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 materials, submittals should be sent to AIPG headquarters twelve weeks in advance of expected publication. Some technical topic issues are planned up to one year before printing, therefore early submittals will be preferred.

Manuscripts should have the following section:

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

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

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

General Topics:

**Technical**

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

**Professional (any issue)**

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

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

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

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

J. Dale Nations, Editor
1997 EXECUTIVE COMMITTEE

OFFICERS

PRESIDENT
Jonathan G. Price
NV Bureau of Mines & Geol.
Univ. of Nevada, Reno/178
Reno, NV 89557-3088
O: (702) 784-6561
Fax: (702) 784-1709
jprice@nbmg.unr.edu

PRESIDENT-ELECT
Stephen M. Testa
Testa Environmental
19814 Jesus Maria Road
Mokena, IL 60448
O: (208) 754-1422
Fax: (208) 754-1402
stesta@goldrush.com

VICE PRESIDENT
Dennis Pennington
P.O. Box 204
Telford, PA 18969-3204
O: (215) 723-8300
Fax: (215) 723-9344
neto@enter.net

SECRETARY
Robert H. Fakundiny
River Road, 0-J
Rensselaer, NY 12144
O: (518) 474-5616
Fax: (518) 474-3866
rfakundiny@nysed.gov

TREASURER
Robert M. Colpitts, Jr.
508 Second Street NE, #12
Goshen, NM 87501-4219
O: (505) 835-2460
Fax: (505) 836-0578
colgso@mallhost.nmt.edu

EDITOR
J. Dale Nations
Northern Arizona University
Dept. of Geology, Box 4089
Flagstaff, AZ 86011
O: (520) 523-4561
Fax: (520) 523-9220
jdunton@nau.edu

ADVISORY BOARD REPRESENTATIVES

Ronald E. Alexander
815 Hobbs Lane
Fisherville, KY 40023
O: (502) 585-1241
Fax: (502) 585-4169

Robert G. Font
P.O. Box 765151
Dallas, TX 75379-5151
O: (972) 516-4725
Fax: (972) 722-5914

Frank W. Harrison, Jr.
P.O. Box 51643 OCS
Lafayette, LA 70506
O: (318) 232-4031
Fax: (318) 235-5333

John T. Howard
ATC Associates, Inc.
8233 Brentwood Industrial Dr.
Brentwood, MD 20614
O: (314) 844-2000
Fax: (314) 844-2088

dhoward@compuserve.com

NATIONAL HEADQUARTERS
7828 Vance Drive, Suite 103
Arvada, Colorado 80003-2124
7:30 AM - 4:30 PM MDT; M-F
(303) 431-0381 • Fax (303) 431-1332
e-mail: aipg@aipg.com
internet: http://www nbmg.unr.edu/aipg

EXECUTIVE DIRECTOR
William V. knight
wvk@aipg.com

PUBLICATIONS MANAGER
Wendy J. Davidson
wdj@aipg.com

MANAGER OF MEMBER SERVICES
Karen L. Spaulding
kspauldi@aipg.com

ADMINISTRATIVE ASSISTANT
Catherine A. O'Keefe
alp@alp.com

OFFICE CLERK
Jamie L. Johnson

INSURANCE PROGRAMS

Professional Liability - (800) 272-7816
Johnson & Higgins - Janet Davis or Etette Gillette
Life and Health - (800) 424-6683
Seabury & Smith - Dora Abercrombie or Cheryl Wilson

ALAMO RENTAL CAR
(800) 354-2352 • Member #17104

AIPG FOUNDATION
Kel Buchanan
Henke-Buchanan Group
P.O. Box 2361
Reno, NV 89505-2391
(702) 786-4515/FAAX (702) 786-4324
summitrik@ail.com

February, 1997
Volume 34, Number 2

The Professional GEOLOGIST

Peer-Reviewed Papers:
Intrisnic Bioattonization:
An Attractive Remedial Strategy for Organic Compounds
Steven P. Sittler, CPG-8175

"Supporting A Ground Water and Soil Natural Remediation Proposal"
Sharon P. McElhand, CPG-9186

Registration (Licensure) of Geoscientists in Canada:
A National Perspective and Update
Gordon D. Williams

BYLAWS AMENDMENT APPROVED

Draft AIPG Position on the Name of the United States Geological Survey

FRONT COVER - Tonto Natural Bridge State Park near Payson, Arizona Photograph was submitted by Larry D. Fellows, CPG-4447.

DEPARTMENTS
TODAY IN WASHINGTON

THE GOVERNMENT AFFAIRS REPORT
15

EXECUTIVE DIRECTOR'S ITINERARY
16

PROFESSIONAL ETHICS & PRACTICES - Column 15
18

EXECUTIVE COMMITTEE SUMMARY
22

MEMORIAL - James H. Irwin, CPG-3530
24

AIPG BENEFITS AND INFORMATION
25

CALENDAR AND ADVERTISER'S INDEX
26

NEW MEMBERS, APPLICANTS, ETC.
27

The Professional Geologist (USPS 590-810 and ISSN 0279-0521) published monthly except semi-monthly in April by the American Institute of Professional Geologists, 7828 Vance Drive, Suite 103, Arvada, Colorado 80003-2124. Periodicals Postage Paid at Arvada, Colorado and additional mailing offices.

POSTMASTER: The Professional Geologist, AIPG, 7828 Vance Dr., Suite 103, Arvada, CO 80003.

Subscriptions for all Members and Affiliates in good standing are included in annual membership dues. Subscription prices are $20.00 a year for Members' additional subscriptions and $30.00 a year for non-members for 12 issues (For postage outside of the U.S. add $10.00 for Canada and $18.00 elsewhere). Single copy price is $20.00 for Members and $25.00 for non-members. Claims for nonreceipt or for damaged copies are honored for three months.

Entire contents copyright 1997 by The Professional Geologist. Original material may be reprinted with permission. Deadline for articles and advertisements is twelve weeks preceding publication. Advertising rates available upon request. Opinions and views expressed by the authors are their own and do not necessarily reflect those of the American Institute of Professional Geologists, its staff, or its advertisers.
Geologic Hazards Kill Over 100,000 People Each Year

— Billions of dollars are wrenched from the world's economy by these disasters —

Help prevent these tragedies by becoming an informed citizen and by insisting on professional geologic research. Public policy, educated planning, and sensible development can make 90% of these losses avoidable.

The CITIZENS’ GUIDE to Geological Hazards by Edward B. Nuhfer (University of Colorado at Denver) and others. Over 100 color illustrations, extensive bibliographies of books, journal articles, and videotapes; data tables, index and two appendices. Provides concise explanations of asbestos, radon, reactive minerals, earthquakes, volcanoes, landslides, subsidence, floods and coastal processes as geological hazards. Roles that geological scientists play in mitigating these hazards are explained (134 pages). Also available: 35mm slide sets for class use.

The CITIZEN'S GUIDE to Geologic Hazards is a "must" read for everyone. It will make a difference in your life and in our communities. This detailed book is especially designed to benefit:

<table>
<thead>
<tr>
<th>Home Owners</th>
<th>Engineers</th>
<th>City Planners</th>
<th>Geologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architects</td>
<td>Zoning Commissioners</td>
<td>Real Estate Companies</td>
<td></td>
</tr>
<tr>
<td>Insurance Agents</td>
<td>Teachers</td>
<td>Mortgage Bankers</td>
<td></td>
</tr>
<tr>
<td>Legislators</td>
<td>Environmental Scientists</td>
<td>Attorneys</td>
<td></td>
</tr>
</tbody>
</table>

ACT NOW! Don’t let you or your community become a tragic statistic.

Be informed and insist officials make decisions based on professional geologic evaluations.

THE LIFE AND PROPERTY YOU SAVE COULD BE YOURS!

YES!

The CITIZEN'S GUIDE to Geologic Hazards

$15.95 for AIPG Members and $19.95 for Non-Members. Slide set of fifty 35-mm slides available for $65.00.

Ship to: ____________________________________________
______
Street
State
City
Zip
Country
Tel: ____________________________ AIPG #__________

Is this your _______ home or _______ office address?

EXTRA SAVINGS Quantity orders of ten or more single copies receive a 10% discount. A box holds 48 books and box orders receive a discounted price of $525.60 ($10.95 each) for AIPG Members and $765.60 ($15.95 each) for Non-Members.

Mail To: American Institute of Professional Geologists
7828 Vance Drive, Suite 103
Arvada, CO 80003-2125
(303) 431-0831 • FAX (303) 431-1332

All orders must be accompanied by payment. All payments in U.S. funds. A ten-dollar ($10) handling fee is required for delivery outside the U.S.

Please send _______ copy/copies of "The CITIZEN'S GUIDE TO GEOLOGIC HAZARDS" (ISBN 0-933637-10-1)

Please send _______ set/sets of the fifty 35-mm slides.

Payment: Check ____ VISA ____ MasterCard ____
Card Number __________________________
Expiration Date ______________________

Cardholder's signature
Intrinsic Bioattenuation: An Attractive Remedial Strategy for Organic Compounds

Steven P. Sittler, CPG-8175

Introduction

Intrinsic bioattenuation is a proven remedial approach that uses naturally-occurring in-situ microbiological processes to metabolize and degrade organic constituents in soils and groundwater. Numerous studies have been performed over the past several years to evaluate and quantify the effects of both aerobic and anaerobic biodegradation of organic compounds at a variety of sites (e.g. Hutchins & Wilson, 1991; Caldwell, et al., 1992; Testa & Colligan, 1994; Novick, et al., 1995; etc.). Many of the techniques and principles evaluated in these and many other studies are concisely presented in a comprehensive volume on the technical protocol for implementing intrinsic remediation, which was recently published by the Air Force Center for Environmental Excellence (Wiedemeier, et al, 1995). In many cases, demonstrating the presence of ongoing intrinsic bioattenuation is performed as part of an integrated remedial strategy to reduce or limit the scope of more aggressive remedial options in source areas. However, for some sites, it can be clearly shown that intrinsic biodegradation processes alone are sufficient to effect remediation.

The two primary microbiological processes involved in intrinsic bioattenuation are aerobic and anaerobic metabolism, both of which are capable of in-situ degradation of a variety of organic constituents, including petroleum components such as benzene, toluene, ethylbenzene, and xylene (BTEX). Aerobic, intrinsic bioattenuation requires that adequate oxygen be available for the metabolic processes to occur. In an oxygen-limited environment, aerobic metabolism results in the depletion of oxygen and anaerobic processes may predominate. Anaerobic metabolism is evidenced by use of alternative electron acceptors such as nitrate, iron reduction, sulfate reduction, and methanogenesis if corresponding reducing conditions (i.e. redox potential) are suitable.

Consequently, due to the comparatively slow movement of groundwater, oxygen and nitrate as electron acceptors cannot be continuously supplied and frequently become depleted in an area of hydrocarbon-impacted groundwater. Portions of the impacted area can then revert to anaerobic processes with use of alternative electron acceptors such as ferrous iron, sulfate, and carbon dioxide. Since these anaerobic processes occur at kinetic rates slower than the kinetic rates of oxygen and nitrate utilization, the groundwater velocity is often adequate to continuously resupply these electron acceptors. In such cases, anaerobic processes can be responsible for much of the bioremediation of organic compounds in groundwater.

