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June, 1993
Volume 30, Number 7

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Geology And Project Management

Mark A. Koestel, CPG-8307, RG, REA

Regardless of the type of geological program mounted, there are basic principles which are commonly followed for successful project completion. Individual management styles and the application of new technologies can be positive contributions, but fundamental practices can make the difference between a successful program and a delayed, costly one.

Program Inception

Planning and organization are paramount to starting any program of any complexity. Is the immediate goal reconnaissance, detailed mapping, sampling, drilling, geophysical studies, remote sensing, ore body delineation, contaminant identification or information gathering?

Careful research (reviewing all readily available data) will enhance any program. Diagraming manpower needs, supplies, time and money is the next step.

Most successful managers contact vendors for current cost estimates to design budgets. If sampling is a significant task, everyone should be appropriately trained and an analytical laboratory selected. Will contact be needed with any regulatory agencies for notification, permits, written plans or meetings? Advance planning is critical here since this can be a time-consuming process and most projects are time dependent. Windows of opportunity for many projects open only during certain times of the year (summer vs. winter, rainy season vs. dry, daylight hours, tourism).

Overseeing the ordering of supplies, allocating existing manpower, scheduling, interviewing and hiring additional support personnel, reservations and transportation logistics are project management responsibilities. When the project ends, reclamation activities, whether temporary or permanent, may have to be implemented. Are the supplies and personnel in place, and has this been included in the budget? Many times these basic needs are overlooked until the eleventh-hour.

Other technical disciplines that might be needed on geological programs are petrography, age dating, aerial photography, geophysics, surveying (soil-vapor or ground), computer modeling, etc. Some of these, such as aerial photography, take considerable advance planning and are dependent on the aforementioned windows of opportunity.

Most of these tasks are basic to any geological program whether exploration, environmental or other. The degree to which they are carried out, and which ones, will depend on the scope and complexity of the program, its locality (local, out-of-state, remote), and budget. Once they are planned out, the program can begin in earnest.

Program Implementation

Project tracking is the hallmark of good management. It is important to always keep your ultimate goal clearly in focus. Are short-term goals being met, is there enough time and money remaining to complete the tasks at hand? What about contingencies, those unexpected delays and
troubles that always happen and hence should not be unexpected? To prevent a program from grinding to a halt, vendors should have a readily available supply of backup parts/equipment and/or personnel.

Budget tracking is commonly done at the end of each work day. An estimate of daily supplies and manpower costs is deducted from the total funds available. Projections are made weekly. It is also a good idea to hold weekly staff meetings to:

- clarify goals
- identify problems and provide redirection
- exchange information among project participants as to how the overall project is progressing and how their individual assignments fit in
- elucidate where everyone is on their assignments
- identify needed training

Good project management needs all of these elements, but early problem identification and redirection is probably the most important. Problems can grow exponentially and soon will consume a great deal of time and money. The varied experience of team members can be brought to bear on problems and their solutions at the weekly meetings. A feeling of unity and importance can be developed here as well.

Upper management usually requires progress reporting, sometimes monthly, usually weekly and occasionally daily. The importance of the project, its public visibility, budget size and manpower allocation are factors in reporting frequency. These reports, whether written or verbal, should be short, concise and to the point, much like the summary section of a final report. Another important service provided by progress reporting is education. All people involved, from top management on down, will want to know not only how things are progressing, but how well they are meeting anticipated models. Lack of upper management understanding of a project’s short-term goals, scientific approach and applied technologies have killed more than one program before its time.

The final report is a reflection on the entire company. A well written, concise document, presenting all data, findings and conclusions, is the culmination of all planning and field work. Whether an internal document or for a client, project management skills are ultimately presented in the final report and hence should be given due consideration (within time and budgetary constraints).

Common Pitfalls

Some of the most common problems in project management are:

1. Lack of sufficient planning (usually relates to lack of experience) which leads to crisis management. Murphy’s Law will always present some unforeseen problems requiring crisis management, but that can be kept to a minimum through anticipation (read experience).

2. Insufficient understanding by management. This relates to the education issue and emphasizes the need for concise, informative proposals and reports.

3. Poor follow-through by:
   - project participants (usually rectified by weekly staff meetings)
   - contractors/vendors (stresses the need for good communications, both written and verbal)
   - regulatory agencies (again stresses the need for good communication and project manager planning and follow-through)

4. Lack of project manager contact with the client/upper management. The “external or internal” client wants to know how his/her money is being spent and how well things are progressing. They in-turn have others to report to. A constant flow of information between the project manager and the client is essential for a successful program. Technical understanding and expertise in a particular area are important to completing jobs satisfactorily, but solid project management skills make the difference between a good and a great job.

