The Professional GEOLOGIST

33rd AIPG Annual Meeting Coverage
Pages 13-20
COLUMBUS - OHIO

A publication of
The American Institute of Professional Geologists
WANTED - TPG ARTICLES
Instructions to Authors

The 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 broken down into parts (e.g. part I and part II), 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 material, submittals should be sent to AIPG headquarters six months 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
- References Cited

One original and two copies of each manuscript should be submitted. Whenever possible, text should also be submitted on diskette (3.5 inch or 5.25 inch IBM/PC format). Headquarters uses DOS WordPerfect 5.1, which is preferred, but Word (for Windows or DOS), ASCII, or translatable files (such as MacWord) are acceptable. The program or format of the text should be clearly marked on the diskette.

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 .dxf, .hgl, .pic, .pcx, .bmp, .eps, .GIF, or other standard formats.

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

General Topics:

**TECHNICAL**
- Mining Geology
- Petroleum Geology
- Hydrogeology
- Environmental Geology
- Geophysical/Engineering

**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, Unusual Applications of Geology.

Authors are encouraged to communicate with Headquarters via mail, fax, or Internet. Send your article or photograph, or communicate questions to:

The American Institute of Professional Geologists
Wendy Davidson, Publications Manager
7828 Vance Drive, Suite 103
Arvada, CO 80003-8124
Voice (303) 431-0831
FAX (303) 431-1332
Internet aipg@aipg.com

Lyle G. Bruce, Editor
Feature: 1996 AIPG Annual Meeting
COLUMBUS, OHIO

PEER-REVIEWED PAPER
Legal Aspects in Karst Areas
P.E. LaMoredes, CPG-0880, Harry E. LeGrand, CPG-2715,
and William J. Powell

The Arizona Section of AIPG Invites You to the Tucson Gem and Mineral Show!

FRONT COVER - Scenic geology of Northeastern Ohio, Borea Sandstone. Photograph submitted by Curtis J. Coe.

DEPARTMENTS
GEOWRITER'S NOTEBOOK
TODAY IN WASHINGTON
EXECUTIVE DIRECTOR'S ITINERARY
PROFESSIONAL ETHICS & PRACTICES - Column 12
LETTER TO THE EDITOR
IN MEMORIAM
AIPG BENEFITS AND INFORMATION
CALENDAR AND ADVERTISERS INDEX
NEW MEMBERS, APPLICANTS, ETC.
# AIPG PUBLICATIONS ORDER FORM

All publications are available to both Members and non-members. Ten percent discounts are granted on quantities of ten or more copies of the same title.

## Issues and Answers Series

<table>
<thead>
<tr>
<th>Publication</th>
<th>MEMBERS</th>
<th>NON-MEMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOME BUYERS' GUIDE TO GEOLOGIC HAZARDS (NEW - 9/96)</td>
<td>$6.00</td>
<td>$9.00</td>
</tr>
<tr>
<td>Groundwater</td>
<td>$6.00</td>
<td>$9.00</td>
</tr>
<tr>
<td>Hazardous Waste</td>
<td>$6.00</td>
<td>$9.00</td>
</tr>
</tbody>
</table>

## Monograph Series

<table>
<thead>
<tr>
<th>Publication</th>
<th>MEMBERS</th>
<th>NON-MEMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOVERNMENT AFFAIRS MANUAL (NEW - 8/96)</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>The Professional Geologist as Expert Witness (revised 4/94)</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>Appraisal of Construction Rocks</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>Organization and Content of a Typical Geologic Report</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>Guide to Federal and State Appointive Positions</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>Program of Cooperative Evaluation of Geology Departments</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>Education for Professional Practice</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>AIPG Student Chapter Operations Manual</td>
<td>$4.00</td>
<td>$6.00</td>
</tr>
</tbody>
</table>

## Special Publications

<table>
<thead>
<tr>
<th>Publication</th>
<th>MEMBERS</th>
<th>NON-MEMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Citizens' Guide to Geologic Hazards</td>
<td>$15.95</td>
<td>$19.95</td>
</tr>
<tr>
<td>The Citizens' Guide to Geologic Hazards - per box (40 copies)</td>
<td>$525.60</td>
<td>$765.60</td>
</tr>
<tr>
<td>(Discount included - no additional discounts granted)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slide Set - The Citizens' Guide to Geologic Hazards</td>
<td>$65.00</td>
<td>$65.00</td>
</tr>
<tr>
<td>This set of fifty 35-mm slides depicts geologic hazards throughout the world</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995 Annual Meeting Proceedings - Prosperity and Professional Geology</td>
<td>$20.00</td>
<td>$25.00</td>
</tr>
<tr>
<td>Buy as a set! (95 Annual Meeting Proceedings &amp; Field Trip Roadlogs)</td>
<td>$25.00</td>
<td>$32.00</td>
</tr>
<tr>
<td>Guide to a Successful Job Search</td>
<td>$6.00</td>
<td>$9.00</td>
</tr>
<tr>
<td>Technical Writing as a Process within a System</td>
<td>10.00</td>
<td>15.00</td>
</tr>
<tr>
<td>Membership Directory</td>
<td>$25.00</td>
<td></td>
</tr>
<tr>
<td>The Professional Geologist - Subscription for one year - 12 issues (For postage to Canada add $10.00, all other countries add $18.00)</td>
<td>$20.00</td>
<td>$30.00</td>
</tr>
<tr>
<td>The Professional Geologist - Single copies</td>
<td>$2.00</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

**TOTAL AMOUNT $__________ $__________**

Order From: AIPG 7828 Vance Drive, Suite 103 Arvada, CO 80003 (303) 431-0831 • FAX (303) 431-1332

Checks should be made payable to the American Institute of Professional Geologists. Prices include surface shipping rates within U.S. Allow 4-6 weeks for domestic. Call for shipping outside the U.S. All orders must be accompanied by payment. Visa and Mastercard accepted. Visa and Mastercard orders must be $10.00 or more.

Payment: Check____ Mastercard____ Visa____ (All payments in U.S. funds)

Card Number_________________________ Expiration Date_____________________

Signature______________________________________________________________

Name______________________________________________________________

Address______________________________________________________________

Address______________________________________________________________

City_________________________ State_________ Zip________________________

Day Phone Number_________________________ Is this your___ home or___ office address? 09/96
Legal Aspects in Karst Areas

P.E. LaMoreaux, CPG-0880, Harry E. LeGrand, CPG-2719, and William J. Powell

Abstract

Environmental impacts on karst settings are common and are more sensitive than those in other rock terrains. Developments and exploitations by man that affect the karst hydrology regime can trigger numerous legal activities, particularly where the effects of changes go beyond property boundaries. Regulatory procedures that are effective in other rock terrains are not necessarily applicable for karst settings.

Karst regions constitute about 25 percent of the land surface of the world. The dependence for water from wells and springs requires careful water development practices and waste management policies that are closely related to potential legal issues. In contrast to the widespread abundant water supplies in the confined karst region of Florida and Georgia, USA, are the restricted and localized zones and springs in the common mature surface karst of many other regions. Development in both types of karst hydrogeologic regions have complex legal implications involving hundreds of millions of dollars. Degradation of sources of karst water supplies can be permanent and costly to replace or remEDIATE.

Numerous lawsuits develop from: (1) the withdrawal of water that results in lowering of water levels beneath wide areas in permeable karst settings that interfere with the quantity of water available from existing sources; and, (2) inability to determine the selective flow paths of subsurface water. Large withdrawals of water for municipal, agricultural, and industrial use may competitively affect the water supply in surrounding areas. Water from springs and wells in karst areas are prone to contamination by unconfined aquifers. The risks of lawsuits are high near buildings and roads in sinkhole-prone areas. Insurance policies against personal and property damages as a result of changes in physical and hydrologic characteristics in karst areas may be restrictive because of uncertainties resulting from human and natural actions. Case histories of environmental problems in karst areas need to be compiled and sorted so that probability assessments for future damaging occurrences can be considered and refined in a Bayesian framework. Years of experience and knowledge of karst hydrogeology are needed to address legal problems and for the development of applicable regulatory procedures.

Some sensitive actions by humans in heavily-populated karst areas will continue to hold karst problems at a high level. Therefore, vulnerability and sensitivity maps that express some cause and effect relations are needed for all karst settings.

Introduction

In 1861 Ohio courts, in the case of Frazier vs. Brown, found that groundwater was "too secret and occult to be adjudicated by law." Finally, in December of 1984, over 120 years later, the Ohio Supreme Court reversed their stand saying, "Scientific knowledge in the field of hydrology has advanced in the past decade to the point that water tables and sources are more readily discoverable."

A substantial amount of literature is available related to law and groundwater waters. Examples of water supply papers include, "Relation of the Law to Underground Waters" by Douglas Wilson Johnson (1905), "Ground-Water Contamination and Legal Controls in Michigan," by Morris Deutsch (1963), and "Water law with special reference to ground water," by C.L. McGuinness (1951). These laws pertain to the occurrence of ground water in karst areas.

Regulators" in their summer 1994 issue of GeoNews. Other state Geological Surveys have released similar materials. One of the first was an atlas by the Geological Survey of Alabama, "Environmental Geology and Hydrology, Huntsville and Madison County, Alabama" (1975).

Other countries have prepared ground water development guidelines, problems and solutions in karst areas, preparing ground water vulnerability maps and reports. In England, some of the most interesting relate to "Research on Radon in British Limestone Caves and Mines, 1970-1990" (Gunn and others, 1991), and "Protecting Cambria's Limestone Pavements" (Cumbria County Council, 1993). In the Western Ukraine, regulations are being developed for karst terrains, environmental changes, and human impact (see Andrajchouk & Klimchouk, 1993).

Another type of legal concern in karst is exemplified by the practice of subsurface injection of waste in the Floridan Aquifer, a karstified sequence of limestone predominantly of Eocene Age. Some publications include: "Monitoring of Surface Injection of Wastes, Florida" (Vecchioli, 1979); "Hydrogeology and Results of Injection Tests at Waste-Injection Test Sites in Pinellas County, Florida" (Hickey, 1982); and "Subsurface Storage of Liquids in the Floridan Aquifer System in South Florida" (Meyer, 1989).

One of the most exhaustive treatments of land subsidence in karst is described in a report of the U.S. National Academy of Sciences titled, "Mitigating Losses from Land Subsidence in the United States" (Holzer and others, 1991). Discussion of management of radioactive waste in limestone are described in a U.S. National Academy of Sciences report, "Panel for the Study of the Management of Radioactive Waste at the Oak Ridge National Laboratory" (LaMoreaux and others, 1985).

Finally, extensive research and associated legislation, rules and regulations have been developed for the Edwards Aquifer in Texas. Similar treatment has been given to the Floridian Aquifer in Florida and south Georgia. These karst aquifer systems are two of the largest in the United States and therefore have tremendous economic value to the citizens of their area. As a result, legislation to protect these resources has been developed at state, county and city levels.

The legal aspects are most prominent when land is exchanged or de-watered, and when consequences of an action on one property affects neighboring properties. These issues are inherently related to karst hydrogeology. It is the purpose of this paper to describe key principles of karst hydrogeology that are commonly related to legal aspects as an aid in facilitating a better understanding to cope with the problems. Key settings in which problems exist and case histories of the problems are described.

