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The Professional
GEOLOGIST

PEER REVIEWED PAPER

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FRONT COVER - Castle Geyser, Yellowstone National Park, has eruptions reaching as high as 90 ft. (27m). It has the largest cone and is believed to be the oldest geyser in the park. Photo submitted by Douglas T. Kuzmiak

BACK COVER - Photographs/Slides were provided courtesy of the Anchorage Convention and Visitor's Bureau, Glee Anderson, Representative (ACVB), and Evelyn's Focus Photography, Evelyn S. Erickson, Photographer (EFP, ESE).

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Coming Your Way - a New Executive Director and a Membership Drive

I take genuine pleasure in informing you that the incoming Executive Director for AIPG is **William J. (Bill) Siok**, CPG-04773, of the Northeast Section. **William V. (Bill) Knight**, CPG-00153, will complete his ten years of service as "Mr. Executive Director" when his contract expires on 30 April 1999, and he plans to "retire." Well, sort of retire, as Martha and Bill plan to return to Tulsa where he will re-establish his consultancy. Whether Knight will be able to undertake much hands-on geology is uncertain in view of the numerous AIPG-related projects that he proposes to pursue.

With Bill Knight's leaving, Bill Siok will face major challenges, though not as great as those faced by Knight ten years earlier. Knight's predecessor as Executive Director was not a geologist, but had an association management background, as AIPG was then in a somewhat different organizational management mode than today. Further, he had left AIPG about a year and a half before Knight came on board, with the Institute somewhat adrift in between. Plus, national dues were increased in 1989, precipitating a small associated drop in membership. Bill Knight set to work and has accomplished much of great value to the Institute during his decade as Executive Director. He deserves a vote of thanks and a sincere "Well Done" from every CPG.

Bill Siok, a native of New England, graduated from Rensselaer Polytechnic Institute in 1969 with a BS in Geology. The cyclical petroleum industry was in a slump and jobs were scarce. On the advice of a professor, Siok spent two years teaching earth science at a junior high school. Wanting to "do geology," however, Bill obtained an assistantship at South Dakota School of Mines and Technology and emerged with a MS in Hydrogeology in 1973. Siok then joined the Vermont Agency of Environmental Conservation as a hydrogeologist and environmental engineer. Six years spent reviewing proposals for wastewater and sludge disposal in cold, cold Vermont led to a career change to private industry in 1979. Siok established the New England office of Wehran Engineering in 1979 and as Vice President was responsible for development of the company's

business activities and management of its projects in the region until 1987. Involvement in various management positions with several firms followed until 1994, when Bill joined ENSR Consulting as Senior Program Manager, providing technical consultation and representation of clients in negotiations with environmental regulatory agencies in New England.

Siok's technical experience is in hydro, environmental, and engineering geology, the specialties of the majority of AIPG's present membership. He lists his skill areas as technical investigations, negotiations, expert testimony, project operations, and financial and staff management. As such, Bill will bring 19 years of private sector and six years of public sector technical, management, and business development experience and skills, mainly in the small company environment, to AIPG. He has exhibited the resilience and determination to persevere and succeed in this environment in upper New England, an area not exactly brimming with economic opportunities. Good training and experience for an AIPG Executive Director!

In addition to AIPG, Siok is a member of the Association of Engineering Geologists and the American Institute of Hydrology, and is a Registered Geologist in Kentucky and a Certified Geologist in Indiana and Virginia. Since becoming a CPG in 1980, Bill has served on the Northeast Section Executive Committee and was an Advisory Board Representative on the 1995 National Executive Committee. During my service as Vice President in 1995, Bill and I got to know and respect one another and enjoyed working together, especially on the Ad Hoc Committee for Bylaws and Policy Review of which he was Chair, continuing into 1996. He is a member of the Task Force for Continuing Professional Development, was AIPG's Vice President for 1998, and was re-elected at Baton Rouge as Advisory Board Representative to the 1999 Executive Committee, a seat which he must relinquish in April.

Bill Siok believes that AIPG is on the verge of becoming either a geoscience organization truly to

be reckoned with in the professional and public arenas or an organization which has experienced its best years and which will gradually become less significant to geologists. AIPG must assert itself as THE representative professional organization for all US geologists. To achieve this we must broaden our appeal for memberships with a much larger number of colleagues and simultaneously increase our revenues. Siok expects to devote a significant portion of his time and effort in the pursuit of non-dues revenue sources. He looks forward with enthusiasm to the challenge ahead and building upon the strengths and accomplishments of Bill Knight.

I believe that CPGs who do not know Bill Siok will come to like and respect him. As for those who already know Bill, I urge you to work with, encourage, and support his efforts as Executive Director in the years ahead.

For additional insight, see Siok's "campaign article" on page 8 of the June 1997 *TPG*. And now, a few words about a major effort by AIPG during 1999 to significantly broaden our membership base – a year-long Memberships Campaign. Intake of new CPGs has slowed, in part due to the increase of the Experience Requirement from 5 to 8 years plus the employment problems currently experienced by many geologists. At the same time, the new Member status has not been promoted effectively as a means of attracting women and men with a geological sciences degree who fall into a number of categories: (1) have worked as geologists for less than the required number of years and wish to become Certified eventually, (2) have worked or are working as geologists and are interested in membership

in a national advocacy organization for geology and geologists, but have no interest in becoming Certified, (3) have never worked as geologists but want to associate with a national organization composed of all types of geologists, and (4) former geologists who have left the profession, voluntarily or involuntarily, but still want a link to geology and professional geologists (i.e., "nostalgic geologists").

With all categories, the opportunity to meet and network with other geologists and participate in many geological events such as field trips, meetings, symposia, and seminars and to keep up in a general way with our science at low annual cost will be attractive to many. This is fine for students of geology as well. Student memberships will receive attention later this year.

You are being asked and will be asked again to consider your list of geological friends, associates, and acquaintances who are not affiliated with AIPG and to identify one or more whom you believe would enjoy and benefit from becoming a Member. The Member application is far less intimidating than that for CPG – essentially all that is required is a degree and transcript plus two sponsors, only one of which must be a CPG, RM, or M (you!). Please, make a real effort to recruit at least one Member this year. I've done so, so why can't you? You will be doing your recruit, the Institute, and yourself a favor in helping build a larger, broader-based and more member-supportive AIPG. By broadening and enlarging our membership base, AIPG can become an even more effective advocate for geology with the public and people in government. Five thousand can be effective but ten thousand much more so.

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Significance of Volatile Organic Compounds Detected in Groundwater Monitor Wells From a Landfill Gas Source

Louis P. Bull, CPG-08161

Introduction

The source of volatile organic compounds (VOCs) detected in monitor wells adjacent to a solid waste landfill is often erroneously attributed to leachate without consideration of other potential sources. Leachate impacts to groundwater show well-documented geochemical signatures. Evidence that leachate has impacted the groundwater includes a combination of the following conditions: a) multiple inorganic exceedences above background, b) increasing trends of leachate indicator parameters (e.g., chloride, iron, total dissolved solids, and others), c) verified volatile organic compound detections, d) leachate characterization indicating that the parameters of concern are in the leachate and there is proper parameter contrast (i.e., typically 5 to 10 times) with groundwater, and e) inorganic and/or volatile organic compound exceedences at one or more down-gradient monitoring points. Potential non-leachate sources of VOCs which should be considered include unidentified upgradient offsite sources, landfill gas, gas condensate, old or abandoned underground storage tanks, and laboratory or field cross-contamination.

Where inorganic parameter increases do not occur, landfill gas is a common source of low-level volatile organic compounds detected in monitor wells adjacent to solid waste landfills. Landfill gas impacts at a well often represent an intra-well phenomenon where impacts are localized to within, or immediately adjacent to, the well both in a lateral and vertical direction. No-headspace sampling (i.e., a sampling technique that minimizes or eliminates the exposure of vadose zone soil gas with groundwater) adjacent to such wells often results in non-detect or below Maximum Contaminant Levels (MCLs), which more accurately represent the true concentrations in the groundwater zone. In other words, landfill gas entering the well through exposed well screen or faulty well construction diffuses into groundwater within the well in a much more efficient manner than in the natural subsurface due to the increased soil gas/water surface area inside the well casing. This circumstance causes erroneously high observed concentrations within the affected well. Sampling can accentuate the phenomenon since mixing can occur, increasing the rate of gas-to-water diffusion. Outside the well, the geologic matrix limits the surface area of contact and the very low diffusion rates limit the vertical extent.

There are sample collection and data evaluation procedures that can be performed to help determine both the source and degree of lateral and vertical impact of the water-bearing zone when VOCs are detected at a monitor well. These include headspace gas sampling and no-headspace groundwater sampling, the protocol to collect and analyze air and groundwater samples for VOCs, inorganic parameters and isotopes, and the process by which the collected data should be evaluated and interpreted. When a landfill gas source is suspected for detected VOCs, these types of investigations more accurately characterize the chemistry of the groundwater and, thereby, allow more effective groundwater remedies. Such remedies may include no action with refined groundwater monitoring, enhanced landfill gas recovery, groundwater monitor well reconstruction/rehabilitation, or incorporating no-headspace groundwater monitoring into the detection monitoring program.

