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Minnesota's Ground Water Monitoring and Assessment Program (GWMAP)

Thomas P. Clark, CPG-6667

Introduction

The mission of the Minnesota Pollution Control Agency’s Ground Water Monitoring and Assessment Program (GWMAP) is to examine the quality of ground water in the state’s principal aquifers, establish baseline conditions, assess changes in these conditions with time, and communicate results to the public in a meaningful way. It is difficult for states to provide staff and financial resources necessary to generate quantitative statewide ground water information. However, with the use of Geographic Information Systems (GIS), Global Positioning System (GPS) technology, and a concerted effort to network with the public and local decision makers, states have the potential to improve the quality of their environmental monitoring programs and reduce the amount of staff time and dollars necessary to collect and evaluate data.

Hydrogeologic Setting

Minnesota, the twelfth largest state, obtains its ground water from 14 principal aquifers (Adolphson, Ruhl, and Wolf, 1981) which span over four billion years of geologic history. Although Minnesota is widely known for its 10,000 lakes, nearly all the rural population of the state depends on ground water for a water supply. Buried and surficial sand and gravel aquifers left by several glacial advances over much of the state in the last million years are composed of outwash, beach ridge, and ice contact deposits. Sandstone and carbonate rocks of Paleozoic and late
Precambrian age comprise the aquifers which support the population of the southeast part of the state, including the metropolitan areas of the Twin Cities and Rochester. Early Precambrian aquifers, consisting of a variety of rock types including granite, basalt and quartzite are important in scattered areas of the state from Minnesota's Iron Range in the northeast, to the southwest corner, where quartzite outcrops occur.

**Well Selection Using GIS**

Minnesota has over 200,000 active water wells, so choosing a representative group of these wells to define water quality of the principal aquifers is a formidable job. It is imperative to have an automated prescreening mechanism in place to facilitate well selection. GWMAP chose GIS as the best tool for this task. GIS enables the program to combine a systematic sampling technique with hydrogeologic criteria to ensure an efficient and cost-effective selection process for designating wells that are useful for evaluating baseline ground water quality conditions. In general, systematic sampling techniques use a randomly generated uniform grid to determine sampling locations in space and/or time (Gilbert, 1987). Systematic sampling was first implemented in GWMAP in 1991 using a manually generated spacial grid defined by the Public Land Survey (PLS). Although the PLS is not 100 percent geographically uniform, it was selected for the grid to expedite well selection from existing digital databases in which wells are located by PLS section. GWMAP has since developed a GIS coverage to create a new sampling grid (Hsu et al., 1993).

The statewide sampling grid, generated from a randomly selected origin, consists of about 700 square cells, each comprised of an 11-by-11 mile square, or 121 square miles (Figure 1). The centroid of each cell is extracted to produce the origin of each sampling zone, a three-by-three mile square from which monitoring points (wells) are selected. The sampling zones are then made into a GIS coverage and overlaid on top of the PLS coverage to extract those sections which are associated with each of the sampling zones. The County Well Index (CWI), a statewide electronic well log database (Wahl and Tipping, 1991), is imported as a point coverage and overlaid with the selected PLS section coverage so that wells falling within the sampling zones may be identified electronically as potential candidates for sampling. For wells that fall within the zones, well construction records are pulled for review by program hydrogeologists. Typically, five to ten percent of all selected wells meeting the location criteria are sampled. This accounts for hydrogeologic and well construction criteria and the cooperation by well owners participating in the program.

**Global Positioning System (GPS) Field Application**

In late 1992, GWMAP began employing GPS in the field to assist in well location. By the end of the 1996 field season, 1153 wells in 86 counties had been located using GPS and sampled. The program uses a multi-channel receiver with internal data logging capability. Typically, the receiver is placed directly on the wellhead and continuously logs 100 to 150 GPS readings into the receiver's memory in about five minutes. The use of GPS to locate GWMAP's wells has increased the efficiency and accuracy of the program, while cutting costs. This technology is suitable for any program that is designed to conduct either large-area or intensive

*Figure 1. Ground water sampling grid and target zones.*
monitoring activities. Efficiency has been further increased by the recent addition of a data logger and bar coder to replace the need for paper field forms and the need to manually label and track sample bottles.

Ground Water Chemistry Data

The conjunctive use of GIS and GPS facilitates the presentation of large amounts of ground water chemistry data on a statewide basis. GWMAP well samples are analyzed for about 125 parameters, including trace metals, organic compounds, and major cations and anions. Ambient monitoring data of the type GWMAP collects is important in helping decision-makers answer such “big picture” questions as: What is the average expected water quality in my area? Is ground water quality improving or degrading? In which areas is ground water quality worse, and are the causes natural or anthropogenic?

As an example of the difference in distribution of a naturally-occurring parameter versus the distribution of a parameter caused largely by human activity, compare the statewide distribution of arsenic (Figure 2) with nitrate (Figure 3). Although small amounts of arsenic may have been contributed to Minnesota ground water through improper use and storage of arsenic for pest control during the 1920s and 30s, the distribution pattern shown in Figure 2 is largely due to geologic factors. The north-south trending band of higher arsenic concentrations in well water in west-central Minnesota coincides closely with the edge of one of the last advances of glacial ice over this part of the state. One theory is that the mineral arsenopyrite in these glacial deposits contributes small amounts of arsenic to the ground water in these buried drift aquifers. The well driller’s logs for the affected wells show remarkably similar geology and the wells are generally over 100 feet deep with a protective clay separation which would inhibit any downward movement of arsenic sources from the surface.

This is in contrast to the distribution shown for nitrate (Figure 3). There are many possible sources for nitrate which can be contributed to ground water resulting from human activity, including use of fertilizer, poorly-designed or improperly maintained septic systems, and contribution from animal feedlots. All of these sources probably contribute in some way to the pockets of elevated nitrates shown in Figure 3. The elevated areas cor-
respond well with land use and geology, such as the large farms and feedlots of southwest Minnesota, the irrigated acreage of central Minnesota’s sand plains, and the sensitive karst geology of southeast Minnesota where the principal bedrock aquifers are at or near the surface.

Conclusions
The conjunctive use of GIS and GPS technologies in a statewide ground water monitoring program has allowed GWMAP to optimize available funding and staff time. This technology is suitable for any program that is designed to conduct either large-area or intensive monitoring activities. Data collected by GWMAP are used not only in regional studies of hydrogeology and ground water chemistry, but can be used as valuable sources of background information in site-specific investigations, assessment of effectiveness of pollution control measures, and establishment of ground water standards.

Acknowledgments
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Figure 3.


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The year 1996 was a rough year for many hydrogeologists. It was a year in which many of us were laid off from well-paying jobs. It was a year in which the value of stock in publicly traded environmental consulting companies fell by 40 percent or more. It was a year in which we saw headlines in the Wall Street Journal that read “Cleanup Industry is Down in the Dumps”, and none of us laughed. For the National Ground Water Association (NGWA), it was the culmination of four consecutive years of declining memberships that caused them to trade their new headquarters for a smaller facility across town.

Those who survived this downturn and are still in the profession may wonder if they should consider a career change. Having experienced a layoff myself, I have a lot of sympathy with that position. But before we make that decision, we should look at some trends and market niches in our industry that are still healthy. In this article I want to examine several of these, and discuss our roles with our counterparts and colleagues, the policymakers and engineers. A good understanding of this situation can only enhance our employment opportunities.

Upside Trends in Hydrogeology

While the topic of technological trends is always of interest to hydrogeologists, my focus here is on trends that provide niches in the marketplace for hydrogeologists. There are two trends that are creating work for us now and in the foreseeable future. These are in the areas of risk assessment for managing releases of hazardous materials, and inorganic geochemistry related to mining operations. I believe others exist, such as groundwater supply, dewatering for mines, and litigation support, however these will be outside the scope of this paper.

Risk Assessments for the Hazardous Waste Industry

The risk assessment trend started in the mid-1980s, primarily through implementation of the federal CERCLA (Superfund) program. The policymakers at the U.S. Environmental Protection Agency (USEPA) viewed uncontrolled hazardous waste sites as posing some degree of risk to humans and the environment. Risks needed to be identified and quantified to prioritize federal cleanup funds, and to provide a way to define cleanup goals. Ironically, one of the major reasons for the downturn in the hazardous waste industry is directly related to growth in the risk assessment approach. Many federal and state environmental regulations promoted the view that releases to the subsurface could be remediated with engineered solutions to either background or regulatory Maximum Contaminant Levels (MCLs). Experience usually showed that these goals could not be reached. The old paradigm needed to be replaced by a new paradigm that was risk-based. Under the latter approach, remedies could partly depend on engineered solutions and institutional controls, or require no further actions after a negotiated level of remediation was reached.

Risk assessments are based on quantitative predictions of the migration of contaminants through geologic media to potential exposure points (USEPA, 1989). Risks depend on source area conditions, on hydrogeologic processes in the saturated zone, and on movement of vapors in the unsaturated zone. Who is better qualified to make such assessments and predictions than hydrogeologists? A toxicologist recently told me that they were better suited to performing risk assessments. This was like telling a remedial engineer he could not do bioremediation unless he is a microbiologist. Although it may be helpful to understand the scientific basis of the dose-response curves and how new research by toxicologists allows us to update these relationships, practicing risk assessors rarely need this level of specialized knowledge.

The more recent development of the ASTM standard for risk-based corrective action (RBCA) at petroleum sites (ASTM, 1995) was a significant contribution to the risk assessment trend. It provided a more streamlined tiered decision approach that uses the same risk equations as the USEPA (1989) but rearranged to calculate a soil, water, or air concentration associated with an acceptable risk. The ASTM guidance has reached a wider audience among regulators, the regulated community, and environmental professionals, including hydrogeologists. The trend continues with the development of RBCA-like programs for less biodegradable compounds such as industrial solvents. We have not seen the end of this development—it will take a few
more years to reach fruition. But I believe that it will ultimately be applied in some form to the majority of sites where the exposure potential is slight. On those sites with unacceptable exposures, engineered solutions will still be needed and new cost-effective technologies will gain popularity. However, as these remedial systems reach their limitations, as they all must, the RBCA approach can always serve as a “safety net” for the future. The other benefit for hydrogeologists is that this market niche has a relatively low barrier to entry.

Geochemistry for the Mining Industry

Over the past decade, growth in the mining sector has been occurring world-wide for several reasons. The process of globalization of the world economy has been stimulated by the removal of barriers to international trade and the movement of international capital. Higher taxes in the industrial countries has encouraged more investments in the third world countries. Finally, the more aggressive environmental protection programs in North America and Europe have impacted the mining sector and caused it to look elsewhere (Ministry of Mines and Energy, 1996). Nevertheless, the third world countries are still using U.S. regulations as a guide for their more flexible programs. Consequently, there is much work to be done by hydrogeologists and engineers in the mining sector over the next decade or more.