Summary

Strong project management skills are difficult to acquire and are best learned through experience. Whether the program is environmental geology, economic geology, hydrogeology, reclamation, or a host of other technical disciplines, basic principles of program management are necessary for a successful conclusion. Success is measured in terms of project completion on time and within budget and receiving accolades in performance reviews.
The Monster Is Dead, But At What Cost?

Larry C. Simpson, CPG-7215
ACOG Garber-Wellington Association, Oklahoma City, Oklahoma

Some non-scientific environmental organizations have long felt that the U.S. oil industry is the major cause of pollution in our country. They are overjoyed that this heinous monster is rapidly dying. They believe that as the oil industry dies, a new period of environmental purity will occur. That concept could not be more wrong!

For some time it has appeared that the year 1992 could well mark the functional end of the U.S. oil industry. Over the last 10 years, low natural gas and crude oil prices, curtailed natural gas production, increased costs due to environmental regulations, and no government support have broken the back of this once healthy industry. Many of the independent producers that operated in 1980 have sold or abandoned their production and gone out of business. During October, 1992, the U.S. Congress approved a new incentive package for the independent oil and gas industry. Oil industry analysts believe that this will only help small, actively drilling independent producers. It will not affect large independents or major companies.

Since the mid-1980's the major companies have been selling production, cutting staff, and moving exploration efforts overseas. Some of the major companies no longer exist, and the rest are down to skeleton staffs. One major is even moving its headquarters out of the country. Many of the U.S. oil refineries have been shut down; and it is now environmentally impossible to build refineries at new locations. These conditions have resulted not only in the loss of 400,000 - 450,000 jobs but a major portion of the tax base in many states.

The number of oil wells has not decreased as fast as the oil companies. Therefore, the remaining companies have the option to buy more and more wells. As these wells grow older, their production and profitability decreases. Therefore, the few remaining companies have growing number of marginally profitable wells. Increasing environmental costs will make these wells even less attractive.

When the oil industry was strong and profitable, most uneconomic wells were properly plugged. The threat of bad publicity, loss of pollution or surety bonds, or expensive litigation made much of upper management environmentally sensitive.

Today's world paints a dramatically different picture. This country has been heavily drilled; and the possibility of a major discovery is minimal in most areas. For a decade, there have been little or no tax incentives to explore for these new oil and gas reserves. Few companies and fewer employees are attempting to explore for new hydrocarbon reserves. Reworking old fields and uneconomic wells is gradually becoming the major emphasis in much of the U.S.

Rapidly declining and irreplaceable reserves have caused cash flow problems which have bankrupted many companies. Nationally this has resulted in thousands of wells being
abandoned. Some of these abandoned wells are in environmentally sensitive areas. Abandoned wells can pose a real problem to surface water and fresh groundwater. Often the pollution bonds put up by the operators are not large enough to plug all the wells or remediate environmental problems.

Consider the situation in Oklahoma as an example of these problems. The Oklahoma Corporation Commission has a plugging fund that was established and financed by the Oklahoma oil industry. These funds are raised from taxing hydrocarbon production. Unfortunately, the dramatically falling production in Oklahoma has reduced the monies available to plug abandoned wells. At the present rate, it will take the plugging fund 30-40 years to plug the 600 wells that are presently on the books. It is estimated that the fund could never plug all of the abandoned wells that are now known to exist. The number of abandoned oil and gas wells of bankrupt oil companies should increase dramatically over the next decade. Each well that is abandoned decreases the funds available to plug abandoned wells. In this “catch 22” situation, a lack of funds at the oil company and state level will leave the responsibility of plugging these abandoned wells to the taxpayers.

There are presently hundreds of thousands of producing wells in our country. Also, approximately two billion dollars worth of producing and non-producing properties are for sale in the United States. Few funds are presently available, nor is there any willingness to buy most of these properties. A rapid deterioration of the oil industry at this time will result in an exploding number of abandoned operations. A strengthened oil industry would allow a more orderly disposal of potentially hazardous oil wells and facilities.

Many believe that an increased oil price will revitalize the oil industry immediately, and things will return to normal. Due to years of neglect, much of the equipment required to expand the oil industry has fallen into disrepair. Many of the companies that supplied materials and technology to the industry are not now in business. Development of a large oil industry will require rebuilding many satellite industries from scratch. There is little present incentive to do that. If prices were elevated it could still take years to rebuild a strong petroleum industry.

The most devastating part of this long industrial collapse is the loss of trained personnel. Most have lost their jobs permanently and have gone into other fields. Many of the remaining professionals are making marginal salaries and are rapidly reaching retirement. The minimal pay received by these well-trained technical experts does not allow them to have apprentices. The low pay also does not encourage younger people to enter these professions. This is especially true in field operations where 10 years ago the U.S. had the best trained professionals in the world. A lack of interest in these fields has made many universities drop oil field-related curriculum. Therefore, when the present working professionals retire, there will be no one to replace them. Much of what they can do is not in books and cannot be learned in school. We have reached high levels of technological advancement over the last 100 years; and soon much of it will be gone forever.