Most professionals working in karst now realize that a description of the structural setting is essential for understanding karst hydrology: (1) development (water and land use), (2) interactions, and (3) problems that may result in legal actions. This is shown by the attention given to these broad subjects in numerous documents, including those by Meinzer (1923), Herak and Stringfield (1972) and Burger and Dubertret (ed., 1975). The specific methods and descriptions for describing the geology, lithology, and structural setting in a karst area are discussed in great detail in the UNESCO, "Guide to the hydrology of carbonate rocks" (LaMoreaux and others, 1984). A summary of key principles that may be useful has been noted by LeGrand and LaMoreaux (1975).

Some of the physical characteristic features that are in places associated with karst terrains include scarcity of soils, scarcity of surface streams, and rugged topography. These features are developed by natural processes. Yet, there are complex insidious problems that develop as humans disturb the natural balance of geologic and hydrologic conditions in karst settings. It is necessary to understand environmental relations to determine whether actions by humans will affect one part of the system or have a direct or indirect effect in another way.

Constructive and thorough discussions on karst are performed by numerous multidisciplines of science. Various regional symposia and colloquia on karst have been organized worldwide over the past 20 years by International Association of Hydrogeologists (IAH), International Association of Scientific Hydrologists (IASH), Food and Agricultural Organization (FAO), and United Nations Educational Scientific and Cultural Organization (UNESCO) within the International Hydrologic Decade (IHD) and International Hydrologic Programme (IHP). The IHD included a Commission for the study of carbonate rocks in Mediterranean countries, and since 1970 a permanent Commission for karst hydrogeology exists within IAH.

The reasons for such an increasing interest in karst include the rapid development of our civilization; new technology, problems resulting from the development of water resources and their systematic study, rational utilization, and protection, in addition to management of hydrological and hydrogeological systems. Karst occurs in many parts of the globe, frequently covering a substantial part of the national territory of individual countries. The water supplies represent the sole or most important natural resource which directly affects social and economic development. Under such conditions, the problems of study, utilization, and protection of water resources, or using contemporary terminology, management and control of water resource systems attain exceptional importance. This has had an effect on the orientation of research.
Existing Legal and Regulatory Standards of a General Character

Since the 1970s, the environmental movement in the USA has progressed from adolescence to maturity. At first everyone agreed that "something" had to be done, and as a result the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) were originated. Initially it was thought that money could solve the problem of groundwater contamination; however, it was soon learned that this was not the solution. These environmental problems have been recognized as complex and variable in both national and international extent. Experienced professional geoscientists were needed to implement programs and solve problems and we have learned that it was necessary to have a readily accessible reserve of professionals, mainly geoscientists, for the governmental infrastructure to guide research, regulation, and remediation.

The range of environmental issues in a karstified area are diverse and encompass local, regional, and global problems involving pesticides and toxic substances, hazardous and solid waste disposal, water quality and quantity, air pollution, resource use and management, soil erosion and stability, degradation of aquatic and terrestrial ecological systems, marine pollution, loss of biological diversity, and climate change.

For example, environmental statutes in the USA that in some way concern ground water in karst areas include:

- Clean Water Act
- Safe Drinking Water Act (SDWA)
- Clean Air Act
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Federal Insecticide, Fungicide, and Rodenticide Act
- Toxic Substances Control Act
- Coastal Zone Management Act
- Endangered Species Act
- Magnuson Fisheries Act
- Resource Conservation Recovery Act (RCRA)
- Forest Land Management Planning Act
- Renewable Natural Resources Planning Act
- Disaster Relief Act
- Marine Plastics Pollution Research and Control Act
- Marine Protection, Research and Sanctuaries Act
- Ocean Dumping Ban Act
- Shore Protection Act
- National Earthquake Hazards Reduction Act
- Energy Policy Act
- Global Climate Change Protection Act
- Global Change Research Act
- Oil Pollution Act
- National Environmental Policy Act
- Weather Service Modernization Act
- Federal Emergency Management Act

Of those listed, the most comprehensive restrictions are contained in SDWA, RCRA, and CERCLA. The authorities responsible for enforcing these rest with the federal government, although each state must enact and provide regulations appropriate to the hydrologic/geomorphic setting and land use in their individual state.

Therefore, there are not only a substantial number of federal laws and regulations to protect the environment in karst areas, there has also resulted a myriad of supporting and supplemental legislation, rules and regulations in each state and in some large intensely developed cities or county areas. For example, the heavily populated Miami and Dade County area of Florida are underlain by the sensitive karstified Biscayne Aquifer.

A. International Law

There has also been a correlative activity in the development of international and even global agreements on water (including karst areas) that involve the USA and other nations of the world. This has resulted in the development of a series of regional and global agreements and conventions that include:

- Convention on Long-Range Transboundary Air Pollution and its associated amendments
- Vienna Convention to Protect the Ozone Layer and its associated Montreal protocol
- Framework Convention on Climate Change
- Convention on Biological Diversity
- International Decade for Natural Disaster Reduction
- London Dumping Convention
- International Convention for the Prevention of Pollution from Ships
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
- Global Forestry Agreement;
- Agenda 21 (follow-up activities such as U.N. Council on Sustainable Development);
- North American Free Trade Agreement
- General Agreement on Tariffs and Trade

Finally, to implement these state, federal and international laws, regulations and agreements, the scientific community must provide basic science, engineering, and technical information pertaining to the application of these laws. This must be done in order to insure the development of mineral, energy, and water resources that will be in the best interest of the government and people of the world.

Types of Potential Legal Problems in Karst Areas

Typical karst problems that could develop include:
A. Instability of the Ground

The solution of carbonate rocks and removal of dissolved mineral matter by circulating ground water produce underground cavities that weaken the structure of the rock or soil above them, causing collapse. These may be a purely natural event
and require a long period to develop in contrast to those caused by human activities, such as loading, inadequate drainage, and pumping of water from wells that accelerate subsidence in many areas over very short periods of time.

B. Effects of Ground Water Withdrawal in Karst

Undesirable and serious consequences frequently resulting from excessive withdrawals of water from aquifers of all types are common. The consequence of water withdrawal can be especially noticeable and extreme in karst settings. Where heavily pumped wells withdraw water from subsurface cavities, there is the potential for water level decline in nearby wells. Moreover, since channeled karst water tends to move without great delay in a circuitous manner to springs, the probability of decreased spring flow may be high. Lakes and streams that have a connection to karst water may also be affected by pumping of wells.

There is a major problem predicting the effects of withdrawal of karst water for those who are subject to environmental regulations and those concerned with developing the regulations. Proximity of a pumping well to a spring or other well is not a good criterion for determining causal relations; in some areas the effects of pumping may be noted several kilometers away, and in other areas there may be no effect a hundred meters away.

C. Landfills in Karst Areas

Proposed, new, or existing landfills in karst terrains are subjects of controversy, and sources of continuing debate as to whether areas underlain by carbonate rocks are suitable sites for construction of landfills. Issues of concern are the potential threats to human health and the environment which could result from: a) collapse or subsidence, with the associated loss of structural integrity of the landfill; b) release of contaminants through collapse, subsidence, or leakage from the landfill; and c) contamination of ground water and/or surface water, which may result from an uncontrolled release.

D. Hazardous and Radioactive Waste Disposal

Perhaps no greater threat to ground water exists than the consideration of a karst terrain site for the disposal of hazardous or radioactive waste. One of the best examples of the experience gained with this type of problem is the management of waste at the U.S. Department of Defense - Oak Ridge National Laboratory, where all types of waste management practices have been studied in great detail and carried out. Included is the injection of waste by wells. For a generic report and list of references, see the report "The Management of Radioactive Wastes at the Oak Ridge National Laboratory" (LaMoreaux and others, 1985; Memon and Prohic, 1989).

E. Contamination of Karst Springs

Contamination of karst spring waters in populated areas will become increasingly serious in the future. The expanded cone of influence around individual wells results in the potential for inducing a mixture of uncontaminated and contaminated water. The widespread distribution of pesticides and various organic compounds at the land surface increases the probability of karst water from wells and springs being contaminated.

Existing legal restrictions on waste disposal and on protection of ground water supplies in general apply to karst regions. In addition, special legal provisions are locally being applied because of the unusual and less predictable hydrologic features of karst regions (Hughes and others, 1994).

Some of the largest springs in the world occur in karst areas. Springs provide water to irrigation projects, municipal water supplies, and for industrial manufacturing purposes. Examples include, Huntsville, Alabama (LaMoreaux and others, 1975); Fijeh, Damascus, Syria (LaMoreaux and others, 1989). Some of these sources are covered by legislation and regulations. For example, the Fijeh Spring area is controlled by environmental guidelines and nearly every State in the United States has regulations under the U.S. Drinking Water Act, the Well Head Protection Act, or companion state regulations. One of the most comprehensive documents controlling industrial development in a karst area is the "Final Environmental Impact Statement for regulatory actions associated with the Olin Corporation, Remedial Action Plan to isolate DDT from the people and the environment in the Huntsville Spring Branch-Indian Creek System, Wheeler Reservoir, Alabama" (U.S. Army Corps of Engineers, 1986).

F. Leakage from Reservoirs and Waste Lagoons

Difficulties in impounding water in surface reservoirs in sinkhole-prone areas is generally realized. The problem can be focused on a rise of the karst water levels into former dry solution cavities when the reservoir is being filled. Thus, a new and more vigorous flow system is formed with greater hydraulic head. As a result, karst water is likely to flow around and under the dams.

G. Contaminant Spills (transportation oriented) and Unreliable Waste-Disposal Environment

Although in some places wastes may be disposed in karst terrains without contamination of ground water, karst terrains in general are not considered ideal places for disposal of wastes. Where soils are thin or absent, the contaminants may penetrate the ground water without attenuating sufficiently; and where permeability is high, the contaminants may move readily through the rock openings. Moreover, the erratic movement of water in some places in karst formations prevents an accurate determination of the direction of movement of water and contaminants that might be associated with it. Therefore, transportation of any wastes across karst terrain has the potential for creating serious prob-
lems. An accidental spill or leak from a tank truck, a railway tank car, or a pipeline can cause serious problems of contamination in a karst area.

References


Cumbria County Council Planning Department, 1993, Protecting Cumbria’s Limestone Pavements, What Limestone Pavement Orders are, why and how they are made, and their legal effect, Published by the Planning Department of Cumbria County Council, Dixon Printing Co., Ltd, Kendal, Cumbria, 1993.


Vecchioli, John, 1979, Monitoring of Subsurface Injection of Wastes, Florida, V. 17, No. 3, Groundwater, May-June 1979, pp. 244-249.


P.E. LaMoreaux, Senior Hydrogeologist, P.E. LaMoreaux and Associates, Inc., P.O. Box 2310, Tuscaloosa, Alabama 35403, Harry E. LeGrand, Hydrogeologist, 331 Yadkin Drive, Raleigh, N.C. 27609, and William J. Powell, Senior Hydrogeologist, P.E. LaMoreaux & Associates, Inc., P.O. Box 2310, Tuscaloosa, Alabama 35403
AIPG INSIGNIA
Great Gift Ideas!

