPG
Newfield Exploration Mid-Continent, Inc.
O: (918) 732-1651
BGgeoconsult@aol.com

EDITOR - Robert A. Stewart, CPG
Arcadis US, Inc.
O: (860) 533-9901
bob.stewart@arcadis-us.com

ADVISORY BOARD REPRESENTATIVES
James F. Howard, CPG
C: (270) 925-6636
jhoward89@hotmail.com

Helen V. Madejsko-Hickman, CPG
HSA Engineers and Scientists
O: (561) 688-9008
mswaterwitch@bellsouth.net

John M. Stewart, CPG
ECS Carolinas, LLP
O: (336) 856-7150
jstewart1@ecslimited.com

Ronald J. Wallace CPG
State of Georgia
O: (404) 362-2589
ronald_wallace@dir.state.ga.us

NATIONAL HEADQUARTERS
12000 N. Washington St., Suite 285
Thornton, CO 80241
7:30 AM - 4:30 PM MDT; M-F
(303) 412-6205 • Fax (303) 253-9220
aipg@aipg.org • www.aipg.org

EXECUTIVE DIRECTOR - William J. Siok, CPG - wsiok@aipg.org

ASSISTANT DIRECTOR - Wendy J. Davidson - wd@aipg.org

PROFESSIONAL SERVICES MGR - Cathy L. Duran - cld@aipg.org

MEMBERSHIP SERVICES MGR - Vickie L. Hill - vhill@aipg.org

OFFICE ASSISTANT - Cristie J. Valero - cjv@aipg.org

ADMINISTRATIVE ASSISTANT - Diana de Cordoba - ddc@aipg.org

LIFE AND HEALTH INSURANCE
GeoCare Benefits Insurance Plan
Phone: 800-537-3140 or 602-870-4121
http://www.geocarebenefits.com/
E-mail: geocarebenefits@aiga.com

AUTO AND HOME INSURANCE
Liberty Mutual
Phone: 800-524-9400
http://www.libertymutual.com/IM/aipg

SUPPLEMENTAL INSURANCE
AFLAC
Phone: (303) 674-1858
http://www.aflac.com

PROFESSIONAL & GENERAL LIABILITY INSURANCE
The Wright Group
Phone: (800) 322-9773 (303) 863-7788
http://www.thewrightgroupinc.com

ALARMO RENTAL CAR -
(800) 354-2322 • Member #BY706768

AVS RENTAL CAR -
(800) 831-8000 • Member #AWD #T003030

BUDGET RENTAL CAR -
(800) 455-2848 • Member BCD #Z663100

UPS Savings Program
www.aipg.org or www.savewithups.com/enroll
Use promo code WES462

DEPARTMENTS
23 Editor’s Corner
25 Test Your Knowledge
26 President’s Message
27 Student Chapters
28 Test Your Knowledge Answers
29 Executive Director’s Column
30 Professional Ethics and Practices
34 Hydrothink
35 Student’s Voice
38 Professional Services Directory
40 AIPG Student Application
41 New Applicants and Members
50 AIPG Professional Member Application
58 Section News
61 AIPG Store

AIPG Publication Policy, October 4, 2010. AIPG encourages submission of articles and editorials for publication in TPG on topics related to the science and profession of geology. Submittals shall be of interest to the members of AIPG, other professional geologists, and others interested in the earth sciences. Articles and editorials may be noted as follows at the discretion of the Editor. “The opinions, positions and conclusions presented herein are those of the author and do not necessarily reflect the opinions, positions or conclusions of the American Institute of Professional Geologists.” All materials submitted for publication, including author opinions contained therein, shall include accurate and appropriate references. The Editor has the authority to solicit, edit, accept, or reject articles and editorials and other written material for publication. The Executive Committee has the authority if it so chooses to act on any particular case to support or overrule actions of the Editor regarding the solicitation, editing, acceptance, or rejection of any particular article, editorial, or other written material for publication.

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

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

The Professional Geologist (USPS 590-810 and ISSN 0279-0521) is published bi-monthly by the American Institute of Professional Geologists, 12000 N. Washington St., Suite 285, Thornton, CO 80241-3134. Periodicals Postage Paid at Denver, Colorado and additional mailing offices.

POSTMASTER: Send address changes to The Professional Geologist, AIPG, 12000 N. Washington St., Suite 285, Thornton, CO 80241.

Subscriptions for all Members and Adjuncts in good standing are included in annual membership dues. Subscription prices are $20.00 a year for Members’ additional subscriptions and $30.00 a year for non-members for 6 issues (for postage outside of the U.S. add $10.00). Single copy price is $4.00 for Members and $6.00 for non-members. Claims for nonreceipt or for damaged copies are honored for three months. Entire contents copyright 2011 by The Professional Geologist. Original material may be reprinted with permission. Deadline for articles and advertisements is six weeks preceding publication. Advertising rates available upon request. Opinions and views expressed by the authors are their own and do not necessarily reflect those of the American Institute of Professional Geologists, its staff, or its advertisers.

Printed in U.S.A. by Modern Litho-Print Company in Jefferson City, Missouri.

For AIPG news and activities go to www.aipg.org.
On behalf of the organizing committee, it is with great pleasure that I announce the American Institute of Professional Geologist’s (AIPG) 48th Annual meeting will be held at the Hilton Chicago/Indian Lakes Resort located in Bloomingdale, Illinois from September 10 through 13, 2011. This is the first time that the AIPG national meeting will be in the Chicago area. The national conference is being held jointly with the American Institute of Hydrology (AIH) and is co-hosted by the AIPG Illinois/Indiana Section and co-sponsored by the Lake Michigan Section of the Air and Waste Management Association (LM-A&WMA).

At this conference you will have the opportunity to increase your technical knowledge of current advancements in technology and practice methods, earn continuing education credits, and interact with fellow professionals from the consulting, municipal, industrial, regulatory, and academic communities. Together, we are working on creating a sustainable environment.

The conference theme is “Geosciences: The Road to a Sustainable Future”. The four day conference includes technical presentations, nationally recognized keynote speakers, workshops, field trips, poster sessions and an exhibit hall. The technical program offers a solid selection of multidiscipline topics including sustainability, natural resource management, energy, environment and technology and climate change. In addition, exciting field trips will include Lake Michigan coastal geology and development, regional quarry and mining trips, and field lectures covering geological, hydrological, and environmental engineering areas of interest. Continuing education credits will be offered for all technical sessions, workshops and field trips. The exhibit hall will include an area for student posters, exhibitor booths for marketing products and services, and, displays from conference sponsors.

The conference organizing committee consists of David Pyles (general chairperson), Marzi Sharfaei (co-chair), Emitt Witt (co-chair), Ramona Cornea (field trips), Jeff Groncki and Jim Cruise (technical sessions), and James Adamson (Student Poster Session). We should all thank the staff at AIPG Headquarters for their time and effort in making this an exemplary conference.

I look forward to seeing you at the conference!

David G. Pyles, CPG-07364
President IL-IN Section of AIPG
General Chairperson
<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thursday/Friday, September 8-9, 2011</strong></td>
<td></td>
</tr>
<tr>
<td>8:00 am Departure Thursday, Return Approximately 5:00 pm Friday</td>
<td>2-Day Field Trip — Quarrying Indiana’s State Rock - Limestone (Registration closes 7/5/11)</td>
</tr>
<tr>
<td><strong>Saturday, September 10, 2011</strong></td>
<td></td>
</tr>
<tr>
<td>7:00 am—5:00 pm</td>
<td>Registration</td>
</tr>
<tr>
<td>7:00 am—8:00 am</td>
<td>AIPG Executive Committee Breakfast</td>
</tr>
<tr>
<td>8:00 am—5:00 pm</td>
<td>Field Trip — Chicagoland Learning Adventure! How Geology influenced the Chicago Metropolis</td>
</tr>
<tr>
<td>8:00 am—5:00 pm</td>
<td>Field Trip — Quaternary Deposits and History of the Ancient Mississippi River Valley, North Central Illinois</td>
</tr>
<tr>
<td><strong>Monday, September 12, 2011 (continued)</strong></td>
<td></td>
</tr>
<tr>
<td>9:00 am—5:00 pm</td>
<td>Exhibits Open</td>
</tr>
<tr>
<td>10:45 am—3:00 pm</td>
<td>Field Trip — Metropolitan Water Reclamation District of Greater Chicago - Tunnel &amp; Reservoir Plan (TARP) Pumping Site (Registration closes 8/1/11 for processing of release forms)</td>
</tr>
<tr>
<td>12:00 noon—1:30 pm</td>
<td>Luncheon with Keynote Speaker Dr. Miguel Medina, Jr. (open to all registrants)</td>
</tr>
<tr>
<td>1:30 pm—4:00 pm</td>
<td>Field Trip — Lynfred Winery Tour and Tasting</td>
</tr>
<tr>
<td><strong>Tuesday, September 13, 2011</strong></td>
<td></td>
</tr>
<tr>
<td>7:30 am—4:00 pm</td>
<td>Registration</td>
</tr>
<tr>
<td>8:00 am—5:00 pm</td>
<td>Field Trip — Kentland, Indiana Meteorite Impact Structure Mine Trip</td>
</tr>
<tr>
<td>8:30 am—5:00 pm</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>9:00 am—4:00 pm</td>
<td>Exhibits Open</td>
</tr>
<tr>
<td>10:00 am—3:30 pm</td>
<td>Field Trip — Morton Arboretum</td>
</tr>
<tr>
<td>11:00 am—5:00 pm</td>
<td>Field Trip — Fermilab Tour</td>
</tr>
<tr>
<td>12:00 noon—1:30 pm</td>
<td>Luncheon with Speaker (open to all registrants)</td>
</tr>
<tr>
<td>6:00 pm—8:30 pm</td>
<td>AIPG and AIH Awards, Dinner and Entertainment</td>
</tr>
<tr>
<td><strong>Wednesday, September 14, 2011</strong></td>
<td></td>
</tr>
<tr>
<td>8:00 am—1:00 pm</td>
<td>Field Trip — Indiana Dunes of NW Indiana Dune and Shoreline Behavior/Lake-Level Change</td>
</tr>
<tr>
<td>8:00 am—5:00 pm</td>
<td>Field Trip — Silurian Geology of the Chicago Area and its Contribution to the Infrastructure of the Region (Thornton Quarry-TARP Reservoir)</td>
</tr>
<tr>
<td><strong>Wednesday/Thursday, September 14-15, 2011</strong></td>
<td></td>
</tr>
<tr>
<td>8:00 am Departure Wednesday, Return Approximately 5:00 pm Thursday</td>
<td>2-Day Field Trip — EarthScope and Economic Geology Pleistocene to Precambrian in Central Illinois (Registration closes 7/5/11)</td>
</tr>
</tbody>
</table>

*Full Registration includes: Welcome Reception, Technical Sessions, Student Poster Sessions, Exhibits, Registration Packet, Continental Breakfast, Lunch, and Breaks on Saturday, Monday, and Tuesday.
Field Trips

2-Day Field Trip-Quarrying Indiana’s State Rock - Limestone

Limestone is Indiana’s state rock and is mined for aggregate and dimension stone throughout the state. Quarrying in the Indianapolis area occurs in urban and spatially confined localities. Here, quarries drill and blast Devonian and Silurian rocks to create aggregate for construction. Southward, between Bloomington and Bedford, quarries saw limestone from the ground for dimension stone. The rock extracted for decorating buildings across the nation is the Mississippian Salem Limestone, which is milled and carved using classic hands-on techniques and modern computer-controlled cutting machinery. Salem Limestone graces many of the buildings of the Indiana University campus. This 2-day trip will visit aggregate and dimension stone quarries, limestone mills, and the IU campus. Some easy walking is required. Hard hats are provided, but please wear closed-toe footwear.

Mississippi River watersheds. This was the landscape factor that predestined the region to be an important mid-continent focal point for water transportation and commerce. Without question, Chicago is a product of its geology.

This full-day excursion will “read” the Chicagoland landscape and the story it tells related to the growth of this metropolis. The trip will be aboard a 55-passenger motor coach with stops at select spots of particular significance. The motor coach will serve as a moving observation platform and the running narrative by the trip leader will explain notable features being passed. The guidebooks essentially functions as a laptop computer with maps and other graphics explaining the geologic relevance of the passing landscape.

Chicagoland Learning Adventure! How Geology Influenced the Chicago Metropolis

Chicagoland landscape tells a unique geologic history of glacial, fluvial and coastal processes. These processes resulted in a natural waterway passage between the Great Lakes and Mississippi River. The Chicagoland landscape is a product of its geology. This full-day excursion will “read” the Chicagoland landscape and the story it tells related to the growth of this metropolis. The trip will be aboard a 55-passenger motor coach with stops at select spots of particular significance. The motor coach will serve as a moving observation platform and the running narrative by the trip leader will explain notable features being passed. The guidebooks essentially functions as a laptop computer with maps and other graphics explaining the geologic relevance of the passing landscape.

Quaternary Deposits and History of the Ancient Mississippi River Valley, North Central Illinois

During most of the Quaternary, the Mississippi River flowed through what is now the Illinois River valley, and continental glaciers entered, overrode, and buried this river valley numerous times. However, about 20,000 14C years ago, the Mississippi River was diverted to its present course following the last of several encounters with ice from the Lake Michigan lobe. The present course of the Illinois River subsequently incised deeply into a portion of the Ancient Mississippi River valley following retreat of the late Wisconsin Episode ice.

This field trip will examine preserved sediments and soil that records complex events that impacted the watershed. Surface exposures will show the succession of glacial, proglacial (fluvial, lacustrine, and loessal), interglacial deposits, and geosols in the region.
Field Trips

The Upper Mississippi Valley Pb-Zn District Revisited: Mining History, Geology, Reclamation and Environmental Issues 30 years after the Last Mine Closed

Date: Sunday, September 11th
Time: 7:00 am to 5:30 pm
Cost: $125/$150 (includes box lunch, snacks, & water)
Leader: Bruce Brown, Tom Hunt, Dave Johnson, and Dan Reid

This trip will travel through the unglaciated landscape of southwest Wisconsin to Shullsburg, site of the last major mine that closed in 1978. We will look at successful reclamation of the site and discuss groundwater issues related to mine closing. In Shullsburg we will take an underground tour of a mid 19th century crevice lead mine. We will travel west to Hazel Green through the heart of the historic mining district with stops at several sites to discuss environmental and reclamation issues. At Platteville we will visit the Mining Museum, which will include underground displays of lead and zinc mining. We will travel east to the historic mining town of Mineral Point, stopping on the way to see examples of the impact of mineralization on highway construction. In Mineral point we will have the opportunity to see many historic buildings that are good examples of the architecture used by the Cornish settlers in the mid 19th Century. Our final stop will be at the reclaimed site of a former zinc roasting plant.

Geology of the St. Peter Sandstone and Ottawa-LaSalle Area

Date: Sunday, September 11th
Time: 8:00 am to 5:00 pm
Cost: $95/$120 (includes box lunch, snacks & water)
Leader: Pius C. Weibel

This one-day trip will travel to the Ottawa-LaSalle area to visit a large quarry where the Ordovician St. Peter Sandstone is mined for use as industrial (silica) sand. Subsequent stops will examine natural exposures of the sandstone within the scenic confines of both Matthiessen and Starved Rock State Parks. Participants will also have the opportunity to view the Ordovician Platteville Limestone, Pennsylvanian cyclic strata, and Pleistocene glacial deposits. In addition to discussions on the deposition of these strata, we will also examine elements of the LaSalle Anticline and the origin of the unique landscape of the area. Hard hats are required for the quarry stop. No geology hammers, please. This trip may include easy to moderate hiking, including numerous stair steps.

Metropolitan Water Reclamation District of Greater Chicago-Tunnel & Reservoir Plan (TARP) Pumping Site

Date: Monday, September 12th
Deadline: Registration closes August 1, 2011
Time: 10:45 am to 3:00 pm
Cost: $95/$120 (includes box lunch, snacks & water)

Calumet Water Reclamation Plant-The Metropolitan Water Reclamation District of Greater Chicago has seven water reclamation plants (sewage treatment plants). The Calumet Water Reclamation Plant is the oldest, based on continuous service. The original plant went into operation on September 11, 1922, and was designed for the primary treatment of 56 million gallons of wastewater per day. Throughout the years, the plant has been upgraded and expanded to the present system, which has both primary and secondary treatments. It now can handle 500 million gallons per day (MGD). The plant services a population of about one million people and an area of about 300 square miles. Its cleaned wastewater, called effluent, is discharged into the Little Calumet River. Because the Calumet River was reversed in 1900 to protect the drinking water for the citizens of Chicago, the effluent flows away from Lake Michigan through waterways down to the Gulf of Mexico.

Calumet Pumping Station-The Calumet Water Reclamation Plant has a pumping station for the Tunnel and Reservoir Plan (TARP). During heavy rainstorms, wastewater and stormwater enter the tunnel system through 17 drop shafts. These flows are stored in the tunnel system until the rain event has ended. Then, this excess rainwater mixed with sewage is sent to the Calumet Plant for treatment. The Calumet TARP System is 36.7 miles long and can hold 630 million gallons. The tunnel varies in length from nine to 30 feet in diameter. Eventually, the Thornton Quarry will be used as a reservoir for the Calumet TARP. This trip will include climbing several sets of stairs. This trip requires release forms and will close as of August 1 to process this paperwork.
Field Trips

Lynfred Winery Tour & Tasting
Date: Monday, September 12th
Time: 1:30 pm to 4:00 pm
Cost: $12/$12

Enjoy an afternoon touring the local Lynfred Winery. You will be lead through the wine production area followed by a guided sampling of Lynfred wines.

Kentland, Indiana Meteorite Impact Structure Mine Trip
Date: Tuesday, September 13th
Time: 8:00 am to 5:00 pm
Cost: $95/$120 (includes box lunch, snacks & water)
Leader: Nelson Shaffer

A unique aggregate mine that has operated for 110 years in a meteorite impact site near Kentland, Indiana, exposes more than 400 feet of structurally disrupted Paleozoic strata. Some units have been uplifted more than 1,500 feet. Mapping by R.C. Gutschick revealed the 7-mile, generally circular structure and delineated major fault and folds. But smaller geologic surprises are found during mining; impact indicators (such as shatter cones) are common, and planar features in quartz and high-pressure polymorphs (such as coesite) have also been found. We will see some of the structural complications surrounding the unmined central uplift and will examine smaller features in the quarry. Some easy walking is required. Hard hats are provided, but please wear closed-toe footwear.

Morton Arboretum Tour
Date: Tuesday, September 13th
Time: 10:00 am to 3:30 pm
Cost: $55/$55 (purchase lunch at the Arboretum)

The Morton Arboretum is an outdoor museum of trees and other plants from around the world. The 16 miles of hiking trails have been carefully planned to enhance your experiences on the grounds. These trails lead you through plant collections, natural areas, and other scenic landscapes. Several trails are paved, but most are wood-chipped. Check in at the Visitor Center for details about the trails or to pick up a map. Arboretum plant collections include 41,000 labeled specimens throughout the grounds. This trip includes a tour on the Acorn Express open-air tram at 11:00 am. Depending on the weather, jackets and good walking shoes are recommended. Includes snacks and water.

Fermilab Tour
Date: Tuesday, September 13th
Time: 11:00 am to 5:00 pm
Cost: $95/$120 (includes box lunch, snacks & water)
Leader: Tona Kunz, Reidar Hahn

The visit can take a group of 10 people at a time underground and includes the NuMI beamline tunnel, which is where the beam starts that shoots to the Soudan Mine in Minnesota and the MINOS far detector. A small section of the tunnel has a bare rock wall and layers of different rock at various ages are visible (See attached photo). You can also see the MINOS near detector, a couple of our dark matter detectors and the MINERvA detector that are all in the same section of the NuMI beamline.

While the other groups are waiting to go underground, the engineer/geologist will discuss the site geology, recent rock corings and how the substructure impacts experiment designs. Moreover, a docent will give a tour of the 15th floor public area with informational posters and a relief map of the site.

Anyone going underground will have to take a 15 minute safety briefing, be able to walk a kilometer to a safety exit in case of emergency and adhere to a safety dress code.
Indiana Dunes of Northwestern Indiana
Dune and Shoreline Behavior/Lake-Level Change

Date: Wednesday, September 14th
Time: 8:00 am to 1:00 pm
Cost: $95/$120 (includes box lunch, snacks & water)
Leader: Todd Thompson and Erin Argyilan

The Indiana Dunes contain some of the highest dunes associated with an inland body of water and are the type area for our understanding of late Wisconsin to modern lake-level change. This trip will examine relict and coastal features within the Indiana Dunes National Lakeshore. Our focus is on the geomorphic and sedimentologic characteristics and distribution of the dunes and shorelines and their response to changes in wind patterns and lake level through time. We will also examine the relationships between vegetation and dune development, and the impacts of modern shoreline disturbance on the natural system. Some easy walking is required. Participants should wear sunscreen and insect repellent, and may get their feet wet.

Silurian Geology of the Chicago Area and its Contribution to the Infrastructure of the Region (Thornton Quarry-TARP Reservoir)

Date: Wednesday, September 14th
Time: 8:00 am to 5:00 pm
Cost: $95/$120 (includes box lunch, snacks & water)
Leader: Don Mikulic

Silurian dolomites have also played a critical role in the region as a factor in the development of some of the largest transportation and municipal engineering projects of their time. Primary examples are the Sanitary and Ship Canal along with the Tunnel And Reservoir Plan (TARP) both of which are large scale flood and pollution control systems designed to help improve the water quality of the area. The tunnels, shafts, and reservoirs of the TARP system have largely been constructed within local Silurian dolomites. The role of these rocks in both the aggregate industry and the TARP system can be seen at the Thornton Quarry which will be the main focus of this field trip. The old building stone quarries along the Sanitary and Ship Canal will also be visited.

During this field trip we will visit the Thornton Quarry located in Thornton Township. Participants will get a chance to examine Silurian rocks and collect fossils. This trip will include easy to moderate walking.

2-Day Field Trip-EarthScope and Economic Geology Pleistocene to Precambrian in Central Illinois

Date: Wednesday, September 14th - Thursday, September 15th
Deadline: Registration closes July 5, 2011
Time: 8:00 am Departure on Wednesday, Sept. 14th
Cost: $395 includes lunch Thursday, hotel, snacks & water
Leader: Robert Nelson and David Malone

During day 1, participants will see dipping and faulted Ordovician strata in Matthiessen State Park. And travel to EarthScope station HDIL located 20 miles northwest of Bloomington. Station HDIL is part of the Advanced National Seismic System and the Plate Boundary Observatory. We will also visit EarthScope Transportable Array Station TA043A. Thirty EarthScope transportable array seismic stations on 75 kilometer spacing will be in Illinois in 2011-2013. EarthScope is the largest continental geology project ever funded by the
Field Trips

National Science Foundation in partnership with the United States Geological Survey, and with the collaboration of UNVARCO Inc., Incorporated Research Institutions for Seismology (IRIS), Stanford University, and NASA. The goal of EarthScope is to explore the geologic structure and evolution of the North American Continent and understand the processes controlling earthquakes and volcanoes.

Day 2 features the CO₂ Sequestration project in Decatur and water flood operations in the St. Elmo Oil Field. In February 2009, Schlumberger Carbon Services began drilling the approximately 8,000-foot-deep injection well at the 207-acre project site near ADM’s corn wet mill in Decatur, Illinois. The injection well and observation wells have been completed. Injection of CO₂ will begin near the time of this field trip. Petco Petroleum Corporation is an independent oil and natural gas producer that specializes in operating mature oil and gas fields with significant reserves.

Social Events

Welcome Reception
Date: Sunday, September 11th
Time: 6:00 pm to 8:00 pm
Cost: Included with Registration

This is a chance to get to know your fellow colleagues attending the annual meeting. This Sunday evening reception is the perfect opportunity to renew acquaintances, meet new people, and visit exhibitors. The reception will feature a cash bar and hors d’oeuvres.