A trend of growing awareness of the environmental problems associated with mineral production began in the 1970s and has gained strength through the 1980s and 1990s. The primary environmental problem is often acid rock drainage and prediction of pit lake chemistry, both of which entail geochemical issues. Modeling of the inorganic geochemistry of groundwater has evolved during this same time period. It has moved from the mineral-equilibria calculations under a steady flow regime (e.g., the WATEQ program developed by the USGS), to “what-if” models such as MINTEQ, developed by USEPA for mining applications, to modeling kinetic reactions in flowing groundwater (e.g., the TRANSRXN model developed by GeoTrans for the USEPA).

Geochemistry is basically the principles of physical chemistry applied to rocks, minerals, and waters. Consequently, the basic theories are used for other ends by exploration geologists and mining engineers. The intersection of two fields: geochemistry of natural waters and groundwater hydraulics has been mastered by relatively few hydrogeologists. For this reason, the mining geochemistry niche is more difficult to enter than the risk assessment niche. To enter this field, one needs the graduate-level training, possibly a short course, and a good mentor.

The most Important Role of the Hydrogeologist

I want to discuss what I believe to be our most important contribution as hydrogeologists to our counterparts in the regulatory community and our colleagues, the engineers. Simply put, it is not the numbers we spin, so much as the conceptual models that describe what is “going on below ground” that best serves the needs of others in our field.

Evidence of this is provided by the remedial “white elephants” occasionally seen on hazardous waste sites. My experience with a variety of remediation systems leads me to conclude that poor performance is often attributable to selection of the wrong technology, or to fundamental design flaws when the right technology has been selected. Such problems are often traced to oversimplified assumptions about hydrogeologic conditions, that lead to flaws in the conceptual design, which then lead to mistakes in the detailed engineering design and construction.

We sometimes see the environmental engineers as our competitors, and indeed, engineers tend to have more influence and control on the market in multidisciplinary fields such as mining and the environment. Their work is more tangible than ours, and it is more likely to get criticized when it does not perform or appears too costly. Engineers appreciate hydrogeologists with quantitative skills because they need numbers for their designs. But more important than numbers is the basis for the numbers. The basis includes the available data, the proper interpretation of the data, and the right conceptual model of the subsurface flow systems. The latter will control the assumptions required for simulations and calculations in support of either risk assessments, engineering design, or geochemical model predictions.

The level of competition for hydrogeologic work is as high as it ever has been. Employment opportunities may get tougher to find in the near term, but eventually the trend will improve. And those hydrogeologists that can best respond to the needs of others in our industry will be the most employable.

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Internships and Preparation for Professional Practice

Robert G. Corbett, CPG-4502

The internship is a specific type of apprenticing, a practice that is traced as far back in human history as the Code of Hammurabi (1792-1750 B.C.). Modern internships, regardless of discipline, involve a work experience that complements the student’s academic training. Engineering education at many universities offers co-op (cooperative education) programs, in which the student apprentices full time at work sites. A co-op student, unlike an internship student, generally cannot graduate in four years, because of several semester- or summer-long co-op placements.

Internships in some form are common to the disciplines of communication, journalism, speech pathology, social work, and other social sciences. In the recent jargon of higher education, internships are “experiential learning.” Students seeking an internship experience may be guided by such publications as America’s Top 100 Internships, (Oldman and Hamadeh, 1994). In the introduction to this catalog of desirable internship sites, the writers reinforce the importance of the internship with such statements or quotes as “at least 1/3 of all college students complete internships before graduation,” and internships offer “...the chance to take on real responsibilities while rubbing shoulders with seasoned professionals.”

The internship concept has considerable appeal. Sublett and Mattingly (1995) present powerful reasons for a required internship program (in geography). During the internship, students apply what they have learned in the classroom, test their skills, evaluate their professional competence, and recognize and plan to fill gaps in their academic preparation. Interns are exposed to state-of-the-art methods and modern equipment. They may anticipate a strong letter of reference from their supervisor. Baker and Millsaps (1991) list some benefits of internships to the sponsor and/or community and the university. Sponsors benefit from assistance for special projects, from fresh ideas and perspectives, and from the opportunity to observe the work of prospective employees. The university may benefit from enhancement of alumni relations, relations with “leaders”, and creation of partnerships.

Internship vs. Short-time Job

Does an internship differ from a short-term job? I posed this question to a number of geologists who had supervised interns at for-profit firms, at government agencies, and at universities. The faculty at universities were responsible in some way for students who undertook internships at companies and agencies. Answers vary from one group to another.

By and large, those at for-profit firms saw no difference or only a minor difference, such as a secondary goal of providing experience to the student. Those at agencies identified a dual commitment to accommodating a student’s need for experience and furthering the work of the agency. University faculty saw great distinctions, especially when college credit was involved, including formal establishment of learning goals and a mechanism for awarding a grade, such as the intern keeping a daily journal and preparing a self-assessment of professional growth.

Another distinction involves compensation. Short-term jobs involve salary or wages. Internships may or may not, some being volunteer, with or without provision of expenses associated with the internship, such as travel, meals, and lodging.

An internship, broadly defined, is “...a work experience that complements the student’s academic training, and that provides the student with an introduction to a specific career or field of interest” (Updike and Rivera, 1977). Clearer distinctions between an internship and a short-term job, more in keeping with my sampling of the views of geologists in government agencies and higher education, are drawn by Baker and Millsaps (1991): the internship has an intentional learning agenda and a pre-set balance between learning goals and the specific work of the organization. According to these writers, “an internship is any carefully monitored work or service experience in which an individual has intentional learning goals and reflects actively on what is learned throughout the experience.” The learning goals should be in writing, agreed to in advance by the supervisor at the internship site and by the faculty.
member responsible for awarding college credit.

The term 'internship' has many connotations. A careful definition for a specific usage is needed to avoid misunderstandings. Referring to the situation in journalism and mass communication, Bruce Garrison (1992) writes that "there must be a nationwide effort to standardize internship administration and experiences," which would also lead to a more restrictive definition. To categorize internship types, Garrison used the three criteria of whether credit is given (yes or no), the internship is required in the program (yes or no), and whether credit is given for a related activity, such as a seminar (yes or no). One may take exception to inclusion as an internship type of the situation of no credit, no internship required, and no credit for related activity. Counting this "non-internship" type, Garrison recognized six (of nine possible) types of internships in current practice, summarized in Table 1.

<table>
<thead>
<tr>
<th>Model</th>
<th>Credit Given?</th>
<th>Internship Required?</th>
<th>Credit Given for Related Activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>NO</td>
<td>NO</td>
<td>YES, Independent Study</td>
</tr>
<tr>
<td>3</td>
<td>NO</td>
<td>YES</td>
<td>YES, Post-Internship Seminar</td>
</tr>
<tr>
<td>4</td>
<td>YES, A Seminar</td>
<td>NO</td>
<td>DOES NOT APPLY</td>
</tr>
<tr>
<td>5</td>
<td>YES</td>
<td>YES</td>
<td>DOES NOT APPLY</td>
</tr>
<tr>
<td>6</td>
<td>NO</td>
<td>YES</td>
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</table>

Why propose six types? Each type represents a different approach to the challenge of how an internship should relate to a degree-granting academic program. Many faculty doubt that such workplace experiences should receive academic credit. Faculty are also concerned about loss of quality control in the academic program, particularly in internships where grades are awarded at least in part on the basis of evaluation by worksite supervisors. To contend with this, either the internship is not used, not recognized as part of the curriculum, or made part of the curriculum with considerable control by the faculty.

What Exists in Geology?

The type of geological internship considered here is one that involves college credit, a faculty coordinator, an on-site supervisor, a contract establishing work-site characteristics, and reports and analyses by the intern (possibly as a written log) of the job experiences and resultant personal growth. To answer that question, I reviewed college catalogs from 100 programs listed in Claudy (1994). The 100 include at least one program from each state, Puerto Rico, and the District of Columbia. I looked for courses with a number in geology, awarding college credit for an internship in the B.S. program in geology. Only 12 programs of the 100 reviewed awarded formal geology credit for an internship experience. Furthermore, the internship was required in only one program and "strongly recommended" in another. Five other programs offered credit for an optional co-op program through a course number in geology. See Table 2.

Internships are uncommon in the geology curricula of our colleges and universities for at least six reasons. First, we emphasize geology field camp courses. Of the 236 listed field courses/camps (excluding those not primarily geology, and counting only one with the highest number of credits for colleges listing more than one) in Claudy, about two-thirds carry six or more credits, the minimum number expected in AIGP guidelines (AIGP 1991). The field camp course is commonly taken by students in the summer after their third or fourth academic year, a time when many students in other disciplines would be embarking on an internship. Second, as a result of faculty reluctance to award college credit for experiential learning or for work experience, and faculty insistence that credit for internships rely upon evaluation by a regular faculty member involved with the intern, the finances required for establishing and operating an internship program are significant. Such costs involve faculty summer salary, reduced load during the academic year, and travel paid by the university. In addition, the student must bear tuition costs. These are in direct competition for dollars needed for field camp courses. Third, many geology programs have little curricular flexibility to add additional courses (such as credit for an internship). Current programs are caught between the existing requirements for preparation for professional practice (external expectations) and the maximum hours allowed for a major (internal mandates). I doubt that we could find anyone in geology today who would take the position that an internship program is more important than, for example, a strong field-camp course. Fourth, many students intend to enter graduate programs upon graduation. For them, independent research experiences are more valuable as preparation for thesis or dissertation research than an internship. Fifth, career paths of many faculty have gone directly from undergraduate degree to graduate degree to faculty position without significant work experience or development of workplace contacts, or even the appreciation of other work environments. Sixth, faculty are generally evaluated upon teaching and publication, a system that results in a financial disincentive for faculty to expend
effort in developing and maintaining an internship program.

**Alternatives to Internships**

Some programs have optional cooperative education programs with college credit. Of the five in the survey, none is required and each is listed as variable credit. Co-ops differ from internships in that several longer experiences in the workplace generally prolong the time to graduate by at least one year. None of the five colleges with co-op credit also has an internship program.

Undergraduate geology majors can gain valuable work experience through paid summer jobs or through volunteer efforts as field or laboratory assistants or technicians. Faculty members encourage and assist undergraduate students in efforts to obtain such experience, and commonly offer students such experience through their own externally funded research or consulting.

**Comparison between Geography and Geology**

In a national survey of internships and co-op programs in 100 geography programs, Sublett and Mattingly (1995) report that 69 have at least one internship-type course in the undergraduate major, although only five require them. For geology programs the comparable numbers are 17 and 1. College internship programs in geography and geology show no regional concentration, and are present in departments granting bachelors-only, masters, and doctoral levels. Internship programs outnumber co-op programs in each discipline. Most programs, regardless of discipline, offer variable credit. Although credit in many programs is less than 9 semester hours, credit ranges from 1-16 semester hours.