Evidence of these processes can be evaluated by comparing impacted groundwater to non-impacted groundwater. Quantification of the biodegradation of organic constituents is performed, according to published and proven stoichiometric relationships for degradation of organic compounds (Wiedemeier, et al., 1995).

Field Methodologies & Laboratory Analyses

In order to evaluate the presence and relative contribution of various potential bioattenuation processes, various site-specific data must be obtained. These data can then be utilized to verify that intrinsic bioattenuation processes are occurring, and to quantify the assimilative capacity of the water-bearing unit to degrade dissolved-phase organic compounds. The assimilative capacity is defined as the total mass of organics which the formation is capable of degrading, both aerobically and anaerobically. The following is an example of the techniques and procedures which can be utilized to evaluate intrinsic bioattenuation at a site with dissolved phase hydrocarbon impacts in groundwater.

As stated above, biogeochemical data must be collected from selected groundwater monitoring wells at the site. Generally, a minimum of four monitoring wells should be sampled as part of the evaluation, including
a non-impacted upgradient well, at least two impacted wells within the plume (preferably with varying levels of impacts), and a non-impacted downgradient well. By comparing use of electron acceptors for both aerobic and anaerobic processes, the assimilative capacity of the water-bearing unit for biodegradation of BTEX constituents can be derived, and compared to known BTEX concentrations in groundwater to determine whether intrinsic bioattenuation is adequate to inhibit plume migration and remediate impacted groundwater.

At each location, the wells must be purged using low-flow purging techniques. Low-flow purging is essential in order to minimize drawdown and accompanying disruption to the formation, which can result in erroneous data. Low-flow purging is accomplished by first inserting a downhole probe to measure pH, specific conductance, and temperature in the well. A low-flow sampling pump is then used to slowly withdraw water from the well. In general, initial withdrawal rates should be less than 50 milliliters per minute (ml/min); however, if no drawdown is induced, a rate of up to 100 ml/min may be utilized. Downhole parameters should be monitored periodically throughout the purging process until the pH, specific conductance, and temperature readings stabilize.

When the downhole parameters become stable, this indicates that the pump is now withdrawing formation water. At that point, purging should be discontinued and field parameters, including pH, dissolved oxygen, oxidation/reduction (redox) potential, specific conductance, and temperature can be obtained from the downhole probe. The pump should then be restarted and a groundwater sample collected from the well and analyzed in the field for ferrous iron, using a colorimetric field test kit. Additional groundwater should then be collected in appropriate containers for laboratory analysis of BTEX, nitrate, nitrite, ammonia, sulfate, sulfide, alkalinity, and dissolved gasses (oxygen, carbon dioxide, carbon monoxide, nitrogen, and methane).

Evaluation of Intrinsic Processes

Both the field and laboratory analytical results can be used to evaluate whether conditions at the site are conducive to intrinsic processes, as well as to calculate the assimilative capacity of the formation to degrade BTEX components.

pH/Temperature/Specific Conductance

The pH of groundwater affects the presence and activity of microbial populations. In general, hydrocarbon-degrading microbes prefer pH values ranging from 6 to 8 standard units (Wiedemeier, et al, 1995). The pH values measured at both impacted and non-impacted monitoring locations should indicate that the pH is within acceptable ranges if bioattenuation processes are to occur. Groundwater temperature affects both the solubility of oxygen and the metabolic activity of microbes. Ideally, temperature should range between 5 and 25 degrees Celsius. Below 5 degrees, biodegradation is inhibited. Specific conductance data are primarily used to ensure that all of the samples collected are representative of the same water-bearing unit.

Alkalinity

The total alkalinity is indicative of the capacity of the groundwater to neutralize acid (Wiedemeier, et al., 1995). Alkalinity is important in maintaining the pH of groundwater because it buffers the groundwater system against acids generated during aerobic and anaerobic biodegradation. In general, hydrocarbon-impacted areas exhibit a higher total alkalinity than non-impacted areas (Wiedemeier, et al., 1995). The total alkalinity values should be compared with the pH data to verify that the site groundwater has a suitable buffering capacity to allow bioattenuation processes to exist and continue.

Dissolved Gasses

Dissolved gas analytical results can be compared between impacted and non-impacted monitoring locations to qualitatively evaluate the presence or absence of ongoing bioattenuation processes. Variations in oxygen concentrations can be used to determine whether adequate dissolved oxygen is available to support aerobic bioattenuation, and whether oxygen utilization via aerobic bioattenuation appears to be occurring. Since carbon dioxide is a by-product of both aerobic and anaerobic bioattenuation processes, increases in the carbon dioxide concentration from an unimpacted upgradient well to an impacted well within the plume suggests the presence of aerobic bioattenuation. Declining carbon dioxide levels may also indicate carbon dioxide utilization as an electron acceptor and subsequent reduction to methane (methanogenesis). If detectable concentrations of methane significantly above background are observed, methanogenesis may be an active component of the anaerobic intrinsic bioattenuation processes at the site.

Nitrate Utilization/Iron Reduction/Sulfate Utilization

After oxygen is utilized, nitrate (if available) can be utilized as an alternate electron acceptor in bioattenuation of dissolved-phase hydrocarbons (denitrification). In some cases, ferric iron can then be reduced to ferrous iron anaerobically, and can thus serve as an alternate electron acceptor under anaerobic conditions. In addition, after depletion of dissolved oxygen, nitrate, and bioavailable iron (in that order), sulfate may also serve as an electron acceptor for anaerobic processes. All of these processes can be quantified at a given site by comparing the levels of the various parameters in non-impacted wells versus impacted wells.

Based on these data, the presence of intrinsic bioattenuation processes actively remediating dissolved-phase hydrocarbon compounds can be verified. Utiliza-
tion of oxygen, nitrate, ferrous iron, sulfate, and/or carbon dioxide as electron acceptors in aerobic and anaerobic bioattenuation processes can be confirmed, if present, and subsequently utilized to determine the assimilative capacity of the formation to degrade BTEX.

**Assimilative Capacity Calculations**

As stated previously, the assimilative capacity of the intrinsic processes to degrade BTEX can be calculated for a given site, based on the relative amounts of electron acceptors utilized by these processes. These calculations utilize published stoichiometric relationships which determine the amount of a given electron acceptor required to metabolize a unit quantity of BTEX. The following stoichiometric values are typically utilized in assimilative capacity calculations (Wiedemeier, et al, 1995):

- Dissolved oxygen - 0.32 milligrams (mg) of BTEX degraded for every 1.0 mg of oxygen consumed.
- Nitrate - 0.21 mg BTEX degraded for every 1.0 mg of nitrate utilized.
- Ferrous iron - 1 mg of BTEX degraded for every 21.8 mg of ferrous iron produced.
- Sulfate - 0.21 mg of BTEX degraded for every 1.0 mg of sulfate reduced.
- Methanogenesis - 1 mg of BTEX degraded for every 0.78 mg of methane produced.

The values obtained from the calculations are then added to generate a total assimilative capacity for the formation. If the assimilative capacity exceeds the highest total BTEX concentration in any well within the plume, then natural intrinsic bioattenuation processes should be adequate to remediate dissolved-phase hydrocarbon impacts in groundwater, and inhibit further plume migration.

**Summary**

Intrinsic bioattenuation frequently plays an important, though often overlooked, role in degrading hydrocarbons and other organic constituents at impacted sites. Thanks to extensive published information on methodologies, procedures, and degradational relationships, it is now possible to clearly demonstrate the presence of intrinsic bioattenuation processes, and to quantitatively evaluate their contributions to site remediation. Although these processes may require somewhat longer time periods to achieve cleanup goals than more active approaches, the significant cost savings associated with elimination of remedial equipment and associated operation and maintenance costs often make intrinsic bioattenuation an attractive option. Many regulatory agencies are amenable to demonstrations of intrinsic bioattenuation processes to support monitoring-only approaches to site closure or reduce the scope of more aggressive remedial techniques. In any case, evaluation of intrinsic bioattenuation should be strongly considered as an integral part of a comprehensive remedial strategy for organic compounds.

**References**


Steven P. Sittler, CPG-8175, is a Senior Hydrogeologist with Malcolm Pirnie, Inc. in Indianapolis, Indiana. Mr. Sittler has more than 11 years of experience in environmental consulting and has managed over 300 site assessment/remediation projects involving hydrocarbons and/or organic compounds. He is currently responsible for project management and remedial strategy formulation for assessment/remediation projects throughout the upper Midwest.
"Supporting A Ground Water and Soil Natural Remediation Proposal"

Sharon P. McLelland, CPG -9681

This article previously appeared in an extended version in the March 1996 edition of the "Site Remediation News", a newsletter published by the New Jersey Department of Environmental Protection, Trenton, NJ.

Natural remediation is a cost-effective remedial strategy that is being evaluated more frequently for moderate to low-level contamination sites. A critical aspect of this strategy is evaluating the geochemical environment of the site to be remediated. It is essential to determine the class of compounds (i.e., aromatic, halogenated alkenes, isoprenoids) to be degraded and the specific geochemical environment prior to proposing a natural remediation strategy. These two items are critical for understanding which compounds can biodegrade and whether natural remediation is even a viable strategy for the site. This article discusses the secondary parameters which affect and/or control biodegradation in various environments.

Natural remediation is driven by the following five predominant factors:

- volatilization
- chemical (abiotic) transformation
- adsorption to soil matrices
- dispersion
- biodegradation

Immediately following a release, volatilization is a critical factor, as is adsorption to the soil matrix. Chemical transformations have not been found to contribute to BTEX degradation (McAllister and Chiang, 1994). Dispersion becomes a controlling factor for non-degradable hydrophilic compounds. However, the most significant process supporting natural remediation for most gasoline discharges is biodegradation.

Biodegradation occurs for aromatic hydrocarbons, such as BTEX, especially under aerobic conditions; however, the ability of some aromatics in particular, such as benzene, to degrade readily in anaerobic conditions is limited (Salanitro, 1993; Godsy, 1994). Studies conclude that significant biodegradation is unlikely to occur in tertiary-branched gasoline oxygenates such as Methyl Tertiary Butyl Ether (MTBE) and Tertiary Butyl Alcohol (TBA) (Sufita and Mormile, 1993; Jensen and Arvin, 1990).

A critical geochemical parameter necessary to determine the type of microbial degradation is dissolved oxygen (DO). If low DO concentrations are exhibited, the site may be anoxic (DO = 0.1 to 2 mg/L) or anaerobic (DO < 0.1 mg/L). This is important as some compounds do not readily degrade under anoxic or anaerobic conditions; the rate of degradation is much slower in these environments than in aerobic environments.