AIPG Past-Presidents Breakfast
Date: Monday, September 12th
Time: 7:00 am to 8:30 am
By Invitation Only

Awards, Dinner and Entertainment
Date: Tuesday, September 13th
Time: 6:00 pm to 8:30 pm
Cost: $65

Tuesday evening will be a pleasant one in the company of friends and colleagues. The festivities will begin with the AIPG and AIH National Awards presentation. Dinner and entertainment will follow. This event is intended to be informal, relaxing, and an opportunity for all attendees to meet and socialize.

Full Registration Includes:
Welcome Reception, Technical Sessions, Student Poster Sessions, Exhibits, Registration Packet, Continental Breakfast, Lunch, and Breaks on Saturday, Monday and Tuesday.
Join the American Institute of Professional Geologists (AIPG) and the AIPG Illinois/Indiana Section for the 2011 Conference Geosciences: The Road to a Sustainable Future with our co-host the American Institute of Hydrology (AIH), and our co-sponsor the Lake Michigan States Section of the Air and Waste Management Association (LM-A&WMA) in Bloomingdale, Illinois. This is a great opportunity to promote your company to hundreds of professionals locally and throughout the US. Following is a summary of available sponsor levels, and the associated benefits to you as a sponsor. Sponsorships at the Lake Superior, Lake Michigan-Huron, Lake Erie, and Lake Ontario levels are available to support the conference.

Lake Superior Level: $7,500
- Company name, address and logo on conference website with a link to your company website
- Company logo on cover of Proceedings of the conference
- Company logo on sign at event entrance
- Complimentary Exhibit Booth
- Company acknowledgement during Opening Remarks
- Company logo prominently displayed on sponsor page of conference program
- Two complimentary registrations to the conference
- Company logo displayed on poster boards in reception area
- Company logo on conference registration bag
- Acknowledgement as conference sponsor on Field Trip Guidebooks
- Marketing material will be included in conference registration packet (if desired)

Lake Michigan-Huron Level: $5,000
- Company name, address and logo on conference website with a link to your company website
- Company logo on sign at event entrance
- Complimentary Exhibit Booth
- Company logo on sponsor page of conference program
- One complimentary registration to the conference
- Company logo displayed on poster boards in reception area
- Acknowledgement during technical session breaks
- Marketing material will be included in conference registration packet (if desired)

Lake Erie Level: $2,500
- Company logo on conference website
- Company logo on sign at event entrance
- Complimentary Exhibit Booth
- One complimentary registration to the conference
- Company logo on sponsor page of conference program
- Acknowledgement during technical session breaks

Lake Ontario Level: $1,500
- Company name on sponsor page of conference program
- Company name on sign at event entrance
- Acknowledgement during technical session breaks
- Company name on conference website

Sunday Evening Welcoming Reception: $1,000
- Company logo on sign at Welcome Reception area and bar during reception

YES!! We want to be part of the AIPG, AIH, & LM-A&WMA 2011 Conference, September 10th-13th, in Bloomingdale, IL. The 2011 Conference can count on us as a Sponsor.

___ Lake Superior ($7,500) ___ Welcome Reception ($1,000)
___ Lake Michigan-Huron ______ Student Programs ($1,000)
______ ($5,000)
___ Lake Erie ($2,500) ___ Field Trips ($1,000)
___ Lake Ontario ($1,500) ___ Lunch/Break ($500 - $250)

TOTAL AMOUNT: $________ Date:________
___ Check enclosed (payable to AIPG)
___ Please invoice - payment due within 30 days.
___ Credit Card (circle one) MC, Visa, or American Express

Card Number:________
Expiration Date:______ CVV (3-digit)______
Card Holders Name:________
Signature:________

Sponsoring Individual or Company:________
Contact Name:________
Title:________
Company:________
Address:________
City:________ State:________ Zip:________
Phone:________ Fax:________
Contact’s E-mail:________
Company’s Website Address:________

Send Sponsorship Form Agreement to:
AIPG, 12000 N. Washington St., Suite 285, Thornton, CO 80241
(303) 412-6205 • Fax (303) 253-9220
www.aipg.org clg@aipg.org

AIPG will contact you upon receipt of this form to complete arrangements.
AIPG 2011
NATIONAL CONFERENCE - ILLINOIS
Geosciences: The Road to a Sustainable Future
September 10-13, 2011
Bloomington, IL

PHOTO BY MICHAEL CHRZASTOWSKI

NAME (Last) (First) (Middle Initial) Member of:
EMPLOYER NAME ON BADGE AIPG
ADDRESS CITY, STATE, ZIP CODE AIH
PHONE E-MAIL ADDRESS LM-A&WMA

*SPOUSE/GUEST NAME NAME ON SPOUSE/GUEST BADGE

FEES AND PAYMENT INFORMATION

<table>
<thead>
<tr>
<th>ANNUAL MEETING REGISTRATION</th>
<th>On or by 8/5/11</th>
<th>After 8/5/11</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Registration</td>
<td>$375.00</td>
<td>$400.00</td>
<td>$</td>
</tr>
<tr>
<td>Non-Member Full Registration</td>
<td>$425.00</td>
<td>$450.00</td>
<td>$</td>
</tr>
<tr>
<td>Daily Registration</td>
<td>$190.00</td>
<td>$215.00</td>
<td>$</td>
</tr>
<tr>
<td>*SPOUSE/GUEST Registration</td>
<td>$190.00</td>
<td>$215.00</td>
<td>$</td>
</tr>
<tr>
<td>Student Full Registration</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$</td>
</tr>
<tr>
<td>Daily Student Registration</td>
<td>$40.00</td>
<td>$40.00</td>
<td>$</td>
</tr>
<tr>
<td>I Would Like to Pay for a Student’s Full Registration</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$</td>
</tr>
</tbody>
</table>

FIELD TRIPS (Must be Registered for the Conference)
(All field trips depart and return to the Indian Lakes Resort)

<table>
<thead>
<tr>
<th>Field Trip Description</th>
<th>On or by 8/5/11</th>
<th>After 8/5/11</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Day Trip - Quarrying Indiana’s State Rock-Limestone</td>
<td>$395.00</td>
<td>Registration Closes 7/5/11</td>
<td>$</td>
</tr>
<tr>
<td>Chicagoland Learning Adventure! How Geology Influenced the Chicago Metropolis</td>
<td>$145.00</td>
<td>$170.00</td>
<td>$</td>
</tr>
<tr>
<td>Quaternary Deposits and History of the Ancient Mississippi River Valley, North Central IL</td>
<td>$95.00</td>
<td>$120.00</td>
<td>$</td>
</tr>
<tr>
<td>Upper Mississippi Valley Pb-Zn District Revisited</td>
<td>$125.00</td>
<td>$150.00</td>
<td>$</td>
</tr>
<tr>
<td>Geology of the St. Peter Sandstone and Ottawa - LaSalle Area</td>
<td>$95.00</td>
<td>$120.00</td>
<td>$</td>
</tr>
<tr>
<td>AWG Breakfast with Speaker</td>
<td>$35.00</td>
<td>$35.00</td>
<td>$</td>
</tr>
<tr>
<td>Metropolitan Water Reclamation District of Greater Chicago Tunnel &amp; Reservoir Plan (TARP) Pumping Site</td>
<td>$95.00</td>
<td>$120.00</td>
<td>$</td>
</tr>
<tr>
<td>Lynfred Winery Tour &amp; Tasting</td>
<td>$12.00</td>
<td>$12.00</td>
<td>$</td>
</tr>
<tr>
<td>Kentland, Indiana Meteorite Impact Structure Mine Trip</td>
<td>$95.00</td>
<td>$120.00</td>
<td>$</td>
</tr>
</tbody>
</table>
FIELD TRIPS (Must be Registered for the Conference) (All field trips depart and return to the Indian Lakes Resort)

<table>
<thead>
<tr>
<th>Field Trip</th>
<th>On or by 8/5/11</th>
<th>After 8/5/11</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morton Arboretum Tour (Tues., 9/13, 10:00 am - 3:30 pm)</td>
<td>$55</td>
<td>$55</td>
<td>$</td>
</tr>
<tr>
<td>Fermilab Tour (Tues., 9/13, 11:00 am – 5:00 pm)</td>
<td>$95.00</td>
<td>$120.00</td>
<td>$</td>
</tr>
<tr>
<td>Indiana Dunes of Northwestern Indiana Dune &amp; Shoreline Behavior/Lake-Level Changes (Wed., 9/14, 8:00 am – 1:00 pm)</td>
<td>$95.00</td>
<td>$120.00</td>
<td>$</td>
</tr>
<tr>
<td>Silurian Geology of the Chicago Area and its Contribution to the Infrastructure of the Region (Thornton Quarry - TARP Reservoir) (Wed., 9/14, 8:00 am–5:00 pm)</td>
<td>$95.00</td>
<td>$120.00</td>
<td>$</td>
</tr>
<tr>
<td>2-Day Trip - EarthScope and Economic Geology Pleistocene to Precambrian in Central Illinois (Registration closes 7/5/11) (Wed., 9/14 - Thurs., 9/15; depart 8:00 am Weds. – return 5:00 pm Thurs.)</td>
<td>$395.00</td>
<td>Registration Closes 7/5/11</td>
<td>$</td>
</tr>
</tbody>
</table>

SOCIAL EVENTS/MEETINGS (Must be Registered for the Conference)

<table>
<thead>
<tr>
<th>Event</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome Reception (Sun., 9/11, 6:00 pm – 8:00 pm)</td>
<td>Included with Registration</td>
</tr>
<tr>
<td>AIPG Past-Presidents Breakfast (Mon., 9/12, 7:00 am – 8:30 am)</td>
<td>Invitation Only (please circle if attending)</td>
</tr>
<tr>
<td>Awards, Dinner and Entertainment (Tues., 9/13, 6:00 pm – 8:30 pm)</td>
<td>$65.00</td>
</tr>
</tbody>
</table>

TOTAL AMOUNT DUE: $   

Organization Meetings (see Program for Dates and Times) – Please Indicate if Attending

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Attending</th>
<th>Attending</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIPG National Executive Committee Meeting (9/10)</td>
<td>yes / no</td>
<td>AIPG 2010-2011 Joint Executive/Business Mtg. (9/10)</td>
</tr>
<tr>
<td>AIPG 2010 Advisory Board Meeting (9/10)</td>
<td>yes / no</td>
<td>AIPG Executive Committee Meeting (9/11)</td>
</tr>
</tbody>
</table>

Full Registration Includes: Welcome Reception, Technical Sessions, Student Poster Sessions, Exhibits, Registration Packet, Continental Breakfast, Lunch, and Breaks on Saturday, Monday, and Tuesday.

I understand that by registering for the AIPG/AIH 2011 Annual Convention & Exhibition, I release and agree to indemnify The American Institute of Professional Geologists (AIPG), The American Institute of Hydrology (AIH), the Lake Michigan Section of the Air and Waste Management Association (LM-A&WMA), and their agents, officers, volunteers and employees from all liability for any loss, damage or injury sustained by me while involved in any way with the Convention and Exhibition except that AIPG, AIH, and LM-A&WMA are not released from such liability to the extent the same is caused by its actual negligence or willful misconduct. I have read and understand this waiver and release.

I also understand that submission of this registration form gives AIPG, AIH, and LM-A&WMA 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, etc.).

Hotel Information: Hilton Chicago / Indian Lakes Resort, 250 W. Schick Road, Bloomingdale, IL 60108 (630) 529-0200.

TOTAL AMOUNT DUE $         

METHOD OF PAYMENT

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

Card No. ________________________________  Expiration Date _________  CVV _______

Print name of cardholder: _________________________________________________________

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

______________________________________________________________________________

Authorized Signature ____________________________

Mail to:
American Institute of Professional Geologists
12000 N. Washington Street, Suite 285, Thornton, CO 80241
or fax to (303) 253-9220 or register on-line at www.aipg.org, phone (303) 412-6205

Refund Policy: A 90% refund of total fees paid (10% withheld to cover administrative costs) will be given upon receipt of a written request until 7/31/11. Cancellations made by written notification received between 8/1/11 and 8/31/11 will be assessed a charge of 20% (to cover administrative costs) of the total fee paid. Cancellation of the 2-day field trip made between 7/15/11 and 8/1/11 will be assessed an additional $75 to cover hotel cancellation fees. NO refunds will be given for cancellations received after 8/31/11 or for no-shows after the meeting. Substitutions welcome. Based on the decision of AIPG field trips and workshops are subject to cancellation due to lack of participation. Notification and a full refund for field trips or workshops will be given in case of required cancellations.
YES!! We want to be part of the 2011 AIPG, AIH, and LM-A&WMA Conference, September 10th-13th in Bloomingdale, IL. The 2011 Conference can count on us as an Exhibitor. Mail to: 12000 N. Washington St., Ste. 285, Thornton, CO 80241, or Fax: (303) 253-9220.

___ $695.00 Exhibit Booth *(Includes one complimentary meeting registration)*
___ $200.00 Additional Exhibitor Registrant

### Exhibitor Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>[Enter Name]</td>
</tr>
<tr>
<td>Title</td>
<td>[Enter Title]</td>
</tr>
<tr>
<td>Company</td>
<td>[Enter Company]</td>
</tr>
<tr>
<td>Address</td>
<td>[Enter Address]</td>
</tr>
<tr>
<td>City, State/Province, Zip</td>
<td>[Enter City, State, Zip]</td>
</tr>
<tr>
<td>Phone</td>
<td>[Enter Phone Number]</td>
</tr>
<tr>
<td>Fax</td>
<td>[Enter Fax Number]</td>
</tr>
<tr>
<td>E-mail Address</td>
<td>[Enter E-mail Address]</td>
</tr>
<tr>
<td>Website</td>
<td>[Enter Website]</td>
</tr>
</tbody>
</table>

### Additional Exhibitor Registrant

$200 for each additional person.

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>[Enter Name]</td>
</tr>
<tr>
<td>Title</td>
<td>[Enter Title]</td>
</tr>
<tr>
<td>Company</td>
<td>[Enter Company]</td>
</tr>
<tr>
<td>Address</td>
<td>[Enter Address]</td>
</tr>
<tr>
<td>City, State/Province, Zip</td>
<td>[Enter City, State, Zip]</td>
</tr>
<tr>
<td>Phone</td>
<td>[Enter Phone Number]</td>
</tr>
<tr>
<td>Fax</td>
<td>[Enter Fax Number]</td>
</tr>
<tr>
<td>E-mail Address</td>
<td>[Enter E-mail Address]</td>
</tr>
</tbody>
</table>

### TOTAL AMOUNT: $____

<table>
<thead>
<tr>
<th>Method of Payment</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check enclosed (payable to AIPG)</td>
<td>[Signature]</td>
</tr>
<tr>
<td>Please invoice immediately - payment due within 30 days.</td>
<td>[Signature]</td>
</tr>
<tr>
<td>Credit Card (circle one): Master Card Visa AmEx</td>
<td>[Signature]</td>
</tr>
<tr>
<td>Card Number:</td>
<td>[Enter Card Number]</td>
</tr>
<tr>
<td>Expiration Date:</td>
<td>[Enter Expiration Date]</td>
</tr>
<tr>
<td>CVV (3-digit):</td>
<td>[Enter CVV]</td>
</tr>
<tr>
<td>Card Holder's Name:</td>
<td>[Enter Name]</td>
</tr>
<tr>
<td>Card Holder's Address:</td>
<td>[Enter Address]</td>
</tr>
</tbody>
</table>

### Exhibit Hours

- Set-up Sunday, September 11, 2011, 10:00 am - 4:00 pm
- Sunday, September 11, 2011, 6:00 pm – 8:00 pm (reception)
- Monday, September 12, 2011, 9:00 am – 5:00 pm
- Tuesday, September 13, 2011, 9:00 am – 4:00 pm
- Tear down Tuesday, September 13, 2011, 4:00 pm - 6:00 pm

### Space Requirements

Space will be reserved on a first-come, first-served basis and we will try to honor special requirements.

Indicate your space requirements below:

- [ ] Electrical (please bring your own power strips/electrical cords)
- [ ] Other

Please note that AIPG is not responsible for any lost or stolen items. The exhibit room will be locked at night but we cannot guarantee security.

### AUTHORIZATION

I, on behalf of my company, hereby acknowledge that we have received, read, and understand the 2011 Exhibitor Prospectus and Terms & Conditions. Furthermore, we understand that these Terms & Conditions are a part of this contract and that by signing this application, we agree to be bound by all the terms contained therein.

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>[Enter Signature]</td>
</tr>
<tr>
<td>Date</td>
<td>[Enter Date]</td>
</tr>
</tbody>
</table>
I am honored to be nominated for the position of President-Elect for 2012. I have been an AIPG member for 20-years with the last 14-years serving on the AIPG National Executive Committee (ExCom) and various State Sections (Alaska, Hawaii, and California). From 2006 to 2009, I served on the ExCom as Secretary and as an Advisory Board representative. During this time, I have served on numerous Ad Hoc Committees which include Continuing Professional Development (CPD), Section Membership, Seminar-Short Course, and Certified Professional Geologist (CPG) Practicality. From 2010 to present, I am supporting 2011 AIPG President Sam Gowan by serving on the Support State Sections and Business Plan Ad Hoc Committees. From 2008 to present, I also serve on the Western States National Screening Committee in reviewing CPG applicants.

In 2010, I was appointed to a 5-year term by Mr. Ken Salazar (Secretary of the Interior) in representing the AIPG as a private sector delegate to the Federal Advisory Committee (FAC) of the USGS National Cooperative Geologic Mapping Program (NCGMP). The FAC provides the USGS review and recommendations of the NCGMP’s 5-Year Strategic Plan, and its allocation of an estimated $30-million annual budget which supports the state geological surveys’ mapping programs through grant assistance. It would be an honor and privilege to continue serving AIPG on the ExCom as 2012 President-Elect, and 2013 President. If elected, I intend to promote continuing efforts in the following programs:

Promote increased CPG value and practicality - I have worked with past and present AIPG presidents, and the CPG Practicality and Ad Hoc Support State Section Committees in responding to the needs and issues of the general membership to better serve the AIPG Sections. My goal would be to help the ExCom 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 or renewable energy. This past year in California, I have worked with the ExCom to promote CPG value and geologists’ role in society by supporting the California State Science Fair, and coordinating with geological societies and Assoc. for Women Geoscientists to host future regional conferences.

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). I support the Webinar Committee’s efforts to prepare web-based seminars and/or short courses in conjunction with the American Geological Institute (AGI) and local universities to bring membership more CPD programs that provide CEUs or PDUs.

Increased membership - I support initiating Professional Member and Young Student membership categories as a means to bring in new members to AIPG. The new membership categories are an excellent way for those geoscientists to continue their professional development until such time that they qualify for CPG status. Additionally, I encourage young students to continue development of student sections at the university level, and promotion of earth science and geologic hazards awareness at the lower age groups (K-12 school levels). As CPGs, we provide a valuable network resource for university students or other AIPG members venturing out into a challenging job market. The Business Plan Ad Hoc Committee will look into increasing membership and how to better serve its members through expanded programs and services. AIPG needs to continue taking a pro-active role in providing network and professional development resources to its members as a means to help them meet their career goals and improved marketability. As president, I will strive to preside at all meetings of the Institute and of the Executive Committee, and shall perform the duties customary to the office.

As President-Elect, I would be honored to continue serving on the ExCom and undertaking special projects requested by the incoming 2012 President Barbara Murphy. My current work on the Support State Sections and Business Plan Ad Hoc Committees will allow me to maintain a smooth transition with President Murphy in continuing and/or enhancing AIPG’s programs. Thank you.
I am honored to be nominated as a candidate for the office of President-Elect of AIPG. Like many other experienced professionals, my career changed as the field of geology evolved over time. I started in the petroleum industry during the boom of the late 1970s, and transitioned to the relatively new field of environmental geology in the late 1980s. In the early 1990s, I moved from environmental consulting to a regulatory position with the Georgia Department of Natural Resources. I have been an active member with AIPG for 20 years. I have held a number of positions, and I am currently President of the Georgia Section. Our section has grown significantly during my tenure with AIPG, but there are two areas I’m particularly proud of pioneering: the innovative remediation conferences we now offer our members as well as other environmental professionals outside of AIPG and the six scholarships we award annually to geology students in Georgia. The conferences allow professionals to accrue continuing education hours and distinguishes our section as an invaluable tool and resource to the environmental community. The scholarships assist students striving for excellence, and universities now recognize the importance of collaborating with local professional organizations such as AIPG to integrate real world practicality in their curriculums. At the National level I have served three years as an Advisory Board representative (which I now currently hold), two years as Treasurer, and one year as Vice-President. I was chairman of the Energy Statement committee in 2009. This committee developed a series of professional articles in order to devise a formal AIPG statement and recommendation concerning energy policy. Last year I was a committee member of the Future Roles of State Geological Surveys, which developed a white paper. I am currently chairman of the Student Outreach committee that recently proposed, and was subsequently approved by the Executive Committee, free student membership with AIPG.

As a member of the Executive Committee for the last few years, I have been very supportive of the goals and missions of our past Presidents, including our current President Sam Gowan. We must continue to support the profession of geology, but AIPG must also provide unique and significant value to all geologists.

The last few years more sections are offering one to two day continuing education courses. National Headquarters runs the annual conference and has had great success in having at least one regional conference on a subject of national interest. This year the number will increase to at least three conferences. These conferences will help educate our members by providing the newest information available and by allowing members to earn their educational training requirements. Since our organization has members with numerous and diverse backgrounds, we can offer the geology community great insight and expertise. AIPG should encourage all sections to offer more services like these in order to promote our goals and increase our membership.

AIPG can truly have a more profound impact at the section level rather than the national level. National can give you some of the tools to be successful but officers at the section level must be motivated to have an active and engaging section. Last year as Vice President I gave all sections at the annual meeting information including student resources and a presentation on geology careers. This presentation was designed so that our members can give talks to high school and university students interested in the geology profession. I am currently finalizing an energy resources presentation that will be available in the near future to all members. These are just a few of the activities we should support that demonstrate AIPG’s value to members.

Another important area is our student members. Offering free membership as long as they are students will increase our enrollment and our chance of having them as professional members in the future. We, as professionals, can offer much to geology students: career networking, mentoring, career opportunities, and career development. We should show our students the personal challenges, successes, and opportunities our professions have to offer. Recently, our section, as indicated in the Jan/Feb TPG article, organized a geology field day for students, professors, and professionals. One of our primary goals should be to reach out to as many students as possible and to encourage the development of AIPG student chapters. In Georgia, we have successfully established two student chapters and look forward to establishing many more.

I am very honored to be nominated and look forward to an opportunity in continuing the important work of AIPG by strengthening the programs we offer, serving the geology community, and developing our student members. For additional information, please go to my web site at http://sites.google.com/site/ronwallacegeologist/. I hope you will vote for me so I can continue to serve our membership.
My sincere thanks go out to the Nominating Committee and Executive Committee for recommending and approving my candidacy for Vice President. These are challenging times for our world, our nation, AIPG and indeed each of us individually. As scientists we are here to meet the technical challenges of safe and reasoned procurement of natural resources, the advancement of the science and teaching thereof. We are also challenged with their appropriately regulated use for the betterment of our fellow man while protecting the environment within which we live and work. As professionals we strive to achieve these goals in an atmosphere of ethics and fairness. These are serious endeavors and I feel both honored and humbled by this nomination for a leadership role.

In accordance with AIPG’s Strategic Plan, one of the key roles of the Vice President is as liaison with the Sections. I have a laptop, printer, phone and mail service, decent tires on my Jeep and soles on my shoes and I can assure you I’m not afraid to use them. In my role with the National Screening Committee since 1993 and as Chairperson since 2003, I’ve been in contact with the Sections at various levels for a variety of reasons and have always come away pleased with their enthusiasm and willingness to assist. At the same time, each section faces its own set of challenges. Some of these challenges are unique but many bear striking similarities. And while some of the challenges are recent in origin, quite a few resemble challenges they and others faced from 15 to 20 years ago. Opportunities abound to share the experiences of other Sections, and the Institute at the national level can do much to further enhance and strengthen the Sections and their programs. The Sections are the eyes and ears on a state or regional level as to changes in our profession. I would appreciate the opportunity to meld the successes of more active Sections into approaches that can be applied by those struggling in that quest. To extract and share that which works will benefit both the Sections and the national Institute.