**Questions to ponder before Establishing an Internship Program**

1. When should students undertake the internship? Conventional wisdom suggests scheduling the internship as far into the academic program as possible. This will allow the students to be more attractive to the agency or company. Also, a summer internship, to the extent one can be scheduled without interfering with field camp, minimizes the possibility of prolonging the years in college before graduation. A Fall or Spring semester internship, for example, has the potential of disrupting the sequence of courses.

2. Can your academic department afford an internship program? Summer salary and travel funds to visit internship sites are needed. A reduced load for a faculty member during the academic year is needed to establish links with potential internship sites and sponsors, to assist students in preparing resumes and applications, to negotiate those educational, legal, and financial matters, such as a learning agenda, acceptable terms for liability, salary or living expenses, and other issues.

3. Do you want an optional or a required internship? The former results in uncertain participation and the latter adds hours to the already burgeoning number of required courses for the degree.

If an academic department wants to proceed, I suggest reading Sublett and Mattingly, 1995. You will be reinforced in your efforts by their descriptions of very positive results reported by worksite supervisors at agencies and companies and also by the high regard for the experience by former interns.

**Final Thoughts**

If you already have an infrequently-used, optional, internship program, keep it. If you have a program requiring an internship and are not in a retrenchment mode, keep it. If the climate on your campus is positive, and if you are not
discouraged after pondering the three questions, establish an internship program. If the climate is not positive, continue to encourage students to obtain experience through short-term jobs.

Acknowledgements

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The Legal Side of Internship Programs

by Rochelle K. Kaplan

Do student interns have to be paid? Are they covered by workers' compensation and unemployment benefits plans? Do equal employment opportunity laws apply? All valid questions. And the short answer is that working with interns doesn't present any burdensome legal requirements. For the most part, the laws and standards that apply to full-time employees also apply to interns. In fact, some of the rules are less onerous with interns, such as those regarding unemployment compensation and terminating the relationship.

There is really nothing in the law that should stop any organization from reaping the benefits of an internship program, which may include summer positions and longer stints during the school year. In a survey of 624 firms by the College Placement Council, 35 percent said interns were their best source of new full-time employees. That's because the company gets a chance to test-drive these prospects, evaluating their performance in a real work setting. And interns who have a good experience with your company are more likely to stick around, resulting in fewer costly hiring mistakes.

The benefits of the program must go both ways, however. Your end of the bargain is to train interns and provide practical work experience in their chosen fields. An internship is not to be confused with other part-time, temporary, or summer jobs, where students simply want to earn money. Interns are expected to further their education and they may receive a grade or course credits for the work. In exchange you get more qualified hands on board and a chance to tap into new ideas in your field, since interns often bring the latest in theoretical learning and research to the job.

Preventive Measures

Before you reach out to local schools, it's best to review your legal responsibilities in hiring interns. Here are some common questions employers have about the federal laws and the general requirements of state laws. Be sure to check for any differences in your own state.

Do you have to pay wages to an intern?

Under the Fair Labor Standards Act, you don't have to pay interns who qualify as trainees. Or, you can choose to pay them a stipend, such as a lump sum of $1,000 to $2,000 to apply toward their job expenses and school tuition. With this approach, you can pay them at a rate that would be less than the minimum wage while avoiding the administrative hassle of adding the students to the payroll.

The U.S. Department of Labor (DOL) has outlined six criteria for determining trainee status. Three of them are straightforward: 1) the students cannot displace regular employees; 2) they are not guaranteed a job at the end of the internship (although you may choose to hire them at that point); and 3) both you and the students know that they are not entitled to wages during the internship.

A bit trickier are the criteria regarding training. For one, the interns must receive training from your company, even if it impedes operations by taking time away from work. Two, the training must be similar to that provided by a vocational school—that is, interns must get hands-on experience with equipment and processes used in your industry. And three, the training
must primarily benefit the student, not your company. That means interns must learn work skills and procedures that are transferable to other jobs.

Of course, it's not always practical to limit interns to activities that do not benefit your company in any way. For example, a graphic arts student who's learning to use computer equipment may do some of the marketing department's actual work. Thus, if your company will benefit from the interns' services and you don't want to pay them wages, the safest approach is to locate interns through programs approved by the school. The reason is that several DOL rulings seem to suggest that interns are not employees for pay purposes as long as the internship is part of a school curriculum and the work benefits the students more than the company.

The very premise of an internship is that the training and work relate to the student's course work. Thus, if what you really want to do is hire college students for summer work that is unrelated to their schooling and career goals, then you must pay them at least the minimum wage. Are interns eligible for workers' compensation benefits?

State workers' compensation laws do not distinguish between employees and trainees. In fact, workers' compensation boards often find that interns contribute enough to a company to make them employees for this purpose. When an intern who is not covered by your workers' compensation insurance is deemed to be an employee, the company is responsible for paying his or her medical benefits and wages.

The bottom line: It is wise to cover interns under your workers' compensation policy even though you are not required to do so. Your premiums should not increase by much because the intern will have little effect on your payroll and experience rating, two of the factors on which premiums are based. Meanwhile, the coverage will limit your liability for job injuries since the students cannot sue you for negligence, which carries potentially unlimited damages. If your insurance company is unwilling to provide coverage for unpaid interns, you may be able to obtain a rider to your policy that covers volunteers for a short time.

Are students eligible for unemployment compensation at the end of the internship?

Generally, the answer is no. Unemployment eligibility is based on a person's availability to work, thus excluding students who currently are in school or will return to school after a summer internship. Even if a student has already graduated or takes a leave of absence from school, the results should be the same for summer interns. Most states require a person to work for three months in a calendar year, earning a minimum of wages, before they can file for unemployment benefits.

What's more, most state laws exempt students who work as part of an education-related program. To prove an intern's ineligibility, simply get the school to certify that he or she is participating in a school-sponsored program. On the other hand, if a student you want to hire for the summer is not linked to such a program, ask the student if he or she intends to return to school. If the answer is no, you can prevent any misunderstandings by explaining that the position is just for the summer and that you can't promise regular full-time work when it's over. Be sure to set a date for the student's last day of work.

Termination, too, is less onerous with interns. If you need to discharge a student for poor performance or another reason during the course of the program, you are not obligated to follow your usual termination procedures, such as formally notifying the student, providing severance pay, or holding a grievance hearing. All you need to do is tell the student why and notify the school.

Do equal employment opportunity laws apply to interns?

None of the federal laws such as Title VII of the Civil Rights Act or the Americans with Disabilities Act (ADA) define who qualifies as employees and who does not. What is important is that they prohibit discrimination in recruiting, hiring, and employment practices. Therefore, it seems obvious that you should treat intern candidates the same as all other applicants and base your hiring decisions on their qualifications rather than on gender, race, color, age, national origin, religion, or disability.

A note about the ADA: You should operate on the assumption that its "reasonable accommodation" provision applies to intern candidates. The law doesn't distinguish between full-time, part-time, or temporary employees, and the expected length
of employment is not relevant in determining whether you can accommodate a disabled worker (such as by modifying certain equipment). But keep the big picture in mind. Just because a person is disabled doesn’t automatically mean that he or she needs an accommodation to do the essential functions of the job. Even if he or she does, 80 percent of the accommodations made by employers to date have cost less than $500.

Are you liable if an intern experiences sexual, racial, or ethnic harassment while on the job?

The answer is an unequivocal “yes.” If an intern is harassed at your worksite and you do nothing about it, your company is exposed to the risk of lawsuits. The problem is students may feel powerless when they are harassed, assuming that no one cares or will believe them. They may not even know that harassment is illegal and that they can complain about it without jeopardizing their positions.

Therefore, take time to advise new interns of your guidelines regarding appropriate workplace behavior and of your company’s harassment policy and complaint procedures. To fend off any problems, let your regular employees know that the policy applies to interns as well as to themselves and that you expect them to treat your interns appropriately.

In fact, the same can be said for all the legal issues that apply to interns—they are generally entitled to the same treatment as employees. Your providing them with a good experience will pay off handomely for all involved in both the short and long runs.

Characteristics of an Unpaid Internship

The following points generally hold true when student interns do not have to be paid the minimum wage:

☐ The work performed by the intern is directly related to his or her educational course work.

☐ The intern will receive course credits for his or her work or is required to complete the work in order to graduate.

☐ The intern must prepare a report of his or her work experience and submit it to a faculty supervisor.

☐ You have a letter or other written documentation from the intern’s school confirming that the internship has been approved and educationally relevant.

☐ Learning objectives are clearly identified.

☐ The intern spends no more than 50 percent of his or her time performing work that’s also done by your employees.

☐ Your company will teach the intern a skill, a process, how to use equipment, or about the business.

☐ The intern is supervised by one of your staff members.

☐ You have not guaranteed a job to the intern upon completion of the internship or graduation.


NOTE: This article appeared under the title “Hiring Student Interns” in Small Business Reports, May 1994, and is reprinted by permission of the publisher, American Management Association, New York. All rights reserved.

AIPG 1997 Honors and Awards

Ben H. Parker Memorial Medal

Marcus E. Milling, Sr.

Martin Van Couvering Memorial Award

Robert K. Merrill

John T. Galey, Sr. Memorial Public Service Award

James E. Slosson

Honorary Membership

Adolf U. Honkala

Ernest K. Lehmann

Outstanding Achievement Award

John McPhee

Presidential Certificates of Merit

David M. Abbott, Jr.

Robert N. Braunstein

Curtis J. Coe

Barbara H. Murphy

James D. Shotwell

Gary E. van Guilder

Philmont Scout Ranch UPDATE

Volunteer geologists, mineral or reclamation specialist, earth-science teachers, etc. are again being recruited to share a week or more of your professional expertise with America’s youth at the Philmont Scout Ranch, Cimarron, New Mexico.

Warm bedrolls, rain gear, the spirit of adventure and a desire to rap informally with teenagers around a campfire or on the trail are all that is needed.

For further information call (505) 376-2281.
CALL FOR NEW MEMBERS

Jon Price, AIPG President, and Larry Weber, Chair of the AIPG Membership Development Committee

To further AIPG's purposes of professionalism in geology and advocacy for geologists, please help recruit into AIPG those geologists who will be willing to commit to the profession. We call upon each AIPG member to identify and encourage appropriate geologists to join the organization.

