

OFFICERS

PRESIDENT

Dennis Pennington
National Envir. Tech. Corp.
P.O. Box 204
Telford, PA 18969-0204
O: (215) 723-9300
Fax: (215) 723-9344
netc@enter.net

PRESIDENT-ELECT

Robert H. Fakundiny
3288 River Rd., 9-J
Rensaelaer, NY 12144
O: (518) 474-5816
Fax: (581) 486-3696
rfakundi@mail.nysed.gov

VICE PRESIDENT

Thomas M. Berg
Ohio Geological Survey
4383 Fountain Square Dr.
Columbus, OH 43224-1362
O: (614) 265-6988
Fax: (614) 268-3669
thomas.berg@dnr.state.oh.us

SECRETARY

Michael D. Lawless
Draper Aden Associates
2206 S. Main St.
Blacksburg, VA 24060
O: (540) 552-0444
Fax: (540) 552-0291
mlawless@daa.com

TREASURER

Kelvin J. Buchanan
HB Engineering Group
P.O. Box 2391
Reno, NV 89505-2391
O: (775) 786-4515
Fax: (775) 786-4324
summitcrk@aol.com

EDITOR

Myrna M. Killey
IL State Geological Survey
615 E. Peabody Dr.
Champaign, IL 61820
O: (217) 244-2409
Fax: (217) 333-2830
killey@igs.uiuc.edu

EDITOR-ELECT

Virginia T. McLemore
NM Bureau of Mines
Campus Station
Socorro, NM 87801
O: (505) 835-5521
Fax: (505) 835-6333
ginger@gis.nmt.edu

ADVISORY BOARD REPRESENTATIVES

William H. Hoyt
Univ. of Northern Colorado
Chair, Earth Science Dept.
Greeley, CO 80639
O: (970) 351-2487
Fax: (970) 351-1269
whhoyt@unco.edu

James A. Jacobs
FAST-TEK Eng. Support Svcs
247 B Tewksbury Ave.
Pt. Richmond, CA 94801
O: (510) 232-2728
Fax: (510) 232-2823
augerpro@jps.net

William V. Knight
5617 S. Quebec Ave.
Tulsa, OK 74135
H: (918) 496-0352
Fax: (918) 496-0358
knightgeol@aol.com

Marilyn A. Plitnik
7127 Old Seward Hwy.
Anchorage, AK 99518
O: (907) 563-2890
Fax: (907) 563-3064
plitnik1fec@micornet.net

NATIONAL HEADQUARTERS

8703 Yates Drive, Suite 200
Westminster, CO 80031-3681
7:30 AM - 4:30 PM MDT; M-F
(303) 412-6205 • Fax (303) 412-6219
e-mail: aipg@aipg.org • internet: http://www.aipg.org

EXECUTIVE DIRECTOR

William J. Stok
wsiok@aipg.org

PUBLICATIONS MANAGER

Wendy J. Davidson
wjd@aipg.org

ADMINISTRATIVE ASSISTANT

Catherine A. O'Keefe - aipg@aipg.org

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Kel Buchanan
Henkle-Buchanan Group
P.O. Box 2391
Reno, NV 89505-2391
(775) 786-4515/FAX (775) 786-4324
summitcrk@aol.com

The Professional
GEOLOGIST

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FRONT COVER - This debris slide originated above timberline at an elevation of about 3,800 m near Loveland Pass, Colorado, about 100 km west of Denver. It then liquefied and turned into a debris flow (note levees at center, below the treeline at 3500 m elevation). The flow continued down a snow avalanche track (center), burying and temporarily closing US Highway 6, just out of the photo to lower right. The flow then raced through the base area of Arapaho Basin Ski Area, causing minor damage. This flow was only one of dozens generated by the torrential rainstorm of July 26, 1999. Photograph submitted by James P. McCalpin, CPG-07020.

BACK COVER - Photographs were provided courtesy of the Milwaukee Convention Bureau, Pfister Hotel, and Dale H. Rezac, CPG-09285.

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POLITICALIZATION OF THE PHYSICAL SCIENCES

Over the last two years, as I traveled across the country, I have observed a major trend in the status of geology and other physical sciences. Ideology has seeped into our profession to the point of interfering with scientific progress. In my opinion, this process is mostly a negative influence. Political correctness affects not only the approach to scientific studies, it also results in the rewriting of existing known facts and earth processes. This seems to be happening in the name of correcting past abuses of industrial nations, as well as in developed regions where someone has decided to exploit the world's peoples and/or resources. Some social engineers go so far as to lie, misrepresent truths, change facts or simply make up data to change our society and re-distribute resources.

We shouldn't have to be discussing politics in the education of geologists or in planning research. There are just too many "litmus tests" today to determine what a scientist should or should not do. At several campuses, companies, and agencies I have visited, there are complaints about restrictions on what a professor or student can or can not say. We expect, in some fields of study such as Sociology, Philosophy, and Political Science, to be discussing politics. We, as a profession, have not expected to consider politics before we make scientific decisions. In the past, a discussion and tolerance of differing points of view were encouraged. It seems to me that in the current academic environment, tolerance is de-emphasized. In the University setting, politics has become a major issue which is effecting change in the Geological Sciences. One example is that Geology Departments and geology majors are being eliminated in favor of titles such as environmental department or environmental management. The major issues of concern are:

1. political correctness incorporated into courses,
2. course work being diluted,
3. core courses in geology majors being reduced,
4. political objectives introduced into non-related areas of science,
5. research funds withheld as a weapon and,
6. key appointed positions withheld from staff for not supporting political goals.

It is also more difficult for professors to communicate with each other in the academic community. A steady increase in anti-industry attitudes has replaced the desire for adding to scientific knowledge. Also, it is becoming common to be intolerant of other views on some campuses. This is in sharp contrast to the ideal of academic freedoms such as freedom of expression and freedom of speech. There is also a clear conflict between an administration more interested in fulfilling government directives than in faculty support. A great deal of peer pressure to force acceptance of politically correct ideas is becoming a more common complaint of both professors and students. Somehow, along the way in the last 20 or 30 years, the geological sciences have become associated by many in

the environmental field with the exploitation of the earth by politicians and by non-professional environmentalists.

Even some environmental organizations appear to be more interested in radical politics than science. They focus on political correctness rather than the cleanup of environmental problems that affect us all. A great deal of hard work and money has been spent in our society to clean up the environment since the 1960s. A result has been the significant environmental restoration of mined lands, contaminated sites, waterways (rivers and lakes), and urban areas. But these positive results have not been communicated to our society and politicians. Rather, people are frightened into spending more money on interest areas of a specific society or environmental organization. This perpetual emphasis on existing major problems often results in the wasting of time and resources and tends not to allocate resources to some of the more important current environmental problems as well as future environmental planning. An obvious example of the current confusion and misrepresentation of facts can be found in the issue of human effects on global warming. As part of a group discussion, in the Spring of 1999, I had the opportunity to discuss with five Nobel Prize winners the concerns related to the effects of politics on scientific inquiry and research. To a person, these Nobel Prize winners expressed a concern that the politicalization of all sciences has been significant during the last seven years.

What can we do? The current trend to politicalization of science can be reversed by being well-informed and involved in policy making and politics, and by ensuring that people are treated the way you want to be treated. Our profession needs to speak out with facts, particularly when misinformation is presented by groups or even agencies. Scientific societies need to provide facts to governments, organizations, and industry, as well as the public, in a manner that all groups can understand. Key to the reversal of political correctness at institutions of learning is the protection of a free and open environment to discuss ideas and argue scientific viewpoints, but never to restrict dissent.

Perhaps educational curricula should include courses in ethics, toleration of opinions, sound scientific methods, and a re-emphasis of peer review of research and public reports. We must insist upon balanced representation on committees which provide reviews and policies. It seems incredible that, as we enter a new millennium, we have to talk about toleration of scientific freedoms that were commonplace in the middle of the 20th century.

There is no harm in presenting opinions and interpretations of data to support changes in our society, but the use of opinions versus facts should always be avoided. Scientists at every level need to be involved, always. The key to success in solving problems is to be well-informed. Before supporting organizations that may have objectives with which you generally agree, ask questions regarding their purpose and goals. You may need to think twice before you buy a specific magazine, belong to a particular organization, or even give alumni support.

GLOBAL WARMING: A Geological Perspective

John P. Bluemle, CPG-02221

The average surface temperature of Earth is increasing. Continued increase could cause profound impacts on Earth and its inhabitants (Figure 1).

The average surface temperature increased from the mid-1880s until about 1940, declined until about 1980, and has been increasing since then (Figure 2). Some believe that the current warming rate is unusually high, is being caused by the burning of fossil fuels that produce carbon dioxide (CO₂), creating a "greenhouse effect," and can be slowed or even reversed. To evaluate the significance of the current warming, one must compare it with temperatures and variations that occurred prior to human activities. If the current warming is greater than in the past, human activities may be a cause. If past temperatures and variations were comparable

to or larger than the current warming, however, human activities may not be significant.

Two colleagues and I reviewed published articles to compare past temperatures and variations with the current warming. Much research has been done on this subject in the past 30 years, especially the last decade. Scientists have completed investigations in widely distributed parts of the world and used varied methods to interpret past temperatures and changes. Independent research has been done on topics such as glacial advance and retreat, ice cores, pollen distribution, lichen growth, tree rings, sediment layers in glacial lakes, sediment on the sea floor, the composition of sea shells and corals, and the composition of cave deposits.



Figure 1. Many glaciers in North America and Scandinavia, including the two in this photograph (Isfallsglaciären and Storglaciären in the Tarfala Valley in Sweden), have receded since the early eighteenth century. If global warming continues, glaciers and ice caps will melt, sea level will rise, and many population centers will be submerged. There would likely be an increase in icebergs, which would endanger maritime commerce. The list of possible effects of continued global warming is long and uncertain.

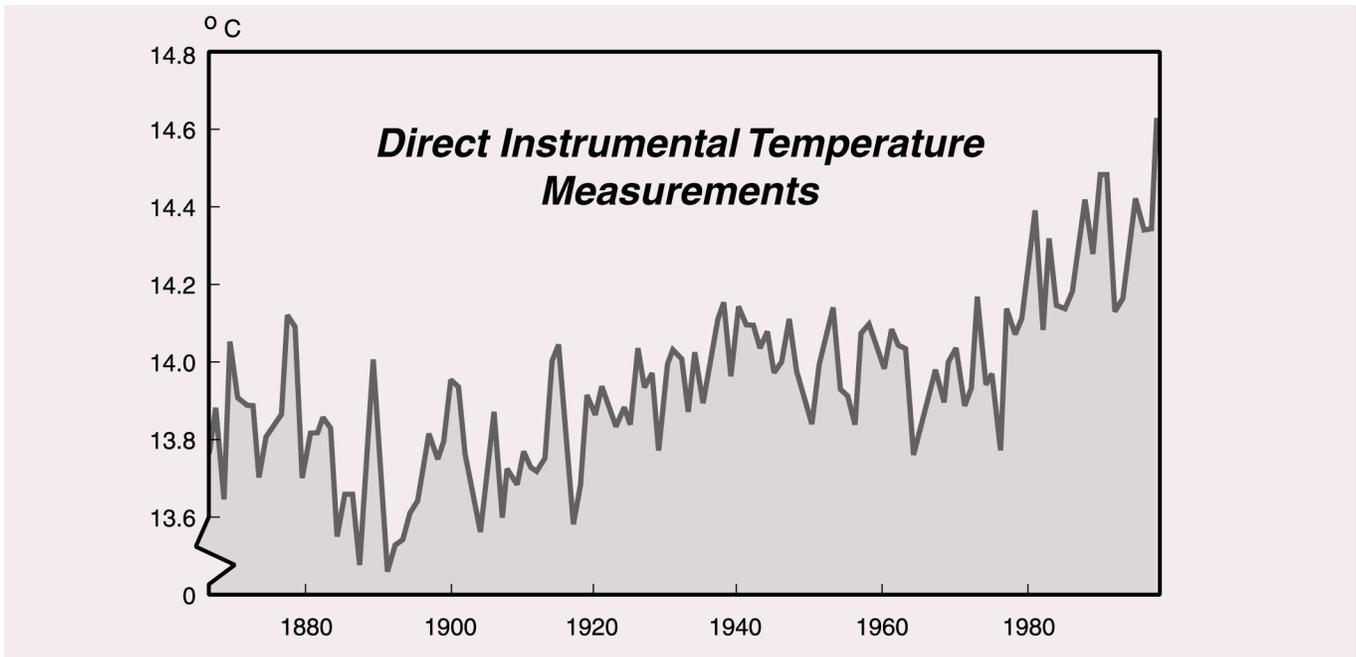


Figure 2. Direct instrumental temperature measurements show that the average temperature at Earth's surface increased from 13.8°C in 1866 to 14.6°C in 1998. Note that the temperature increased from about 1885 until 1940, decreased until about 1978, and has been increasing since then. Modified from a graph provided by the Goddard Institute for Space Studies.