A good many years ago, as a newer member of AIPG, I wondered aloud as to whether our ranks could be expanded with a category for students and those who were accumulating experience for the day they would qualify for CPG. Not long thereafter the Executive Committee took that thought to heart and created the Student and Member categories. Then came the Student Chapters and a bit more liaison with the universities. Students began showing up at Section meetings and even some at National meetings. We now have a much stronger platform for recruitment at each of these levels. AIPG’s Strategic Plan charges the Vice President specifically with the promotion of Student Chapters in their liaison activities with the Sections. I would welcome the opportunity to further that effort with the Sections and universities wherever possible. These entry level geologists are our future and our future CPG’s.

Applicant screening and membership have been a great interest of mine since the late 1980’s. As part of that process, I have been involved with installing the infrastructure; the National and Section level screening committees, and instituting procedures; the screening procedures, checklists, guidelines, transmittals that were originally by mail and now are completed electronically. The process was modified as necessary and appropriate alternative methods were developed and implemented to assist applicants with the process. In the last several years we’ve brought the application process from a 4 to 8 month period down to generally a couple of months while maintaining the high standard we set for Certified Professional Geologists. Yet we face continuing challenges as the universities respond to pressure to broaden their programs with new offerings some of which are only tangentially related to the real core of geology. I will remain involved with AIPG’s reinforcement of our requirements for a high level of competency to be associated with the CPG title while working with the universities where possible to maintain within their programs a mandatory core of basic geologic knowledge.

As your Vice President I will work to maintain the high standards the Institute has set within the context of today’s dynamic professional environment. Our Mission and Strategic Plan call for the American Institute of Professional Geologists (AIPG) to be an effective advocate for the profession of geology and to serve its members through activities and programs that support continuing professional development and promote high standards of ethical conduct. I believe our future lies within this mission. You and I are part of that future.
What do the 5,000+ members of the AIPG look for in a Vice Presidential candidate? Perhaps the following profile of my 35+ years of professional geologist career, leadership positions, and a commitment to serve you in this capacity will match your desired criteria.

Like many of you, I have experienced the business cycles and ups and downs of a multi-disciplined career. In its 50 years of service, the AIPG has and will continue to transcend these cycles, including all of our disciplines, while promoting all geological sciences and maintaining the highest ethical standards. Increasing demands for professionalism in the science will be a catalyst for a renewed need for Certified Professional Geologists. Part of this demand will be the pending changes in international “qualified person” requirements, which will no longer recognize state-registered professional geologists. In addition, some states will be eliminating, or at least attempting to revoke, their licensure laws. Many professional geologists in these states will be seeking assistance from AIPG to thwart the developing trend of licensure revocation. AIPG must be prepared for these changing scenes, and determine how to respond to this call for help.

For 9 of the last 11 years I have held the following leadership positions with the Colorado State Section of the AIPG: president, vice president, secretary, and advisor. The Colorado Section is privileged to be home to the National Headquarters Office, providing easy access and interaction with the National AIPG. Colorado has hosted two recent national conferences, Glenwood Springs in 2003 and Grand Junction in 2009. For the 2009 National Conference, I worked directly with the Grand Junction Geological Society, a sister organization and co-host, to bring statewide and national geologists together for an industrious conference. A highlight of that conference for me was co-leading a field trip through the Uravan Mineral District.

As Colorado Section President in 2008, along with the national executive committee and other section representatives, I attended the national conference in Flagstaff, AZ. These national events create dynamic opportunities for geologists to interact with one another across the country and across our multi-faceted disciplines, which benefits each of us with new ideas and innovative approaches to our work.

As the elected Vice President, I will maintain communication with the state sections in support of President-Elect, Barbara Murphy’s platform. After discussing the Strategic Plan with Barbara, I whole-heartedly support her agenda. We will work together to promote the AIPG with the resources of our headquarters, expanded website, and continuing education opportunities. But more important to achieving real action and progress is to find and enlist the AIPG members just waiting for volunteer opportunities (could this be you?). Together with increased communication and awareness of membership benefits, we can produce synergy within state sections and individual geologists. An example is AIPG’s partnership with AGI in the production and promotion of webinars which will strongly support continuing professional development.

Current VP, Foster Sawyer, has graciously shared his experiences, platform and efforts about the nature and duties of the Vice Presidency. It is with this understanding of the position (and a review of the bylaws) that I will continue the efforts to increase student involvement and membership into the AIPG.

One key responsibility is maintaining a healthy liaison between the sections and the national executive committee. I pledge to do this and as such, will strive to improve the vitality of the sections and future growth of the institute. I will increase contact with the sections from an annual basis to communicating with each section quarterly. I believe through national AIPG interaction with the sections, the significance of the AIPG can be greatly improved. Foster and I will develop a strategic plan to promote the 2012 AIPG National Conference in South Dakota, which will include the lofty goal of having participation from every section. (Don’t forget this year’s conference in Chicago - Are your bags packed?)

Working closely with the oil and gas, mining industries, and municipalities as an environmental consultant in regulatory compliance and permitting, it is quite clear the critical need for the AIPG and members to have an active role with state legislatures and local governing agencies. The Colorado Section is fortunate to contract a part-time lobbyist to inform us of possible legislation changes. This enables us to solidify our position of strength in regulatory decisions and policies. I strongly encourage other sections to become involved in their own community and state legislative process, and I will provide assistance via the VP position.

Confident that my experiences in several geologic disciplines, my communication and organizational skills, which will enhance and support our growing programs and services, it would be a privilege and high honor to serve this stalwart organization as Vice President. I welcome your comments and suggestions at my personal email address: goe-cav@comcast.net. Thank you for your vote!

E. Thomas (Tom) Cavanaugh, CPG-10493, Arvada, Colorado

www.aipg.org
I was both honored and humbled to receive a nomination for the position of AIPG National Secretary. Honored to be considered as a candidate worthy of fulfilling the duties of this important position, and humbled by the opportunity to follow in the footsteps of our past outstanding national officers who have ably guided the Institute and represented the membership of AIPG. I strongly believe in giving something back to the profession that has given me such a fulfilling and rewarding career, and it was with gratitude, excitement, and anticipation of the many possibilities for the future of AIPG that I accepted the nomination.

My prior service to AIPG has included terms as the South Dakota Section President, as a member of the National Advisory Board, and currently as the National Vice President. I presently serve on the Ad-Hoc Committee on Support of Sections, the Student Outreach Committee, and the Organization Committees for both the 2011 and 2012 Annual National Conferences. As National Vice President, I also act as liaison to the AIPG State Sections which has greatly enhanced my perception of the broad spectrum of issues and challenges faced by our various Sections across the nation. All of these activities have helped me to more clearly focus on key aspects of our Strategic Plan and to understand that the need to meet the objectives of the Strategic Plan is more urgent now than ever before for the future of the Institute and to the practice of professional geology.

My profession as a faculty member of a geoscience department also has afforded an interesting perspective on a particularly critical aspect of professional geology – the importance of attracting young people to geoscience fields and of preparing them for successful careers as professional geologists. I recently returned from a geologic field trip to New Zealand with fifteen geology students, and I was amazed by the excitement and enthusiasm for geology that this trip engendered in the students (and the faculty)! It reinforced to me the necessity of continuously piquing the interests, stretching the horizons, and bolstering the enthusiasm of young people interested in geosciences. With a field of study as broad and fascinating as our dynamic planet, it is a pleasure and privilege to do so, and I relish the future opportunities to stimulate young people in geosciences through avenues provided by AIPG activities.

Regarding the position of AIPG National Secretary specifically, there are few activities more important than accurate documentation and reporting of the work of the National Executive Committee for the membership and staff of AIPG. Ours is an extremely professional society, and part of maintaining the level of professionalism attained by our predecessors includes producing accurate, thorough records of the proceedings of the Institute, and clearly conveying those proceedings to the membership. In addition, I firmly believe that all AIPG officers, regardless of their position, should contribute in any way appropriate to the furtherance of the practice of professional geology and to the overall growth and development of the Institute.

If elected, I cannot guarantee that I will match the achievements of our accomplished past officers; however, I can promise that I will perform the duties of the National Secretary to the utmost of my abilities, that I will record and report the actions of the National Executive Committee accurately and honestly, and that I will apply myself in every way possible to promote and develop the practice of professional geology.

Thank you for your consideration and for your continued support of the American Institute of Professional Geologists.
I am honored to be nominated for election as National Editor 2012-2013. I was the AIPG National Editor in 2001-2003 and enjoyed working with the executive committee and performing editorial tasks. Since then, our country saw an increase in economic growth, followed by a major recession, which has left some of our members out of work or barely functioning under reduced budgets.

However, as geologists we are entering an exciting time for our profession. We are moving out of the economic recession. Commodity prices have increased and mining and petroleum exploration and production are increasing. We are slowly re-entering an economic “boom” that could last for a decade or more. Future production and consumption of minerals and petroleum will increase 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 populations. Mining and petroleum production can and should be done according to today’s environmental standards and minimize the impacts to the environment and to world climate. AND geologists form the core of these extractive industries, including meeting environmental and climatic 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 more sustainable industries are developed that will allow for continued growth of mining communities when the mine closes. Water supplies in many areas of the world are in short supply and geologists and hydrologists must meet these ever increasing demands for more fresh water. AIPG and its members are meeting these challenges and we need to let others know that we are and how. Our profession and our Institute have changed dramatically since I became a working geologist in 1980, 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, climate, and urban geology. All of these fields and specialties will be needed in the future and AIPG needs to be involved in many of these challenges facing our profession.

Our Institute must continue to take the lead in state certification where appropriate. We need well-defined legislative programs to promote our profession and enable us as an Institute to help solve geological problems that affect the public. AIPG is on track as an active organization meeting these challenges with 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 editors and 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 kept the cost down by publishing TPG 6 times a year instead of 12 times a year. The directory is available to all members on our Web page. We also added new features to TPG during my tenure. The 2003 Student Issue was a success and well received and is 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 again as National Editor.

We must find ways to encourage junior and senior high school students to choose geology as a career and then we must find ways to keep them interested as college students and beyond—the TPG student issue is one example of that success. TPG provides one mechanism that AIPG has to communicate not only to its members, but also to the public at large. We can expand this effort to include our young students and their teachers.

In summary, my goals as your Editor are to 1) continue the efforts of past editors to improve and expand the scope of the Institute’s publications, 2) to broaden the understanding of geologic concepts to the public, especially secondary students and their teachers, 3) continue to encourage student participation in AIPG and TPG, and 4) to continue to provide a forum for controversial issues facing our profession, such as water, environmental, climate change, mining, the need for minerals for green technologies.

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 Editors have done before me to strengthen AIPG. I am looking forward to meeting these challenges as Editor for your Institution!
CANDIDATE FOR AIPG NATIONAL PRESIDENT-ELECT 2012

Mark W. Rogers
CPG-08926
Long Beach, California

Statement of purpose or goals you have for AIPG: To continue implementing the initiatives begun by recent presidents which includes promoting the profession of geology, supporting continued professional development (CPD) and the careers of geologists, fostering cooperation and support between the State Sections and National, and providing value (i.e., Web-based CPD Courses, Regional Conferences / Seminars) to members and potential members including state licensed Professional Geologists, and recently added professional member and young student membership categories.

Universities Attended
- University of Idaho
- University of Alaska-Anchorage

Company
- Alaska Gold Company
- Smith-Emery Company
- WestGold Explor. & Mining, Ltd.
- WGM Mining Consultants
- Dames & Moore Consultants
- RZA AGRA-Alaska, Inc.
- GeoEngineers, Inc.
- Dawson Group, Inc.
- Masa Fujikawa & Assoc.
- Parsons Infrastructure & Tech.
- Environmental Chemical Corp.
- ERRG, Inc.

AIPG Activities:
- Alaska Section Executive Committee 1997-01
- Alaska Section State Geology Registration Chairman 1999-01
- Alaska Section President-Elect 2000-01
- Hawaii Section President 2003-05, 2008
- Hawaii Section Screening Committee Chairman 2004-08
- California Section Secretary 2009-present
- AIPG Western States National Screening Committee 2008-present
- AIPG National Technical Presenter at 41st Annual Meeting 2004
- AIPG National Presidential Certificate of Merit 2004
- AIPG National Certificate of Appreciation, CPG Practicality Committee 2005
- AIPG National Secretary 2006-07
- AIPG National Advisory Board Representative 2008-2009
- AIPG National AD Hoc Committee on Support of State Sections 2010-2011
- AIPG National Business Plan Committee 2010-2011
- AIPG Delegate to Federal Advisory Committee, USGS NCGMP 2010-present

Table 1: Universities Attended

<table>
<thead>
<tr>
<th>Universities Attended</th>
<th>Degrees Granted</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamar University</td>
<td>BS, Geology</td>
<td>1983</td>
</tr>
<tr>
<td>University of Kansas</td>
<td>MS, Geology</td>
<td>1979</td>
</tr>
</tbody>
</table>

Table 2: Companies and Titles

<table>
<thead>
<tr>
<th>Company</th>
<th>Title</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska Gold Company</td>
<td>Engineering/Exploration Geologist</td>
<td>1981-86</td>
</tr>
<tr>
<td>Smith-Emery Company</td>
<td>Environmental/Engineering Geologist</td>
<td>1987</td>
</tr>
<tr>
<td>WestGold Explor. &amp; Mining, Ltd.</td>
<td>Project / Exploration Geologist</td>
<td>1987-88</td>
</tr>
<tr>
<td>WGM Mining Consultants</td>
<td>Project / Exploration Geologist</td>
<td>1988-91</td>
</tr>
<tr>
<td>Dames &amp; Moore Consultants</td>
<td>Engineering Geologist</td>
<td>1991</td>
</tr>
<tr>
<td>RZA AGRA-Alaska, Inc.</td>
<td>Project Geologist</td>
<td>1991-93</td>
</tr>
<tr>
<td>GeoEngineers, Inc.</td>
<td>Project Geologist</td>
<td>1993-2001</td>
</tr>
<tr>
<td>Dawson Group, Inc.</td>
<td>Office Mgr./Sr. Project Mgr.</td>
<td>2001-02</td>
</tr>
<tr>
<td>Masa Fujikawa &amp; Assoc.</td>
<td>Senior Project Manager</td>
<td>2002-03</td>
</tr>
<tr>
<td>Parsons Infrastructure &amp; Tech.</td>
<td>Senior Project Manager</td>
<td>2003-04</td>
</tr>
<tr>
<td>Environmental Chemical Corp.</td>
<td>Project Manager / Senior Hydrogeologist</td>
<td>2004-08</td>
</tr>
<tr>
<td>ERRG, Inc.</td>
<td>Project Manager</td>
<td>2008-present</td>
</tr>
</tbody>
</table>

Table 3: AIPG Activities

<table>
<thead>
<tr>
<th>AIPG Activities</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIPG Georgia Section Executive Committee</td>
<td>1997-1998</td>
</tr>
<tr>
<td>AIPG Georgia Section Vice President</td>
<td>1999-2001, 2010</td>
</tr>
<tr>
<td>AIPG Georgia Section President</td>
<td>2000-01</td>
</tr>
<tr>
<td>AIPG Georgia Section Screening Committee</td>
<td>2008, 2009, 2011</td>
</tr>
<tr>
<td>AIPG National State Affairs Committee Chairman</td>
<td>2006-2008</td>
</tr>
<tr>
<td>Presidential Certificate of Merit Georgia State University Student Chapter</td>
<td>2006</td>
</tr>
<tr>
<td>AIPG National Treasurer</td>
<td>2007-2008</td>
</tr>
<tr>
<td>AIPG National Energy Statement Committee</td>
<td>2009</td>
</tr>
<tr>
<td>Presidential Certificate of Merit Energy Statement Committee</td>
<td>2009</td>
</tr>
<tr>
<td>AIPG National Vice President</td>
<td>2010</td>
</tr>
<tr>
<td>Martin Van Couvering Memorial Award</td>
<td>2010</td>
</tr>
<tr>
<td>AIPG National Future Roles of State Geological Surveys Committee</td>
<td>2010</td>
</tr>
<tr>
<td>AIPG National Student Outreach Committee Member</td>
<td>2010</td>
</tr>
<tr>
<td>AIPG National Student Outreach Committee Chairman</td>
<td>2011</td>
</tr>
</tbody>
</table>

Ronald J. (Ron) Wallace
CPG-08153
Roswell, Georgia

Statement of purpose or goals you have for AIPG: To continue to show value to our members and to all professionals. To support the continued growth in educational training by conferences, workshops, and field trips. To reach out to the universities and students and show them the opportunities they will have as professional geologists and how AIPG can help them reach their goal.

Universities Attended
- Lamar University
- University of Kansas

Degrees Granted
- BS, Oceanographic Technology 1973
- MS, Geology 1979

Company
- Skidaway Inst. of Oceanography
- Exxon Company, USA
- Exxon Company, USA
- Engineering Science
- Sierra Piedmont
- Mill Creek Environmental Services
- Georgia Envr. Protection Division
- Senior Geologist to Advanced Geologist 1999-present

AIPG Activities:
- AIPG Georgia Section Executive Committee 1997-1998
- AIPG Georgia Section Vice President 1999-2001, 2010
- AIPG Georgia Section President 2002-2009, 2011
- AIPG National State Affairs Committee Chairman 2006-2008
- Presidential Certificate of Merit Georgia State University Student Chapter 2006
- AIPG National Treasurer 2007-2008
- AIPG National Energy Statement Committee Chairman 2009
- Presidential Certificate of Merit Energy Statement Committee 2009
- AIPG National Vice President 2010
- Martin Van Couvering Memorial Award 2010
- AIPG National Future Roles of State Geological Surveys Committee 2010
- AIPG National Student Outreach Committee Member 2010
- AIPG National Student Outreach Committee Chairman 2011

Reserve Your Room Today!

Hilton Chicago/Indian Lakes Resort
250 W. Schick Road
Bloomingdale, Illinois 60108
(630) 529-0200

Room rates are $109 a night in our room block. Remember to mention American Institute of Professional Geologists to get the discount rate.

Book by August 23, 2011
See you there!!
Lawrence M. (Larry) Austin
CPG-05181
Grand Rapids, Michigan

Statement of purpose or goals you have for AIPG: My goals for AIPG are to further strengthen our National level relationship with the Sections, smooth the membership and certification processes as possible while maintaining our high standards for the Certified Professional Geologist. In a larger sense I’d like to see AIPG continue to strengthen our relationships with Canada, Europe, Australia and to open discussions with professional geologists in Africa, Asia and South America as possible.

Universities Attended
Grand Valley State College
Western Michigan University

Company
Williams & Works
Aqua-Tech Consultants, Inc.

AIPG Activities:
AIPG-Michigan Section successive officers (Sec-Treas to Past Pres) Culminating in 1988
AIPG Advisory Board Rep to Exec Comm
AIPG National Screening Committee Chairman
AIPG-Michigan Section Certificate of Recognition, 1999
AIPG Martin VanCouvering Memorial Award, 2005
AIPG Presidential Certificate of Merit, 2007
AIPG 25 Year Recognition of Active Support, 2008
AIPG Honorary Membership, 2010

E. Thomas (Tom) Cavanaugh
CPG-10493
Arvada, Colorado

Statement of purpose or goals you have for AIPG: To enhance the communication with all of the state sections, increasing the sharing of ideas between all sections and with the National Executive Committee to stimulate growth and development of sections while working with the current VP to make a transitional change and continue his efforts. My goals include assisting the president in affecting her agenda, the AIPG strategic plan, strengthening the stature of CPG, and promoting the National Conferences.

Universities Attended
Colorado School of Mines
Colorado School of Mines

Company
Power Resource Corporation
Yellowstone Resources, Inc.
Jayare Exploration, Inc.
CavTRAC Enterprises, Inc.
McLaughlin Water Engineers and ASCG, Inc.
O & G Environ. Consulting, LLC
BCI Engineers’ & Scientists, Inc., AMEC-BCI

AIPG Activities:
AIPG Colorado Section, Secretary 2001
AIPG Colorado Section, Vice President 2003
AIPG Colorado Section, Vice President 2005
AIPG Colorado Section, Advisor 2006
AIPG Colorado Section, President-Elect 2007
AIPG Colorado Section, President 2008
AIPG Colorado Section, Advisor 2009
Co-Field Trip Leader, National Conference in Grand Junction 2009
AIPG Colorado Section, Advisor 2010
AIPG Colorado Section, Vice President 2011
CANDIDATE FOR AIPG NAT’L SECRETARY

J. Foster Sawyer

CPG-10000
Rapid City, South Dakota

Statement of purpose or goals you have for AIPG: To promote the role of geologists as decision makers, providers of critical information, and public educators regarding our natural resources. To stimulate growth and development within struggling and inactive State Sections. To increase student participation in AIPG through student participation in meetings and field trips, and through increased interaction between AIPG and geoscience departments across the nation.

Universities Attended

<table>
<thead>
<tr>
<th>Company</th>
<th>Title</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inyan Kara Group, LLC</td>
<td>Vice President</td>
<td>1996-present</td>
</tr>
<tr>
<td>South Dakota Geological Survey</td>
<td>Hydrology Specialist</td>
<td>1999-2008</td>
</tr>
<tr>
<td>S.D. School of Mines &amp; Tech.</td>
<td>Assistant Professor</td>
<td>2008-present</td>
</tr>
</tbody>
</table>

AIPG Activities:

- AIPG South Dakota Section “Geologist of the Year” Award 2004
- AIPG South Dakota Section President 2002-2009, 2010
- AIPG National Advisory Board Representative 2010
- AIPG National Age of the Earth Committee Member 2010
- AIPG National State Geological Survey Committee Member 2010

OFFICIAL AIPG 2011 BALLOT
NATIONAL OFFICER ELECTION

PRESIDENT-ELECT — (To be President 2013)

☐ MARK W. ROGERS

☐ RONALD J. (RON) WALLACE

VICE PRESIDENT — (Term of Office 2012)

☐ LAWRENCE M. (LARRY) AUSTIN

☐ E. THOMAS (TOM) CAVANAUGH

SECRETARY — (Term of Office 2012 and 2013)

☐ J. FOSTER SAWYER

EDITOR — (Term of Office 2012 and 2013)

☐ VIRGINIA T. (GINGER) McLEMORE

AIPG Bylaws – 5.2.6. Election of Officers – Election of officers shall be by a ballot. The ballot shall be sent to all Members by May 15. Election shall be by the majority of all qualified ballots cast. In order to be counted, ballots must be received at Institute Headquarters on a date named by the Executive Committee, which date shall be no later than June 30.

BALLOTS MUST BE RECEIVED AT HEADQUARTERS BY JUNE 30, 2011. YOUR AIPG NAME AND MEMBER NUMBER MUST BE PRINTED BELOW FOR THE BALLOT TO BE VALID.

Only AIPG CPG’s and MEMBERS are authorized to Vote.

Mail in this ballot or Vote Online

Name __________________________________________________________

Member Number________________________________________________
Promoting Our Profession to Students

Robert A. Stewart, CPG-08332

On Tuesday, March 22, 2011, I moderated a technical session at the combined meeting of the northeast and north-central sections of the Geological Society of America (GSA) in Pittsburgh, PA. The title of the session was “Employment Opportunities.” I proposed this session to the GSA as a way of introducing geoscience students to various aspects of professional employment. The topics included mineral exploration, environmental consulting, environmental regulation, the interviewing process, career tracks, how to advance your career, and pitfalls to avoid:

1. Use Of Glacial Geology For Mineral Exploration (Bob Stewart, CPG-08332)
2. So You Want Me To Hire You—An Employer’s Reflections On The Interviewing Process (Bob Stewart)
3. Your Career As An Environmental Scientist (Raphael Ketani, CPG-09003)
4. Interviewing Tips For Recent Geoscience Graduates (Laurie Scheuing, CPG-09898)
5. Some Perspectives On The Status Of Geoscience Training For Environmental Geology (Bob Stewart)
6. Landing Your First Professional Position: Do's And Don’ts From An Employer's Perspective (Mark Eisner)

As is typical of many professional meetings, abstract submission lags until the last minute, helped in this case by a December snowstorm, which gave authors a few extra days. As the session convener I was able to monitor the submittals, and with a little more than a week until deadline, I had nothing. I also had no intention of cancelling the session, so, ever the optimist, I counted on the goodwill of an enthusiastic student audience that would be willing to listen to me expound on my various geological careers (mineral exploration, academia and environmental consulting), and submitted three abstracts just in case I was the only act in the show.