On the basis of an overwhelming majority of CPGs voting for change, the AIPG bylaws have been changed to create new categories of membership. This will more easily allow us to attract into AIPG those geologists who are likely to get involved in political advocacy at various levels of government, in continuing education (such as field trips, short courses, symposia, and technical meetings), and in other aspects of professionalism and professional practice (such as issues of ethics and business practice). Although more states are adopting registration, and therefore the need for the CPG designation may be diminishing in the eyes of some, there continue to be enormous local, state, national, and international pressures that affect our profession. AIPG is evolving to respond to these pressures and issues.

We now have three categories of membership: Certified Professional Geologist (CPG), with a return to the higher educational and experience requirements of earlier years; Registered Member, for geologists who are registered in individual states but do not see the need for CPG; and Member, for geologists who either don't yet meet the experience requirements for CPG or currently do not see the need for CPG status for themselves.

We have streamlined the processing of applications for CPG, and the process for becoming a Registered Member or Member will be even quicker than that for CPG.

AIPG needs as members, geologists who are willing to work for the profession. That does not mean that we necessarily need every state-registered geologist to join AIPG. Nor do we expect every degreeed geologist who qualifies for membership to become a Member. What we need are those 10 or 15% of the profession who are likely to get involved in political advocacy at various levels of government, in continuing education, and in other aspects of professionalism and professional practice. We also want to help our younger colleagues, who have not gained the experience needed for CPG, to learn more about competence, integrity, and ethics, the three aspects of professionalism that appear on AIPG's logo.

As an example, there are about 700 geologists in Nevada (1,100 members of the Geological Society of Nevada, many of whom do not currently live or work in Nevada). Of these, there are about 70 AIPG members, a good proportion of whom, but not all, are professionally active. But there are probably 50 to 100 geologists, who are not AIPG members but have demonstrated their commitment to the profession in various capacities, whom we would like to see active with AIPG. Also working in Nevada are a number of new graduates who could benefit greatly from AIPG membership. With the new category of "Member" we can attract these individuals as full participants in AIPG Section activities.

There have to be good reasons for geologists to want to join AIPG as a national organization, and there are many, even for geologists who plan to work their entire careers within the borders of one state.

AIPG provides a means for easy transfer of information on the successes of individual Sections. So often a good idea from one Section is picked up by another, either through discussions at the annual meetings, through communications from Headquarters, through exchange of Section newsletters, or through publication in The Professional Geologist. AIPG also keeps us current on recipro-
ty, licensing, registration, and related issues of professional practice in all the states and throughout the world.

AIPG assists Sections with their political issues at the state and local levels in numerous ways, such as the recently published Government Affairs Manual for Sections and the exchange of ideas on how other Sections have successfully handled difficult situations.

In many states, AIPG has been the organization to take the lead in passage of bills for registration of geologists. The new category of Registered Member will facilitate an AIPG Section’s becoming the primary lobbying group for registered or licensed geologists in that state. AIPG’s status as a 501(c)(6), non-profit organization, with the capability to lobby, allows the Sections to be more active politically than most other groups. In some states, however, where the lobbying effort needs to involve a broader group than the AIPG membership, it makes sense for AIPG to actively participate in other groups that form.

AIPG pays close attention to political and social issues affecting the profession at the national and international levels. AIPG’s efforts at comity or reciprocity among states with registration and between countries place us at the lead of member organizations. The meeting that our National and International Affairs Committee recently held in Washington, D.C., to which all Section Presidents or their representatives and members of the State Affairs Committee were invited, demonstrated how effective AIPG can be on the national political scene, lobbying for programs important to geologists.

Our commitment to ethical standards places us at the forefront of ongoing debates, as demonstrated by our significant participation this summer in a major conference on Ethics in the Geosciences sponsored by the Geological Society of America, American Association of Petroleum Geologists, U.S. Geological Survey, National Science Foundation, and AIPG.

Whether someone comes into AIPG as a Member, Registered Member, or CPG is not as important, in our opinion, as getting the best people involved in advocacy for geology and geologists. Once involved with AIPG, the added benefits of Certification by the Institute will likely become apparent.

AIPG Headquarters is sending each Member, along with the October issue of The Professional Geologist, a copy of the revised, full application. The Membership Development Committee is working on plans for a major membership campaign, to be started soon and completed in the year 2000. Please feel free to send AIPG Headquarters (7828 Vance Drive, Suite 103, Arvada, CO 80003-2124; fax 303-431-0831; e-mail aipg@aipg.com) any ideas that you have for the membership drive, such as incentives that would attract individuals or Sections to participate.

There are about 100,000 geologists in the United States. We should recruit into AIPG the 10,000 or so who are likely to get involved in activities on behalf of the profession, and we should encourage new graduates to get involved. We currently have about 5,000 AIPG members. It would make a lot of sense for each AIPG member to recruit one, two, or three geologists, whom we know would participate in AIPG activities. Thank you for your personal help.

### Executive Committee and Headquarters Activity

Members of the Executive Committee and/or of the Headquarters staff will participate in the following meetings, which provide opportunities for AIPG Memers to exchange ideas with the Executive Committee and staff. We also welcome invitations from AIPG Sections to discuss AIPG programs and goals. If your Section would like to meet with members of the Executive Committee or Headquarters staff, please contact Headquarters to schedule a convenient time. Thank you.

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<td>AIPG Oklahoma Section Annual Meeting</td>
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<td>September 16</td>
<td>Denver, Colorado, Section Meeting</td>
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<td>September 26-28</td>
<td>AIPG Nevada Section field trip</td>
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<td>October 6-11</td>
<td>Houston, Texas, AIPG Annual Meeting, including Executive Comm. meetings October 8 and 10th</td>
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<td>October 18-23</td>
<td>Salt Lake City, Utah, GSA Annual Meeting, including meetings of the Government Affairs Program Advisory Committee and the Member Society Council of AGI</td>
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<td>October 25</td>
<td>Madison, Wisconsin, National Association of State Boards of Geology annual meeting</td>
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<td>December 18</td>
<td>Reno, AIPG Nevada Section annual meeting on mineral exploration outlook</td>
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Is the United Nations Really on a U.S. Land Grab?

Submitted by John J. Dragonetti, CPG-2779

The debate over federal public lands is an ongoing aspect of the American political landscape, particularly when it comes to the western United States where the title to over 50 per cent of the land area of the eleven western states is held by the federal government.

In the wake of recent controversies over the Crown Butte mine in Montana and the creation of the Grand Staircase-Escalante National Monument in Utah, western lawmakers introduced a number of bills to limit the President’s ability to designate national monuments and otherwise operate with a free hand on federal land issues. Now, Congress is addressing concerns over infringement on states and property owners rights by an even larger government entity - the United Nations. Legislation has been introduced that is designed to grant Congress the power to limit US participation in the United Nations World Heritage and Biosphere Reserve programs.

House Resources Committee Chairman Don Young (R-AK), along with 166 cosponsors, has introduced H.R. 901, entitled the “American Land Sovereignty Protection Act,” which amends the National Historic Preservation Act Amendments of 1980 and explicitly limits the Secretary of the Interior’s capacity to nominate federal lands for inclusion on the World Heritage List. In order to nominate potential sites, the Secretary would have to demonstrate that no commercially viable uses would be adversely affected, and perhaps more significantly, assess and report to Congress on the lands’ natural resources. The Secretary would then have to gain approval from Congress before submitting a World Heritage site nomination to the United Nations Educational, Scientific, and Cultural Organization (UNESCO). In addition, no federal official would have the power to nominate a US site as a UN Biosphere Reserve. If enacted, H.R. 901 would cancel 67 sites in the United States already identified by UNESCO as potential cultural or natural heritage locations. Senate Energy and Natural Resources Committee Chairman Frank Murkowski (R-AK) has introduced similar legislation, S. 691, entitled the “Public Land Management Participation Act of 1997.”

According to supporters of the bill, H.R. 901 is necessary in order to preserve the states’ sovereignty with respect to federal land managers and to protect private property rights. The opposition to H.R. 901 cites legal authority for US participation in the World Heritage and Biosphere Reserves programs and emphasizes their importance as a framework for international conservation efforts and scientific cooperation. According to the supporters of these UNESCO programs, the UN does not and will not have any authority over US federal land management decisions.

The World Heritage program dates back to 1959 when UNESCO launched an international campaign to save ancient Egyptian temples slated to be submerged beneath the waters of the valley behind Egypt’s Aswan High Dam. The United Nations effort succeeded in having the Abu Simbel and Philae temples dismantled, moved to dry ground and reassembled. The program has grown over the years with the objective of conserving the world’s natural and scenic areas and historic sites. During the 1960s, UNESCO created the Man and the Biosphere (MAB) program designed to preserve diversity of plants, animals, and micro-organisms. Within this program in the 1970s, the concept of a “Biosphere Reserve” was introduced to identify special sites to balance the apparently conflicting goals of conservation and development. More recently, the 1992 United Nations’ Conference in Rio de Janeiro brought attention to issues such as biological diversity, climate change, and desertification, all of which fit into what is now being termed sustainable development.

A House Resources Committee hearing on H.R. 901 in early June played to a standing room only crowd largely the consequence of the substantial showing by the Alliance for America organization. The extensive witness list was separated into four panels consisting of state officials and political representatives, academics, federal executives, public interest spokesmen, and representatives from conservation and environmental groups. Each of the witnesses provided testimony and responded to questions from committee members consistent with the philosophy of their group affiliation.

The Resources Committee held a markup, or voting, session on H.R. 901 in late June. Committee Chairman Don Young (R-AK) opened the session by declaring that Congress, local government and the American people have been excluded from the Biosphere Reserves and World Heritage des-
ignation process. Battle lines were immediately drawn between the Republican supporters of the bill and the Democratic opposition.

Heated exchanges took place between bill advocates, led by Chairman Young, Barbara Cubin (R-WY), and Helen Chenoweth (R-ID), and dissenting senators Edward Markey (D-MA) and Bruce Vento (D-MN).

In response to earlier testimony by an Arizona rancher, Representative Chenoweth offered an amendment to include the UN Ramsar Convention in the list of programs covered by H.R. 901. The Ramsar treaty provides a “framework for international cooperation for the conservation and wise use of wetlands and their resources.” This amendment immediately caused one of the few Democratic supporters of the bill, Neil Abercrombie (D-HI), to withdraw his backing because he was unacquainted with the Ramsar wetlands definition. Representative Markey introduced a touch of mockery to the proceedings by suggesting that it was fitting that the supporters of the bill were acting on the 50th anniversary of the Roswell incident which formed the basis of many “convoled conspiracy theories.” He also stated that the belief that the UN was taking over the United States through the National Park Service was the product of “inexplicably paranoid conspiracy theorists.” In spite of the comedic and dynamic efforts of the Democratic contingent, there was an overwhelming outcome in favor of reporting the bill out of committee by a roll call vote of 26 to 9. The measure now goes to the full House for possible action. Considering the large number of cosponsors, its prospects for passage seem good. In the Senate, meanwhile, staff indicate that Senator Murkowski is contemplating a hearing on S. 691 after the August recess.