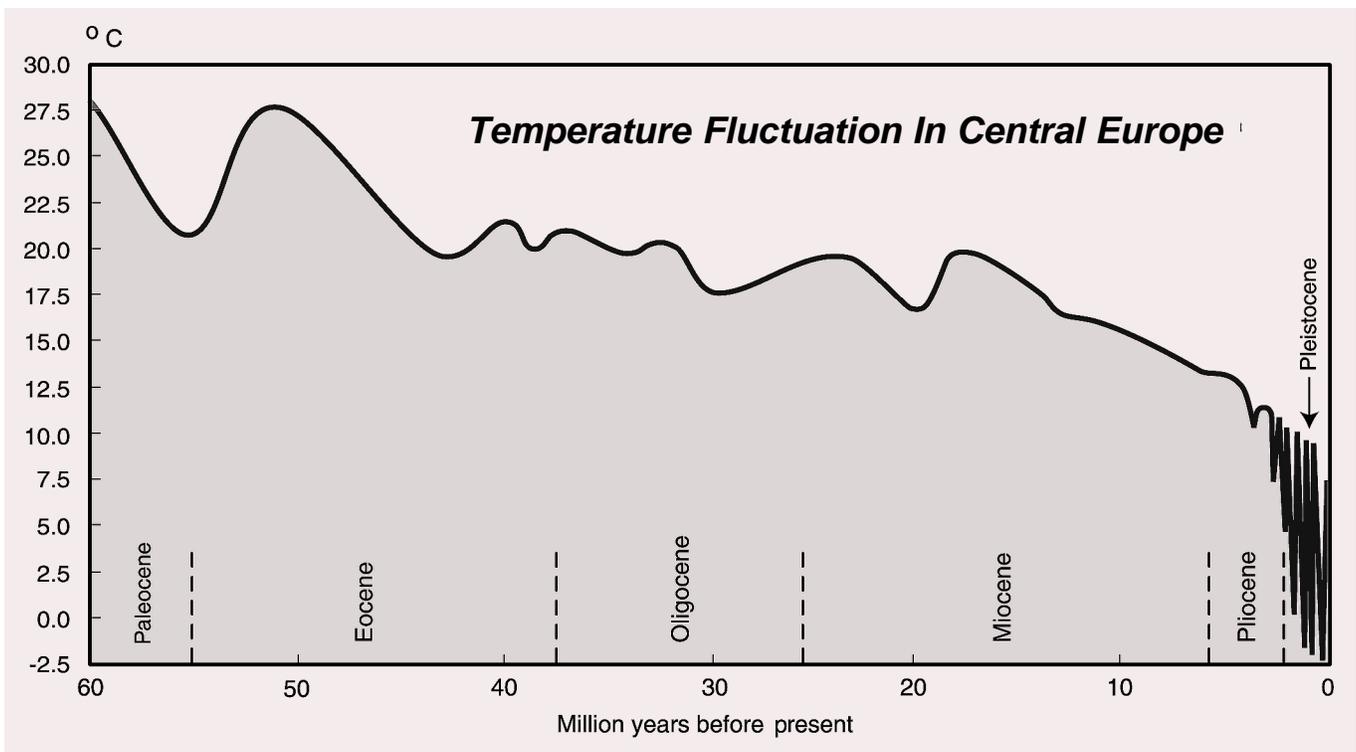


Figure 3. Temperature fluctuation (mean annual temperatures) in central Europe during the past 60 million years. Except for a peak about 50 million years ago, temperatures decreased about 15°C prior to the Pleistocene Epoch, which began about three million years ago. At that time glacial conditions began and temperatures fluctuated widely, ranging from full glacial to interglacial conditions. The modern condition is approximately +4 to +5 degrees Celsius. Graph is modified and adapted from Anderson, B. G. and Borns, H. W., 1997, *The ice age world*: Oslo, Scandinavian University Press.

Information about past temperatures, variations, and trends is summarized below.

Temperature variations during the Ice Age

The global temperature declined at least 10°C during the Ice Age (Pleistocene Epoch), which began two to three million years ago. In addition, the temperature cooled 15-20°C in central Europe in the 55 million years or so that preceded the Pleistocene (Figure 3).

Extensive continental glaciation took place in North America and northern Europe during the Pleistocene. Ice sheets advanced and retreated repeatedly, reaching as far south as the Missouri and Ohio Rivers in the United States. At least six major glacial advances and retreats occurred in North Dakota. Each major glacial and interglacial episode lasted about 100,000 to 200,000 years, during which the temperature decreased roughly 10°C during glaciation and increased by a comparable amount during the interglacial period.

Studies of ice cores from Greenland indicate that temperatures there rose and fell abruptly during the Pleistocene. On two occasions between 135,000 and 110,000 years before present (BP), temperatures dropped from 2°C warmer than they are today to 5°C cooler in less than a few centuries. In one instance the temperature dropped 14°C in a decade and returned to its former level 70 years later.

During the Wisconsin glacial maximum, between 20,000 and 14,000 years BP, glacial ice covered about 27 percent of Earth's land surface. During that time, sea level was about 130 m lower than it is today. Sea level rose to current levels

when the ice melted. Only about ten percent of the land surface is covered by ice today.

The most recent interglacial age

We are living in the most recent of many interglacial ages. Geologists call it the Holocene Epoch. Frequent and rapid climate fluctuations have occurred throughout the Holocene, which began about 13,000 - 10,000 years BP and includes all of recorded history. Ice core studies show that, about 9500 years ago, temperatures in Greenland changed from warmer than today to full glacial severity within 100 years. All glacial ice in North Dakota had probably melted by 8000 years BP; the Scandinavian ice sheet had almost completely disintegrated before about 7000 years BP. The last remnants of the once huge Laurentide ice sheet in the Hudson Bay region had melted by 5000 years BP.

Temperatures have fluctuated rapidly during the last 2000 years, although not to the extent they did during the Pleistocene interglacial periods. A time of relatively warm temperatures, the Medieval Warm Period (Figure 4), is well documented in Europe and the western hemisphere between about 1100 and 600 years ago (900-1400 AD). It was followed immediately by a period of cooling from about 600 years ago until 200 years ago (1400 to 1800 AD) that included a particularly cold interval, the Little Ice Age, between 400 and 250 years BP (1600-1750 AD).

The entirety of Holocene climatic history can be characterized as a sequence of 10 or more global-scale "little ice ages," fairly irregularly spaced, each lasting a few centuries, and separated by global warming events.

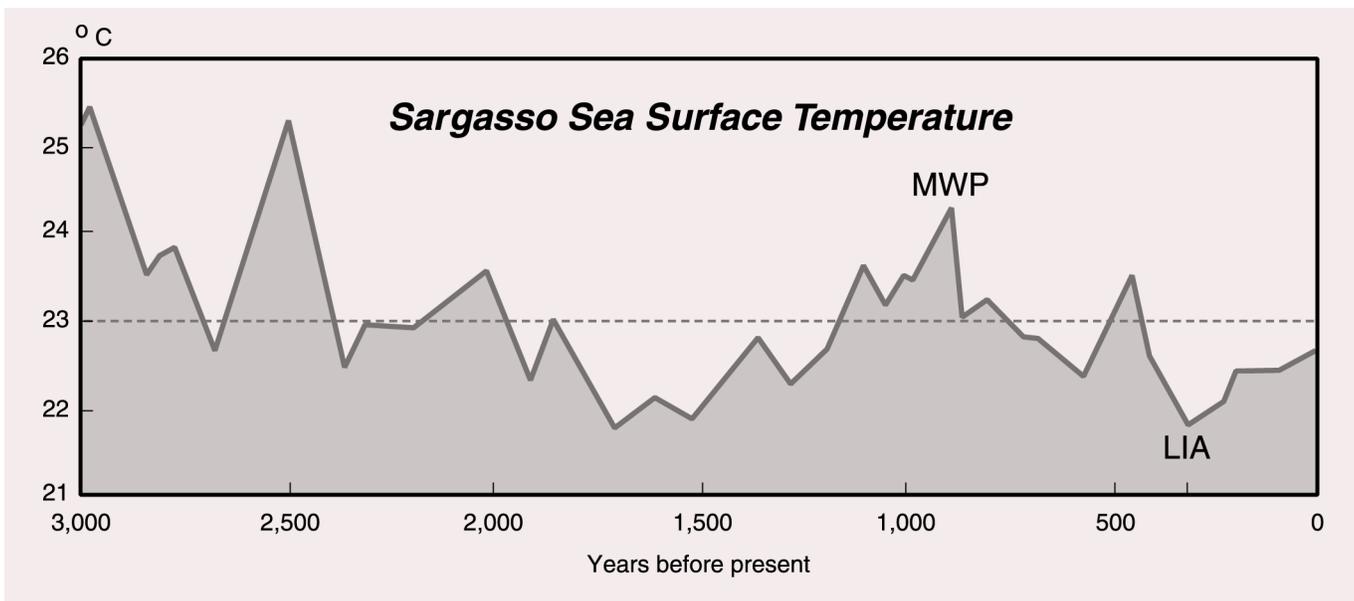


Figure 4. This graph shows the Sargasso Sea surface temperature, which was derived from oxygen isotope ratios. This is an indicator of evaporation and, therefore, a proxy for sea-surface temperature. The Sargasso Sea is a two-million-mi² body of water in the North Atlantic Ocean that lies roughly between the West Indies and the Azores from approximately 20-35°N. It is relatively static through its vertical column so that potential interference from mixing with other water masses and sediment sources is minimal. The isotopic ratios are derived from biotic debris that has precipitated onto the sea floor. Wide and abrupt variations in temperature are indicated. The relative temperature variations of the Little Ice Age (LIA) and the Medieval Warm Period (MWP) are prominently recorded in the data. Note that the temperature has been increasing since about 300 years before present (1700 A.D.) The horizontal line is the average temperature for this 3000-year period. After Keigwin, L. D., 1996, The Little Ice Age and Medieval Warm Period in the Sargasso Sea: *Science*, v. 274, p. 1504-1508.

Direct instrumental measurements

Direct instrumental measurements indicate that the average temperature at the Earth's surface increased about 0.8°C from 1866 until 1998 (Figure 2). During this same time, the concentration of CO₂ in the atmosphere increased from 280 to 353 parts per million volume. Because this period of time very nearly coincides with the industrial revolution, the supposition arose that the warming was caused by human activities. Most of the warming, however, took place before most of the CO₂ increase occurred. Statistical analyses of the climate record since 1860 show that significant interannual and interdecadal variability occurred. This suggests that the warming had causes other than an increase in greenhouse gases alone.