This is doubly distressing since these professionals are doing some of the best environmental work in the United States. They help supply fresh drinking water through water well drilling, logging and completion activities. The extent of subsurface contamination plumes are being defined by those same aging oil field technicians. They are supplied by the few remaining oil field satellite industries. The eventual loss of this talent will result in a reduced ability to develop quality water supply wells and define subsurface contamination.

The death of the U.S. oil industry is being greeted with glee by many environmental groups. As it falls into decline a terrible environmental cycle will occur. Lost jobs, industries, and hydrocarbon production will result in reduced taxes. Oil company bankruptcies will leave an ever increasing number of abandoned wells and facilities. Pollution from these bankrupt operations will be left to tax-supported government commissions to remediate. The increasing national trade deficit due to foreign oil will weaken the government even more. The reduced financial capability of the government and public will allow oil-related pollution to increase dramatically over the next decade. Finally, the loss of trained personnel and the total lack of replacements for these technical specialists will make cleanup operations less effective.

A strong oil-and-gas industry will help supply this country with energy, jobs, financing and technology necessary to survive into the next century. A strong industry will also clean up much of its own pollution. A clean environment and a strong country will only occur with a healthy oil-and-gas industry. Positive incentives for the oil industry will not only help our nation but also its delicate environment.

The Professional Geologist • JUNE 1993
Needed: A Risk Scale To Describe Potential Disasters

Donald H. Kupfer, Geologist, 7324 Menlo Drive #3, Baton Rouge, LA 70808

Summary: An informed public needs a simple, numerical, risk-rating scale that classifies most of the hazards controlled by man. If they can evaluate the relative danger each risk presents to themselves, the Nation, and the environment, they will then be better informed and able to act accordingly. Inevitably risk-rating scales of variable quality are now being used, and some are in conflict. We should start now to develop a universally acceptable scale that is useful, accurate, and developed by a diverse group under national supervision.

Cry Wolf

It is a rare TV news broadcast that does not inform us of one or more impending calamities. These may be a threat to our health, a change in our environment, a disaster to wildlife, or even the impending demise of the Earth. Many have heard the cry of "wolf" so often that they cannot comprehend the danger, let alone take any action.

The time has come for the media and the public to be able to differentiate between moderate calamities and BIG CALAMITIES. To do this they will need a universal Relative Risk Scale, RRS, similar to the Richter Scale of earthquake magnitudes. The first scale developed may be a very crude evaluation of "risk", but once established it can be improved. Ideally it should attempt to cover all of the risks over which people have control, or hope to have control, including both natural disasters and those devised by man. We may need to move toward this goal in steps.

The Richter Scale

The Richter Scale is a good analogy. Today, no newspaper reports an earthquake without giving its Richter Magnitude, even though that magnitude will be changed within a week or so, as more data becomes available.

Until about 1900 the public was aware that all major earthquakes were catastrophes and associated with great human suffering and loss of life. About that time scientists began to develop instruments to detect and measure earthquakes, at first crudely, but then with increasing accuracy and frequency. As reported in the newspapers and journals, earthquakes suddenly were occurring everywhere and with alarming frequency. By the late 1920's the public was becoming confused; and a single geological report unduly scared many Californians and some of the insurance industry. The public clearly had a need to differentiate between the many earthquakes reported by scientists, and the earthquakes that were disasters. Richter supplied that need.

The Richter Scale, designed for scientists, has become a standard for media journalism because it is simple and serves a need. This is true even though the original version was crude, measured a single aspect of earthquake activity, and had extremely limited "exact" application. Unbeknown to the general public, it has been modified and redefined several times, but nevertheless has proved to be exceptionally useful.

The Problem

Today we are in a similar situation with respect to potential disasters. In the past, newsworthy calamities were few, and commonly associated with great loss of life. They were to be avoided by every engineering and legislative means possible. Today, people are made aware of an abundance of potential disasters on a daily basis. Some are remote, others can affect every aspect of their lives. A Relative Risk Scale would help both layman and engineer to evaluate these problems.

Today the scientist can measure lead, mercury, and all other elements in parts per million or billion, whereas a few years ago they used parts per thousand. In most cases, we do not yet have the background to evaluate which of these "parts per million" are routine occurrences, and which are dangerous. Some "trace elements" are proving essential to life, both of man and plants. Similarly, medical and laboratory technicians can now evaluate the effects of large doses of elements and compounds on mice, fruit flies, or great apes, and are doing so at a rapidly increasing rate. But the relationship of the laboratory data to the real world is less well known. The result is considerable alarm by the public. Commonly the alarm is caused by what they are not told -- the amount of risk involved.