The issue has broad implications in the context of the separation of powers, for it is another example of legislative assertiveness into the presidential province. It is therefore not surprising that all indications point to a Presidential veto.

Regardless of the outcome, the debate will continue over who controls federal lands and who determines to what uses they are committed. The issue concerns the geological community, for the decisions could have profound effects on geoscientists involved in research, extraction, and other activities on federal lands.

The Government Affairs Column is a bimonthly feature written by John J. Dragonetti who is Senior Advisor to the American Geological Institute’s Government Affairs Program. The author is indebted to AGI intern Stephanie Barrett who provided much of the information contained in this article.
Registration and Multistate Geologic Practice—Wyoming’s New Rules

Last month’s column contained the example of my work several years ago on Wyoming coal properties where the work was mostly done in Denver but involved expert testimony in California. Between writing that piece and this, I received notice that Wyoming recently amended its licensing bill so that all geologists practicing before the public in Wyoming must be registered, including professors and geologists those who work for government.¹ I talked with Gary Glass, CPG-2503 and Wyoming State Geologist, about Wyoming’s new bill in the context of last month’s example and some the questions I posed. On the question of when does practice occur in Wyoming, the answer is physical presence in Wyoming and actual time spent doing geology. On the issue of reciprocity, Wyoming grants a 6-month lifetime reciprocity with any geologist licensed in another state.² You are required to give notice to Wyoming that you wish reciprocity in advance, but that’s the basic requirement. Also, the 6-months is for total use. For example, if you went to Wyoming to testify regarding a drilling application and your testimony took 2 hours, you would have used 2 hours of your 6-month total. Glass remarked that he expects that the chief enforcers of the new bill will be attorneys representing the other side in hearings before various state and local agencies, who will object to the testimony of geologists not holding a Wyoming license.

In summary then, this discussion was prompted by one member’s frustration at the time and expense of registering to practice in a state in which only limited practice was contemplated. Wyoming has provided an easy and free method of resolving this issue for those who have a license and whose work in Wyoming will indeed be limited. It would be nice if other states would follow Wyoming’s lead in reciprocity; it might foster greater compliance.

Footnotes

1. For those of you interested in obtaining a Wyoming license, a new grandfather period from July 1, 1997 to June 30, 1998, was established. Those with appropriate education and experience can obtain a Wyoming license without taking the ASBOG test. For more information contact the Wyoming Board of Professional Geologists, P.O. Box 3068, Laramie, WY 82071, telephone (307) 766-2490; Fax (307) 766-2713, e-mail <wbpbg@wgsa.uwyo.edu>.

2. Reciprocity is granted only to those with a government-issued license, not those who are certified by the distinguishing fact in the Wyoming statute. While this is a distinguishing fact of law, whether it means anything in practice is a different question which Glass readily acknowledges.

Conflicts of Interest: Reporting Twice on the Same Property

Monica E. Gowan, CPG-9958, submitted the following situation and questions. “This past winter I was hired by a realtor for ‘Smith’ to evaluate coastal erosion had on a piece of island property. Smith had an option to purchase a narrow, triangular-shaped lot on the island’s peninsula, but were concerned that shoreline setbacks might make the available building area too small for their desires (shoreline setbacks are measured from the top of the bluff if the bluff is eroding, otherwise from the ‘Ordinary High Water Mark’).”

“I completed the work and submitted it to Smith’s realtor in March, including a copy for the County Planning Department. I haven’t heard from Smith since.

“This month (July), I receive a call from ‘Jones’ who says Smith dropped his interest in the property and Jones is now negotiating to purchase. Jones is completing his due diligence and wants to see a copy of my report. I directed him to the County to review the documents. It turns out Smith never submitted the report to the County. Jones calls me back, asking if I will send him the report. I say it’s not in the public domain, it’s proprietary, and so I cannot release the report without the permission of Smith. Jones contacts Smith’s realtor, and finds Smith will not release the report to Jones. The price of the property dropped since last March and now Smith is interested in buying again. But now they are #2 behind Jones (Smith must have given up his option, although I don’t know this as a fact).

“Jones calls me again, this time asking if he can hire me to ‘tell him whether he has enough room to build.’ I said possibly.

“I consulted the AIPG Code of Ethics and become concerned when I read Rule 3.1.3 (A Member employed or retained by one employer or client shall not accept, without that employer’s or client’s written consent, an engagement by another if the interests of the two are in any manner conflicting.) I ponder whether the Rule is moot for this situation since I am no longer retained by Smith. I consulted with my father, a Minnesota State District Court judge, and my sister, an Assistant US Attorney. Neither feels there is a conflict of interest legally (e.g., the knowledge I have regarding the condition of the property can be obtained by any trained eye just for the looking), but notes there might be an appearance of conflict of interest.
"So, here I am, wondering: (a) will the simple appearance of a conflict land me in legal trouble, if I am retained by Jones, and (b) would this still be considered a conflict under the AIPG Code?"

McGowan correctly recognized that the report she did for Smith is Smith's private property, not hers, unless it becomes a public record by being filed with the County Planning Department. However, her engagement by Smith has ended and there appears no reason to prevent her working for Jones. The property seller is on the other side of the transaction. And the ultimate question, can the buyer build the desired house, may be quite different depending on the size of house selected, something Gowan is not opining on. She can do a new report for Jones so long as that report contains no confidential information obtained from Smith (a situation more common in natural resource deals). This includes the need to re-examine the property and re-take any required measurements; these cannot come from the report done for Smith.

Gowan also correctly notes that her choices regarding what to do in this case have an "optical" component or the appearance of a conflict of interest even in cases where no conflict exists. (I make no comments on the legality of the situation, which is a different issue.) The optics test is this, would you care if the facts were prominently published in the local paper? While this is not the only test of ethical behavior, it is a good one. I believe that the appearance issue is heightened by the brief period of time between submission of the report to Smith and the request by Jones and by Smith's renewed interest in the property.

Slight changes in the situation Gowan presented can lead to different answers and some of you may have different ones from what I've presented. Would your answer change if Smith had not renewed interest in the property? Let me know what you think.

American Geophysical Union Joins AGI

The American Geological Institute is pleased to welcome the American Geophysical Union (AGU) as its 30th member society. The re-affiliation of AGU represents a tremendous opportunity for expanded cooperation within the geoscience community. AGU and AGI are already collaborating in a variety of areas, including human resource surveys, the Sloan careers project, and government affairs. Re-affiliation is expected to strengthen these ties and foster new ones in other areas. Since 1992, the number of earth-science organizations that have joined AGI has grown from 19 to the present 30, an increase of more than 50 percent in five years.

The American Geophysical Union is an international scientific society with more than 35,000 members in over 115 countries. Its membership includes researchers, teachers, science administrators, and students. The society's disciplinary sections include Atmospheric Sciences, Geodesy, Geomagnetism and Paleomagnetism, Hydrology, Ocean Sciences, Planetary Geology, Seismology, Space Physics and Aeronomy, Tectonophysics, and Volcanology, Geochemistry, and Petrology.

AGU officers for 1997 are: President Sean C. Solomon, Past President Marcia Neugebauer, President-Elect John A. Knauss, International Secretary Robin Brett, and General Secretary Christopher A. Harrison. AGU's Executive Director is A. F. Milhous Jr.

More information on AGU and its meetings, journals, and activities is available on the World Wide Web home page: http://www.agu.org

Study shows Canadian Salaried Mine Personnel Earn Less than U.S. Counterparts

Canadian mine salaried personnel earn about 5% to 15% less than their counterparts at U.S. mines after currency exchange adjustment, according to recent surveys by Western Mine Engineering, Inc. This conclusion is reached by comparison of salary survey data for 18 management, technical, and administrative job titles from parallel 1997 surveys of Canadian and U.S. mines.

The Canadian information comes from a survey report released recently, while the U.S. information is from a report released earlier this year. "The bias is consistent across virtually all job titles," according to Otto Schumacher, president of Western Mine Engineering. "Despite the relative vigor of the Canadian mining industry, the Canadian companies pay their personnel less than the American companies." As an example, a chief engineer at a Canadian mine earns on average $76,100 Canadian or $55,400 U.S., while his or her counterpart in the U.S. earns $87,400 Canadian or $58,300 U.S.

In addition to salaries, the surveys also include wages, benefits, and bonus plans for hourly workers. The Canadian survey report contains information about some very innovative bonus systems recently implemented at Canadian mines. Bonus plan details showing how companies reward workers for performance in a variety of areas are included. Some of the more creative plans include environmental stewardship, ore grades, and profit, in addition to the more traditional production-based criteria. One company even includes currency exchange rates in its bonus calculation.

The full Canadian report (US$125 + s/h) can be obtained from Western Mine Engineering, Inc. at 222 W. Mission #218, Spokane, WA 99201; [509] 328-8023; email western.mine@westernmine.com. Also available are separate compensation reports for U.S. coal and metal and industrial mineral mines (US$250 each) and Latin American mines.
CONSULTANTS’ COLUMN

Fred L. Fox, CPG-1273

Certainly you’ve noticed that most of our breed now work in or near the environmental field. Ours, once a discipline dealing with mostly rocks (and then water as it became a popular item) now includes nasty things as DNAPLs and similar distinctly unearthly substances. We’ve even become sufficiently mathematically adept to substitute statistics for what used to be known as “field work.” Ah, progress.

One thing that’s remained constant, however, is the geologists’ proclivity for being at the wrong end of the professional food/money chain. Seems that the environmental field, while being founded squarely on our very own terrain (by definition), has been polluted by scientists of other persuasions (soil, air, biology, name the rest yourselves), even environmental scientists, whatever they may be, and engineers. Our kind still find ourselves working under the thumb of someone less-qualified higher up the food/money chain. Time was when we suffered only at the hands of mining engineers, production types, and of course the ubiquitous civil engineer who will continue to block our progress toward registration in at least two eastern states. Now we suffer at the hands of even (aargh) environmentalists. Well, I guess that’s some form of progress.

Worse yet, the environmental field is now being claimed not by experts, but by attorneys and insurance companies. At least that’s where the money circulates. Almost every one of my last twenty projects has had a lawyer at or near the helm, and insurance money is both at stake and being spent in large amounts (but not on geological expertise). Lawyers are making the big bucks at this point, and there’s no end in sight.