Case Study

The following summarizes conclusions and recommendations that were approved by the overseeing state solid waste regulatory agency for a landfill in the Midwest. Landfill gas was demonstrated to be the source for the organic compounds in the monitor wells based on isotope data, well-headspace gas data, hydrogeologic data, no-headspace sample data, and groundwater chemistry data. The following findings supported this conclusion:

- Inorganic leachate indicators had never been detected above background levels in the VOC-impacted monitor wells;
- Methanogenic modern carbon (i.e., carbon that results from the breakdown of solid organic matter in a landfill) had affected groundwater within the VOC-impacted wells based on the correlation between carbon-13 and carbon-14 isotope levels in groundwater and leachate dissolved inorganic carbon. The source of the methanogenic modern carbon was determined to be gas because of the low tritium/carbon-14 ratio in groundwater at the VOC-impacted wells. Since a high tritium/carbon-14 ratio was observed in leachate at the landfill, this high ratio would exist in groundwater if leachate were the source of the methanogenic modern carbon.

- Elevated percentages of methane and carbon dioxide and depressed percentages of nitrogen and oxygen were measured in the VOC-impacted wells. Significantly lower concentrations of VOCs were measured in adjacent no-headspace groundwater samples.
- Gas to water effects (i.e., partitioning of VOCs from soil gas to groundwater) were artificially amplified in the VOC-impacted wells as shown by adjacent no-headspace samples. For example, VOCs were either non-detect or detected only slightly above the analytical detection limit in groundwater samples collected at 5 feet below the water table. Groundwater samples collected at 2 feet below the water table (i.e., closest to the bottom of the vadose zone) also showed very low to non-detect levels of VOCs. These results indicate that groundwater is only slightly affected by soil gas immediately adjacent to the well and that VOCs impacts are not ubiquitous in the water-bearing zone. Conversely, the monitor well samples are more affected by soil gas because partitioning of VOCs from soil gas to water is much more efficient within the well (i.e., increased soil gas/water surface area).
- Potential pathways for landfill gas to enter the wells were provided by screened intervals and filter packs that intersect the water table and expose the well headspace to vadose zone gas.
- Based on deuterium and oxygen-18 data, the groundwater and leachate samples analyzed for the various isotopes were confirmed to be valid. These isotopes are used as indicators of anomalies or processes (e.g., evaporation, mineral interaction, mixing, dilution by precipitation) that might invalidate the isotope data.

The data collected also showed that there is essentially no risk to human health or the environment associated with the organic compounds detected at the wells in question. This conclusion was supported by the following:

- The vertical distribution of the organic compounds in the water-bearing zone is extremely limited by the relatively slow gas-to-water transfer process (i.e., compared to leachate-to-water transfer) and the fact that the mass transfer from gas to water is limited to the gas/water interface.
- Downward movement of groundwater is severely limited because of the very low vertical hydraulic conductivity of the clay-rich till (i.e., 1×10^{-5} to 1×10^{-7} cm/s) that underlies the monitored zone.
- The regional aquifer is protected by 250 feet of the low-permeability till. There were no water wells screened in the till near the landfill.
- Limited vertical extent of the organic compounds in the water-bearing zone was verified by the no-headspace sampling effort.
- The concentrations of VOCs at 5 feet below the water table are all below MCLs, with the exception of one VOC at one well (i.e., trichloroethene). However, the vertical extent of this VOC is extremely limited based on the no-headspace groundwater data.
- Groundwater VOC concentrations are relatively stable based on the absence of a trend in the concentration of the organic compounds and on the very stable hydraulic conditions observed at the landfill for the past four years; and,

- Groundwater flow is extremely slow based on conservative travel times from the downgradient edge of the landfill to the downgradient monitor wells. Conservative travel times are calculated to be on the order of hundreds of years.

CONCLUSIONS

The data presented and evaluated demonstrated that gas was the source of the organic compounds detected in several monitor wells and that the impact to groundwater was essentially limited to the well, or a small area immediately surrounding the well (i.e., VOCs were not ubiquitous in the water-bearing zone). In addition, essentially no risk to human health or the environment was associated with these gas effects. Therefore, continued routine semi-annual groundwater monitoring at the wells was approved by the State regulatory agency to evaluate the trends in concentrations of these organic compounds over time. No additional action was required. The gas effects may be reduced by a passive gas recovery system that was installed at the landfill after this study to satisfy other regulatory requirements.

This approach to addressing the VOC detections resulted in a very inexpensive and effective solution to this issue. A less-coordinated approach could have resulted in a time-consuming and expensive VOC evaluation and possibly unnecessary groundwater remediation.

Louis P. Bull, CPG-08161, R.G., C.H.G., Manager, Groundwater Programs Waste Management.

Reviewers: Edward M. Baltzer, CPG-08861 and Kerry M. Hanlon, CPG-09866.

AIPG MEMBERSHIP CARDS

AIPG Members that paid their 1999 Annual Membership Dues by December 28, 1998 should have received their Membership Card in the mail. All others Members that pay by February 15, 1999 will receive their Membership Card by the end of February.

In accordance with Article 8, Section 8.2.1, of the Bylaws, Annual Membership dues are due and payable January 1, 1999. Those Members whose dues are not paid by February 15, 1999, will be suspended and will not be listed in the 1999 Membership Directory.

Water Flows Downhill

Recent discussions in *The Professional Geologist* relating to expert witnesses and communication in science are mirrored in other institutions. *SCIENCE*, Vol. 287, 7 August 1998 reports that The Ecological Society of America has received a \$1.5 million grant from the David and Lucile Packard Foundation "to train sixty experts in the arts of lobbying, testifying, giving explanations to reporters, and writing letters to the editor." The project leader is quoted as saying that "we desperately need more competent scientists who know how to communicate with non-scientists."

In my opinion, scientists communicating with non-scientists is a challenge much less forbidding than scientists communicating with attorneys. Science and law might be basically compatible, but communication between scientists and lawyers can be impossible in an adversarial environment.

Take a simple principle related to gravity. Water flows downhill. The following contrived exchange is sound both from the point of view of an irrigation expert and an attorney.

On September 2, 1998, I tuned in Channel 6 at 8:00 P.M. A gentleman makes this statement when introducing the program: "Man-made aqueducts are built on a downhill slope." For some reason that simple statement triggered the following imaginary dialogue, precipitated in no small way by my recent musings regarding David Abbott's brave decision to delve ever deeper into "legal vs. scientific truth."

Lawyer: "Sir, do you wish to stand by your statement, "Man-made aqueducts are built on a downhill slope"?"

Expert: "Yes, for as long as gravity exists."

Lawyer: "Just answer the question, please."

Expert: "Yes."

Lawyer: "If I were to contradict your statement by declaring that man-made aqueducts are instead built on uphill slopes, would you alter your statement?"

Expert: "You just said the same thing in another way."

Lawyer: "Just answer the question, please."

Expert: "No, I would not alter my statement."

Lawyer: "Would you agree with my statement."

Expert: "Of course I would. You just said it in a different way."

Lawyer: "Yes or no."

Expert: "Yes."

Lawyer: "Then it makes no difference whether they are built on an uphill or downhill slope?"

Expert: "Of course not, just as long as it is sloped in the right direction."

Lawyer: "What direction is that?"

Expert: "Toward the destination."

Lawyer: "Here I have a map of the course of a well-known aqueduct that has been delivering water for centuries. Here is the source of the water and over here is the destination. Can you say that the aqueduct is always sloped in the direction of the destination?"

Expert: "Of course not, it has to follow the topography."

Lawyer: "So you would alter your statement about the direction of slope?"

Expert: "I might expand it to state that the slope is not always a straight line."

Lawyer: "So you would alter your statement, yes or no."

Expert: "Yes."

Lawyer: "Now before we leave this matter of slope. Do you mean to imply that an aqueduct with no slope would not deliver water? Just answer yes or no, please."

Expert: "Well, if you kept adding water at one end, it would flow to the other end."

Lawyer: "Your honor, would you please instruct this witness to answer yes or no."

Judge: "Please answer yes or no."

Expert: "No, it would flow."

Lawyer: "I have one more question, but first let us review your testimony thus far. In installing an aqueduct it really makes no difference whether it is installed downhill or uphill and the direction of the aqueduct at any point is irrelevant and indeed it need not be installed on a slope."

"My question: Can you understand why your expert testimony might be confusing to the layman?"

Expert: "Not if they understand that water flows downhill."

Lawyer: "We are talking about the installation of aqueducts and your expert testimony. Can you understand why your expert testimony might be confusing to the layman? Please, once again, merely answer yes or no."

Expert: "Yes, but you have created the confusion."

Lawyer: "No, sir, you have created the confusion with your sworn expert testimony."

Ramon E. Bisque, CPG-01595, 9113 Fern Way-Blue Mountain Estate, Golden, Colorado 80403.

Reviewers: Edward M. Baltzer, CPG-08861 and Dale H. Rezabek, CPG-09285.

Request for Outstanding Photos for Children's Book Project

James A. Jacobs, CPG-07760

Most geologists understand the aesthetic qualities of rock. The Art of Rocks - Children's Book Project has been designed by photojournalist Lou Jacobs, Jr., a writer of over 40 books on photography and numerous children's books. Although there are plenty of landscape photos of the Grand Canyon or Big Sur that might be perfect for a calendar, the object is to show nature or the natural processes as the artist and the rocks as the finished art.

The Art of Rocks book project is designed for 8 to 12 year old children, to interest them in science, in the aesthetics of geology as well as the important lesson of seeing the art in natural objects. The planned book will contain numerous color and black and white photos combined with limited text about the interesting features or special history of the photo. Various scales will be represented, from x-ray crystallography, to rock thin sections, to close-ups of crystals or hand samples, to landscape views.

