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The American Institute of Professional Geologists

WANTED - TPG ARTICLES

Instructions to Authors

TPG accepts articles of modest length for publication. Submittals should be no more than approximately 1600 words, or six typed pages, double spaced. Longer articles may be divided into parts (e.g., part 1 and part 2), but this is not encouraged. Articles may be technical or professional in nature. General topics are listed below. Articles containing news of importance to professional geologists will also be considered. Except for news articles, or articles containing dated materials, submittals should be sent to AIPG headquarters twelve weeks in advance of expected publication. Some technical topic issues are planned up to one year before printing, therefore early submittals will be preferred.

Manuscripts should have the following sections:

- Title
- Author(s) with CPG number and address
- Text
- Tables if included
- Figures with captions if included
- Appendix(es) if included
- Acknowledgments
- References Cited

One original and two copies of each manuscript should be submitted. Whenever possible, text should also be submitted on diskette. Headquarters uses WordPerfect 7 for Windows '95, which is preferred, but Word, ASCII, RTF, or translatable files are acceptable. The program or format of the text should be clearly marked on the diskette. Articles can also be transmitted by e-mail.

Graphics should be clear, camera-ready, line drawings whenever possible. Photographs (color or black and white) are also encouraged. Whenever possible, drawings may be submitted on diskette in .pcx, .bmp, .tiff, .gif, or other standard formats.

TPG wants color slides and photographs. Slides and photographs alone may be submitted for the cover. They should have a geologic theme and an informational caption.

General Topics:

Technical

- Mining (January)
- Petroleum Geology (March)
- Hydrogeology (July)
- Environmental Geology (September)
- Geophysical/Engineering (November)

Professional (any issue)

- Government and the Geologist
- Ethics and Standards of Practice
- Public Perception of Geology and Geologists
- Definition, Certification, and Licensing
- Practicing Geology Internationally

Other suggestions: Forensic Geology, History of Practice in a given field, Book Reviews, Geology and the Military, and Unusual Applications of Geology.

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The Professional
GEOLOGIST

PEER REVIEWED PAPERS

The Professional Geologist as Human Health Risk Assessor: Covering New Ground with Caution

Troy L. Schultz, CPG-09902, and Alan H. Coogan, CPG-02597 **4**

Surface Water Impacts on Ground Water Quality in a Shallow Limestone and Dolomite Bedrock Aquifer, Clark County, Ohio

Rich Bendula, CPG-09764, and Bob Moore, RS **8**

The Third AIPG Annual Washington, DC Fly-In

James D. Shotwell, CPG-08290 and Tom Fails, CPG-03174 **12**

Section Visits by Executive Committee Members and Executive Director

14

After the Rapture or AIPG's Role After Registration

William V. Knight, CPG-00153 **20**

FRONT COVER - Quechuan woman (descendant of Incas) grazing llamas and alpacas at BHP's Tintaya Copper Mine in South Peru, elevation 13,000 feet. Photograph submitted by Martin A. Nelson, CPG-08197.

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).

DEPARTMENTS

PRESIDENT'S MESSAGE - When the Sections Speak, National Lists!	2-3
AGI GOVERNMENT AFFAIRS PROGRAM MONTHLY UPDATE	15-19
PROFESSIONAL ETHICS & PRACTICES - Column 40	17-19
PROFESSIONAL SERVICES DIRECTORY	22-23
INSIGNIA ITEMS AND ORDER FORM	24-25
AIPG WEB SITE MEMBER LOGIN INSTRUCTIONS	26
CALENDAR	27
TYPES OF MEMBERSHIP AND REQUIREMENTS	28
NEW MEMBERS, APPLICANTS, ETC.	Inside Back Cover

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When the Sections Speak, National Listens!

In recent years each Section has been asked, in its report to the Annual Advisory Board Meeting, to:

“Please report on ideas that you have for AIPG National and Headquarters to better serve the Sections and the membership.”

The Sections reply with a number of mostly good ideas that do not always receive the attention or obtain the action they deserve from the Executive Committee. Headquarters tries to respond effectively to relevant Section suggestions. Three Sections reported to the 1998 Advisory Board meeting that “Headquarters is doing a good job.”

A closer National-Section working relationship is one of my goals. As Vice President in 1995, I contacted the President of each Section twice during the year. This resulted in a better understanding of both the problems affecting the Sections and wishes of some Sections for a closer two-way National-Section relationship. A feeling that the National Executive Committee was indifferent to the problems faced by many Sections was occasionally evident. National really does care but perceptions otherwise exist. The 1999 National Executive Committee wants to allay these perceptions and to respond more effectively to Section recommendations to the 1998 Advisory Board.

Ten of the most common Section recommendations were selected for continuing action by Executive Committee members during 1999, based upon the summary published on page 30 of the December 1998 *TPG*. Executive Committee members will have individual responsibility for each of these Section recommendations. They are the contact persons for the Sections for their one particular recommendation. As in previous years, Headquarters and the Vice President are also contacts for Section enquiries and complaints, but the Headquarters staff, now reduced to three, is hard-pressed to carry out their regular duties, and the Vice President, a very busy individual, has his required duties and is not always available. Please do not hesitate to contact the Executive Committee members listed below regarding their particular issue before contacting Headquarters, if possible.

- “Increased access to expanded National Website; increased use of e-mail communications.” Comment—Our National Website is now up and running at www.aipg.org. An increasing number of members have e-mail addresses, including Headquarters and all National Executive Committee members. EDITOR MYRNA KILLEY is contact person.
- “National help with registration efforts.” Comment—Headquarters holds considerable registration-related information and materials, including a model law and numerous State registration laws, that are available to Sections upon request. Bill Knight is a valuable resource as well, but will retire at the end of April. ADVISORY BOARD REPRESENTATIVE LYNN KANTNER is contact person for this issue.
- “Development of recruitment materials packages for use at Section and National meetings.” Comment—An excellent idea but may take some time and effort. Cost is a consideration as well. VICE PRESIDENT ROBERT FONT is contact person. He will contact the three Sections that made this suggestion for their ideas on same.
- “Better National-Section communications, including more visits by National Officers.” Comment—This recommendation has been divided into two parts. ADVISORY BOARD REPRESENTATIVE RON ALEXANDER is contact person for National-Section communications. Ron plans an aggressive quarterly report program to help him improve National-Section communications.
Comment regarding National Officer visits to Sections: We are trying to accommodate as many Sections as possible, but time and expense are limitations for all Officers. At present, the President is committed to visit Arizona Section in February. Additional opportunities for Section visits by National Officers are:
 - Capitol, Northeast, Pennsylvania, Virginia Sections after the April 24 Executive Committee meeting in Washington DC in connection with the AIPG Fly-In, April 25-27/28. Fails, Buchanan, and Siok could visit

Midwestern or South Central Sections as an alternative.

- Midwestern Sections before or after the National Conference of State Legislatures meeting in Indianapolis, July 26-27.
- Western, Midwestern, or Southern Sections after the October 3-8 Annual Meeting near Anchorage.
- Sections in these areas should express their interest in hosting a meeting with a National Officer or the new Executive Director to Headquarters as soon as possible.
- “National help with competition issues.”
Comment—Two new National Affairs Subcommittees—Government Competition (Chair Dawn Garcia) and Interprofessional Relations (competition by engineers, etc.) (Chair Mike Lawless)—were formed in 1998. Both Chairs seek additional Subcommittee members. These Subcommittees deserve your support and participation, as they will provide long-sought AIPG emphasis on these two areas. Incidentally, formation of the Government Competition Subcommittee DOES NOT indicate AIPG support for privatization of governmental organizations employing geologists. Rather, membership of government employee CPGs on this Subcommittee is sought and encouraged. ADVISORY BOARD REPRESENTATIVE DAWN GARCIA is contact person.
- “National prepare a guidance manual for Section governance; National prepare a list of all services National can provide to Sections.” Comment—Two suggestions in the same area have been combined. The Section Officers manual, authored by

1998 Vice President Bill Siok, is in second draft form and should be published during 1999. ADVISORY BOARD REPRESENTATIVE/new EXECUTIVE DIRECTOR BILL SIOK is contact person.

- “Foster closer coordination/cooperation with other geoscience organizations, including shared services.” Comment—Several Executive Committee members are working on closer relations with other geoscience organizations in the US and abroad. AIPG has been approached with shared services proposals in the past, but as they involve AIPG being provided with services by another geoscience organization on relatively unattractive terms, nothing has come of them to date. VICE PRESIDENT ROBERT FONT is contact person.
- “National to provide help in affirming desirability of CPG status for registered geologists.”
Comment—PRESIDENT TOM FAILS is contact person for this issue. My President’s Message in the January *TPG* dealt with my idea. Among the few comments received to date, some thought it was a good idea, but others thought better arguments could be made. Although responses and recommendations were asked for, nothing has been received so far. Come on! Let’s have some better ideas than mine. They are out there, I’m sure.

The above describes a special effort by this year’s Executive Committee to work more closely with the Sections by listening and responding to your recommendations and suggestions. The Sections are the heart and soul of AIPG—Headquarters and the Executive Committee are the support system. Let’s work together for a healthier AIPG and profession.

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The Professional Geologist as Human Health Risk Assessor: Covering New Ground with Caution

Troy L. Schultz, CPG-09902, and Alan H. Coogan, CPG-02597

Background

Human health risk assessment is a relatively new and challenging field for environmental geologists. The multi-disciplinary character of risk assessment is captured quickly by noting that practicing risk assessors include: geologists, chemists, engineers, toxicologists, biologists, and public-health professionals. Risk assessment requires many of the core elements of an environmental geologist's experience such as media, pathway, and chemical analysis. For this reason, environmental geologists can take advantage of the significant growth within this field.

As risk assessment becomes increasingly part of the site characterization process, certified professional geologists must take care not to exceed their own professional capabilities nor expose themselves, their colleagues, and companies to unwanted legal liability. Moreover, the assessment of public health risks due to chemical exposure, or potential chemical exposure, should not be arbitrarily too conservative and costly, nor too liberal. Defensible risk assessment is not a "boiler-plate" exercise. After all, at issue is human health!

With the adoption of Risk-Based Corrective Actions (RBCA) across the country, the site characterization and risk assessment evaluation steps merge into one process (ASTM, 1995). This merger compels geologists to learn about risk assessment in those states that have already adopted a RBCA process. Others may choose to learn risk assessment to increase their understanding of assessment needs or to become professional risk assessors. Many certified professionals, including ourselves, find the application of risk assessment to be refreshing and an essential key to defending complex remedial decisions. It is certain that the use of risk assessment in environmental work will expand here and abroad. However, many professionals are moving towards the use of risk-based methods without sufficient supporting data, particularly during underground storage tank closures where information about site receptors and the extent of impact is very limited.