Do you realize that geologists are still trying to justify our position as professionals, even after all these years (50 that I know of)? And to whom? It’s so bad that there’s been serious talk of deleting the USGS, and at least one very environmentally-sensitive state was or is in danger of losing its state survey. Another had its long-standing geological registration threatened at the same time that others are still clawing desperately toward that coveted(?) goal. Think about that for a minute. Then think about why. Is it possible that we don’t have a socially (or even scientifically) significant identity? Lord knows we’ve sacrificed our professional ID at the altar of employment, in which effort we’ve failed (I just saw an ad for a full-time geological position— not entry-level—for $11 and change per hour!). And until we identify who we are and what we do, we will continue to lose ground until even our own terra firma, the very forum in which we are supposed to rule, will be out of our reach.

We have in AIPG an organization that, if it succeeds at nothing else, has to succeed at unifying geologists at a visibly professional level. The only way it can do so is with the active support of qualified membership. Numbers are only part of the story. Quality, not quantity, rules. And nothing will happen until we identify ourselves and SHOW that geologists really have a handle on this Earth we all live on. If we can’t honestly do that, then we deserve what we’re getting. Fax me: (520) 742-0130.

Status of Geologists’ Regulation Bills

The following status reports were obtained July 22, 1997.

KANSAS: Kansas Bill 2490 has been passed and signed by the Governor. The “grandfathering” period closes July 1, 2000.

MISSISSIPPI: House Bill 953 has been passed and signed by the Governor. It was effective July 1, with “grandfathering” to close December 31, 1998.

NEBRASKA: Legislative Bill 700 has been held over until the next Legislative session. The Bill Status telephone numbers are (800) 742-7456 for In-state, and (402) 471-2709 for Out-of-state. Between sessions it is (402) 471-2271.

NEVADA: Assembly Bill 531, the Professional geologist definition act, has been passed and awaits the Governor’s signature.

NEW MEXICO: House Bill 474 has been tabled, its sponsor likely will reintroduce it in the next session. The current session adjournment was March 22. The Bill Status telephone number is (505) 886-4600 for both houses, both during and between sessions.

TEXAS: House Bill 3447 failed on a point of order, making Senate Bill 496 moot. The Geologists’ Task Force shepherding the effort is studying options for future action.

WYOMING: Senate Enrolled Act 73, changing the original act from “title” to “practice”, has been enacted. The "grandfathering" period closes June 30, 1998.

IN SUMMARY: Kansas, Mississippi, Nevada and Wyoming have new regulation laws. The Nebraska, New Mexico, Texas and Utah bills are dead for this session, but may be revived in the next legislative session.
Dear Editor,

Nevada Assembly Bill AB531, the professional geologists definition act, was passed on July 6, 1997 and awaits the governor’s signature. This bill is the result of many years of negotiation between the state’s economic geologists, engineering geologists and the Nevada State Board of Professional Engineers. It is the first reference in Nevada law to the science of geology. It also provides that the director of the Nevada Bureau of Mines and Geology be a professional geologist. This was not the case in the past. The current director is Jon Price, our current AIPG President.

Like all mediation agreements, this bill is not perfect. It does not go far enough for some engineering geologists who wish a registration board for geologists, and it goes too far for certain engineers who do not consider geologists professionals.

It should be noted that certification by AIPG conforms to the standards set by AB531 and this may be a tool in increasing local membership in AIPG. A copy of the bill is appended.

Kelvin J. Buchanan, CPG-6058

Assembly Bill No. 531-Assemblyman Sandoval

CHAPTER...

AN ACT relating to geology; defining “professional geologist” and “science of geology”, requiring that the director of the bureau of mines and geology be a professional geologist with expertise in the science of geology; and providing other matters properly relating thereto.

THE PEOPLE OF THE STATE OF NEVADA, REPRESENTED IN SENATE AND ASSEMBLY, DO ENACT AS FOLLOWS:

Section 1 Chapter 514 of NRS is hereby amended by adding thereto the provisions set forth as sections 2, 3 and 4 of this act.

Sec. 2 As used in this chapter, unless the context otherwise requires, the words and terms defined in sections 3 and 4 of this act have the meaning ascribed to them in those sections.

Sec. 3 “Professional geologist” means a person who:
1. Possesses a baccalaureate or higher degree from an accredited college or university with at least 30 semester hours or 45 quarter hours of course work in the science of geology and has at least 5 years of experience in the science of geology, which may include no more than 2 years of postgraduate course work in the science of geology;
2. Has at least 12 years of experience in the science of geology, at least 3 years of which must have been completed under the supervision of a professional geologist; or
3. Is currently licensed or certified as a professional geologist:
   (a) In another state; or
   (b) By a national nonprofit geological organization with members in at least 10 states who are licensed or certified, if the requirements for his current licensure or certification included requirements at least equal to those set forth in either subsection 1 or 2.

Sec. 4 “Science of geology” means the:
1. General study of the Earth, including its origin, processes and history;
2. Collection and investigation of specimens of the constituent rocks, minerals, fossils, solids, mineralizing fluids, gasses and other materials of the Earth that are located from the center of the core of the Earth to the surface of the earth; and
3. Application of the knowledge set forth in subsections 1 and 2 for the benefit of the general public and the general welfare of this state.

Sec. 5 NRS 514.030 is hereby amended to read as follows:

514.030. The board of regents of the University of Nevada shall appoint as director a competent scientist or engineer, to be known as the director of the bureau of mines and geology, who must be a [graduate];
   (a) Graduate of a recognized college or university with a degree in some branch of earth science or mineral engineering [, to be known as the director of the bureau of mines and geology.]; and
   (b) Professional geologist with expertise in the science of geology.

2. Upon the director’s nomination, the board of regents of the University of Nevada shall employ such assistants and employees as the board deems necessary.
3. The board of regents of the University of Nevada may also determine the compensation of all persons employed by the bureau of mines and geology and may remove them at will.
Wyoming Establishes True “Practice Act”
For Professional Geologists

The 1997 Wyoming Legislature passed Senate Enrolled Act No. 73 (Chapter 170) which amended the Wyoming Geologists Practice Act (W.S. §33-41-101 through W.S. §33-41-121). This act changes the original act from simply a title act to a practice act as well. The new statutes now require the licensure of anyone wishing to practice geology before the public. “Practice before the public” is defined as the performance of geological services or work including consultation, investigation, evaluation, planning, preparation of geologic reports and maps, the inspection of geological work, and the responsible supervision of geological services or work, the performance of which is relevant to public welfare or the safeguard of life, health, property, and the environment, unless exempted under the act.

The minimum requirements for licensure as a professional geologist have not changed:

Education: A bachelor’s degree in geology or an associated science with a minimum of 30 semester hours of 45 quarter hours in geology course work; and

Experience: At least 4 years of active professional experience of a character acceptable to the Board.

During the first year following the effective date of these new statutes (July 1, 1997, through June 30, 1998), a grandfather clause allows geologists who meet the minimum statutory requirements noted above, to apply for licensure without taking any examinations. The grandfather clause will also allow geologists who meets the statutory requirement for education but lack the required experience, to apply for certification as geologists-in-training without an examination.

Please contact the Board office for further information; WY Board of Professional Geologists, P.O. Box 3008, Laramie, WY 82071-3008, (307) 766-2490, e-mail: wbrpg@wsgs.uwyo.edu

Applications for the grandfather period will be available on or before June 1, 1997. Individuals wishing to receive applications for licensure during the grandfather period, should send their names, mailing addresses, and phone numbers to the Board address shown above.

MEMBERS IN THE NEWS

Oil and Gas Commission
Supervisor Steps Down after 37 Years

Governor Jim Geringer announced that Don Basko, CPG-1356, the Supervisor of the Wyoming Oil and Gas Commission, retired June 30 after serving more than 37 years with the Commission. Basko directed the Commission for the past 28 years.

As Supervisor of the Commission, Basko is responsible for directing the regulatory authority of all oil and gas drilling and production in the State of Wyoming.

“It is extraordinary for one individual to head an organization for 28 years,” Geringer said. “Especially when you consider that the supervisor serves in an at-will capacity. Don has demonstrated unprecedented expertise in oil and gas issues and is recognized as one of the foremost authorities in the nation. He will be missed.”

When retired Basko will have served under seven governors including Governors Hickey, Gage, Hansen, Hathaway, Herschler, Sullivan and Geringer.

Basko is the only state employee to have a State building named after him while actively employed by the State of Wyoming. The Basko building is located in Casper and was built in 1983.

“Certainly I leave with mixed emotions,” Basko said. “I have always enjoyed what I do. I will miss the Commission but look forward to traveling and playing golf.”

Basko has overseen tremendous changes in oil and gas production since assuming management of the Commission. Production of natural gas has increased by more than six-fold in 36 years—from 181 billion cubic feet of gas in 1960 to over a trillion cubic feet in 1996.

Basko predicted that the future of natural gas production will continue to be bright as long as the federal regulatory climate doesn’t become overly restrictive.

“I think the gas business has a huge potential because of the vast reserves we have in Wyoming,” Basko said. “If BLM allows access to public lands, I see no reason why it shouldn’t continue.”

Basko will assume duties as an advisor and special projects coordinator to the commission during the transition period following his retirement.

Carol W. Bowers, CPG-7689, has joined the Geo-Institute of the American Society of Civil Engineers, Reston, Virginia, as technical program manager. She was previously Manager, Herndon, Virginia office of Environmental Science & Engineering, Inc.

Craig E. Crowder, CPG-9167, to senior project manager, CH2M Hill, Paducah, Kentucky. Previously project manager/senior hydrogeologist, CDM Federal Programs, Paducah.

John J. Dragonetti, CPG-2779, receives the I.C. White Memorial Award for his long-term support of the missions, goals and geological research of
MEMBERS IN THE NEWS (continued)

the state geological surveys of the Appalachian Basin.

James M. King, CPG-5012, co-founded AVANT Group, Inc., an environmental consulting firm in Fort Wayne, Indiana, in February 1997. Jim was formerly the branch manager of GAI Consultants, Inc., in Fort Wayne.

Robert Lamonica, CPG-5149, named Executive Vice President and Chief Operating Officer of Leggette, Brashears & Graham, Inc. In his new position, Mr. Lamonica will be responsible for corporate management and oversight for LBG's 11 offices nationwide.

James M. King, CPG-5012

Dale Nations, CPG-6364, wrote the second edition of *Geology of Arizona* with Edmund Stump. The book includes a discussion of basic geologic principles and their application to the interpretation of rocks and landscapes of Arizona. It also includes stratigraphic correlation diagrams, tectonic maps, isopachous maps, paleogeographic maps, and a folded copy of the *Geologic Map of Arizona*, published by the Arizona Geological Survey as Map 26. The 260-page softcover book may be purchased from Kendall/Hunt Publishing Co., 4040 Westmark Dr., Dubuque, IA 52002 for $36.95 plus postage. Include the ISBN number (0-7872-2525-8) with your order.

Lois K. Ongley, CPG-5007, assistant professor of geology at Bates College, has been honored with the 1997 Kroepsch Award for Excellence in Teaching. The

two-part award includes a $1,000 prize and a $1,500 discretionary fund to support Ongley's teaching.