The increase in temperatures recorded by direct measurements may be part of a longer-term warming trend that began after the Little Ice Age and before the Industrial Epoch. Many poorly understood factors influence atmospheric CO₂ concentrations. For example, because the current increase follows a 300-year warming trend, the observed increases in CO₂ are of a magnitude that can be explained by oceans giving off gases naturally as temperatures rise.

Conclusions

A review of research on past temperatures and variations led us to the following conclusions:

1. Climate is in continual flux: the average annual temperature is usually either rising or falling and the temperature is never static for a long period of time.
2. Observed climatic changes occurred over widespread areas, probably on the global scale.
3. Climate changes must be judged against the natural climatic variability that occurs on a comparable time scale. The Little Ice Age, Medieval Warm Period, and similar events are part of this natural variability. These events correspond to global changes of 1-2°C.
4. Global temperatures appear to be rising, irrespective of any human influence, as Earth continues to emerge from the Little Ice Age. If the temperature increase during the past 130 years reflects recovery from the Little Ice Age, it is not unreasonable to expect the temperature to rise another 2 to 2.5 degrees Celsius to a level comparable with that of the Medieval Warm Period about 800 years ago. The Holocene Epoch, as a whole, has been a remarkably stable period with few extremes of either rising or falling temperatures, as were common during Pleistocene glacial and interglacial periods. Nevertheless, the Holocene has been, and still is, a time of fluctuating climate.
5. Climatic changes measured during the last 100 years are not unique or even unusual when compared with the frequency, rate, and magnitude of changes that have taken place since the beginning of the Holocene Epoch. Recent fluctuations in temperature, both upward and downward, are well within the limits observed in nature prior to human influence.

Editors note: This article was summarized from "Rate and Magnitude of Past Global Climate Changes," which was published in *Environmental Geosciences*, volume 6, number 2, 1999, pages 63-75. The authors are John P. Bluemle (State Geologist of North Dakota, Bismarck, ND), Joseph M. Sabel

(geologist with the U.S. Coast Guard in Oakland, CA), and Wibjörn Karlén (Professor of Physical Geography at the University of Stockholm, Sweden). In the *Environmental Geosciences* article the authors include citations to more than 70 peer-reviewed reports.

John P. Bluemle, CPG-02221, State Geologist and Director, North Dakota Geological Survey, earned a B.S. degree from Iowa State University, M.S. from Montana State University, and Ph.D. in geology from the University of North Dakota. He has worked on the glacial geology, geomorphology, and economic geology of the northern Great Plains and Williston Basin for nearly 40 years. Bluemle, who has worked at the North Dakota Geological Survey since 1962, has been State Geologist and Director since 1991.

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Study Shows Most Private Wells in Nebraska Lack Sufficient Fluoride

LINCOLN, Nebraska — Most Nebraskans who get their drinking water from private wells are not getting the amount of fluoride suggested by the U.S. Environmental Protection Agency, according to a new study.

Only eight of 93 counties had average fluoride concentrations in private drinking wells that met EPA-suggested minimum levels, the study showed.

While about 70 percent of Nebraskans served by a public water supply received fluoridated water, those with private wells must do their own testing and supplementation of fluoride if they want the well-documented benefits to dental health of adequate fluoride in drinking water.

The study by the University of Nebraska-Lincoln's Conservation and Survey Division and the Nebraska Department of Health and Human Services tested 1,794 domestic wells that had fluoride concentrations varying from less than 0.1 milligram per liter to 2.6 mg/l. It resulted in a statewide average of 0.4 mg/l and a median of 0.3 mg/l.

EPA and the state Department of Dental Health recommend concentrations for optimal dental health in Nebraska that vary depending on estimates of water consumed but range from 0.7 to 1.5 mg/l.

Counties with average fluoride concentrations in rural domestic drinking water that met that 0.7 minimum were: Box Butte (0.7 mg/l), Chase (0.8 mg/l), Cheyenne (0.7 mg/l), Dundy (1 mg/l), Frontier (0.7 mg/l), Hayes (0.8 mg/l), Hitchcock (0.8 mg/l), and Knox (0.6 mg/l). Three counties came close: Kimball, Red Willow, and Scotts Bluff, all with an average of 0.6 mg/l.

Fluoridation of water is recommended by the American Academy of Pediatrics, the American Dental Association, and the American Medical Association, among many other prominent national health organizations. The downside of fluoride is that excessive amounts can discolor teeth, although the AAP says that is only cosmetic and not a health issue.

The fluoride survey should help determine areas where testing of rural domestic water supplies would be advisable. Study authors recommend that all private wells be tested, said David C. Gosselin, CSD groundwater geologist. A national study published in 1992 reported that more than 164 million hours of work and 51 million hours of school time were lost because of dental problems, he added.

The Conservation and Survey Division is a unit of the Institute of Agriculture and Natural Resources. For more information, write to Gosselin at: 113 Nebraska Hall, University of Nebraska-Lincoln, 68588-0517; e-mail: dgosselin2@unl.edu; or call (402) 472-8919.

Ethical Dilemmas Posed During a Mineral Project Appraisal¹

Trevor R. Ellis, CPG-06740

Abstract

The author carried out an assignment in 1998 to develop two appraised value reports on a "proven reserve" of an industrial mineral that were to be used in financing. One report was on an *as is* basis and the other follows guidelines provided by the lending institution to support its proposed loan. The partner companies developing the reserves contracted directly with the author's one-person consulting corporation for the work. Unforeseen complexities and dubious arrangements were uncovered during the assignment. The relationship between the partners soured as did their relationship with the author. As the assignment progressed, the author received specific directives for determining the product selling price, which the client expected would result in the favorable appraised value required to obtain the loan. This paper addresses many ethical issues which confronted the author during this assignment, including the issue of his own areas of competency; the level of reasonable due diligence; obligations to the contracting partners versus the lender; the issue of independence and whether he could resign from the project or not follow his client's instructions; and his strong desire to get paid.

Introduction

One beautiful day in 1998, I was attempting to act productive in my Denver home office, while looking out the window at the plants blooming outside, and thinking that maybe my dog needed a good walk. At that moment, I received one of those rare, unexpected phone calls out of nowhere. The man on the other end of the line was essentially asking me to drop everything and jump on a plane the next day to inspect a mineral property in the middle of the western desert. We will call him Mr. Rising Sun. He was the owner of a small, independent investment business, Rising Sun Investments, based in one of the US East Coast cities.

Although I wasn't exactly hungry for work, times were slow, and I was keen to get more. So I was willing to jump. But he seemed unusually anxious for me to do the work, without asking me much. He had found me from an Internet search and didn't have any professional references. I was cautious. I asked him lots of questions about the project and his involvement.

He had partnered his company with a small, privately owned mineral exploration development company. We will call its owner Mr. Apex and the company Apex Exploration. Apex was based in the southwest US. Mr. Apex and his exploration company had apparently been around for a lot of years, and had a moderately successful and profitable track record.

Mr. Rising Sun told me that Apex had pulled a coup in securing the purchase rights to a proven reserve of many hundreds of thousands of tons of a valuable industrial mineral. He told me that processed product was selling throughout the US and internationally at about \$6/lb, and they had three written expressions of interest to purchase the product at that price. The feasibility study of Apex's consulting metallurgist had shown that the cost to extract a product of adequate purity would be around \$2/lb. An independent geological report had estimated that the mineralization contained in the reserve had potentially astronomical value. Mr. Rising Sun had lined up a lender to provide the many millions of dollars for the plant and equipment. My report of appraised value was needed very quickly by the lender to support the loan.

He asked me to give a rough estimate over the phone of how much the appraisal would cost. I threw out a figure. No problem. The retainer I asked for up front to work against would be wired to my bank account the next day.

Competency

Next he asked me if this was a job that I had the appropriate experience to conduct. I thought for a few moments about my competency to conduct the assignment. I told him about my qualifications as a Certified Minerals Appraiser and a Certified Professional Geologist, with a Masters Degree in Mineral Economics, and 25 years of experience. He was already aware of these, which is why he had called me. I explained to him that I generally did my reports to abide by the *Uniform Standards of Professional Appraisal Practice* (USPAP) of the Appraisal Foundation, which I expected the lending institution would require. He asked me if I had ever appraised this type of industrial mineral before. I told him no, but explained to him that every property that I worked on in my career was different. I always built time into my budget for doing an extensive amount of research to get up

¹ This paper was presented at the 1999 Annual Meeting of the Geological Society of America, held in Denver, October 25- 28, in the AIPG-sponsored session, *Geoscience Ethics Guidelines: A Discussion of Their Development, Utility, and Implementation*. A narrative of the events that occurred during the assignment discussed here also appeared in the June 1999 issue of the Newsletter of the American Institute of Minerals Appraisers, without substantive addressing of the issues raised here (Ellis, 1999).

to speed on the particular commodity and the issues involved relating to that property. He was satisfied.

The relevant AIPG Rule, 3.3.1 states:

A Member shall perform professional services or issue professional advice which is only within the scope of the education and experience of the Member and the Member's professional associates, consultants, or employees, and shall advise the employer or client if any professional advice is outside of the Member's personal expertise.

The American Institute of Minerals Appraisers (AIMA), under which I am certified as a minerals appraiser, has identical language for Rule 3a of its Code of Ethics. This is because I used some of the AIPG's Code when I was drafting AIMA's Code, with permission and appropriate credit. In a very narrow perspective, I did not have everything pre-loaded in my brain that I needed to know to do the job. However, I believed that I had the education and experience to determine what I needed to know, to locate the information efficiently, and to understand the necessary information adequately when I obtained it.

In my mind, the metallurgy presented the biggest issue. However, Mr. Rising Sun assured me that their consulting metallurgist had done a feasibility study. Therefore, I should only need to check the metallurgist's credentials, and review the study to assure that it appeared professional and credible.

Regarding the market for the product, with my mineral economics credentials and experience, I was well qualified to conduct the necessary research. Also, Mr. Rising Sun told me that I would need to do essentially no market research because of the three letters of expressions of interest accounting for all of their proposed production. In addition, he would send me a large amount of information they had accumulated during their market research.

I was still suspicious. Things sounded too positive and simple to be true. My suspicions increased when Mr. Rising Sun told me that I could talk to anyone I liked, except for Mr. Apex. Apparently he and Mr. Apex were having a falling out over how to do business together. This didn't sound good. No communication with such an important partner was certainly an unusual ground rule.

I asked him about the geological work, and how quickly he would be able to get me a copy of the geological report. By coincidence, I knew the geologist and geochemist who had done the work, and their office was just across town. Thirty minutes later, I was in their office going over the geological report. They had thoroughly sampled, tested, and investigated the reserves. The reserves were definitely there. It seemed like a coup for Apex.

Their words of advice indicated that I shouldn't worry about doing the job. They had done work for Mr. Apex a number of times over the years. He wasn't good at paying. Mr. Apex still owed them a few thousand from the last job. However, Mr. Rising Sun would take care of everything. He was the type who paid immediately, and was taking care of their bills. His credit history and his company's sparkled.

The contract I faxed was returned the next day, signed by both Mr. Rising Sun and Mr. Apex for their companies. My bank told me that their retainer was in my account. Their lending institution had already approved my credentials. I was to write two appraisal reports. The first report was to

value the reserves *as is*. The second report was to be produced under strict terms provided in written instructions from the lending institution. The report would determine what the lender termed "the net processed value" of the small portion of the reserves that would be run through the plant in the first two years of production. The lender wanted to know the net value of the selling price minus direct operating cost for the resulting processed product. This would be an indicator of how much money would be available to service the loan. It seemed like a relatively easy assignment with all of the information that would be available to me.