Default Clean-Up Goals

Geologists have been doing limited, qualitative risk assessments for several years, perhaps without knowing it. Many states developed clean-up levels that require some type of site analysis to qualitatively rank the health risks at a site. Clean-up levels are generally more conservative at sites where the potential for human exposure to pollutants is greater. One of us (TLS) helped establish such a risk-based system for the State of Ohio in 1992 (BUSTR, 1992). The action levels in the Site Feature Scoring System (SFSS) were developed so that anyone who could tell the difference between clay, silt, and sand could determine the action levels for a site. These action-levels incorporate conservative assumptions to account for a lack of site-specific data. More specifically, these conservative assumptions regard potential exposure to multiple media, pathways, and chemicals. Even at sites where impact limits are not defined, and where soil leaching problems may exist, these action levels are used as an initial screening tool to determine if full site characterization is needed.

After a complete site characterization of the plume limits and natural attenuation status, one can either apply these conservative action levels or develop site-specific target levels as final clean-up objectives. Many new state-specific soil and ground water clean-up regulations, particularly for petroleum sites, no longer account for such a broad spectrum of uncertainties in the development of their risk-based screening levels (RBSLs). The purpose often is to expedite site closure and to keep costs down. The result, however, is that many potential health threats may go undiscovered (e.g., the discovery of phase-separated liquids during site characterization). This has created a potential gap between what is acceptable by regulation and what is scientifically defensible.

RBSLs should be calculated conservatively to account for the lack of information that may be available during their anticipated first use, and also to account for the anticipated experience level of the first users. Higher levels of tiered, risk assess-



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ment should then be made available to incorporate more site-specific information as it is obtained. If RBSLs are based on exposure pathway elimination and chemical segregation, then experienced, professional scientists would be the logical first users. Such a system would be inappropriate for non-scientists. If non-scientists or inexperienced professionals were to use such a system, their work may not be defensible.

Cautions

Nearly all state environmental rules and guides incorporate some risk assessment options, since their provisions mimic federal rules. Substantial differences in risk assessments exist, however, among sites as a result of both federal program differences, state-specific requirements, and site-specific factors. The context in which a risk assessment is to be undertaken can be the most important consideration in its development.

A common misconception about risk assessments is that only a toxicologist or human health professional can complete them. This is not true and in fact, without site characterizations commonly completed by geologists, the health scientist would not be able to complete a risk assessment. It is our opinion that geologists and hydrogeologists bring a crucial perspective to risk assessment. Who else is better suited to understand the migration of chemicals in the subsurface and make decisions regarding potential exposure?

Risk assessments involving fate and transport modeling require an understanding of the geological processes that form soil and rock that may act as preferential migratory routes for contaminants. If a route of contaminant migration can reach a receptor (i.e., humans, plants, animals), a complete exposure pathway is present and should be evaluated in risk assessment. A professional opinion regarding the presence or absence of complete exposure pathways is critical in risk assessment and should be formed with caution and consideration. In risk assessment, both current and future exposure pathways should be evaluated.

An environmental geologist can complete a baseline risk analysis using USEPA algorithms presented in the core Superfund risk assessment guidance (e. g., USEPA, 1989). These are the same algorithms used by ASTM in RBCA, but on a media-, pathway-, and chemical-specific basis. If you want an understanding of how risk assessment developed, there are plenty of references available that will point you in the correct direction (search "Risk Assessment" at <http://www.NTIS.com>). In cases of potential litigation, or where a higher level of certainty is necessary, we highly recommend that a toxicologist review your work. An experienced toxicologist is better suited to determine potential health effects due to cumulative exposure to several chemicals, pathways, and media. In other words, a person may be exposed to several different media (e.g., soil, water, air), in several pathways (e.g., showering, soil ingestion, etc.), and to several chemicals (e.g., TCE, benzene, lead) simultaneously.

Without access to a toxicologist, the environmental geologist could assume cumulative and additive effects of exposure to multiple chemicals, pathways, and media as a defensible default assumption. To assume individual exposure to all media, pathways, and chemicals, in all situations, opens one up to criticism, since it would be contrary to current USEPA protocol (USEPA, 1997). In addition, many of the pre-determined chemical segregations by target organ are still debated in the toxicological community, and should be used with extreme caution if you do not fully understand their basis. If

you are not capable of defending certain assumptions, you should not make them.

The ability to determine segregation of media and pathways may often hinge on institutional or engineering controls. The professional must ensure that any assumptions based on these controls are realistic and can be maintained or enforced as long as the contaminants are present. Impacts from some contaminants such as metals, PCBs, and from some chlorinated solvents can exist for decades.

Definition of the plume status (i.e., expanding, shrinking, stable) is key to exposure pathway analysis and defense. Before the certified professional can state or claim that all current and future receptors have been identified, the full extent of impact, for all phases in all media, will need to be fully quantified. The most defensible way to support such claims, to a high degree of scientific certainty, is with actual site analytical data, not to some risk-based level but to background or nondetect. Modeling is often needed, but is easy to argue in court. Be sure your analysis of uncertainties is thoughtful, explicit, and complete. Another expert, perhaps with a better model, may make your arguments look weak. Select models carefully and use them only when real world data will not accomplish the same objectives. The stronger the supporting evidence, the stronger the risk assessment conclusions.

When the demands of environmental regulations that require the polluter to meet certain clean-up standards are met, the regulating agency commonly issues a No Further Action (NFA) letter. The regulatory burden and expense are now lifted, but the NFA may do little to relieve your client from litigation by third parties who are affected by contaminants that have migrated off the site. The additional cleanup costs, probably incurred to meet a higher standard, and the claimed "loss of property value" reintroduces potential evaluation needs. If your risk assessment was the basis for an NFA, and if your risk assessment used look-up tables and default values, and if you did not define the plume, how will you meet the required professional standard of care? How will you answer the lawyer's question "You can't tell me that the adjacent property owner is not being exposed to these contaminants, can you?"

Lastly, professionals should be cautious about any "cook-book" risk assessment methods that may be presented, for example, by industry groups or individual states that may have a particular interest, or that were developed by inexperienced professionals. Ultimately, the certified professional is held responsible for the work.



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In conclusion, even though the science of risk assessment is relatively young, numerous lessons have been learned and should be the basis on which further risk assessment is based. If you really want to understand risk assessment, go to the core USEPA documents, or talk to people with substantial backgrounds in traditional risk assessment. We hope this essay provides sufficient fuel for further discussion.

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- USEPA, 1997, USEPA Memorandum: Cumulative Risk Assessment Guidance-Phase and Scoping. Carol M. Browner and Fred Hansen, Washington, DC.

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Reviewers: Brett A. Urian, CPG-09456, Bob Worstal, CPG-09520, Marian Bayne, CRA, Edward M. Baltzer, CPG-08861, and Robert H. Fakundiny, CPG-04977.

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.

New Soils Book Highlights Environmental Concerns

ALEXANDRIA, VA — Without soil, life as we know it could not exist. *Sustaining our Soils and Society*, the new release in the American Geological Institute's (AGI) Environmental Awareness series, published in cooperation with the Soil Science Society of America (SSSA) and the USDA National Resources Conservation Service, presents a refreshing nontechnical look at soils. The colorful 64-page book is filled with striking photos and illustrations that demonstrate the importance of our soil resources and how they are connected to our daily lives and the future of society. Each copy of the book contains a poster that will be of special interest to teachers and youth leaders. The 18" x 24" poster relates soils to the environments in which they occur; the reverse side of the poster contains a soil investigation activity for middle- and high-school students.

Copies of the soils poster and a soils book mark are available from AGI and SSSA. The list price for *Sustaining Our Soils and Society* is \$15.95. Members of AGI member societies, teachers, and youth leaders may purchase the book for \$9.95 — a discount of nearly 40 percent — plus shipping and handling. Call the AGI Publications Center at (301) 953-1744. For information on bulk discounts on the soils book, poster, and book mark, contact Robert Tiffey at AGI headquarters by e-mail <rlt@agi-web.org>, or by phone (703) 379-2480.

Update from the Subcommittee for Competition between Government and the Private Sector

Dawn Garcia, CPG-08313

In the December 1998 *TPG*, the article on government competition stated that the Kentucky Geological Survey (KGS) was logging core, evaluating mining conditions, offering reserve assessments, and competing against private mining consultants. That statement resulted from a misunderstanding. The AIPG Kentucky Section Executive Committee has discussed the work of the KGS and concluded that no conflicts exist between the KGS and the private sector. The core descriptions prepared by the KGS are considered to be mandated research and not within the realm of the private sector. The Kentucky Geological Survey, upon seeing the article in *TPG*, acted promptly to investigate what complaints might exist. They are to be commended for their commitment to avoid conflicts with the private sector.

Surface Water Impacts on Ground Water Quality in a Shallow Limestone and Dolomite Bedrock Aquifer, Clark County, Ohio

Rich Bendula, CPG-09764, and Bob Moore, RS

Introduction

Drinking water wells in the upland areas of southwestern Clark County, Ohio, have experienced water quality problems with turbidity after heavy rains. Some of these wells were contaminated with bacteria and nitrate (see Figure 1). Until recently, the casings for water wells were advanced only a few feet into bedrock, and the annular space was not grouted. In this area the primary aquifer is comprised of consolidated limestone and dolomite bedrock which is encountered at depths as shallow as 4 to 25 feet. In 1997, the Ohio EPA and the Clark County Health Department began working together to design and conduct a water quality study. The objectives of this study were to determine the inorganic and bacteriological quality of the upland bedrock aquifers, and if any regional water quality problem exists in the area. The data from the study is being used to determine the need to provide alternate water supplies to the area.

Hydrogeologic Setting

Clark County lies within the Till Plains section of the Central Lowlands physio-

graphic province and is situated on the east flank of the Cincinnati Arch (Fenneman, 1938; Norris and Fidler, 1973). The bedrock consists of consolidated limestone and dolomite deposits of Silurian age and is the primary aquifer in the upland areas. Four to 25 feet of glacial till overlies the highly weathered and fractured Lockport Dolomite and sub-Lockport Limestone aquifer (Swinford and Shrake, 1993; see Figure

2). The bedrock aquifers are separated into an upper and lower aquifer by the Massie and Osgood Shales, which are the uppermost formations of the sub-Lockport (Shrake, 1994b). The sub-Lockport aquifer overlies Ordovician shales of low permeability, while the Mad River and its associated buried valley aquifer trend from the north toward the southwest, dissecting the study area.