Happily for all, colleagues from the Northeast Section and elsewhere provided four additional abstracts to fill out the session. The presenters included private consultants and one regulator. We spoke to a group of 70+, with standing room only in our room. The students, and a few faculty members, got a great education about technical, financial and administrative aspects of private sector work and the regulatory basis for environmental site assessments and remediation. Raphael Ketani gave the only presentation from a regulator’s point of view, which impressed the audience with the breadth of settings, particularly residential, in which oil and chemical spills occur. Most of the audience had not considered that home heating oil tanks, above-ground and underground, can spawn problems comparable to those found at larger commercial and industrial properties.

Along with my presentation on the interviewing process, Bob Blauvelt, Mark Eisner and Laurie Scheuing shared their experiences and guidance on matters of professional practice and ethics as interviewees, new hires, and early-career geologists. On-the-job health and safety was a recurring theme, and other than the routine requirement for OSHA HAZWOPER training, most students were unfamiliar with this concept as a central principle of the consulting business – worker safety comes first, and is an integral part of planning the scope of work and budget for any project. Students are expected to comply with their college or university’s code of conduct, including academic honesty, and such behavior continues with the professional ethics demanded by future employers, whether in the public or private sectors. Our presenters recounted a number of examples.

The only drawback to our session was the 15-minute time limit on each presentation, and every one of us went over. The audience didn’t seem to mind, and the stories were clearly holding everyone’s attention. Lunchtime forced us to end the session, which then segued into the John Mann Mentors in Applied Hydrogeology Student Luncheon, where the fun continued. The Mann Luncheon was complemented by the Roy J. Schlemon Mentors in Applied Geology Student Luncheon, and both are regular GSA events at its meetings. The luncheons place students with (mainly) non-academic geologists in a speed-dating format (change tables every 10 minutes), allowing the students to learn about various geoscience careers from a variety of practitioners. Several of the presenters were able to participate in one or both of the luncheons.

We finished the luncheon on Tuesday thoroughly talked out before travelling home. Over the years, we’ve all accumulated a personal library of professional successes and failures, both amusing and dead-serious, and although we may be guilty of too-often repeating our stories to long-suffering colleagues or family, there is nothing more refreshing than telling the same stories, for the first time, no less, to an audience of geoscience students still contemplating their future plans in the profession. Bringing together professionals in a technical session to talk to students is an effective model, and there are others that also work well, such as panel discussions and field demonstrations, which other AIPG sections have used effectively. Regardless of format, this is one of the most fulfilling events a section can offer future generations of geoscience professionals, and I encourage you to try it.
DEEP FOUNDATIONS INSTITUTE

36th ANNUAL CONFERENCE on
Deep Foundations

BOSTON
OCTOBER 18 - 21
2011

THE SEAPORT HOTEL AND
WORLD TRADE CENTER
200 Seaport Boulevard  Boston, MA 02210
www.seaportboston.com

RESERVATIONS:
Call 1-877-SEAPORT, mention the group code of DFI1101, and request the group rate of $254 for Deep Foundations Institute. Click here to make reservations online.

For assistance contact DFI's Travel Coordinator, Lorraine Engelman, at Lorraine@blueribbon.travel or 1-718-767-5455

This discounted room rate is for DFI Attendees and is subject to a cut-off date of Monday, September 26, 2011 and availability. The special rate will also be honored 3 days prior and 3 days following the conference, based on availability.

CONFERENCE HIGHLIGHTS

October 18:
- Pre-Conference Events
  - Importance of Testing and Inspection for Deep Foundations Short Course
  - Deep Foundations for Landslides and Slope Stabilization Short Course
- Student Pile Prediction Competition
- DFI Technical Committee Meetings

October 19-21:
- DFI Technical Committee Meetings
- Technical Program
  - Preliminary Session Topics:
    - Unique Deep Foundation Solutions for Constrained Urban Areas
    - Deep Foundation Applications to Renovations and Retrosfits of Existing Structures
    - Evolution and Change in Deep Foundation Design and Construction
    - Current Trends and Issues
    - Innovations and Advancements in Deep Foundations
    - If I Only Knew Then What I Know Now: Lessons Learned
  - Keynote Lecture: Overview of Central Artery Project by Dave Thompson, Haley & Aldrich
  - Hal Hunt Lecture by Craig Omlsted, Cape Wind Associates
- Exhibition Hall Attractions
  - Over 90 Contractor, Supplier and Consultant Displays
  - Cooperating Organization Displays
  - Poster Presentations
  - Student Job Fair
  - Internet Café
  - Chilean Mine Rescue Display (replicas of rescue capsule and LP Drill)
- Social Events
  - Welcome Lunch
  - Welcome Reception
  - Business Meeting Lunch
  - Networking Breaks
  - Awards Banquet (separate ticket required)
    - Distinguished Service Award
    - Outstanding Project Award
    - Special Lecture on Chilean Mine Rescue by Center Rock Inc.
  - Companions Program
    - Full Day Tour of Boston, Welcome Tea, Welcome Reception and Breakfasts
  - Post Conference Boat Tour of Harbor (separate ticket required)
    - Lunch
    - Introduction of Boston’s Man-Made Land by Nancy Seasholes
    - On-Boat Guide Narration by David Woodhouse

For more information or to register call 973-423-4030 or visit www.deepfoundations2011.org
1. This chemical element has an atomic number of 23 and is used in the strengthening of steel and titanium. It is found in minerals such as “patronite” and “carnotite” and it occurs in association with magnetite in mafic and ultramafic igneous rocks, as well as with bauxite and fossil fuels (like crude oil, oil shale, coal, etc.):

   a) Vanadium
   b) Zirconium
   c) Molybdenum

2. This clay mineral is characterized by hexagonal flat sheets with a width to thickness ratio of about 5 to 1, has low affinity for water, low surface activity and exhibits an x-ray peak at about 7.2 Å. What is it?

   a) Goethite
   b) Smectite
   c) Kaolinite

3. This orogenic system consists of mainly folded mountains of sedimentary strata uplifted in the Late Jurassic and extends from Morocco to Tunisia:

   a) Ahaggar Mountains
   b) Massif De L’Air
   c) Atlas Mountains

4. We have found a thick and extensive shale deposit with TOC values ranging from 4% to 10%, Ro values ranging from 0.3% to 0.45% and a substantial predominance of Type III kerogen. What is the most likely characterization of this stratigraphic unit in reference to its unconventional hydrocarbon resource potential?

   a) A mature and organic-rich oil-prone strata
   b) An immature and organic-rich gas-prone strata
   c) An organic-poor and immature gas-prone strata

5. Given a stream channel with a width of 350 feet and a hydraulic radius of 21.875 feet, what would we expect its wetted perimeter to be?

   a) 350 feet.
   b) 400 feet.
   c) 450 feet.
   d) Give me a break!
Ramblings About Ethics

Samuel W. Gowan, CPG-07284

I always enjoy reading David Abbott’s, CPG-04570, TPG column on “Professional Ethics and Practices”. The column gets me thinking about the various forms that ethical issues can take and how varied our responses will be. Questions of ethics arise often in my professional practice, and I find that not everyone within our own small consulting firm has a clear view of what is proper or improper. This is not meant to imply a tendency toward improper behavior, but, rather is a result of not having a clear view of where to draw the line.

The example, “Receipt of an Unexpected Bonus after Work is Completed”, that was discussed in David Abbott’s column in the January/February 2011 issue of the TPG, is a perfect illustration of the fuzzy line. In my view, there is nothing wrong ethically with accepting the bonus after the work is completed since there can be no influence on the product; however, choosing to accept the bonus may open one to issues for future projects. Acceptance of the bonus may lead to a sense of obligation on any additional projects. My choice is to reject the bonus and anticipate return business and referrals. These are the key ingredients to successful consulting.

Some situations are much more blatant and, perhaps, bordering on criminal. My first experience with these types of situations was while working as a field geologist on a lignite prospect in Texas during my first two years out of college. The land man, who was responsible for obtaining drilling permits on unleased property, was approached by a wealthy landowner who offered to pay him $10,000 if he would give him a map with resource data for the prospect. To put this in perspective, the annual salaries at the time for both the land man and myself were in the range of $8,000 per year. The deal was simple, the land man only had to leave the map on the seat of his vehicle with the windows down while in the local fast food establishment. The land man, who was 35 years my senior, asked my advice, which was a simple “no” with an explanation of why this was a huge mistake with career ending potential. I believe he took my advice.

I had another experience myself on the same lignite prospect, though the maneuver was not as overt. Our entire crew, which included myself, our drillers, the geophysical logging technician and the land man, were invited to a ranch where we were provided our fill of the best cuts of beef and beer. I was young and naive, but that changed quickly when I was met, as I arrived, by one of the drillers who informed me that the landowner was expecting resource information for his gracious hospitality. I met the landowner momentarily and refused to give any information. He became cool and the party soon ended. The situation was very uncomfortable because the landowner had already been led down a path of expectation by the crew and had made an investment. This was an eye opening experience for me that I survived.

Fortunately, I have not had many more situations involving payment for information. Our more common ethics challenges come when two existing clients or potential new clients ask for services on different sides of a project or in a semi-cooperative role on a complex project where potential conflicts could arise. For example, we were helping a municipality improve a water supply consisting of wells and springs. Another pre-existing client of ours proposed a new project in the vicinity of critical components of the municipal supply and thought our firm would be ideal to address the potential impacts that might arise. On one hand, we were the most knowledgeable of potential impacts; therefore, ideal from a technical prospective; however, this was a definite conflict of interest that led us to refer the proposed project to another qualified firm. This conflict was not clear to everyone involved and led to an internal discussion to vet the issues. We have found that internal discussions are extremely helpful for identifying and addressing conflicts of interest. Not everyone has the same level of experience or exposure to potential conflicts.

Other very interesting conflict of interest situations involve work with attorneys on legal matters. I have had two occasions where an attorney was working with me or a colleague in our firm on one case while simultaneously working for the other side on another case. One of these examples occurred when I was providing direct testimony for an attorney in an adjudicatory hearing during the day while he was preparing my cross examination during the evening for a different case scheduled for the following week. I became aware of this after the fact; consequently, I did not see a conflict from the professional geologist’s perspective, but the attorney would appear to be in a gray zone. Had I been aware, the potential conflict for myself might have been more apparent.

Working with attorneys also raises a whole host of other types of ethics challenges that arise from the fact that our responsibilities as a professional geologist are not the same as the attorney.
An attorney is ethically bound to be an advocate for his client. The attorney’s job is to assist the client in achieving the client’s goals within the guidelines of the law. Our job as the scientist is to provide technical advice and expert opinions derived from investigations and interpretation based on scientific principles and methods. We are not the client’s advocate, but rather, an advocate for the science.

I classify it as a good working relationship with an attorney when they listen to the professional advice and adjust the project or case accordingly. This typically improves the outcome for the client. On some occasions, this may be a recommendation that the client achieve a reasonable settlement rather than face a high risk of a costly loss. Negative, and ethically dangerous relationships develop when an attorney pushes the professional to misrepresent the science in favor of the client. For example, I was asked by an attorney to provide an opinion that ground water from a proposed mine would not flow into a reservoir relied on by a major metropolitan area in New York. This was nonsense since the proposed quarry was on a peninsula in the reservoir. The attorney was not happy with my advice. I will not work with that attorney, and we have managed to avoid contact with each other for many years despite numerous projects I have done for his partners. It is my opinion that our professional reputation, and, as a consequence, our ability to earn a living, is enhanced by not capitulating to the pressures of a zealous attorney.

Another interesting challenge that can arise when working with attorneys concerns the methods of payment. It is acceptable for attorneys to be paid contingent and proportional to the success of a case. A “professional” that accepts those contracts has a vested interest in the outcome. This bias will be made obvious to the judge and jury. It is standard practice for opposing attorneys to ask how much one is being paid to provide expert opinions in order to leave the impression that the professional is a money-grubbing hired gun; however, having a vested interest in the outcome based on a contingency is a definite disaster before the court.

I have only had two cases where the fee has been an issue. One case was relatively simple. The attorney, who asked that I provide services on a contingency basis, understood my explanation of the need to be paid. Since he was unwilling to fund the scientific investigation to move forward, he dropped the case. My second example involved a case for which I was contracted for payment, but the attorney decided to negotiate the payment of an invoice prior to trial. I explained that expert witnesses must be paid, and I offered to drop work on the case and void my invoice for work completed so that another expert could be hired. I was paid the next day.

I hope you have found these anecdotes interesting, and perhaps helpful. Open exchange and discussion of conflict of interest situation and other ethics issues is a helpful approach to preparing oneself when similar challenges arise. Our National AIPG Executive Committee is currently working with AGI to establish educational programs using webinars. Ethics training will be one of those that will be considered.
 Answers:

1. The answer is choice “a” or “vanadium”.
   Zirconium and molybdenum have much higher atomic numbers of 40 and 42, respectively.
   Zirconium usage includes applications involving resistance to corrosion and heat, as well as gemology.
   Molybdenum has a very high melting point and it is also alloyed with steel to make it stronger and more heat resistant.
   Molybdenum is also used as a catalyst, in paint pigments, as a smoke and flame retardant, etc.

2. The answer is choice “c” or “kaolinite”.
   Kaolinite also exhibits low plasticity, low potential volume change, a one-to-one structure with a silicon tetrahedron and an aluminum octahedron and strong hydrogen bonding.
   Smectite occurs as disc-shaped particles with a width to thickness ratio of 200 to 1 or 300 to 1. It exhibits high plasticity, high potential volume change, high affinity for water, high surface activity, a two-to-one structure with two silica tetrahedra and an aluminum octahedron, weak secondary bonds easily separated by water (expansive clays) and x-ray peaks at 14 to 15 Å (17.5 Å if saturated with ethylene glycol). Goethite is not a clay mineral, but a hydrated iron oxide “FeO(OH)”

3. The answer is choice “c” or the “Atlas Mountains” of northwestern Africa, extending for 2,000 kilometers from the port of Agadir in Morocco on the west, to the city of Tunis in Tunisia on the east.
   The “Ahaggar Mountains” constitute a mountainous plateau region in southeastern Algeria extending about 1,550 kilometers in the north-south direction and 2,100 kilometers in the east-west bearing. The area is one of rocky desert rising above a massif of pink granite.
   The “Massif De L’Air” is located in Niger and is formed by Pre Cambrian peralkaline granites covering an area of about 84,000 square kilometers.

4. The answer is choice “b” or “an immature and organic-rich gas-prone strata”.
   TOC values greater than 2% are indicative of “very good” organic richness. Thus, values of 4% to 10% are definitely in that category.
   Ro (vitrinite reflectance) values of less than 0.5 to 0.6% are indicative of immaturity. Generally, the oil window occurs within the range of 0.6% to 1.2%, the condensate and gasoline-like petroleum window in the range of 1.2% to 1.5%, the wet gas window in the range of 1.5% to 2.0%, the dry gas window in the range of 2.0% to 3.0%, with graphite forming at temperatures in excess of 450 degrees Fahrenheit. For our shale, the Ro values of 0.3% to 0.45% are indicative of a thermally-immature deposit.
   Type III kerogen (woody, land-derived) tends to be gas prone, whereas Type I (lacustrine) is oil prone and Type II (marine, algal and plankton-derived) depends on the degree of maturation, yielding liquid petroleum when mature and gas when over mature. In our case, the predominance of the type III kerogen indicates gas-prone strata.

5. The answer is choice “b” or 400 feet.
   The hydraulic radius of a stream channel “H” is equal to the cross-sectional area (width times depth) divided by the wetted perimeter (width plus depth times two). Thus:
   \[ H = \frac{(w)(d)}{(w + 2d)} \]
   In our example, \( H = 21.875 \text{ feet} \) and \( w = 350 \text{ feet} \). Then,
   \[ (H)(w) + 2dH = wd \]
   \[ (H)(w) = wd - 2dH \]
   \[ (H)(w) = d(w-2H) \]
   \[ d = \frac{[(H)(w)]/(w-2H)} = 21.875/(350/350-2(21.875)] = 25 \text{ feet} \]
   Wetted perimeter = \( w + 2d = 350 + [(2)(25)] = 400 \text{ feet} \).

---

**Online Course:** Geotechnical Properties and Engineering Problems of some of the North Central Texas Clay-Shales – Regional Geology Case History Series

- Cretaceous shales in the north-central Texas area give rise to engineering problems. This online short course covers:
  - Regional geologic setting, structure and stratigraphy.
  - Specific material geotechnical properties including:
    - Clay mineralogy, values of Atterberg limits and indices, potential volume change, shear strength, etc.
  - Engineering problems and solutions concerning:
    - Accurate shear strength determination as dictated by field conditions, mass wasting, swell pressures and more.

AIPG Accredited! 0.5 CEU

[www.geodm.com](http://www.geodm.com)  
[www.aipg.org](http://www.aipg.org)

Robert Font, PhD, CPG, PG, EurGeol – Author  
Geoscience Data Management
I recently had the honor of being a participant in a seminar at Rensselaer Polytechnic Institute, Troy, NY with fellow alumnus Pat Leahy, AIPG President Sam Gowan, and AIPG Past President Bob Fakundiny. The subject matter focused on career preparation, career options, and post academic credentials.

Each of us had an opportunity to provide our respective insights into our individual careers and then to respond to questions from students and faculty. In preparation for my comments, I created a mental list of the various applied and service-related professional careers in which AIPG members are engaged. Although not an exhaustive list, these are some of the significant categories.

- **Academia:** University, Community College, K-12.
- **Government:** Federal, State, County & Municipal.
- **Industry:** Resource Exploration (energy, minerals, water); Investigation (geotechnical, hydrogeologic, forensic); Resource Development (oil, gas, metals, water, aggregate); Research; Banking & Finance; Law; Management.
- **Not-for-profit:** Scientific/Technical; Professional; Academic.
- **Independent:** Consultant: Oil & Gas, Environment, Investment, Law, etc.

The preponderance of AIPG members are in applied fields, predominantly in industry.

This list suggests the broad spectrum of professional endeavors available to geoscientists. When compared to the detailed statistics compiled by AGI and published in its periodic Geoscience Workforce reports, the future for career geoscientists appears bright indeed.

The demographics show huge numbers of practitioners retiring in the next decade and an equally large demand for replacements. (For detailed demographics and statistics see the Geoscience Workforce section on the AGI website www.agiweb.org.) There may be insufficient numbers of geoscientists to fill the demand.

Overall the statistics portend well for the next generation of geoscientists. Can you imagine the opportunities which are about to unfold for today’s young professionals, both those already in the workforce and those completing degrees?

Geoscientists who are nearing the career stage which is commonly (and I think inappropriately) labeled ‘retirement’ will create a very large vacuum in the ranks of the profession. The anecdotal evidence suggests that the professional societies, although aware of these demographics, are falling short of adequately advising departments, students, and faculty regarding the pending shortfall.

There is an eager audience awaiting the information so conscientiously developed by AGI. It is incumbent upon us to make the effort to assist in its dissemination.
Misuse of the “Certified Professional Geologist” Title

Recently, Adam Heft, CPG-10265, contacted me and AIPG HQ about a Michigan geologist who in various press releases and other documents is using the “Certified Professional Geologist” title or the “CPG” abbreviation. This individual is not certified by either AIPG or by the AAPG’s Division of Professional Affairs, which grants the “Certified Petroleum Geologist” title, also abbreviated CPG. This is simply the latest example of the misuse of the “Certified Professional Geologist” title that AIPG has learned about.

Because the individual misusing the title is not an AIPG member, the individual cannot be charged with violating the AIPG’s Code of Ethics. However, when AIPG learns about such cases, it sends a letter to the individual asking them to cease and desist from using the title. If the misuse persists and if the individual is licensed/registered or belongs to some other professional organization with an enforced Code of Ethics or Professional Conduct, AIPG could bring the matter to the attention of that organization for dishonesty.

AIPG has also become aware that Professional Geologists licensed in some states incorrectly believe that their license grants them the right to use the “Certified Professional Geologist” title. This is not the case. In such cases, when AIPG’s letter points out the misuse, corrections are generally promptly made.

In cases like these, as with all cases where ethical misconduct may have occurred, someone has to bring the matter to AIPG’s attention. All AIPG members are asked to be alert to instances where the “Certified Professional Geologist” title is being misused or any other potential breach of professional ethics and bring it to AIPG’s attention.

Students Gazing Darkly into the Future—Career, Life, and Everything

Jim Williams, CPG-00374, wrote me the following note after reading my article “Students gazing darkly into the future—career, life, and everything” in the January/February 2011 TPG. “Marilyn and I thought your article superb; it clearly and effectively expresses a view of the future. It also lays out ‘is this for me’ to the student.

Mid 1980s I was working with the lead geologist for Bechtel. They were just beginning, as the consultant to the DOE, investigation of the low-level radiation wastes at Weldon Springs, some 40 miles west of St. Louis. I knew Bechtel worked worldwide, and this person had just returned from six months in Indonesia. A few months after the start of their work one or two more Bechtel geologists arrived on the scene. One a young lady who was just married. It was December and she was not going to be allowed off the job long enough even during Christmas to return to her brand new husband for a few days. Christmas in a motel room. My Bechtel friend said their geologists had a 75% divorce rate.

I have some military history, including geodetic surveying, in Germany and North Africa in the mid-1950s. Then as now, one sees the military having considerable concern and care about their service personnel. Wars do make an exception.

My point, the geologist is on his or her own, nationally and internationally, more than almost any other profession including military. Also, it is not a profession without its dangers. Interestingly for me, I had far more threats upon return to the Missouri Survey from the good folks of the Missouri Ozarks than from the Bedouins in Libya.

“I was this year’s [2010] Missouri Section AIPG president and really tried to promote students. The last phase was a jointly hosted event with our Section obtaining donations to support a seminar and banquet at Missouri State University. We co-hosted with the geology program. In choosing the panelists for the seminar, I wanted examples of private consulting, academia, and public service. Two panelists were especially interesting and certainly for the students, Ann Hagni and Ana Londono. Ann Hagni is a mining consultant in SW US, Mexico, and Australia; Ana Londono is a geologist, formerly with the Columbia, SA Geological Survey, and later a Univ. of Cincinnati PhD and now professor at St. Louis University. A number of student questions involved foreign work. Both ladies gave excellent previews of what to expect. Ana had an example of particular interest regarding the power of a culture of which students must be aware. In her example, a priest persuaded people to remain in an area where the geologists warned about the immediate landslide-flood threat. They stayed with the priest and 2,000 people died. An adult geologist later could not
see why anyone would work in a country or area having such a culture control. My response, accept what exists, one’s job is as a geologist, not a cultural changer. That answer did not satisfy everyone. What was really satisfying about the seminar was the student enthusiasm which I really do think was bolstered further by the seminar. The department chairman of the geology, urban planning, and geography programs, especially wanted the students to see faces different from his and those of his profs, who the students see every day.

“Of all professions, I think that of the geologist is the most difficult to truly explain and probably is the most difficult to stay with over the long term. Exceptions to this observation generality exist, for example, the family doctor in a rural area with no back up or the large livestock veterinarian with no back up. The latter profession is a bit more dangerous than that of most geologists. However, as occupations in general, farming, which we have followed for our entire lives, other than military service absence, ranks in the top three or four. The other top dangerous professions are mining, construction, and truck driving. Mine safety has greatly improved through the years. In past decades, one sees many geologists coming off the farms and the difficulties of geology hardly noticed. Not so for kids these days with urban-suburban lives. It is of great importance your article reaches their hands to read.”