SHOW YOUR PRIDE!

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tee Shirt</strong>, Russell, 50% cotton, white with royal blue silk screen AIPG seal. Sizes M, L, XL, add $2.00 for XXL</td>
<td>$12.50</td>
<td></td>
</tr>
<tr>
<td><strong>Sweat Shirt</strong>, Russell 9 oz, 50% cotton, royal blue with white silk screen AIPG seal. Sizes M, L, XL, add $2.00 for XXL</td>
<td>$21.50</td>
<td></td>
</tr>
<tr>
<td><strong>Golf Shirt</strong>, Outerbanks, 100% cotton, white with royal blue embroidery of AIPG in upper left chest. Sizes L, XL, add $2.00 for XXL</td>
<td>$30.00</td>
<td></td>
</tr>
<tr>
<td><strong>Caps</strong>, royal blue, navy and navy with yellow bill with AIPG logo. Please specify color:</td>
<td>$15.50</td>
<td></td>
</tr>
<tr>
<td><strong>Coffee Mug</strong>, 12 oz., ironstone, shatterproof, microwaveable, cobalt blue, gold band and AIPG seal.</td>
<td>$10.50</td>
<td></td>
</tr>
<tr>
<td><strong>Sports Bottle</strong>, 32 oz., plastic, white with blue AIPG seal.</td>
<td>$2.50</td>
<td></td>
</tr>
<tr>
<td><strong>Plaque</strong>, walnut, for 8.5” x 11” certificate, with acrylic cover and brass tacks.</td>
<td>$38.00</td>
<td></td>
</tr>
<tr>
<td><strong>Certificate</strong> (Add $2.00 for mounting - plaque sold separately).</td>
<td>$7.50</td>
<td></td>
</tr>
<tr>
<td><strong>Gold Lapel Pin/Tie Tack</strong></td>
<td>$25.00</td>
<td></td>
</tr>
<tr>
<td><strong>Self-inking Stamp</strong></td>
<td>$28.00</td>
<td></td>
</tr>
<tr>
<td><strong>Steel Die</strong> (left, right, or bottom)</td>
<td>$35.00</td>
<td></td>
</tr>
<tr>
<td><strong>Steel Die</strong> (replacement insert)</td>
<td>$28.00</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td>$</td>
<td></td>
</tr>
</tbody>
</table>

Ship To ____________________________________________________________
Address __________________________________________________________
Street ____________________________________________________________
City __________________________ State __________ Date __________
Zip __________________________ Country ____________________________
Tel.: __________________________ AIPG # __________________________

Is this your ___ home or ___ office address?

Prices include surface shipping rates within U.S.
Allow 4-6 weeks for domestic.
Call for shipping outside the U.S.
All orders must be accompanied by payment.
All payments in U.S. funds. Mastercard and Visa orders must be $10.00 or more.
Payment: Check ____ Mastercard ____ Visa ____
Card Number _______________________
Expiration Date __________

Cardholder’s Signature _________________________________________
09/96

10 The Professional Geologist • DECEMBER 1996
The Art of Giving Instructions

Hugh Hay-Roe, CPG-3291

Part 1

In telling how to follow any procedures, you need first of all to find out readers' background and limitations. This obvious piece of advice is overlooked with dismaying frequency.

If you've ever travelled overseas or south of the Rio Grande, you surely know the frustration of trying to give instructions to a hotel maid or cab-driver whose English was limited. You quickly realized the importance of knowing the limitations of your "audience" and of making your instructions as simple and direct as possible - even drawing a map or picture, if necessary, to supplement your words. When these measures weren't enough, perhaps you turned to a foreign phrase-book to try to communicate in words your audience would recognize.

These same techniques turn out to be very effective in any kind of "how-to" writing, from a half-page safety memo to a huge training manual. Start by listing your readers (or classes/groups of readers) and their backgrounds. If you don't know how well your audience understands the general subject of the instructions, take time to find out before you go on.

Why did "user-friendly" become a buzz-phrase in the computer industry? Because so much software and so much documentation have been written by experts who figured their readers where experts, too: "Plug the appropriate end of the connecting cable into the modem's RS-232 jack." [Even if you know what an RS-232 jack looks like, what do you do if both ends of the connecting cable appear to be the same? Are they actually the same? Which end is "appropriate"?]

"Caution should be exercised in attempting to use this option. One mistake could cause problems with your program diskette." [Oh, just great! How do I go about "exercising caution" in attempting to use this option? Is it going to make my computer blow up? Or merely ruin the applications disk?] Those instructions were taken verbatim from the communications manual of a company with a reputation for user-friendliness (name withheld to protect the guilty). Clearly, the experts who wrote it did not know their audience.

Part 2

After analyzing readers, their background and limitations, (1) break the procedure into small steps, giving them in sequence; (2) phrase instructions as simply and directly as you can; and (3) use illustrations and other techniques to improve clarity.

Here are five techniques for giving instructions.

1. Use the imperative (command) form of the verb (as we've just done) - don't say, "the command form of the verb should be used" or "in the presentation of clearly intelligible instructions, it is generally considered preferable to employ verbs that are expressed in the imperative mood."

2. Break your instructions into small individual steps. Number them in the sequence in which they have to be carried out. If it makes no difference, say so, (unless that's obvious).

3. Use the plainest language you possibly can. Prefer short sentences. If you must use technical jargon, explain all unusual terms, either the first time you use them or in a glossary at the front of the manual.

4. Don't jump abruptly from one subtopic to another. Use transition words (next, then, after, finally, while, also, in the same way, otherwise) and headings to help the reader figure out how to get from A to B.

5. Never leave users guessing. Anticipate problems and "What if ...?" questions. Cover all reasonable eventualities (remember Murphy's Law). Don't write merely to be understood; write so that you cannot be misunderstood.
Use Illustrations and Eye Appeal

- Especially if you are dealing with equipment, use illustrations to describe things that are hard to make clear in words. Line drawings are often preferable to photographs that may not show clearly what seems obvious to you as the expert.
- Try for wide margins and clearance around headings to maintain white space. If you can call on a specialist in page makeup for help in making your pages attractive, do it.
- If your budget can stand it, use color – not only in illustrations, but to highlight safety instructions and other key information.
- To organize information, use tables and numbered or "bulleted" lists like this one.

- If the procedures you’re talking about are long or complex, a flow diagram may help users to get a feel for where they’re being taken.

More Ways to Help the User

- If the document is long enough to merit it, help readers find their way around with a table of contents, plenty of bold headings, cross-references, index tabs, and a complete subject index.
- Don’t clutter up the main sequence of instructions with a lot of highly specialized detail that most readers will never use. Put it in an appendix.
- Find a couple of “guinea pigs” among your colleagues: give each a draft copy of your instructions with a request to try them out. Chances are they’ll come up with improvements.

NSF Slated to Invest $50 Million in SBIR Program in 1997

The National Science Foundation (NSF) will invest over $50 million in the NSF Small Business Innovation Research Program (SBIR) in 1997 -- a 50% increase in award amounts since 1994. The program helps fund firms with 500 or fewer employees to perform cutting-edge research addressing the nation’s most critical science and engineering needs. SBIR was instituted at NSF in 1977. It expanded as a federal program to 11 principal research and development agencies in 1982. The Program spans all disciplines. More information may be obtained by calling the conference hotline at (360) 683-5742.

EOScape™, Earth Observation Software Package Offered to High Schools

Richmond Hill, Ontario - September 20, 1996: EOScape, Earth Observation Software for the Classroom, is now available for use in high school geography, earth science and/or technology curricula. The software package which includes imagery, optional Earth Observation Curriculum, Student User's Guide and enhanced Teacher's Guide; provides students with an interactive introduction to Remote Sensing and digital image processing through the analysis and interpretation of satellite imagery as it pertains to current resource and environmental management. EOScape is available for use on PC, Mac and OS/2 platforms.

Contact: Jessica Shields, PCI Enterprises, 50 West Wilmot Street, Richmond Hill, Ontario Canada L4B 1M5, (905) 764-0614, Fax: (905) 764-9604, e-mail: shields@pci.on.ca

ATTENTION

AIPG has a new e-mail address:
aipg@aipg.com

Additional e-mail addresses have been added for the following staff:

William V. Knight
Executive Director
wvk@aipg.com

Wendy J. Davidson
Publications Manager
wjd@aipg.com

Karen L. Spaulding
Manager of Membership Services
kspauldi@aipg.com

12  The Professional Geologist  •  DECEMBER 1996
THE FUTURE OF GEOLOGY:
POLITICS, ECONOMICS AND TECHNOLOGY

Elegance, friendship and comradery defined the essence of the 33rd annual meeting in Columbus, Ohio. The theme of the meeting "The Future of Geology: Politics, Economics and Technology" provided fertile ground for discussion and reflection for all who attended. As we met to discuss the future of geology, we were surrounded by the past. The Great Southern Hotel (Westin) was built in 1896. Today the hotel has been restored to its original elegance and is listed on the register of historic places. It was the stopping place for many a traveler. During their stay in the hotel travelers often discussed politics while resting in luxury.
Meeting activities included:
(1) Technical Sessions
(2) Exhibits
(3) Executive Committee and 
   Advisory Board Meetings
(4) Business Luncheon & Meeting
(5) Annual Awards Banquet
(6) Cafe Dinner Theater
(7) Geologic Field Trips
(8) Spouse Trips
(9) Special Events

The opening event included an elegant night at the William Graystone Winery, located in the Brewery District in downtown Columbus. Wine was served at the tables while guests enjoyed a buffet dinner cooked to order by the Graystone Winery chefs. During dinner all were entertained by a harpist. Raspberry champagne was served with desert.

"Let's Kill the Boss" was the title of the Mystery Cafe Dinner theater play. Dinner was a time to gather clues and interrogate suspects as well as solve the mystery of who killed the boss. It was a time for fun, relaxation and comradery.

A highlight of the meeting was the presentation of the first student chapter charter to the Wright State University Geology Department. As we look to the future, we are reminded that students currently in the universities are the geologists that will discover the resources we will all use tomorrow. We owe these students our encouragement and support for a bright tomorrow. Congratulations!

The Ohio Section Annual meeting committee members would like to thank all of the attendees for their support. We would also like to thank the exhibitors, sponsors and advertisers that made the 33rd Annual Meeting a resounding successes. As our logo states, Geology is the "heart" of our world. The status of our profession depends on our successful promotion of Geology to the world we live in. It has been our sincere pleasure to serve the needs of the AIPG membership by sponsoring the annual meeting in Columbus, Ohio.

TECHNICAL SESSIONS

Over twenty-five speakers presented informative and educational talks dealing with the future of geology. The political symposium focused on the
need for more effective government relations. Columbus Mayor Greg Lushutka welcomed meeting attendees to Ohio. During his talk he emphasized the need for sound science for informed decisions affecting city government. Craig Schiffries, our keynote speaker, provided us with insight into how geologists can influence the political system. We were glad that Craig could attend the meeting. His presence in Washington is important to all geologists. Thank you Craig for coming to Ohio.