A typical landscape photo from Lake Tahoe shows rounded boulders that might look as if they were sculpted by an artist. The boulders of granite may have the accompanying text reflect the themes of fire and ice: the original plutonic origin of the rock, uplift, erosion and deposition, and the later sculpting of the rounded shapes and striations by the more recent glaciers. This book is to excite the imagination of children with the beauty of rocks in easy and understandable (nontechnical) language. Another example might be a thin section showing various colors of crystals

that is visually appealing which might be analogous to a Jackson Pollack painting. The text might explain the sedimentary origin of the rock and the types of minerals as well as any interesting history of the rock. A worm tube cast that now looks more like modern sculpture might be a perfect shot worth submitting for the book project.

The Art of Rocks Book Project is requesting those with appropriate photos to submit them for the upcoming book. Submitters of photos selected for publication will receive a free copy of the book and a listing in the photo credits. The photos are requested by February 15, 1999; however, late photos may be accepted. All photos, whether they are used in the book or not, will be returned if a stamped and self-addressed envelope is included with the submittal. Please mark all photos or slides with the submitter's name. No fees will be paid for the use of the photos and it is assumed that the act of submittal of the photos is the permission to use the photos for this particular purpose. It is recommended that copies be made of the submitted materials, in case the photos are lost in the mail. In addition to the photos, please submit a brief discussion of the subject matter and a few sentences about how the photo came to be taken and a little about the photographer. There is a thrill associated with being able to go into a local bookstore and see a book with one's photos and credits in it.

About the project designers: Lou Jacobs, Jr. teaches photography and photojournalism at various southern California universities. He is the for-


mer national president of the American Society of Magazine Photographers. Jim Jacobs is a geologist who likes photography and interesting photos of rocks. Jim Jacobs has several photos that have appeared in his uncle's photography books.

Rules of submission: Please send color slides or 4" X 6" prints to James A. Jacobs, Art of Rocks Book Project, 707 View Point Road, Mill Valley, CA 94941; work phone: (510) 232-2728; ext. 222; e-mail: augerpro@jps.net.

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A Quest for Intergovernmental Cooperation within the Domain of Geographic Data

Submitted by **John J. Dragonetti, CPG-02779**

In October 1990, the White House Office of Management and Budget (OMB) revised its existing policy on surveying and mapping in response to an ever-increasing demand from local communities for the federal government to share geographic data. The new policy was also a recognition that by then nearly 100 federal agencies were using geographic data for applications involving federal land ownership and use. Although OMB is primarily known as the federal government's budgetary arm, its role in the Executive Office of the President includes the delegated power to issue directives – known as circulars – that stipulate certain specified activities of federal agencies. The revised Circular A-16, entitled "Coordination of Surveying, Mapping, and Related Spatial Data Activities," extended the scope of spatial data coordination and created a new interagency committee to guide and oversee geographic data coordination. This committee, labeled the Federal Geographic Data Committee (FGDC), was charged with the responsibility for promoting the development, use, sharing, and distribution of surveying, mapping, and related spatial data. Another aspect of the OMB decree was the creation of a national spatial data resource specifically mandating the incorporation of state and local government as well as the private sector within the system. This resource was to become known as the National Spatial Data Infrastructure, or NSDI.

Babbitt Takes Control

Management of the FGDC was originally placed within the U.S. Geological Survey. Then in 1993, Vice President Al Gore adopted the activity as part of his reinventing government strategy formally known as the National Performance Review. Shortly thereafter, during the 1994 fiscal year, Secretary of the Interior Bruce Babbitt assumed leadership of the committee, where the authority still resides. The success of the FGDC can be traced through the continuous elevation of its stature within the government's hierarchy: from its beginnings as a modest undertaking by a few federal agencies to its adoption throughout all levels of government, the personal involvement of a cabinet-level official, and finally becoming accepted at the White House as an element of the Presidential budget.

Gore Announces New Initiatives

In a speech at the Brookings Institution last September, the Vice President criticized the uncoordinated expansion within many of the nation's populated areas. He deplored the many problems associated with congestion and called for a better-informed growth strategy for America's cities, suburbs, and rural areas. One element of his stated plan to achieve this purpose is a series of nationwide "listening sessions" to be chaired by members of the President's Cabinet. Scheduled for this coming fall, the sessions are to provide a forum to hear how communities are grappling with sprawl and how the federal government can offer assistance. As a critical component of such assistance, the

President's fiscal year 2000 budget reportedly will significantly expand grants for communities to allow access to the NSDI clearinghouse.

This January, the Vice President proposed a "Better America Bonds" initiative designed to assist communities in alleviation of traffic congestion, greater protection for water quality, restoration of abandoned industrial sites, and preservation of green space.

Another aspect of the Administration's plan is to utilize geographic information system (GIS) technology to aid communities in more suitable patterns for land growth. Gore identified the launching of six demonstration projects across the country to provide technical support for locally generated efforts. The communities identified to receive demonstration status were Dane County, Wisconsin; Gallatin County, Montana; Tillamook County, Oregon; Tijuana River Watershed, California; the Upper Susquehanna/Lackawanna River area, Pennsylvania; and the city of Baltimore, Maryland.

The Partnership

The 16 federal agencies that currently comprise the FGDC, in cooperation with organizations from state, local, and tribal governments, the academic community, and the private sector, have formed the Community/Federal Information Partnership. This group has initiated a strategy to provide incentives for communities to widely distribute geographic data through a competitive matching grant program, and to support federal agencies in the implementation of the NSDI.

The Forum

The FGDC is planning a National GeoData Forum in Washington, D.C. on June 7-9, 1999. The forum is intended to reflect on the past, assess the present, and explore future development of the NSDI. Meeting details are currently being arranged by a steering committee co-chaired by the Department of the Interior's Deputy Assistant Secretary for Water and Science Mark Schaefer and FGDC Coordination Group Chair Gene Thorley. Confirming the national government's determination to truly include the entire realm of geographic data practitioners in future activities, the steering committee consists of representatives from numerous governmental and commercial organizations. The committee includes, among its members, Congressman Paul Kanjorski (D-PA) and representatives from the International City/County Manager's Association, the National League of Cities, the National Geographic Society, the University Consortium for Geographic Information Sciences, the National States Geographic Information Council, the National Association of Counties, the Western Governor's Association, and several business groups.

Geographic or spatial data is a fundamental component of land planning, land and resource management, and recreational

siting. The geosciences have a great deal to contribute to these activities and provide many of the data layers for GIS-based systems. However, our profession will not be adequately represented in these initiatives unless professional geologists become more involved. The FGDC has published a handbook titled "The Framework Introduction and Guide." It is available from the FGDC, c/o U.S. Geological Survey, 590 National Center, Reston, VA 20192, attn: J. Fox. Information is also available at <http://www.fgdc.gov>.

The Government Affairs column is a bimonthly feature written by John Dragonetti, who is Senior Advisor to the American Geological Institute's Government Affairs Program.

Acknowledgment: Norman Gunderson, FGDC Senior Advisor for Business Development.

Geological Ethics and Professional Practices, 1987-1997 published by AIPG

The American Institute of Professional Geologists (AIPG) announces publication of *Geological Ethics and Professional Practices, 1987-1997*, a 202-page reprint of articles, discussions, and other material relating to ethics and general items of professional geological practice from AIPG's monthly magazine, *The Professional Geologist (TPG)*. The book was edited by David M. Abbott, Jr., compiler of the "Professional Ethics and Practices" (PE&P) column in *TPG*. Discussion topics from the column form a significant percentage of the book's content. The book provides a thought-provoking introduction to geological ethics unavailable in any other single source.

Geological Ethics and Professional Practices, 1987-1997 is divided into five parts. Part I introduces the concept and scope of professional ethics codes and their close relationship to professional practices. AIPG's Code of Ethics and Disciplinary Procedures follow as basic reference material for the rest of the book. Part II contains general contributions on professional ethics as a whole. Part III focuses on registration and licensing issues, including testing. It examines questions such as the effectiveness of registration in protecting the public. Part IV examines the utility and limitations of professional standards and the free exercise of professional judgment. Part V is an admitted melange of topics, although all address important issues. Related discussion topics from the PE&P column are included in relevant places throughout the book.

Rather than providing definitive answers to issues, *Geological Ethics and Professional Practices, 1987-1997* provides a variety of views. It demonstrates that many ethical questions are not black and white but rather require careful reflection and analysis. The whole range of geological practice in terms of both area of specialization and employer is covered. The target audience includes the whole range of the profession from undergraduate students through practicing geologists and professors to those who have reached emeritus status. It can serve as both a text and the starting point for further exploration of both the topics presented and other situations and examples from the reader's own experience.

Geological Ethics and Professional Practices, 1987-1997 is available from AIPG at a cost of \$18 for AIPG members, students, and public libraries; and \$25 for others. The price includes shipping and handling. Orders can be placed by calling 303-431-0831.

Drop in National Ground Water Usage Not Matched by All End Uses

Total 1995 withdrawals of fresh ground water declined nearly 4 percent when compared to 1990 estimates, according to recent U.S. Geological Survey (USGS) data reviewed by the National Ground Water Association.

In 1995, total U.S. withdrawals of fresh ground water equaled 76.4 billion gallons a day, down three billion gallons from 1990, the new USGS report, *Estimated Use of Water in the United States in 1995*, finds. Not all end uses experienced declines, however.

Domestic supply (household use) was up 2.7 percent from 1990, commercial increased 3.4 percent, industrial rose 3.5 percent, and thermoelectric power usage jumped 7.6 percent. While public supply stayed even at 15.1 billion gallons a day (bgd), irrigation – the nation's single biggest user of ground water at 49 bgd – declined 3.9 percent, livestock watering was down 16 percent, and mining was down 11.6 percent.