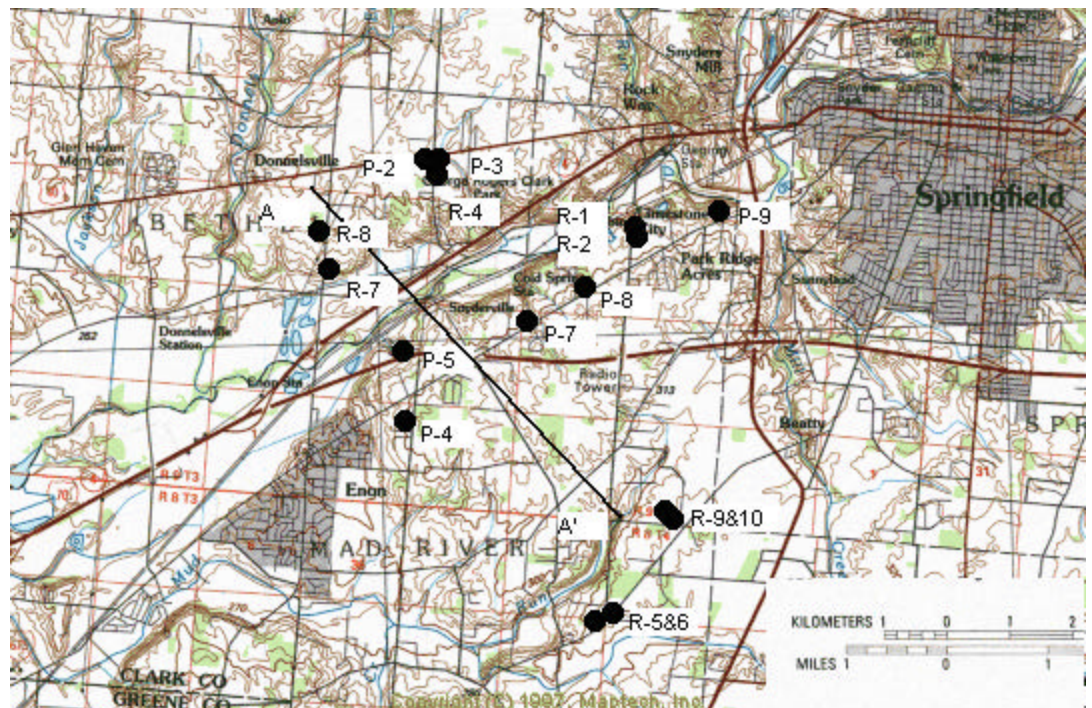


Figure 1. Clark County Study Area

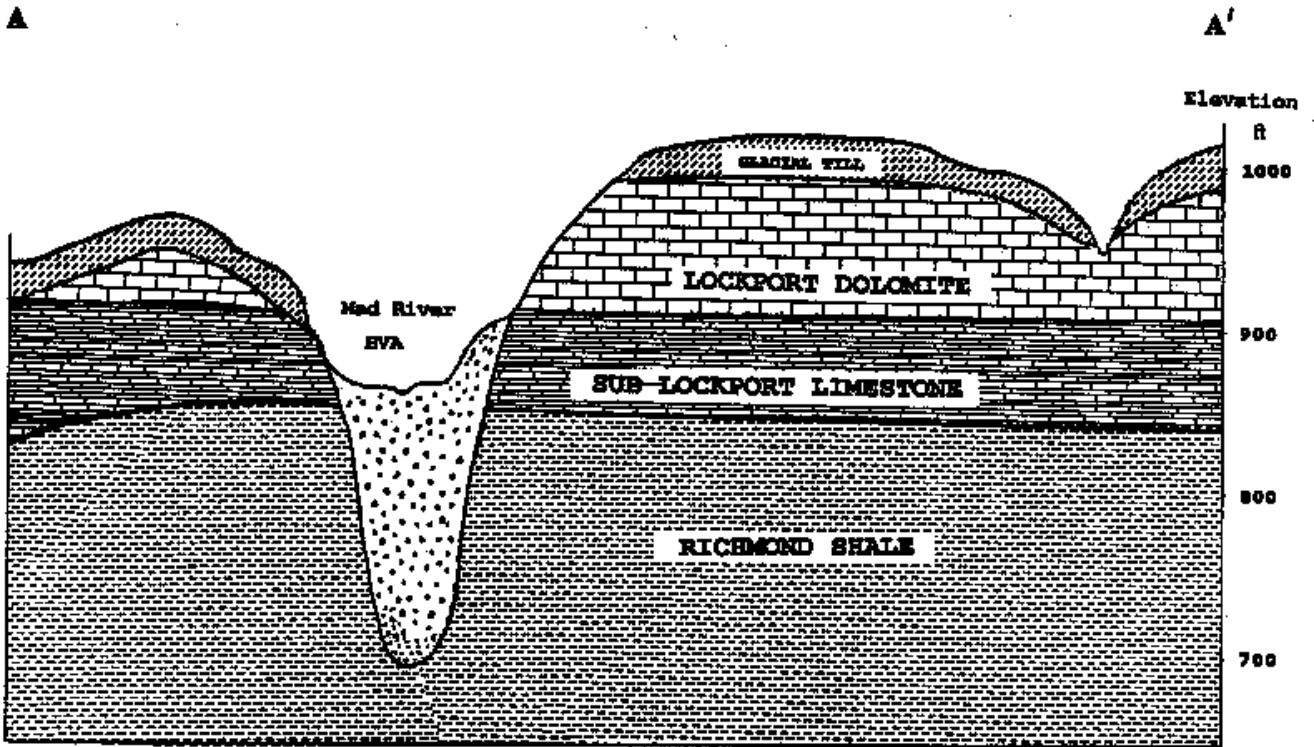


Figure 2. Generalized Geologic Cross-Section

The upper portions of the Lockport Dolomite can be highly weathered with solution channels present along the regularly spaced joints and fractures. The occurrence of interconnected joints and fractures can promote the rapid infiltration of surface water into the aquifer in areas where the bedrock is at shallow depths. Water wells that tap the fractured and weathered portions of the Lockport Dolomite aquifer can yield up to 30-50 gallons per minute (gpm), while the sub-Lockport Limestone aquifer may have significantly lower yields (i.e., 3 to 10 gpm). This is an important consideration when the Lockport Dolomite is con-

taminated and attempts are being made to establish an adequate water supply in the sub-Lockport aquifer.

Currently, water wells in the upland bedrock aquifers are drilled by either cable tool or rotary methods and are completed using a minimum of 25 feet of steel or PVC casing. The casing is set into the bedrock and the annular space grouted with bentonite or neat cement. The remainder of the bore hole is uncased, allowing water to enter the well from multiple depths. Most newer wells are drilled to a depth of 100-150 feet and may penetrate both aquifers. In contrast, older wells tend to be less than 50 feet deep

and were cased only a few feet into rock and were not grouted. The depth to water in the wells in the Lockport Dolomite ranges from 8-15 feet below ground surface compared to 90 feet or more in the wells installed in the sub-Lockport. In certain wells where the Lockport was not cased off and isolated by grouting, water can be heard running down the borehole, thus interconnecting both aquifers. In these cases, improperly abandoned wells or deep fully penetrating wells may be a source of contamination of the lower aquifer.

Table 1. Nitrate Contaminated Wells

Well ID	Nitrate (N) ppm.	Ammonia (N) ppm.	Geologic Formation	Well Depth ft.	Depth to Water ft.	Casing Length ft.
R-5	10.9	<0.05	Lockport	80	45	30
R-9	11.7	<0.05	Lockport	55	8	28
R-10	8.99	<0.05	Lockport/ sub-Lockport	108	42	28
R-2	5.85	0.99	Lockport/ sub-Lockport	135	85	28

Water Quality Study

Water samples were collected quarterly during 1997-98 by the Ohio EPA from 10 private and 11 public water wells. All wells selected for the study meet current well construction standards and were analyzed for total coliform bacteria, while 12 wells were analyzed for 19 inorganic constituents. In addition, the USEPA research laboratory in Cincinnati, Ohio, analyzed water samples from all the wells for *Escherichia coli*, heterotrophic plate count, *Enterococci*, *Clostridium perfringens*, aerobic spores, and protozoans. Four wells were selected for detailed Microscopic Particulate Analysis (MPA) by a private laboratory to determine if any microscopic organisms that are indicative of surface water contamination were present in the drinking water.

Detailed geologic maps, well drilling techniques, and construction methods were evaluated where the upper aquifer was contaminated. In two cases, replacement wells were drilled at R-2 and P-4 using rotary methods. The casings were advanced into the sub-Lockport and grouted in an attempt to get safe water from the lower aquifer.

Water Quality Results

Inorganic Water Quality

The bedrock aquifers are characterized by calcium-magnesium-bicarbonate ground water, which is excessively hard and may contain objectionable amounts of iron and manganese. The relative percentages of calcium and magnesium were higher in the Lockport Dolomite compared to the sub-Lockport Limestone. These differences are due to the greater degree of solution weathering of the upper bedrock aquifer. Ground water from sub-Lockport contained higher concentrations of sodium and chloride than the Lockport, which is believed to be a result of the upwelling of brackish water from Ordovician shales.

With the exception of nitrate, the inorganic water quality of the wells sampled met all primary drinking water standards. Wells R-5 and R-9 exceeded the Drinking Water Standard of 10 mg/l for nitrate while wells R-2 and R-10 were above 5 mg/l (See Table 1). Wells R-2 and R-10 penetrate both aquifers and may provide a pathway for nitrate contamination of the sub-Lockport aquifer.