Independence and Due Diligence Obligations

The following day I was out at the property examining samples with the consulting geologist and metallurgist. After the inspection I asked the metallurgist to show me his design and cost calculations for the processing plant. He pulled out a couple of worn sheets of writing paper with a hand sketched flow chart and some rough calculations. I had no intention of relying on those. I asked him lots of probing questions. He was working for a piece of the action, and hadn't been paid anything yet. He had no direct experience with this particular mineral, but could talk a good story and could quote metallurgical text references about the mineral.

The metallurgist showed me the three letters from third parties expressing interest in purchasing the product at about \$6/lb. These buyers wanted everything that Apex could possibly produce. One was a trading company based in Europe buying for the European market. Another was a minerals trading company based in the South Pacific buying for the Asian market. They looked good, but I would do some verification.

I phoned Mr. Rising Sun and told him that I couldn't rely on the metallurgist's work. Without a valid process, the "net processed value" would obviously be zero. At his request I gave him a couple of names of metallurgists I respected. I headed for the state's capital city to do some historical research into the property. The next evening, I found out that the metallurgy professor that I had suggested was on his way out to take some bulk samples back to a major minerals research laboratory for bench testing of the mineral recovery and concentration. I could rely on his report. However, at the same time Mr. Rising Sun was becoming nosy about what I was doing in my research. He and a partner in his company made mild expressions of dissatisfaction with me doing research into the history of the property without his approval. In particular, they told me that there was no need for me to research the market for the product. I countered that I must work independently to produce a valid appraisal report.

Two areas of difficulty were arising for me here. My client wished to limit my research. Also, I didn't have much in the way of guidelines that I knew of as to how much due diligence research I should invest. Essentially, I was working from personal experience and gut feel. Although I had obligations to my client, I was bound by the following statements.

USPAP Standard Rule 1-1(b) provided the following binding statement regarding due diligence:

In performing appraisal services an appraiser must be certain that the gathering of factual information is conducted in a manner that is sufficiently diligent to ensure that the data that would have a material or significant effect on the resulting opinions or con-

clusions are considered. Further, an appraiser must use sufficient care in analyzing such data to avoid errors that would significantly affect his or her opinions and conclusions (USPAP, 1998).

The AIMA Code of Ethics under which I am bound has a similar requirement, being Rule 4b:

A Member shall not give a professional opinion nor submit a report without being as thoroughly informed as might be reasonably expected, considering the purpose for which the opinion or report is requested.

It also provides the following about independence from the client's influence, being Rule 5a:

While realizing that Members are contracted to perform appraisals with many differing purposes or characteristics, Members shall perform their appraisal work with independence from influence or bias from their client's, employer's, or any other party's desires, needs or wishes as to the outcome of their valuation.

Therefore, I was required to conduct a prudent amount of independent due diligence research into the history of the property and the market for the product. My interpretation was that I should do enough that I could comfortably sleep at night without worrying about what I might have missed. I was also required to maintain my independence from the influence of my client.

Obligation to Resign

A week later, the metallurgy professor's tests weren't coming up with the recoveries needed for a viable project. Mr. Rising Sun was getting very worried. He told me that he was now in a severe legal fight with Mr. Apex. He was fighting to get control of the project and the reserves from Mr. Apex.

Then an unexpected breakthrough came. Mr. Rising Sun had been talking with the management of an operating toll processing facility. It sounded like it had everything going for it. The trucking distance for the raw mineral was long, but not too long. I talked on the phone to the operator and his process chemist. They sounded like they knew this specific reserve and its product well. The chemist had already been to the property and taken a bulk sample. His initial tests looked good. He would fax me the results of more comprehensive tests in two or three days.

In the meantime, I continued to investigate the product market, even though Mr. Rising Sun told me I must rely on the market data he provided. He said that he didn't want me running up the bill for unnecessary research. He was worried about the fast mounting legal costs of fighting Mr. Apex. I assured him that I was within budget, but he still told me that he didn't want me doing my own market research.

Again, he banned me from talking to Mr. Apex. However, Mr. Apex phoned almost daily to ask me how my work was proceeding and to slander Mr. Rising Sun. I wasn't giving Mr. Apex any direct answers about my work. This was a very awkward position to be in, since Mr. Apex was the primary signer of my contract. I was getting worried as to whether I could proceed under these conflicts.

Through my research, I determined that the two international trading companies that had provided letters of expressions of interest did indeed exist. However, my suspicions about them were fast mounting. I could not locate the third

potential buyer which was a western-US based outfit. I asked the "consulting" metallurgist for help in locating it. Mr. Rising Sun sent a stream of faxes with price quotes and specifications from trade magazines and market literature to support his theory that the product selling price should be much higher than \$6/lb.

The professor came to my office to discuss his test results and the project status. I suggested to the professor that we should cut our losses and resign from the project. I went over the above problems with him.

I was approaching violation of AIPG's Code of Ethics Standard 3.5:

Members who find that obligations to an employer or client conflict with professional or ethical standards should have such objectionable conditions corrected or resign.

The AIMA Code of Ethics Rule 1b has similar wording.

Despite Mr. Rising Sun's directives, so far I felt that I had been able to maintain my professional and ethical standards. Although Mr. Rising Sun and Mr. Apex had employed me, I viewed my major client as being the lending institution. As a lender, it was entitled to receive a high quality, independent appraisal to use in its lending decision. The lender could lose millions of dollars if I did not do adequate due diligence.

If I resigned, the professor faced bigger financial losses than me for unpaid time and thousands of dollars in bills for laboratory testing. We concluded that we certainly wouldn't be paid for the balance of our time, and he might be forced to personally pay for the laboratory bench testing.

The professor phoned Mr. Rising Sun from my office. After a lengthy conversation, the professor was convinced that all of the problems were coming from sleazy Mr. Apex. Mr. Rising Sun didn't seem to be trying to do anything underhand. Also, the small-scale bench test by the toll processing facility had proved positive. Mr. Rising Sun wanted us to immediately go to the property and take a larger, secure bulk sample. We would then drive it to the processing facility, where we would provide secure supervision of a larger test. We agreed to Mr. Rising Sun's request.

The next day my payment for my first invoice arrived by wire in my bank account. I still had the initial retainer, so I was breaking even. A fax from Mr. Rising Sun doubled the value of my contract. The lender had given a one week extension on my delivering the appraisal report. The professor's major laboratory bill was paid. We caught a plane the following morning.

Conflict with Additional Instructions

At the site we collected sealed buckets of sample. We drove them to the toll processing facility for the chemist to bench test. The professor supervised the testing for the next couple of days, while I continued my research from the motel.

In three days we had a sample of the product from bench testing that was ready for us to take back to Denver. By then, I was convinced that the three letters expressing interest in purchasing the product were a sham. I assumed they were the result of a scheme by Mr. Apex. I told Mr. Rising Sun what I had found out. He and his partner did not seem to believe my conclusion, but sounded depressed and very frustrated.

Mr. Rising Sun insisted that I base my "net processed value" calculations on quotes he had found for small lots of

the material. I told him that his partnership did not have the marketing ability to sell a significant amount of product in small lots. They would be a producer rather than a wholesaler. In no sense would they be a retailer of small lots.

Mr. Rising Sun began sounding desperate. He and his partner remained insistent that I must use their prices for small lots. "Who are you to tell us that we can't sell all of the product in small lots?" I began wondering what Mr. Rising Sun and his partner planned to do with the cash from the loan. I doubted that much of it would be going into processing the "reserves."

Back in Denver, a laboratory chemical analysis found that the purity of the sample product was borderline. Nevertheless, the professor assured me he was confident that the recovery could be improved sufficiently. I received the professor's moderately positive written report on the process. His cost estimates for the toll processing did not kill the project.

I continued the market research investigations that I had been ordered to cease doing. Whether or not I was within the expanded budget, I needed answers. I took some of the product sample to a petrographer for X-ray diffraction determination of its crystallography. The result was that most of the product had the wrong crystal form to meet high end market specifications. I confirmed this conclusion by hiring a consultant to some major US consumers of this mineral. Material of this crystal composition could only be sold into an intermediate level market. The selling price would not cover the direct operating costs of toll processing.

Payment First or Report Delivery First

I concluded my two reports very negatively, giving zero value for both appraisals. By this time, Mr. Rising Sun had a pretty good idea of what he would be receiving. He was irate, severely bad-mouthing me with foul language. I asked for payment of my large, outstanding invoice before sending the copies of my two reports, which were already bound and signed. He refused to pay. He insisted that he first needed to review the report as a draft. He knew that a negative report would be useless to him. I held my ground and he held his. More than a year later, the reports are still sitting in my office.

In this step, to my knowledge I was not violating any US codes that I was operating under. However, if I had been operating under the Australasian Institute of Mining and Metallurgy's highly regarded VALMIN Code for valuation of mineral and petroleum properties and securities, I would have been in violation of Code item 36:

The Commissioning Entity must be given a draft copy of a Report to determine and advise the Expert or Specialist as to any information not taken into account, the accuracy of the facts stated and the non-objection or otherwise to the assumptions made and to inform the Expert or Specialist of those parts of the Report which the Commissioning Entity regards as confidential (AusIMM, 1998).

It is rare that I have provided a draft of any appraisal report for critique by the commissioning property interest holder. I believe that this reduces my independence. Any haggling over changes to the draft would be an attempt to influence the appraiser. A lender relying on the appraisal report could well view giving the potential borrower an opportuni-

ty to critique the draft report as providing an opportunity for the borrower to impart bias. Therefore, the lender might view it as an impropriety. If the appraiser's payment is dependent on the borrower being satisfied with the outcome of his review, then the review is not impartial. The AIMA's Code of Ethics Rule 1a states:

Members shall avoid even the appearance of impropriety.

On two occasions, I have provided a draft report to the commissioning property owner. However, these were complex, high value appraisals, where this provision was written into my contract. In neither of these cases was the appraisal designed for use in external financing. Nor was the appraisal the basis of settlement of sale of the property. I have conferred with a few appraisers of large value real estate properties, such as farms. They tell me that they never provide a draft. They insist on full payment before or at the time of delivery of the report.

Postmortem

Mr. Rising Sun won his legal battle against Mr. Apex, and he now owns the interest in the minerals. In the process, he had to sell off his family investment business. Mr. Apex spends a lot of time in the Bahamas, living on Mr. Rising Sun's initial investment. Perhaps he spends his days planning his next minerals scam. The two payments I had received covered the cost of my education on the project. The professor came out a little better. A collection agency is attempting to squeeze some more money out of Mr. Rising Sun for my unpaid work. I don't expect to see any. Mr. Rising Sun often phones the geologist and geochemist who worked on the property. He tries to pick their brains about how he can peddle the mineral interest. He is seeking a specialist to produce the type of report he needs in order to make the property salable.

Conclusions

This paper has illustrated how Codes of Ethics can prove important in supporting an ethical approach by a geologist in interactions with an employer. During this appraisal assignment, I received verbal instructions, payment contingencies, and false and misleading information. All of these were designed to upwardly distort my determination of the appraised value. Maintaining my independence as an appraiser, with an ethical obligation to provide an accurate, unbiased report to the lending institution, required breaching the on-going directives of the principal of the commissioning firm. The principal was angry that I performed adequate due diligence in my investigations and research in violation of his instructions. However, I did not breach my written contract.

Perhaps I should have resigned at the mid-point of this assignment when I was seriously discussing this option with the professor of metallurgy. Hindsight is wonderful. On weighing the pros and cons from the information available to us at the time, I believe my colleague and I made the correct decision to proceed. Resigning at that time, or a later time, would have had serious financial implications for my colleague. It would also have left me open to a lawsuit for breach of contract from the two companies holding the mineral interest.