Tom Fails lead a panel discussion on the basics of how to be a volunteer lobbyist. Also, included on the panel were Herb Eagon, John Howard and Thomas Bruns. As we move into the future, geologists need to become more involved in the political system. Increasingly, sound geologic advice is needed during negotiations with lawyers, regulators and politicians. As a result, it is important to know what works, what does not, what to avoid and what to focus on. Brent Huntsman presented an excellent talk on the status of geologist registration in Ohio.

As the nation debates the issues of economic reform and budgetary cutbacks, the existence of the United States Geologic Survey and many state geologic surveys were threatened with abolishment. Patrick Leahy, Chief Geologist with the USGS was on hand to address the future of the USGS. Thomas Berg, Ohio State Geologist, presented an informative talk on the status of the state geologic surveys. Both speakers provided insight into how the USGS and state geologic surveys are adapting to funding cutbacks on the state and federal levels. These men said that in the future geologic surveys will be increasing their role in public education and awareness of geology as a profession.

During the economic symposium, we heard many insightful presentations on the future of the minerals industries. Doug Crowell, with the Ohio Geologic Survey, presented an informative talk on the state of the coal industry in Ohio. Although coal is Ohio’s single-most valuable resource, coal production in the state continues to decline. Similar trends have been noted in other coal producing states. The primary reason for the decline in the coal industry, in the eastern US, can be traced to cost associated with the implementation of the Clean Air Act and its amendments.
John Kennedy, Editor of the Oil and Gas Journal, spoke on the long-term supply of oil and gas. He spoke on the increasing dependence of the nation on foreign oil supplies. Simultaneously, domestic oil and gas production has been declining. As a result, the United States is more vulnerable to supply disruptions than ever before in history. To compensate for the decline in both oil and gas reserves, the current administration has worked with Congress to enact several laws to rejuvenate domestic exploration and production.

Andrew Haumersson, with Continental Placer, Inc., addressed economic trends in the aggregate industry. Christopher Hartman, with the Franklin County Soil and Water Conservation district discussed the economic impacts related to soil erosion.

During the Environmental Geology and Hydrogeology Symposium, attendees heard papers on future trends for the industry. The availability of abundant clean ground water is often taken for granted. Kevin McCray, Executive Director of the National Ground Water Association presented an overview of the ground water industry. During the past two decades, the environmental industry has grown into a multi-billion dollar market. We heard an informative talk on the future of the industry and the changing role of the NGWA.

Wayne Jones presented a talk on the changing role of the Ohio Department of Natural Resources Water Resource Division. Today statistics, geochemistry and ground water modeling are being used as tools for ground water resource management. Douglas Wagner, Laidlaw Waste Systems presented an excellent talk on the technical design of new landfills. Ms. Christine DiCato-Thaxton, Geo Analytical, Inc., discussed the changing role of laboratories under government regulations. She presented an educational talk on how to find a laboratory to meet specific government regulations. Jayne Fitzgerald, Dames
and Moore talked on the standards and trends for companies involved with international work.

Those that attended the Future Trends and Technology Symposium, heard Dr. Frank Schwartz, Eminent Professor of Geology at Ohio State University; discuss the fate of university geologic science programs. Rebecca Petty, Principal Hydrogeologist, ODNR Division of Water discussed the computerization of the 830,000 well logs on file with the State of Ohio. Gary Rowe with the USGS discussed the use of transient tracers for the age-dating of young ground waters. He showed how the data was used to calibrate ground water flow models for the buried valley aquifer near Dayton. Robert Hayes, STS Consultants, presented a very informative talk on how hydrogeology is used in the courts and other legal proceedings.

As an added bonus, two excellent workshops were presented with the technical sessions. Work Shop 1 focused on Professional Environmental Liability Insurance. Paula Selvaggio, with the DENMARK Group discussed trends in Risk Management activities as they applied to hydrogeologists and geotechnical engineers. Several excellent case studies were presented to show how losses could have been avoided and risk reduced through advance planning.

Work Shop 2 focussed on how immunoassay test kits are being used in the field to make real time decisions. Roy Rivett from Millipore Corp. provided a history of the technique. He also discussed the principles on which immunoassay technology are based. He provided typical case histories, cautions, limitations and developments. Those present were treated to a demonstration on how to use the test kits in the field.

Many thanks are extended to Tim Sainey for putting together an excellent program of papers concerning the future of geology. Thank You Tim!
SHORT COURSES

For those with the time to attend, the short courses provided an opportunity to update technical skills and knowledge. The short courses were designed to help the practicing professional with business and technical management needs. Short Course 1 on Management Development for Geologists and Related Professionals was presented by David E. Fletcher and John H. White. The short course was developed in conjunction with the Colorado School of Mines. Those that attended were presented with techniques on how to effectively manage their businesses and projects. Topics covered during the two-day course included: identifying and setting objectives, strategic decisions and planning, accounting fundamentals, financial statements and managing risk while planning budgets.

Short Course 2 on Environmental Applications of Geostatistics was presented by Bruce Buxton, Battelle Memorial Institute. This course covered how to use geostatistical methods to solve problems in ground water hydrogeology, surface water, soil as well as air. Students were presented with case studies and shown how the underlying statistical methods could be applied to real world problems.

Short Course 3 presented information on Existing and Emerging Technologies in Ground Water Remediation. Dr. Frank Schwartz, Ohio State University and Dr. Robert Schincariol, The University of Western Ontario presented the course materials. Students were provided with useful information on pump and treat, soil vapor extraction, and air sparging remediation methods. The course also included an examination of more exotic alternatives such as bioventing, surfactant washing, and reactive barrier systems. Case studies and problem sets were used to help the student with problem solving on the job.

I would like to thank Kathy Epp for putting together an excellent educational program. Thank You Kathy!

FIELD TRIPS

Two field trips were developed to showcase Ohio’s Geology. These field trips were organized by Tom Berg, Ohio State Geologist. Field Trip 1 showcased the Ordovician fossils and glacial features of southwestern Ohio. Attendees toured John Bryan and Caeser Creek State Parks to examine the carbonate rocks
and collect fossils. The fossils in these rocks continue to add to our biostratigraphic knowledge of the Ordovician in North America and Europe. Along the way, travelers could observe the glacial deposits that cover the bedrock while imagining mile thick ice sheets.

Field Trip 2 included a trip to several industrial mineral locations as well as Hocking Hills State Park. This trip included a stop at the American Aggregates quarry south of Columbus to see the Devonian Carbonate rocks. Attendees were taken to visit a state-of-the art Olen sand and gravel quarry along the Olentangy River. At Hocking Hills State Park visitors studied exposures of the Black Hand Sandstone in their natural setting. Many spectacular exposures were carved by the glacial meltwaters. Over time, the stream erosion exposed the cross bedding associated with the interplay of the offshore bars and fluvial-deltaic systems.

I would like to extend a warm thank you to Tom Berg, for putting together an excellent program so that all could explore the wonders of Ohio's Geology. Thank You Tom!

SPOUSE TRIPS

Three spouse trips were designed to showcase the rich culture and history of Ohio. The first guest trip showcased the heritage of the historic German Village district located adjacent to downtown Columbus. On this tour visitors explored the old style German brick cottages that characterize the community. Spouses were invited into some homes to study the living styles and the unique architecture. Lunch was served at Schmitz Sausage Haus in the traditional German style.

Guest Trip 2 was a sightseeing tour to historic Roscoe Village founded in 1816. The houses and roads that make up the community were restored to their original splendor. Roscoe Village is nestled in the rolling hills of northeastern Ohio. Guests were treated to a horse-drawn flat boat ride down the historic Ohio and Erie Canal. The village is noted for its quaint stores and shopping. As part of the tour, guests also visited the famous Longaberger Basket Company. A fun filled trip was enjoyed by all.

The third Guest Trip toured the Franklin Park Conservatory. It is a 28-acre indoor botanical garden. Approximately 10,000 plants are contained in the collection, representing more than 1,200 species. The plants are displayed in nine climatic zones from around the globe.

I would like to say thank you to Jenny Rytel, for putting together an excellent program. Thank You Jenny!

BUSINESS LUNCH/ANNUAL AWARDS BANQUET

Many awards and honors were presented during the Business Lunch and Awards Banquet. Ralph Bernhagen was honored during the business lunch for his many years of dedicated service to the citizens of Ohio. All of my efforts were rewarded when Richard Bateman, Executive Secretary of The Geologic Society of London; presented me with an original 145 year old printed manuscript of Sir Charles Lyell's, Manual of Elementary Geology. It is a present that I will cherish throughout my life. Thank you Mr. Bateman for your thoughtfulness!

During the Annual Awards banquet President Bob Merrill passed out awards to the following individuals:
1. Ben H. Parker Memorial Medal went to Bill Fisher, CPG-2398
2. Martin Van Couvering Memorial Award went to Bill Knight, CPG-0153
3. John T. Galey, Sr. Memorial Public Service Award went to John W. Rold, CPG-0448
4. Award of Honorary Membership went to Robert R. Jordan, CPG-1262 and Charles Makking, CPG-1415
5. Presidential certificates of Merit were awarded to Thomas M. Berg, CPG-8208, Wilgus B. Creath, CPG-2334, Thomas G. Fails, CPG-3174, David R. Rensink, CPG-6399, James H. Williams, CPG-0374 and Margaret Kloska, SA-0044.

Many special thanks are extended to Tom Jenkins. Tom was Co-chairman for the annual meeting. He also acted as the hotel liaison. Thank You Tom!

In addition, a special thank you is extended to Sam Stowe for his work on editing the May Issue of the TPG. Sam was also responsible for editing the contents of the meeting program. A special thank you is extended to Mary Croll for coordinating the meeting registration. I would like to thank Scott Dailey for his help with budgeting and paying the bills. Thank you Scott.

The Ohio Section sends its best wishes to the Texas Section, may the 1997 annual meeting in Houston be a successful and rewarding experience!

Curtis J. Coe, CPG 6240
General Chairman,
1996 Annual Meeting
The Arizona Section of AIPG Invites You to the Tucson Gem and Mineral Show!

The Arizona Section of AIPG invites all AIPG Members and their guests to the section activities being held during the Tucson Gem and Mineral Show. The theme for 1997 features Arizona and copper minerals. The show is open to the public February 13 - 16, 1997 at the Tucson Convention Center. This is the single largest gem and mineral show in the world. There will be fossils, gems and minerals to delight every geologist, rockhound and even non-geologist. There are visitors from all over the world who come to Tucson for this event. Should you be planning a visit to Tucson for the show or as a winter visitor, please join our AIPG section for some activities and local hospitality.

On Friday, February 14, at 6:30 pm we will meet at the home of Dawn Garcia, CPG 8313 (AZ section 1996 president), for a casual evening. Richard Allen, CPG-6610 an accredited gemologist, will be demonstrating gem appraisal techniques. Everyone will have opportunities for hands-on experience using a mobile kit that Richard will bring with him. Dinner will be included. The cost is $7 per person. Please RSVP to Dawn (520/326-1898) by February 11, 1997.