Irrigation usage was 49 bgd, followed by public supply at 15.1 bgd, industrial at 4.09 bgd, domestic at 3.35 bgd, livestock at 2.26 bgd, mining at 1.07 bgd, commercial at 0.939 bgd, and thermoelectric power at 565 bgd.

Domestic, commercial, and industrial uses in 1995 are the highest levels recorded in the 1980 to 1995 period, the study shows.

California remains atop the list of ground water states, withdrawing some 14.5 bgd. Texas follows it at 8.4, Nebraska at 6.2, Arkansas at 5.5, Florida at 4.3, and Kansas at 3.5.

NEW AIPG WEBSITE UP AND RUNNING

Check out AIPG's new web site at <http://www.aipg.org>. Members will need to call or e-mail Headquarters to get their ID Number and Password to access the Members only portion of the site. Login instructions are on page 17 of this issue.

We look forward to your comments and suggestions on the new site.



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AGI GOVERNMENT AFFAIRS PROGRAM MONTHLY UPDATE

Monthly update prepared by Kasey Shewey White and David Applegate

- Yucca Mountain Viability Assessment: “No Showstoppers”
- Senators Press for Science in Fiscal Year 2000 Budget
- AGI Thanks Senator Wyden for Earth Science Week Support
- AAAS Holds Workshop on House Science Policy Study
- 1999 AGI Congressional Fellowship, Internships Available
- Tentative Schedule of Upcoming GAP Activities
- New Material on Web Site

Yucca Mountain Viability Assessment: No “Show Stoppers”

On December 18th, the Department of Energy released its *Viability Assessment of a Repository at Yucca Mountain*, which provides an interim report to the President, Congress, and the public on the results from the department’s study of this site adjacent to the Nevada Test Site. According to DOE, the assessment – begun in 1996 – identified no “show stoppers” with respect to the site’s suitability for underground storage of high-level nuclear waste. As a result, “work will proceed toward a decision in 2001 whether to recommend the site to the President for development as a geologic repository.” The report acknowledges remaining uncertainties on “key natural processes, the preliminary design, and how the site and the design would work together.” Tests will continue over the next three years until the 2001 decision.

DOE announced separately that additional funding would be provided to the State of Nevada for its own tests. The state has been very opposed to the Yucca Mountain project since its inception over 15 years ago. Critics recently released a report that they say demonstrates the site’s unsuitability for waste storage. One study, by geoscientist Yuri Dublyansky of the Siberian branch of the Russian Academy of Sciences, shows evidence for past flooding of the mountain by upwelling hot water sometime in the last 12.5 million years. The arguments are similar to ones advanced in the past by former DOE scientist Jerry Szymanski. Those earlier claims were thoroughly debunked by a National Research Council study.

New Energy Secretary Bill Richardson has visited Yucca Mountain twice in recent weeks and has vowed: “I am very intent on making my decision based on science, not politics.” On the political front, action will likely begin early in the 106th Congress to establish an interim storage facility adjacent to Yucca Mountain. Efforts to pass such legislation in the 105th Congress were not successful. A synopsis of those efforts and additional background on high-level nuclear waste legislation are available on the AGI web site at (<http://www.agiweb.org/legis105/yuccup97.html>).

Senators Press for Science in Fiscal Year 2000 Budget

In response to the gloomy predictions for science in the Fiscal Year (FY) 2000 budget, a bipartisan group of 24 Senators wrote a letter to President Clinton on December 11th urging him to increase federal R&D funding by 6 or 7 percent in his budget submission for FY 2000. They cited the broad support for and

recent Senate passage of S. 2217, the Federal Research Investment Act, which calls for a doubling of civilian federal R&D funding over the next twelve years. The letter states: “We are hopeful that the Administration’s fiscal year 2000 budget will reflect its, and our, priorities for a healthy scientific enterprise. S. 2217 calls for approximately a six percent increase in civilian R&D for fiscal year 2000, bringing the total level of investment for civilian R&D up to \$33.6 billion. We would appreciate your active help in promoting a six to seven percent investment level as the budget is drawn up by the Office of Management and Budget.” This letter mirrors a letter sent by scientific societies, including AGI, to President Clinton in November requesting a similar increased investment in R&D for FY 2000.

AGI Thanks Senator Wyden for Earth Science Week Support

On December 9th, AGI recognized Senator Ron Wyden (D-OR) for his efforts in promoting Earth Science Week. Senator Wyden introduced a statement supporting Earth Science Week into the Congressional Record, which was vital in raising the awareness of the earth sciences both in Congress and the general public. His early support was also a key factor in obtaining an Earth Science Week message from President Clinton. AGI President David Stephenson and Oregon State Geologist Don Hull met with the senator in his Washington office and presented him with a plaque bearing a fossilized leaf from Oregon as a token of AGI’s appreciation.

AAAS Holds Workshop on House Science Policy Study

On December 16th, the American Association for the Advancement of Science held a day-long symposium on the House Science Policy Study released this fall. Taking Rep. Vern Ehlers (R-MI) at his word that the study, which he spearheaded, was a living document, AAAS plans to provide a report of the workshop to the House Science Committee as feedback on the study and a guide for future directions. Speakers included both supporters and critics of the study. Breakout sessions focused on federal support for basic/applied research, the role of the private sector, sound science for government decision-making, and the importance of science education. The workshop came at a time when the study’s fate is decidedly uncertain following the November resignation of its chief patron, former Speaker Newt Gingrich (R-GA). A more extensive report on the forum is available from AGU at (<http://www.agu.org/cgi-bin/asla/asla-list?read=1998-25.msg>). A Geotimes column on the study’s implications for the geosciences is available at: (<http://www.agiweb.org/geotimes/nov98/scene.html>).

1999 AGI Congressional Fellowship, Internships Available

AGI is accepting applications for its 1999-2000 congressional science fellowship, and the AGI Government Affairs Program is accepting applications for its 1999 summer and fall internships. Information on both the fellowship and

internships is available on the AGI website at (<http://www.agiweb.org/gaphome.html>). We encourage you to pass along the information to individuals that you feel may be interested. The application deadline for the fellowship is February 1, 1999, and the internship deadline is March 1, 1999. Please contact Dave or Kasey if you have any questions.

Tentative Schedule of Upcoming GAP Activities

A draft report from the last AGI Government Affairs Advisory Committee forum held in Toronto is available on the web at <http://www.agiweb.org/gapac/report1098.html>. The committee's next meeting is tentatively scheduled for Friday, April 23, 1999 at AGI headquarters in Alexandria VA.

- Jan. 22-25, AAAS Annual Meeting, Anaheim, CA
- Jan. 26, USGS Geologic Division Mtg., Annapolis, MD
- Feb. 11, PPP 2000 Summit, Washington, DC
- April 21-22, Congressional Visits Day, Washington, DC
- April 23, GAP Advisory Cmte. Mtg., Alexandria, VA

New Material on Web Site

The following updates and reports were added to the Government Affairs portion of AGI's web site (<http://www.agiweb.org>) since the last monthly update:

- Eisenhower Professional Development Program Update (12-31-98)
- Global Climate Change Update (12-29-98)
- High-Level Nuclear Waste Update (12-23-98)
- Women and Minorities in Science Legislative Update (12-15-98)
- Clean Water Act Issues Update and Hearing Summary (12-10-98)

- Grand Staircase-Escalante National Monument Update (12-10-98)
- Public Land Sovereignty Issues Update and Hearing Summary (12-10-98)
- Regulatory Reform Update (12-10-98)
- House Science Policy Study Update (12-9-98)
- Outer Continental Shelf Lands Act Update (12-9-98)
- Solid Waste Disposal Update (12-9-98)
- Wetlands Restoration and Improvement Act Update (12-9-98)
- Hardrock Mining Regulations Update and Hearing Summary (12-8-98)
- Update on Legislation to Repeal Goals 2000 and the National Skill Standards Act of 1994 (12-2-98)
- Geotimes News Note: Diversity in the Science Work Force (12/98)
- Geotimes Political Scene: A Look Back at the 105th Congress (12/98)
- The Many Facets of Global Climate Change (reprinted from *The Professional Geologist* 12/98)
- Update on Electricity Deregulation (11-30-98)

This monthly update goes out to members of the AGI Government Affairs Program (GAP) Advisory Committee as well as the leadership of AGI's member societies and other interested geoscientists as part of a continuing effort to improve communications between GAP and the geoscience community that it serves. Prior updates can be found on the AGI web site under "Government Affairs" <http://www.agiweb.org>. For additional information on specific policy issues, please visit the web site or contact us directly at govt@agiweb.org or (703) 379-2480.

LETTER TO THE EDITOR

Dear Editor:

Regarding the article by John J. Dragonetti, "The Many Facets of Global Climate Change" in the December issue, a few comments:

1. Global warming is not a reality. The climate has been naturally warming since the Little Ice Age ended in 1850, but during the past 20 years atmospheric temperatures have tended to go down, based on satellite and weather balloon data. Surface temperatures have increased as airports (where official temperatures are recorded) are enveloped by urban development and its attendant heat islands.
2. CO₂ is not a pollutant, it is a plant nutrient. In huge greenhouses in Europe, food crops are grown in CO₂ enriched environments because of significantly increased yields. This should not be surprising, since green plants have evolved in atmospheres in which CO₂ was usually higher than at present.
3. It is of interest that the Administration wants to spend more on climate change research than on medical research for some of our most intractable diseases, as the climate continues to fluctuate naturally as it always has.
4. However, the notion that global warming will become a great environmental challenge in the future may be correct. Recent observations and computer simulations suggest that in about 2,500 years the solar system will plow into a large cloud of inter-stellar gas and dust a thousand times more dense than the space through which we now travel. Hydrogen atoms in the cloud might flow into the lower atmosphere and react with oxygen to form water vapor. As water vapor is a significant contributor to the greenhouse effect, there may be big time global warming (although by then it may just pull us out of another ice age).