Some of the issues that confronted me arose out of the question of whether we would be paid. This has historically

been a major problem for geological consultants, particularly those working for small exploration companies. It is even more of a problem for those of us who have specialized as minerals appraisers. Often our clients have a lot riding on the result of our report or legal testimony. Frequently the value we report does not meet our client's expectation, and this can lead to bitter feelings and nonpayment.

There are ways in which I may have been able to prevent the eventual nonpayment of invoices. The obvious solution would have been for me to have refused the assignment when things didn't smell quite right. I was skeptical about the property during my initial phone conversation with Mr. Rising Sun. However, I prefer doing paying work rather than watching the garden grow from my home office window. I also enjoy intellectually challenging assignments.

A second possibility would be to have a contract with the lender rather than the borrowers. The lender could have paid me from funds deposited in advance by Rising Sun Investments. This is the typical arrangement under which residential appraisers work. The lender would pay me on completion of predefined stages of the assignment. The final payment would be made on delivery of my final reports to the lender. A third possibility would have been for me to set up an escrow account with an escrow company. This would have the same arrangements for payment as that suggested with the lender. There are, of course, complexities and significant cost associated with this arrangement.

Some large banks that fund major mining projects take on the payment arrangements for appraisals. Appraisers of farms and office buildings are often provided with this security. However, a well-respected appraiser of large, high-value, western agricultural tracts told me that it is rare that he is provided with this arrangement. Without the benefit of a comprehensive survey, my impression is that many lenders do not like to be involved in contracting appraisers for any properties that they view as unusual. Lenders that do contract for minerals appraisals typically use appraisers they already know, or they contract with one of the major mining consulting houses.

When we are all charged up ready to rush off into the heat of battle to meet a tight assignment deadline, it is very difficult for the independent consultant to tell the potential client to hold off for a couple of days while we attempt to negotiate and set up a secure payment arrangement. This action would cast an air of distrust. The potential client may easily turn to someone else for the work who is going to give him less hassle.

I did the next best thing. I found out the credit history of both companies. Printed reports are available quickly for a fee through reporting agencies such as Dun & Bradstreet, Experian, and affiliated brokers. Verbal reports can sometimes be obtained for free from a debt collection firm. We need to obtain a credit report before signing a contract with a client we don't know well, although the reports are only as good as the data received by the reporting service. Requesting some trade references to check may also be helpful. However, credit reports and references do not necessarily tell us whether the principal or manager who contracted us will continue to feel obligated to pay us if he receives severely negative results from our assignment. I obtained a retainer more than adequate to cover the travel and other expenses of my initial contract. A retainer of 50% of the contract bud-

et would provide more security, but insisting on this high percentage may turn some clients away.

There may not be a good solution to this issue of how to assure that we get paid, without making the arrangement onerous for the potential client. I have resolved myself to the expectation that occasionally I will be left partially unpaid on a contract. As an independent minerals appraiser working in a lean, somewhat depressed mining industry environment, it is difficult to budget for that sad circumstance. However, doing so has been essential for my survival.

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Trevor R. Ellis, CPG-06740, Ellis International Services, Inc., Denver, Colorado.

AIPG Reviewers: Edward M. Baltzer, CPG-08861 and David M. Abbott, Jr., CPG-04570.

AIPG 2000 MEMBERSHIP DUES

In accordance with Article 8, Section 8.2.1, of the Bylaws, Annual Membership dues are due and payable January 1, 2000. Members and Adjuncts whose dues are not paid by February 15, 2000, will be suspended and will not be listed in the 2000 Membership Directory.

A twenty-dollar late fee is required for dues paid after February 15, 2000.

Membership Development: The State-Registered Geologist

Dawn H. Garcia, CPG-08313, Chair, Membership Development Committee

This month's membership development column focuses on state-registered geologists. The value of AIPG membership to a registered geologist is grossly undervalued. Most registered geologists fall into the trap of thinking that state registration is the pinnacle of their career goals. That myth needs to be broken! Registration is a start of your career, but the professional pathway requires much more. This is where AIPG comes into play!

AIPG provides you the opportunity to enhance both your career and the profession of geology.

AIPG membership enhances your professional career. The purposes of AIPG include

- Advancement of the science and profession of geology.
- Establishment of professional and ethical standards.
- Representation of and advocacy for the profession before government and the public.

How does AIPG serve you nationally? AIPG members serve on the Association of State Boards of Geology (ASBOG), as well as state boards. Members provide expert testimony regarding geologic issues to state, local, and federal agencies. AIPG acts as a lobbyist and is heard throughout the nation. AIPG has adopted policy statements and positions with respect to various governmental and legislative initiatives. AIPG works with other groups to promote the importance of geology to the public and has been a strong supporter of the national Earth Science Week. AIPG members are part of the decision-making process. These roles are not and cannot be filled through state registration.

As part of the membership development drive, I have prepared a "form letter" that sections can use to create a letter to target registered geologists in their state. The section should add information about their section's activities, their officers, and their next planned activity. The letter should give enough details about the next activity so that any geologist thinking about joining will have an opportunity to visit at a section activity. The state board of registration will be able to provide the list of state-registered geologists to the section. This may be downloadable from their website, or on diskette. The section will need to cull the list of geologists residing outside of the state and their current AIPG members. The reduced list can be used as a mass mailing, or the section may pare the list down even further based upon geologic specialties, regions, or so other criteria.

Each section will receive the form letter, plus the Arizona Section letter as an example of the expanded, state-specific letter. The letters will be e-mailed to each section president and the membership development chair. Please contact me if you do not receive the letter (dgarcia@theitgroup.com or 520/792-2800). Sections that include states without registration are very welcome to alter the letter for another target audience, such as a state geological society or state employees.

Lastly, if anyone would like to serve on this committee, I have a list of tasks awaiting assignment to a committee member. I am eager to expand our membership development efforts and would welcome your participation.

Sample Form Letter

Dear Colleague:

The American Institute of Professional Geologists (AIPG) is a national organization that represents the interests of professional geologists. As an Arizona-registered geologist, you have complied with the public's need to ensure its safety by registering professionals. Have you considered your own professional needs? AIPG provides you the opportunity to enhance both your career and the profession of geology.

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What has AIPG done in Arizona? An AIPG member is on the Arizona State Board of Technical Registration. AIPG members were the leaders for the 1999 Earth Science Week efforts in Phoenix, Tucson, Prescott, Flagstaff, Yuma, Safford, and Sedona. AIPG reviewed the policies and activities of the Arizona Geological Survey and published a report of its findings and recommendations. AIPG members met with Arizona legislators and presented each legislator with a copy of the Arizona geologic highway map published by the Arizona Geological Survey and Arizona Geological Society. AIPG has held student career sessions at Northern Arizona University, Arizona State University, University of Arizona, and the Arizona Hydrological Society (AHS) annual symposium. The Arizona Section mails several newsletters each year to its members, plus members receive the national publication. The Section typically holds two field trips annually, most recently to the Pinacate volcanic field in Sonora, Mexico; Chiricahua National Monument; Meteor Crater; and Jerome. The next field trip is planned for spring 2000 to Kartchner Caverns. The Section also has several business dinner meetings annually to provide members with an update on local, state, and national issues affecting geology and geologists.

The Arizona Section of AIPG will hold its next meeting in February 2000 in association with the Tucson Gem and Mineral Show. We will have a dinner and talk on Friday evening (February 11) and a business meeting on Saturday morning, February 12, followed by a behind-the-scenes tour of the Gem and Mineral Show. Please contact Fred Fox, 2000 President of the Arizona Section, for more information on the meeting itinerary. He may be reached at 520/742-0233 or via e-mail at thefox@theriver.com. AIPG would welcome you as a guest or new member.

AIPG invites you to make it part of your professional package. AIPG has two membership categories that should be of particular interest: the Certified Professional Geologist and the Registered Member. The Certified Professional Geologist category is a national certification showing competence, integrity, academic training, and work experience. Membership dues are \$120 annually. A registered member is a state-registered geologist who meets the integrity and ethics qualifications required by AIPG. Membership dues are \$70 annually. Contact AIPG National Headquarters at 303/412-6205 or see the AIPG website for further information and an application form (www.aipg.org). Become part of a group that serves both the geologist and the profession of geology!

Sincerely,

Dawn H. Garcia, CPG-8313, AZ RG 26034
AIPG National Membership Committee Chair

Professional Certification and Licensure

William J. Siok, CPG-04773

Whether it's attributable to my greater involvement, and hence greater awareness of professional issues since becoming the Executive Director of AIPG, or whether it's reflective of the rapidly changing workplace for geologists, I sense a greater interest in professional and legal aspects of the profession. For example, the State of Illinois has a registration statute, albeit one that does not adequately define the prerogatives of professional geologists practicing in Illinois. In reaction to this, a group of Illinois Licensed Professional Geologists have recently organized (under the auspices of AIPG) in order to represent geologists practicing in Illinois with a unified voice. The coming together was done as a matter of professional self-interest, since there was no single representative organization addressing the specific issues of importance to the practicing geologists.

In Illinois, the fact that registration exists does not necessarily guarantee the role of geologists. As a matter of fact, the reason Illinois geologists were recently galvanized into action was the step taken by the Illinois Environmental Protection Agency to amend regulations pertaining to underground storage tanks. The amendments change language in the regulations specifically adding **licensed professional geologist**, as well as other procedural changes. Geologists in Illinois organized to respond to the proposed amendments with a unified credible voice.

Overall, it's clear that geologists, in seeking to establish registration statutes or modify existing laws and regulations, realize that registration is in some respects a double-edged sword. This is because the primary legal basis for the state-granted privilege to practice through licensure is the protection of public health and welfare. On the other hand, from a purely practical standpoint, registration does offer a certain amount of protectionism, or professional prerogatives, for the licensed professional. Regardless of one's perspective however, the bottom line is that when the licensee's performance is questioned, the state views the licensee as the adversary and aligns its considerable resources against the accused professional practitioner. This is the actual underlying consequence of state registration. The practitioner is liable and must defend himself or herself against allegations of wrongdoing, be they real or imagined.

Which brings me to the primary point to be made. Namely, there is a very sound reason, rooted in pure self-interest, to seek and maintain **Certification** in addition to Registration. Very often suit is brought against a practitioner for legitimate causes. All geologists are familiar with situations in which practicing professionals are rightly taken to task for ethical and or legal lapses. These individuals deserve the full consequences of the law, particularly when their actions frequently serve to generally besmirch their respective professions.

But very often, the circumstances under which a practicing geologist becomes embroiled in legal or administrative

proceedings are due to ambiguities in statutes or regulations. In cases like this, the practitioner may be guilty of no legal or moral infraction, yet often must defend himself or herself on the basis of technical and professional competence alone. Let me attempt to explain why, in such situations, Professional Certification and association with an advocacy organization such as AIPG is desirable.

In a recent case, a municipal government engaged the services of a professional geologist to evaluate a hydrogeologic investigation and report prepared by a third party. The geologist performing the review found deficiencies and so informed the municipality. Using the findings reported by the geologist, the municipality sought damages from the original investigator, who was a professional engineering consultant. The court had refused the affidavit of findings of the geologist since, not being a licensed professional engineer, the geologist was not considered by the court to be qualified in hydrogeologic matters. Without going further into the particulars of this case, it is obvious that the issue here is one of professional qualification and recognition of geologic practice.