DO is the preferable electron acceptor for biodegradation of hydrocarbons. As the DO concentrations decrease, aerobic (oxygen-rich) degradational environments change anaerobic (oxygen-depleted) degradational environments. The depletion of oxygen results in either nitrate, ferric iron, sulfate or carbon dioxide serving as the primary electron acceptor thus controlling the type of degradation, such as anoxic (denitrifying) or anaerobic degradation (iron-reducing, sulfate-reducing or methanogenic). Low dissolved oxygen levels may be representative of the interior of the contaminant plume, whereas the downgradient or upgradient edges of the plume may demonstrate aerobic conditions (DO > 2 mg/L). It would be important to determine if a ground water recharge area exists upgradient to a low DO plume, providing a continuing source of dissolved oxygen to the upper aquifer. The availability of oxygen determines the ability of the plume to be remediated through biodegradation.

Site data supporting the type of degradation environment is critical information for the natural remediation proposal. For example, benzene has been found to be resistant to anaerobic degradation (Godsy, 1994), yet toluene, o-xylene, and potentially m-, and p-xylene have been field demonstrated as biodegradable under anaerobic conditions (McAllister and Chiang, 1994; Borden et al, 1995; Crell and Garner, 1988). Benzene degradation under anaerobic conditions remains disputed in the literature with some support for benzene degradation under denitrifying conditions (Major et al, 1988). As conditions become more anaerobic, the ability of the alkylbenzenes to degrade decreases. Also, the sulfate-reducing and methanogenic environments are highly sensitive to changes in secondary parameters such as temperature, nutrient levels and pH (Borden et al, 1995).
The concentration of DO also determines the rate of degradation; anaerobic degradation of gasolines, has been found to occur at significantly slower rates than aerobic degradation (Crell and Garner, 1988; Salanitro, 1993). The rate of biodegradation is also enhanced with hydrocarbon concentrations lower than 1 ppm (Chiang et al., 1987). Conversely, hydrocarbon concentrations greater than 10 ppm present an inhibitory effect on the rate of degradation, potentially a result of toxicity effects (Testa, 1995). Jensen and Arvin (1990) found MTBE to have a minor inhibitory effect at elevated concentrations (200 ppm). Generally, as the concentrations increase, the concentration of DO required to degrade the compounds also increases.

After the initial field parameters of DO, pH, temperature and Eh are obtained, the secondary indicators require evaluation according to the potential degradation environment: aerobic, anoxic, or anaerobic.

Aerobic, anoxic and anaerobic environments may all be exhibited across the site, while monitoring the upgradient wells, the plume edge wells and the plume interior wells. As the DO is used up preferentially by the microbes, plume interior and deep wells may demonstrate anaerobic conditions. Low aerobic/anoxic conditions are often observed nearer to the plume edge, with aerobic conditions noted at the plume edge and outside of the plume (Crell and Garner, 1988).

**Aerobic Environments** Sites demonstrating elevated DO (>2 ppm) across the site, including wells within the plume should exhibit aerobic degradation. With aerobic degradation, the initial indicator parameters (DO, pH, Eh and temperature) are essentially all that are critical to confirm aerobic degradation is occurring, when combined with contaminant monitoring (i.e., BTEX). In the short-term (30 to 60 days), MTBE has not been found to degrade in aerobic environments (Jensen and Arvin, 1990). At 25°C and pH=7 S.U., aerobic degradation occurs around Eh=+820MV (Wiedemeier et al., 1994).

**Aerobic Environments** Sites that have exhibited DO readings in the low aerobic range of 0.1-2 ppm within and outside of the plume, require additional sampling for the secondary parameters for determination of the degradation processes. Generally, after DO has been depleted, denitrification becomes the dominant degradation process when nitrate is present (Borden et al., 1995; McAllister and Chiang, 1994). To determine how the plume is degrading, sampling requires expansion to include nitrate (the electron acceptor). Benzene is not readily degraded, although ethylbenzene may degrade by denitrification processes (Borden et al., 1995; Salanitro, 1993). Toluene and the xylene isomers have been found to degrade under denitrifying conditions in several studies, as reported in Borden et al. (1995) Continued monitoring of the BTEX compounds is important to determine whether individual compounds are degrading as the process changes from an aerobic, high DO environment to a anoxic, lower DO environment.

It is important to include upgradient and downgradient well points in the monitoring program for comparison with the interior plume data. Decreased nitrate concentrations over background points coupled with lower Eh and lower DO readings from the aerobic environments support denitrification as the active degradation process. At 25°C and pH=7 S.U., denitrification occurs around Eh=+740MV (Wiedemeier et al., 1994).

**Anaerobic Environments** Once DO is reduced, nitrate and ferric iron are generally the secondary electron acceptors. After depletion of these compounds, sulfate and then carbon dioxide become the electron acceptors for biodegradation. In order to evaluate if the contamination is readily degrading under the varying aerobic to anoxic to anaerobic conditions across the plume, it is important to determine through the secondary indicators which process is predominant. These secondary indicators include nitrate, dissolved ferrous iron, sulfate and if very low Eh is detected, carbon dioxide (dissolved). Alkalinity is a geochemical parameter necessary to help determine if the dissolved carbon dioxide concentrations are a result of microbial respiration, a function of the geologic formation, or a result of the geochemistry of the ground water. Organic acids are produced as oxygen is reduced, creating a lower-pH area which could affect the alkalinity concentrations if within a carbonate aquifer (McAllister and Chiang, 1994).

Toluene, and o-, m- and p-xylene have been found to degrade in anaerobic environments with toluene consistently degrading even under methanogenesis. Sulfate-reducing environments appear to degrade even benzene, as do denitrifying conditions, (Salanitro, 1993). Ethylben-
zene was not found to be anaerobically degraded except under denitrifying conditions (Salanitro, 1993).

In anaerobic environments, ferric (Fe$^{3+}$) iron is reduced to soluble ferrous (Fe$^{2+}$) iron. It is important to know the background concentrations and site geology when using ferrous iron as an indicator of anaerobic conditions. Naturally elevated iron levels may be present and thus comparing interior plume results to exterior plume readings is critical to demonstrate the interior anaerobic environment is iron-reducing as a result of biodegradation.

**Soil Remediation**

While many natural remediation strategies are proposed for ground water remediation, some proposals are presented as a soil remedial strategy. When soil is to be evaluated for natural remediation, additional parameters need to be considered to determine if the vadose zone is suitable for sustaining microbial degradation.

To evaluate soil conditions for degradation potential, it is necessary to measure for Total Organic Carbon (TOC) content, soil moisture, soil pH, dissolved oxygen and dissolved carbon dioxide. TOC content is used in determining the rate of desorption from the aquifer matrix into the ground water and is also a factor in determining retardation rates for migrating ground water plumes. Microbial growth is affected by very dry and very wet conditions (Testa, 1995). Microbial degradation is sensitive to pH, and populations can be threatened by acidic or alkaline conditions, especially if these changes occur rapidly. DO and CO$_2$ gas ratios are used to determine if aerobic or anaerobic processes are occurring (Weidemeier et al., 1994). Increasing amounts of CO$_2$ relative to DO demonstrate microbial respiration is occurring as DO is being depleted. Aerobic degradation in the vadose zone requires a minimum of 1% oxygen (Testa, 1995). These preliminary parameters can provide the support for a natural remediation strategy.

**Summary**

Literature reviews can assist in determining whether an aerobic, anoxic or anaerobic conditions are likely to exist; however, they should not be the sole basis for a natural remediation strategy. Secondary geochemical parameters are inexpensive and enhance the environmental professional's understanding of the specific site's ability to undergo natural remediation.

**References**


Sharon P. McLelland, CGP-9681, Senior Geologist, New Jersey Department of Environmental Protection.
Registration (Licensure) of Geoscientists in Canada: A National Perspective and Update

Gordon D. Williams

A National Perspective and Introduction
The registration (licensure) of professionals such as doctors, lawyers, engineers and, increasingly, geoscientists in Canada is the responsibility of individual provinces and territories, under acts of their respective legislatures. These acts limit or restrict the practice of the professions to those persons who are registered (licensed) by autonomous, self-governing professional associations established under the legislation. This right-to-practice legislation enables the professional associations to protect the public by preventing unqualified, unskilled or unethical persons from carrying on the restricted professions. Aside from appointing public members to the governing councils and key committees of the professional associations, governments play no direct role in the licensing of practitioners.

A different arrangement, providing less protection for the public, is right-to-title legislation which permits designated occupational associations to certify their members and give them the right to use a specific reserved title. Persons who are not members of the designated association (and therefore not certified) cannot be prevented from practicing the occupation, regardless of the level of their qualifications or ethics, provided they do not use the reserved title. Right-to-title legislation usually is also the responsibility of provincial and territorial legislatures.

Current Status of Registration (Licensure) of Geoscientists in Canada
Professional registration of geoscientists (albeit as Professional Engineers in the Mining Division) began in Canada in Alberta with the formation of the Association of Professional Engineers of Alberta (APEA) in the 1920s. Dr. John A. Allan, founder of the Geology Department at the University of Alberta, was active in establishing the Association and became its president in the 1930s. Geologists, and the practice of geology and geophysics, were explicitly identified in the Engineering Act in 1955. Separate designations (P.Geo. and P.Geoph.) were introduced in 1960 and, in 1966, APEA became the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

Today, approximately 5,000 geoscientists are registered (licensed) under combined engineering and geoscience right-to-practice legislation in Alberta, British Columbia, Newfoundland and the Northwest Territories as Professional Geoscientists (P.Geo.), Professional Geologists (P.GeoL.) or Professional Geophysicists (P.Geoph.). Saskatchewan will begin registering Professional Geoscientists under their new Engineering and Geoscience Professions Act in 1997. Ultimately, approximately 10,000 geoscientists will be registered in Canada over the next few years as other provinces enact appropriate legislation.

The Nova Scotia legislature gave first reading to a bill establishing the Association of Professional Engineers and Geoscientists of Nova Scotia in May, 1996, before adjourning for the summer. Because of difficulties between engineers and architects in the area of professional practice, the bill was withdrawn from the fall legislative session and a task force of engineers and architects is working diligently to overcome the problems. With an early and successful resolution of the issues, the next window of opportunity for reintroducing a new act will be at the spring, 1997, session of the legislature.

In Manitoba, a joint committee of geoscientists and engineers has developed a new act to create the Association of Professional Engineers and Geoscientists of Manitoba. The result of several years of intense effort on the part of geoscientists and engineers, it is anticipated that the act will be introduced into the legislature early in 1997.

Geoscientists in Ontario, who have been working with the Association of Professional Engineers of Ontario since 1990, have formed the Association of Geoscientists of Ontario to assist in preparing new legislation for the
registration of geoscientists and engineers. A draft of the new act could be completed early in 1997 and a final version could be before the legislature by the end of the year.

In New Brunswick, the report of a joint task force of the Association of Professional Geologists of New Brunswick (APGNB) and the Association of Professional Engineers of New Brunswick (APENB) has been accepted by the Council of APENB and a recommendation to develop a new combined engineering and geoscience act will be put to a vote at the APENB Annual Meeting in February, 1997. Assuming a favorable response, the first draft of a revised act could be completed by the end of the year.