Williams is correct in observing that at least some groups of geologists, those who spend a lot of time in the field or otherwise are away from home at lot, tend to have a high divorce rate. I remember receiving a somewhat humorous and somewhat sad list of characteristics of geologists from the Geological Society of Nevada that noted that December was when a lot of geologists returned from the field having finished their contracts logging core or whatever and were now unemployed, at least temporarily, and on returning home discovered that their wife had left them. But this is not true of all geologists and there are those in the wife had left them. But this is not true of all geologists and there are those in the family. The other top dangerous professions are mining, construction, and truck driving. Mine safety has greatly improved through the years. In past decades, one sees many geologists coming off the farms and the difficulties of geology hardly noticed. Not so for kids these days with urban-suburban lives. It is of great importance your article reaches their hands to read.”

Proposed Changes in Canadian NI 43-101—State-licensed PGs Not Recognized

The Canadian Securities Administrators (CSA) on April 8, 2011 adopted changes to National Instrument 43-101 that covers technical reports about mining properties. Some of the changes, such as the re-organization of and relaxing of the rigidity of the form of the report (NI 43-101F1) are welcome improvements. However, the proposed change in the definition of “qualified person” is causing concern to some professional organizations, particularly US state-licensed PGs and RGS. The definition of “qualified person” is being changed to make it less prescriptive and more adaptable. This requirement would relieve the CSA from having to amend NI 43-101’s list of recognized foreign professional associations every time another professional requests recognition. At the same time, the CSA has shortened its list of recognized foreign professional organizations. The proposed changes to NI 43-101 contains an Appendix A, the “Accepted Foreign Associations and Membership Designations.” The CSA’s proposal is designed to bring greater consistency in the assessment of those organizations and their membership grades that are deemed appropriate for recognition as “qualified persons.”

AIPG CPGs are listed in Appendix A, as do licensed or certified professional engineers from a US state. Licensed or registered geologists by US states are conspicuously absent. Those of you and your colleagues who are relying on a US state-issued Professional or Registered Geologist license for their credential for “qualified person” status should apply for AIPG certification.

Similarly, the Australasian Institute of Mining and Metallurgy (AusIMM) has recently noted that the proposed changes will no longer recognize AusIMM or AIG Members as “qualified persons.” Instead Fellowship status or recognition as an AusIMM Chartered Professional will be required for recognition. The reason for this change in the recognition of AusIMM membership categories is to bring uniformity to the characteristics of those recognized as meeting the definition of “qualified person.” Like AIPG, AusIMM has different membership categories. In AusIMM’s case, the “Member” category “is available to graduates following three years of relevant experience after graduation. In the case of a three year degree or equivalent, the required length of experience is four years.” The requirements for certification or chartered professional status are generally higher and frequently require a that a minimum number of continuing professional development (CPD) credits be undertaken each year. I encourage those AIPG CPGs who are interested in being recognized as “qualified persons” for the purposes of NI 43-101 or NI 51-101 (for oil and gas) to maintain a CPD log. AIPG’s website has allowed members to keep a good on-line CPD record but this function is currently not available as AIPG’s website undergoes a major reconstruction—the previously recorded CPD activities have not been destroyed; you can get copies from Vickie Hill at AIPG HQ.

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

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


2. Three-year undergraduate degrees are common in other countries. In these countries a 4-year degree is an “honors” degree.
MESSAGE FROM AIPG PRESIDENT SAM GOWAN

The AIPG Foundation (AIPGF) announced on April 6, 2011 that the AIPGF will be dissolved. The financial assets of AIPGF have been distributed to AIPG sections and others in accordance with historical patterns of grant distribution. The AIPGF was incorporated and managed by a Board of Directors completely separate from AIPG; consequently, AIPG has had no direct involvement in the allocation of AIPGF resources in the past, and, has in fact been a grateful recipient of past distributions. AIPG would like to take this opportunity to thank the AIPGF for its historical support of AIPG and other worthy recipients of financial support.

AIPG will continue to have a need for sources of funding outside of the normal revenues generated by membership dues and other miscellaneous sales. This need has increased and will become more significant in the near future as the result of our recent decision to develop educational webinars in conjunction with the American Geological Institution (AGI) while continuing to maintain our outreach programs. These activities will require outside sources of revenue that are far beyond that which the AIPGF was historically been able to provide. AIPG is actively pursuing the development of a new 501(c)3 corporation that is capable of raising the necessary capital. In this regard, we are discussing possible cooperation approaching with AGI that have great potential.

AIPG is poised for a bright future representing and advocating for our profession. The entire Executive Committee thanks you for your active support of AIPG and wishes you a successful career.

Invitation from AIPG to Submit Articles

You are invited to submit an article, paper, or guest column based upon your geological experiences or activities to the American Institute of Professional Geologists to be included in “The Professional Geologist” (TPG) bi-monthly journal. The article can address a professional subject, be technical in nature, or comment on a state or national issue affecting the profession of geology.

Article submissions for TPG should be 800 to 3200 words in length (Word format). Photos, figures, tables, etc. are always welcome! Author instructions are available on the AIPG website at www.aipg.org.

Please contact AIPG headquarters if you have any questions. AIPG email is aipg@aipg.org or phone (303) 412-6205.
AIPG 2011
National Award Recipients

**Ben H. Parker Memorial Medal**
Dr. Robert G. Font, CPG-03953
Plano, Texas

**Martin Van Couvering Award**
Barbara H. Murphy, CPG-06203
Glendale, Arizona

**Honorary Membership**
James A. Jacobs, CPG-07760
Mill Valley, California

Congratulations

Securing Stakeholder Engagement for Mutual Benefit in Energy Exploration and Production Projects Conference

July 18-19, 2011
Pittsburgh, PA

This course is designed to outline the knowledge and skills required of energy company representatives to develop and implement an effective stakeholder engagement strategy.

Instructor: Lawrence A. Cerrillo, President, Ingenuity Enterprises Inc., AIPG Past President.-Larry Cerrillo is president of Ingenuity Enterprises Inc. in Evergreen, Colo. He is formally trained in environmental and public policy dispute resolution and has numerous certificates in dispute resolution, including a Certificate of Advanced Study in Dispute Resolution from the University of Denver. He has done groundwater consulting work worldwide, and his environmental work includes such projects as Love Canal, the Rocky Mountain Arsenal, and Fort Riley, Kansas. As a mediator he has worked on more than 100 cases, many on groundwater issues. He was a principal organizer and first president of the Colorado Groundwater Association, a past state and national president of the American Institute of Professional Geologists, and a past and current member of boards and committees dealing with groundwater and public policy issues.

*Mention Larry's name and receive a 25% discount on your registration.*

For more information please go to http://www.euci.com/events/?ci=1354&t=0
Most hydrochemists would agree that water standing in a non-pumping well is stagnant and some volume should be removed before a representative sample can be taken. Purging the traditional three well volumes before sampling is not only time-consuming but often produces a large quantity of water whose disposal is costly. Thus, people welcomed the low-flow method when introduced, sometimes without thinking. In this method, a small stream of water is collected slowly from a discrete portion of the well screen. Much less water has to be purged (and disposed of) and sampling takes much less time. Also, pump-induced turbidity and drawdown in low-permeability material are eliminated with the lower flow rate. Sounds good, eh? But, since sampling is so focused, it is critical that the device be placed opposite the most contaminated portion of the screened interval. In monitoring, you want the worst news the well has to offer.

Once when working for a state environmental agency, I was amazed to see that data from a TCE site showed contaminant levels decreased when the owner switched from bailing to low-flow sampling! Message: if you want to meet standards, use low-flow sampling (until you get caught, at least). Intuitively, values should have increased, because in low-flow sampling, the water has not been diluted by mixing with that from the entire screen length. In the TCE case, those responsible for the site had apparently found a “sweet spot” in the screen (where there was little contamination) and set the sampler there.

To be truthful in monitoring, a profile should be made of contaminant concentrations throughout the screened interval. That is, low-flow samples should be taken at regular intervals along the entire length of well screen and then the sampler should be deployed opposite the zone yielding the highest concentration for the constituent of concern. Although the source of the sample will still not be entirely clear because of the vertical flow that has been documented in long-screened wells, profiling is the best we can do. The low-flow method calls for short screens to avoid vertical flow, but any screen spanning materials of different hydraulic head and different hydraulic conductivity can be considered to be “long.” Tip: Just as a well has to be logged to help you decide where to place the screen, the screen has to be profiled to help you decide where to place the low-flow sampler.

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

AFLAC

Why Supplemental Insurance?
Even the best health insurance plan can leave you vulnerable to:

- Unpaid medical bills... including deductibles, co-payments, and out-of-network charges.
- Loss of income... if a serious illness or accident seriously reduces the total earning power of the afflicted employee and/or spouse.
- Out-of-pocket expenses... such as the cost of travel, lodging, meals, child care, home care, and special equipment, as well as everyday living expenses like mortgage/rent, car, utilities, food, and credit card balances.

That’s why over 40 million people worldwide have turned to AFLAC. Our full range of guaranteed-renewable insurance policies includes:

- Accident/Disability
- Hospital Confinement Indemnity
- Hospital Intensive Care
- Specified Health Event, Life, Long-Term Care, Dental

Most important, all of our policies pay cash benefits directly to you even if you have other coverage. You decide where the money goes. It’s your choice!

http://www.aflac.com
Carol Streicher, AFLAC Sales Associate
Phone: (303) 674-1808
Please identify yourself as an AIPG Member to receive the AIPG Association discounted prices.
Spike Takes on the EPA

Stephanie Jarvis, SA-1495, sjarvis11@wooster.edu

By the time you are reading this, the sun will be shining, I.S. (Independent Study) will be turned in, I’ll know what I’m doing for the next year or so of my life, and I’ll be spending my days going for inadvertent 50 mile bike rides and basking in the glory that is the home-stretch of senior year. Right now? Well...I just finished coloring some hatching dinosaurs that reminded me of Spike from The Land Before Time.

Distractions are key to maintaining what sanity is possible during this time of year for a senior at The College of Wooster. To give you some perspective, I was in front of the computer in my lab by 7 am this morning (it’s a Sunday). I’m gearing up for a late night to start another week off right, clutching my mug of tea (green if I think I’m going to make it, black if it could be bad, some really disgusting coffee if I’m absolutely falling apart) and making that really hard choice between some shuteye and a shower. As the due date that we hear about the first day we step foot on campus draws near (the one for I.S., that is), friends are solidifying post-graduation plans, and the grey February days of NE Ohio drag on, we’re looking a little frazzled. I do what I can to give others fuel to feed the distraction fire. Coloring, for instance, works wonders. As do politics.

Lately, it’s been Kentucky’s coal politics that have been grabbing my attention. The sleepover at the Governor’s the weekend before Valentine’s Day was especially exciting. Though it may not have convinced the Governor to drop the lawsuit he is currently in with coal companies against the EPA for actually upholding The Clean Water Act (really, what is the EPA thinking?), it created quite a buzz. A look at the bills being considered by the state legislature shows just how necessary that buzz is. A “21st Century Bill of Rights” to prohibit laws or rules that may result in the prevention of the severing of coal (which, according to the Kentucky Resource Council, could include mine safety regulation and the coal severance tax) and the declaration of Kentucky as a “sanctuary state” from the EPA’s water quality standards are among issues of concern during the 2011 session.

Every morning I eat breakfast by the windows in the dining hall, watching the sun rise behind the smokestack of my campus’s coal-burning power plant. It’s rather pretty, actually. When I was little, my family would visit Otter Creek State Park, and I remember watching the barges loaded with coal go by on the Ohio River. I would get so excited at the sound of a barge, rushing to the porch of the cabin to watch it maneuver its way around the bend with its heavy load and straining to see until it was out of completely sight. I never had to see the mines—you can’t from the rolling hills of the Bluegrass Region, and there really isn’t any reason to go looking for them. I wasn’t aware of the controversies of mining until late high school, and it wasn’t until a few summers ago that I saw a mine. I don’t think I had even held a piece of coal before becoming a geology major.

Mining is ugly; that’s its nature. But there are ways to do it right that are often overlooked when money is to be made and companies can get away with it. Due to its economic importance in Kentucky and elsewhere, companies tend to be able to get away with it far too often. Regulation is bad for business. So is, as pointed out by one of my advisors, killing your customers. There’s a balance to be found in everything.

You see, there are different kinds of distractions. There’s the coloring baby dinosaurs kind that can be mindless, happy, and easily put down. And then there’s the kind that works up passions and frustrations. Passion because you can’t help but be disgusted by people who not only pollute water in the name of profit but have the gumption to think it should be illegal to prevent them from doing so. Frustration because you have a thesis to write and all you want to do is color more baby dinosaurs. Balance, for an aspiring geologist, can take on some odd forms.

IN MEMORY
Richard L. Beasley
CPG-02993
Member Since 1976
Oklahoma City, Oklahoma

James T. Skelcy
Member Since 2009
August 11, 2010
Cranford, New Jersey
This service is open to AIPG Members as well as non-members. The Professional Services Directory is a one year listing offering experience and expertise in all phases of geology. Prepayment required. Advertising rates are based on a 3 3/8” x 1 3/4” space.

**ONE YEAR LISTING FOR ONLY:**

- **AIPG Member** $300.00
- **Non-Member** $400.00

Space can be increased vertically by doubling or tripling the size and also the rate.

---

**David M. Abbott, Jr.**
Consulting Geologist LLC
AIPG CPG, FAusIMM, EurGeol, PG-TX, UT, WY

2266 Forest Street
Tel: 303-394-0321
Denver, CO 80207-3831
Fax: 303-394-0543

dmageol@msn.com or dmageol@aol.com

---

**MCD of Central Florida**
Subsidence Investigation Specialists

Geologic Evaluations • Geophysical Surveys
Geotechnical Investigations

P.O. Box 747
Lake Wales, FL 33899

Phone 863-676-2600
Fax 863-676-2699

www.sinkhole-expert.com

---

**Groundwater Assessment & Remediation**
Solid Waste Management
Wetlands & Ecological Services

Draper Aden Associates
Engineering • Surveying • Environmental Services

Blacksburg, VA • Charlottesville, VA • Hampton Roads, VA • Richmond, VA

www.ca-a.com

---

**HB Engineering Group**
Risk Analysis, Corporate Restructuring & Mine Appraisers

Kelvin J. Buchanan, P.E., M.B.A., CPG
President

Call 775-786-4515 • Cell 416-845-4487
775-786-4515 • fax 775-786-4324 • email: summitcrk@aol.com
1665 Lakeside Drive • P.O. Box 2391 • Reno, NV 89505-2391

Serving the mining, legal, environmental and banking fields.

---

**BCI Engineers & Scientists, Inc.**
2000 E. Edgewood Dr., Ste. 215
Lakeland, FL 33813
863-667-2345/863-667-2662 Fax
www.bcieng.com

---

**Clear Creek Associates**
Practical Solutions in Groundwater Science

www.clearcreekassociates.com
AIPG Corporate Member

---

**SRK Consulting**
Engineers and Scientists

ENGINEERING, GEOSCIENCE, & ENVIRONMENTAL SERVICES
MINE EXPLORATION, DEVELOPMENT, OPERATION, & CLOSURE

3275 W. Ina Road, Suite 240
Tucson, AZ 85741 • U.S.A.

(520) 844-3968 • Fax (520) 844-9853
36 Offices on 6 Continents • www.srk.com

---

**Daub & Associates, Inc.**

SPECIALIZING IN PROFESSIONAL GEOLOGICAL, ENVIRONMENTAL, HYDROLOGICAL, GEOTECHNICAL AND PERMITTING SERVICES

Gerald J. Daub, P.G., C.P.G.
President

2241 SOUTH BROADWAY
GRAND JUNCTION, CO 81507-4101

CELL (970) 216-1010
OFFICE (970) 254-1224
FAX (970) 242-8438
gjdaub@daubandassociates.com www.daubandassociates.com

---

**LEGGETTE, BRASHEARS & GRAHAM, INC.**

Professional Geologists & Environmental Engineering Services

UST RCRA, CERCLA
Remedial Design & Implementation
Property Transfer Assessments
Second Opinion Reviews

Water Supply
Water Rights
Computer Modeling
Expert Testimony

Offices Nationwide | Toll Free 877-959-7800 | 203-964-5000
www.lbwen.com

---

**AIPG Corporate Member**

BCI
Engineers & Scientists, Inc.
2000 E. Edgewood Dr., Ste. 215
Lakeland, FL 33813
863-667-2345/863-667-2662 Fax
www.bcieng.com

---

**HB Engineering Group**
Risk Analysis, Corporate Restructuring & Mine Appraisers

Kelvin J. Buchanan, P.E., M.B.A., CPG
President

Call 775-786-4515 • Cell 416-845-4487
775-786-4515 • fax 775-786-4324 • email: summitcrk@aol.com
1665 Lakeside Drive • P.O. Box 2391 • Reno, NV 89505-2391

Serving the mining, legal, environmental and banking fields.

---

www.aipg.org
Want to purchase minerals and other oil/gas interests. Send details to:
P.O. Box 13557, Denver, CO 80201.

ELLIS INTERNATIONAL SERVICES, INC.
Valuations • Geology • Economics
www.minevaluation.com

TREVOR R. ELLIS
Certified Minerals Appraiser-AIMA
Certified Professional Geologist-AIPG
Mineral Economist-NS

600 Gaylord Street
Denver, Colorado 80206-3717, USA
Phone: 303 399 4361
Fax: 303 399 3151
e-mail: ellis@minevaluation.com

Dr. Robert Font, CPG, PG, EurGeol
President
Geoscience Data Management, Inc.

Our geological scientists specialize in the research, analysis and electronic data capture of geoscience data. Examples include unconventional hydrocarbon resources and oil & gas field studies.

972-509-1522 (office) www.geodm.com
P. O. Box 864424, Plano, TX 75086
AIPG Corporate Member

PROFESSIONAL SERVICES DIRECTORY

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.

OFFICES IN:
NEW HAMPSHIRE
ARIZONA
(603)-773-0075
(888)-836-6571
WWW.GEOSPHEREINI.COM

LSP SERVICES
INFORMATION LOSS SUPPORT
SITE INVESTIGATIONS
Remedial Design
Compliance and Permitting
Groundwater Supply Development
LITIGATION SUPPORT
LANDFILL SERVICES
IRRIGATION WELLS

Environmental & Groundwater Supply Solutions

New Software
AIPG has new software for our website. This change will make the website easier for our members to use the online directory, signup for events, purchase products and pay dues.

When you go to the website for the first time to login, the system finds you and confirms your identity. Then you will be sent an email with a link to set a password.

Please review and update your information.

You may contact AIPG at aipg@aipg.org if you have any questions.

The website is www.aipg.org.

www.aipg.org

MAY/JUNE 2011 • TPG 39
### Student Application Form

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

<table>
<thead>
<tr>
<th>Last Name:</th>
<th>First Name:</th>
<th>MI:</th>
<th>Suffix:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>School Name:</th>
<th>Undergraduate ☐ Graduate ☐ Doctoral Candidate ☐</th>
</tr>
</thead>
</table>

**Preferred Mailing Address:** ☐ Home ☐ School  
Anticipated Graduation Date:  
Birth Year:  
Male ☐ Female ☐  

<table>
<thead>
<tr>
<th>Street:</th>
<th>City:</th>
<th>State:</th>
<th>Zip:</th>
<th>Country:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>School Ph:</th>
<th>Home Ph:</th>
<th>Cell:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Email:</th>
</tr>
</thead>
</table>

**ATTESTATION:** I attest that I meet the requirements for AIPG Student Adjunct (currently enrolled in a geological science degree program) and agree to abide by AIPG Bylaws and Code of Ethics.

<table>
<thead>
<tr>
<th>Applicant Signature:</th>
<th>Date:</th>
</tr>
</thead>
</table>

**HEADQUARTERS USE ONLY**  
Rcvd:  
Mbr #:  
www.aipg.org
Applicants for certification must meet AIPG’s standards as set forth in its Bylaws on education, experience, competence, and personal integrity. If any Member or board has any factual information in regard to these standards, whether that information might be positive or negative, please mail that information to Headquarters within thirty (30) days. This information will be circulated only so far as necessary to process and make decisions on the applications. Negative information regarding an applicant’s qualifications must be specific and supportable; persons who provide information that leads to an application’s rejection may be called as a witness in any resulting appeal action.

### New Applicants and Members (2/1/2011-4/12/2011)

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>CPG/Non-Practicing</th>
<th>As of 04/07/10</th>
<th>As of 04/12/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Matthew Faust</td>
<td>CPG-11403</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Ronald G. Worl</td>
<td>MEM-0683</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>Anthony P. Taylor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>Kristine L. Romanik</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>Joe S. Brinton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Karren Smith</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>Peter C. Breen</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### New Associate Member

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>AD #</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ</td>
<td>Keith Scoular</td>
<td>AS-0061</td>
</tr>
<tr>
<td>AZ</td>
<td>Richard Lundin</td>
<td>AS-0064</td>
</tr>
<tr>
<td>FL</td>
<td>Bob Baker</td>
<td>AS-0062</td>
</tr>
<tr>
<td>MA</td>
<td>Philip J. Villeneuve</td>
<td>AS-0060</td>
</tr>
<tr>
<td>NY</td>
<td>Matt Hoskins</td>
<td>AS-0063</td>
</tr>
<tr>
<td>TN</td>
<td>Norm Kennel</td>
<td>AS-0059</td>
</tr>
</tbody>
</table>

### New Members

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>AD #</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Jennifer Roskowski</td>
<td>MEM-2000</td>
</tr>
<tr>
<td>CA</td>
<td>Jacob Henry</td>
<td>MEM-2001</td>
</tr>
<tr>
<td>CO</td>
<td>Michael Sheehan</td>
<td>MEM-2002</td>
</tr>
<tr>
<td>FL</td>
<td>Ernest Hargrove</td>
<td>MEM-2003</td>
</tr>
<tr>
<td>FL</td>
<td>David Wilshaw</td>
<td>MEM-2004</td>
</tr>
<tr>
<td>GA</td>
<td>Stewart Dixon</td>
<td>MEM-2005</td>
</tr>
<tr>
<td>MI</td>
<td>Leslie Park</td>
<td>MEM-2006</td>
</tr>
<tr>
<td>MI</td>
<td>Brian A. Beach</td>
<td>MEM-1992</td>
</tr>
<tr>
<td>MN</td>
<td>Catherine E. Von Euz</td>
<td>MEM-1987</td>
</tr>
<tr>
<td>NV</td>
<td>Duane W. Bays</td>
<td>MEM-1993</td>
</tr>
<tr>
<td>NY</td>
<td>Matthew E. Dupee</td>
<td>MEM-1994</td>
</tr>
<tr>
<td>NY</td>
<td>Trevor M. Gowan</td>
<td>MEM-1995</td>
</tr>
<tr>
<td>NY</td>
<td>Joseph Campisi</td>
<td>MEM-2007</td>
</tr>
<tr>
<td>NY</td>
<td>William J. Stelmack</td>
<td>MEM-1996</td>
</tr>
<tr>
<td>OR</td>
<td>Adam Reese</td>
<td>MEM-1999</td>
</tr>
<tr>
<td>PA</td>
<td>William K. Crist</td>
<td>MEM-1986</td>
</tr>
<tr>
<td>PA</td>
<td>Seth Cleaver</td>
<td>MEM-2009</td>
</tr>
<tr>
<td>TN</td>
<td>Christopher L. Seifer</td>
<td>MEM-1988</td>
</tr>
<tr>
<td>Intl</td>
<td>Andrew Wood</td>
<td>MEM-2008</td>
</tr>
</tbody>
</table>

### New Young Professional

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>AD #</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>Leslie N. Park</td>
<td>YP-0001</td>
</tr>
<tr>
<td>PA</td>
<td>Connor H. O’Loughlin</td>
<td>YP-0002</td>
</tr>
</tbody>
</table>