Scientists, engineers, and sociologists are daily discovering new problems. These data are then repeated by environmentalists, news reporters, and politicians, without full knowledge of the risks involved. The public
is inundated by potential disasters in the making, some real and some not. There are more problems than there are resources available to attack them all, full-scale, and at once. Which are the most significant? Which require the most immediate attention?

Relative Risk

For example, does the risk from radon rate as a 2 or 8 on a scale of 10; and on that same scale, where would the risk lie from asbestos, lead poisoning, or smoking? How do these compare with the threat from nuclear power generation, the greenhouse effect, groundwater contamination, and acid rain? No one can be exact, but the public needs to know what is known, and what is conjectural. They can watch to see if a risk-scale rating, once given is generally accepted, or is it challenged on many fronts.

In developing the relative risk scale, each member should be classified relative to others, using a query (?) or two (?) after the more doubtful. This will point up where more studies are needed. The danger from some risks is well established. Others can only be estimated to within a couple of orders of magnitude. The specialists may not know exactly how X and Y risks compare, but they may know that both are 1000 times more likely or more dangerous than risk Z. That is relative risk, -- the basis of an RRS.

A major criticism of this endeavor will be that it attempts to compare oil, peas, children's jacks, and air pollution -- all on the same scale. Quite true. Therein lies both the greatest danger, and yet its strength. Mishandled, the risk scale will 'thunk out' immediately, both with scientists and the general public. Yet anyone looking at the list just given will have some idea of which are more, and which less harmful. This is an RRS, it just needs numbers. Once established, it can be fine-tuned.

A second criticism states that a poorly constructed risk scale might cause more damage than it does good. Quite so. But risk scales are already commonplace, and some are poorly constructed. The need is to get them unified and trustworthy.

The Task

Risk scales are fraught with problems. How many are at risk, how often, and where? Does the risk affect all citizens, or only people working at a certain place? This list can be greatly expanded; and some will say that there are so many variables that nothing can be done. This is a defeatist attitude.

Risk scales are now used, but on a small scale. For example, for political and financial reasons, toxic dumps have been classified (rated), and the ratings used to distribute the "Superfund" dollars. That rating has caused disagreement, but the process of evaluation is a healthy one. Ratings should go much further. What is the risk-variation among oil-field brines, old city-dumps, surface nuclear waste repositories, and dumps containing old transformers with PCB?

Even the best risk scale, developed and refined by thousands of researchers over several decades, will still be imperfect, but lack of perfection is no excuse for inaction. The original Richter Scale was not a precise measure of earthquake danger or of damage. The need is now, improvement can come later. But where to start?

One suggestion. Publish the need nationally and get a variety of suggestions from students, industry, academicians, and anyone else interested. The first step may require many scales that later can be meshed together, but the final scale, the one adopted, must be simple and easy to use; it must be reasonable and consistently used. It is important that once a scale is adopted, no matter how crude and incomplete, most of the decision-making organizers stand behind it -- even while improving upon it.

The adopted scale should allow an informed expert to fit any observed or potential problem or disaster into the scale. Review of the "assignment" will be appropriate and necessary, even if confusing to the public. With study, the assignment may be moved up or down, but the "rating" should tend to stabilize with time.

Who?

The scale must not be developed by some group with "an axe to grind". National competitions may suggest diverse approaches, which will have to be evaluated. For example, several published risk scales are based on mortalities per thousand, but someone may suggest a better approach. The numerous, yet-to-be-proposed approaches, and the problems, should be reviewed by a nationally appointed group of specialists involving diverse interests such as government, universities, and research centers. Others interested can have representatives attend as advisors. The actual working groups must be small.

Some might see the need of a governing body or "supreme court". This implies the force of law, which might be the wrong approach. The scale should remain flexible and informational.

The Media

The public, through the media, must be educated and prepared for controversy. Once a scale is adopted, there will be dissent, and this will be electronically aired. Those that are hurt will yell the loudest, and those with the greatest "clout" will be heard the most, but that doesn't make them right. Noise level is neither a valid basis for ranking, nor an indication of perfection. The public must be prepared in advance for this inevitable eventualty, so that they do not become immediately discouraged.

If the RRS is to be accepted, and therefore useful, it will take a concerted effort by all concerned to keep the public from loosing faith. The need to know should be the driving force.