In Québec, the situation is somewhat different. Geoscientists have been seeking registration since 1968, but the body responsible for registering engineers in Québec, the Ordre des ingénieurs du Québec (OIQ), has for many years consistently rejected joint task force recommendations for combined registration. After a moratorium on the creation of new professional orders (associations) was lifted by the provincial government in 1990, the geoscientists, then represented by the Association Professionnelles des Géologues et Géophysiciens du Québec (APGGQ), took their requests directly to the government. In view of the recognized need to protect the public, the Office des Professions du Québec recommended that the Ordre des Géologues Agréés du Québec (OGAQ) be created under existing right-to-title legislation. The OGAQ has yet to be proclaimed by the Ministers in Council despite continuing efforts to encourage the government to proceed.

A very small number of geoscientists practice in Yukon and Prince Edward Island and interest in registration currently appears to be very low. As registration of geoscientists becomes accepted in more of the other provinces, the engineering associations in these jurisdictions will probably recommend revising their acts to include geoscientists.

National Coordination - The Canadian Council of Professional Geoscientists

The professional practice of geoscience is typically less constrained by political boundaries than is the practice of many other professions. This is true both within Canada, where geoscientists often practice in several provinces and territories, and outside the country as, increasingly, more geoscientists practice internationally. In light of the distribution of legislative authority in Canada, and given the high mobility of geoscientists in the global workplace, a strong need has been identified for coordination and cooperation among the provincial and territorial licensing associations in areas such as:

- transferability of registration between jurisdictions and mobility of registered professionals;
- reciprocal arrangements which permit members to practice outside their 'home' jurisdiction for short periods of time or practice in other countries (for example under the North American Free Trade Agreement or within the European Economic Community); and
- the balance between the supply of new practitioners by the universities and demand for them by the economy.

In the engineering disciplines, the body that provides this type of national and international coordination is the Canadian Council of Professional Engineers (CCPE). In the geoscience professions, the need for coordination and standardization has grown dramatically in the past few years as more professional associations move to register geoscientists. In response to this need, a new organization, the Canadian Council of Professional Geoscientists (CCPG), is being formed as a federally chartered not-for-profit corporation under the Canada Business Corporations Act.

The members of the CCPG will be those provincial or territorial associations that license or certify geoscientists, or which may be established to license or certify geoscientists, in any province or territory of Canada.

Individual geoscientists will not be eligible for membership in CCPG, nor will the CCPG register, certify or regulate individual geoscientists. These are legislated functions of the provincial and territorial associations that will hold membership in the CCPG.

The CCPG will assist its member professional associations by providing a national focus for their activities and concerns. The principal objectives of the CCPG, as listed in the application for letters patent, will be:

- to safeguard and promote the present and future interests of the geoscience professions in Canada;
- to establish and maintain liaison among the provincial and territorial associations and corporations of professional geoscientists in Canada and to assist them in:
  a) coordinating, correlating and standardizing their activities, particularly in the areas of registration of geoscientists, mobility of registered practitioners and interprovincial practice;
  b) promoting and maintaining high standards in the geoscience professions;
  c) developing effective human resources policies and promoting the professional, social and economic welfare of the members of the geoscience professions;
  d) promoting a knowledge and appreciation of geoscience and of the geoscience professions, and enhancing the usefulness of the professions to the public;

The Professional Geologist • FEBRUARY 1997
e) promoting the advancement of geoscience and related education;

f) generally carrying out their various objectives and functions;

• to act on behalf of and to present the views of its constituent associations and organizations in matters that are national or international in scope, including international registration or certification of geoscientists, and reciprocal practice;

• to act in respect of other matters of Canada-wide or international nature concerning the geoscience professions either alone or together with other bodies;

In addition, under the by-laws, the directors of CCPG may undertake to perform such services, enter into contracts, or otherwise take steps to generate income for the operation of the Council, i.e., to ensure its continuing financial viability.

The CCPG is committed to being inclusive rather than exclusive, and to working with its member organizations, CCPE, the universities and the learned societies to enhance the professional qualifications and stature of individual geoscientists and the geoscience professions in Canada.

Liaison with other organizations such as the American Institute of Professional Geologists and the European Federation of Geologists is an explicit objective of the CCPG to facilitate the international recognition and mobility of Canadian professional geoscientists.

Developments in 1996

Because a significant and rapidly increasing number of its constituent associations register geoscientists, the Canadian Council of Professional Engineers (CCPE) supported establishing the CCPG to provide services for the geoscience professions comparable to what CCPE provides for engineering. An Implementation Task Force, consisting of geoscientists from all provinces and territories except Yukon and PEI, was formed by the CCPE in January, 1996, and given a mandate to establish the CCPG within two years.

The Task Force met four times during 1996, twice in person and twice by teleconference. A business plan has been developed and a budget established, by-laws have been drafted, an application for incorporation has been submitted and letters patent should be granted by the time this report is published. Office facilities have been established in Calgary, the Task Force has begun to operate as the interim CCPG Board of Directors and has started to address the stated objectives of the Council.

The Canadian Council of Professional Geoscientists, as distinct from the Implementation Task Force, will become a reality early in 1997, well before the mandate of the Task Force expires.

Initial funds for the Task Force for 1996 and 1997, in the amount of approximately $40,000 per year, are being provided by CCPE. This is equal to the annual assessment collected by CCPE from its constituent associations for their geoscientist members. CCPE has agreed that the amount of the annual geoscience assessment will be permanently transferred to CCPG when it becomes operational.

For more information, please contact the writer or any other member of the Task Force.

Members of the Task Force:

Michel Bouchard, Ph.D.
Québec (514) 343-6821
Terry Hennigar, P.Eng.
Nova Scotia (902) 453-2266
Bob Leech, M.Eng.Sc.
Ontario (905) 477-8400
Hugh Miller, Ph.D., P.Geo.
Newfoundland (709) 778-0462
Philip Reeves, P.Eng.
Saskatchewan (306) 787-2584
Carolyn Reif, Ph.D., P.Geo.
Northwest Territories (403) 920-3347
Brian Stimpson, Ph.D., P.Eng.
Manitoba (204) 474-8820
Linda Thorstad, P.Geo.
British Columbia (604) 688-6500
Reg Wilson
New Brunswick (506) 547-2070
Gordon Williams, Ph.D.,
P.Geo., Chair
Alberta (403) 247-3225
Suite 1600, 734 Seventh Avenue SW
CALGARY, AB T2P 3P8
Tel: (403) 232-8511 • Fax: (403) 269-2787

Gordon D. Williams, Ph.D., P.Geo., Chair, Canadian Council of Professional Geoscientists, Implementation Task Force.

Karst Control

Specialists in the application of Pressure Grouting Technology to control groundwater flow and stabilize structures in karst terranes.

"The Pressure Grouting Specialist"

STRATA SERVICES

Contact: Dave Taylor 314-828-5858

FEBRUARY 1997 • The Professional Geologist 13
Comments by F. B. "Ted" Mullin, CPG-1716

This edition of TIW will be shorter than I had anticipated 30 days ago. I have been in the process of moving from the office I have occupied for the past 18 years to a new office at home. "It won't happen to me" did and I was forced to retire earlier than I anticipated. Actually, I was caught in the downsizing of the Forest Service and my position was abolished. Fortunately for me, unlike so many others, I was eligible for retirement. Either way it happens, moving is a hassle. I notified our editor that I would continue to do the column. At least, I will have access to my information sources via the web as soon as my system is up and going. I will have my office set up and operating before the next issue. This short break will give me an opportunity to bring you more information next month.

However, the Federal Register has at least one gem for you this month. Volume 61, Number 241, 12-13-97, on page 65874.

Department of Defense, Department of the Army, Corps of Engineers. Final Notice of Issuance, Reissuance, and Modification of Nationwide Permits. Final Notification.

The CE is reissuing the existing nationwide permit (NWPF) and conditions, some with modifications, and issuing two new NWPs. These changes will change the way wetlands are protected and clarify which excavation activities are regulated.

For further information contact: Mr. Sam Collinson or Mr. John Studt at (202) 761-0199, or access the U.S. Army Corps of Engineers Regulatory Home Page at: http://wetland.usace.mil, or by mail at Office of the Chief of Engineer, Attn: CECW-OR, 20 Massachusetts Ave., NW, Washington, DC 20314-1000.

Until next month - Stay well.

F. B. "Ted" Mullin, is currently a consultant after retiring from the United States Forest Service after 18 years. The Today in Washington column is a monthly feature and has been written by Ted since September, 1991.

---

BYLAWS AMENDMENT APPROVED

The 1997 Advisory Board has recommended and requested that the Executive Committee of the Institute submit the following question to a vote of the Membership.

"Shall Article 10 of the Bylaws be amended by adding Article 10.3 as follows?

The Executive Committee of the Institute is directed to amend the Bylaws as necessary and appropriate to provide for one or more classes of membership in addition to Certified Professional Geologist, provided

1. That only Certified Professional Geologists may hold offices for which the Membership at large votes; and

2. that the Executive Committee of the Institute be so structured that a majority of its Members must be Certified Professional Geologists."

"An affirmative vote will instruct the Executive Committee to proceed with this assignment without further action by the Membership."

Yes - 1,601

No - 299
A Posthumous Commentary on the U.S. Bureau of Mines

It has been over a year since the 104th session of the U.S. Congress, in its wisdom, eliminated funding for the U.S. Bureau of Mines (USBM).

The USBM closure on March 30, 1996 was a consequence of the budget cutting frenzy initiated by the House Republicans as part of their "Contract with America." Although statutory authority still exists for the agency, the lack of an appropriation essentially abolished the Bureau. It is an unfortunate end for an agency with a fine record of serving the nation since 1910. Prior to that time, many of its operations were conducted under the aegis of the U.S. Geological Survey (USGS), and just as some Bureau activities predate the agency's creation, several of its functions were recognized as significant enough to be preserved after its demise and have been dispersed throughout the executive branch.

One such operation was identified by Secretary of the Interior Bruce Babbitt who indicated, during the December 1995 ceremony honoring the Bureau's accomplishments, that he was pleased the important health and safety functions would be continued by the federal government. Also slated for preservation were segments of the minerals information program, environmental and materials research, upkeep of coal and non-coal mine maps, and the mineral land assessment project in Alaska.

The helium program was targeted by separate legislation and is destined for significant downsizing by 1998. Whereas all of the affected processes once resided in a single agency, citizens will now have to search through a multitude of federal agencies to obtain mining and minerals information. This article is intended to assist in that endeavor.