Karl A. Riggs, CPG-2740, has been appointed International Man of the Year 1996/1997 by the International Biographical Centre, Cambridge, England.

Karl A. Riggs, CPG-2740

Steve Robertson, CPG-9232, has joined Northern Environmental Technologies, Inc. as Senior Hydrogeologist to its St. Paul office. His experience will be applied in wellhead protection, ground-water supply exploration and development, ground water/surface water interactions, contaminated site cleanup, and landfill investigation, monitoring, and treatment.

Steve Robertson, CPG-9232

N. Thomas Sheahan, CPG-2481, has been appointed a vice president and officer of Dames & Moore, a global professional services company of the Dames & Moore Group. The appointment recognizes outstanding professional achievement. Sheahan has over 30 years of experience in hydrogeology and water resources development, and is based in the company's Ontario, California office.

John Vecchioli, CPG-1614, U.S. Geological Survey, Tallahassee, Florida, received the Distinguished Service Award of the U.S. Department of the Interior. This highest honor of the Department of Interior was granted to him for his outstanding contributions to the ground-water hydrology programs of the U.S. Geological Survey.

George B. Vockroth, CPG-5037, has been elected President of the Mississippi Geological Society for 1997-98. He resides in Jackson, Mississippi where he is the owner of Vantage Oil Company. He is a member of AAPG, SIPES, AIPG, SPWLA, SEG, New Orleans Geological Society, Desk and Derrick Club of Jackson, American Association of Petroleum Landmen and Society of Petroleum Engineers.

David A. Wiley, CPG-7086, named Senior Associate by Leggette Brashears & Graham, Inc. (LBG) in its Tampa, Florida office. Mr. Wiley's experience with LBG encompasses all phases of project management, including design, operation and analyses of aquifer tests; safe yield analyses for groundwater withdrawals of major public-supply well fields; and computer model development.

Robert W. Wilhelm, II, CPG-9949, is now Senior Project Manager of Sanborn, Head & Associates, Inc., a professional geoenvironmental engineering firm located in Canton, Ohio. Mr. Wilhelm is an Ohio Certified Professional and specializes in hazardous and solid waste site characterization, soil and groundwater remediation, and regulatory and litigation support. He is responsible for all aspects of the firm's environmental practice, including client and project management, technical work, and business development.
AIPG ANNUAL MEETING UPDATE

SHORT COURSE #1 - CONTINUING EDUCATION:
Management Development for Geologists and Related Professionals - Management of Organization
Monday, October 6 and Tuesday, October 7, 8:00 am - 5:00 pm (16 hours)
Course Fee: Members $300.00, Non-Members $400.00
Continuing Education Units (CEUs) from Colorado School of Mines: $50 additional

AIPG offers a continuing education program in business and management training for geologists and other scientists and engineers. Management of Organization, one of five self-contained two-day continuing education sessions, will be offered at the AIPG 1997 Annual Meeting in Houston, Texas. Who should attend? All professionals who want to become more effective in managing their projects and their business. Topics covered in this two-day course include: knowledge requirements; business organizations; managerial and communications styles; human relations; communication; performance appraisal and discipline; managing technology and management change; inter-cultural relations; and labor relations.

Presented by: David E. Fletcher, Ph.D., Director of the Executive Program and Professor of Mineral Economics, Colorado School of Mines, Golden, Colorado.

FIELD TRIPS

Field Trip #1 - Houston Area Superfund Sites
Saturday, October 11, 8:00 am to 7:00 pm - Departs from Double Tree-Galleria Hotel, Houston, Texas
Fee: $100.00

Field Trip #2 - East Texas Items of Geological Interest
Saturday, October 11, 8:00 am to 8:00 pm - Departs from Double Tree-Galleria Hotel, Houston, Texas
Fee: $100.00

HOTEL INFORMATION

The hotel reservation form is on page 26 and the registration form is on the back cover of this issue.

Correction - The map and picture in the June issue of TPG is incorrect.
The meeting will be held at the Doubletree Hotel at Post Oak, 2001 Post Oak Blvd., Houston, TX 77056.
(713) 961-9300, Fax (713) 961-1557, 1(800) 222-TREE.

Airport Directions - 28 Miles
Intercontinental Airport - Take I-45 South to 610 West. Continue to 610 South and exit at Post Oak Blvd. Go past three traffic lights. The hotel is on the left after the third light.

Airport Directions - 20 Miles
Hobby Airport - Take 45 North to 610 West. Continue to 610 North and exit at Westheimer Road. Turn left and go to Post Oak Blvd. Turn right on Post Oak Blvd. And the hotel will be on the right.

Doubletree Hotel at Post Oak
2001 Post Oak Blvd.
Houston, TX 77056.
(713) 961-9300, Fax (713) 961-1557
1(800) 222-TREE.
The Doubletree Hotel at Post Oak is pleased you have selected our hotel as your Houston, Texas host. Our staff looks forward to serving you in fine Doubletree tradition.

In making your reservation we require that you:
1.) Enclose a check or money order covering the first night’s stay to include 15% sales tax.
   -OR-
2.) Send us the entire number of your credit card with the expiration date and your signature. We accept: AMERICAN EXPRESS, DINERS CLUB, VISA, MASTERCARD, CARTE BLANCHE OR DISCOVER.

Deposits will be refunded only if reservation is cancelled by 4:00 PM on the day of arrival.
Please retain your cancellation number.

Reservation request subject to availability. In the event room type or smoking preference is not available, nearest available room type will be assigned.

Accommodations may not be available until 3:00 P.M. on day of arrival. Check out time is 12:00 Noon.

Name (print) ___________________________ Phone ( ) ___________________________
Address ________________________________________________________________________
City ___________________________ State _________ Zip ________
Arrival date _______ (day) _______ (date) Departure Date _______ (day) _______ (date)
No. of rooms ___________________________ No. of people (4 Person Max.) __________
Name(s) of person(s) sharing accommodations ____________________________

(only one reservation card required per room regardless of # of guests)
☐ Check or money order enclosed ☐ Diners Club ☐ American Express
☐ Carte Blanche ☐ Visa ☐ Mastercard ☐ Discover
Amount $ ______________
Credit Card Number ___________________________ Exp. Date ______________

Group Name American Institute of Professional Geologists
Dates October 6-11, 1997
Single Rate $115.00
Double Rate $115.00
Jr. Suites: $210.00
1 Bedroom Ste. $250.00

Please circle Requested Room Type:
☐ 2 dbl beds King
Special request ____________________________
Smoking Non-Smoking

Reservation must be received by 09/9/97 to ensure availability and group rate.
Non-guaranteed reservations are subject to cancellation 4pm day of arrival.
AIPG MEMBERSHIP BENEFITS

Certification

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

Representation

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

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

Education

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

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


Insurance

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

Information

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

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

REQUEST FOR APPLICATION AND ADDITIONAL INFORMATION

NAME_______________________________________

EMPLOYER___________________________________

STREET_______________________________________

CITY___________STATE_________ZIP__________

DAYTIME PHONE______________________________

Mail, fax, e-mail, or call:

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

Please send me information on:

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

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

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

☐ Continuing Education  ☐ Advertising Rates

☐ Insurance  ☐ TPG Subscription

☐ Publications  ☐ Insignia Items
1997


Sep. 3-4. Alexandria University Third Conference on Geochemistry, Alexandria, Egypt. Contact: A. M. El Bousayly, Alexandria University, Faculty of Science, Geology Dept., Alexandria, Egypt., Ph.: 020-3-4921595.

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


Sep. 30-Oct. 4. AEG 40th Annual Meeting, Converging at Cascadia, Portland, OR. Contact: AEG '97 c/o Julie Keaton, 130 Yucca Dr., Sedona, AZ 86336, Ph.: (520) 204-1553.


Oct. 6-7. Fundamentals of Petroleum Exploration, Drilling, and Production, Denver, CO. Contact: The University of Tulsa, Div. of Cont. Educ., 600 S. College Ave., Tulsa, OK 1401-3189, Ph.: (918) 631-3088, e-mail: cted_ece@utulsa.edu.

Oct. 6-9. Ecuador Mining '97 - Exploration, Geology, Mine Development, Business Opportunities Conference, Cuenca, Ecuador. Contact: George H. Roman, Conference Director, Engineering & Mining Journal, 29 N. Wacker Dr., Chicago, IL 60606, Ph.: (773) 342-1167, e-mail: ghroman@msn.com.

Oct. 16-17. Structuring and Selling Oil and Gas Programs for Profit, New Orleans, LA. Contact: The University of Tulsa, Div. of Cont. Educ., 600 S. College Ave., Tulsa, OK 1404, Ph.: (918) 631-2347.


Nov. 5-7. Problems and Pitfalls in Joint Operating Agreements, Houston, TX. Contact: The University of Tulsa, Div. of Continuing Education, 500 S. College Ave., Tulsa, OK 1404, Ph.: (918) 631-3088, e-mail: cted_cee@utulsa.edu.

Nov. 16-19. International Conference on Advances in Ground-Water Hydrology - A Decade of Progress, Tampa, FL. Contact: American Institute of Hydrology, 2499 Rice St., #135, St. Paul, MN 55113-3724, Ph.: (612) 484-8169, Fax (612) 484-8357, e-mail: alhydro@aol.com.

1998

Jan. 25-29. Tailings and Mine Waste '98, Fort Collins, CO. Contact: Linda L. Hinshaw, Dept. of Civil Eng., Colorado State University, Fort Collins, CO 80523, Ph.: (970) 491-6001, e-mail: lhinshaw@vines.colostate.edu.

Feb. 16-20. Intl. Erosion Control Assn., 29th Annual Conference and Trade Exposition, Reno, NV. Contact: 1998 ICA Conference Program, P.O. Box 774904, Steamboat Springs, CO 80477, Ph.: (900) 455-4322, e-mail: scinfo@icae.org.

May 14-18. Linking Spatial and Temporal Scales in Paleoecology and Ecology, Annapolis, MD. Contact: Lois J. Elms, Western Experience Penrose Conference Coordinators for the GSA, 4881 Evening Sun Lane, Colorado Springs, CO 80917, Ph.: (719) 597-9201, e-mail: l jelms@aol.com.

May 17-22. American Society for Surface Mining and Reclamation, Mining - Gateway to the Future!, St. Louis, MO. Contact: Dianne Throgmorton, Coal Research Center, Southern IL Univ., Carbondale, IL 62901-4623, Ph.: (618) 536-5521, e-mail: diannette@siue.edu.

Jul. 4-11. Processes of Crustal Differentiation: Crust-Mantle Interactions, Melting and Granite Migration through the Crust, Verbania, Italy. Contact: Lois J. Elms, Western Experience Penrose Conference Coordinators for the GSA, 4881 Evening Sun Lane, Colorado Springs, CO 80917, Ph.: (719) 597-9201, e-mail: l jelms@aol.com.