Bacteriological Water Quality

Thirty-three percent of the shallow cased wells (i.e., 30 feet or less of casing)

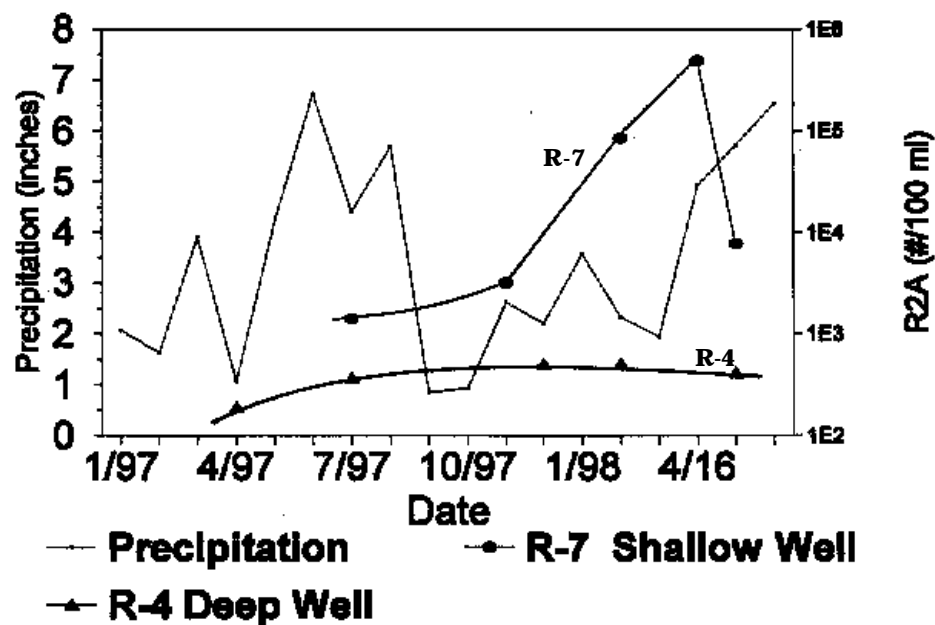


Figure 3. Precipitation vs R2A

and 30 percent of the deep wells experienced problems with the presence of total coliform bacteria. There appears to be a correlation between precipitation and bacterial contamination in some wells. When monthly precipitation exceeds 4-6 inches, some water wells test positive for total coliform. Two types of heterotrophic plate counts (PCA and R2A) were used to quantify the number of anaerobic bacteria in the water samples (Eaton et al., 1995). The populations of bacteria identified in the R2A plate increased considerably in most shallow wells and some deep wells over baseline conditions after heavy spring rains (see Figure 3).

The water from several wells in the area became slightly turbid after 4 inches of rain fell within several hours in April, 1998. Water analysis of the turbid sample from R-7 confirmed bacterial contamination of the water as total coliform increased from a few colonies to 3,500/100 ml. In addition, *E. coli* and *Enterococci* that were not previously detected in the well increased to 3,500/100 ml and 2,000/100 ml respectively. The R2A numbers increased from 1,400 to 490,000 organisms per 100 ml, and nitrate also increased from 2.9 to 5.47 mg/l in this well after the storm event. The source of the contamination appears to be direct infiltration of surface water from an intermittent stream which flows on top of the Lockport Dolomite approximately 75 feet from the well. This stream drains an agricultural area that has a row of homes along the roadway. A home owner expressed

concerns over the possibility of failing septic systems in the area upstream of the well as contributing to the contamination.

Wells P-2, P-4, R-4, and R-7 were selected for a Microscopic Particulate Analysis in order to determine if any microscopic organisms indicative of surface water contamination were present in the bedrock aquifer. The MPA test is an excellent way to define if a ground water system is under the direct influence of surface water and requires filtering a minimum of 1,000 gallons of untreated well water (Vasconcelos, 1992). The filters were analyzed using a microscope, while any observation of *Giardia* or *Cryptosporidium* parasites would result in a ranking of high risk. Based upon the MPA, P-4 (a deep cased sub-Lockport replacement well) and R-7 (a shallow cased sub-Lockport well) were classified as having a high risk of surface water contamination (see Table 2). The primary surface water indicators observed consisted of rotifers, green algae, and diatoms with chlorophyll. These were found in the range of 50 to 113 organisms per 100 gallons respectively. No *Giardia* or *Cryptosporidium* parasites were found in any of the wells tested. The MPA filters from wells P-4 and R-7 were stained brown due to heavy sediment in the raw water even though the water appeared only to be slightly turbid. Two other wells, P-2 (an intermediate cased Lockport well) and R-4 (a deep cased sub-Lockport well), were ranked as a low risk for surface water

Table 2. Bacteriological Water Quality

Well ID	Total Coliform	E. Coli #/100 ml.	F2A #/100 ml.	Nitrate (N) ppm.	Ammonia (N) ppm.	Well Depth ft.	Geologic Formation	Depth to Water ft.	Casing Length ft.	Depth to Rock ft.	MPA
R-7	Positive	<1-3,500	1,400-490,000	2.7	ND	110	sub-Lockport	45	22	4	High Risk
P-4	Positive	<1-6	800-5,400	3.09	ND	118	sub-Lockport	96	55	6	High Risk
P-2	Negative *	<1	60-3,400	ND	0.03	100	Lockport	11	40	15	Low Risk
R-4	Negative *	<1	160-510	ND	0.41	160	sub-Lockport	97	100	22	Low Risk
* Well periodically tested positive for total coliform											

contamination because no primary surface water microscopic organisms were found.

Conclusions

The hydrogeologic setting of an area, well casing length, depth of grouting and depth to water are very important factors which can influence the bacteriological quality of the water. Wells P-4 and R-7, which were classified at high risk of surface contamination, encountered bedrock at depths of 4 to 6 feet and were contaminated with bacteria. The well casings did not extend into the ground water, and nitrate was detected in the water sample. In contrast, wells P-2 and R-4 were ranked as low risk, encountered bedrock at depths of 18 to 22 feet, and were only periodically contaminated with coliform bacteria. In these wells, the well casing extends into the water table while nitrate was not detected. Sixty-six percent of the wells which tested positive for total coliform had the well casings terminated in the bedrock before the water table was encountered. When the casing is extended into the water table and grouted, the chances of obtaining a water sample free of coliform bacteria is increased.

Water wells that produce turbid water after significant precipitation events are under the direct influence of surface water and most likely are contaminated with high concentrations of bacteria. Water wells on the southeast side of the Mad River contained higher concentrations of nitrate compared to the remainder of the study area. To reduce the concentrations of nitrate in wells R-2 and R-10, the well casings should be extended into the sub-Lockport and grouted to seal off the contaminated Lockport. It is critical to properly seal all unused wells by grouting to minimize the potential for the entrance of surface water into the aquifer.

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Rich Bendula, CPG-09764, Bob Moore, RS, Ohio Environmental Protection Agency, Dayton, Ohio.

Reviewers: Robert A. Stewart, CPG-08332, and Scott A. Tiller, CPG-010016.


Acknowledgment: This project would not be possible without the assistance of the USEPA Research Personnel E.W. Rice and C. Johnson.

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The Third Annual AIPG Washington, DC Fly-In

**James D. Shotwell, CPG-08290, Chair, AIPG National Affairs Committee, and
Thomas G. Fails, CPG-03174, 1999 AIPG President**

The Third Annual American Institute of Professional Geologists (AIPG) Washington, DC Fly-In will be held April 25 through 27/28 in the Nation's capitol. As in the past, AIPG members from across the country will donate their time and travel to Washington, DC at their own expense to provide an advocacy role for the profession of geology. Advocacy of the profession is one of the major purposes of the Institute, and the DC Fly-In is an excellent venue for such an effort. Every AIPG member is invited to participate in the 1999 DC Fly-In, and each AIPG State Section is invited to send a representative.

The First Annual DC Fly-In, held in May 1997, boasted 21 participants, lasted 3 days and was instrumental in accomplishing the goals of supporting the USGS Water Resources Division (WRD) and Geologic Division, influencing the passage of the Reauthorization of the National Mapping Act, and meeting with leaders in federal agencies and national organizations that impact geologists on a daily basis. The Second Annual DC Fly-In, held in May 1998, had 14 participants, lasted 4 days, and focused on competition, energy issues, wetlands, and relations with other professional disciplines, for example, two separate professional engineering groups. This year's Annual Fly-In will be a more issues-oriented endeavor because the AIPG 1998 Executive Committee created four new Subcommittees and several official AIPG Policy Statements which directly impact the advocacy role that has become the primary focus of the National Affairs Committee.

The American Geological Institute (AGI), of which AIPG is a member organization, has again offered their hospitality and logistical support for the Fly-In participants. The AGI Government Affairs Program has been instrumental in providing AIPG with timely updates and analysis of congressional and federal agency initiatives. Centreville Travel of Wilmington, Delaware, again has donated their time and considerable expertise to locating relatively inexpensive, suitable accommodations in the DC area for the Fly-In participants.

As in the past two Annual Fly-Ins, we will convene on Sunday, April 25, at AGI headquarters for an orientation and strategy session. Participants will be briefed on the appointment schedule and the message to be delivered at each meeting with Senators, Congressmen, and the various leaders of federal agencies and private scientific organizations with whom we will be meeting. A lead speaker for each appointment is identified during the strategy session. There have been several participants in the previous DC Fly-Ins, generally from the greater Washington, DC area, who join the Fly-In for less than the full schedule. The 1999 DC Fly-In is scheduled to last three days, but participants are welcome to attend less than the full program.

During 1998, four new Committees or Subcommittees were created by the AIPG Executive Committee: the Subcommittee

on Professional Practice, the Subcommittee on Competition Between Government and the Private Sector, the Subcommittee on National Energy Issues, and the Committee for Peer Review. These Committees/Subcommittees are all under the umbrella of the National Affairs Committee, and will concern themselves with the following issues which are the basis of the 1999 DC Fly-In:

- The Subcommittee on Competition Between Government and the Private Sector has been very active in calling attention to instances of competition between federal governmental agencies and private sector professional geologists. The Subcommittee has communicated directly with the USGS - WRD and the USGS - Geologic Division about perceived conflicts in Arizona, has participated in the National Research Council's Committee on Future Roles, Challenges and Opportunities for the US Geological Survey, and has served on the Department of Interior's Advisory Committee for Water Information's Task Force for the Review of the Federal-State Cooperative Water Program. AIPG involvement in each of these programs has provided a platform from which we have been able to elevate the dialog among these organizations to a level at which constructive criticism is exchanged and policies for avoiding conflict in the future are being formulated. Because of AIPG's involvement with the leadership of the USGS, we were asked to comment on the USGS Water Resources Division Strategic Direction for the Water Resources Division, 1998 - 2008. The comments were gathered from various AIPG reviewers and presented in a letter written by 1998 President Stephen M. Testa.
- The Subcommittee on National Energy Issues has been charged with tracking the Department of Energy's (DOE) implementation of the Kyoto Agreement, access to federal lands for energy minerals exploration, and the progress of the National Geologic Data Repository. The issues of Global Climate Change and the Kyoto Agreement are areas the Subcommittee has identified as key issues that may impact professional geologists in the near- to medium-term future. In addition, the Subcommittee will be concerned with the implementation of the DOE's Comprehensive National Energy Strategy, especially as it may impact professional geologists. AIPG is working on a Global Climate Change Policy, and the Fly-In participants will visit the leadership of the DOE to communicate our views.
- The Subcommittee for Professional Practice is establishing a dialog with the American Society for Civil Engineering (ASCE) and with the National Society for Professional Engineers (NSPE) so that areas of professional practice can be identified and discussed. In addition, issues such as

the attempted exclusion of professional geologists from underground storage tank projects in Oklahoma and the recent Proposition 229 in California will be discussed during visits with ASCE and NSPE during the 1999 DC Fly-In.