### New Students Adjuncts

- Sohini Ganguly | SA-2061
- David Edge    | SA-3018
- Kaitlyn LeBaudour | SA-2066
- Michael Trumbower | SA-3051
- Jennifer K. Davidowitz | SA-3057
- Shauna Morrison | SA-1987
- Abigail Maxwell | SA-2059
- Amanda E. Lanning | SA-2070
- Amber L. Skiles | SA-207
- Andrew T. Abbott | SA-2099
- Scott H. Yurman | SA-3000
- Hilal Sevindik Mentes | SA-3001
- Dickson M. Liadey | SA-3002

### AIPG Membership Totals

<table>
<thead>
<tr>
<th>Category</th>
<th>As of 04/07/10</th>
<th>As of 04/12/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPG/Active</td>
<td>3,585</td>
<td>3,337</td>
</tr>
<tr>
<td>CPG/Non-Practicing</td>
<td>414</td>
<td>368</td>
</tr>
<tr>
<td>Prof. Member</td>
<td>1052</td>
<td>825</td>
</tr>
<tr>
<td>Associate Mem.</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>Young Professional</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Student Adjunct</td>
<td>510</td>
<td>702</td>
</tr>
<tr>
<td>Corporate Member</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TOTALS</td>
<td>5,583</td>
<td>5248</td>
</tr>
</tbody>
</table>

### Applicants for Certified Professional Geologist

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>AD #</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Andrew Smith</td>
<td></td>
</tr>
<tr>
<td>AK</td>
<td>Neil McKay</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Fred Barnard</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Patrick Hollenbeck</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Preston L. Niesen</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Raymond Pierson</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Joe S. Brinton</td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>Kristine L. Romanik</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>(Sara) Mihan H. McKenna</td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>Anthony P. Taylor</td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>Edward J. Gilbert</td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>Jean M. Neubeck</td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>Joanne M. Yeary</td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>Peter C. Breen</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Shavonne D. Gordon</td>
<td></td>
</tr>
</tbody>
</table>

### Applicants Upgrading to CPG

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>AD #</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>Ronald G. Worl</td>
<td>MEM-0683</td>
</tr>
<tr>
<td>KY</td>
<td>Trent M. Garrison</td>
<td>MEM-0907</td>
</tr>
<tr>
<td>MI</td>
<td>Jon A. Hirschenger</td>
<td>MEM-0788</td>
</tr>
<tr>
<td>NV</td>
<td>Frederick P. Zornier</td>
<td>MEM-1998</td>
</tr>
<tr>
<td>NV</td>
<td>Daniel P. Michaud</td>
<td>MEM-0232</td>
</tr>
<tr>
<td>OH</td>
<td>David W. Crayne</td>
<td>MEM-1997</td>
</tr>
<tr>
<td>OH</td>
<td>James R. Anderson</td>
<td>MEM-1991</td>
</tr>
<tr>
<td>OH</td>
<td>Carol F. Doe</td>
<td>MEM-0619</td>
</tr>
</tbody>
</table>

### New Certified Professional Geologists

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>AD #</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Matthew Faust</td>
<td>CPG-11403</td>
</tr>
<tr>
<td>AK</td>
<td>Peter D Condon</td>
<td>CPG-11402</td>
</tr>
<tr>
<td>AK</td>
<td>David K. Goodman</td>
<td>CPG-11404</td>
</tr>
<tr>
<td>MI</td>
<td>Susannah Duly</td>
<td>CPG-11401</td>
</tr>
<tr>
<td>NV</td>
<td>Caroline E. Bardwell</td>
<td>CPG-11397</td>
</tr>
<tr>
<td>NV</td>
<td>Nathan T. Kranes</td>
<td>CPG-11400</td>
</tr>
<tr>
<td>RI</td>
<td>Brian E Kortz</td>
<td>CPG-11399</td>
</tr>
<tr>
<td>VA</td>
<td>Michael Alter</td>
<td>CPG-11398</td>
</tr>
<tr>
<td>WA</td>
<td>David S. Smith</td>
<td>CPG-11405</td>
</tr>
</tbody>
</table>

### New Young Professional

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>AD #</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>Leslie N. Park</td>
<td>YP-0001</td>
</tr>
<tr>
<td>PA</td>
<td>Connor H. O’Loughlin</td>
<td>YP-0002</td>
</tr>
</tbody>
</table>

### New Students Adjuncts

- David Edge | SA-3018
- Kaitlyn LeBaudour | SA-2066
- Michael Trumbower | SA-3051
- Jennifer K. Davidowitz | SA-3057
- Shauna Morrison | SA-1987
- Abigail Maxwell | SA-2059
- Amanda E. Lanning | SA-2070
- Amber L. Skiles | SA-207
- Andrew T. Abbott | SA-2099
- Scott H. Yurman | SA-3000
- Hilal Sevindik Mentes | SA-3001
- Dickson M. Liadey | SA-3002

Continued on Page 42.

MI Jamie M. Laginess SA-3049
MI Chelsea M. Brooks SA-3050
MI Anthony V. Moncada SA-3062
MI Aaron M. Garceau SA-3063
MN Maverick Deschamp SA-2077
MO Dominike Merle-Johnson SA-3046
NC Rebecca J. Dozier SA-2050
NC Anna C. Stoddard SA-2069
NC Michael Wutke SA-3059
NM Katherine R. Hamilton SA-2068
NM Francis Dick SA-2079
NM Linda N. Amponsah SA-2081
NM Pruthvidhar Geedipally SA-2091
NY Lauren A. Droge SA-2060
NY Thomas E. Carboni SA-2067
NY Krystyna M. Kornecki SA-2073
NY Eric Lenio SA-3056
NY Nathan Rabideaux SA-3058
NY Collin Nowalk SA-3060
OH Anna C. Mudd SA-2074
OH Thomas A. Davis SA-2076
OH Matthew Wayman SA-3054
OR Shereena S. Dyer SA-3052
PA Michael B. Cronin SA-2075
PA Muhammad Babar SA-3019
PA Brian Culp SA-3053
TN Kolbe D. Andrzejewski SA-2058
TN Cory A. Perrin SA-3044
TX LJ Dial SA-2065
TX Andres Guerrero SA-3055
UT Daniela Anguita SA-2063
WY Tabetha Johnson SA-2064

Introduction to Well Logs and Log Analysis for New Hires

- A review of well logs in petroleum exploration and development.
- Prerequisites for finding commercial reserves.
- Exploration techniques.
- Integration of geophysical exploration records with log data.
- Calculating reserves and field size.
- Importance of economics and risk analysis.
- Drilling and logging.
- Lithologic and mud logs.
- Electric logs.
- Basic and specialized porosity logs.
- Other logs and log curves used in exploration and production work.
- Selecting log suite.
- Basic log analysis (recognizing pay zones).
- Identification and classification of logs and well log data management.

A product of Geoscience Data Management, Inc.

Author: Robert Font, PhD, CPG, PG

Power Point slides with review and self assessment questions.

AIPG accredited 1 CEU (with exam) or 0.5 CEU (without exam).

Reference CD available

To order the course or for more information go to www.aipg.org.


MI Jamie M. Laginess SA-3049
MI Chelsea M. Brooks SA-3050
MI Anthony V. Moncada SA-3062
MI Aaron M. Garceau SA-3063
MN Maverick Deschamp SA-2077
MO Dominike Merle-Johnson SA-3046
NC Rebecca J. Dozier SA-2050
NC Anna C. Stoddard SA-2069
NC Michael Wutke SA-3059
NM Katherine R. Hamilton SA-2068
NM Francis Dick SA-2079
NM Linda N. Amponsah SA-2081
NM Pruthvidhar Geedipally SA-2091
NY Lauren A. Droge SA-2060
NY Thomas E. Carboni SA-2067
NY Krystyna M. Kornecki SA-2073
NY Eric Lenio SA-3056
NY Nathan Rabideaux SA-3058
NY Collin Nowalk SA-3060
OH Anna C. Mudd SA-2074
OH Thomas A. Davis SA-2076
OH Matthew Wayman SA-3054
OR Shereena S. Dyer SA-3052
PA Michael B. Cronin SA-2075
PA Muhammad Babar SA-3019
PA Brian Culp SA-3053
TN Kolbe D. Andrzejewski SA-2058
TN Cory A. Perrin SA-3044
TX LJ Dial SA-2065
TX Andres Guerrero SA-3055
UT Daniela Anguita SA-2063
WY Tabetha Johnson SA-2064

Should I become a CPG?

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

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

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

www.aipg.org

FREE RESUME POSTING
POST AND VIEW RESUMES FOR FREE ON THE AIPG NATIONAL WEBSITE VIEW JOB LISTINGS FOR FREE
www.aipg.org
Click on Jobs.

Practical Petroleum Geoscience
For Novice AND Experienced Oil-Finders!
by Robert Font, Ph.D., CPG, PG, EurGeol

Deepen Your Understanding of Your Industry

700+ PowerPoint Slides delivered to You Over the Net

AIPG Accredited (8 CEU’s)

an another course offering from:
GeoScience Data Mgmt.
www.geodm.com or www.aipg.org

for more information, contact
rgfont@geosciencedm.com
slbshop@geosciencedm.com

www.aipg.org
Virtual HERMIT® Kit Streamlines Pump Tests

The Virtual HERMIT Aquifer Testing Kit simplifies step-drawdown and constant-rate pump tests. Monitor all deployed Level TROLL® 700 instruments with one system.

- Rent Virtual HERMIT software and customized instruments only from In-Situ® Rentals.
- Simultaneously configure, start, view, or stop all connected instruments.
- Step a test and capture pump and recovery data on the same log.
- Minimize data processing.

For more information, visit www.in-situ.com and call us at 1-800-446-7488 or 1-970-498-1500.

View results during test.
ASR Using Sodium Bisulfide Treatment for Deoxygenation to Prevent Arsenic Mobilization

Mark S. Pearce and Mike Waldron

Abstract

This paper summarizes a portion of the information presented at the joint September 2010 AIPG/AGWT conference held in Orlando Florida. The discussions in this paper address three topics: 1) the observed variations in arsenic mobilization that have occurred within Florida; 2) methods that have been introduced to minimize arsenic mobilization; and 3) the use of sulfides (as HS\(^{-}\) or S\(^{-}\)) to prevent the mobilization of arsenic at a site in DeLand, Florida.

Keywords:

ASR, aquifer recharge, arsenic, trace metals, mobilization, sulfides, NaHS

Introduction

Aquifer Storage and Recovery (ASR) is the term used to describe the injection of water into a subsurface aquifer for storage during periods when water is available and recovery at a later date when water is less available. An example of an ASR cycle in Florida would be the injection of 100 million gallons (MG) of water at 1 million gallons per day (mgd), followed by a storage period of one to four months. At the end of this period, when surface water resources are reduced due to lack of rain, the water is recovered as needed or to a water quality limit such as 250 mg/l chloride, the current drinking water standard.

The ability to store and recover water below the surface resulted in the implementation of numerous ASR projects in Florida over the last three decades as more and more utilities grew concerned about growing needs and dwindling supplies. ASR technology offers the ability to store potable water, partially treated surface water, and reuse water from waste water treatment plants without the need to develop above-ground storage facilities.

By regulation, all water stored in the subsurface must meet primary drinking water standards when it is injected into an aquifer defined to be an underground source of drinking water (USDW) by the US Environmental Protection Agency (EPA). A USDW is defined as an aquifer containing less than 10,000 mg/l total dissolved solids (TDS). The Federal regulations also require that the injected water not cause changes in the native formations which would result in concentrations of regulated chemicals to exceed primary drinking water standards or exceed native formation water quality if the concentrations in the native formation water exceed primary drinking water standards for a given parameter.

As the number of ASR projects increased in Florida and around the country, additional water analyses were required by the regulating bodies to further establish water quality in the injected and recovered water. Additional monitoring of arsenic levels was required between 2000 and 2004 since the EPA planned to lower the primary drinking water standard for arsenic from 50 ug/l to 10 ug/l. The new rule went into effect on January 1, 2005 in Florida and January 1, 2006 nationally. Early reviews of thirteen ASR sites indicated that arsenic levels in recovered water commonly exceeded the regulatory standard of 10 ug/l during the first cycle, but that arsenic levels often dropped below the 10 ug/l limit during additional cycles (Pyne et al; 2004). This information was based on the review of twelve ASR sites in Florida. As arsenic monitoring continued after 2006, it became clear that arsenic was a continuing problem at some sites in Florida (Llewellyn, 2008). In order to fundamentally address the arsenic issue, entities tied to the water resource industry in Florida began reviewing the literature for a broader understanding of the source of arsenic mobilization and the development of treatment alternatives where they were needed. The work by Stuyfzand (1998) showed that arsenic mobilization within subsurface aquifers is closely associated with the injection of oxygenated water into anoxic aquifers containing pyrite. Unfortunately, this observation is not sufficient to explain the different behaviors manifested by arsenic mobilization at different sites. The observed behavior of mobilized arsenic varies between sites as enumerated below: 1) The maximum measured concentration of arsenic observed during recovery at different ASR wells varies. Initial arsenic concentrations range from below the detection limit of 3 ug/l to more than 90 ug/l; 2) The point during recovery when the maximum arsenic concentration is observed at ASR wells during cycle recovery varies. At some sites, the maximum arsenic level occurs in the first few samples at the start of recovery. At other sites, the maximum value is reached at the end of recovery. A third observed type of behavior is represented by sites where the maximum arsenic level occurs at an intermediate point during recovery. 3) A third difference between sites is how arsenic concentrations vary during recovery. At some sites arsenic concentrations decline rapidly during recovery and do not exceed regulatory levels during additional cycles. At other sites, little arsenic is recovered during the initial recovery cycle. However, arsenic levels start low at the start of additional cycles, but increase with recovered cycle volume. Finally, at one site, the arsenic level during three consecutive cycles increased at the very start of each recovery from an initial low of approximately 90 ug/l on the first cycle to a record high of almost 900 ug/l on the third cycle. At this site, arsenic concentrations declined to a steady level between 60 to 100 ug/l during the remaining stages of each recovery. Also, over 2.5 times the volume of water...
stored in the aquifer was required to be recovered before arsenic levels fell below 3 ug/l at this site. The varied behavior observed for arsenic mobilization suggests that there are multiple reaction pathways operating even though the dissolved oxygen content in the injected water and the arsenic content and location of the arsenic within the formations are similar. If it is assumed that the reaction rate associated with the basic reactions are likely similar, then the variation in arsenic concentrations and behavior is most likely associated with different formation flow properties such as flow paths (heterogeneous versus homogeneous) and dispersivity, injected water quality (presence or absence of organic materials), and other parameters that are more easily conceptualized than demonstrated.

Based on site-specific circumstances and the insights provided by Stuyfzand (1998), the water resource industry began to address arsenic mobilization following four different approaches that were partially dependent on the site. For sites where arsenic did not rise above regulatory standards, additional monitoring was required. For some sites that were continuing to experience arsenic at elevated levels, additional cycles were undertaken and additional monitoring wells were sometimes required. These sites appear to be operating under the assumption that arsenic could be completely leached from the formation after an unspecified number of cycles (CH2MHill, 2007). The third approach was designed to remove the dissolved oxygen from the water using a membrane technology (Kohn, 2009) or catalytic removal using hydrogen and a palladium catalyst (ENTRIX, 2009b). Finally, a fourth approach was undertaken in response to the difficulties encountered by the membrane and catalytic treatments. The fourth treatment method was based on the addition of sulfides (HS\(^{-1}\) and S\(^{-2}\)) in the form of sodium bisulfide (NaHS), since the NaHS could both react with dissolved oxygen and would chemically oppose the dissolution of pyrite (Pearce and Waldron, 2010).

**Prevention Of Arsenic Mobilization**

**Natural Attenuation**

Natural attenuation is likely associated with the formation of iron oxyhydroxides that adsorb and bind arsenic, and is likely represented by those sites where arsenic levels fall below regulatory limits within a few cycles. In the absence of sulfide ions or other ions capable of reducing the iron, it is likely that the arsenic will remain trapped within these oxides (Pearce, 2005).

**Leaching Process**

It has been suggested that the arsenic in a formation may be removed completely by leaching arsenic from a formation using multiple ASR cycles and high oxidant concentrations (CH2MHill, 2007). This expectation appears unlikely. As an example, the Florida Department of Environmental Protection (FDEP) has estimated that an average concentration of arsenic in Florida’s aquifer matrices utilized for storing water is on the order of 3 mg/kg of formation (Haberfeld, 2009). Further, the bulk, if not all, appears to be bound in the pyrite located within the matrix pore spaces (Price and Prichler 2005). A simple mass balance analysis shows that 12 billion gallons of water would need to be cycled through an anerobic to remove all of the arsenic from a pore volume of 100 million gallons assuming that the concentration of arsenic in the recovered water remains constant at 50 ug/l and that the formation contains 3 mg of arsenic per kg of formation (Pearce and Waldron, 2010). The potential to leach all of the arsenic from a formation based on this analysis appears to be an unrealistic expectation.

**Physical Methods for Removing Oxygen**

In the event that either arsenic levels do not fall below regulatory levels in the recovered water after a few ASR cycles, or the performance of several cycles does not appear to be a viable approach for minimizing arsenic mobilization at a given site, then it is reasonable to expect that other methods for limiting arsenic mobilization would be reviewed. Since oxidants in the injected water appear to play a major role in arsenic mobilization, then methods designed to remove the oxidants from the injected water might be expected to reduce the amount of arsenic that may be mobilized at new sites or sites experiencing continued elevated arsenic concentrations. A brief review of generally available information indicates there are two physical systems available to remove oxygen from the injected water. These methods include: 1) nitrogen de-gasification systems to remove oxygen from water as used by the off-shore oil and gas industry; and 2) a membrane de-gasification system as used by the food and beverage industry, the semiconductor industry, and other industries including those concerned with corrosion due to dissolved oxygen. Although both methods can successfully remove oxygen to very low levels, cost and operational issues must also be considered.

The nitrogen de-gasification system was reported to cost approximately $1,000,000 in capital equipment for the construction of a 1-MGD system (Pearce, personnel communication from vendor, 2005). This cost was considered beyond the budget tolerance of most utilities for this type of system and was not pursued. The membrane system provided by Membrana, Inc. to remove oxygen appears to provide adequate oxygen removal, but suffers from plugging of the membranes (Kohn, 2009).

**Catalyzed Removal of Oxygen**

Catalytic removal of dissolved oxygen using a palladium surface and dispersed hydrogen gas is also a potential oxygen removing process. However, initial miniscale pilot test results performed for the St. Johns River Water Management District (SJRWMD) and the City of DeLand, Florida indicated that the efficiency of the palladium catalyst to remove oxygen declined rapidly and did not suggest favorable long term performance (ENTRIX, 2009c).

**Chemical Removal of Oxygen Using Sulfide**

Due to the capital costs and operational issues associated with the previously mentioned treatment options, a sulfide treatment was developed for recharge water based on the following principles: 1) As indicated by Reaction 1 provided below, sulfides and oxygen can react to form sulfate ions. Therefore, the introduction of sulfides into the injected water would diminish the amount of oxygen available to react with pyrite in the target storage formation; and 2) Sulfides provide a second line of defense against arsenic release in anoxic aquifers as indicated (Reaction 2). In this case, sulfides are able to suppress the dissolution of pyrite based on Le Chatelier’s principle of equilibrium.

1. \[ \text{HS}^- + 2\text{O}_2 \rightarrow \text{H}^+ + \text{SO}_4^{2-} \]
2. \[ \text{FeS}_2 + 2\text{H}_2\text{O} \rightarrow 2\text{Fe}^{2+} + 1.75 \text{HS}^- + 0.25 \text{SO}_3^{2-} + 0.25 \text{H}^+ \]
Reaction 2 also represents the natural equilibrium condition in the subsurface involving sulfides, sulfates, iron, pH, and pyrite.

In order to evaluate the ability of sulfides to prevent the mobilization of arsenic, it is relevant to review the potential pathways leading to the release of arsenic within the subsurface and to establish a reaction rate between sulfides and dissolved oxygen within the injected water. Reaction 3 provides an indication of the chemical reactions occurring in the subsurface when oxygenated water is introduced into a formation containing pyrite.

$$3) \quad 4 \text{FeS}_2 + 14 \text{H}_2\text{O} + 15 \text{O}_2 \rightleftharpoons 4 \text{FeO(OH)} + 8 \text{SO}_4^{2-} + 16 \text{H}^+$$

Arsenic bound to pyrite \(\rightleftharpoons\) Arsenic bound to FeO(OH)

It is instructive to note that the iron in the above equation is oxidized from the +2 oxidation state to the +3 oxidation state (Usher et al., 2004), whereas, the written reaction between dissolved oxygen and pyrite often suggests that only the sulfides in pyrite are oxidized during this reaction (Price and Pichler, 2005).

A secondary reaction that is indicated immediately below Reaction 3 is that arsenic, which is bound to the pyrite as a trace metal, is oxidized and then adsorbed by the iron oxyhydroxide formed during the reaction of pyrite with the oxygen. In this reaction, the arsenic is unlikely to be mobilized to any significant extent if the reaction occurs within a zone where the water is not moving rapidly (flow through a porous media). However, in zones of fast moving water such as along fractures, arsenic may not have time to bind to the newly formed iron oxyhydroxides. Reaction 4 illustrates the reaction that occurs during groundwater recovery when naturally occurring sulfides in the native water contact the iron oxyhydroxide formed during the injection of water containing dissolved oxygen.

$$4) \quad 8\text{FeO(OH)} + 9\text{HS}^- \rightleftharpoons 8\text{FeS} + 5\text{H}_2\text{O} + 7\text{OH}^-$$

Arsenic (trace in FeO(OH)) \(\rightleftharpoons\) Arsenic (Mobilized)

In this case, the sulfides in the native water react with the iron oxyhydroxides to produce iron sulfide. As the iron oxyhydroxides are reduced by the sulfides, the formerly bound arsenic moves into solution (Fendorf and Tufano, 2008).

**Performance Of A Test Sulfide Injection System**

When the catalytic process failed to produce positive results for deoxygenating the water in the mini-test, the SJRWMD was interested in pursuing other options for preventing arsenic release. At this point, Cardno-ENTRIX (2009a), proposed the use of sulfide compounds (NaHS or other soluble Group I or Group II metals) to prevent arsenic mobilization based on preliminary testing and theoretical concepts for deoxygenation that they had been evaluating. The basic premise was that the addition of low concentrations of sulfides would make the injected water more chemically similar (chemical and oxidation/reduction conditions) with the native water in the target storage zone. In turn, the sulfides would prevent or limit the formation of iron oxyhydroxides and therefore limit arsenic mobilization.

Two major technical issues needed to be evaluated under field conditions to confirm that sulfides would limit arsenic mobilization. The required information concerned the kinetic reaction rate between sulfides and dissolved oxygen and the actual attenuation of arsenic mobility under operating conditions. The first step was to perform a pilot test to evaluate the chemical rate of reaction.

**Reaction Kinetic Testing**

The rate of dissolved oxygen depletion in the presence of low concentrations of sulfides was investigated using an approximate 300-gallon system with four sampling ports. The flow rates through the system were set at 0.5, 1.0, and 2.0 gallons per minute (gpm), which equate to retention times of 600, 300, and 150 minutes. Oxidation/Reduction potentials and oxygen concentrations were measured for samples recovered from four sampling ports. The ports were located just prior to the introduction of sulfides, just after the introduction of sulfides, after 150 gallons of system volume, and at the end of the 300-gallon pathway (Pearce and Waldron, 2010).

Although somewhat crude, the data, as presented in Figure 1, suggest that the decline in dissolved oxygen follows first order kinetics with a half-life of approximately 2 hours. The data also indicated that the half-life may be significantly lower in the presence of limestone. However, since the limestone was not characterized, such a conclusion would be premature (Pearce and Waldron, 2010).

The conclusions that were drawn, based on the kinetic results for the decline of dissolved oxygen, were: 1) sulfides react to remove dissolved oxygen; 2) the reaction is not sufficiently rapid to prevent dissolved oxygen from entering the formation; and 3) dissolved oxygen will be reduced to insignificant levels within 24 hours after entering the formation based on the reaction half-life of 2 hours at a sulfide concentration of 6 mg/l in the absence of any formation material.