Conclusion

A relative risk scale, RRS, can be developed. A simple scale is required. There will be inertia and opposition, but the problems are not too complex. The public need is to know -- now.
Outcomes Of Education On Geologic Hazards In The International Decade Of Natural Hazards Reduction

Edward B. Nuhfer, CPG-2808

Geologic hazards are those hazards that pose substantial danger to life, or produce serious economic losses to members of society. The concept of an International Decade of Natural Hazards Reduction (1990 - 2000) was suggested by Dr. Frank Press in 1984 (NRC, 1989). The concept was well-founded. Natural hazards are not minor, and losses of life from geologic hazards are comparable in magnitude to losses of life from the worst of familiar current events (Nuhfer et al., 1993). The period from October, 1989, through the present, has been the most expensive in history for the U.S. in terms of process-based hazards; largely the result of coastal destruction from hurricanes Hugo and Andrew, and the property losses in the Loma Prieta earthquake. Global cooling from Pinatubo's 1991 eruption (Minnis et al. 1993) was accompanied by the southwestern United States' snows and rains that produced record floods in January and February of 1993, and by the East Coast's "storm of the century" in March, 1993.

Although educators like to assess learning outcomes by standardized tests, an alternative measure of outcomes of education on geologic hazards might lie in evaluating how successfully public funds (in a democracy) are spent to deal with geologic hazards. This is certainly meaningful to the pocketbook of the average citizen. Table 1 provides a summary of the general dollar costs of such hazards in the U.S. One can challenge the accuracy of any of the numbers in the table, but the numerical ranking from most to least expensive would probably remain consistent at the end of any quibbling snit. Two hazards, asbestos and radon, have caused tremendous expenditures already; and these hazards are unusual in that the costs were produced more by government mandate than by an irreversible geological event. Costs of these can be increased, modified, or eliminated by the same process that created them a characteristic reversibility that is not an option when dealing with other hazards.

GEOLOGIC HAZARDS in the U.S. and their COSTS

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<th>GEOLOGIC HAZARD</th>
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<td>HAZARDS from MATERIALS</td>
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<td>Asbestos</td>
<td>$12 to 75 billion cumulative for remediation of rental &amp; commercial buildings; $100 billion including litigation and enforcement</td>
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<tr>
<td>Radon</td>
<td>$100 billion ultimately to bring levels to EPA recommended levels of 4 PCU/L</td>
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<tr>
<td>Swelling Soils</td>
<td>$6 to 11 billion annually</td>
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<tr>
<td>Acid Drainage</td>
<td>$365 million annually to control; $13 to 54 billion cumulative to repair</td>
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<tr>
<td>HAZARDS from PROCESSES</td>
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<tr>
<td>Earthquakes</td>
<td>$230 million annually decade prior to 1989; over $6 billion in 1989</td>
</tr>
<tr>
<td>Volcanoes</td>
<td>$4 billion in 1980; Several million annually in aircraft damage</td>
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<tr>
<td>Landslides/Avalanches</td>
<td>$2 billion /$0.5 million annually</td>
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<td>Subsidence and Permafrost</td>
<td>At least $125 million annually for human-caused subsidence; $5 million annually from natural karst subsidence</td>
</tr>
<tr>
<td>Floods</td>
<td>$3 to 4 billion annually</td>
</tr>
<tr>
<td>Storm Surge and Coastal Hazards</td>
<td>$700 million annually in coastal erosion; over $40 billion in hurricanes &amp; storm surge</td>
</tr>
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</table>

1989 - early 1993

Table 1 A summary of the dollar costs of geologic hazards in the U.S. (abbreviated from Nuhfer and others, 1993. See original table p. 3 of that reference for primary sources on each hazard.)
The asbestos "crisis" began about 20 to 30 years after the end of World War II as an inordinate number of workers who had served as insulators and pipe fitters in Navy shipyards began to develop lung cancer, asbestosis and mesothelioma. Government mandate preceded thorough research, and by 1986 the Environmental Protection Agency succeeded in convincing the public that "asbestos" at any level in any amount was a serious threat to health (Benarde, 1990). By late 1989, a 5-billion-dollar-per-year asbestos abatement industry was growing at a rate that was forecast to double in size by 1992 (Rifkin-Wernick, 1989). Asbestos mining, processing and fabricating firms were subjected to lawsuits, and that industry was devastated. Property values fell as public buildings with asbestos were devalued (see Croke et al., 1989). By 1988, 46 states had passed restrictions even more stringent than the federal government's.

The legislation classified minerals as equal hazards that were not even related in crystal structure or chemical composition. Studies that established a serious health hazard from the amphibole, crocidolite ("blue asbestos" used in a minor 2% of applications), ended up being misused to implicate as an equal villain, chrysotile, ("white asbestos," a useful mineral with a sheet crystal structure very different from the crystal structures of amphiboles). Chrysotile was the mineral used in 95% of commercial asbestos. In 1984, Malcolm Ross, a geologist with the USGS, actually did some of the "critical thinking" that academics love to extol. He decided to test the dangers by examining the mortalities of actual populations in asbestos processing and mining communities. His investigation yielded results that made the panic over chrysotile look foolish: "Despite the wide dissemination of white asbestos in our environment in schools, homes, public buildings, brake lining emissions and so forth, there is little evidence that the very frequent non-occupational exposures to this form of asbestos have caused any harm. On the other hand, nonoccupational exposure to blue asbestos has been conclusively proven to have caused significant mortality" (Ross, 1984). If 95% of asbestos was "white asbestos," what was the actual risk? Melvin Benarde (1990) outlined lifetime risk values (chances of death per 100,000) for a number of situations. Dying as result of smoking was rated highest, at 21,900. Driving a car was rated at 1,600, being killed by lightning carried a value of 3 and dying of asbestos in nonoccupational exposure came in with a ranking of 1. In short, an amount of money roughly equivalent to the annual budget of the National Institute of Health, was mandated to be spent yearly to "save" us from a hazard that posed about 1/3 the danger of lightning, mandated by the same government that continued to subsidize the tobacco industry.