On Saturday, February 15 at 10 am we will meet in downtown Tucson at the offices of the Arizona Geological Survey (416 West Congress Street). Dr. Jon Price, our national AIPG president and CPG-7814, will be the featured speaker at this meeting. Following the meeting, we will walk across the street to the Tucson Convention Center for a "behind the scenes" tour. Erick Welland, CPG-6892 and 1997 Chairman of the Gem and Mineral Show, will be our guide.

After the tour, everyone may explore the many Gem and Mineral Show activities.

The Arizona Section Members invite other AIPG Members and their guests to join us for these activities. Please contact Dawn Garcia for further information, including directions to the activities and hotel accommodations (ph: 520/326-1898; fax: 520/747-3491; e-mail: gwrinc@rtd.com).
AIPG National Meeting
1997

The TEXAS Section of the American Institute of Professional Geologists is pleased to announce that the 33rd ANNUAL MEETING will be held at the DOUBLETREE HOTEL POST OAK

in

HOUSTON, TEXAS

October 8-11, 1997

Theme of the meeting will be:
The 21st Century Professional Geologist - Training, Credentials, Business and Political Considerations

General Chairman
John L. De Vault
(713) 496-1521
Fax (713) 558-5876

Vice Chairman - Sponsors and Exhibits
Hugh W. Hardy
(713) 729-9208
Fax (713) 726-0456
Well, it’s done. The elections are over and both sides won. Maybe not what they wanted, but they won. Of course, in any contest there are losers, but are they really losers? There are a lot of very good people in this country who spent a lot of time and money with the hopes of getting a foothold in the political system. If they are truly interested, they will continue in that endeavor. They aren’t losers. You don’t get shot or exiled for trying to change the system, furthermore, you can vote for whomever you please. That’s what has allowed this country to remain great.

The months to come will bring many changes in the Administration. Who knows who will end up filling some of the newly vacated Cabinet positions.

There will be a lot of political appointments made to pay off debts. Political patronage always runs rampant after an election. Personally, there are a few vacancies I’d like to see, but I won’t babble on about that anymore.

During all the uproar and hubbub, the presses rolled at the Government Printing Office and the Federal Registers continued -- some of the contents may be of interest to you. They follow.


EPA is asking Federal Agencies for written commitment to the principles contained in the CEMP and a description of the agency’s plans for implementation.


Vol. 61, No. 202, 10-17-96, page 54120. Department of Interior, Bureau of Land Management, Proposed Rule, Appeals Procedures; Hearings Procedures. The proposed regulations provide more consistent procedures for administrative review of all BLM decisions the proposal also clarifies when and how BLM decisions go into effect and if an appeal will or will not stay the effectiveness of a BLM decision.

For further information contact: Jeff Holdren at (202) 452-7779, or Bernie Hyde at (202) 452-5057.

Vol. 61, No. 203, 10-18-96, page 54384. Department of Interior, Bureau of Land Management, 43 CFR Parts 3500, 3510, 3520, 3530, 3540, 3550, 3560, 3570. Leasing of Solid Minerals other than coal and oil shale. The proposed rule will reorganize solid minerals regulations to eliminate redundant language and streamline the regulations. For further information contact: Jim Horan at (202) 452-5023.

Vol. 61, No. 206, 10-23-96, page 55014. Department of Interior, Geological Survey. The acronym of the month award goes to the “Earth Observing System Land Processes Distributed Active Archive Center Science Advisory Panel” (EOSLPAACSAIP) who are gathering together to discuss DAAC. EOS, EODIS, GLP, IMS, and DEM. They forgot DESE and DOSE. By the time you read this, they will have met. Sorry you missed the meeting announcement.

Have a good Holiday Season.

F. B. "Ted" Mullin, CPG-1716, is currently a Supervisory Geologist for the Rocky Mountain Region, United States Forest Service. The Today in Washington column is a monthly feature and has been written by Ted since September, 1991.

---

**CORRECTION**

Two typographical errors in quotes attributed to George D. Klein’s letter in regards to “Acceptance and Unacceptance of a Job offer” in the Professional Ethics & Practices - Column 11 of the October issue of TPG.

Page 22, (under item 1: third line) should read “research assistant professorship.”

Page 23, (paragraph immediately after item 2) should read "bondage provision."
Professional Ethics & Practices - Column 13

Compiled by David M. Abbott, Jr., CPG-4570, Ethics Committee Chair, 624 South Vine St., Denver, CO 80209-4615, 303-715-1350, david-abbott@msn.com or DMAgeol@aol.com

This column begins the second year of Professional Ethics & Practices. I began hoping that some of you would comment on various issues raised and would contribute questions and situations of your own. You did. Thank you to all of you who've contributed to the column.

This year's columns start off with a letter I hope each of you will consider carefully and comment on. Compiling this column is fun, administering ethics complaints is not. Nevertheless it is an important job most of us probably haven't given much thought to unless we've become involved with one, and most of us have not. AIPG's Disciplinary Procedures, TPG, May 1996, p. 47-52, are important background reading for this one.

AIPG Disciplinary Procedures:
Comments on the Conduct of an Investigation

Scott L. McCreaery, CPG-8525, wrote, "I recently learned that the application for AIPG membership of a former colleague for whom I had been a reference was denied. I take my membership in the AIPG and my professional certification very seriously, and am quite selective in choosing those for whom I will be a reference. As such, I was somewhat surprised by the actions taken by the National Screening Committee. I was subsequently shocked to find that the denial of my colleague's application was due to allegations of a lack of professional integrity. These allegations were made by three former co-workers with whom the applicant and I had both worked for over three years. More importantly, the allegations were made relative to projects that I had an intimate familiarity with—I was the Project Manager on the projects in question, having day-to-day responsibility for technical and budgetary aspects of each of the projects. The applicant was the Project Director for these projects, a supervisory position encompassing technical and budgetary oversight.

"Many of the details of the allegations are unimportant, at least within the context of this letter. Suffice it to say that the applicant was accused of professional negligence and of lying to clients. Having held the position of Project Manager—commonly, as in this case, the one person with intimate knowledge of all aspects of a project—I know these accusations to be false. I know this because I was present when each alleged lie was made and when each so-called negligent decision was made. I was not afforded the opportunity to make these statements and clarify the situation, however, because I was never contacted during the investigation that was conducted by the Ethics Committee regarding the allegations made against the applicant.

"My understanding of the Screening Committee procedures in general and the specific facts of this case is this: once allegations of impropriety were made against the applicant, the Ethics Committee Chair assigned an 'investigator' to the case from among the members of the Ethics Committee. The role of this AIPG 'investigator' was to determine whether the allegations made against the applicant were substantiated and report the findings to the Screening Committee. This report is made through the Ethics Committee Chair and includes a recommendation as to acceptance or denial of the application. In this case, the assigned AIPG 'investigator' concluded that the allegations were substantiated and recommended against acceptance of the application in question. Unfortunately for both the applicant and the AIPG membership as a whole, the investigator failed to contact the one person who knew the most about the issues in question—me.

"While it can be assumed that I would be supportive of the applicant (I did, after all, act as a reference for this person), it should also be assumed that as an AIPG member in good standing I would want to protect the integrity of the membership and would answer any questions the 'investigator' might have honestly. Apparently, however, the guidelines that have been established for the..."
conduct of such investigations do not require that an applicant's AIPG-member references be included in any questioning done relative to allegations brought against that applicant. Nor, apparently, are AIPG 'investigators' required to question those most familiar with the technical and management aspects of a project on which allegations of professional misconduct have been raised. Based on my questioning of the Ethics Committee Chair after the denial of the application, it appears that the only people contacted during the investigation were those persons who levied the allegations against the applicant in the first place. I am concerned that the positions that two of the individuals who made the allegations previously held as AIPG officers at the Section level had undue influence on the scope of this investigation. Using the yardstick of propriety, much less the standard of scientific rigor and competency that the AIPG espouses, the integrity of the investigation conducted by the Ethics Committee does not hold up to scrutiny.

"The irony in this tale is that the applicant, a well qualified and highly ethical geologist with over 20-years experience, had previously chosen not to pursue AIPG membership because he perceived it to be an 'old boys' network.' This stigma is one that is characteristic of many less professional and less ethical self-certifying organizations and one that the AIPG must fight vigorously. I am concerned that, in this case, my friend's perception has been borne-out.

"I strongly urge the AIPG National Screening Committee Chair and the Ethics Committee Chair to review their procedures for addressing allegations of ethical impropriety against applicants. Clear procedures stipulating the depth of inquiry into allegations of impropriety should be developed and a peer review of investigative procedures should be conducted on a case-by-case basis.

"With regard to the case in point, after my discussion with the Ethics Committee Chair and identification of the oversight which marked this investigation, the Chairman suggested to both the applicant and to me that the applicant was free to appeal the finding of the Ethics Committee investigation and that further investigation would subsequently follow the appeal. My friend, his concerns about the 'old boy' nature of the AIPG realized, chose to pass on the Ethics Committee Chair's invitation. I support his decision and, under similar circumstances, would probably have done the same. I believe that the AIPG has done this former-applicant an injustice and owes him a written apology. It seems to me to be the ethical thing to do."

Comments: McCreery's main suggestion, and the one we discussed which prompted his letter (at least in part), is that the Ethics Committee write a set of investigative procedures. Currently no set procedures for conducting an investigation exists. The Disciplinary Procedures set out how complaints shall be handled but do not have specific investigative points to follow. Having such a set of procedures may be of assistance and your suggestions are welcomed. I will simply note that in my experience, each inquiry is different and delineating a list of specifics "to dos" which applies generally is difficult. Consider your geologic investigations. Are they all the same?

As for some of McCreery's other comments, some response seems appropriate. First, an ethics investigation, like any "legal" action, differs from scientific investigation and debate in a couple of very fundamental ways. An ethics inquiry must reach a conclusion and a decision made. The issue cannot be debated back and forth, dropped for a while, and then re-visited like, for example the debate over continental drift from the time of Wegener's proposals (1912) on through the present.

Second, the Disciplinary Procedures clearly set up an adversarial system of arriving at the truth, again like legal disputes. The various steps of the Disciplinary Procedures set out a series of steps allowing for review after each step. The investigation phase substantiates an initial complaint. It's purpose is to determine whether there appears to be a valid complaint and to obtain documentary support for formal charges. It is not to inquire into the entirety of the matter. The situation is just like that were a district attorney presents evidence to a Grand Jury, whose job is to determine whether there is enough evidence to bring charges, not whether the party charged is guilty or innocent.

Once grounds for a complaint, based on the Code of Ethics, are established, a formal complaint is prepared and sent to the respondent, the party against whom the charges are made. A copy of all documents supporting the complaint are provided. It is now the respondent's turn to present evidence rebutting the allegations in the complaint. A hearing to decide the issues in dispute between what is alleged and the respondent's rebuttals is held, if the respondent elects to dispute the allegations. The hearing is a time for a full presentation of all the relevant facts and issues as seen by both the plaintiff and the respondent.

McCreery asserts that he should have been among those contacted during the investigation because he was a sponsor. The investigation's purpose was to substanti-
ate the allegations made in the initial complaint. The record does not suggest that McCreery had relevant information about the specific allegations and that he should be contacted. In any case, had the respondent decided to present McCreery’s information by contesting the allegations in the formal complaint, McCreery’s information would have been considered. The decision not to fully pursue the matter was made by the respondent, not AIPG.