- We will schedule a meeting with the National Science Foundation (NSF) to discuss the provision of AIPG reviewers for NSF grant proposals in geoscience research. The Peer Review Committee is in the process of organization. A Chair has been appointed, and a call for volunteers was published in the February issue of *The Professional Geologist*.

Related issues that will be important in the 1999 DC Fly-In are:

- The creation of an official AIPG Wetlands Policy and the management of wetlands by the US Army Corps of Engineers and the US Geological Survey, specifically the USGS WRD and the Biological Resources Division. AIPG will stress the importance of the input of qualified geoscientists in the management of wetlands resources and in the creation of new wetlands for pollution remediation purposes. The current draft of an AIPG Policy on Wetlands has received considerable comment. At their January 23, 1999 meeting, the Executive Committee instructed the Task Force for a Wetlands Policy to take these comments into account in further deliberations on drafting the Policy.
- Various geoscience budgets within the federal government have become increasingly important over the last several

years. The 1999 DC Fly-In will attempt to visit with the Office of Management and Budget to present our views on budgetary erosion of key programs and agencies within the Department of the Interior and at the NSF.

- We will seek to meet with representatives of the Federal Emergency Management Agency (FEMA) to determine whether AIPG could play a role in prediction and avoidance of certain geologic hazards, many of which were identified in the AIPG publication "The Citizen's Guide to Geologic Hazards," before they become true emergencies.

As in the past, a brochure which states the various AIPG purposes and policies that are pertinent to the advocacy of the profession of geology will be delivered during each appointment. Any comments or suggestions for additional issues which we may address during the 1999 DC Fly-In are welcome: a simple e-mail, letter, or phone call to AIPG Headquarters is all that is needed. Participation by additional members is sought and encouraged, and will be welcome.

While the Annual DC Fly-Ins are an excellent arena for advocating the profession of geology to national legislators and regulators, other means of providing advocacy include visiting State and local governmental officials, delivering speeches to service organizations such as the Rotary and Kiwanis Clubs, and becoming involved in setting a sound earth science curriculum in local or state elementary and secondary schools. Sponsoring merit badge training sessions for the Boy Scouts and Girl Scouts is also a very enjoyable means of providing advocacy. Every AIPG member is encouraged to become more active in advocating the geosciences to the public.

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.

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Appraisal of Construction Rocks - 2nd Edition, Published by AIPG

The American Institute of Professional Geologists (AIPG) announces publication of *Appraisal of Construction Rocks - 2nd Edition*. This guide is designed to set out principles and some techniques used in appraising construction rocks, viz., crushed rock, sand and gravel, and fill material. Reasons for appraisal include: for government, eminent domain (condemnation), taxation, disposal of land assets, planning, and mineral conservation.

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Section Visits by Executive Committee Members and Executive Director

Several Sections have enquired about the possibilities of visits by Executive Committee members and/or the new Executive Director during 1999. At the time of writing (first week of February), AIPG's financial situation is unknown as dues payments are still coming in. So a degree of caution is necessary on this subject at present. Many Executive Committee members, especially Presidents and Presidents-Elect, have self-financed Section visits in the past and are expected to continue to do so in the future. Some Sections, however, prefer to part or fully fund Executive Committee Member visits. Executive Director visits are usually paid for by the Institute or by the Section/Sections visited, at least in part. But Section financial support of Executive Director visits should never be an absolute requirement but rather a reflection of a Section's sound financial condition.

Given AIPG's present financial uncertainty and the varying abilities of Executive Committee members to absorb the costs in time and dollars necessary for a Section visit, the Institute's plans for the majority of Section visits during the remainder of 1999 will be scheduled around three meetings which some or all Executive Committee members plus the Executive Director are expected to attend:

April 24 - April Executive Committee meeting in Washington, DC in connection with the April 25-27/28s AIPG Fly-In. Opportunities for visits to Sections near Washington exist, especially Capitol, Northeast, Pennsylvania and Virginia. Additional opportunities for visits to Midwestern and South-Central Sections exist for President Tom Fails (CO) and Treasurer Kel Buchanan (NV) who might be able to

make a post-Fly-In visit on the way home, 28 or 29 April. Dawn Garcia (AZ), Advisory Board Representative, is already booked for a visit to Florida Section. Vice President Font will not be available. In order to facilitate purchase of inexpensive airline tickets, indications of interest by Sections should be forwarded to Headquarters immediately.

July 26/27 (tentative) - National Convention of State Legislators in Indianapolis. President Tom Fails and new Executive Director Bill Siok will definitely attend, and possibly be joined by Executive Committee members from adjacent states. This offers opportunities for visits to Midwestern and Border State Sections by Fails, Siok and possibly others. It is not too early for Sections to indicate to Headquarters their interest in scheduling a visit for the day following the NCSL.

October 4-8 - AIPG Annual Meeting near Anchorage. All Executive Committee members and the new Executive Director are expected to attend. The opportunity to schedule a number of visits during return flights after the Annual Meeting exists - Western Sections by President Fails, Treasurer Buchanan, Advisory Board member Garcia and Executive Director Siok, and for Sections farther east, northeast and southeast by others. Again, to facilitate planning, Sections should indicate their interest to Headquarters.

In addition to these three scheduled events, President Fails and Executive Director Siok might be available for a small number of additional Section visits.

Petroleum Issues and Answers **published by AIPG**

The American Institute of Professional Geologists (AIPG) announces publication of *Petroleum Issues and Answers*, a 36-page book with colorful illustrations throughout. This book addresses the issues and points the way to possible answers to questions such as: Is there enough oil to maintain our current lifestyle? Will there be oil available in the decades ahead? Will its price be affordable for us to both drive and keep warm in all parts of the country? Who should be blamed for the problem of supply and price? Why do we not just produce more oil in the U.S. and ignore the rest of the world? Is our national security in jeopardy because of the declining domestic production and increasing imports? What is the long-range environmental impact of any position we take? Should we save our oil for the future, or use it all now? In order to explore answers to these questions, this publication puts into perspective the nature and importance of petroleum, the geographical distribution of its reserves, the history of the industry, and an overview of petroleum exploration, production, and transportation.

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Supervision defined by North Carolina Board for Geology Work

The North Carolina Board has had several occasions in the past and at present to make use of a definition of the term "supervisory control" or "direct supervision." The subject arises when considering cases where an individual charged with oversight of a geology project leaves some doubt as to actual direct supervision or supervisory control.

At the May, 1998, meeting the subject was discussed with representatives from the North Carolina Department of Environment and Natural Resources. A flow chart of handling complaints about licensed geologists' work and a definition resulted from the meeting. They were presented and discussed at the August meeting.

After some discussion, the Board arrived at the following policy concerning supervision.

"Sufficient personal on site involvement and continual direction and review of the activities of subordinates that constitute public practice of geology while such activities are in progress.

"The licensee is expected to provide such supervision and have sufficient personal knowledge of the project and site conditions necessary to assure accuracy and compliance with all applicable laws and regulations including NCGS 89E and the rules promulgated thereunder."

The policy already has been put to use in writing a consent agreement with one licensed geologist who was the subject of a complaint and investigation.

North Carolina Board for Licensing of Geologists Newsletter,
January 1999

AGI GOVERNMENT AFFAIRS PROGRAM MONTHLY UPDATE

Monthly update prepared by Kasey Shewey White and David Applegate

- AGU Releases Climate Change Statement
- Hutchison Introduces Oil Industry Relief Bill
- Plans Introduced to Redirect OCS Funds
- Research Doubling Efforts Begin Again
- BLM Accepting Comments on Grand Staircase Management Plan
- USGS Streamgaging Report to Congress
- Nuclear Waste Legislation Given High Priority
- Gee Named To Head DOE Fossil Energy

AGU Releases Climate Change Statement

The American Geophysical Union (AGU) held a press conference on January 28th at the National Press Club to release its position statement on climate change. While acknowledging that uncertainties still exist in understanding climate change, the statement concludes that “the present level of scientific understanding does not justify inaction in the mitigation of human-induced climate change and/or the adaptation to it.” The statement calls for an increase in research along with development of strategies to reduce emissions, sequester greenhouse gases, and prepare society to cope with the impacts of climate change.

The statement has received wide press coverage in the press with stories in the New York Times, Washington Times, Detroit Free Press, and others. Reaction to the statement has been mixed. In a news release, Vice President Gore cited the AGU statement as further reinforcement that “the risks of climate change are serious, the costs of potential impacts are large, and the time to act to protect our national interests is now.” The statement has generated criticism from some advocacy groups on both sides of the global warming debate either for going too far or not far enough. The Competitive Enterprise Institute, a group promoting free enterprise and limited government, issued a press release stating that “AGU has betrayed science and embraced politics.”

The AGU statement was developed by a panel chaired by Dr. Tamara Ledley, senior scientist at TERC in Cambridge, MA. It was approved unanimously by the AGU Council at its December 1998 meeting in San Francisco. The full statement is available on the web at:

http://www.agu.org/sci_soc/policy/climate_change.html
Several of AGI's member societies are currently developing policy statements on the issue of climate change. A statement approved by the AGI Executive Committee will be distributed to the member societies next week for their endorsement.

Hutchison Introduces Oil Industry Relief Bill

Also on January 28th, Sen. Kay Bailey Hutchison (R-TX) introduced S. 325, the U.S. Energy Economic Growth Act, to encourage domestic production of oil and gas. The bipartisan bill has 18 original co-sponsors, many of whom attended a Senate Energy and Natural Resources Committee hearing that day on the state of the domestic industry. The legislation provides tax

credits for marginal wells—those that produce 15 barrels a day or less. These wells are the most vulnerable to being shut down, yet collectively produce 20 percent of the nation's oil, the same amount currently imported from Saudi Arabia. The tax credits would be phased out as prices increased. The legislation also would provide a tax exemption for the costs of restarting inactive wells, based on the success of a similar state program in Texas. Other incentives include the expensing of geological and geophysical costs associated with domestic exploration. At the hearing, Hutchison reported that the oil and gas rig count hit an all-time low this week of 588 rigs nationwide, down from nearly 5,000 rigs operating in 1981. In constant dollars, crude oil prices are at their lowest point since World War II, with prices as low as \$6 per barrel being reported. Thousands have lost their jobs in recent weeks, and additional layoffs are expected. At the hearing, Energy Information Administration director Jay Hakes stated that prices were not expected to rise until the end of this year at the earliest.