During the 1995 fiscal year, personnel of the USBM numbered approximately 2,200. Faced with a budget reduction of $20 million and reading "the writing on the wall," 450 clairvoyants elected to retire during that fiscal year. Of the remainder, the largest surviving segment of 527 were initially transferred in 1996 to the Office of the Assistant Secretary for Fossil Energy in the Department of Energy (DOE). Those transferred to DOE included the personnel in Albany, Oregon, involved in advanced materials research and those in Pittsburgh, Pennsylvania, and Spokane, Washington, conducting health and safety research. In addition, there was a group in Pittsburgh performing mining-related environmental research that was relocated to DOE. In late 1996, the personnel at Pittsburgh and Spokane involved in health and safety research were reassigned, once again, this time to the National Institute for Occupational Safety and Health (NIOSH), an agency within the U.S. Department of Health and Human Services' Centers for Disease Control and Prevention. During the second transferal of the Pittsburgh center, their environmental research component remained with the fossil energy branch in DOE. Subsequently, DOE decided to de-emphasize mining-related environmental research and to redistribute most of those involved in that activity into other components of DOE. Despite the disruptions faced by the Pittsburgh and Spokane centers, it was a far better fate than most of the Bureau's research centers that were closed, including those in Denver, Colorado; Minneapolis-St. Paul, Minnesota; Reno, Nevada; Rolla, Missouri; Tuscaloosa, Alabama; and Salt Lake City, Utah. Also abolished were the Field Operations Centers in Denver and Spokane and all of the associated headquarters functions in Washington, D.C. Those employees who were not transferred, were dismissed by the end of March 1996.

The second largest portion of the USBM staff to be relocated came from the mineral data collection and analysis program. Approximately 170 staff from that program were reassigned to the USGS where, coincidentally, that function had resided in the late 19th and early 20th centuries. The relocated group now constitutes the major part of the Minerals Information Team situated at Reston, Virginia, in the USGS Geologic Division. The team will continue to publish many of the documents formerly prepared by the USBM including the Minerals Yearbook, Mineral Commodity Summaries, the monthly, quarterly and annual Mineral Industry Surveys, Mineral Industry Indicators, and material flow studies.

The mineral land assessment projects in Anchorage and Juneau, Alaska, were reassigned to the Bureau of Land Management (BLM) in that state.
The management of the helium program was also placed, albeit temporarily, in BLM. Although the federal government will continue to manage and operate its helium reserve, the recent couple of decades, legislation passed in the last Congress decreed that refinery operations will cease during 1998 with an accompanying reduction in staff to about 70 to around 40. The care and feeding of coal and non-coal mire maps will now be the responsibility of the Office of Surface Mining Reclamation and Enforcement within the Department of the Interior.

In February, 1996, 1200 employees were terminated under what the federal government terms a Reduction in Force (RIF). Fortunately for some there is life after the Bureau of Mines. Kudos go to the closure team who did an outstanding job in the extremely short timeframe in developing options and alternatives for displaced employees. It must be recognized that while the team operated, the President and Congress squabbled over the budget causing government-wide shut downs, Washington experienced two major snow storms causing additional work stoppages, and for those who still felt the spirit, there was the opportunity to observe the holiday season. It is estimated by the closure team that approximately 350 personnel found homes either on a temporary or permanent basis in other federal agencies, while several hundred others opted for retirement. Yet it appears, over a year later that several hundred people have changed careers or, tragically, are still unemployed.

The Government Affairs Column is a bimonthly feature written by John Dragonetti. John Dragonetti is Senior Advisor to the American Geological Institute’s Government Affairs Program. The author is indebted to the many former Bureau employees who provided the bulk of the information contained in this article, principally

Colorado Legislative Reception Successful

Approximately one third of the Colorado Legislature attended the Geologists’ Reception January 28. This annual 2-hour event is organized by AIPG’s Colorado Section and cosponsored by a number of local related organizations as diverse as the Friends of Dinosaur Ridge, the local DPA of AAPG, the Colorado Geological Survey and Colorado School of Mines. Most sponsors had displays which interested the legislators. Several had hand-outs. The state geologic map, given by GSA, was especially popular. Some of the legislators remarked that they always enjoy this annual event because they find the displays and the people interesting and they “don’t have to talk to a bunch of lobbyists.”

Wyoming State Geological Survey Seeks Assistance in Mapping

To accelerate geologic mapping in Wyoming, the Wyoming State Geological Survey is soliciting additional assistance from qualified volunteer geologists. The State Geological Survey is presently working on 1:24,000-scale and 1:100,000-scale mapping, with an emphasis on the populated areas of Wyoming.

A similar request in June of 1995, was answered by a number of geologists. Volunteers were found to compile the Cody, Sheridan, Casper, Thermopolis, and Worland 1:100,000-scale quadrangles, and the Thermopolis 1:24,000-scale quadrangle. These maps are in differing stages of preparation, with the first drafts for the Casper and both Thermopolis maps approaching completion.

Geologists with expertise and interest in a desired map area are encouraged to contact Alan Ver Ploeg at the Wyoming State Geological Survey at (307) 766-2286.

Executive Director’s Itinerary

(subject to change)

The Executive Director is visiting various Sections, agencies, campuses, and other organizations. He is talking, listening, and exchanging information and ideas. Members are encouraged to attend these meetings wherever and whenever possible. His itinerary for the next several months, as presently scheduled, is:

Feb. 22-27: Society for Mining, Metallurgy & Exploration, Annual Convention, Denver, CO
Mar. 7: Texas Section, Dallas, TX
Mar. 12-15: Council of Engin. & Scientific Society Executives, Victoria, BC.
Apr. 6: Geoenvironmental Forum, Dallas, TX
Apr. 6-8: American Geological Institute, Envir. Geoscience Advisory Committee, Member Society Council, Government Affairs Program Committee, Dallas, TX
Apr. 6-9: American Association of Petroleum Geologists, Annual Convention, Dallas, TX
Apr. 26: Executive Committee, Arvada, CO
May 18-21: AIPG National Affairs Fly-In, Washington, D.C.
Jul. 16-21: AIPG-GSA-AAPG/DPA-USGS Ethics Conference, Welches, OR
ATTENTION MEMBERS

The AIPG Executive Committee solicits your comments on the following draft position. As background for suggesting that we take this position, we note that the Director of the U.S. Geological Survey, Gordon Eaton, has predicted that within five years the name “geological” will be gone from the USGS name, and that they may call themselves a natural resources agency. The Director’s prediction is at least in part in response to expanded responsibilities resulting from the merger of the National Biological Service into the USGS as the Biological Resources Division. In January, 1996, AIPG adopted a position regarding such mergers, supporting integration of scientific disciplines and defending the original mission of the USGS (see the April, 1996, issue of The Professional Geologist for the wording of this position). The suggestion to eliminate the name “geological” is not yet an official statement on behalf of the USGS, and Congressional action would be required to change the name.

Please send your comments to the AIPG Executive Committee, 7828 Vance Drive, Suite 103, Arvada, CO 80003; fax: 303-431-1332; e-mail: aipg@aipg.com. Thank you.

Jonathan G. Price, President

DRAFT AIPG Position on the Name of the United States Geological Survey

(to replace the AIPG Position on Mergers Between the United States Geological Survey and Other Government Agencies, adopted January 20, 1996)

AIPG supports keeping “geological” in the name of the United States Geological Survey as a bureau within the Department of Interior.

Geology is “the study of the planet Earth—the materials of which it is made, the processes that act on these materials, the products formed, and the history of the planet and its life forms since its origin.” (Glossary of Geology, American Geological Institute, 1987). By AIPG’s definition, “geology is the science which treats of the Earth and its origin and history, in general; the investigation, including collection of specimens, of the Earth’s constituent rocks, minerals, fossils, solids, fluids including surface and underground waters, gases and other material from the center of its core to the outer limits of its atmosphere; the study of the Earth; and the application and utilization of this knowledge of the Earth. The knowledge and principles of geology are also applied to extraterrestrial bodies.” By these definitions, geology has vital applications to a variety of national issues ranging from natural resources to hazards to environmental concerns.

AIPG enthusiastically supports the Congressionally mandated original mission of the USGS (1879), to classify the public lands and examine the geological structure, mineral resources, and products of the national domain. This mission has evolved into one that is much broader and self-defined, as stated in the Strategic Plan for the USGS, dated May 1996: “The U.S. Geological Survey provides the Nation with reliable, impartial information to describe and understand the Earth. This information is used to: minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; enhance and protect the quality of life; and contribute to wise economic and physical development.” AIPG supports this expanded mission only to the extent that it applies to activities that are clearly in the national interest. The livelihoods of many AIPG members and other professional geologists are dependent on projects and activities that are of local and state concern. We believe that it is inappropriate for a Federal agency to duplicate and compete with them on these types of projects. The new Biological Resources Division of the USGS fits well into both the original mission and the more recent mission statement.

Activities of all divisions of the USGS appropriately fall within the term “geological.” Ecological and environmental concerns of the Biological Resources Division; all surface- and ground-water activities of the Water Resources Division; hazard, energy- and mineral-resource, geologic mapping, and environmental programs of the Geologic Division; and base-map preparation of the National Mapping Division are directly related to studies of the Earth and “geology.”

The USGS has developed an excellent reputation for impartiality and defensible science to help solve national problems. A move away from the term “geological” in the agency’s name would not only be inappropriate by definition but also would be confusing to the public. The fiscal and other costs of changing the name of the USGS would far outweigh any benefits of such a change.
Résumé Honesty: “Been There, Done That!”

(Nov. ’96, p. 26)

John Howard’s article “Been There, Done That!” in the November 1996 TPG prompted Andrew McCorkle, CPG-8949, to write the following comments to Howard. Because both Howard’s article and McCorkle’s comments address topics covered by the P&EP column, I requested and received their permissions to include them here. In reading the following, please keep in mind that the personal pronouns refer to Howard and McCorkle.

“Responding to your commentary, I agree there may be a tendency for some to exaggerate their qualifications on a résumé. Especially in the environmental industry, where numerous individuals have handled components of projects that could be construed as project management. As one who keeps my résumé current, I have some difficulty in finding language which would differentiate my qualifications from someone with much less actual experience.

“The issue at the heart of your discussion is this: There is little to no definition of the term project management. You wrote ‘An individual who had graduated with a Bachelor’s degree in 1995 had written that he/she was now a project manager responsible for environmental investigations and remediation projects.’ You then slammed a former professor for allowing this student to ‘lie’ on his/her résumé. That person may well have been justified in making that statement. If that student had received a grant to perform a thesis, then he/she was responsible for managing the project. Even if the professor had received the grant, the student was responsible to the professor for managing the project. Under this broad definition of project management the graduate did not overstate his/her qualifications. The term itself does not carry with it any description of responsibility for fiscal or technical components. On a résumé, it’s hard to distinguish between one who has had overall responsibility for project implementation and completion, versus one who, in my mind, has been nothing more than a task manager.

“I have been in the same position you’re in when it comes to reviewing résumés. Prior to my current position, I was a manager within a large, international consulting firm. I remember those résumés from applicants. They all looked alike! So many times I saw the words project manager of this-and-that. It’s almost impossible to evaluate one’s technical and fiscal management skills from that one- to two-page piece of paper. Even though I’ve been responsible for annual budgets exceeding $3MM and critically evaluated hundreds of individual reports for accuracy, relevancy, and quality, I still look at my résumé and see the words project manager. Even though I have managed over 100 UST field projects, I still see the words project manager. Even though I have been responsible for completion of five large-dollar RCRA and CERCLA field investigations, I still see the words project manager. And even as one who now hires numerous consultants, is responsible for the scopes of their work, and is responsible for their accuracy and technical competency in completing work, I still see the words project manager. I sometimes wonder how a personnel director at any company would be able to distinguish my qualifications from those listed on the résumé from the individual of which you spoke!