As for the assertion that a “good old boy” network was involved, that may be what the respondent and McCreery believe; I do not. I had no information regarding what various parties may or may not have done for AIPG at a Section level nor is such information in any of the documents constituting part of the files. There are names of people I don’t know personally and, as far as I know, neither did the investigator, who need not be and, in this case, was not a member of the Ethics Committee. (The investigator was selected because of experience dealing with problem applications.) In short, no “good old boy” networking that I know about occurred.

Finally, McCreery alleges in his letter that the allegations made against the respondent were lies and that he was present when each “lie” was made. If true, McCreery has an obligation to substantiate his own allegations (Standards 1.1 and 5.5). Abuse of AIPG’s Disciplinary Procedures clearly warrants vigorous action, which I am fully prepared to undertake.

In summary, should AIPG adopt specific investigative procedures and what specific procedures would you recommend including? Contributions will be much appreciated.

Scope of AIPG’s Code of Ethics: Application by an Ex-Con

Professional ethics was the topic of a recent monthly meeting of the Colorado Section. A particular news item generated some interesting discussion on the scope of the Code of Ethics, the admissions process, and a reprise of one of the initial topics of this column (#1, Nov. ’95). The item was the following news clip.

"Man Sentenced to 8 Years for Incest: A former oil-company geologist accused of long-term incest with a stepdaughter, beginning when she was age 6, was sentenced in Jefferson County District Court yesterday to eight years in prison" (Rocky Mountain News, 2/6/90, p. 14).

Discussion of what obligation AIPG had to formally discipline a member or applicant, should the “former oil-company geologist” have been one, covered a number of earlier columns. My sense of the resolution of those discussions was that because the Incest does not involve geological practice (in contrast to the case of a professor and student), AIPG would not bring an ethics case. The conviction itself provides what society deems appropriate punishment. However, this case can serve to present a different issue.

Assume that the convicted geologist has served his time (an 8-year sentence would normally result in about 4 years of actual time served) and is again practicing geology. Further assume that the geologist decided to apply to AIPG for membership. Should the application be accepted? How would AIPG know of the conviction and time served? Does the nature of the offence make a difference; would you accept this particular applicant and not one whose conviction had been based on geologic fraud such as the geologist discussed in the last part of column 12 (Nov. ’96)?

The discussion addressed some of these questions. The question concerning how AIPG would know of the conviction noted that the résumé section would have to account for the 4+ years spent out of the profession (in jail) in some way and the honesty with which this time period was accounted for could well indicate a great deal about the applicant’s honesty. If the applicant was not honest about this period, that would definitely be grounds for rejecting the application. The opinion that the type of conviction would make a difference was also expressed. A fraud conviction, which involves both lying and theft, or an embezzlement conviction were viewed as having more direct bearing on one’s professional practice and therefore more clearly warranting rejection of the application. What do you think?

Does the length of time since the conviction make a difference to you? The Disciplinary Procedures provide that rejected applicants may re-apply after three years. Although the Executive Committee may defer admission of someone terminated with prejudice for another 3 years, "[t]hereafter, in the absence of a showing of subsequent additional violations, prior disciplinary action shall not be considered" (Section 6.3, TPG, May ’96, p. 51). Do you agree with this? Should the Disciplinary Procedures be changed? How and why?
Dear Editor:

I applaud Mr. Lamarre (CPG-6798) for his timely article entitled "Predicting Success of a Geologist in the Environmental Restoration Field," which appeared in the September 1996 issue of The Professional Geologist. In the business world of today, Mr. Lamarre’s message applies to all geologists, engineers, and scientists. Unfortunately, Mr. Lamarre is of the misconception that only geologists in the environmental field are juggling multiple duties that require the survival skills necessary in this day of downsized corporations focusing on the bottom-line. I would like to meet the mining industry geologist described by Mr. Lamarre, who spends up to 95 percent of their time doing typical geologic tasks, just so I can tell that person to never quit their ideal job.

As a mining industry geologist, the trend by mining companies is that management funnels anything dealing with below the ground or somehow having to do with the ground through the geologic staff. I’d like to share some of the duties I as a geologist have experienced in working for medium-to-smaller mining companies.

Besides the so-called "typical geologic tasks" today’s mining geologist is involved in, he/she deals with mine permitting activities, regulatory compliance activities, water issues, dust issues, reclamation and yes, even environmental issues. We mining types prepare reports and attend and represent our firms at the popular public meetings generated by requesting a mining permit. That usually occurs after we have coordinated (for up to several months) the multi-disciplinary team of consultants, lawyers and community relations experts toward the goal of an environmentally sound mining operation and reclamation. Once the permits are in place, our regulatory friends visit us often. It gets to be a bit much so we develop a budget for consulting services and coordinate (and control) any number of consultants when we are not looking at new properties, talking to farmers about acquiring their property, reading up on new or pending regulations or watching the driller’s sample reserves. But as the permittee, management expects my staff or I, not the consultants, to make sure the regulations are complied with, budgets are kept, regulators are kept informed, and the neighbors are happy. Of course, since mining is so popular and geology is such a novelty, management likes the geologists to coordinate the open houses, tour the school children, and talk at the local chamber of commerce luncheon.

I’m sure several other groups like petroleum and government geologists could chime in with their similar diversified duties necessary today. In fact, lets hear from some other people so we can break down the misconceptions within our own industry.

Is my description any different than Mr. Lamarre’s description of the environmental geologist? I think not. Is this what I was academically trained for? Not entirely, but I wouldn’t trade it for anything. Besides, you can’t learn attitude, work ethic, a sense of humor, and common sense in school. Mom, Dad, brothers, sisters, peers, and employers should help with developing these traits/skills.

The keys today are being flexible, willing to learn new skills, being a team player and doing what it takes to get the job done well. Professors, just keep being innovative, give us new hires with sound and state-of-the-art geologic skills, and encourage the kids to enjoy school, the good employers and mentors will do the rest.

James W. Schmitt, CPG-6637

Retreating Uranium Price should not affect Increases in Wyoming Production

On October 1st, the Uranium Exchange listed the spot market price of uranium at $15.25 per pound of yellowcake, a drop of twenty-five cents from the high of $15.50 reported on the first of September. This is the first decrease since spot sale prices of yellowcake began increasing from the $7.20 per pound reported in March of 1995.

According to Ray Harris, uranium geologist with the Wyoming State Geological Survey, at least one reason for the recent doubling of the spot sale price for uranium was less than expected sales from the Commonwealth of Independent States (CIS). These expected sales may have started increasing. Some of the CIS countries, including Russia, have large stockpiles of uranium, which they have been selling on the world market at relatively low prices.

Because most yellowcake sold from Wyoming’s two uranium operations is under contract, Harris feels this slight decrease in the price of yellowcake will not have any significant effect on the increasing production of uranium in Wyoming. Contract prices are not affected by short-term changes in the spot market price, and the worldwide uranium demand by nuclear power plants continues to increase.

Wyoming’s two uranium producers, Power Resources and COMIN, operate in-situ uranium recovery operations in the Powder River Basin. Both Power Resources and COMIN have announced production increases, and they have constructed additional recovery fields to accommodate these increases. In addition, Cameco Corporation, a Canadian company, recently announced its intentions to acquire Power Resources as part of a larger purchase of Magnox Electric’s North American holdings.
Gale Curtis Knutsen, CPG-9913

by Timothy J. Rohrbacher

My friend Gale C. Knutsen was born February 28, 1952 in Seattle, Washington and died October 2, 1996 when Aeroperu flight 603 crashed off the coast of Lima, Peru.

Gale Knutsen grew up in the Seattle, Washington area, learning to love the mountains and waters of the northwest. He graduated from Onalaska High School in 1970 and then spent four years in the US Army as a cryptographer, stationed at the Misawa Air Force Base in Japan. Upon returning home he studied Geology at Washington State University where he earned a BS degree in 1976 and an MS degree in 1979. He married Debbie Nabbefeld on February 2, 1977 in Tacoma, Washington. In 1989 he earned an AA degree in Business Administration from Northern Nevada Community College in Elko, Nevada. During college summers and following graduation, he worked as an exploration geologist for Canadian Superior Mining Company evaluating a number of gold and silver deposits in the northern Rocky Mountains.

Gold deposits and exploration continued to attract Gale and in 1980 he was hired by Newmont Exploration, Ltd. to manage the exploration and development of the world-class Rain gold deposit. Here he gained practical experience in mining law, geochemical and geophysical investigations, mining permits and environmental assessments. Odin Christensen, Chief Geologist for Newmont Exploration related: "In 1982, Newmont Gold Company purchased the sprawling T Lazy S Ranch to secure patented mineral rights to the Gold Quarry gold deposit. The purchase brought to Newmont 400 square miles of ranch land, a diseased herd of cattle, and a bunch of cowboys.

Gale Knutsen was given the responsibility of designing and executing a five-year exploration program to demonstrate that no other gold deposits existed, so that Newmont could sell the bothersome ranch. Soon his exploration team was distracted by their discovery of the Post deposit, then the Genesis deposit, then the Capstone deposit, then the Tusca deposit, then the Bobcat, and the Lantern, and the Beast, and the Deep Star, and on and on. The ranch lands still have not been sterilized. In the intervening years, Newmont's annual gold production from the area has increased 10-fold (160,000 to 1,600,000 ounces/year), reserves remaining have been increased 4-fold (8 million to 33 million ounces), and Newmont has produced more than twice the reserves known at the time of initiation of the program (16 million ounces). Yes, Gale's geological team failed spectacularly in their mandate to sterilize the land, but because of it, almost 3000 people are directly employed, and the citizens of northern Nevada and the United States have benefitted greatly."

In 1986 Gale was promoted to Senior Geologist with responsibilities for exploration and mine development geology. Under his direction environmental remediation, drill hole plugging, and safety programs were designed and implemented while gold deposit modeling was enhanced. For his efforts and leadership, Newmont awarded Gale their "Gold Finder Award", given to only a few of the most deserving explorationists during the history of the company. In 1989 he was promoted to Manager of Exploration with Newmont Mining Corporation and was responsible for all exploration, development, and mining geology activities on the Carlin Trend in Nevada and in the eastern Great Basin geologic province. One associate recalled Gale's compassion for an old prospector who held an over-riding royalty agreement with Newmont on property that would not come into production during his life. Gale was instrumental in rewriting the Newmont contract, thus allowing the prospector to obtain value from the property while he could still enjoy it.

Gale's managerial capabilities and ability to learn new languages were tested in 1990 when he assumed the duties of Director of Exploration for Empresa Minera Newmont, the Spanish subsidiary of Newmont Mining Corporation. Charged with the exploration and development of the Salave gold deposit in Asturias, Spain, he led the geological, geotechnical, environmental, and archeological investigations of a deposit originally developed during the pre-Roman era. Upon their return from Spain, Gale and his family moved to the Denver, Colorado, area where he continued his exploration activities out of the
corporate offices. These activities took him to Canada, Alaska, Australia, Africa, and South America.