The primary basis for identifying asbestos and distinguishing one asbestos mineral from another is use of the polarizing microscope. Teaching mineral microscopy is one of the most labor-intensive courses in a university, and bringing a student to a high level of skill requires much personal attention by the professor. In classes larger than a dozen, it becomes difficult to teach students well. But training of microscopists in the 80s and 90s ran counter to the aspirations of college deans and presidents anxious to prove "productivity" and "fiscal responsibility" to legislators and regents by terminating small classes. As asbestos abatement grew toward a 10-billion-dollar-per-year industry, so did the demand for good mineral microscopists, and thanks to the many universities that eliminated their small geology classes, skilled microscopists simply were not available. As a remedy, week-long short courses were offered to try to train microscopists to do asbestos work. Walter McCrone, arguably the world's most successful microscopist, noted the fruits of the "fiscally responsible": "At the Institute, we have noticed a gradual change over the past 20 years in the students' level of understanding. During the 1970s, many students were already trained in polarized light microscopy, and often had backgrounds in mineralogy. These students did very well; and we were confident of their ability to avoid false negatives or positives. As time went on, we have become much less confident that graduates of the one-week course could perform the job satisfactorily." (McCrone, 1989). Teaching optical mineralogy
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to neophytes in a week is somewhat akin to teaching one to play the fiddle in seven days. The results are likely to be less than spectacular, no matter how good the teacher. McCrone's Institute was training close to 1000 microscopists a year when the above was written. The status of identification accuracy at that time was confirmed by Harvey (1990) who noted that false negatives and positives generally occurred in more than 10% of samples. Harmless wollastonite, a calcium silicate, and polyethylene fibers were misidentified as asbestos between about 20% and 40% of the time! There is no way to know how much money was wasted in removal of harmless substances that were falsely identified as asbestos, but it doesn't take a rocket scientist to look at just 1% of 10 billion dollars a year to recognize that elimination of small classes that supplied competent microscopists provided no bargain to the public.

Radon followed a remarkably similar path to asbestos on its way to yielding costly regulatory mandates. The basis for a radon hazard lies in a fact that radiation is damaging to living cells, and in an observation of uranium miners having increased mortality rates due to lung cancer. Such observations merited serious investigation but were not in themselves justification for launching a multi-billion dollar remediation program.

Nevertheless another risk table was assembled by the Environmental Protection Agency, a table not based on any population of individuals proven to have died from casual exposure to the perceived radon hazard. An acceptable maximum limit of concentration of indoor radon of 4 pCi/l was defined. As in the case of asbestos, some states soon mandated remediation and passed laws limiting the salability of structures to that which had indoor concentrations that met the EPA-recommended limit. The result could be a 100-billion-dollar bill to the public, paid largely by private homeowners.

When deaths attributed to radon in uranium mines were adjusted for smoking and other factors, Saccomanno and others (1986) noted that the deaths from lung cancer for uranium miners who don't smoke occurred at about the same rate as that for the general nonsmoking public. Following the logic of Ross's 1984 study of asbestos mining and milling populations, investigations of death rates by lung cancer in regions characterized by soils and rocks with high radon should be compared with those in areas of lower radon. This has now been done on the broad scale of states (see Gundersen et al., 1992), and no alarming relationship has been established. In fact, the state with the greatest longevity, North Dakota, happens to be one of the states with the highest radon concentrations (Brookins, 1990). Further large-scale mapping is now enabling comparisons between radon levels and death rates over smaller areas. Such information is needed, but present data fails to justify a crisis reaction. The primary logic in handling of asbestos and radon could be irreverently summarized by "Pass the legislation first and perform the science later." Mapping should have been done and the dangers assessed before any legislative mandates were passed. The U.S. Geological Survey, which has a deserved reputation for doing impeccable science, was consulted to produce map data only after non-geologists were permitted to politicize a conjectural hazard into a national crisis. Neither legislators nor the public demanded the needed data, because neither understood that an answer to the actual risks ultimately required a geological study. "Critical thinking" was not demonstrated in evaluating the radon hazard or in questioning the validity of EPA's risk table.