“The point you raise is relevant. Terms on résumés are subject to broad interpretation. There is little to no way for one to be able to evaluate an applicant’s technical, verbal, written and fiscal skills from the words on a résumé. In the absence of testing requirements for membership in many certification programs, this will continue to be the case. I’m not in favor of testing requirements for membership in AIPG; however, I believe that some kind of national program is necessary to separate technical qualifications, especially of individuals within the environmental industry. Maybe through NAEP.

“I believe that it is the employers’ responsibility to separate the ‘wheat from the chaff’ with respect to overstated qualifications. So long as credible individuals are managing those companies, this will be the case. The position I took at that international consulting firm was to replace an individual who was fired for, among other things, misrepresentation of qualifications. This person is also a CPG (I cannot, however, say anything negative against this person because I have no evidence to document the misrepresentation). I believe the system worked in this case.”

John Howard, CPG-8740, replied to McCorkle with the following clarifications.

“As an individual who works within the environmental industry for a major petroleum supplier, I am sure you have seen more than your share of SOQs [state-
ments of qualifications] and proposals which contain glowing tributes and statements about the qualifications of individuals who will work on your specific projects. But I have to ask, how many times were your projects directly affected because of an overstatement of qualifications or experience?

"The main point I was trying to get across is that people should be held responsible for their statements. Understandably, AIPG cannot control those individuals outside of our jurisdiction, but we as peers can rein in those individuals we observe blatantly misrepresent the facts.

"I am not sure another organization can provide the necessary certification for project managers. Your comments and analogies regarding the terminology and over usage of the phase project manager are correct. I think that this is where the astute personnel manager or human resources professional can assist our profession by devising ways to ferret out those people who overuse or incorrectly use the terminology."

On reading John Howard's article, Richard Lyster, CPG-8076, wrote, "I'm compelled to comment that it is the best, brief article concerning the current trend of individual over exaggeration of professional experience that I also see on résumés and during interviews. [The] article contains some excellent comments and suggestions about the geologic profession. I have routed the article to the project managers at our multi-discipline consulting firm."

The same article prompted Marsha L. Taylor, CPG-6950, to comment, "I enjoyed [the] article about individuals overstating their qualifications on résumés. I especially appreciated [the] thoughts on the competitive market forcing many geologists to practice beyond their capabilities, having experienced first hand the 'fall out.'

"I am Past President of the Kentucky Section of AIPG, and have been gainfully employed as a hydrogeologist for nearly 15 years, specializing in ground water resources. Several years ago, I had a project for a coal company, to locate a ground water supply for a coal washing plant. The area could be termed 'bone dry' as far as the availability of ground water was concerned, and the project proved to be very difficult. The difficulty was enormously compounded by the coal geologist (originally a petroleum geologist) who was unfortunately, supervising the project. This man had read one book, U.O.P. Johnson's Ground Water and Wells. As a result, he felt that he personally knew everything there was to know about hydrogeology, test drilling, well design, etc., etc., etc. He was technically incompetent, dishonest in his dealings with both me and the drilling firm hired to complete the test drilling, and refused to remotely consider that he was practicing outside his area of expertise.

"I withdrew from the project when it became apparent that I was not going to be allowed to provide my professional services in an ethical, technically correct, cost-effective manner. I never sent a bill for the services rendered to that date, because I didn't feel that the project had been conducted properly—solely due to the geologist in question—nor did I want my name in any way associated with the project. Note: the coal company currently buys city water for the plant.

"Since he was not an AIPG member, I was unable to complain to the AIPG Ethics Committee. And although I wrote a complaint about his behavior to the Indiana Certification Board, I never received a reply.

"Since then, I have been contacted by this same company to do more work for them. However, I requested a $10,000 retainer fee to be deposited in a bank, in my name, prior to the startup of the project, to be withdrawn by me immediately upon appearance of the geologist discussed above on the site. The retainer was in addition to my normal fees and charges. Needless to say, I made my point, but I don't have the work either. Which is fine with me. $10,000 won't cover the cost of the nervous breakdown, or a defense attorney should I commit murder.

"I would seriously appreciate your comments on what, if anything, can be done by qualified, competent, ethical geologists, to 'discipline' those who practice out of their area of specialty, behave unethically, or are technically incompetent."

Taylor raises several interesting points. She describes her personal efforts to bring the unethical practice of one geologist to the attention of the appropriate licensing body and to the individuals employer. Neither approach appears to have resulted in discipline of the geologist in question. I asked a similar question at the end of column 12 (Nov '96). What can we individually or as AIPG due about those who practice unethically but are not AIPG members or are not members of certifying associations and/or licensing boards willing to exert their disciplinary rules? What methods have you tried to deal with unethical practices such as Taylor describes? What was the result of your efforts? Descriptions of what worked, and what didn't work—so we don't make the same mistakes—would be most welcome.

As Harry W. Smedes, CPG-6480, wrote, "Your [PE&P] column gave me occasion to take a new look at the responsibilities we all have as professionals and as members of AIPG—not just ethical practice on the job, but ethical behavior as guardians of the health and integrity of the profession as well as concerns about the public trust."
Comments on the Conduct of an Investigation,
(see Column 13, TPG, Dec '96)

The purpose of including the material under this heading in column 13 was to solicit specific suggestions for rules on investigations. Several members have expressed their opinions to me that specific rules ought to exist, they just have been short on the specifics. It was not my intention to spend much time rehashing the specific investigation Scott L. McCreery, CPG-8525, used as a starting point of the discussion; that matter is closed. I received two letters on the issue, one from Harry Smedes and one from Bill Weist. Because these letters overlapped in part with each other and with statements already appearing in this column, and because other topics were addressed (Smedes' letter was cited above), I have edited them (in part by splitting sections out) more than I normally do. This section of this column, contains their observations on investigations.

Harry W. Smedes, CPG-6480, wrote 'I have enjoyed your commentaries on ethics issues in TPG, and commend you on your activities on behalf of the AIPG. ...

'I suspect that the Screening Committee does not need much additional guidance; too-specific a list of procedures is likely to hamper rather than help investigations. However, a recurrence of a situation like that cited by McCreery probably could be avoided in the future by making it a firm policy that investigators: a) confer with all persons listed by a nominee as references; b) inform those persons of any negative statements that would disqualify a nominee; and c) solicit their response to such negative statements. ...

'As you cited, AIPG's Code of Ethics includes as an obligation that members should bring substantiated evidence of violation of the rules (Standards) to the attention of the Institute. The Bylaws state that a member's professional conduct shall be governed by that code.

'It may seem ironic, but I place the burden not on the National Screening Committee and its procedures, but on each one of us to fulfill our obligations under the Code of Ethics to which we all subscribe.'

William G. Weist, Jr., CPG-1937, commented, 'You state that McCreery asserts that he should have been among those contacted during the investigation because he was a sponsor.'

'As I read McCreery's letter, he felt he should have been contacted because as Project Manager when the unethical events were supposed to have occurred, he was most familiar with what happened. He seemed to feel that he was not contacted mainly because he was a sponsor.

'If McCreery's statement ... is true, that the only people contacted by the investigator were those who made the allegations, then I fault the investigator for not contacting the person charged to get his side of the story and to find out if there was anyone or any evidence to support it. How can anyone reach a conclusion and make a recommendation when they only have one side of the story? When I was Ethics Committee Chair and sent an investigator to check on charges of unethical behavior, I specifically told him to talk to the person against whom the charges had been brought as well as the person who filed the charges, and to anyone else who might have knowledge of the incident. Many times, you can get a better feel for what happened by talking with the participants face-to-face than you can by reading a statement that probably was rewritten several times before it was submitted. ...

'Should AIPG adopt specific investigative procedures? Definitely not. As you pointed out, each case is different, and what are good procedures for one case may not be effective for another. Perhaps some guidelines and/or checklist could be developed covering all known cases. Then the Chair and/or the investigator could apply those that seem pertinent to a particular case. Certainly when I was Chair, I would have appreciated some form of guidance. ...

'In summation, I think mistakes were made by both sides in the case. Based on the information in your column, I do not think AIPG owes the applicant a written apology.'

"Good Old Boys" in Action

The alleged operations of the "good old boy" network have arisen in the discussions related to "Comments on the Conduct of an Investigation" in column 13 (Nov. '96) and in a conversation I recently had with Stephen A. Sonnenberg, CPG-6201, regarding his experiences on screening committees. The time has come to describe these "operations."

Sonnenberg received a call one day from a member regarding a geologist whose name had recently been published as applying for membership. The caller arranged for a breakfast meeting during which various alleged ethical deficiencies of the applicant were enumerated. However, when Sonnenberg asked that the allegations be put into writing and substantiated to the degree possible, the complainer would not do so. He had thought that having the "little chat" with Sonnenberg would be sufficient to blackball the applicant. He was wrong.
Unsubstantiated oral allegations epitomize the "good old boy" in action. As William G. Weist, CPG-1937, recounts, "AIPG's Code of Ethics will not be effective unless every member of AIPG who is aware of unethical conduct is willing to face the heat and bring charges against that person. Unfortunately, this is not the situation. When I was Ethics Committee Chair, I was contacted at least three times by members concerning bringing charges of unethical conduct. But when I told the caller that I had to have written charges, that the person charged would receive a copy of the charges and would have a chance to respond, and that there could be a face-to-face confrontation, I never heard anything more. Apparently, those members were not willing to take a stand on unethical behavior if it meant that they might be subject to any unpleasantness." In our society and in AIPG, those accused have the right to face their accusers.

Scope of AIPG's Code of Ethics: Application by an Ex-Con
(see Column 13, TPG, Dec '96)

I received a couple of comments on this column and have been promised others. William G. Weist, CPG-1937, wrote, "To me incest, besides being a felony, is unethical. It is betrayal of trust given by a child to the perpetrator. Certainly, in an attempt not to be found out, the perpetrator much have taken actions to cover up his offense. Again, to me, this is unethical. If a person is unethical in one situation, how can one be sure he or she would not be unethical in another situation. In my opinion, the application should not be accepted, or if accepted, it should not be approved."

Another member commented that he didn't want anyone pointing out, "There's an AIPG-certified felon." Yet other members have told me that if someone has served their time or otherwise paid his or her debt to society, then, if he or she wants to become certified, it should be allowed.

My major objective in presenting this topic was to point out that AIPG's current Disciplinary Procedure (Section 6.3) allows a convicted felon to become a member no more than 6 years after a post-conviction application. Rather than my opinion, this procedure is the Institute's rule. If the majority of the membership disagree with this rule, then the rule should be changed. My purpose was to point the rule out, in part because I suspected that the foregoing comments favoring a permanent ban reflected a common impression of what the rule ought to be and, I think I recall, was at one time. Let's discuss the issue.