AIPG ANNUAL MEETINGS

October 8-11, 1997
Houston, Texas

October 4-8, 1998
Baton Rouge, Louisiana

October 5-8, 1999
Anchorage, Alaska

October 11-15, 2000
Milwaukee, Wisconsin

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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 applicant’s rejection may be called as a witness in any resulting appeal action.

Applicants for Certified Professional Geologist
TX-Childress, Jay C.
6702 Charette, Amarillo TX 79124.
Sponsors: Earl Harrison, Jeff Flowers, Dale Stout.

IL-Hampel, Martin J.
3843 West 61st Pl., Chicago IL 60629.
Sponsors: Dennis Lawton, Sidney Glenn, Gary Cipriano.

MI-Heft, Adam W.
224 S. Summit St., P.O. Box 362, Webberville MI 48892.
Sponsors: James Bradley, Steve Stahl, David Matty.

AK-Johnston, David W.
320 Mariner Drive, Anchorage AK 99515.

NE-Morriesette, Steven E.
14804 Karen Circle, Omaha NE 68137.
Sponsors: Denzil Jorgenson, Jan Mazgaj, David Rachek.

MI-Peng, Wei-Shyuan
292 College Ave., Holland MI 49423-3850.
Sponsors: Jeff Sutherland, Tom Brunelle, John Wu.

OH-Phillips, Teri R.
771 Hallock-Young Road, Mineral Ridge OH 44440.

IN-Welting, Steven H.
11908 Hardwick Dr., Fishers IN 46038.
Sponsors: Thomas Kallio, Issey Medinsky, Bruce Bultman.

OH-Wurm, Cynthia M.
8031 Abbeyshire Court, Dublin OH 43016.
Sponsors: Steven Thacker, Michael Raimondi, Joseph Mancuso.

Upgrading to CPG
CO-Bowden, Wilson L.
0415 Harvey Gap Road, Silt CO 81652.
Sponsors: Jeffrey Hynes, Rick Andrew, Tom Prather.

AZ-Howell, Eugenia F.
5434 W. Desert Hills Drive, Glendale AZ 85304.
Sponsors: Larry Fellows, Greg Wallace, Wesley Hipke.

Applicant for Candidate for Certification
TN-Bond, Paula Jean
4444 St. Lucia Lane, Knoxville TN 37921.
Sponsors: Dave Hybert, Ken Skinner.

CT-Chaudhury, Habib A.
424 Middle Tpke West, 5-U, Manchester CT 06040.
Sponsors: Muhammad Nawaz, Ajitkumar Shah.

TX-King, Christopher A.
6572 Shady Brook St., Apt 4162, Dallas TX 75206.
Sponsors: John Van Braham, Linda Hanson.

VA-Louth, K. Matthew
5092 Barfield Circle, Virginia Beach VA 23456.
Sponsors: Cullen Sherwood, John Tomik.

New Certified Professional Geologists
CT-Danielson, Robert M., CPG-10130
338 Sheriffs Lake Road, Tolland CT 06084, (860)564-2469

MI-Coyle, Brett W., CPG-10125
1087 Red Run Drive, Dorr MI 49323, (616) 940-2007

NJ-Filsou, Joseph G., CPG-10131
78 Mariners Cove, Freehold NJ 07728-3713, (908) 225-6116

NM-Gilles, Geoffrey C., CPG-10104
4556 Mockingbird St., Las Cruces NM 88011, (505)524-5352

TX-Landeneau, Kyle, CPG-10132
12639 Duchess Lane, Houston TX 77070, (713) 266-6867

MA-Leaffer, Douglas J., CPG-10109
65 Millpond, North Andover MA 01845, (603)880-6992

NY-Lipson, David S., CPG-10133
1418 Westmoreland Ave., Syracuse NY 13210, (315) 446-9120

NJ-Mark, Benjamin S., CPG-10135
The Village Green 14G, Budd Lake NJ 07826, (201) 301-0078

OH-McCready, Roger W., CPG-10120
2308 Shroyer Road, Dayton OH 45419, (513)320-3601

IA-Muckenhang, Peter G., CPG-10122
436 Hayward Avenue, Ames IA 50014, (515) 233-4282

IA-Pence, Stan F., CPG-10127
517 19th St., Hawarden IA 51023, (701)677-2527

NE-Thompson, Terrance L., CPG-10124
11324 Raleigh Drive, Omaha NE 68164, (402) 334-8181

New Candidate for Certification
MS-Glover, William D., CFC-0137
414 Evans Street, Vicksburg MS 39180, (601)636-1133

IN MEMORIAM
Richard C. Harding, CPG-3609
Jackson, California

F. W. Hinrichs, CPG-1653
Beverly Hills, California

Wilson M. Laird, CPG-0176
Kerrville, Texas

Roger Rice, CPG-2239
Butte, Montana

Colorado Geological Survey Distributes Teachers Packets on Minerals and Mining
The Colorado Geological Survey (CGS) has assembled a packet of videos, computer games, brochures, pamphlets, workbooks, posters and a curriculum on minerals and mining that is being distributed free of charge to Colorado middle and high school Earth science teachers. The CGS has sent over 550 letters to middle and senior high schools in the state advertising the packet. The packet, which was assembled as part of the CGS’s Mineral Education Program, contains videos donated by Caterpillar Corporation, Asarco, Inc., Pikes Peak Mining Company and Cyprus Amax Minerals Co. Also included are brochures and information from several other companies.

To request a packet for your middle school or high school, please send a letter on school stationery to: Jim Cappa, Mineral and Mineral Fuels Section, CO Geological Survey, 1313 Sherman St., Room 715, Denver, CO 80203 (303) 866-2611.

AIPG Membership Totals
As of 7/31/96 As of 7/24/97

<table>
<thead>
<tr>
<th>Category</th>
<th>Active</th>
<th>Retired</th>
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<td>CFC</td>
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<td>SA</td>
<td>60</td>
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<td>Honorary</td>
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<td><strong>TOTALS</strong></td>
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<td><strong>5,060</strong></td>
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# PRE-REGISTRATION FORM

**34TH ANNUAL AIPG MEETING**

**HOUSTON, TEXAS - OCTOBER 8 - 11, 1997**

"The 21st Century Professional Geologist: Training, Credentials, Political & Business Considerations"

**CPG NO.**

---

**NAME:**

**SPOUSE/GUEST NAME:**

**COMPANY/INSTITUTION:**

**ADDRESS:**

**TELEPHONE:**

**FAX:**

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**REGISTRATION:** (Includes Technical Sessions, Business Luncheon, Gala Dinner and “Kick-off” Mexican Fiesta).

<table>
<thead>
<tr>
<th><strong>APG MEMBERS</strong></th>
<th><strong>ON-SITE</strong></th>
<th><strong>NUMBER OF PERSONS</strong></th>
<th><strong>AMOUNT PAID</strong></th>
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<td><strong>PRE-REGISTRATION</strong></td>
<td><strong>PER PERSON</strong></td>
<td><strong>BEFORE 9/12/97</strong></td>
<td><strong>AFTER 9/12/97</strong></td>
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<td>$200.00</td>
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<tr>
<td>Registration for Spouse/Guest</td>
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<td>$100.00</td>
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<tr>
<td>STUDENTS (Technical Sessions Only)</td>
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<th><strong>NON-MEMBERS</strong></th>
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<td><strong>PRE-REGISTRATION</strong></td>
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**EVENTS:**

1. **Trip #1: Golf at “Tour 18”**
   - Tuesday, 6:15 am to 2:00 pm *(NEW TIMES)*
   - $100.00
   - $150.00

2. **Trip #2: Offshore Energy Center and Galveston Sampler (Lunch)**
   - Wednesday, 9:00 am to 4:00 pm
   - $60.00
   - $85.00

3. **Trip #3: Major Art Museums (Lunch)**
   - Thursday, 10:30 am to 3:30 pm
   - $45.00
   - $70.00

4. **Trip #4: Space Center Houston - N. A. S. A. (Lunch)**
   - Friday, 10:30 am to 4:30 pm
   - $55.00
   - $80.00

5. **Trip #5: Theater Under the Stars Musical**
   - Friday, 7:00 pm to 11:00 pm
   - $65.00
   - $90.00

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**MINIMUM NUMBER OF PARTICIPANTS MUST BE MET BY SEPTEMBER 5th.**

**SHORT COURSES:** *(Meeting Registration not Required)*

1. **Management Development Program for Geologists and Related Professionals**
   - Monday and Tuesday, 8:00 am to 5:00 pm
   - $300.00
   - $375.00

2. **Environmental Chemistry**
   - Tuesday, 8:00 am to 5:00 pm
   - $300.00
   - $375.00

3. **Environmental Geophysics for Oil & Gas Geologists and Geophysicists**
   - Tuesday, 8:00 am to 5:00 pm
   - $335.00
   - $410.00

4. **Continuous Process Improvement in Professional Services**
   - Wednesday, 8:00 am to 12 noon
   - $50.00
   - $50.00

5. **Geostatistics**
   - Wednesday, 8:00 am to 5:00 pm
   - $250.00
   - $325.00

6. **Multidisciplinary Teams: How and Why They Make You Money**
   - Wednesday, 8:00 am to 5:00 pm
   - $250.00
   - $325.00

   - Thursday, 8:00 am to 5:00 pm
   - $335.00
   - $410.00

8. **Reservoir Seismic Methods**
   - Thursday, 8:00 to 5:00 pm
   - $250.00
   - $325.00

9. **Introduction to Reflection Seismic Interpretation**
   - Friday, 8:00 am to 5:00 pm
   - $360.00
   - $435.00

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**Mini-Symposium:** Environmental Ethics, Professional Practices, and Related Issues

- Wednesday, 1:00 pm to 5:00 pm
- $25.00
- $50.00

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**TOTAL AMOUNT PAID $**

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**RETURN FORM WITH PAYMENT TO:** John L. DeVault, AIPG-Houston 1997, P. O. Box 218567, Houston, Texas 77218-8567

**VISA / MASTERCARD / AMERICAN EXPRESS / DISCOVER CARDS ACCEPTED**

**CARD TYPE:**

**CARD NO.:**

**EXP. DATE:**

**SIGNATURE:**

**MAKE CHECKS OR MONEY ORDERS PAYABLE TO AIPG-HOUSTON 1997**

**REFUND POLICY:**

Refunds of 100% of registration fees will be given upon written request if received by 5:00 pm on Friday, September 19, 1997. Notification and full refund for field trips or social activity fees will be given in cases of cancellations due to insufficient registration by this date also 50% refunds will be given up to October 3, 1997.