In the western states where swelling soils abound, large amounts of development have taken place since Kohn and Slossen (1980) provided estimates of costs of swelling soil damage. Swelling soils' damage is most acute to light structures such as homes, and flatwork such as sidewalks and streets. Where homeowners' insurance policies do not cover damages from heaving of soils, losses come largely out of the pockets of homeowners. Legislation that required disclosure about swelling soils and design codes would probably save citizens money. Losses to individuals could be reduced through better-educating the public to know about swelling soils and how to spot developments built on them. It would be especially beneficial to teach students how to use the services of their state geological surveys and how to access USGS information.

The ultimate costs to remediate acid drainage on abandoned mined lands is tens of billions of dollars. Every geology student is shown a nice, shiny piece of pyrite as a sort of laboratory curio, but the topic of acid drainage is left out of most textbooks and courses.

The Loma Prieta earthquake in 1989 furnished a 6-bil- lion-dollar reminder to the public about seismic risk. In comparison with the 1988 Armenian earthquake, it demon-strated that (a) building codes that take geologic hazards into account reduce loss of life from thousands to dozens; (b) engineering for potential quakes saves lives and dollars and (c) there is no substitute for earthquake insurance when your home is being damaged. Yet the percentage of individuals who have earthquake damage insurance is surprisingly small in earthquake-prone Cali-
ifornia counties (Kunreuther, 1993), and in areas where large but infrequent quakes occur, insignificant numbers of property owners have earthquake insurance. Introductory earth science courses inform students about earthquake locations and mechanisms, but little useful information is provided about how to actually prevent losses to one's own property.

Flooding (both riverine and coastal storm surge) remains the most expensive process-based hazard; and it is especially difficult to procure accurate dollar-value loss figures for floods. A very large part of the annual National Flood Insurance Program losses come from a disproportionately small part of insured lands, areas that flood repeatedly but whose structures are exempted from compliance by "grandfathering." Costs of developing flood-prone areas are obscured by annual reports that show "value saved" by flood control structures as opposed to flood damage done. On paper, the same structures are "saved" repeatedly. Students are not taught to question this, or to confront why losses from floods and coastal erosion have not actually decreased significantly over the past 30 years.

Summary

The unqualified successes in education have been in the production of competent geological specialists and in technical advances produced by sponsored research. We have technical expertise to cope with most hazards, and higher education can be justifiably proud of geology graduates. The primary failures have been in education of non-majors and the general public. Introductory geology courses and texts seem constructed more around what geology majors need to know, rather than around topics relevant to the everyday lives of most students. Although rich resources in publications and films on geologic hazards exist, the public isn't taught how to access them. In most general college curricula, ignorance of one's own planet is considered acceptable, as reflected in how few colleges actually require study of geology as part of the core curriculum. Selective science requirements that exclude geology and discourage teaching of small courses leave geology programs particularly vulnerable to elimination and cuts. Money thus "saved" by colleges ultimately costs the public orders of magnitude more, as public naiveté about geologic hazards lets costly (and sometimes foolish) legislation and policy go unchallenged. Some government agencies have been able to use fear and ignorance to mobilize billions of dollars for mitigation of nebulous hazards, while funds to produce basic information such as maps are made scarce. A national insurance program for hazards that could be operated profitably and provide significant financial protection hasn't been given the consideration it merits. Ignorance of geology is the most expensive geologic hazard because it weakens the public's will to use funds and available knowledge effectively.

REFERENCES CITED


Croke, K., and others, 1989, Asbestos in buildings: effects on residential and commercial real estate values: The Environmental Professional, v. 11, pp. 256 - 263.


Harvey, B. W., 1990, Classification and identification error in bulk insulation proficiency testing materials: American Environmental Laboratory, v. 4/90, pp. 8 - 14.


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LOUISIANA 4064
AGENCY: Dept. of Transportation & Development/Bd. of Registration of Professional Engineers & Land Surveyors
TOPIC: BUSINESS AND CORPORATIONS
SUMMARY: Relates to branches of engineering; includes added branches and other curricula.
AGENCY CONTACT: Paul L. Landry, P.E., Board of Registr. for Prof. Engineers and Land Surveyors, 1055 St. Charles Ave., #415, New Orleans, LA 70130
CITATION: LAC 48 IXI 902., 903 Engineering Branches
PROPOSAL DATE: 03/20/93
COMMENT DEADLINE: 06/03/93
HEARING DATE: 06/07/93

LOUISIANA 1121 AUTHOR: Theriot Sam
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION
SUBTOPIC: MINERALS AND MINING
SUMMARY: Relates to the legal counsel for the Mineral Board; deletes the authority of the Attorney General; deletes the authority of the Mineral Board; provides for the authority of the Secretary of the Department of Natural Resources; provides for related matters.
STATUS: 4/12/93 INTRODUCED.