Joseph P. Riva, Jr., CPG-03548

Compiled by David M. Abbott, Jr., CPG-04570, Ethics Committee Chairman, 2266 Forest Street, Denver, CO 80207-3831, 303-394-0321, fax 303-394-0543, DMAgeol@aol.com

AIPG Disciplinary Procedure Actions 1989 through 1998

AIPG's Disciplinary Procedures are conducted confidentially to protect those against whom allegations of ethical misconduct are not sustained or those whose sanctions are private letters of admonition. Nevertheless, AIPG members and the public should know (1) that Disciplinary actions are undertaken, (2) the types of activities prompting actions, and (3) the results. The following summary provides that information. While these summaries can be characterized as "washing our dirty laundry in public," they demonstrate that AIPG's commitment to the ethical practice of its members does not stop on admission to membership. Because of the importance of demonstrating this commitment to the public, a very slightly different version of the following summary will be put on AIPG's web page. I intend to update these summaries annually.

An ethics complaint is a serious matter. While AIPG is willing to pursue complaints, it must first receive a written complaint accompanied by sufficient information to pursue a formal inquiry. Failure to provide such information results in no action being taken. The following brief summaries of AIPG Disciplinary Procedure actions are provided to document the number and variety of activities resulting in ethics complaints being brought to AIPG's attention and the results of those complaints. The summaries are arranged from most recent to oldest by the year in which the matter was concluded.

The summaries are brief. Many of the relevant ethical issues have been the topics addressed in this column over its life. Discussion of the ethical issues arising prior to 1998 are contained in *Geological Ethics and Professional Practices, 1987-1997, AIPG Reprint Series #1*. The summaries are generic and do not contain the name of the member charged with violating AIPG's Code of Ethics.

The number of cases is not large. This reflects several factors. First and foremost, most geoscientists practice ethically. Second, charging someone with unethical conduct is an unpleasant task. It also requires detailed knowledge of the situation in order that the required burden of proof can be met. While the individual bringing the complaint—who may or may not be an AIPG member—does not have to file a completed investigation, sufficient evidence of unethical conduct is required to warrant pursuit of the matter. Charges must be substantiated. Several of the matters listed below were dismissed due to lack of sufficient evidence, and, in one case, the investigation established that the individual bringing the complaint was committing the same ethical breaches as the individual against whom the initial complaint was brought. The unpleasantness and effort required to bring charges no doubt reduces the number of matters brought to the Institute's attention. Third, there are situations in which a complaint would be filed except that convincing evidence cannot be obtained for one of a variety of reasons. Neither the world nor AIPG is perfect. However, AIPG does its best to promote ethical and competent practice in the geosciences. Perhaps it is most successful when efforts to educate geoscientists about ethical issues help prevent the occurrence

of unethical practice in the first place. And finally, as indicated by the cases of expulsion summarized below, when someone seriously violates the Code of Ethics, the violations are often multiple, egregious, and can result in civil or criminal actions as well.

1998

Making untrue, exaggerated, and/or unwarranted statements: A member complained that a Section officer abused his position by (1) making untrue, unwarranted, and exaggerated statements in advocating a particular position regarding administration of regulations affecting the practice of geology in the Section's state, (2) using his position as a Section officer to lend credence to his views, and (3) violating AIPG's Policy on Advocacy by presenting the untrue, exaggerated, and/or unwarranted statements. Sufficient documentation of the alleged activities was provided to permit an inquiry to be conducted. The investigator obtained additional information from the complainant, the respondent, and others having knowledge of the facts. The investigation established evidence supporting some of the allegations but not others. Indeed the investigation demonstrated that the complainant had himself made exaggerated and unwarranted statements in making the complaint. Some of the statements made by the respondent which the complainant alleged to be false were verified as being true.

The investigation provided sufficient evidence to bring formal charges against both the original respondent and the original complainant. The facts of the case suggested that private letters of admonition and, in the case of the Section officer, additional sanctions, would be appropriate. Both members accepted the proposed letter of private admonition, and, for the Section officer, additional sanction, rather than going forward with a formal hearing as provided for by the Disciplinary Procedures, thus terminating the case.

Failure to pay trade bills: A member complained that another member had failed to pay subcontractors' bills and that the member in question had a reputation for failing to pay trade bills. Contracting for work without intention of paying for it is dishonest and therefore clearly unethical. However, AIPG is not a collection agency. Billing disputes and/or late payments are not uncommon and the circumstances of individual cases vary widely. As a result, establishing the intent to not pay and thus an ethical violation is quite difficult. In this case, the complaining member was unable to provide sufficient support for his allegations that the member complained about routinely failed to pay his trade bills, and, therefore, no formal action was taken.

1997

Disagreement over applicability of a particular scientific procedure leading to allegations that the other side was doing "bad" or incompetent work: Two members and their colleagues have been involved in a dispute involving the validity and applicability of a particular scientific procedure. In the course of their dispute, statements were made by one side that the member on the other side viewed as maligning his professional competence. This led to the complaint. The ethical issue presented was not concerned with the scientific procedure being

debated—science has a well-developed procedure for dealing with such disputes. Rather the ethical issue was whether the respondent had made unwarranted statements regarding the professional competence of the complainant. Both the complainant and respondent agreed that the ethical issue differed from the scientific and to the impartiality of the investigator appointed. The investigator obtained copies of the relevant publications and other documents and interviewed participants at meetings at which one side or the other had made relevant presentations and answered audience questions. Although the respondent's published papers did contain the phrases the complainant viewed as being derogatory, the investigation concluded that those reading the papers and those who attended meetings where the disputants' positions were stated did not view the respondent's written or oral statements as being personally derogatory or as challenging the complainant's professional competence. The sensitivity of the disputants to statements made by the other side appears to have been far greater than the sensitivity of those not involved. The investigation also demonstrated that in making their respective arguments, each side in the dispute was not directly addressing the arguments made by the other side. The matter was concluded by a letter stating that the investigation had not sustained the charges made in the complaint and that in pursuing the debate over the validity and applicability of the procedure in question, greater care be made to avoid words and phrases which could be viewed as inflammatory by the other side.

1996

Application: A member challenged the ethical conduct of an applicant following publication of the applicant's name in *The Professional Geologist*. The complaint included the names of additional members who had knowledge of the relevant facts and who were willing to confirm the allegations. An investigation produced three written statements supporting the alleged ethical violations and formal charges were brought against the respondent applicant. The charges alleged violations of Standards 3.3 and 3.4 and alleged that the applicant/respondent had (1) deliberately assigned an unqualified individual to a project to "demonstrate" the individual's lack of qualification, (2) failed to transfer work to a branch of the consulting firm for which the applicant worked that was better qualified to perform the services the client requested, and (3) lied to a manager regarding whether a client had been given performance guarantees that were not met and failure to initiate a project. The applicant chose to withdraw the application rather than contest the charges.

Client "ownership": A complaint alleged that a member had "stolen" clients on leaving a consulting firm. The investigation revealed that at the time of the member's departure from the consulting firm, there was no contractual agreement covering clients in effect (an earlier contract had expired). Further, informing clients that one is leaving employment and the resulting change in client contact is good business practice (although the exact manner and timing of such announcements require careful attention to avoid problems). The client is then free to choose whether to continue with the current firm or move with the individual with whom it has been working (assuming the individual is still available to do the work in the new situation). The complaint was therefore dismissed.

This case involves the general area of employment contracts, law, and non-compete clauses. Misuse of proprietary information or techniques may present legitimate ethical problems but were not an issue in this case. Those faced with similar situa-

tions should consult with an attorney as the particular circumstances and law vary with each situation and jurisdiction.

1993-1995

No complaints received during these years.

1992

A complaint was received but the complainant failed to provide sufficient evidence to warrant an investigation.

1991

Falsified time sheets on a job led to criminal conviction and expulsion from AIPG: A member was convicted of overcharging a client by more than \$100,000 through submission of false time sheets. Expulsion from AIPG was based on Standards 1.1 and 2.2.

Misuse of AIPG Seal: There were two cases in 1991 involving the misuse of AIPG's certification seal by members who had been suspended for non-payment of dues. In one case, it was determined that the use was unintentional and no adverse action was taken. In the other case, the member had joined the Institute in 1973, had been suspended in 1974 for non-payment of dues when payment was made with an NSF check. The 1991 use of AIPG's certification seal prompted a letter to cease and desist from claiming AIPG membership, but as the individual was not a member, no other formal action was taken. If this individual should re-apply for membership, this misuse of AIPG's seal would be taken into consideration in the application review process.

Misrepresentation of professional qualifications: A complaint was received that an AIPG member's Masters degree was in education, not geology. Although the Masters degree was in education, the member had more than sufficient geology credit hours to meet AIPG membership requirements and the complaint was dismissed.

1990

No cases.

1989

False statements about gold reserves leading to state civil and criminal actions for violation of the securities laws and expulsion from AIPG: A member was president of two small mining companies that had sold investments in gold to investors from a number of states in violation of state securities laws. Thirteen states issued Cease & Desist Orders against the member and the companies. The AIPG complaint alleged that the member's geologic reports contained unwarranted claims, omitted telling investors about the various state securities actions, and omitted to tell investors of the criminal convictions of two of the member's associates. Among other representations, the member told investors that the properties contained gold reserves while at the same time telling the County Assessors in the counties in which the properties were located that there were no reserves to avoid paying ad valorem taxes to the counties. Either reserves existed or they didn't; the member couldn't have it both ways. The charges were presented at a hearing, which concluded that the member had violated Sections 2.1, 2.5, and 2.6 of the Code of Ethics and recommended expulsion from AIPG. Subsequent to AIPG's expulsion, the member was criminally charged and convicted in connection with these activities.