Gale joined the US Bureau of Mines in mid-1992 as Chief, Intermountain Field Operations Center in Denver, Colorado. He was involved in establishing mineral-environmental studies and abandoned mined land inventories, while improving the quality of mineral assessments on Federal lands. He fostered an atmosphere that allowed the staff to create business opportunities to leverage Bureau expertise. Partnerships were formed with Bat Conservation International, National Biological Survey, the Bureau of Land Management, USDA Forest Service, the EPA, various State agencies, National Renewable Energy Laboratory, and US AID, to name a few. When the Government of Peru requested assistance in establishing environmental regulations for their energy and mining industries, Gale was selected to assemble an international team of experts to study and recommend environmental guidelines that did the job with minimum negative effect on the Peruvian economy.

Gale had many difficult hills to climb at the Bureau, but the most difficult occurred shortly after he started with the Bureau when two of his staff were killed by a lightning strike in western Utah. He showed compassion and understanding for the affected families and friends of those fallen geologists. Subsequently, he field safety methods and handbooks were revised by Intermountain Field Operations staff and became the standards for the Bureau and the Department of the Interior. With the forecast of the US Bureau of Mines' closure, Gale began looking for alternative employment, first an examination of coal resources in Peru and then a consulting assignment to evaluate a gold and tin deposit in Zaire, Africa. The Zairian property was purchased based on Gale's recommendation and is presently being developed.

Upon closure of the Bureau of Mines in February 1996, Gale began employment with Cyprus-Amax Minerals Company as Exploration Manager for Peru, Ecuador, and Bolivia. Although much of his time was spent directing exploration activities around the Cerro Verde property and the southern Peru Copper Belt, he managed the crew involved with the discovery and evaluation of a new copper deposit in northern Peru. Gale continued to build a positive relationship with Buena Ventura Mining Co., Cyprus-Amax's Peruvian partners, and investigated Peruvian privatization opportunities at Antamina, Las Bambas, and Quicay. His technical accomplishments were significant for the brief eight months on the job; however, his management of the exploration offices, and the development and motivation of his Peruvian geologists into an efficient exploration team may be his greatest contribution to Cyprus-Amax Minerals Company and the people and country of Peru.

Gale enjoyed travel and adventure, whether he was learning from coal mine tours, inspecting mining-related environmental problems in Peru or Colorado, or examining complex gold deposits in central Africa. He had a unique ability to observe a problem or geological sequence, put the scenario in perspective, and suggest logical solutions. He was always looking for the better "mouse trap"... how can you do the job more efficiently? How can you obtain a "quantum leap" forward in productivity? He never allowed his staff to climb into their comfort zone and rest on their merits.

One might think that an explorationist and manager of this caliber would be totally engulfed in his work and have little time for family functions - but family values and quality time with his wife and children were served with the same high energy and planning that he had on the job. Gale never left any doubt that Debbie was the co-captain of the family team and that team came first in his life. I can remember several occasions when he postponed spontaneous evening work with his manager to attend a previously planned family event. He was a scoutmaster for five years and enjoyed family camping and travel on a regular basis. Gale had mastered the secret of being the best at home and at work. He will be truly missed by his family and friends. Gale Knutsen is survived by his wife, Debbie, daughter, Valerie, and son Derek.

CLASSIFIED ADS

The Professional Geologist accepts classified ads. Ads are at the rate of $0.75 per word, minimum charge of $25. Just write out the ad, count the words and send it to us with prepayment. Ads paid by Visa or MasterCard can be faxed in. Ads received prior to the first of the month will appear in the subsequent edition.

For further information or assistance, call (303) 431-0831, fax (303) 431-1332, e-mail: alpg@alpg.com, or wjd@alpg.com

GEOLOGICAL PROJECT ANALYST
(Class Code SC57): STATE OF WYOMING. Location: Wyoming State Geological Survey, Laramie. Full-time, permanent position as head of the Coal Section. Requires the equivalent of a Master's Degree in Geology plus two years or more experience in the geology of coal, coal characterization, coal petrography, and resource assessment. Preference will be given to those applicants having experience with personal computers. Salary range: $2,339 - $2,961/month depending on qualifications. Obtain official applications from the Personnel Division, Emerson Building, Cheyenne, Wyoming 82002-0060, (307) 777-7188, FAX (307) 777-7275, or from Job Service. Return completed applications in duplicate, along with college transcripts of relevant course work, to the address above. Open Until Filled. Applications should be submitted promptly. Vacancy will close without advanced notice. An EEO/ADA employer.
AIPG MEMBERSHIP BENEFITS

Certification

AIPG certifies the qualifications of professional geologists prior to admitting them into membership. By means of a rigorous and thorough peer review process, the Institute investigates applicants who voluntarily apply for self-regulation through the Institute. This screening carefully evaluates their education, experience, technical competence, and ethical conduct. If they meet AIPG’s high standards, applicants are granted Certification and the title of "Certified Professional Geologist" (CPG). When the letters CPG follow an individual’s name, they proclaim to the public that this person has met the standards and subscribes to the Institute’s Code of Ethics and By-laws.

Representation

Members are represented by qualified geological professionals. Congress, Legislatures, and Federal and State agencies are lobbied on specific mining, petroleum, water, environmental and other issues of special interest to geologists.

A portion of AIPG’s monthly magazine The Professional Geologist (TPG) is devoted to reporting developments at all government levels. Thirty-six sections of AIPG provide group representation on a state or regional level and offer opportunities to meet, work and exchange ideas and information with colleagues.

Education

At the national and section level, AIPG provides materials designed to enhance the professional knowledge and skills of its members. Educational opportunities range from seminars and short courses to sectional and national meetings. To encourage high standards of educational programs, the Institute recently established a program of Accreditation of Continuing Education opportunities offered by other organizations.

The Institute prepares and distributes comprehensive publications giving background and scientific explanations on geologically-related matters of public concern. Topics include: ground water, radioactive waste, and hazardous waste.


Insurance

Professional liability, health, and life insurance are available to members.

Information

AIPG disseminates information to its members and to the public in a number of ways on a wide variety of topics. The Institute publishes a monthly magazine The Professional Geologist (TPG). It is mailed to members and interested individuals, businesses, and political leaders. Subscriptions are available to non-members.

A comprehensive Membership Directory is published annually. Copies are sent to federal, state, regional and local governments, libraries, consulting firms, corporations, and other potential users of geologic services throughout the United States and abroad. The Directory may also be purchased by non-members.

REQUEST FOR APPLICATION AND ADDITIONAL INFORMATION

NAME__________________________________________

EMPLOYER_____________________________________

STREET_______________________________________

CITY__________STATE____ZIP_________________

DAYTIME PHONE______________________________

Mail, fax, e-mail, or call:
AIPG
7828 Vance Drive, Suite 103
Arvada, CO 80003-2124
(303) 431-0831 - FAX (303) 431-1332
E-mail address: aipg@aipg.com

Please send me information on:

☐ Certification - (degree and 36 semester hours in a geological science, plus five years of experience).

☐ Candidate for Certification - (degree and 36 semester hours, but less than five years of experience).

☐ Student (declared a major in a geological science).

☐ Continuing Education ☐ Advertising Rates

☐ Insurance ☐ TPG Subscription

☐ Publications ☐ Insignia Items
1997

**Jan. 6-8.** High-resolution Geophysics Workshop, Tucson, AZ. Contact: Ken Sternberg, LASL, MGE Dept. Bldg. #12, University of Arizona, Tucson, AZ 85721, Ph.: (520) 621-3711, Fax (520) 621-8330, e-mail: hires@nisee.uz.ch.

**Jan. 13.** IRIS Site Remediation Course, Dayton, OH. Contact: Write State University, Center for Ground Water Management, 3640 Colonel Glenn Hwy., 056 Library, Dayton, OH 45435, Ph.: (513) 875-3643, e-mail: IRIS@desrec.wri.edu.

**Feb. 2-5.** International Society of Explosives Engineers, 23rd Annual Conference, Las Vegas, NV. Contact: ISSEE, 29100 Aurora Rd., Cleveland, OH 44139, Ph.: (216) 349-4004, Fax (216) 349-3788.

**Feb. 24-27.** SME Annual Meeting & Exhibit, Denver, CO. Contact: SME, P.O. Box 625002, Littleton, CO 80126-5002, Ph.: (303) 763-3132, Fax (303) 979-3461, smanet@aol.com, http://www.smanet.org.

**Feb. 25-28.** 28th Annual Conference and Trade Exposition, Erosion Control and the Environment Working in Harmony, Nashville, TN. Contact: Andrew Hackett, IECA Technical Program Chair, Ocean Breeze City Cc., Inc., 10276 Riverside Dr., Palm Beach Gardens, FL 33410, Ph.: (407) 627-4407, Fax (407) 627-4408.


**Mar. 25-26.** Marine Castics in the Southern Midcontinent, Norman or Oklahoma City, OK. Contact: Kenneth S. Johnson, OK Geological Survey, 100 E. Boyd, Room N-131, Norman, OK 73019, Ph.: (405) 352-3031, Fax (405) 352-7089.

**Apr. 6-9.** AAPG Annual Meeting, "Future Legates", Dallas, TX. Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101-0979, Ph.: (918) 560-2679, Fax (918) 560-2684, e-mail: dkeim@aaapg.org.

**Apr. 6-8.** 6th Conf. Seiches, Eng. & Env. Impact Karst, Springfield, MO. Contact: B.F. Beck, P.E., LaMoreaux & Associates, Inc., P.O. Box 4878, Oak Ridge, TN 37831-4878, Ph.: (423) 483-7483, e-mail: pelarar@usei.net.

**Apr. 22-29.** 1997 GSA Penrose Conference, Paleoecene/Eocene Boundary Events in Time and Space, Albuquerque, NM. Contact: Dr. Spencer Lucas, NM Museum of Natural History, 1801 Mountain Rd. NW, Albuquerque, NM 87104, Ph.: (505) 841-2873, Fax (505) 841-2866, e-mail: lucas@darwin.nnmmnabq.mus.nm.us.

**Apr. 22-29.** Pacific Northwest Metals and Minerals Conference, Conference Ctr., Ph.: (509) 747-0769, e-mail: aberg@on-ramp.ioc.com.

**May 8-10.** 48th Highway Geology Symposium - symposium and field trip, Knoxville, TN. Call for papers - deadline January 15, 1997. Contact: Harry Moore, TN Dept. of Transp., Geotechnical Section, P.O. Box 58, Knoxville, TN 37901, Ph.: (423) 594-9436, Fax (423) 584-9310.

**Jun. 1-8.** CSPG-SEPM 1997 Joint Convention, Sedimentary Events and Hydrocarbon Systems, Calgary, Alberta, Canada. Call for papers - deadline February 1, 1997. Contact: CSPG Convention Office, CSPG 4505, 206 - 7th Ave. S.W., Calgary, Alberta, Canada T2P 0W7, Ph.: (403) 264-4860, Fax (403) 264-5988, e-mail: cspg@cspg.org or www.cspg.org/csgsepm97.