This is a typical example of the general ignorance (displayed in this case by the court's refusal to recognize the qualifications of a Certified Professional Geologist) of the contributions made by the geologic community to the general health and welfare of society. And while the geologist here is not personally in jeopardy, the principle at stake is recognition of the profession. The experience underscores to each practicing geologist and AIPG the necessity of continuous and increased promotional and advocacy efforts on behalf of our profession. The gist of this case relates to the fact that the pertinent statute and regulations require that hydrogeologic reports be prepared by a professional engineer. This emphasizes the need for advocacy to change the statutes and regulations to address this obvious deficiency, particularly in regard to work that a geologist is qualified to perform.

In this case, unfortunately, AIPG was not able to participate in the proceedings as an advocate. However, this fact does not diminish the effectiveness of AIPG as an advocate for the profession. I believe this example underscores the desirability and necessity of strengthening our advocacy role in order to allow AIPG, at some point in the future, to have the monetary resources to allow us to file as *Amicus Curiae* in similar cases. Having the ability to do so requires not only the financial resources to retain legal counsel, but it also requires a credible credential. That credential exists vis-a-vis AIPG Certification.

I believe there are convincing reasons for those geologists who hold licenses to also hold certification from AIPG. The case of the individual cited above clearly exemplified the need to place more emphasis upon educating our lawmakers and regulators regarding the role of geologists. In the Illinois situation, registration did not automatically define the role of

geologists. That objective required that more educational effort be made by the affected practitioners.

Although neither Certification nor Licensure is the panacea to all professional issues, they are certainly not exclusionary credentials. In fact, they are complementary in that Certification attests to the individual practitioner's basic preparation, competence, and ethics, whereas Licensure indicates the state's granting of a privilege to the practitioner. With licensure, the individual practitioner stands alone in the eyes of the state. With Certification, the practitioner stands united with fellow professionals in pursuit of a common goal—professional recognition and credibility.

Scientists look for Signs of Pollution in the Superhighway in the Sky

WASHINGTON -- If you think traffic is getting worse on your commute, you are not alone. Hundreds of commercial airline flights carry thousands of passengers between the U.S. and Europe each day, traveling along what has become the busiest jet super highway in the world: the Atlantic corridor. Could all of that air traffic exhaust be a detriment to the atmosphere at 35,000 feet, the way that auto exhaust pollutes the air we breathe? In a study to be published in the October 15 issue of the journal *Geophysical Research Letters*, NASA scientists found that the atmosphere over the Atlantic acts nothing like the Los Angeles basin when it comes to collecting ozone—the chemical responsible for smog.

The key chemical in creating ozone is nitric oxide, a byproduct of aircraft and rocket exhaust, said Dr. Anne M. Thompson, a Goddard Space Flight Center (Greenbelt, Md.) atmospheric scientist who led the study as part of NASA's Atmospheric Effects of Aviation Experiment. Increasing the amount of nitrogen oxides increases the amount of ozone. "When we cross the jet tracks an hour after they pass by, it's easy to find their chemical trail," said Thompson. But when the scientists looked for increased levels of smog chemistry covering the entire flight corridor, they could not find them, she said.

In the Fall of 1997, the scientists in the Subsonic Assessment Ozone and Nitrogen Oxides Experiment (SONEX) set out to see if the high volume of airline travel was helping heat up the globe. The team flew for more than 100 hours from Bangor, Maine, Azores, and Shannon, Ireland, in a specially equipped NASA DC-8, collecting samples of the air's chemistry.

What complicated the gas analyses is that ozone and nitrogen oxides have several ways of working their way six miles up into the atmosphere. The gases can come from below, when man-made smog is funneled up during a thunderstorm. Ozone can meander down from the stratosphere, where it acts as Earth's ultraviolet shield. And nitrogen oxides in large amounts can be produced on the spot by lightning strikes. So it becomes very difficult to pin down unequivocally where the nitrogen oxides and ozone are coming from.

Another critical ingredient complicating the November 1997 study was the year's powerful El Niño. Thompson found that on the eastern side of the Atlantic, clean air made aircraft exhaust easy to find. But, over Maine and Canada, nitrogen oxides from summer-like thunderstorms and lightning

Each state that enacts registration laws does so with sovereignty. There are no guarantees of uniformity of approach from one state to the next. Depending upon the specific requirements of a particular state, the interests of practicing geologists in the respective states may not coincide. Certification, on the other hand, provides a uniformity of approach throughout the country and provides a representative organization whose primary goal is the promotion of the profession on behalf of all practicing geologists.

swamped the aircraft signal, leaving scientists to wonder how typical their sampling period was.

Since ozone at 35,000 feet cannot hurt your lungs or make your eyes water, why do scientists care about air quality there? According to Thompson, when ozone gets that high up, it starts to act like a greenhouse gas and can contribute to global warming. "So knowing how airliners and rockets add to the picture is important for climate research," she said.

In the end, Thompson said, the findings showed that jet aircraft, which burn very "clean" fuel, probably added a few tens of parts per trillion of nitrogen oxides to the atmosphere. But the air that far up is so clean that even such a small number of molecules could be an increase in nitrogen oxides of more than 20 percent, Thompson said.

For now, Thompson contends that ozone impacts along the Atlantic corridor are too small to detect, but according to industry specialists, who indicate that the future holds a steady increase in air traffic, it makes understanding the effects of air travel on the global climate increasingly important.

For more information on SONEX, visit the website at: [<http://telsci.arc.nasa.gov/~sonex/>]. See images at: [<FTP://pao.gsfc.nasa.gov/newsmedia/SONEX>].

*AGU Release No. 99-30
Joint AGU-NASA Release*



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PROFESSIONAL ETHICS & PRACTICES - Column 51

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

Ethical Dilemmas Posed During Mineral Project Appraisal (this issue, p. 7-11)

Trevor R. Ellis' (CPG-06740) article appearing on pages 7 through 11 of this issue is the written version of the well-received presentation he gave at the AIPG-sponsored Ethics Session at the GSA meeting in Denver last October. Ellis' account of a particular consulting experience demonstrates ways that ethical issues crop up in the course of professional work. As is often the case, decisions regarding such ethical issues must be made promptly. Sometimes you can take time to phone trusted colleagues for advice, but sometimes you can't.

Preparing for these ethical decision points ahead of time will help you steer through what can be very rocky shoals. The first requirement for preparation is recognizing that an ethical issue is potentially involved. As Ellis demonstrates, one of the issues is being thoroughly familiar with the Codes of Ethics of your various professional organizations. You must also be aware of the provisions of any applicable practice guidelines. In Ellis' example, there were some potential conflicts between provisions of the AIPG and the American Institute of Mineral Appraisers Codes of Ethics, the Australian VALMIN Code (a practice guideline for the valuation of mineral properties), and the Uniform Standards for Professional Appraisal Practice.¹

If you haven't read Ellis' article, do so. Please comment and contribute your own experiences as well. Such contributions allow us all to be more prepared. In particular, please contribute examples of dealing with conflicts between differing ethics codes and/or practice guidelines and how they were resolved. I'm also seeking similar presentations for the AIPG-sponsored session at the upcoming GSA meeting in Reno this fall—send me an e-mail for more information.

Comment on Column 49, December 1999

Fred L. Fox, CPG-01272, commented on three parts of Column 49. On "The Distinction Between the Two Preceding Topics" (the first topic dealt with a suspected fraud and the second with a lab's loss of reputation due to bad work): "There's nothing ethical or unethical about making a decision. You make it and that's it. You decide based on what you **know** (if you're ethical) or even suspect. In this case you **trust** the two people who **knew** that a lab had botched jobs and made your decision on that basis. You probably made the right one."

On "The Ethics of Changing Jobs," Fox stated, "**Knowledge is truth**. And **truth** is the basis—the **only** basis—of **ethics**. One can only **know** what's **true**. If it's not **true** you can't **know** it (you only can think/believe that you know it). One cannot (and must not) ignore what one **knows**, and what one **knows** is one's property—it can't be removed or taken away from oneself. A person owns his knowledge/truth; **truth** is owned by everyone. It can't be an individual property. One can argue other things in a report, but truth can't be one of them."

On "Expert Witnesses: Should They Serve the Parties or the Court?," Fox notes that expert witnesses "are a legal entity and so are subject to the law; the law may be ethical or not. The person, however, is not a legal (but is instead an ethical) entity. So if the court retains the witness, then the witness is responsible to the court. If an individual client retains the witness, then the witness is responsible to the client. This has to be the case or there would be no reason to take the job/hire an expert. This does not mean that the witness is a slave to his client. There remains his unseverable ethical/moral connection to humanity, but discussing that will take more space. Anyway, bias is automatic—it comes with the individual. Nobody can be totally objective—it's impossible. This has something to do with taking sides."

Readers of this column will recognize Fox as a regular contributor who is unafraid to express his views regardless of their popularity. He and I disagree on a number of points but recognize each other's basic commitment to ethical practice. Fox firmly believes that truth is the most important thing in ethics (see above). He and I have had a running e-mail debate on the subject. Neither of us has completely convinced the other but such debate does force one to think harder about one's positions. Further contributions to the debate are always welcomed.

Fairness, What Is It?

Standard 1.1 of the AIPG Code of Ethics states that "members should pursue...fairness, impartiality,... as a way of life. What does "fairness" mean? **L. Graham Closs**, CPG-07288, sent me a copy of an ethics article, "Fairness in the engineering workplace," by Jim Ridley, PE, in *Engineering Dimensions*, Sep-Oct 1999, the publication of the Ontario Professional Engineers. Ridley notes that there are a variety of ways of defining fairness. One way describes the process used to achieve fairness, that is impartiality, objectivity, and lack of bias. A second way states the standards used, legal, ethical, and one's conscience. A third way considers the consequences of the planned action in terms of consistency with stated goals and purposes. Ridley points out that none of

1. As more organizations adopt Codes of Ethics or ethics guidelines, and the number of practice guidelines increases, the potential for conflicting positions increases as well. Only by being aware of the details of these codes, guidelines, etc. can you identify the potential conflicts. Once having identified a conflict, bring the conflict to the attention of the appropriate organizations. I can't predict the resolution, but at least the problem will be noted and hopefully addressed. While I am Chairman of AIPG's Ethics Committee, I promise to do what I can to eliminate the problems. I can also assure you that the time for addressing these issues is before a problem occurs whenever possible. Nevertheless, conflicts will occur, which presents yet another set of ethical issues.

these definitions result in equality of treatment for all affected individuals.

Perceived lack of fairness arises most commonly in personnel actions, hiring, firing, promotions, bonus awards, project assignments, training, recognition, etc. Adding to the mix are society's equal opportunity goals. In quoting the extract from Standard 1.1, I included "impartiality," the word immediately following "fairness" in a string of nine characteristics members are to pursue. This suggests that the aspects of the first definition of fairness, the use of an impartial, objective, and unbiased process, are important. Yet the results of a process are clearly important to many. For example, following the election for the 2000 AIPG Executive Committee, including the Advisory Board Representatives, I heard more than one member comment on the number of women on the Executive Committee.

What are your views on fairness? Please contribute examples of situations demonstrating either fairness or unfairness.

Ethical Issues in Sarah Andrews' *Bone Hunter*

Sarah Andrews is a geologist and a mystery writer (and other things as well, like most of us). Her latest mystery, *Bone Hunter* (1999, St. Martin's Minotaur), discusses two aspects of professional ethics, theft of another geologist's research work and professional geologists who are liars.

The most explicit ethical example involves research work theft and is told in the "Author's Note" at the end of the book. Ms. Andrews was teaching a class on dinosaurs, and a visiting lecturer described important new evidence supporting his thesis with photographs of physical evidence obtained in a foreign country by foreign paleontologists. After the class, the visiting lecturer freely admitted to Ms. Andrews that the photographs had been smuggled out of the country and had allowed the visiting lecturer to scoop the story of the new evidence. The visiting lecturer's picture appeared on the cover of a well-known magazine before the paleontologists who actually made the find and did the related work were able to report their findings. As Ms. Andrews wrote, "This man had just blithely admitted that he had committed theft." The theft in this case was the credit for finding and interpreting important new evidence.