Copying a former employer's report and submitting it as new work: An associate member copied a report prepared by a former employer and submitted it as the associate mem-

ber's own, new work. The associate member resigned following the filing of formal charges.

Charging and Paying Fairly

The AGI Ethics Guidelines for Ethical Professional Conduct were included in last month's column (38). The section on Employees states that employees should receive "fair compensation" and the section on Clients states that geoscientists should "charge fairly." Now, while I agree with the general proposition that geoscientists should receive appropriate compensation, I am not sure what "fair" means. How does one measure "fair"?

My comments on these statements to the AGI committee, which obviously were not accepted, pointed out that I didn't know what "fair" meant. I was and am concerned that attempts to list what "fair" means, such as "a geologist holding an MS and having 6 years of experience should be paid between" some figures, will justifiably draw the attention of those charged with enforcing antitrust laws.

Let me describe a personal example. I was retained as an expert witness. The contract for my services specified that I

would charge a specified hourly rate for actual hours worked. Further, it was agreed that I would not charge for time spent traveling (although if I spent time on an airplane reviewing documents, etc., that time was chargeable). Because the contract was agreed to and signed by both parties, I argue that the rate included in the contract was "fair" regardless of what other geologists might charge for similar services or what I might charge other clients for other work. The month immediately preceding the trial along with my actual trial preparation and testimony necessarily resulted in my spending a good deal of time on the case. Among other things, I received the opinions of the other side's experts and had to examine their validity and evidentiary weight relative to my client's case. The result of spending a large number of hours on the case was a sizeable fee bill. The attorney for whom I worked asked me to consider the size of the bill and adjust the fees charged. Do you think this was "fair"? Why should my fees change based on the number of hours worked? This was not a fixed price contract nor were my fees dependent on the outcome of the trial. Further, the attorney told me that he believed that I had done an excellent job. What have you done in similar situations?

MEMBERS IN THE NEWS

James A. French, CPG-05032, has been named Vice President of Collector Wells International, Inc. in Columbus, Ohio, a water supply contracting firm that specializes in the siting, design, construction and rehabilitation of radial collector wells, infiltration galleries and surface water intakes. Mr. French has over 25 years experience with all aspects of radial collector wells, and most recently had been the Director of Technical Services for the Ranney Division of Hydro Group, Inc., a position he held for more than 20 years. He is a Certified Professional Geologist in Indiana, a member of the National Ground Water Association and the American Water Works Association.

Henry C. Hunt, CPG-06427, has been named Sr. Project Manager of Collector Wells International, Inc., a new firm based in Columbus, Ohio, specializing in developing water supply systems throughout the country and overseas. Mr. Hunt has over 20 years experience in the siting, design, and rehabilitation of radial collector wells and surface water intakes. He most recently was a Project Manager for the Ranney Division of Hydro Group, Inc. before joining the firm. He is a Certified Professional Geologist in Indiana and is a member of the National Ground Water Association and American Water Works Association.

Paul W. Lambert, CPG-06974, is Environmental Group Manager, overseeing STS's environmental consulting services statewide. Paul is a 20-year veteran of the business with experience in site remediation for industry and PRP groups. He has extensive remedial experience involving contaminated sediments. Paul holds a Bachelor's Degree in Geology from Indiana State

University and a Master's Degree in Environmental Science from Indiana University.

Robert Lamonica, CPG-05149, has been named president and chief executive officer of Leggette, Brashears & Graham, Inc. (LBG), a ground-water and environmental engineering services firm headquartered in Trumbull, Connecticut with 14 offices nationwide. Mr. Lamonica replaces Russell Slayback who is remaining active with the firm and will serve as chairman of the board. Previously an executive vice president and LBG's chief operating officer, Mr. Lamonica joined the firm in 1976. He was named an associate in 1982 and a vice president and director in 1987. Mr. Lamonica's extensive technical experience encompasses management of all types of ground-water investigations, ranging from water-supply studies to evaluation of contamination by industrial chemicals and free-phase and dissolved petroleum products. He has served as LBG's project manager on Superfund site remediation projects and has provided expert testimony on numerous ground-water contamination cases. Mr. Lamonica is a certified professional geologist by AIPG and a licensed environmental professional in Connecticut. His professional affiliations include the Association of Ground-Water Scientists and Engineers, the Geological Society of America, the New England Water Works Association, and the Environmental Professionals' Organization of Connecticut.

Robert H. (Barney) Oldfield, CPG-06346, has recently accepted a position as an Environmental Program Specialist with the Arizona Department of Environmental Quality, Phoenix, Arizona. Barney will be working in the Federal Lands Program Unit of the Waste

MEMBERS IN THE NEWS (continued)

Management Division managing projects on DOD and non-DOD Federal Lands. Some of his work will involve active and abandoned mining operations on National Forest and National Park Lands in Arizona.

Barney retired from the USDA-Forest Service in December 1997. He worked for the Forest Service for over 20 years on National Forests in Utah, Kentucky, North Carolina, and Arizona. He received many awards, including the Chief's National Award for Outstanding Minerals Management in 1988.

Russell G. Slayback, CPG-02305, became the first recipient of the Russell G. Slayback Award on October 21, 1998. The award was introduced at the Northeast Section's Fall Meeting dinner following a "behind the scenes" tour of the American Museum of Natural History's Gem, Mineral, and Meteorite Collection. **Leonard Rexrode**, (CPG-07204, President-Elect) introduced the award and **Richard Young**, CPG-03356, presented the award to Russ.

Russ' service to AIPG has been exemplary. The Executive Committee statement (found in "Presidential Ramblings of the Northeast Section Newsletter) discusses the various positions within AIPG which Russ held since he was first elected to the Northeast Section Executive Committee in 1974. During his 15 year tenure as the editor of the NE Section Newsletter, Russ established a communication link for NE-AIPG members spread over eight states. His editorials, editor's notebook, and constant prodding of the membership to submit "news of Members" and articles resulted in the superior newsletter enjoyed by the members of the Northeast Section. In addition, his vision and service as an advisor to the Executive Committee and past presidents helped to shape the section into its present robust standing. The Russell G. Slayback award was created and presented with a heartfelt appreciation and thanks from all of us within the Northeast Section of AIPG.

Samuel M. Stowe, CPG-04935, has been named Technical Director of Collector Wells International, Inc., in the Columbus, Ohio office, and President of International Water Consultants, Inc., a wholly-owned subsidiary. Mr. Stowe has nearly 25 years experience in the siting and design of radial collector wells, as well as environmental consulting for landfills and ground water contamination investigations, throughout the U.S. and overseas. He is past Chairman of the Ohio Section of AIPG, is a member of the National Ground Water Association and American Water Works Association, and is a Certified Professional Geologist in Indiana, Missouri, Kentucky, and Pennsylvania. Prior to starting the firm, he had been the Technical Director for Ground Water Associates, a subsidiary of Hydro Group, Inc.



Midwest Regional Award of Merit is held by David G. Taylor, President of Strata Services (center), with Illinois Dam Safety Chief Engineer, Robert Dalton (left) and Missouri Dam Safety Chief Engineer, James Alexander (right).

David G. Taylor, CPG-04601, accepts Dam Safety Award. The Association of State Dam Safety Officials (ASDSO) has presented Strata Services with its 1998 Midwest Regional Award of Merit. This award is given annually to organizations working in the dam safety field that have made outstanding contributions to dam safety on a regional level.

Strata Services was recognized for its expertise in the application of pressure grouting technology to repair lake and dam related leakage problems. Over the last twelve years, Strata Services has completed remedial pressure grouting projects on approximately thirty Missouri-regulated dams, six Illinois-regulated dams, and 150 non-regulated dams in the Midwestern region.

David G. Taylor, President of Strata Services, accepted the award at the ASDSO's annual conference at the Riviera Hotel in Las Vegas, Nevada, October, 1998.

Send in your news items to: AIPG, 7828 Vance Drive, Suite 103, Arvada, CO 80003-2125 • Fax (303) 431-1332 or e-mail: aipg@aipg.org. We look forward to hearing from you.

NEW LAPEL PIN/TIE TACK AVAILABLE

AIPG now has a Lapel Pin/Tie Tack available to Members and Registered Members. The Institute's emblem, enamelled in red on a 14-karat polished gold disk, is available as a combination tie tack and lapel pin. Comes in gift box with detachable tie chain.

John C. Archibald, Jr.,
CPG-06851,
Hondo, Texas

George W. Berry,
CPG-01782,
Boulder, Colorado

J. P. Boyle, Jr.,
CPG-02441,
Oklahoma City, Oklahoma

Norman H. Foster,
CPG-01679,
Denver, Colorado

Keith Frye,
CPG-09341,
Tyro, Virginia

Robert M. Hutchinson,
CPG-00326,
Charter Member,
Golden, Colorado

Wilbur H. Knight,
CPG-02553,
Jackson, Mississippi

John F. Mann, Jr.,
CPG-00697,
Charter Member,
La Habra Heights,
California

J. S. Martin,
CPG-03112,
Midland, Texas

Donelson A. Robertson,
CPG-00110, Charter
Member,
Tampa, Florida

John C. Archibald, Jr., CPG-06851

The American Embassy in Mexico had advised John Christie Archibald and Edith Mangum Archibald, living in Guanajuato, to leave the country as Pancho Villa was on his way south. This was in March of 1916.