Another member commented that he was tired of hearing about the sexual assault. Okay, how about the member convicted of DUI and manslaughter? Should a member or applicant with a DUI conviction be treated differently than one convicted of geologic fraud in the promotion of an oil & gas or mining property? What do you think?

As always, comments on the foregoing topics or any other topic relating to professional ethics and practices are welcomed. Your comments which make this column what it is.

Requesting Suggestions For Nominations

The 1997 AIPG Awards Committee is seeking nominations for future recipients of the Ben H. Parker Memorial Medal, the Martin Van Couverying Memorial Award, the John T. Gale, Sr. Memorial Public Service Award, the Presidential Certificate of Merit, and Honorary Membership. The qualifications for these awards are found on pages 26 and 27 of the 1996 Membership Directory. Nominations for these awards, accompanied by supporting statements, should be sent to the AIPG Committee on Honors and Awards, 7828 Vance Drive, Suite 103, Arvada, CO 80003.

Licensing Professional Geologists in Illinois

The Professional Geologist Licensing Act, (Illinois Public Act 89-0368) went into effect on July 1, 1996. The newly appointed Board of Licensing is formulating regulations to implement this law, which will be administered by the Department of Professional Regulation (DPR). The grandfather period extends to June 30, 1997, but may be extended by the Illinois legislature through a request from DPR.

Geologists wishing to be licensed in Illinois, especially those who would qualify under the grandfather provision, should request applications now. Send requests to: Illinois Department of Professional Regulation, 320 West Washington St., Third Floor, Springfield, IL 62786. Attention: Judy Vargas.
Summary of the January Executive Committee Meeting

Ronald E. Alexander, CPG 6372, Advisory Board Representative

Just as change within the technical aspects of our profession is necessary, due to an ever changing understanding of the forces which shape our Earth, so is change in how we must best serve our profession as a whole. Recognizing the growth of state registration/licensing legislation (among other events) across the nation and the concerns of registered geologists seeking representation within the profession, past Executive Committees have discussed, debated and proposed many plans to further the purposes of AIPG while addressing these concerns. Concluding that the present membership structure was not viable enough to allow AIPG to effectively encourage participation among practicing geologists as well as others with interests in the profession, a change in the bylaws was considered necessary. This was the motivation behind the recent ballot.

The response to the ballot, (over 1,900 returned, considerably more than is typically received for AIPG elections) was greeted enthusiastically by the Executive Committee which met on January 18, 1997 at Headquarters. In addition, the five to one margin, in favor of the amendment to the bylaws indicates that a significant portion of the membership agrees that action to achieve these goals is long overdue. The amendment allows the Executive Committee to create new categories of membership, within certain guidelines aimed at ensuring control of the organization by CPGs and maintaining strict adherence to our Code of Ethics. The upcoming agenda includes review of draft revisions by the Executive Committee prior to publication in The Professional Geologist for member comment. Secondly, and following considerations of concerns and comments of the general membership, the final amendment will be acted upon by the Committee. Upon approval, it is the goal of the Executive Committee to have the amendment in place and be prepared to initiate a new membership campaign no later than October at the annual conference in Houston.

Beginning with an original draft provided by Past President Bob Merrill and with input from Tom Fails and Dave Abbott, chairs of our State Affairs and Ethics Committees respectively, a general consensus was reached on several key items of the proposed changes to the bylaws, by the close of the January 18 Executive Committee meeting. Additional guidance was provided by Bill Knight and Karen Spaulling, AIPG staff, in their roles of being in constant contact with applicants and members as well as their vast experience in related legal matters. These key items are as follows:

A. Membership should be open to degreed geologists regardless of experience level, provided educational requirements have been satisfied. This would apply to recent graduates without experience as well as practicing geologists not interested in CPG status through certification. These members would have voting rights and be allowed to serve as Section officers and Advisory Board Representatives on the Executive Committee.

B. Certified Professional Geologists (CPGs) would become a special class of membership within the organization. To maintain a majority control, only CPGs would be allowed to hold offices which are elected by the membership at large, and which include the President, President-Elect, Vice President, Secretary, Treasurer and Editor. This would result in at least 60% of the Executive Committee being of CPG status. Any issues affecting the status or rights of CPGs could only be decided by CPGs and only CPGs could serve on either the Section or National Screening Committee deciding the disposition of applications for CPG status.

C. A non-voting class should include the present classification of Student Affiliate as well as other individuals, who share similar concerns and interests of AIPG, yet may not have satisfied educational requirements as presently stipulated. Although affiliated with AIPG, these individuals may not promote themselves as geologists or imply that they are capable of practicing geology based on this affiliation.

D. Finally, regardless of the member classification, all must subscribe to adherence to the AIPG Code of Ethics.

The Executive Committee also discussed concerns on behalf of the Minnesota Section and others regarding the inclusion of state-registered geologists as CPGs. Although individual state registration legislation varies tremendously, the Committee does wish to accommodate these registrants in the certification process. However, it is of greatest importance that all applications be treated fairly with no regard to the registration status of the applicant. The Executive Committee does desire and intend to streamline the certification process for state-registered geologists in light of the fact that a certain degree of screening has taken place at the state level. Along this
line, several ideas were debated on how to accomplish this.

Depending on the final draft of the bylaws revision it could be possible for a state-registered geologist to submit a number of documents in lieu, or in support, of the present application. For example, these might include; a) a copy of their state registration application which would possibly detail education and employment history, b) a copy of their registration certificate, c) college transcripts to verify education requirements, and d) the signature of one CPG as a sponsor in lieu of multiple sponsors and letters of employment verification. This sponsor would typically be a CPG familiar with the applicant that could verify the experience level since the date of registration. Following receipt of the above, the applicants name could be published in the TPG.

While the application is being reviewed by the National Screening Committee, a period of time would be allowed for membership comment. Assuming no problems are encountered, some time could be saved by the Section Screening Committee from the state(s) of residence and/or registration.

The bylaws revision ballot and subsequent action thereupon were the most anticipated items on the agenda at the Executive Committee meeting and were, therefore, saved for last. However, for those of you who often ask, “What goes on at these meetings?” and those who add, “My sentiments exactly,” a wide variety of issues was discussed and acted upon. Past Executive Committees had often debated the issue of increasing the experience requirements for certification to 8 years after attainment of the educational requirements. After further discussion, the 1997 Executive Committee agreed that this change in requirements should be enacted. Additionally, it was agreed that an M.S. degree could be substituted for one year of professional experience while a Ph.D. would qualify as three years of experience. Regardless of the educational level attained, a minimum of five years of professional experience would be required, not including research toward degree requirements. Although these requirements tend to be considerably lofty compared to requirements for registration in most states, it must be remembered that the certification process is not endeared or valued for setting minimum requirements for practice in order to ensure projection of the public. Instead, it is to set a proficiency standard to better advocate the profession. In addition, and more directly related to the purpose, even with the current 36 hour educational and 5 year experience requirements, it has not been unusual to uncover questionable qualifications during review of applications by the National Screening committee.

Continuing education has been a topic of discussion for several years and continues to be a hotly debated issue. Although a consensus exists that some form of continuing education is of value, it has been difficult to agree on what would satisfy this concept. Others tend to feel that this responsibility rests with the regulatory agencies of the states, especially those with registration legislation. Regardless, the past, but now defunct requirement of belonging to a “member society” to maintain AIPG membership was not such a bad idea. Although the Executive Committee is not inclined to reinstate that requirement at this time, these societies may offer the most convenient method to accomplish continuing education, since many of them offer short courses on a regular schedule.

Increased member services were also discussed at the January meeting. Included in these discussions were ideas to design and offer educational opportunities to assist in preparation for the ASBOG exam, an already scheduled “fly-in” to Washington, D.C., May 19-21 to relate the importance of geology to Congress and Federal agencies (contact HQ for more information), and ways to offer assistance to AIPG Sections with lobbying and legislative efforts. The latter is presently underway through efforts to prepare and publish a manual on lobbying by volunteers and is planned to complement the recent publication of the Government Affairs Manual, 1996. A Career Day event, successfully accomplished recently by the Colorado Section and others has also been targeted for encouragement to the Sections as a way to discuss job opportunities within the profession with students.

In recap, we anticipate publication of key wording of the proposed bylaws changes in one of the next issues of TPG. Any and all comments will be considered prior to a vote by the Executive Committee later this year. With phone calls being difficult to document, voice your concerns and comments by either e-mail, fax or in writing to headquarters. The Executive Committee depends on input from Sections as well as individuals in its actions and constantly maintains the interests of AIPG and the profession at the top of its list of priorities. Your assistance will ensure that your voice will be heard in these efforts.

Missouri Section Candidate for National Award
AIPG’s Missouri Section has been named a candidate for the 1996 ASAEE (American Society of Association Executives) Award of Excellence in Government Relations. This singular honor is in recognition of its organizing and coordinating the successful first-time attempt to enact professional registration of geologists in Missouri.
James Haskell "Doc" Irwin, geologist, hydrologist, musician, artist and family man, died on August 31, 1996, at the age of 73. He is survived by his wife Mary Ellen Irwin of the home, four children and nine grandchildren. Jim was born on June 2, 1923, to Haskell and Norene Irwin of Oklahoma City, Oklahoma. Jim graduated from Classen High School in 1941 with honors and enrolled at the University of Oklahoma. Jim's formative years had been profoundly influenced by the Depression and he learned at an early age the necessity of hard work to achieve his goals. He supported part of the cost of college education by working nights and weekends at a funeral home in Oklahoma City where he drove the ambulance, played the organ and was part time embalmer's assistant. However, his dream of entering medical school was interrupted by World War II, and he enlisted in the army as a medic. He was in charge of a hospital train which traveled coast to coast moving injured soldiers from ships to hospitals.

After the war, "Doc," a nickname acquired in the service and one that he would answer to for the rest of his life, returned to the University to finish his degree and apply for entrance into medical school. However, during this period he had enrolled in several geology courses as electives, changed his major to geology and acquired his bachelor's degree. In 1947 he was accepted into the graduate school of geology at the University of New Mexico in Albuquerque. During this period he spent his summers running samples on test wells at Los Alamos for the Atomic Energy Commission.

Upon graduation he was employed by the U.S. Geological Survey as a geologist trainee and married his first and only true love, Mary Ellen Ely. After a short period, Jim was transferred to Holbrook, Arizona, to map the surface geology on the Navajo reservation. For the next three years, Jim spent his days isolated on the reservation walking the outcrops while Mary Ellen made him a home in Holbrook. In 1953 he moved to Durango, Colorado, and was placed in charge of a hydrologic study of the Triassic Formation along the Arkansas River in Colorado for the benefit of the Ute Indians. He coauthored, with J. W. Harshbarger and C. A. Repenning, U. S. Geological Survey, Professional Paper #291, "Stratigraphy of the uppermost Triassic and the Jurassic rocks of the Navajo Country." In 1964, after the project was completed, he was briefly stationed in Washington, D.C., for operational training prior to transferring to Oklahoma City as geologist in the hydrological division. He continued to advance his career with the survey and at retirement was the District Chief of the Water Resources Division for the State of Oklahoma.