Plans Introduced to Redirect OCS Funds

One of the first bills introduced in the Senate during the 106th Congress was S. 25, the Reinvestment and Environmental Restoration Act of 1999, by Senator Mary Landrieu (D-LA). The bill was introduced with nine cosponsors, including Senate Energy and Natural Resources Committee Chair Frank Murkowski (R-AK) and Majority Leader Trent Lott (R-MS). The bill would redirect half of the Outer Continental Shelf (OCS) oil and gas revenues from the federal treasury to states and conservation programs. Coastal states would share 27 percent of the royalties for OCS impact assistance. The remainder of the royalties would be divided among all states: 16 percent would go to the Land and Water Conservation Fund and 7 percent would go to state fish and wildlife conservation programs. The Senate Energy and Natural Resources Committee held a hearing on the bill on January 27th, at which witnesses from Alabama, Louisiana, Mississippi, and Alaska testified in support of the bill. The Clinton Administration has proposed a similar, but larger, program—the Lands Legacy Initiative, which increases funding for the Land and Water Conservation Fund to purchase land and provide grants to states for conservation projects.

Research Doubling Efforts Begin Again

Last year, efforts to increase funding for research and development ended on a high note as the Senate passed S. 2217, a bill to authorize a doubling of federal, non-defense R&D over 12 years. Taking advantage of the momentum the bill gained, Senator Bill Frist (R-TN) joined with 19 bipartisan cosponsors to introduce the bill in the 106th Congress as S. 296, the Federal Research Investment Act. Among the 14 agencies included in the bill are NSF, NASA, NOAA, EPA, and the Departments of the Interior, Transportation, Energy, Agriculture, and Education. A companion bill is expected to be introduced in the House in the near future.

BLM Accepting Comments on Grand Staircase Management Plan

President Clinton created the Grand Staircase-Escalante National Monument in Utah over two years ago, setting aside the lands as "exemplary opportunities for geologists, paleontologists, archeologists, historians, and biologists." The monument is managed by the Bureau of Land Management, which was charged by the original presidential proclamation to develop a management plan within three years. BLM is currently accepting comments on a draft plan that includes several alternatives. Given the monument's creation for scientific purposes, a number of geoscientists have raised concerns over restrictions on access for research and education. The draft plan is available on the web at <http://www.ut.blm.gov/monument>. Comments will be accepted by BLM until March 12, 1999.

USGS Streamgaging Report to Congress

The US Geological Survey's Water Resources Division has released a congressionally mandated report evaluating the Survey's streamgaging network. The report was requested by the House Appropriations Subcommittee on Interior and Related Agencies, noting "the steady decline in the number of streamgaging stations in the past decade, while the need for stream flow data for flood forecasting and long-term water management uses continues to grow." The streamgaging network is funded by a range of state, local, and federal partners with only one-third of funding from the USGS itself. The report concludes that the diverse funding sources, while an overall strength of the program, have focused on specific needs at individual stations while static funding has limited the Survey's ability to fill gaps in streamgaging information that serves national needs. The report is available on the web at <http://water.usgs.gov/streamgaging>. Last year, the Association of American State Geologists issued a position statement urging the USGS to make streamgaging a national priority and encouraging support from other federal agency users as well. They called on the federal government to fully fund a baseline national network of streamgaging stations.

Interim Nuclear Waste Storage Site a High Priority

In the opening day of the 106th Congress, Rep. Fred Upton (R-MI) introduced H.R. 45, a bill to amend the Nuclear Waste Policy Act of 1982. The bill, which was introduced with 47 cosponsors, is similar to H.R. 1270, which passed the House during the 105th Congress by a 307-120 margin. The legislation would locate an interim high-level nuclear waste storage facility adjacent to the proposed site for a permanent repository at Yucca Mountain in Nevada. As in past years, the main challenge for

the bill will be to achieve a veto-proof majority in the Senate to override the threatened Presidential veto. Senate Energy and Natural Resources Chair Frank Murkowski (R-AK) is said to be seeking a compromise on a nuclear waste bill with the panel's new ranking member, Sen. Jeff Bingaman (D-NM), to gain these votes. Committee Staff Director Andrew Lundquist said: "Nuclear waste will be our number one priority and we will introduce legislation fairly soon."

Robert Gee Named DOE Assistant Secretary for Fossil Energy

On January 29th, President Clinton announced his intention to nominate Robert W. Gee as Assistant Secretary for Fossil Energy at the Department of Energy. Gee, of Austin, Texas, currently is the DOE Assistant Secretary for Policy and International Affairs. He replaces Principal Deputy Assistant Secretary Robert S. Kripowicz, who has been serving in an acting capacity since August 1998. The Assistant Secretary manages the Federal Energy Technology Center, Clean Coal Technology Program, the Strategic Petroleum Reserve, and the Naval Petroleum and Oil Shale Reserve.

Tentative Schedule of Upcoming GAP Activities

The next meeting of the AGI Government Affairs Advisory Committee is scheduled for Friday, April 23, 1999 at AGI headquarters in Alexandria VA.

- Feb. 7-8, AAPG Day, Tulsa, OK
- Feb. 11, PPP 2000 Summit, Washington, DC
- March 29-30, GSA Geology & Public Policy Committee, Washington, DC
- April 21-22, Congressional Visits Day, Washington, DC
- April 23, GAP Advisory Committee meeting, Alexandria, VA

New Material on Web Site

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

- Congressional Efforts to Double Science Funding Update (1-25-99)
- Outer Continental Shelf Royalties Update (1-25-99)
- High-Level Nuclear Waste Update (1-20-99)
- Future Issues in Oil and Natural Gas (1-19-99)
- Geotimes Political Scene: A Fellow on the Hill (by AGI Congressional Science Fellow David Wunsch; 1/99)
- Geotimes News Note: Researchers Look Ahead (1/99)

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.

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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

Is the Truth an Absolute?

Fred L. Fox, CPG-1273, in his remarks contained in January's column 38 under "Are Ethics Being or Doing?," asserted that truth is an absolute, "like the laws of thermodynamics and gravity—that we can count on totally." I don't share Fox's perception of certainty. For example, consider coal. We all learned in mineralogy that a mineral is inorganic, among other things. Thus a statement that coal is not a mineral is true. Nevertheless, if one wishes to mine coal, one better have the mineral rights to do so. Legally, coal is a mineral. So we have two true statements, one stating that coal is a mineral, and another stating that coal is not a mineral. The difference is whether one is viewing coal mineralogically or legally. And the difference in viewpoint is very much a non-trivial distinction in considering whether either or both statements about coal are true or false. The coal example is easily comprehended. However, other differences in truth related to viewpoint may not be so obvious and may be the crux of some dispute.

For example, in column 32 (July '98) I referred to a case in which a geologist and client came to what they thought was a verbal mutual agreement regarding the geologist's scope of work. The geologist truly believed that the job required doing just enough work to meet minimal regulatory requirements and that keeping expenses to a minimum was a prime consideration for the client. The client truly believed that the geologist had nevertheless committed to complete a far more comprehensive and expensive evaluation. I state that each party "truly believed" his viewpoint because that is what each testified to in court. In deciding the dispute, how was the judge to determine the truth? The practical means of avoiding such difficulties is a well-written scope of work to which both sides agree. But where such clear, written agreements are lacking and a dispute arises, someone must make a decision that the losing side will perceive as having failed to recognize the truth. An all-knowing being would be in a better position to determine the absolute truth of this situation, but since we humans lack that knowledge, we cannot know the "absolute" truth in every case.

In making the foregoing argument, I don't mean to imply that all truth is relative. But our individual perceptions of the truth can differ. And such differing perceptions of the truth can lead to differing conclusions regarding how one should truthfully and ethically act in a particular situation. This being so, it behooves us to take the common views of an action into account in determining whether an action is ethical. This is not to say that the majority view is necessarily ethically correct. But substantial variance with the majority view does provide a warning flag that we should very carefully examine our differing views.

Fox provided an interesting example, the case where one lies to a knife-wielding thug asking about the whereabouts of the intended victim. Fox views the lie as unethical because it is untruthful. While Fox is logically correct in his analysis given

his view of the importance of truth, I doubt many of us would condemn the liar in this case. In column 37, I reviewed Stephen L. Carter's book, *Integrity*. Carter examines similar issues in his consideration of integrity and honesty in the cases of those who hid Jews from the Nazis or who helped runaway slaves escape through the underground railroad. Carter argues that these are examples of situations in which at least some lying is required of people of integrity and ethics. But Carter believes that such cases are few and far between, and must be very carefully weighed prior to embarking on them. I agree with Carter and believe that most of us agree as well.

Censorship in Scientific Journals (column 38, Jan '99)

Lee C. Gerhard, CPG-3461, commented, "Censorship by editors is not uncommon, as science publication has always been subject to editorial selection. Although the proposal was to consciously censor topics, we must understand that there is censorship in favor of the 'ruling paradigm.' Ruling paradigms or ruling theories, whichever term is preferred, imply that any departure from that theory is heresy, and is not worthy of publication. My own experience in both writing and reviewing papers and books is that this is a real phenomenon. In one case a reviewer and the editor argued that the paper was publishable if my co-author and I would change our interpretation to fit that of the distinguished reviewer. We declined.

"In another, I reviewed a book that was highly speculative, advanced a theory I could not adopt, but one that forced me to review my own tectonic theory and make substantial arguments in its defense. I find those useful intellectual exercises that remind me that I am not the only scientist privy to nature's secrets.

"It is on the nature of science and academia that change is anathema and must be undertaken with great caution. Perhaps that is correct, but new ideas are difficult to advance, particularly if the author does not already have great standing. Think about how difficult and long a process it was to get Larry Sloss's stratigraphic sequence ideas into the mainstream (about 1946 to 1970).

"A reference that some may be interested in reading is: Richard T. DeGeorge and Fred Woodward, 1994, Ethics and manuscript reviewing: *Journal of Scholarly Publishing*, v. 25, n. 3, 133-145.

"That may be the definitive word."

Gerhard also sent along the following item from the Science & Environmental Policy Project Newsletter, which illustrates aspects of both censorship and junk science.¹

"The Week That Was: February 1-7, 1999—An e-mail update from The Science & Environmental Policy Project

1. In referring to junk science, I am not advocating one position or the other on the global warming debate. I am calling attention to the failure to meet criticism with thoughtful rebuttal. I recall the plate tectonics debates of the late 1960s and early 1970s when the Meyerhoff brothers were perhaps the most prominent and prolific opponents of plate tectonics. The Meyerhoffs' views forced proponents to look at the holes in their ideas and improve and revise the plate tectonic theory. The result was better science. Ignoring and belittling another's views because they are different or opposed is the easy, junk science way out.