**Jul. 15.** Ground Water Hydrology, Dayton, OH. Contact: Wright State University, Center for Ground Water Mgmt., 3640 Colonel Glenn Hwy., 056 Library, Dayton, OH 45435, Ph.: (513) 873-3648, Fax (513) 873-3649, IRIS@desrec.wri.edu, http://biology.wright.edu/cgw/cw_home.html.


**Jul. 28-Aug. 1.** Geoscld II, Learning about the Earth as a System, University of Hawaii at Hilo, Hawaii. Abstract submission deadline is December 6, 1996. Contact: M. Frank Wet Ireten, Geoscld II Registration, Education & Research Directorate, American Geophysical Union, 2000 Florida Ave., NW, Washington, DC 20009, e-mail: fireton_agu.org.

### NOTICE

**NATIONAL SCREENING BOARD MEMBERS WANTED**

CPGs willing to review member and affiliate applications are encouraged to contact Steve Testa at (714) 248-9328.

### ASSOCIATE EDITORS WANTED

CPGs willing to work on theme issues of the TFG, special publications in their field of expertise, should contact the publications manager, Wendy Davidson, at (303) 431-0831 or wjd@aitg.com.

---

**AIPG ANNUAL MEETINGS**

<table>
<thead>
<tr>
<th>October 8-11, 1997</th>
<th>October 3-7, 1998</th>
<th>October 5-8, 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houston, Texas</td>
<td>Baton Rouge, Louisiana</td>
<td>Anchorage, Alaska</td>
</tr>
</tbody>
</table>

---

**ADVERTISERS INDEX**

| AIPG Insignia | 10 |
| AIPG Publications | 4 |
| AIPG Publication | BC |
| Airmag Survey, Inc. | 24 |
| Geraghty & Miller, Inc. | 25 |
| Krueger Enterprises, Inc. | 5 |
| Strata | 23 |

---

**AIPG Membership Totals**

<table>
<thead>
<tr>
<th>Totals</th>
<th>As of 12/05/95</th>
<th>As of 12/16/96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>4,540</td>
<td>4,600</td>
</tr>
<tr>
<td>Retired</td>
<td>521</td>
<td>501</td>
</tr>
<tr>
<td>Affiliates</td>
<td>83</td>
<td>127</td>
</tr>
<tr>
<td>Honorary Members</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>TOTALS</td>
<td>5,147</td>
<td>5,233</td>
</tr>
</tbody>
</table>
APPLICATIONS RECEIVED - (November 15, 1996 - December 16, 1996)

Applicants for certification must meet AIPG’s standards as set forth in its Bylaws an education, experience, competence, and personal integrity. If any member or holder of a factual information to all applicant’s qualifications in regard to these standards, whether that information might be positive or negative, please mail that information to the Headquarters within thirty (30) days. This information will be circulated only as 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 applicant’s rejection may be called as a witness in any resulting appeal action.

APPLICANTS FOR CERTIFIED PROFESSIONAL GEOLOGIST
NM-Brothow, William A.
701 Three Crosses, Roswell NM 88201, Sponsor: James

New Certified Professional Geologists

TN-Alino, Nickonor M., CPG-9987
504 Brookhollow Drive, Maryville TN 37804, (423)990-3211

Mi-Baldamanni, Laura S., CPG-9795
615 Randolph Street, Apt. 108, Northville MI 48167, (313)844-9000

NH-Bannon, James P., CPG-9988
2 Francenest Turnpike, Mont Vernon NH 03057, (603)72-2611

IL-Borey, Peter E., CPG-9963
1106 Seward Street, Unit 2-E, Evanston IL 60202, (312)704-8553

VA-Beard, James S., CPG-9989
401 Haistown Road, Martinsville VA 24112, (703)966-8611

VT-Bowes, James B., CPG-9990
P.O. Box 1054, Montpelier VT 05602, (802)229-4600

IL-Brunette, Charles C., CPG-9991
P.O. Box 339, Janice Road, Aurora IL 60506, (708)955-6789

NY-Calderone, Gino M., CPG-9976
P.O. Box 314, High Falls NY 12440, (588)28-2700

KY-Cuthart, Gregory L., CPG-9964
305 Stonehenge Way, Lexington KY 40503, (606)254-8223

MI-Feorg, Andrew John, CPG-9977
2020 Litchfield, Detroit MI 48211, (313)626-1640

FL-Gibson, Gail C., CPG-9993
25048 Five Court, Bonita Springs FL 33925, (239)732-2902

FL-Girardot, Gerald B., CPG-9992
318 Oceanwalk Drive South, Atlantic Beach FL 32233, (904)260-7012

MI-Gulotta, Eugene J. Ill, CPG-9978
2454 Argus St, Grand Rapids MI 49506-5613, (616)844-5000

MO-Handley, Steven J., CPG-9994
226 W. Essex Avenue, Kansas City MO 64105, (816)426-0900

NY-Harvey, Jesse P., CPG-9995
209 West Lincoln Avenue, Bannockton MI 60601, (708)299-9933

NY-Hoffclaw, Stuart R., CPG-9945
203 Kaymer Drive, North Syracuse NY 13212, (315)485-6535

MI-Jolls, Brian G., CPG-9979
5800 High Street, Bath MI 48808, (517)373-9097

MI-Krug, Donald J., CPG-9980
2165 Cumberland, Kalamazoo MI 49006, (616)239-1600

MI-Mahanow, Elizabeth N., CPG-9966
207 Salem Court #1, Princeton NJ 08540, (609)208-9923

FL-Markway, Richard M., CPG-9996
2109 St. Andrews Drive, Cantonment FL 32533, (904)344-6573

MI-McMenone, A. L., CPG-9981
22096 Ferith, Livonia MI 48154, (313)626-6000

KY-Montgomery, Raymond J., CPG-9967
P.O. Box 8485, Parkhicks KY 40202-8485, (859)241-5871

FL-Nicola, Bruce W., CPG-9997
1718 Osprey Lane, Lutz FL 33549, (813)352-4447

MA-O’Leary, John D., CPG-9968
71 Ring Road, Plympton MA 02367, (617)327-4253

NY-Pare, Christopher G., CPG-9969
3351 Longfellow Avenue, Windsor ON 11, Canada (810)922-2228

IL-Perry, Russell R., CPG-9970
3112 Ridge Crest Drive, Bloomington IL 61704, (309)597-6729

MI-Potter, Darrell L., CPG-9980
4314 Heartfield Drive, Traverse City MI 49684, (616)273-2202

NY-Rhodes, James P., CPG-9983
330 Homestead Road, Bayport NY 11705, (516)599-6535

NY-Ridsenow, James A., CPG-9998
3-24 Farnsworth Drive, Singers Point Jacksonville FL 32219, (904)545-6409

SD-Rucks, Robert G., CPG-9999
4216 Huntington Circle, Sioux Falls SD 57103, (605)344-6000

MI-Smits, Lakshmi N., CPG-9984
26351 Grand River Avenue #203, Farmington MI 48335, (248)473-0720

SD-Sowyer, John F., CPG-10000
13866 Bogus Jim Road #1, Rapid City SD 57702, (605)346-2229

MA-Schilling, Keith R., CPG-9973
2220 New York Avenue, Des Moines IA 50318-3450, (515)258-0531

NY-Shields, Daniki M., CPG-9972
282 Saticoy Avenue, Buffalo NY 14216, (716)856-5536

NY-Smith, Jacqueline A., CPG-10001
199 Sanders Ave., Scotia NY 12302, (518)439-8447

KY-Spalding, Thomas S., CPG-9973
3049 Radiance Road, Louisvile KY 40220, (502)549-6470

MI-Tolando, Jean, CPG-9985
7284 Rivine Road, Kalamazoo MI 49009, (616)384-5117

NJ-Van Dyke, Nancy V.R., CPG-9974
6 Concord Road, Randolph NJ 07620, (201)356-3601

OH - Wilheim II, Robert W., CPG-9949
9320 Summit Street NW, Clinton, OH 44216, (216)624-2000.

NEW CANDIDATES FOR CERTIFICATION

Mi-Bellman, Bruce K., CFC-0128
3511 Waverly Hills Road, Laning MI 46117, (216)27-0240

TN-Bond, James A., CFC-0131
464 Saint Louis Road, Knoxville, TN 37921-5185, (423)481-3552

New Student Affiliates

OH-Clark, Paul B., SA-0046
4206-C Commerce Drive, Dayton OH 45424, (937)345-1085

VA-Crabtree, Lance W., SA-0067
1071 Dougall Ct, Great Falls VA 22066

OH-Khoe, Cheryl A., SA-0069
1028, Nicholas Street, Dayton OH 45410, (937)345-1085

OH-Maxwell, Stephen, SA-0070
600 Windmere Drive, Troy OH 45373

NJ-Marcocci, Claudia M., CFC-0130
63 Frederick Street, Little Ferry NJ 07643, (973)726-3759

CT-Neel, John C., CFC-0126
210 New Carpa Avenue, Northwell CT 06850, (203)542-5100

NJ-Ruhl, John II
1511 Longley Court, Somerville NJ 08876-720, Sponsor: Carl Norman, Eric Kinsel, John Blankenreipa

PA-Walsh, H. T.
943 Jocnam Avenue, Pittsburgh PA 15202. Sponsor: John S. Witherspoon, Steve Pettit, Paul Weiss, Ken Meek

PA-Walsh, H. T.
943 Jocnam Avenue, Pittsburgh PA 15202. Sponsor: John S. Witherspoon, Steve Pettit, Paul Weiss, Ken Meek

NJ-Williams, John L.
2400 B 4th Street, Las Alamos NM 87544, Sponsor: Steve Colburn, Cathryn Stewart, Don Bielewski

OH-Zakrzewski, Mark F.
3011 Redford Road, Parma OH 44124, Sponsor: David Mustafoga, J. Scott Biegler, Richard Laubacher.
HOME BUYERS’ GUIDE to GEOLOGIC HAZARDS
An AIPG ISSUES AND ANSWERS Publication

YES! I want to order the "HOME BUYERS’ GUIDE TO GEOLOGIC HAZARDS"
$6.00 for AIPG Members and $9.00 for Non-Members

Ship to_____________________________________
Address____________________________________
Street______________________________________
City_________________________State_________
Zip____________________________Country________
Tel:______________________________AIPG #____

AIPG Section__________________________

Is this your _______ home or _______ office address?

Mail To:
American Institute of Professional Geologists
7828 Vance Drive, Suite 103
Arvada, CO 80003
(303) 431-0831 • FAX (303) 431-1332
e-mail: aipg@aipg.com
http://www.nbmg.unr.edu/aipg

EXTRA SAVINGS: Quantity orders of ten or more single copies receive a 10% discount. A box holds 100 books and box orders receive a discounted price of $480.00 ($4.80 each) for AIPG Members and $720.00 ($7.20 each) for Non-Members.

All orders must be accompanied by payment. All payments in U.S. funds. Shipping and Handling included within the U.S.

Please send ________ copy/copies of the "HOME BUYERS’ GUIDE TO GEOLOGIC HAZARDS"

Payment (check one):
Check _____ VISA _____ MasterCard _____

Card Number________________________
Expiration Date_____________________

Cardholder’s signature____________________