He was a Fellow of the Geological Society of America, a past chapter president and Certified Professional Geologist in the American Institute of Professional Geologists, an active member of the American Association of Petroleum Geologists and a dedicated member of the Oklahoma City Geological Society. He was an active member participant of geological societies and civic organizations wherever he was stationed. His honors include the United States Department of Interior "Superior Service Award" and the Governor of the State of Oklahoma Award as "Oklahoma Water Pioneer."

After retirement, he dedicated his time to his family, church and friends but was frequently called by various industry and governmental organizations for his expertise in hydrology and environmental concerns.

He was an enthusiastic member of the Westminster Presbyterian Church choir and his perfect pitch and tenor voice were assets to the group. He was proud of his ability to play the piano, both by sight and by ear. Although he had years of classical piano lessons as a child, he invariably wandered into the realm of his inner ear and most compositions became originals. He loved to play "Malaguena" but invariably with such spirit and innovation that the composer would have difficulty recognizing it. Jim was an avid collector of Navajo rugs, baskets and pottery and served as a docent at the National Cowboy Hall of Fame. He could always be counted on to share his intimate knowledge of the west with visitors.

Jim will be remembered by all who knew him for his integrity, moral character, and his dedication to his family and profession.

Charles E. Branham, CPG-0257
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 Bylaws.

Representation

Members are represented by qualified professional geologists. 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
CALENDAR

1997


Apr. 6-9. AAPG Annual Meeting, "Future Legends", Dallas, TX. Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101-0979, Ph.: (918) 560-2879, Fax (918) 560-2864, e-mail: dkeim@aapg.org.

Apr. 6-9, 6th Conf. Sinkholes, Eng. & Env. Impact Karst, Springfield, MO. Contact: B.F. Beck, P.E. LaMoreux & Associates, Inc., P.O. Box 4578, Oak Ridge, TN 37831-4578, Ph.: (423) 483-7483, e-mail: pelaor@use.net.

Apr. 7. Science vs. Jung Science, How Bad Geology makes Bad Law; The Role of the Geologist, Dallas, TX. Contact: AAPG, 1444 S. Boulder, Tulsa, OK 74119, Ph.: (918) 584-2555.

Apr. 24-29. 1997 GSA Penrose Conference, Paleocene/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, e-mail: lucas@darwin.nnmnh-abq.nm.us.


May 8-9. Concepts of Gas Imbalance and Gas Balancing Agreements, Houston, TX. Contact: The University of Tulsa, Div. of Continuing Education, 600 S. College Ave., Tulsa, OK 74104, Ph.: (918) 631-3088, e-mail: contaed_cee@utulsa.edu.

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) 594-9310.

Jun. 1-6. CSPG-SEPM 1997 Joint Convention, Sedimentary Events and Hydrocarbon Systems, Calgary, Alberta, Canada. Call for papers - deadline February 1, 1997. Contact: 1997 Convention Office, CSPG #505, 206 - 7th Ave. S.W., Calgary, Alberta, Canada T2P 0W7, Ph.: (403) 264-5610, e-mail: cspg@cspg.org, or www.cspg.org/cspgsepm97.


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@desire.wright.edu, http://biology.wright.edu/cgwm/cgwm_home.html.


Sep. 9-13. 4th Annual Conference & Trade Exhibition, Soil and Water Mgmt. for Urban Development, "Beyond the Drain - Future Direction for Stormwater Mgmt.", Sydney, New South Wales, Australia. Contact: Alison Frost, Hawthor Castle Technologies Ltd., UWS-Hawthor Castle, P.O. Box 415, Richmond, NSW 2753, Australia, Ph.: 61 45 701 690, Fax 61 45 701 520.


Nov. 5-7. Problems and Pitfalls in Joint Operating Agreements, Houston, TX. Contact: The University of Tulsa, Div. of Continuing Education, 600 S. College Ave., Tulsa, OK 74104, Ph.: (918) 631-3088, e-mail: contaed_cee@utulsa.edu.

Nov. 16-19. International Conference on Advances in Ground-Water Hydrology — A decade of Progress, Tampa, FL. Contact: American Institute of Hydrology, 2499 Rice St., #135, St. Paul, MN 55133-3724, Ph.: (612) 484-8169, Fax (612) 484-8337, e-mail: ahydro@aol.com.

AIPG ANNUAL MEETINGS

October 8-11, 1997
Houston, Texas

October 3-7, 1998
Baton Rouge, Louisiana

October 5-8, 1999
Anchorage, Alaska

ADVERTISERS INDEX

AIPG Publication 4
AIPG Publication BC
Airmag Survey, Inc. 11
Geraghty & Miller, Inc. 7
Krueger Enterprises, Inc. 9
Strata 13
Applicants for certification must meet AIPG's standards as set forth in its Bylaws on education, experience, competence, and personal integrity. If any Member or board has any factual information as to any applicant's qualifications in regard to these standards, whether that information might be positive or negative, please mail that information to Headquarters within thirty (30) days. This information will be circulated only so far as necessary to process and make decisions on the applications. Negative information regarding an applicant's qualifications must be specific and supportable, persons who provide information that leads to an application's rejection may be called as a witness in any resulting appeal action.

Applicants for
Certified Professional Geologist

AK-Boeckman, Craig T.
173 Ocean Park Drive, Anchorage AK 99515.
Sponsors: Greg Siegner, Brad Authier, Mike Condon.

CA-Bunker, James V.
23003 Bajada Drive, Valencia CA 91355.
Sponsors: Tim Latiolait, Stuart Michtchen, Tom Davis.

VA-Cartten, Richard B.
2019 Headlands Circle, Reston VA 22091.
Sponsors: Jonathan Price, Bruce Lipin, Willis White.

KY-Conner, Michael Ray
1443 State Route Hwy 505 South, Horse Branch KY 42349.
Sponsors: Kenneth Kuehn, Mark Sweet.

MI-Eiselechick, Joseph G., Jr.
3252 Milldale Drive, Ann Arbor MI 48105.
Sponsors: James W Griswold, A. Linette McMonagle, Craig Savage.

OH-Forster, Nancy J.
19 Gumbert Drive, Amalia OH 45102.
Sponsors: Charles McCulloch, Joanne Mitock, Edie Lewis.

TX-Frost, Steve
103 Misty Water, Berghen, TX 78004.

CT-Gardner, Jeffrey D.
34 Old Chester Rd., Haddam CT 06438.
Sponsors: David Cook, Ted Nowak, John Sullivan.

MO-Garstang, Mimi R.
11655 Greenwood Court, Rolla MO 65401.
Sponsors: Jerry Vineyard, Jim Williams, John Bogner.

AK-Horner, Greg J.
16244 Gavin Circle, Eagle River AK 99577.

FL-Ledbetter, Howard Ray
8950 NW 45th Court, Coral Springs FL 33065.
Sponsors: Gary Eichler, Daniel Cassala, Roque Rokovich.

FL-Parker, Steven J.
1812 East Lee St., Pensacola FL 32503.
Sponsors: Brian Caldwell, Paul Stoddard, Robert Mink.

IA-Seale, Michael
411 SE Delaware Ave., Ankeny IA 50021.
Sponsors: Gene Blazenko, Robert Cody, Eric Arno.

OR-Sprecher, Terry Ann
551 NW Trenton Ave., Bend OR 97701.
Sponsors: G. Martin Booth, Ralph Christensen, Nancy Nethin.

MI-Spurlin, Wade J.
818 Coughlan Drive, Auburn Hills MI 48326.
Sponsors: Andrew Foer, Frederic Roesser, Robert Nowakowski.

NM-Tonander, Karl E.
325 Monterey Drive, Las Cruces NM 88005.
Sponsors: Jack Ford, C. Almone-Martin, Robert Eweleth.

NY-Wheatcroft, Suzanne B.
182 Edgewood Ave., Rochester NY 14618.
Sponsors: Fred Ames, Robert Mahoney, Judy Ausmus.

Upgrading to CPG

TX-Wick, Elizabeth J.
508 Bayland Avenue, Houston TX 77009-6606.
Sponsors: David Sackett, Gary Bates, Jerry Vincent.

Candidate for Certification

WI-Clayton, Derek H.
10330 W Dean Road #105, Milwaukee WI 53224.
Sponsors: Lawrence Wedman, Jeff Lamont.

MI-Finch, Anthony J.
2874 Benstein, Walled Lake MI 48390.
Sponsors: Steve Stahl, Dennis Theoret.

New Certified Professional Geologists

MN-Baillie, Jennifer L., CPG-10034
2651 E. Lake of Isles Parkway, Minneapolis MN 55406, (612)244-9939

TX-Barrett, Estrella L., CPG-10039
5415 Anita St., Dallas TX 75206-5335, (214)800-9345

TX-Dann, Jeffrey P., CPG-10040
2202 Melanie, Collegeville TX 76033, (214)831-2700

AK-Dowian, Paul R., CPG-10041
8181 Fairwood Circle, Anchorage AK 90018, (907)562-3366

TX-Eckenerd, Katherine M., CPG-10042
P.O. Box 5411, Austin TX 78753, (512)571-1141

WA-Galloway, Gary, CPG-10039
3102-220th Place SE, Issaquah WA 98027, (206)827-3674

TX-Gates, Kirk S., CPG-10043
305 Marsha Manor, Richardson TX 75081, (214)407-0550

LA-John, Chucko J., CPG-10044
947 Louray Road, Baton Rouge LA 70808-5844, (504)388-2861

NY-Neumann, Brian L., CPG-10037
P.O. Box 249, Poestenkill NY 12140, (518)452-4291

TX-Petrosian, Rima, CPG-10038
110 Lake Road, Apartment #803, Lake Jackson TX 77566, (409)238-1877

CT-Santovasi, Joseph A., CPG-10036
65 County Road, Box 494, Marion CT 06454-0494, (860)349-3598

AIPG Membership Totals

As of 2/1986
CPG - Active 4,576
CPG - Retired 538
CFC 99
AP 0
SA 66
Honorary 3
TOTALS 5,214

As of 2/11/97
CPG - Active 4,585
CPG - Retired 509
CFC 99
AP 0
SA 66
Honorary 3
TOTALS 5,229

IN MEMORIAM

Bruce D. Brooks,
CPG-0482, Charter Member, September 28, 1996, Sacramento, California

Ernest Dobrovolny,
CPG-0443, Charter Member, May 18, 1906, Lakewood, Colorado

Joe S. Farmer,
CPG-3175, January, 1997, Houston, Texas

Fred Mencenberg,
CPG-7641, July 20, 1996, Washington, Michigan

Gerald C. Merket,
CPG-2459, April, 1996, Tyler, Texas

Rayburn D. Ocomb,
CPG-3271, Houston, Texas

Laurence L. Sloss,
CPG-1546, Honorary, Member, November 2, 1996, Northbrook, Illinois

Dan A. Thompson,
CPG-6457, July 22, 1995, West Blocton, Alabama

Donald R. Van Buskirk,
CPG-6435, August 25, 1996, Berthoud, Colorado

John A. Wolfe, CPG-0239, Charter Member, December 26, 1996, Manila, Philippines
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