Canon 4 of the AIPG Code of Ethics outlines our obligation to "respect the rights, interests, and contributions of [our] professional colleagues." Rule 4.1.2 states that "A Member shall not...use materials prepared by others without appropriate attribution." The case Ms. Andrews describes is an excellent example of the blatant violation of these ethical principles.

The story in *Bone Hunter* involves several professionals in the vertebrate paleontology community² who lie. The murder victim is widely viewed as a notorious liar. But others lie in various ways as well. What is interesting in *Bone Hunter*

is Ms. Andrews' description of a discussion on a bus heading out on a field trip where the characters discuss the murder victim's lying and how his professional colleagues reacted. Not only great reading but an insightful look at how we as a profession behave.

As noted before in this column, scientific dishonesty is the greatest sin we can commit as geoscientists. But our reputations for honesty in general, or lack of it, affect our professional reputations in general. Our professional lives depend on the basic honesty of our colleagues. As mistaken, confused, or lacking in data to support our hypotheses as we may be, our basic honesty is assumed. We may even be naive about the amount of lying that actually takes place. I've encountered this naivete in industry geoscientists as well as in research geoscientists. How do we deal with it? Ms. Andrews offers an excellent fictional account; her book accurately describes scenes we are all familiar with.

Enjoy Ms. Andrews' books³, but reflect on the ethical issues she presents while doing so. They have the advantage of being fictional, contain lots of relevant information to the issues presented, and so make excellent case histories. *Bone Hunter* also has some interesting descriptions of professor/student relationships, intra-departmental relationships, etc. If anyone has comments on the ethical aspects of any of the Em Hansen mysteries, please contribute them.

Disciplinary Proceedings During 1999

The public's ability to rely on AIPG's Code of Ethics as an assurance of competent and ethical geological practice must be supported by a public statement of what AIPG has done in those cases where failures to practice ethically and competently have been alleged. Column 39, February 1999, contained a summary of AIPG Disciplinary Proceedings from 1989 through 1998. This is the 1999 addition to that summary. Column 39 also contains some additional explanatory notes I will not repeat here. A summary is also available on AIPG's website.

Two ethics inquiries were initiated during 1999. One involved a federal government agency implementing apparently policy-based decisions that were purportedly backed by scientific studies performed by a private firm under contract. In essence, the complainant asserted that the agency used the private contractor's work to support a foregone conclusion. The accused AIPG member was an employee of the private firm and his only identifiable act was to sign a cover letter for a document transmission to the agency. Documents provided by the complainant suggest that the private firm's scope of work was limited and did not address all possible geologic aspects affecting the agency's ultimate decision. Because the conclusion allegedly ignored published geologic information and because the accused member worked for the private firm, the complainant believes the member should be found liable for the agency's misconduct. The documents provided in support of the complaint failed to show that the accused member had practiced improperly in some way. His

2. Paleontologists are a part of the geoscience community and have the same general ethical views, habits, and foibles as the rest of the geoscience community. This particular story happens to be about them. Ms. Andrews' previous Em Hansen mysteries deal with liars and others in the oil and gas and environmental parts of the profession.
3. There are five books in the Em Hansen series: *Tensleep*, *A Fall in Denver*, *Mother Nature*, *Only Flesh and Bones*, and *Bone Hunter*. *Tensleep*, *A Fall in Denver*, and *Only Flesh and Bones* involve the oil patch. *Mother Nature* involves underground storage tank issues in California.

being an employee and signing a letter are not enough. The documents did not provide convincing evidence that the private firm had done anything improper in completing the scope of work it accepted. However, documents do support the contention that geology was misused or ignored in arriving at the policy decision. The question remains, "Who was responsible?" The common practice in government agencies and private firms of not naming those responsible for doing specifically described parts of a project frustrates inquiry into who did what and who should be held responsible. Unfortunately, AIPG cannot cure all the world's problems.

The matter was concluded as "not proved" and no formal charges were initiated against the accused member.

The second case involves accusations that a member regularly failed to properly complete government-required forms for his clients. These failures lead, in some cases, to the clients' inability to demonstrate that required remediation work was properly completed. Such failures could result in the accused member's clients being required to duplicate the work already done. A formal investigation was conducted and the matter will continue into 2000. Resolution will be reported next year.

MEMBERS IN THE NEWS

Paul R. Day, CPG-09192, received a J.D. in Environmental Law from Chicago-Kent College of Law located in Chicago, Illinois on December 22, 1999. The December, 1999 law school graduates have adopted the motto "They saved the best for last!" because this graduating class will be the last class of the century. Mr. Day is currently seeking employment as an attorney in a capacity related to geology. Paul can be contacted at (847) 699-2012 or by e-mail at <number6@terra.igcom.net>.

Richard E. Gray, CPG-01257, Senior Vice President of GAI Consultants, Inc., Monroeville, Pennsylvania, was recently elected to a four year term as Vice President for North America of the International Association for Engineering Geology and the Environment. This organization comprises over sixty national groups representing Engineering Geologists worldwide.

William C. Haneberg, CPG-10311, has established Haneberg Geoscience, a consulting practice located in Port Orchard, Washington. His areas of expertise include slope stability, land subsidence, aquifer characterization, geologic hazard assessment, geomechanics, and the incorporation of geologic information into land use and planning decisions. In addition to his membership in AIPG, Dr. Haneberg is a Fellow of the Geological Society of America and a member of the Association of Engineering Geologists, the American Geophysical Union, the American Rock Mechanics Association, and the Northwest Geological Society. He is the author or co-author of more than two dozen peer-reviewed papers and co-editor of two books. The most recent book, "Faults and Subsurface Fluid Flow in the Shallow Crust," was released in October 1999 as an American Geophysical Union monograph.

Dr. Haneberg previously held the positions of Senior Engineering Geologist and Assistant Director with the New Mexico Bureau of Mines and Mineral Resources, and sat on the board of direc-

tors of the Rio Grande Utility Corporation. He remains affiliated with the New Mexico Institute of Mining and Technology, where he is an adjunct professor in the Department of Earth and Environmental Sciences and the Department of Mineral and Environmental Engineering.

Michael F. McGowan, CPG-09733, RPG, recently joined GSC Environmental, Inc. as Geological Services Division Manager in Augusta, Georgia. GSC serves commercial, industrial, and local government clients. Mr. McGowan has both a bachelor and master's degree in geology. He has over twenty-one years experience as a geologist with thirteen in the environmental field. Mr. McGowan is a registered professional geologist in Georgia and South Carolina. For the previous four years, he has operated as an independent geological consultant in the Augusta, Georgia area.

Daniel R. Toder, CPG-06668, was recently promoted to Vice President of Killam Associates, Consulting Engineers. Mr. Toder is a member of Killam's Millburn, New Jersey office. He is a resident of Langhorne, Pennsylvania. Mr. Toder is a member of AIPG and the National Groundwater Association. Killam Associates, headquartered in Millburn, has been practicing infrastructure engineering for over 60 years. The firm has an extensive clientele in both the public and private sectors.

John Vecchioli, CPG-01614, recently retired from the U.S. Geological Survey after almost 42 years of service. He plans to continue professionally as a consultant in hydrogeology practicing out of his home in Tallahassee, Florida. Vecchioli is a licensed Professional Geologist in Florida and has broad expertise in ground-water hydrology, having worked for the USGS's Water Resources Division in New Jersey, Long Island, New York, and for the past 22 years in Florida.

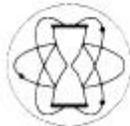
Vecchioli will spend part of his retirement time doing volunteer service for the National Research Council, having been recently appointed to their Committee on Restoration of the Greater Everglades Ecosystem, and as a contributor to the functions of the Florida Hydrogeology Consortium.

John can be reached at 3433 Castlebar Circle, Tallahassee, FL 32308, (850) 893-4782, fax (850) 894-2556, or e-mail <jvecchioli@yahoo.com>.

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LETTERS TO THE EDITOR

Dear Editor:

AIPG is in a good position to help get Earth Science Week declarations in all 50 states. Getting a proclamation from the governor is easy in our state, but apparently difficult in some others. I suggest that a good effort for AIPG members at the section level is to work with the State Geologists to help get the proclamation, if the State Geologist is unable to do so. This is such a non-controversial issue that I can only think of good that can come from such an overture from the AIPG section members.

The one we have for Nevada is one that applies “henceforth” into the future, so it doesn’t need to be renewed every year.

The suggestion I am making is that you consider contacting each of the Section leaders (along with one of your standard memos to them) and suggest that they undertake this as part of their state government affairs programs.

Jonathan G. Price, CPG-07814

National Convention in Brief

Dear AIPG Members:

I would like to extend my sincere appreciation to the Michigan Section for providing me the opportunity to represent it at the 1999 National Conference in Girdwood, Alaska. As the delegate from Michigan, I presented this Section’s activities to the Advisory Board and other delegates. National was pleased and impressed with the success and progressiveness of our Section. We have been asked to write an article for *The Professional Geologist* on the Section Educational Award and the Miller School project.

As Michigan’s delegate, I had the opportunity to participate in discussions regarding the purpose and direction of AIPG as a national organization. The conference was also a forum to learn techniques that other sections are implementing that benefit their members and the Institute as a whole. There are many services that National can provide to the Section, and we should be making the most of those services. Likewise, there is much support that the Michigan Section can provide to National, and we ought to be making the most of those opportunities as well. A concerted effort is required to promote the profession of geology, educate the public, and protect it by reducing the number of unqualified practitioners.

It is my intent to continue the excellent leadership that this Section has experienced over the past few years, and to work hard at making the Michigan Section even more productive and valuable for its members. Just a small group within the Section cannot seize all of the available opportunities. Each of us pays dues and expects something worthwhile in return from this organization. Each of us has busy schedules; however, the investment we make in AIPG need not be time-consuming to be profitable. Consider how you can augment your investment by assisting in one of this Section’s projects. AIPG is already a terrific organization. Let us work together to make it that much better.

**Lisa M. Boettcher, CPG-09504,
AIPG Michigan Section, President-Elect**

The following is submitted in response to the President’s Message – Tom Fails, entitled Professional Geologists Organizations? AIPG Already is One! (November 1999 TPG)

Dear Editor:

Some of the points raised by President Tom Fails in his article entitled Professional Geologists Organizations? AIPG Already is One! (November 1999 TPG) were disconcerting to many NE-AIPG members because they did not present the complete story of what has occurred with the licensing effort, particularly in New York. While the article presented several points worthy of consideration, any time an effort for licensure/registration of geologists is undertaken in a state, the unique political setting and conditions in that individual state must also be considered. What was not brought out was that this process did, in fact, occur in New York. The NE-AIPG and its members were closely involved in the process, but in the end the decision was made that a local organization best served the interests of promoting licensure in New York State.

NE-AIPGs’ lack of “standing” with New York legislators was not a consideration in New York CPGs deciding to support formation of the Council. According to the CPGs who were founding members of NYSCPG, this was not the issue at all. Actually, there were three primary issues that led to the formation of NYSCPG. Those three issues included: 1) NE-AIPG, with its broad eight-state geographic area, would not be able to give its undivided attention and support to the New York licensing effort. 2) State legislatures typically focus on their local constituency and are not interested in what multi-state organizations want from them. To get a good foothold into the state legislature, you need constituents from the district of your sponsor and a local organization is the way to achieve that. 3) There was a desire to keep this effort at the grassroots level and open to all concerned parties, including non-CPGs.