"SEPP President S. Fred Singer, out in Palo Alto, California, this month as Visiting Fellow at the Hoover Institution at Stanford University, is making the West Coast global warmers a tad nervous apparently. When Stanford announced that Singer would be giving a seminar lecture to faculty and students on his favorite topic February 10, 'alerts' were shotgunned onto the Internet faster than the Greens glom onto an EPA grant.

"Stanford Professor Stephen Schneider personally warned some 80 members of the Stanford faculty via e-mail that Singer was, after all, the 'controversial dean of the climate contrarians, a small minority of largely elliptical critics of mainstream science and scientists.' He then reminded faculty members that a pro-warming speaker was scheduled for the same time slot, and that if they had 'serious interests in sound scientific study of climate change and its potential impacts' they'd join him there.

"Keep cool, my friend," said Singer, who found all the fuss extremely amusing. In Singer's e-mail reply, copied to Schneider's list of faculty, he thanked him for his 'ringing endorsement' and suggested that a 'good debate'—The Elliptical Critics vs. The Hyperbolics—might be 'instructive.'"

The Professional Ethical Obligations of an Organization

The ethical topics discussed in this column so far have focused on the ethical responsibilities of individuals. Most of us work for organizations of one sort or another, companies, government agencies, and schools. Organizations act through their agents (employees, members, subcontractors, etc.), and thus many of our actions are made on behalf of an organization. How then do our acts on behalf of an organization affect the organization's professional ethics as well as our own? How does an organization of which we are a part demonstrate the "competence, integrity, and ethics" we individually subscribe to as AIPG members?

For example, last month's column contained a summary of the Disciplinary Proceedings conducted by AIPG for the past ten years.² Although I wrote the summary, I did so in my capacity as Chairman of the Ethics Committee, and the summary was reviewed by the Ethics Committee, the Executive Committee, and AIPG's counsel prior to its publication. The summary is therefore an organizational statement. The summary serves two purposes. First, it demonstrates to both AIPG members and the public that AIPG is willing to enforce its Ethics Code, and, second, it illustrates the variety of actions which have been brought, and their results.

Should it happen that the summary of Disciplinary Proceedings be challenged by someone, both I and AIPG will be held responsible. In addition, the challenger might assert that the President, and perhaps other members of the Executive Committee, are responsible as well. For example, assume that one of the parties in the 1997 matter decides to challenge AIPG's action in that matter. Which AIPG President should be held responsible: this year's president, Tom Fails, or the 1997 president, Jon Price, or both? I'm not a lawyer and have no idea what the legal answer to the question is; however, I can argue that Price's responsibility stems from the fact that he was President when the matter was decided and Fails' responsibility stems from the fact that he was President when the summary was published. The point of this example is that there is no way for any agent of AIPG, whether it's the President, or me as Ethics Chairman, or anyone else, to be fully knowledgeable about what every other agent of AIPG is doing at all times. We have to trust

each other. When a matter comes to our attention, then our responsibility for doing something increases.

Some examples will help illuminate some of the issues. Suppose that you are asked to write a transmittal letter for a report prepared by someone else in the organization. Does that make you responsible for the contents of the report, or at least impose an obligation that you review the report? Does it make a difference if your name appears on the signature line rather than the organization's? Does the situation change if at least one of the reasons you were asked to write the letter is because you can put a seal on your name? Does it make a difference if the person(s) responsible for the report are clearly identified in the report, along with appropriate qualifications and seals?

The previous example clearly addresses the issue of reliance on colleagues' work. Mineral reserve reports commonly include discussions of geology, extraction methodology, processing methodology, economic analysis, legal opinions on various issues, and environmental impact and mitigation analyses. No one is fully qualified in all these areas, although the project manager should be familiar with the general subject areas. My paper "What is a Competent or Qualified Person and Who Cares?" in the January 1999 *TPG* addressed aspects of this issue.

How is responsibility to be assigned? Assume that an AIPG member is the project manager having overall responsibility for a report. Further assume that the member read the entire report and found nothing amiss prior to signing the report. It later turns out that not only was one of the extraction or processing methodologies used in the analysis in error, but that the error resulted from well-concealed but clearly incompetent work. The project manager member has accepted responsibility for the whole report thus potentially triggering a variety of legal sanctions. What are the ethical implications and possible sanctions under the AIPG Code of Ethics? Note that the Preamble concludes, "A Member shall not be relieved of an ethical responsibility by virtue of his or her employment, because the Member has delegated an assignment to a subordinate, or because the Member was not involved in performing services for compensation." Your examples and ideas are welcomed.

The Scope of Professional Ethics

"The Code of Ethics obligates AIPG members to the highest standards of personal and professional conduct (Canon 1: General Obligations). However, in practice most of us tend to think in terms of professionally related behavior" (column 1 Nov. '95). What are the limits of professional conduct and ethics? Column 1 used the example of a member accused of sexual assault to initiate a lively debate on the subject. Various aspects of the scope of professional ethics have been topics in this column since then (*Geological Ethics and Professional Practices 1987-1997*, p. 58-68).

Three topics related to the scope of professional ethics in general and ethics codes in particular recently came to my attention. First, I received a request for ideas on the definition of "professional" from President Tom Fails. Second, I looked up the American Statistical Association's Code of Ethics and found some interesting issues related to the ethical treatment of colleagues and employees. And third, a recent newspaper article concerning the revocation of professional licenses in Colorado for failure to pay child support. I'll examine the last two topics in the next two sections of this column. Tom Fails will speak for himself.

2. The summary of disciplinary proceedings is available on AIPG's web site under "The Institute" and then "Ethics" topics.

The Scope of Professional Ethics: The Ethical Treatment of Students and Employees

Column 38 (Jan '99) contained the *AGI Guidelines for Ethical Professional Conduct*. Those guidelines contain provisions stating that employees and students should be treated with respect. The AIPG Code of Ethics contains no explicit provisions regarding employees or students and I urged consideration of adding appropriate statements. In column 32 (July '98), I reviewed the American Statistical Association's (ASA) draft code for the professional use of statistics. I recently visited the ASA web site (www.amstat.org) to look at the most recent draft (IV, 12/22/98) and at the discussions of various drafts. The ASA ethics guidelines have evolved from focusing on statistical practices to include professional practices such as the ethical treatment of colleagues and employees. Part of Section F, "Responsibilities to Other Statisticians or Statistical Practitioners" states:

"3. Assess methods, not individuals.

"4. Respect differences of opinion.

"5. Make decisions regarding statistical practitioner's hiring, firing, promotion, work assignments, publications and presentations, candidacy for offices and awards, funding or approval of research, and other professional matters on the basis of the professional qualification and contributions of the individual. Avoid harassment or of discrimination against statistical practitioners on professionally irrelevant bases such as: *race, color, ethnicity, sex, sexual orientation, national origin, age, religion, nationality, or any disability*" (italics in original).

The final sentence of #5 prompted an opposing comment from an individual who is religiously opposed to homosexuality. While I do not want to debate the specifics of homosexuality or other forms of discrimination, I would like a debate on the scope of professional ethics, and in particular whether AIPG or any other professional association should be involved in discrimination actions or actions such as the child support issue discussed below. If AIPG were to adopt provisions similar to the ASA items above, with the exception of the final sentence of #5, what would AIPG's disciplinary obligations be? Would adoption of provisions similar to the three above without the last sentence of #5 imply the omitted sentence? If we agree that the Code of Ethics properly calls for treating others with respect (see Canon 4, Standards 4.1 and 4.2, and Rule 4.2.1; see column 34, Sept '98, or the Ethics Code on AIPG's web site for Standard 4.2), what disciplinary obligations does AIPG have regarding members who are found to have improperly discriminated? Please contribute your thoughts.

The Scope of Professional Ethics: Loss of Professional License for Non-Payment of Child Support

A recent Sunday paper contained a lengthy article on Colorado's practice of suspending the license to practice from professionals such as accountants, attorneys, engineers, and others who are delinquent in their court-ordered child support payments. Colorado geologists are not affected because Colorado does not license geologists. The court's order requiring payment and proof of non-payment are sufficient grounds to trigger license suspension. The merits of or ability to pay the child support are not debatable, those are matters for the court entering the order. Suspension is averted only by payment, entering into

an agreed upon payment plan, or modification of the court order to make payment. Colorado professional license renewal forms have a check-off statement regarding whether the licensee is current in such obligations, and a signature is required. Failure to honestly check the appropriate box is viewed as a dishonest statement warranting suspension on its own grounds. AIPG has a similar check-off box regarding disciplinary actions by other professional bodies on its membership renewal form and similar consequences for failure to honestly respond.

Should AIPG become involved in issues like this? The argument for doing so can be based on our obligation to "the highest standards of personal integrity and professional conduct" and on a broad view of the scope of our obligation to "uphold the public health, safety, and welfare." However, as stated in the Preamble to the Code of Ethics, "The Code of Ethics applies to all professional activities of Members and Adjuncts, wherever and whenever they occur." Does non-payment of child support fall within the scope of "professional activities"? As with the preceding section's questions on the scope of professional ethics and discrimination issues, there may be situations in which the answer is "yes," others where the answer is "no," and an unclear middle ground. Please contribute your ideas and examples illustrative of critical issues.

Geology and the Law: Geology Flows Downhill

Raymond E. Bisque's, CPG-1595, article, "Water Flows Downhill" in the February *TPG*, responded to my request for further discussion of geology and the law by presenting a hypothetical portion of a transcript in which a lawyer cross-examines a geologist. Bisque's hypothetical geologist is made to look confused and ridiculous by skillful questioning. Part of being an expert witness is possession of expertise in being a witness, in being familiar with how examination and cross-examination are conducted, how evidence is properly admitted, and other aspects of operating within the legal system. Truth is not different in court than outside it. There is a difference in the method used to arrive at the truth, the adversarial legal system. If you do not understand your role as an expert witness in that system, you may, like Bisque's fictional geologist, be made to look confused and foolish.

Bisque's geologist gets into trouble by getting lost in the point of whether an aqueduct is built on an uphill or downhill slope. The geologist needs to remember the important fact that water flows downhill and to repeat the fact in his testimony. The geologist could answer the questions with something like, "It doesn't matter whether the aqueduct is built uphill or downhill, the water runs downhill." An alternative response to the lawyer's third question could be, "You may make the contradictory statement but that does not result in changing the fact that water flows downhill." Making such points, and reiterating them if necessary, will prevent the subsequent confusion. Knowing to when and how to make such points is part of being an expert witness.

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.

AFTER THE RAPTURE OR AIPG'S ROLE AFTER REGISTRATION

"They fought retail, and were slaughtered wholesale. If they had been inseparable, they would have been insuperable."
- Attributed to Tacitus, writing of the Gauls' inability to maintain unity.