They loaded all their belongings in a freight car and started for the border. Mrs. Archibald was expecting her first child at any time. It became clear as they neared San Luis Potosi, that the baby was not going to wait to be born. John Christie Archibald, Jr. (known as Jack) was born in the British Consulate in San Luis Potosi, S.L.P. Mexico on March 15, 1916.

After living about a year in Negaunee, Michigan, where Jack's brother Don was born, they returned to Guanajuato. Three brothers, Frank, James, and Robert, and a sister, Mary, were born there.

Jack was married to Marjory Cash in 1935. They had five children, John Christie Archibald, III (Chris), Wendy, Robert, Elva, and Michael. He was widowed in 1952. He married Fontella Baird in 1955 who passed on in 1986. He then married Juanita Hackebel in 1988.

Jack spent his formative and later years in Mexico. Graduating from Montana School of Mines in Butte, Montana in 1938, Jack worked for several mining companies in Montana, Connecticut, and Mexico. He was a geologist in Brazil in 1942 during WWII mining quartz crystals needed for the radios used in the war. In 1947 he was hired as a General Superintendent of Minera y Refina Mexicana at Wadley, S.L.P. He was Manager of Texas Mining and Smelting Division of National Lead at Laredo, Texas from 1952 to 1973. He then went to work for Joy Manufacturing as an International Sales Manager. In 1982 he moved to Elko, Nevada to run a gold mine.

In 1985 he was in partnership with his brother Don in their company. He bought his brother out and became President of Drilar Co. until his death November 25, 1998—still traveling extensively into Mexico for the company.

J.C. Archibald, Jr. was a member of the Masonic Lodge, Rotary, MENSA, Society for Mining, Metallurgy and Exploration, Inc., Registered Professional Engineers, Society of Geologists of California, and Asociacion De Ingenieros De Minas, Metalurgistas y Geologos De Mexico A.C.

Donelson A. Robertson, CPG-00110

Donelson A. Robertson, P.E., CPG, passed away in Tampa, Florida on August 20, 1998, after an extended illness. Don was a geology graduate of Centenary College of Louisiana and received his masters degree in geology from the University of Illinois. He specialized in exploration geology and in blasting seismology.

Don's professional background included 15 years with the Shell Oil Company as district geologist, 11 years with Martin Marietta Aggregates, initially as director of technical services and then as vice president of northeast operations, executive vice president of Philip R. Berger & Associates, Inc. (which subsequently became GeoSonics, Inc.) for four years, and in a number of capacities with Patrick Petroleum Corporation and Ladd Petroleum Corporation 1980 - 1987, from which he retired as vice president and regional manager for the eastern U.S. Most recently, Don served as a technical consultant for GeoSonics, Inc./Vibra-Tech Engineers, Inc. in Carlisle, PA.

Mr. Robertson was a registered professional engineer in Pennsylvania and a charter member of The American Institute of Professional Geologists. He was a past president of the Pennsylvania Section of the latter organization as well as a past president of the Harrisburg Area Geological Society. In addition, he held memberships in the Association of Engineering Geologists, the American Association of Petroleum Geologists, the American Institute of Mining, Metallurgical and Petroleum Engineers, and the International Society of Explosives Engineers.

Don was also principal author of reports prepared under contracts held by Philip R. Berger & Associates, Inc. with the U.S. Bureau of Mines, "Evaluation of Alternatives to the Kelly Bar Method of Loading Explosives," and "Survey of Blasting Effects on Ground Water Supplies in Appalachia."

AIPG Web Site Member Login Instructions

Here are instructions for using the new AIPG web site, www.aipg.org. **To enter the Members portion of the site, you must request your login name and password from Headquarters (303-431-0831 or aipg@aipg.org).** If you are unable to connect to the site, please let us know immediately. Please remember that this is a new site with some sections still under construction. Comments and suggestions are welcome.

(Note: Your password is linked to your member record in the database. You will not be able to change it.)

The new home page is a more attractive, easy-to-use source of information for the public. It also offers new services to AIPG members. The site was designed by Advanced Solutions International and is linked to the AIPG database. Until mid-1999, the database will not be updated automatically and will require a periodic upload from Headquarters. An address change that you send to Headquarters may not show up on the site for several weeks.

- The "Welcome" section of the site is available to anyone. It features general information on AIPG, the application package, lists of state registration offices, publications, etc.
- To enter the members-only portion of the site, scroll down to "AIPG-Login". Enter your name (all caps) and password as shown above. A new sidebar will appear with "Member," "AIPG," and "Membership" sections.
- The "Member" section has descriptions of our insignia items and publications, with a link to headquarters to place an order. There is also a list of the other member benefits such as insurance companies, rental car discount codes, etc.
- The "AIPG" section will give you up-to-date information on AIPG business. [Note: you do not need to login again here]
- "Check Out" will have information on future meetings.
- "URLS" provides links to sections, related societies, and state registration boards.
- "E-mail lists" lets you sign up on lists such as one for information on the 1999 Annual Meeting in Anchorage.
- "Comments" lets you send messages to Headquarters and to the Ethics Committee Chairman.
- "Pages" has folders on the status of registration bills and other topics of interest to the membership.
- "AIPG Forums" are for online discussion by the Executive Committee (Private Forum) and by the general membership (Public Forum).
- The "Membership" section is the online AIPG directory. The easiest way to look for a particular member is to use "Speed Search." When searching by last name, you can enter the first few letters of the last name; this field is not case sensitive. You will also be able to search by company name at a later date. There will be names, city/states, and phone numbers for the members listed. For additional information, double click on the member name. On this page, you can send an e-mail directly to the member by clicking on the red underlined e-mail address.

**DO NOT USE THE SEARCH PORTION.
IT WILL BE REMOVED IN A FUTURE UPDATE OF THE SITE.**

- The "Directory" section is organized like the printed directory, listing names alphabetically. However, the listings are organized by Section, with members who live outside the U.S. or in states that do not have sections being listed first. The Comp Section includes retired members and students.

Under Demographics, member specialty fields and employer names are listed. The primary specialty is UF_5, the secondary specialty is UF_6 and the tertiary specialty is UF_7. The employer name is by UF_10 and List1 shows the states/provinces where the member is registered/certified. In a future update of the site, we will be able to use the proper names for the fields.

[Note: As in the printed directory, there are symbols by some of the last names. * is for Registered Member, # is for Member, % is for Student Adjunct and ^ is for an Associate.]

PROFESSIONAL SERVICES DIRECTORY

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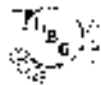
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UNITED STATES

EAST NORTH CENTRAL

Illinois	170
Indiana	62
Michigan	235
Ohio	343
Wisconsin	141
TOTAL	951

EAST SOUTH CENTRAL

Alabama	60
Kentucky	94
Mississippi	28
Tennessee	86
TOTAL	268

MIDDLE ATLANTIC

New Jersey	164
New York	252
Pennsylvania	264
TOTAL	680

MOUNTAIN

Arizona	114
Colorado	473
Idaho	16
Montana	48
Nevada	83
New Mexico	129
Utah	46
Wyoming	55
TOTAL	964

NEW ENGLAND

Connecticut	76
Maine	15
Massachusetts	101
New Hampshire	46
Rhode Island	15
Vermont	16
TOTAL	269

PACIFIC

Alaska	135
California	262
Hawaii	14
Oregon	25
Washington	101
TOTAL	537

SOUTH ATLANTIC

Delaware	13
D.C.	25
Florida	141
Georgia	62
Maryland	56
North Carolina	80
South Carolina	25
Virginia	158
West Virginia	52
TOTAL	612

WEST NORTH CENTRAL

Iowa	25
Kansas	56
Minnesota	134
Missouri	83
Nebraska	31
North Dakota	20
South Dakota	18
TOTAL	367

WEST SOUTH CENTRAL

Arkansas	19
Louisiana	95
Oklahoma	147
Texas	758
TOTAL	1,019

CANADA

Canada	29
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FOREIGN

Foreign Countries	91
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BONUS CIRCULATION

Trade Shows (annually)	400
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Office Copies and Samples (monthly)	100
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TOTAL CIRCULATION
6,287

AIPG Members by Primary Specialty Field of Practice

Appraisals/evaluations.....	53	Geostatistics	0	Paleontology.....	4
Coal	89	Geotechnical	6	Palynology.....	1
Cold regions/permafrost.....	2	Geothermal	1	Petrography/petrology.....	14
Computer applications	23	Hazardous waste.....	146	Petroleum.....	325
Construction materials.....	39	Hydrogeology.....	1,232	Phosphates.....	3
Economic geology.....	131	Industrial minerals.....	39	Planetology	0
Engineering geology	253	Investment analysis.....	5	Regional geology.....	6
Environmental geology.....	935	Land reclamation	4	Remote sensing.....	11
Envir. impact assmt.....	6	Leasing.....	1	Sedimentology	26
Envir. site assmt.....	14	Management	90	Seismology	6
Exploration	256	Marine geology	5	Soil science.....	2
Field geology	22	Mathematical geology	1	Stratigraphy	17
Forensic geology	5	Metallic minerals.....	9	Structural geology	12
General geology/Earth science	27	Micropaleontology	3	Tectonics.....	2
Geochemistry	38	Mineralogy	5	Uranium.....	7
Geologic modeling.....	0	Mining geology	64	Volcanology	1
Geomorphology	14	Natural gas.....	25	Waste disposal	26
Geophysics	54	Operations/development	18	Water resources.....	29



The Professional GEOLOGIST

Editorial Scope

The Professional Geologist is published monthly by the American Institute of Professional Geologists and provides a forum for discussion and dissemination of professional and scientific information in all areas of geology.