During the time NYSCPG was initially being formed (1996), the founding members had dinner with Bill Knight, then Executive Director of AIPG. Bill suggested keeping the licensing effort within the confines of NE-AIPG. An immediate concern raised by the NYSCPG members was how could they expect full support and attention from a “regional” AIPG chapter that has members spread across eight states (NY, NJ, CT, VT, NH, MA, ME and RI). Bill suggested the formation of a separate NY Chapter. While certainly worthy of consideration, this idea raised another difficulty, however, because if New York were to form a separate chapter, it would thereby exclude New Jersey from the rest of NE-AIPG because the Section would no longer be contiguous [AIPG By-laws state that a Chapter must consist of contiguous states].

The NYSCPG also recognized that many of their constituents, including a majority of their board members, were not AIPG members. For them to continue their involvement with the licensure effort, they would then have to either become CPGs [a good idea to grow the Section, but certainly a time-consuming process that could delay the licensing effort] or resign from the licensing effort [why eliminate valuable supporters at a time when building consensus and pro-

LETTERS TO THE EDITOR (continued)

moting unity are critical?]. In addition, the NYSCPG founders [and later many in NE-AIPG] recognized the value of an organized grassroots effort. In this manner, individual geologists including both AIPG members and non-AIPG members, geological organizations [there are over 30 including NE-AIPG], public and private companies, and other interested individuals [including engineers] could contribute time and money to a unified "non-political" alliance whose only mission is to support the licensure of geologists in the state of New York. The NYSCPG founders took Bill's advice under consideration, but ultimately they felt that they were not in a position to coerce NJ and the other states in NE-AIPG to form separate chapters. In the end, they decided to continue as NYSCPG and maintain the involvement of non-CPGs.

Currently there are four regional New York geology associations [Albany, Buffalo, Syracuse and Long Island] that are sponsoring NYSCPG. The support of these associations, which were formed long before NYSCPG, has been vital to the NYSCPG grassroots effort. While the combined efforts of NE-AIPG and the regional associations have been unsuccessful to date, a licensing bill has been introduced in the New York State Assembly and should be decided in the year 2000. This amount of progress alone is a testament to the untold hours of hard work and thousands of dollars of financial support that has gone into the licensure effort.

The NE-AIPG has played a progressively larger support role with NYSCPG. Initially, there were mixed feelings by the NE-AIPG Executive Committee toward providing financial support for NYSCPG because the group was locally based in Syracuse, did not have statewide support, and seemed to lack technical direction. Through the efforts of Executive Committee members Sam Gowan and Dean Herrick, that has changed. Over the past two years, Sam and Dean, working in unison with non-AIPG members of NYSCPG, have increased statewide representation and renewed focus to the licensing effort by moving the base of operations from Syracuse to Albany. During this time they have also kept the NE-AIPG Executive Committee up-to-date on progress of the bill. To date, the NE-AIPG has contributed \$8,000.00 in financial support. In addition, four CPGs, two of whom are NE-AIPG Executive Committee members, serve as officers and/or directors on the 12-member NYSCPG Board.

It makes sense for NE-AIPG to work closely with NYSCPG while we continue to encourage their members to join AIPG. The existence of the organization does not undermine or dilute AIPG or NE-AIPG.

**NORTHEAST SECTION
EXECUTIVE COMMITTEE**

AIPG SECTION NEWS

ARIZONA SECTION

The Arizona Section, AIPG, holds its February meeting in conjunction with the annual Tucson Gem & Mineral Show, the world's largest. The world's finest collections of gem-quality (and other) minerals will be on display, and world-class specimens for sale, for several weeks. In other words, it's worth the trip.

This year's (2000) meeting will be held during the last full weekend of the Show: February 10, 11, and 12. The Section Meeting will be held at the Arizona Geological Survey, across the street from the Convention Hall. Tucson is a winter destination because of good weather, so the town is "full-up," but we will have available a block of rooms at the La Quinta, very convenient to downtown. It's a great getaway that you might want to consider.

We welcome you to the Show and to our meeting. We're still making arrangements, but for the details as they emerge, contact Fred Fox either by formerly conventional means (520) 742-0233 or digitally at <thefox@theriver.com>.

Fred L. Fox, CPG-01273

LOUISIANA SECTION

The elections for the officers of the Louisiana Section of AIPG (LSAIPG) for the year 2000 have been completed and the following are the results: President, Steven E. Whitting, CPG-08561; Vice President (President-Elect), Nelson Morvant, CPG-10069; Secretary, Emil 'Sonny' Maciasz, CPG-08400; and Treasurer, Lee A. Day, CPG-09630.

It was an interesting experience to serve as the President of the LSAIPG for this year, and perhaps the most significant development in Section activities was arranging to have joint monthly luncheon meetings with the Baton Rouge Geological Society. These meetings have so far proved to be quite successful. I would highly recommend such an arrangement with local geological societies in places where the numbers of AIPG members are small. We also attempted to start a quarterly newsletter, but it was dropped after the first issue due to inadequate member response required for continuation.

On behalf of the 1999 officers of the LSAIPG, I would like to convey our thanks to you and to the headquarters staff of AIPG, Wendy Davidson and Catherine O'Keefe, for your help during the course of the year.

**Chacko J. John, CPG-10044
AIPG Louisiana Section President (1999)**

CALENDAR

2000

Mar. 2-3. *The Ground Water Monitoring Field Course*, Orlando, Florida. Contact: The Nielsen Environmental Field School, Inc., Ph.: (740) 965-5026, e-mail: nielsen-fieldschool@juno.com.

Mar. 3. *Micropurge Low-Flow Purging and Ground Water Sampling*, Orlando, FL. Contact: The Nielsen Environmental Field School, Inc., Ph.: (740) 965-5026, e-mail: nielsenfieldschool@juno.com.

Mar. 6-7. *Fundamentals of Ground Water Geochemistry*, San Francisco, CA. Contact: NGWA at (800) 551-7379, e-mail: csr@ngwa.org, www.ngwa.org.

Mar. 7-8. *Transport & Fate Principles and Parameter Estimation: Use and Modeling for Risk-Based Evaluation and Screening of Soil Contamination*, San Francisco, CA. Contact: NGWA at (800) 551-7379, e-mail: csr@ngwa.org, www.ngwa.org.

Mar. 8-10. *Applications of Ground Water Geochemistry*, San Francisco, CA. Contact: NGWA at (800) 551-7379, e-mail: csr@ngwa.org, www.ngwa.org.

Mar. 9-10. *Applied Transport & Fate Modeling for Risk Based Soil Screening and Cleanup Levels (Using the new Windows 98/NT SESOIL and AT123D)*, San Francisco, CA. Contact: NGWA at (800) 551-7379, e-mail: csr@ngwa.org, www.ngwa.org.

Mar. 13-14. *Great Lakes Region Geological Conference*, East Lansing, MI. Contact:

Tom Godbold (517) 334-7527 or Kellogg Center, Michigan State University Campus, East Lansing, Michigan.

Mar. 16-17. *16th Annual - Mining and Land Resource Institute*, Reno, NV. Contact: The American Association of Professional Landmen, Ph.: (817) 847-7700, or <http://www.nvlandman.org/malri.html>

Mar. 21-24. *The Environmental Sampling Field Course*, Orlando, FL. Contact: The Nielsen Environmental Field School, Inc., Ph.: (740) 965-5026, e-mail: nielsenfieldschool@juno.com.

Mar. 28-29. *Petroleum Systems of Sedimentary Basins in the Southern Midcontinent*, Oklahoma City, OK. Contact: Ken Johnson, Oklahoma Geological Survey, Energy Center, 100 E. Boyd, Room N-131, Norman, OK 73019-0628, Ph.: (405) 325-3031.

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

Apr. 16-19. *AAPG Annual Meeting & Exhibition*, New Orleans, LA. **Call for Abstracts.** Contact: Sandy Hensley, AAPG, P.O. Box 979, Tulsa, OK 74101, Ph.: (918) 560-2641, e-mail: shensley@aapg.org.

May 8-10. *Rietveld Method Short Course*, Atlanta, GA. Contact: Georgia Institute of Technology, Atlanta, GA 30332-0385, Ph.: (404) 385-3052, e-mail: angela.arnold@conted@conted.gatech.edu <http://www.conted.gatech.edu>.

Aug. 3-5. *Conference on the History of Geologic Pioneers*, Troy, NY. **Call for papers.** Contact: Northeastern Science Foundation, Inc., affiliated with Brooklyn College of the City University of New York, P.O. Box 746, Troy, NY 12181, Ph.: (518) 273-3247, e-mail: gmfriedman@juno.com, <http://www2.netcom.com/~gmfstf/>

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AIPG Membership Totals

	As of 12/05/98	As of 12/17/99
CPG - Active	4,410	4,217
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Member	10	37
Registered Memb.	13	17
Associate Memb.	4	7
Student Affiliate	70	87
Honorary	17	19
TOTALS	5,103	4,962

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NEW APPLICANTS AND NEW MEMBERS - (12/02/99 - 12/17/99)

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

Applicants for Certified Professional Geologist

CO-Thomas W. Finley
537 East 9th St., Loveland CO 80537.
Sponsors: Neil Sherrod, David Cushman, Tom Chapel.

MI-Brian P. Doyle
466 Arbutus Trail, Traverse City MI 49686.
Sponsors: Kurt McClung, John Morehouse, Ben Verburg.

Applicant for Member

MI-Colleen E. Lillie
1434 Smithfield, East Lansing MI 48823.
Sponsors: Tim Mayotte, David Regalbuto.

New Certified Professional Geologists

WY-Drechsel, Colby CPG-10456
Rio Algom Mining Corp., P.O. Box 1390,
Glenrock WY 82609, (307) 358-3744

HK-Yuen, Dennis Kam-Ming CPG-10457
Flat C, 15/F Block 2, Avon Park, 15 Yat Ming Rd.,
Fanling NT, HONG KONG, 21 74 2551

CT-Bell, David L. CPG-10461
91 Sheffield St., Old Saybrook CT 06475, (860)
388-4631

ME-Marvinney, Robert G. CPG-10462
Maine Geological Survey, 22 State House
Station, Augusta ME 04333-0022, (207) 287-
2804

FL-Hallett, Robert B. CPG-10464
8933 Western Way, Suite 12, Jacksonville FL
32256, (904) 363-3430

MO-Cockrum, Deborah J. CPG-10465
11427 Nora Ct., Bridgeton MO 63044, (314)
843-4220

MI-Crockford, Graham CPG-10469
1544 Jenifer, Madison Hgts. MI 48071, (734)
971-7080

New Student Adjunct

NY-Rapp, Alan S. SA-0150
242 Hillair Circle, White Plains NY 10605, (609)
219-3913

IN MEMORY

John E. Clare, CPG-00483,
Charter Member, February 1999,
Bakersfield, California

A. R. Jennings, CPG-01513,
November 14, 1999,
Abilene, Texas

Dr. A. Ray Jennings, CPG-01513,
73, died Sunday, November 14, 1999, at
a local hospital.

Dr. Jennings was born in Grosvenor and graduated from Hardin-Simmons University with a bachelor's degree in 1958. He graduated from Texas A&M University with a master's degree in 1960 and a Ph.D. in 1964. He worked for Mobil Oil in Houston and Corpus Christi, then taught at East Carolina University from 1968-1974, when he moved to Abilene. He was head of the Geology Department at HSU from 1974 until retiring in 1988. He was a Methodist and a member of American Association of Petroleum Geologists, Alpha Chi, AIPG, Geological Society of America, and Sigma Xi.

Survivors include his wife, Gladys V. Jennings of Abilene, one son, Andrew Roman Jennings of Abilene, one daughter, Ann Jennings Guerrero of Abilene, one sister, Jane Dickenson of Monument, New Mexico, and three grandchildren.

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