William V. Knight, CPG-00153

Some geologists seem to view state registration as nearly equivalent to heaven on earth. So, when a registration law is adopted in a state, they regard the act's passage as akin to the biblical rapture.

Now they are "home free," they think. Their professional status is forever assured, they think.

These are symptoms of the malaise which typically sets in when geologists believe that what they think about state registration is actually true. It was a tough battle and they won. There is a tendency, an inclination, to relax and enjoy the fruits of that victory.

Then, after a while, some begin to notice that things are not as rosy and the fruits are not as sweet as they had expected.

The counterattacks commence. Attempts are made to modify and weaken the law, by actions in the legislature, the regulatory agencies, and the courts. "Sunset" legislation is introduced. Other disciplines seek to restrict the law's application or to dilute it. They may seek exemptions for their members. They may seek to expand the law by adding provisions to include their members. They may contend that some of their college courses are really geology courses by another name. They may seek to establish separate registration acts for their members, carving out or overlapping portions of the geologic definitions and practices.

These counterattacks usually take time to get under way. They often are not recognized until after the aforementioned malaise is well established. Most of the geologists have gone back to whatever it was they were doing before they organized themselves to get their own act passed. Their organization is in serious disarray or has completely disappeared. Thus, they are not aware of these counterattacks until they have gained some momentum, and they are not prepared to meet them. Some members of the state board are probably among the first to recognize the threat, but the malaise has left their professional support group weak and poorly organized.

Other things begin to happen.

The board makes unpopular or controversial rulings. Politicians bring pressures on behalf of this or that constituent. Other regulatory agencies take advantage of the registration bill to expand their own jurisdiction and authority or to restrict geologic practice within it. Some courts cause hardship to individual geologists by following the letter, instead of the spirit, of the law, or by sometimes misinterpreting the law's intent. Registration fees gradually escalate. The anticipated recipro-

ty with other states does not materialize. It becomes more difficult to import expertise from other states. And, conversely, to provide expertise in another state, multiple registrations may become necessary, increasing costs of doing business. New legislation and regulations are proposed, affecting any or all aspects of geologic practice in the environmental, construction, mining, petroleum, water, etc., industries.

What to do?

The registered geologists had forgotten that the stated purpose of the state board is to protect the public, not to protect the profession. Indeed, in many cases, the board cannot even protect itself.

This phenomenon is not unique to the geologic profession. It has happened with nearly every profession that has any sort of state regulation of its practice. To survive, other professions have developed combination national/state organizations to serve as political and legal advocates for both their profession and their state boards. The medical, dental, legal, and engineering professions, to name but a few, all have closely related national and local organizations. They are constantly alert to proposed legislation, regulations, or rulings which will affect them, directly or indirectly, nationally or locally.

Each of these organizations constantly struggles to assure and improve the stature of its profession. It is the strength of these organizations, both nationally and locally, that determines the stature of the profession in the nation and in the individual states. In states where the professional society is weak, the profession is weak, and other professions encroach. Where the local organization is strong, and backed by a strong national organization, other professions find encroachment more difficult. A strong national organization is essential. So is a strong state organization. They are interdependent and mutually supportive. If one is weak or non-existent, the other is thereby weakened. **One is not enough. Both are essential. And, they must be closely related to realize maximum effectiveness.**

AIPG is the geologic counterpart of the American Medical Association, the American Dental Association, the American Bar Association, the National Society of Professional Engineers, etc., and their state organizations.

Nationally, AIPG's influence is growing. But, in some of the states, our members have lost sight of the potential political power which exists and which is theirs for the taking. If this is true in your state, it is up to you and each of your fellow mem-

bers to build your AIPG Section into an organization that can realize and utilize this power. Whether your state registers geologists or not, much happens that affects you. Your best weapon is a strong and active AIPG.

National can provide the organizational framework, but it is the responsibility of each member to make sure that it works—everywhere, but especially at the Section level.

To paraphrase a current television commercial, there are the shakers and there are the shaken. Then, there are those who sleep through the whole thing to awaken in an unfamiliar world that they do not like. And wonder what happened.

Which are you?

Editor's note: This is the second in a proposed series of articles dealing with the role of AIPG in states that register geologists. If you have insightful ideas or opinions on this subject, please consider submitting an article or Letter to the Editor for publication in The Professional Geologist. If a sufficient number of papers on this subject are received and published, they could be collected and republished in an AIPG Reprint Series, for use as a long-term aid in recruiting.

AIPG Washington Fly-In

April 25-27/28

One of the means by which AIPG promotes our profession's interests to our appointed officials is via the annual Washington Fly-In. The AIPG Washington, D.C. Fly-In for 1999 is scheduled for April 25-27/28, 1999 with arrivals on April 24 or 25. We hope that as many Sections as possible be represented.

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For more information contact AIPG National Headquarters at (303) 431-0831 or Jim Shotwell, CPG-08290, at (512) 327-9840 or e-mail: jim.shotwell@rmtinc.com.

Recently Adopted Policy Statement by AGU on Climate Change and Greenhouse Gases

Publication does not indicate endorsement of this statement by AIPG

Atmospheric concentrations of carbon dioxide and other greenhouse gases have substantially increased as a consequence of fossil fuel combustion and other human activities. These elevated concentrations of greenhouse gases are predicted to persist in the atmosphere for times ranging to thousands of years. Increasing concentrations of carbon dioxide and other greenhouse gases affect the Earth-atmosphere energy balance, enhancing the natural greenhouse effect and thereby exerting a warming influence at the Earth's surface.

Although greenhouse gas concentrations and their climatic influences are projected to increase, the detailed response of the system is uncertain. Principal sources of this uncertainty are the climate system's inherent complexity and natural variability. The increase in global mean surface temperatures over the past 150 years appears to be unusual in the context of the last few centuries, but it is not clearly outside the range of climate variability of the last few thousand years. The geologic record of the more distant past provides evidence of larger climate variations associated with changes in atmospheric carbon dioxide. These changes appear to be consistent with present understanding of the radiative properties of carbon dioxide and of the influence of climate on the carbon cycle. There is no known geologic precedent for the transfer of carbon from the Earth's crust to atmospheric carbon dioxide, in quantities comparable to the burning of fossil fuels, without simultaneous changes in other parts of the carbon cycle and climate system. This close coupling between atmospheric carbon dioxide and climate suggests that a change in one would in all likelihood be accompanied by a change in the other.

Present understanding of the Earth's climate system provides a compelling basis for legitimate public concern over future global- and regional-scale changes resulting from increased concentrations of greenhouse gases. These changes are predicted to include increases in global mean surface temperatures, increases in global mean rates of precipitation and evaporation, rising sea levels, and changes in the biosphere. Understanding

of the fundamental processes responsible for global climate change has greatly improved over the past decade, and predictive capabilities are advancing. However, there are significant scientific uncertainties, for example, in predictions of local effects of climate change, occurrence of extreme weather events, effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. In view of the complexity of the Earth's climate system, uncertainty in its description and in the prediction of changes will never be completely eliminated.

Because of these uncertainties, there is much public debate over the extent to which increased concentrations of greenhouse gases have caused or will cause climate change, and over potential actions to limit and/or respond to climate change. It is important that public debate take into account the extent of scientific knowledge and the uncertainties. Science cannot be the sole source of guidance on how society should respond to climate issues. Nonetheless, scientific understanding based on peer-reviewed research must be central to informed decision-making. AGU calls for an enhancement of research to improve the quantification of anthropogenic influences on climate. To this end, international programs of research are essential. AGU encourages scientists worldwide to participate in such programs and in scientific assessments and policy discussions.

The world may already be committed to some degree of human-caused climate change, and further buildup of greenhouse gas concentrations may be expected to cause further change. Some of these changes may be beneficial and others damaging for different parts of the world. However, the rapidity and uneven geographic distribution of these changes could be very disruptive. AGU recommends the development and evaluation of strategies such as emissions reduction, carbon sequestration, and adaptation to the impacts of climate change. AGU believes that the present level of scientific uncertainty does not justify inaction in the mitigation of human-induced climate change and/or the adaptation to it.

PROFESSIONAL SERVICES DIRECTORY

This service is open to AIPG Members as well as non-members. The Professional Services Directory is a 12-month 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.

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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.]

1999

Apr. 10-14. *Seventh Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of KarstTM*, 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. 12-13. *Micropurge Low-Flow Purging and Ground-Water Sampling*, Concord, CA. Contact: David M. Nielsen, The Nielsen Env. Field School, 4686 S. State Route 605, Galena, OH 43021-9652, Ph.: (740) 965-5026, e-mail: nielsenfieldschool@juno.com.

Apr. 13-16. *The Environmental Sampling Field Course*, Columbus, OH. Contact: David M. Nielsen, The Nielsen Env. Field School, 4686 S. State Route 605, Galena, OH 43021-9652, Ph.: (740) 965-5026, e-mail: nielsenfieldschool@juno.com.

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. 28-29. *The Ground-Water Sampling Field Course (Includes Micropurging)*, Boston, MA. Contact: David M. Nielsen, The Nielsen Env. Field School, 4686 S. State Route 605, Galena, OH 43021-9652, Ph.: (740) 965-5026, e-mail: nielsenfieldschool@juno.com.

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, mcramer@expomasters.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.

Sep. 26-30. *The Society for Organic Petrology Annual Meeting*, Salt Lake City, UT. **Call for papers deadline June 1, 1999.** Contact: Jeff Quick, UT Geological Survey, 1594 W. North Temple, #3110, Salt Lake City, UT 84114, Ph.:

(801) 537-3372, e-mail: <nrgus.jquick@state.ut.us>, web site: <http://www.tsop.org>.

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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. Lutenegeger, 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.

Aug. 3-8. *Geo Denver 2000*, Denver, CO. Contact: American Society of Civil Engineers <http://www.asce.org/conferences/geo2000>.

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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October 4-8, 1999
Anchorage, Alaska

October 11-15, 2000
Milwaukee, Wisconsin

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	As of 2/20/98	As of 2/23/99
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Registered Memb.	5	13
Associate Memb.	2	4
Student Affiliate	39	71
Honorary	14	17
TOTALS	4,788	4,649

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ASSOCIATE

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

Note to those who received their degrees from non-U.S./Canadian universities: If you received a degree from a university or college outside the U.S. or Canada, and the school is unable to provide an acceptable transcript, you must submit a copy of your diploma and a list of courses taken. The Screening Committee may ask you to provide additional information or an equivalency evaluation, at your expense.

NEW APPLICANTS AND NEW MEMBERS - (02/03/99 - 02/23/99)

Applicants for certification must meet AIPG's standards as set forth in its Bylaws on education, experience, competence, and personal integrity. If any Member or board has any factual information as to any applicant's qualifications in regard to 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.

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