Editorial Emphasis Issues

January	Mining Geology
March	Petroleum Geology
May	AIPG Convention
July	Hydrogeology
September	Environmental Geology
November	Geophysical/Engineering

The Professional Geologist is distributed to over 6,000 members, businesses, libraries, universities/colleges, and government agencies.

Mechanical Requirements

Size	Format	Width/Height
Full Page	Vertical	7 1/4" x 9 1/2"
2/3 Page	Vertical	4 3/4" x 9 1/2"
2/3 Page	Horizontal	7 1/4" x 6 3/8"
1/2 Page	Island	4 3/4" x 7 1/4"
1/2 Page	Vertical	3 1/2" x 9 1/2"
1/2 Page	Horizontal	7 1/4" x 4 3/4"
1/3 Page	Vertical	2 1/4" x 9 1/2"
1/3 Page	Square	4 3/4" x 4 3/4"
1/4 Page	Vertical	2 1/4" x 7 5/8"
1/4 Page	Horizontal	4 3/4" x 3 5/8"
1/6 Page	Vertical	2 1/4" x 5"
1/6 Page	Horizontal	3 1/2" x 3 1/4"
1/8 Page	Vertical	2 1/4" x 3 7/8"
1/8 Page	Horizontal	3 1/2" x 2 1/2"

Printed Offset, 70-lb. coated stock, sheet fed, saddle-stitched binding.

Width of column	2 1/4"
Depth of column	9 1/2"
Trim Size	8 1/2" Wide x 11" Deep
Bleed Size	8 3/4" Wide x 11 1/4" Deep
Halftone Screen	133 lines, up to 150 lines

AIPG Annual Membership Directory

Same rates apply. Back cover is only available to four-color full page advertisers at the rate of \$1,300.

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1/3 Page	300	255	245	240	225
1/4 Page	200	170	160	155	150
1/6 Page	150	130	120	115	110
1/8 Page	100	85	80	75	70

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Closing date for orders - 1st of month preceding issue month.
Closing date for mechanical - 15th of month preceding issue month.

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General Information

AIPG Annual Membership Directory contains the names and addresses of all Members and Adjuncts of the Institute and is used as a networking resource among geologists. Listings include alphabetical, geographical, and primary specialty field of practice. The Directory also contains the Institute Bylaws, Code of Ethics, Policies, and the qualifications required to gain membership to the Institute.

American Institute of Professional Geologists (AIPG) is the only national organization which 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.



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CALENDAR

1999

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Mar. 4, 11 & 18. *Geosynthetic Institute, Geosynthetics in Transportation Facilities*, Folsom, PA. Contact: Ms. Marilyn Ashley, Geosynthetic Institute, 475 Kedron Ave., Folsom, PA 19033, Ph.: (610) 522-8440, Fax (610) 522-8441 or e-mail: marilyn.ashley@coe.drexel.edu.

Mar. 5, 12 & 19. *Geosynthetic Institute, Geosynthetics in Waste Containment*, Folsom, PA. Contact: Ms. Marilyn Ashley, Geosynthetic Institute, 475 Kedron Ave., Folsom, PA 19033, Ph.: (610) 522-8440, Fax (610) 522-8441 or e-mail: marilyn.ashley@coe.drexel.edu.

Mar. 10-12. *SIPES 1999 Annual Meeting and Seminar, Sharpen Your Skills and Expand Your Horizons*, Wichita, KS. Contact: Randall Koudele, Ph.: (316) 789-9595, Fax (316) 789-9590, e-mail: sipes@sipes.org or web site: <http://www.sipes.org>.

Mar. 16-17. *Second Annual Ground Water Industry Legislative Conference*, Washington, D.C. Contact: NGWA, 601 Dempsey Rd., Westerville, OH 43081, Ph.: (800) 551-7379, e-mail: ngwa@ngwa.org, <http://www.ngwa.org>.

Mar. 21-25. *Third Inter-American Dialogue on Water Management, Facing the Emerging Crisis in the 21st Century*, Panama City, Panama. Contact: Third Inter-American Dialogue, Ph.: (507) 232-6851, e-mail: cathd3@sinfo.net, web sites: <http://www2.usma.ac.pa/~cathalac/dialogue3.htm> or <http://iwrn.ces.fau.edu>.

Mar. 23-24. *Silurian, Devonian, and*

Mississippian Geology and Petroleum in the Southern Midcontinent, Norman, OK. Contact: Oklahoma Geological Survey, Energy Center, 100 E. Boyd, N-131, Norman, OK 73019-0628, Ph.: (405) 325-3031.

Mar. 28-30. *8th Annual Investing in the Americas '99*, Miami, FL. Contact: International Investment Conferences, Inc, 6310 Sunset Dr., Miami, FL 33143, Ph.: (305) 669-1963, e-mail: iiconf@iiconf.com, www.iiconf.com

Apr. 10-14. *Seventh Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst™*, Harrisburg, PA. Contact: Gayle Herring, PELA, 106 Administration Road, Oak Ridge, TN 37830, Ph.: (423) 483-7483, pelaor@usit.net, <http://www.uakron.edu/geology/karstwaters/7th.html>.

Apr. 11-14. *AAPG Annual Meeting, Revisiting the Rocks - Applying New Technologies*, San Antonio, TX. Contact: AAPG, P.O. Box 979, Tulsa, OK 74101, Edward Roy, General Chr., Ph.: (210) 736-8204, eroy@trinity.edu.

Apr. 19-21. *Asia-Pacific Conference to Promote Benefits of Bioengineering for Erosion Control and Slope Stabilization*, Manila, Philippines. Contact: North America - IECA, P.O. Box 774904, Steamboat Springs, CO 80477-4904 USA, Ph.: (800) 455-4322, (970) 879-8563, ecinfo@ieca.org, <http://www.ieca.org>.

Apr. 28-30. *Geosynthetics 1999*, World Trade Center, Boston, MA. Contact: Industrial Fabrics Association Int., 1801 County Rd. B W, Roseville, MN 55113, Ph.: (612) 222-2508, generalinfo@ifai.com, www.ifai.com.

Jun. 3-5. *ICADD-3: from Theory to Practice (3rd International Conference on Analysis of Discontinuous Deformation)*, Marriott's Mountain Resort, Vail, Colorado. Sponsored by American Rock Mechanics Association and

the ARMA Foundation. Contact: Professor Bernard Amadei, University of Colorado, Dept. of Civil Engineering, CB 428, Boulder, CO 80309-0428, Ph.: (303) 492-7734, amadei@spot.colorado.edu, www.tmn.com/~arma

Jun. 6-9. *Vail Rocks '99, 37th U.S. Rock Mechanics Symposium, Rock Mechanics for Industry*, Marriott's Mountain Resort, Vail, CO. Contact: ExpoMasters, c/o Mark Cramer, 7632 E. Costilla Ave., Englewood, CO 80112, Ph.: (303) 771-2000, mrcramer@exposmasters.com, www.tmn.com/~arma

Jun. 9-15. *MINETIME 99, 5th World Mining Technology Exhibition*, Dusseldorf, Germany. Contact: Dusseldorf Trade Shows, Inc., 150 North Michigan Ave., Ste. 2920, Chicago, IL 60601, Ph.: (312) 781-5180, <http://www.dtsusa.com/dts/>.

Jun. 13-17. *The Third National Conference of the Geo-Institute of ASCE, Geo-engineering for Underground Facilities*, Urbana, IL. Contact: Conferences and Institutes, University of Illinois at Urbana-Champaign, Ph: (217) 333-2880, e-mail: onderdon@uiuc.edu.

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Apr. 9-12. *Amherst 2k: Specialty Conference on Performance Verification of Constructed Geotechnical Facilities*, Amherst, MA. Sponsored by Geo-Institute of ASCE. Contact: Dr. Alan J. Lutenege, Dept. of Civil and Environmental Engineering, 139 Marston Hall, Univ. of MA, Amherst, MA 01003, Ph.: (413) 545-2872, Fax: (413) 545-4525, or e-mail: lutenege@ecs.umass.edu.

Send notices of meetings of general interest, in format above, to Editor, TPG, 7828 Vance Drive, #103, Arvada, CO 80003, e-mail: wjd@aipg.com.

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AIPG ANNUAL MEETINGS

October 4-8, 1999
Anchorage, Alaska

October 11-15, 2000
Milwaukee, Wisconsin

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TYPES OF MEMBERSHIP AND REQUIREMENTS

CERTIFIED PROFESSIONAL GEOLOGIST

- EDUCATION:** 36 semester or 54 quarter hours in geological sciences* with a baccalaureate or higher degree; certified copy of official transcripts must be sent by each college or university
- EXPERIENCE:** 8 years beyond bachelor's degree, or 7 years beyond master's degree, or 5 years beyond doctorate
- SPONSORS:** 3 required from professional geologists, 2 of whom must be CPG's (see Section 2.3.1.4 of the Bylaws for exceptions)
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- CERTIFICATION/REGISTRATION:** None required
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- ANNUAL DUES:** \$60 plus Section dues; both pro-rated for remainder of year when accepted

STUDENT

- EDUCATION:** Currently enrolled in a geological science* degree program
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- SCREENING:** Headquarters can approve
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ASSOCIATE

- EDUCATION:** None required
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*As defined by the American Geological Institute, a geological science is any of the disciplinary specialties that are part of the science of geology, e.g., geophysics, geochemistry, paleontology, petrology, etc.

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Student Affiliate	53	81
Honorary	14	17
TOTALS	5,165	5,085