The oxidation reduction potential (ORP) data were somewhat clearer. Prior to the addition of sulfides, the ORP values were greater than 100 millivolts (mv). However, immediately after the sulfides were added, the ORP value dropped to below -250 mv even though the dissolved oxygen concentration had not changed (Pearce and Waldron, 2010). These results show that ORP values do not represent the final chemical environment of the water at equilibrium or the actual ORP level that will exist once equilibrium is reached.

**Mini Pilot Testing**

Based on the favorable results from the kinetics testing, the SJRWMD approved the construction and testing of a full-scale sodium bisulfide (NaHS) injection system at the DeLand Florida site. The NaHS storage and chemical feed building was installed with secondary containment and simple metering equipment to control the NaHS concentration in the injected water.

After the installation of the NaHS handling equipment, several mini pilot tests were performed by injecting water into the target ASR storage zone while varying the sulfide concentration for each test. In order to establish a baseline, two mini-tests were performed without treating injected water with NaSH, two mini-tests were performed using 2 ppm NaHS in the injected water, and two mini cycles were performed using 6 ppm NaHS. Finally, the last two test cycles, 7 and 8, were performed using 4 ppm NaHS. Cycle 7 was completed using an injected volume of 750,000 gallons and the 8th cycle was performed using 5 million gallons. Testing results are provided in Table 1.

The data in Table 1 show that more arsenic was mobilized when no sulfides were introduced than occurred when
Sulfides were introduced. It is recognized that the arsenic levels in the cycles that were not treated with NaHS remained below the regulatory limit, but it should be recognized that the cycle volumes were small and were only utilized to provide some insight into the potential for arsenic release at this site. Overall, the data indicated that sulfides could minimize arsenic mobilization and that further testing was warranted.

It is also relevant to note that the potential for capturing high levels of arsenic in the iron hydroxides, by injecting a large volume of water prior to running the testing with sulfides, warranted the use of lower volumes in the mini-cycles. It is worth noting that the stoichiometric concentration for the removal of oxidants was approximately 3.3 to 3.5 mg sulfides per liter of injected water.

**Preliminary Large Scale Testing**

Based on the success of the mini scale and 5-MG cycle testing, a preliminary large-scale test was performed. This test was designed to inject, store and recover 20 MG. The results of 20 MG test are also presented on line 9 of Table 1. It should be specified that the high value of 1.3 ug/l arsenic observed in this test was recorded in the initially recovered sample. No other samples indicated the presence of arsenic at concentrations above the detection limit of 0.5 ug/l.

**Conclusions**

Based on the data obtained during the testing performed during this project and presented in Table 1, it is reasonable to conclude that the addition of sulfides can limit the potential to mobilize arsenic during ASR and aquifer recharge projects.

**Acknowledgements**

We would like to acknowledge the assistance, cooperation, support, and timely efforts of St. Johns River Water Management District staff and the City of DeLand’s staff for the opportunity to implement the sulfide technology during the pilot testing program to establish a chemical pretreatment program to prevent the mobilization of arsenic. In particular, we would like to thank the following individuals:

**St. Johns River Water Management District:** Doug Munch, P. G., Division Director, Groundwater Programs, and Glenn E. Forrest, P. E., Sr. Prof. Engineer, Water Supply Management

**City of DeLand:** Keith Riger, P. E., Director of Public Services, Jim Ailes, Utilities Director, and Rob Harrison, Deputy Utilities Director

**References**


Pearce, M. S., 2005, Arsenic Mobilization in Florida’s Aquifers, A Basic Perspective, Presentation at ASR V, American Ground Water Trust, October 20, 2005, Tampa, Fl.


**Reviewed by AIPG Associate Editors:** Gail Gibson, CPG-09993, Robert Minning, CPG-02565 and Dale Rezabek, CPG-09285.

Mark S. Pearce, Ph.D., received a B.S. degree from Southern Oregon College in Chemistry and a Ph.D from Washington State University in Chemical Physics. He has used his knowledge in these areas as an assistant professor at South Dakota State University, as a Research Specialist at Exxon Production Research Co. in the Well Completion and Workover Section, as a technical director in the deep well injection industry, and finally as a lead consultant for Cardno ENTRIX in the application of Aquifer Storage and Recovery (ASR). Dr. Pearce managed such projects as the long term development of the Marco Island ASR program and the second expansion of the Peace River ASR program, located in DeSoto County Florida. Since 2009, the Marco Island surface-water ASR program has won three prominent national awards for environmental-engineering excellence and sustainability. During the last several years, Dr. Pearce has devoted much of his time to the investigation and evaluation of methods to limit the mobilization of arsenic during ASR activities.

Mike Waldron, P. G., is a Florida-licensed professional geologist with over 21 years of experience in the water resources and environmental fields. Mr. Waldron has served as project manager for numerous injection-well programs and water supply well projects. He is knowledgeable concerning state and federal regulatory agency operations and codes relating to design, permitting, testing and construction of both Class V Aquifer Storage and Recovery (ASR) well systems and Class I injection wells. Mr. Waldron has a B. A. in Geology from the State University of New York - College at Oswego and currently is employed as a Senior Technical Consultant with Cardno ENTRIX.

---

**Is Your Profile Correct?**

It is important to keep your address, phone numbers, and e-mail information up to date in our records. Please take the time to go to the AIPG National Website, [www.aipg.org](http://www.aipg.org), login to the member portion of the site and make sure your information is correct. You can edit your record online. If you do not know your login and password you can e-mail National Headquarters at aipg@aipg.org or call (303) 412-6205.
YES Network Becomes AGI’s First International Associate

Alexandria, VA – The American Geological Institute (AGI) is pleased to announce that the YES Network, a professional global network for the support of early-career professionals and students in the geosciences, is the first International Associate of the AGI Federation.

The YES Network is a global network of individuals who are early-career geoscientists, students, or professionals interested in supporting the development of the next generation of geoscientists. The YES Network was formed as a result of the International Year of Planet Earth in 2007. Its first international Congress was in Beijing, China in 2009. That meeting focused on climate, environmental and geoscience challenges facing today’s society, as well as career and academic pathway challenges faced by early-career geoscientists.

Since the congress, the YES Network has more than tripled its membership and now has members in 102 countries working on geoscience projects in every corner of the globe. The YES Network aims to establish an interdisciplinary global network of individuals committed to earth science solutions to the global society’s challenges, and furthering the IYPE motto of “Earth Sciences for Society.” As the YES Network is a fully self-organizing network, there are no membership fees or dues.

“With the addition of YES to the larger AGI community, we are broadening the profession’s discussion not only internationally, but also more deeply with the emerging generation of geoscience leaders. I cannot think of a better group to be the inaugural International Associate than the YES Network. The member society council looks forward to working with this new organization to ensure that AGI is fulfilling its mission to serve as a voice of shared interest in the profession not just in the U.S. but throughout the world.” says AGI Executive Director, Dr. P. Patrick Leahy.

All information about YES Network activities and its ongoing events are posted on the YES Network site: http://www.networkyes.org/.

AGI Welcomes The National Cave and Karst Research Institute

Alexandria, VA – The American Geological Institute is pleased to announce the 48th Member Society of the AGI Federation, The National Cave and Karst Research Institute.

Originally part of the National Park Service, The National Cave and Karst Research Institute (NCKRI), is a non-profit organization with three founding partners: The National Park Service; the City of Carlsbad; and the New Mexico Institute of Mining and Technology. NCKRI exists to advance cave and karst science, serve as a repository for data, foster partnerships, promote educational programs, develop both national and international programs, and promote environmentally sound and sustainable cave and karst management.

Their addition to the AGI federation adds to the quality speleological and hydrological organizations already part of AGI’s member society council. NCKRI’s active role in research, publishing and developing educational and outreach programs matches well with AGI’s mission. Dr. P. Patrick Leahy, AGI Executive Director says “We are very pleased to include NCKRI as part of the AGI Federation and hope to partner with their staff on shared initiatives to increase the public awareness of the earth sciences. This is an exciting time at NCKRI as they transition to non-profit status and it is our hope that belonging to AGI is beneficial during this process.”

NCKRI’s Executive Director, Dr. George Veni, sees AGI membership as integral to fulfilling NCKRI’s mission. “Roughly 25% of this country is karst, yet most people, including some geoscientists, don’t adequately understand what that means. AGI offers an unparalleled platform for educating the public, policymakers, and the geoscience community about how karst functions, and the resources and challenges it presents.”

To learn more about NCKRI visit http://www.nckri.org/.

AGI Welcomes International Medical Geology Association

Alexandria, VA – The American Geological Institute (AGI) is pleased to welcome its 49th Member Society, the International Medical Geology Association (IMGA).

IMGA was established in 2006. Since that time, its nearly 500 members represent 73 countries. This multi-national organization facilitates interactions between geoscientists and biomedical and public health researchers to address human and animal health problems created by geologic materials and processes.

Dr. P. Patrick Leahy, AGI Executive Director, says of IMGA’s addition to the AGI federation, “IMGA is an association that truly matches with AGI’s mission to increase the awareness of the vital role the geosciences play in society. Human health directly relates to the earth sciences, be it access to safe drinking water, or geo-engineering to live safely in an area of high earthquake risk. IMGA assures that the quality application and knowledge of the geosciences protect society.”

To learn more about IMGA please visit their website at http://www.medicalgeology.org/index.htm.
Earth: A Decade-Plus Of Tracking Lunar Larceny

Alexandria, VA – In the back alleys of the world’s capitals and the ballrooms of presidential palaces exists a black market that preys on the imagination of some and the greed of others. These black-market items are not of this world: They are moon rocks, collected decades ago by six Apollo missions and three unmanned Soviet missions to the moon.

For the past decade, former NASA investigator Joseph Gutheinz Jr. has been tracking this lunar larceny - with a good bit of success. In the March feature “A Memoir: A Decade-Plus of Tracking Lunar Larceny,” Gutheinz recalls some of the most famous thefts and losses of the Apollo moon rocks. He also details how he and his students have helped uncover some of these thefts and helped recover several of the missing rocks.

Read more of this crime-fighting memoir in the March issue, as well as other analytical stories on topics such as how remote sensing is helping aid agencies prepare for famine before it strikes, how oil and water helped the U.S. and the Allies win World War II, and who should be paying for cleanup after wildfires and landslides strike.

For further information on the March featured article, go to http://www.earthmagazine.org/earth/article/410-7db-2-16.

Earth: Alive! Bacteria Back From The Brink

Alexandria, VA – In 1993, “Jurassic Park” thrilled the world with the idea that dinosaurs could be resurrected from bits of DNA preserved in mosquitoes trapped in ancient amber. In the 18 years since the movie came out, scientists have been finding that parts of this scenario are closer to reality than anyone ever imagined: Researchers have found microbes living for tens of thousands - and maybe millions - of years inside salt crystals.

These findings raise exciting questions, as EARTH explores in “Bacteria Back From The Brink” in the April issue. Could these hibernating microbes be brought back to active life today? If so, what can such microbes tell us about ancient life on Earth? And could similar microbes also be living on other planets?

Learn more about how these fascinating microbes stay alive over millennia, and read other stories on topics such as how black carbon affects climate, how to figure out if there is hexavalent chromium in your drinking water, and whether science education is passing or failing in the U.S. in the April issue. Plus, don’t miss the surprising story about discovering dinosaur tracks in a New Jersey housing development.

For further information on the April featured article, go to http://www.earthmagazine.org/earth/article/423-7db-3-7.

PROFESSIONAL MEMBER APPLICATION

American Institute of Professional Geologists
Professional Member Application

Sign up Online – www.aipg.org
12000 N. Washington Street, Suite 285, Thornton, CO 80241 – (303) 412-6205 - aipg@aipg.org

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

Last Name: ___________________________ First Name: ___________________________
MI: _____ Suffix: _______________________

Employer Name: _______________________
☐ Mr. ☐ Ms. ☐ Mrs. ☐ Dr.

Preferred Mailing Address: ☐ Home ☐ Business Male ☐ Female ☐
Street: ________________________________
City: __________________ State: ______ Zip: ______ Country: __________
Work Ph: ____________________________ Home Ph: ___________________________
Cell: ________________________________

Email: ________________________________ Yr Highest Degree Awarded: ______

Geological Degree: ☐ BA ☐ BS ☐ MA ☐ MS ☐ PhD __________________________
University: ____________________________

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

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

Applicant Signature: ___________________________ Date: ____________

HEADQUARTERS USE ONLY
Amt: __________________________ Date Rcvd: __________
Mbr #: __________________________
Key Issues from the Earth Systems Science Education Summit

The American Geological Institute (AGI) hosted the first Earth System Science (ESS) Education Summit in Houston, Texas, at BP Exploration’s new Helios Plaza meeting facility on February 8-11, 2010. The Summit was supported by a grant from the National Science Foundation, as well as by funding from AGI, the American Association of Petroleum Geologists and the Geological Society of America. Forty-two representatives of AGI member societies and key partners met to discuss and address key issues facing the K-12 geoscience education community.

Key issues included:
- Perception of high school ESS as a non-rigorous, non-laboratory course;
- Status of the preparation and continuing education of ESS teachers;
- Inclusion of ESS alongside other sciences in the new national science education standards;
- Lack of an ESS advanced placement course;
- Challenges to ESS in schools by the creationist and Intelligent Design movements; and
- Role of the International Earth Science Olympiad in raising the profile of ESS.

Summit participants aimed to establish a formal consensus about key challenges, identify initiatives and individuals to address challenges, form teams to work on specific projects, identify possible funding sources for projects, and plan for U.S. participation in the International Earth Science Olympiad. In addition to affirming the priority issues listed above, the meeting resulted in five chaired Working Groups, as well as lists of Big Ideas and Action Items.

Big Ideas

Participants substantively agreed:
1. The geoscience community must speak with a common voice.
2. The geoscience community needs a public relations campaign for ESS education.
3. ESS education needs to be inclusive.
4. Teacher professional development for ESS must be organized nationwide.
5. There needs to be a state-level network to deal with crises in ESS education.
6. A nationwide campaign is needed to encourage institutions of higher learning to accept ESS high school courses as laboratory science courses.
7. The geoscience community must be politically savvy in ensuring ESS inclusion in national and state standards.
8. The geoscience community needs to work with guidance counselors and parents to raise the profile of ESS in schools for subject literacy and as a career option.
9. An AP Earth Science Exam can legitimize ESS in schools.
10. Look to the International Earth Science Olympiad as a public relations opportunity for ESS education and a chance to engage students at all levels in solving local geoscience problems.

Action Items

Participants made a shared commitment to:
1. Collect baseline data on existing ESS teacher pre- and in-service programs in the U.S.
2. Collect baseline data on four-year institutions that do and do not accept a high school ESS course for admission.
3. Update AGI’s Pulse of Earth Science web site to reflect states that both require a course in ESS and that accept a course in ESS for high school graduation.
4. Review the draft version of the new national science education standards and provide feedback.
5. Seek funding support for a Center for Geoscience Understanding.
6. Seek funding and explore potential partnerships for the International Earth Science Olympiad.

- Ann Benbow
  Education, Outreach and Development Director
The Yellowstone plume is bigger than thought

WASHINGTON—Geophysicists have made the first large-scale picture of the electrical conductivity of the gigantic underground plume of hot and partly molten rock that feeds the Yellowstone supervolcano. The image suggests that the plume beneath the volcanically active area—renowned today for geysers and hot springs—is even bigger than it appears in earlier images made with earthquake waves.

“It’s like comparing ultrasound and MRI in the human body; they are different imaging technologies,” says geophysics Professor Michael Zhdanov of the University of Utah in Salt Lake City. Zhdanov is principal author of the new study and an expert on measuring magnetic and electrical fields on Earth’s surface to find oil, gas, minerals and geologic structures underground.

It’s a totally new and different way of imaging and looking at the volcanic roots of Yellowstone,” says study co-author Robert B. Smith, professor emeritus and research professor of geophysics, also at University of Utah, and a coordinating scientist of the Yellowstone Volcano Observatory.

In the past 2 million years, three eruptions at Yellowstone have been huge, belching enough volcanic ash to cover half of North America. The new study says nothing about the chances of another cataclysmic caldera (giant crater) eruption at Yellowstone, but it provides scientists with a valuable, new perspective on the vast and deep reservoir of fiery material that feeds such eruptions.

The new study has been accepted for publication in Geophysical Research Letters, a journal of the American Geophysical Union, which plans to publish it within the next few weeks.

In a December 2009 study, Smith used seismic waves from earthquakes to make the most detailed seismic images yet of the “hotspot” plumbing that feeds the Yellowstone volcano. Seismic waves move faster through cold rock and slower through hot rock. Measurements of seismic-wave speeds were used to make a three-dimensional picture, quite like X-rays are combined to make a medical CT scan.

By comparing these images with those made by seismic waves at Yellowstone, Zhdanov and colleagues determined that the hot plume at Yellowstone is bigger than previously thought. The 2009 images showed the plume of hot and molten rock dips downward from Yellowstone at an angle of 60 degrees and extends 240 kilometers (150 miles) west-northwest to a point at least 660 km (410 mi) under the Montana-Idaho border—as far as seismic imaging could “see.”

In the new study, images of the Yellowstone plume’s electrical conductivity—generated by molten silicate rocks and hot briny water that is naturally present and mixed in partly molten rock—shows the conductive part of the plume dipping more gently, at an angle of perhaps 40 degrees to the west, and extending perhaps 640 km (400 mi) from east to west. The geoelectric image can “see” only 320 km (200 mi) deep.

Two Views of the Yellowstone Volcanic Plume

Smith says the geoelectric and seismic images of the Yellowstone plume look somewhat different because “we are imaging slightly different things.” Seismic images highlight materials such as molten or partly molten rock that slow seismic waves, while the geoelectric image is sensitive to briny fluids that conduct electricity.

“It [the plume] is very conductive compared with the rock around it,” Zhdanov says. “It’s close to seawater in conductivity.”

The lesser tilt of the geoelectric plume image raises the possibility that the seismically imaged plume, shaped somewhat like a tilted tornado, may be enveloped by a broader, underground sheet of partly molten rock and liquids, Zhdanov and Smith say.

“It’s a bigger size” in the geoelectric picture, says Smith. “We can infer there are more fluids” than shown by seismic images. Despite differences, he says, “this body that conducts electricity is in about the same location with similar geometry as the seismically imaged Yellowstone plume.”

Zhdanov says that last year, other researchers presented preliminary findings at a meeting comparing electrical and seismic features under the Yellowstone area, but only to shallow depths and over a smaller area.

The study was conducted by Zhdanov, Smith, two members of Zhdanov’s lab—research geophysicist Alexander Gribenko and geophysics Ph.D. student Marie Green—and computer scientist Martin Cuma of the University of Utah’s Center for High Performance Computing. Funding came from the National Science Foundation (NSF) and the Consortium for Electromagnetic Modeling and Inversion, which Zhdanov heads.

The Yellowstone Hotspot at a Glance

Almost 17 million years ago, the deep plume of hot and partly molten rock known as the Yellowstone hotspot first breached the surface in an eruption near what is now the Oregon-Idaho-Nevada border. As North America drifted slowly southwest over the hotspot, there were more than 140 gargantuan caldera eruptions—the largest kind of eruption known on Earth—along a northeast-trending path that is now Idaho’s Snake River Plain.

The hotspot finally reached Yellowstone about 2 million years ago, yielding three huge caldera eruptions about 2 million, 1.3 million and 642,000 years ago. Two of the eruptions blanketed half of North America with volcanic ash, producing 2,500 times and 1,000 times more ash, respectively, than the 1980 eruption of Mount St. Helens in Washington state. Smaller eruptions occurred at Yellowstone in between the big blasts and as recently as 70,000 years ago.

Seismic and ground-deformation studies previously showed the top of the rising volcanic plume flattens out like a 480-kilometer-wide (300 mile-wide) pancake 80 km (50 mi) beneath Yellowstone. There, giant blobs of hot and partly molten rock break off the top of the plume and slowly rise to feed the magma chamber—a spongy, banana-shaped body of molten and partly molten rock located about 6 km to 16 km (4 to 10 mi) beneath the ground at Yellowstone.

Computing a Geoelectrical Image of Yellowstone’s Hotspot Plume

Zhdanov and colleagues used data collected by EarthScope, an NSF-funded effort to collect seismic, magnetotelluric and geodetic (ground deformation) data to study the structure and evolution of North America. Using the data to image the Yellowstone plume was a computing
challenge because so much data was involved.

Inversion is a formal mathematical method used to “extract information about the deep geological structures of the Earth from the magnetic and electrical fields recorded on the ground surface,” Zhdanov says. Inversion also is used to convert measurements of seismic waves at the surface into underground images.

Magnetotelluric measurements record very low frequencies of electromagnetic radiation – about 0.0001 to 0.0664 Hertz – far below the frequencies of radio or TV signals or even electric power lines. This low-frequency, long-wavelength electromagnetic field penetrates some three hundred kilometers (about 200 mi) into the Earth. By comparison, TV and radio waves penetrate only a fraction of a centimeter (inch).

The EarthScope data were collected by 115 stations in Wyoming, Montana and Idaho – the three states straddled by Yellowstone National Park. The stations, which include electric and magnetic field sensors, are operated by Oregon State University for the Incorporated Research Institutions for Seismology, a consortium of universities.

In a supercomputer, a simulation predicts expected electric and magnetic measurements at the surface based on known underground structures. That allows the real surface measurements to be “inverted” to make an image of underground structure.

Zhdanov says it took about 18 hours of supercomputer time to do all the calculations needed to produce the geoelectric plume picture. The supercomputer was the Ember cluster at the University of Utah’s Center for High Performance Computing, says Cuma, the computer scientist.

Ember has 260 nodes, each with 12 CPU (central processing unit) cores, compared with two to four cores commonly found on personal computer, Cuma says. Of the 260 nodes, 64 were used for the Yellowstone study, which he adds is “roughly equivalent to 200 common PCs.” To create the geoelectric image of Yellowstone’s plume required 2 million pixels, or picture elements.


---

The American Institute of Professional Geologists Brings Exclusive UPS Savings to its Membership

Thornton, Colorado — Looking to save some money? Well starting on April 4, 2011, members of the American Institute of Professional Geologists can now save up to 28% percent on their express shipping courtesy of UPS (NYSE: UPS).

Customers wanting to sign up for the UPS Savings Program can log onto the American Institute of Professional Geologists’ Web Site for more information or log onto www.savewithups.com/enroll. Use promo code WES462 to enroll.

The savings on shipping, which increases the more packages or letters the user sends, will be applied once enrollment is complete.

For more information on the UPS Savings Program, visit the American Institute of Professional Geologists’ Web Site at www.aipg.org or www.savewithups.com/enroll. Use promo code WES462 to enroll.

Contact Information:
American Institute of Professional Geologists
(303) 412-6205

---

AAPG Recruiting for new Executive Director

Rick Fritz has chosen to leave his position as Executive Director of AAPG to return to industry. He will continue to serve AAPG through the Annual Convention in April, and will then join the exploration staff of a large independent company.

AAPG president Dave Rensink has formed an ad hoc search committee composed of members of the Executive Committee and the AAPG Foundation. The search for a new Executive Director will begin immediately. At this time, all inquiries should be directed to Dave Rensink.

For additional information, refer to the AAPG website at www.aapg.org.
Rare Earths – What’s All the Fuss?

Jim Burnell, MEM-0205

The term “rare earth elements” has appeared in the news a lot in recent months. Policy makers are discussing them in Congress and are working to facilitate their mining in the U.S. Investment advisers are following developments in the mining industry where rare earths are involved. Reporters are even writing articles about them. Clearly, this group of elements has caught the attention and the imagination of the public. Is that attention warranted?

Terminology

To a geologist, geochemist or chemist, the Rare Earth elements (REE) comprise a very specific group. Also known as the Lanthanide Series, the REE warrant their own row on the periodic table of the elements (Figure 1). The row begins with element number 57, Lanthanum – the source of the name “Lanthanide Series.” It ends with element number 71, Lutetium.

In recent years, other elements have been spoken of as “rare earths” in various forums. Scandium (Sc) and Yttrium (Y) are commonly discussed as rare earths within the commodities community. In fact, the chemical characteristics and behavior of these two elements are similar to the Lanthanide elements. Others, such as germanium (Ge), gallium (Ga), tantalum (Ta) have been called “rare earth elements.” These elements come up in the same conversations as the Lanthanide Series, because they are in demand by technology industries and are mostly imported. They aren’t technically “rare earth elements,” so they won’t be discussed in this paper.

The name itself is misleading. Rare Earths aren’t really rare – certainly not as rare as other mined commodities (Figure 2). Elements of the Lanthanide Series are estimated to be as abundant in the crust as 60 parts per million (for Cerium) and 30 parts per million (for Lanthanum). Even the least abundant of the Lanthanide Series – Thulium (Tm) and Lutetium are more abundant (0.5 parts per million) than silver (0.07 parts per million), gold (0.004 parts per million) and many of the platinum group metals such as osmium, iridium and platinum (0.001 parts per million each).

What makes the REE “rare” is their tendency to be somewhat evenly distributed throughout the crust. Nature provides mechanisms to concentrate many elements, including the base metals and precious metals into ore deposits where they can be profitably extracted. The Lanthanide elements, however, are not so cooperative. The scarcity of economic concentrations of these elements is what makes them rare.

Chemical Characteristics

The elements of the Lanthanide Series possess special chemical properties because of their electron configuration. Atoms of these elements have, of course, one more proton successively from atomic numbers 57 through 71. They also have an additional electron for each successive atomic number. However, the electrons are added in an inner shell that does not effectively shield the outer electrons from the increasing attractive power of the added protons. The additional proton pulls the electron shell into a tighter mass. The result is that the atomic radii of the elements of the Lanthanide series decrease systematically as their atomic numbers increase. This phenomenon is called the “lanthanide contraction.”

Because of that unique characteristic, all 15 of the Lanthanides possess nearly the same atomic radius and the same valence. Therefore, the elements are fractionated only slightly by natural processes and generally occur all

---

<table>
<thead>
<tr>
<th>Element</th>
<th>Abundance (ppm)</th>
<th>Element</th>
<th>Abundance (ppm)</th>
<th>Element</th>
<th>Abundance (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanthanum</td>
<td>30</td>
<td>Europium</td>
<td>1.2</td>
<td>Erbium</td>
<td>2.8</td>
</tr>
<tr>
<td>Cerium</td>
<td>60</td>
<td>Gadolinium</td>
<td>5.4</td>
<td>Thulium</td>
<td>4.5</td>
</tr>
<tr>
<td>Praseodymium</td>
<td>8.2</td>
<td>Terbium</td>
<td>0.9</td>
<td>Ytterbium</td>
<td>3.4</td>
</tr>
<tr>
<td>Neodymium</td>
<td>28</td>
<td>Dysprosium</td>
<td>3</td>
<td>Lutetium</td>
<td>0.5</td>
</tr>
<tr>
<td>Samarium</td>
<td>6</td>
<td>Holmium</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold</td>
<td>0.002</td>
<td>Silver</td>
<td>0.07</td>
<td>Copper</td>
<td>50</td>
</tr>
</tbody>
</table>

---

Figure 1. The Lanthanide row of the periodic table of the elements. Lanthanum is the lightest, followed by Cerium, Praseodymium, Neodymium, Promethium, Samarium, Europium, Gadolinium, Terbium, Dysprosium, Holmium, Erbium, Thulium, Ytterbium, and Lutetium. Of these, only Promethium does not occur in nature.

Figure 2. Abundances of Lanthanide elements in the earth’s crust (Taylor, 1964). Numerous researchers have provided tables of crustal abundances for elements in the crust, but Taylor is used here because the values represent a good average of other published figures. Promethium is not included because it does not occur naturally. Gold, silver and copper are added to the table to compare with the Lanthanides.
RARE EARTHS—WHAT’S ALL THE FUSS

Characteristics of the Lanthanide series elements give them their useful properties. For example, the very high magnetic moments of some of the Lanthanides make them valuable for specialized magnets. Several of the elements possess extremely high magnetic properties. The luminescence of lanthanide atoms when excited makes them particularly useful for laser and other applications using the generation and amplification of light.

Mineralogy

As many as 50 minerals contain more than a trace of rare earth elements, but only three are generally considered principle ore minerals of the Lanthanides – bastnaesite, monazite and xenotime. Other minerals you may have heard of, such as apatite, loparite, allanite and zircon, also contain significant amounts of the Lanthanides, although not enough to be considered ore. The current practice for the rare earth-bearing minerals is to name the mineral by the predominant rare earth element in the structure. For example bastnaesite that contains dominantly cerium, is termed bastnaesite-Co; monazite containing predominantly lanthanum is monazite-La (Eckel, 1997).

Bastnaesite is one of the principle ore minerals of the rare earth elements, concentrating particularly the light rare earths (LREE). Bastnaesite is a rare earth carbonate with the general formula of \( \text{REECO}_3\text{F} \). Lanthanum, cerium and yttrium concentrate in bastnaesite, but all the rare earths do occur in the mineral. It is most commonly found in carbonatites, although has been identified in some unusual granites and in karst bauxite deposits in Europe (Long, et al, 2010). Bastnaesite is the ore mineral found in both the huge Bayan Obo deposit in China and the Mountain Pass deposit in California (Figure 3).

Monazite

Monazite (Figure 4) is a rare earth phosphate and is an important source of thorium in addition to rare earths. The formula is expressed as \( \text{REE(Th)} \text{PO}_4 \). Monazite is widely distributed as an accessory mineral in granitic intrusives and gneissic metamorphic rocks. As a very resistant mineral, monazite persists in the environment, concentrating in sediments derived from its parent rocks. Consequently, monazite is often found in placer deposits (Deer, et al., 1966).

Xenotime

Xenotime is a phosphate mineral, isostructural with zircon that concentrates the heavy rare earths (Deer, et al., 1966). The formula is \( \text{(REE)PO}_4 \) and is most commonly found as Xenotime-(Y), indicating the predominance of yttrium. Yttrium is not a lanthanide, but shares many of the chemical properties of that group. The mineral also commonly contains uranium and thorium. Xenotime is a common accessory mineral in many igneous rocks and metamorphic rocks.

Other REE-bearing Minerals

At the Pajarito deposit in New Mexico (Sherer, 1990) and the Nechalacho deposit in Nunavut, eudialite contains considerable REE. Typically a zirconium-bearing mineral, eudialite – \((\text{Na,Ca,Fe})_6\text{Zr(Si}_3\text{O}_9)\text{(OH,F,Cl)}\) is found in quartz-undersaturated (nepheline-bearing) intrusive and pegmatites (Berry and Mason, 1959; Avalon Minerals Ltd., 2011). Synchysite – \(\text{Ca(REE,Y)}\text{(CO}_3\text{)}_2\text{F}\) – is a rare earth carbonate found in alkali syenites and pegmatites and is also considered a potential ore mineral at the Nechalacho Deposit (Mindat, 2010; Avalon Minerals, Ltd, 2011). Loparite, ancylite, synchysite, fergusonite are all uncommon REE-bearing minerals that appear in some deposits.

Geologic Occurrences

Lanthanide elements are found in most rocks, but ore-grade concentrations are rare. High concentrations of rare earth elements are found in magmatic carbonate and alkali-rich rocks. Carbonatites (magmatic carbonates) contain several of the world’s known large deposits, as do peralkaline (alkali-rich) late stage granitic rocks. The huge deposits at Bayan Obo (Inner Mongolia) and Mountain Pass (California) and the Seis Lagos deposit in Brazil are carbonatite occurrences. The Nechalacho of Nunavut, Bokan Mountain deposit in Alaska (Warner and Barker, 1989) and the Kola Peninsula in Russia are related to syenitic or peralkaline granites. Pegmatites, also formed as late-stage volatile-rich igneous rocks, commonly contain high concentrations of Lanthanide elements.

One of the most unusual types of rare earth ores are the large “IOCG” deposits (Iron Oxide Copper Gold), typified by the Olympic Dam deposit in Australia. Several locations in the U.S. also display high rare earth contents in magmatic iron deposits (Klemec, et al., 1989; Long, et al, 2010).

Because several lanthanide-bearing minerals are resistant to weathering, rare earths also occur in rocks derived from the primary igneous source. Placer
In the industrial sector, lanthanum, cerium and lutetium are used as cracking catalysts in petroleum refining and cerium is used in the production of ethyl alcohol. Gadolinium and ytterbium are used in some stainless steel alloys and cerium in tungsten arc welding. Rare earths are valuable in the nuclear industry as neutron absorbers for control rods, especially samarium, europium, dysprosium and erbium.

The rare earths are important in the glass and ceramics industries. Cerium is a valuable glass polishing material, and praseodymium, a glass colorant. Special glass for filtering UV, for astronomical and welding requires cerium, neodymium and/or europium. The rapidly-growing field of ceramics has developed uses for europium, holmium and praseodymium. One of the more exotic is the use of thulium in ferrites – magnetic ceramic materials.

The unique luminescence properties of the rare earths make them important for laser and microwave applications, trichromatic and carbon are lighting and energy efficient fluorescent lighting. One of the oldest uses for rare earths is as phosphors for television and computer screens. Solid state electronics, compact discs and magnetic storage media all use rare earths.

Electric vehicles contain up to 25 pounds of rare earths each in a variety of uses (Molycorp Minerals, 2010). Most widely known is the lanthanum and cerium used in the nickel metal hydride battery of the Toyota Prius and others. The computer, electronics, braking and glass components use other rare earths.

In some medical applications, rare earth elements are irreplaceable. The unique atomic properties of gadolinium and dysprosium are used in magnetic resonance imaging (MRI). Lutetium is used in positron emission tomography (PET scanning) and dysprosium and thulium are valuable as portable radiation sources.

The use gathering the most notoriety is magnets. Samarium-cobalt and neodymium-iron-boron magnets are used in numerous applications. The website www.rareearth.org traces the history of the theses magnets, including a table of patents. The strength, permanence and heat-tolerance of rare earth magnets are ideal qualities for such applications as electric motors. They can be fabricated in very small sizes, unusual shapes and even included as a powder in rubber and plastic fixtures, making them indispensable in devices such as computers, electronics equipment and toys.

The awareness of the U.S. shortage of this family of commodities has been driven by their military and aerospace applications. The properties of the rare earths that bring them to the market in the technologies above make them integral to the U.S. defense industry. Hedrick (2004) provided an excellent summary of numerous uses of the rare earths in the defense industry. Rare Earth magnet technology is used for precision guided munitions, a wide range of communications and electronic countermeasures equipment, aircraft, stealth technology, radar and sonar and optical equipment. Rare earth laser technologies used by the military include range-finders, target designators and interrogators. The modern electronic military uses much of the same phosphors for computer displays, avionics displays and vision enhancement technology. The ability of rare earths to absorb neutrons is valuable in nuclear marine propulsion. The modern military would operate very differently without rare earths.

**Mining**

The importance of the rare earths to the U.S. has generated concern because none have been mined domestically since 1991. According to the U.S. Geological Survey (2011) the U.S. has been 100 per cent dependent upon imports since 2003. Some small amount of rare earths are recovered from operations in other countries, mostly as by-products. Even still, most of the processing of lanthanide ores has been done in China.

Recognition of the large and growing market has encouraged the development of mines around the world. Nearest to production in the U.S. is the Mountain Pass Mine in southern California (Figure 6). Once the largest rare earth mine in the world, the mine closed down in 1991 with a large remaining reserve of ore. The owner-operator – Molycorp – has announced plans to reopen the mine and to accomplish all the processing of the rare earth product in the U.S. The operations are scheduled to resume in 2012.

---

**Applications**

For a long time after their discovery, the rare earths were largely a curiosity and an object of research by chemists and physicists on their atomic properties. The earliest use of the rare earths was for incandescent lamp mantles (Hedrick, 2000). Later, *mischmetal* was developed. A mixture of lanthanum, neodymium and several other metals, mischmetal is used in lighter flints and other sparking devices.

By the 21st century, the applications for rare earths have grown significantly. Rare earths are found across a wide spectrum of economic endeavors. Websites of various rare earth companies have included summaries of applications of their products including Molycorp Minerals, (2010), Lysnas Corporation (2010), UCore Rare Metals (2011), and Great Western Minerals Group, along with Kingsnorth (2009), Castor and Hedrick (2006) and the US Geological Survey Minerals Information site (2010).

---

**Figure 5. A black sand or heavy mineral sand of the Deep Sands Deposit in Utah. The sand, rich in rare earth-bearing monazite, was deposited along the beach of prehistoric Lake Bonneville. Photo courtesy of Great Western Minerals Group.**
Several other deposits outside China are in, or near to, production. Lynas Corporation is mining at their large Mount Weld deposit, a carbonatite in Western Australia. Upstream processing will be accomplished on-site in 2011 with concentrate shipped to Lynas’s plant in Malaysia (Lynas Corporation, 2011). The Nechalacho Deposit in Nunavut, Canada, is an advanced project by Avalon Rare Metals. No date has been published for their initial operations (Avalon Rare Metals, 2011).

The Great Western Minerals Group is a Canadian company developing projects in South Africa (Steenskampkraal), northern Saskatchewan (Hoidas Lake) and Utah (Deep Sands placer deposit). The company also plans to perform their own processing with their subsidiary Great Western Technologies, Inc., at their facilities in Michigan. Other notable deposits include the Bear Lodge deposit in Wyoming, owned by Rare Element Resources, Ltd, and the Iron Mountain, southeast Alaska, currently owned by UCore Rare Metals. The company is currently conducting an advanced drilling program to define the reserves.

Conclusion

The indispensable properties and the short supply of the rare earths have energized the mining world with a new appreciation of their value. The industry is experiencing a new enthusiasm for the production of the lanthanides. The positive effect on the American public and policy makers is a growing recognition of the need to mine not just rare earths, but the other materials needed for our economy.

References


Hedrick, James B., 2004: Rare Earths in selected U.S. defense applications; 40th Forum on the Geology of Industrial Minerals, Bloomington, IN.


Jim Burnell is the Senior Minerals Geologist with the Colorado Geological Survey, responsible for metals, uranium, and industrial minerals. A Vietnam veteran, Jim received a bachelor’s degree in geology from Franklin and Marshall College, a M.S. from the University of Minnesota – Duluth, and a PhD from Brown University. He has been involved in teaching (Auburn University), research (Pacific Northwest National Laboratory), and worked in the fields of minerals, hazardous waste, and general geologic and management consulting in the private sector and for a Native American Tribal organization. With the State of Colorado since 1997, Jim joined the CGS in 2007.
Colorado Section

Summer West Slope Meeting And Trip-Plans are brewing to hold our annual summer board meeting on the West Slope. We may try to do this in Durango this year. The meeting will necessarily involve a field trip. Southwest Colorado members have suggested we Front Rangers come over and do some geology in their area. Anyone who accompanied us on the Ouray field trip two years ago can attest to the great hospitality and the good time had by all.

Stay tuned.

Other Field Trip News-In a recent meeting of the Colorado Scientific Society (the oldest scientific society west of the Mississippi), upcoming field trips were discussed. Since your editor participates with that group also, he thinks it appropriate to warn you of upcoming field trips.

(1) A sojourn through Glenwood Canyon will occur this spring that includes a bicycle tour—all downhill, I’m told.
(2) The annual family day is in the planning stages but will superb ideas for the kids.
(3) A fall field trip is under discussion that involves a half-trip on the Cumbres and Toltec Railroad along with a jeep trip along the access road to the tracks. It seems that a C&TTRR staff member is a geologist; he invited the CSS and will lead the geology tour.

Just stay tuned to Doug’s email blasts for details. I will further warn you in this newsletter as the events approach.

Jim Burnell, Editor

Georgia Section

25 years of membership-Each year AIPG recognizes those members that have been AIPG members for 25 years. I am happy to say that we have two Georgia Section members that have been honored with 25 year lapel pins. David Avant, Jr. and Charles Thomas have been active in our section for many years and we have had field trip to visit David’s company in the kaolin district. Congratulations to both.

Scholarships and donations to our two student sections-In December letters were sent to our members asking for donations to support our two student chapters and for scholarships for six students from our six universities that offer geology degrees. I thank all who donated and I’m please to announce that we have given $500.00 to each of our student chapters and we will give our six students scholarships of $250.00 each. The six students that will receive the scholarships are: Ashley White – University of West Georgia, Bryan Victor – Columbus State University, Joseph Dehnert – Georgia Southern University, Semir Sarajlic – Georgia State University, Shauna Morrison – Georgia Southwestern State, and Abigail Maxwell – University of Georgia.

Ron WallAce, Section President

Illinois-Indiana Section

Field Trip Report – “Geology and the Making of a Metropolis”-Field trips often result in several hours of bumpy ride interrupted by five to ten minute presentations of highly interesting technical discussions or observations. The AIPG field trip of September 25, 2010 was a delightful departure from this usual format.

While leaving the parking lot, Michael (Miko) Chrzastowski, PhD, PG, Senior Coastal Geologist with the Illinois State Geological Survey (ISGS) introduced himself as a “coastal geologist” which immediately begged a couple of questions in everyone’s mind: “how did a coastal geologist end up in the Midwest” and “did he fail map reading 101”. Mike quickly explained his long-term interest in historic and present day geologic forces at work in the Great Lakes region, and along the Lake Michigan shore line. It was obvious that Mike’s knowledge of these subjects was extensive. What was even more apparent was his love of the subject and his desire to share that knowledge. Even as we were riding east on I-90 towards the lake shore Mike was pointing out subtle rises, crests and dips of the various glacial moraines as we crossed them. He also discussed the unique river and drainage water sheds as we proceeded to the lake.

At the Dead River and the Illinois Beach State Park we were treated to a “hay ride”. Every one climbed on wagons, with hay bale seats, and was chauffeured to the Lake Michigan shore by park staff. This three mile hay ride was much appreciated, as Mike pointed out local geologic features such as “sand deposition waves”, sand dunes, vegetation changes and oak forestation. He explained the current lake erosion process that includes eroding glacial till embankments that generate sand, that then moves south toward Indiana (and the dunes) by wind and wave action.

The high point at the Dead River State Park was observing the “dead river” that periodically opens, closes and moves its drainage point between dunes into Lake Michigan. I won’t give any more details. You will have to take the field trip at the Fall 2011 AIPG National Meeting in Chicagoland to see more, understand, and appreciate this very unique situation.

Josh Poole accepting the $500.00 for University of West Georgia Student Chapter.

The mouth of Dead River and surrounding land at the Illinois Beach State Park mimics the presettlement setting of the Chicago River mouth.

We also visited the Forest Park Beach and Montrose Avenue Beach where we saw a “manmade” beach that was created by importing tons of sand and constructing protective barriers and sea-walls. Extensive studies of tides, currents and wind forces were used to design and create a self-sustaining beach that works.
with these forces of nature, and not against them.

The last stop on our trip was to the Chicago Portage National Historic Site Park where in 1673 Father Jacques Marquette and Louis Jolliet traveled up the Des Plaines River. They found a shallow but navigable waterway (or at least short portage in dry weather) between the Des Plaines River and Lake Michigan. Even in 1673 these two amazing explorers realized this connection meant rapid water transportation between the Great Lakes, the eastern United States, and the Gulf of Mexico.

Mike maintained a running commentary on the geologic features we were seeing, and he shared his experiences working on various projects and studies. Mike also provided social discussion as to how physical landform features influenced street and rail layout, and thereby population movement and migration as lake-side cities developed. Technical information from this trip is presented in the “Chicagoland, Geology and Making of a Metropolis” prepared by Dr. Michael Chrzastowski and issued by the ISGS. This document contains state-of-the-art computer renditions of various geologic features, cross sections and tables and is worth the trip price in itself.

There are sketches of the first log cabin built by Jean Baptiste du Sable in the mid 1780s at the mouth of the Chicago River where it entered Lake Michigan (before the Chicago River was reversed to drain out of the Lake). Today the Dead River mouth, with its sand dunes looks eerily similar to the dunes shown in this early BC sketch (before Chicago). Today, you can look north from this site and see the Zion Nuclear Power Plant. For better or worse man is improving his understanding of the geologic past. Let’s hope we all learn from the past, and also learn how to live in the future.

Erik Spande, Editor

North Avenue Beach on Chicago’s Near North Lakefront is one of the most successful engineered beaches in the nation.
Volunteers at the AIPG booth during the SME Convention in Denver.
New Coffee Mugs


Roadster Mug - Get exclusive double-wall insulation that keeps the “hots” hot and the “colds” cold. Discover the comfortable handle with thumb grip and spill-resistant lid with thumb-slide opening. It even fits easily into automobile cup holders. Product Size: 16 oz. Price: $7.50

Sportsman Hat - 100% cotton, 3-panel construction, self-fabric sweatband and stitched eyelets. Lightly brushed to soften the fabric and color. Unique look achieved through a special pigment dye and garment wash process. Available Colors: Berry, Black, Navy, Faded Denim, Green, Khaki, Blue, and White. Price: $16.00

Outback Hat - The “down under” styling adds a sense of adventure to any outing. Heavyweight 100% cotton canvas; drawstring with cord locks and fashion brass eyelets. Two side snaps give the option of wearing the brim up or down. Available Colors: Canvas/Canvas, and Canvas/Navy. Price $18.00

SALE SALE SALE BOOK - Learn about the Geology of Northern Arizona with maps, photos and expert descriptions! This 6”x9” paperback has 321 pages that are packed with detailed information about Northern Arizona Geology. Price: $10

SALE SALE SALE BOOK - An excellent resource, the Second Edition of Roadside Geology of Colorado is a great book to add to your backseat. So pickup this book and hit the road. Price: $10

SALE SALE SALE BOOK - If you have wondered about the actual dangers of asbestos, radon, earthquakes, etc., that are not explained very well in the news, then this book is for you. Price: $12

CHECK OUT OTHER GREAT ITEMS AVAILABLE AT WWW.AIPG.ORG
Not Just Software... RockWare.
For Over 28 Years.

AquaChem™
The Most Complete System for Water Quality Data Analysis, Plotting, Reporting and Modeling
- Data Management – Customizable MS Access database
- Data Analysis – Numerical calculations, compare/mix samples, correlation matrix, data reliability check and more!
- Statistical Calculations – Trend analysis, outlier tests, test for normality
- Water Quality Modeling – PHREEQC
- Plotting, Mapping & Reporting – 23 industry-standard plots including: Piper, Schoeller, Scatter, Box & Whisker, time series, histogram, Stiff, Radial and Pie chart

$1,490

WellCAD™
Well Log Data Management
- PC-based composite log package, combining comprehensive graphic editing and data processing tools
- Formula parser for log analysis
- Fracture and breakout analysis
- Optional modules for core logging, image analysis, LIS/DLS import, sonic processing, deviation calculations, ODBC connectivity, automation and cross-section generation
- Integrates all data acquired in a well into a single document
- Combines excellent display, editing and analysis capabilities for well data

$3,120

PetraSim™
A Preprocessor and Postprocessor for TOUGH2, T2VOC, TNVOC, TOUGHREACT and TOUGH-FX/HYDRATE
- Model multi-component fluid flow, heat transfer and reactive transport process
- Saturated and unsaturated conditions
- Fractured and porous media
- Mesh generation, parameter definition, and display of results
- Now supports TOUGH2-MP (parallel version of the TOUGH2 simulator)
- Applications include geothermal studies, carbon sequestration, contaminant transport modeling, vadose zone hydrology and more

Call for pricing

The Geochemist Workbench®
Address oil and gas-related water chemistry issues:
- Scaling
- Souring
- Flooding
- Formation damage
- Frac jobs
- Fluid compatibility

GWB Essentials
Speciation Models and activity diagrams
$999

GWB Standard
Reaction Path Modeling
$3,499

GWB Professional
ID/2D Reactive Transport Modeling
$7,999

Free trials for most of our products available at www.rockware.com

Follow us on:

RockWare®
Since 1983
303.278.3534 • 800.775.6745
RockWare.com