LOUISIANA 1480 AUTHOR: Hammett
TOPIC: BUSINESS AND CORPORATIONS
SUBTOPIC: SPECIFIC INDUSTRIES, OCCUPATIONS
SUMMARY: Relates to professional liability of an architect, engineer land surveyor, or landscape architect, requires the filing of an affidavit alleging negligence.
STATUS: 3/30/93 INTRODUCED.

LOUISIANA 815 AUTHOR: Bankeston
TOPIC: BUSINESS AND CORPORATIONS
SUBTOPIC: SPECIFIC INDUSTRIES, OCCUPATIONS
SUMMARY: Relates to the Louisiana Geological Survey; provides for transfer of the Louisiana Geological Survey from the Dept. of Natural Resources to Louisiana State University in Baton Rouge; provides for powers, duties and responsibilities.
STATUS: 4/12/93 INTRODUCED.

MICHIGAN 1901 AGENCY: Department of Natural Resources
TOPIC: ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL
SUMMARY: Lists the definitions and regulations for aboveground tanks, contain ers, and contingency plans; defines hazardous waste.
AGENCY CONTACT: Department of Natural Resources, Waste Management Division, P.O. Box 30241, Lansing, MI 48909
CITATION: R 299.910 through 299.1105 Hazardous Waste Management/Tanks
PROPOSAL DATE: 03/1/93
COMMENT DEADLINE: 5/04/93
HEARING DATE: 5/04/93

MINNESOTA 1503 AUTHOR: Sparby
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION
SUBTOPIC: WATER SUPPLY AND PRESERVATION
SAME AS: S 1401
SUMMARY: Relates to water well inspectors; requires that well inspectors used by the Commissioner of Health be qualified for licensure as a well contractor.
STATUS: 3/29/93 INTRODUCED.

NEVADA A 481 AUTHOR: Committee on Commerce
TOPIC: FINANCIAL INSTITUTIONS
SUBTOPIC: LOANS AND CREDIT
SUMMARY: Relates to mechanics’ liens; provides a lien on the land and improvements thereon for the services of an engineer, land surveyor or geologist; provides other matters properly related thereto.
STATUS: 4/13/93 INTRODUCED.
NEVADA S 396  AUTHOR: Committee on Comm and Labor  TOPIC: BUSINESS AND CORPORATIONS  SUBTOPIC: SPECIFIC INDUSTRIES, OCCUPATIONS  SUMMARY: Relates to professional land surveyors; revises the provision concerning what constitutes the practice of land surveying; clarifies what information must be provided in a record of survey; revises certain provisions relating to the adoption by governing body of standards for setting final monuments to include the Nevada coordinate system.  STATUS: 4/14/93 INTRODUCED.


NORTH CAROLINA 2412  AGENCY: Department of Environment, Health, and Natural Resources  TOPIC: ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL  SUBTOPIC: SPECIFIC INDUSTRIES, OCCUPATIONS  SUMMARY: Concerns solid waste management, establishes the criteria for classifying all sanitary landfills, includes requirements for Municipal Solid Waste Landfill Facilities.  AGENCY CONTACT: Brad Rutledge, Solid Waste Section, P.O. Box 27667, Raleigh, NC 27611-7667, (919) 733-0922  CITATION: 15A NCAC 13B .0501, .1601-1604, .1621 - 1628, .1630 - 1637, .1680 Solid Waste Management  PROPOSAL DATE: 3/15/93  COMMENT DEADLINE: 4/15/93

PENNSYLVANIA H 1128  AUTHOR: Geist  TOPIC: BUSINESS AND CORPORATIONS  SUBTOPIC: SPECIFIC INDUSTRIES, OCCUPATIONS  SUMMARY: Amends the Professional Engineers and Professional Land Surveyors Registration Law. Provides for immunity from liability.  STATUS: 3/29/93 INTRODUCED.

PENNSYLVANIA H 1176  AUTHOR: Potrone  TOPIC: BUSINESS AND CORPORATIONS  SUBTOPIC: SPECIFIC INDUSTRIES, OCCUPATIONS  SUMMARY: Provides the selection of registered architects, professional engineers, landscape architects and land surveyors to provide professional services to Commonwealth agencies. Makes repeals.  STATUS: 3/30/93 INTRODUCED

SOUTH CAROLINA  AUTHOR: Canty  TOPIC: RESOURCE MANAGEMENT AND PRESERVATION  SUBTOPIC: MINERALS AND MINING  SUMMARY: Imposes a severance tax on the mining or quarrying of metalliciferous minerals or minerals and other minerals.  STATUS: 4/14/93 INTRODUCED.

SOUTH CAROLINA  AUTHOR: Neal/Williams  TOPIC: BUSINESS AND CORPORATIONS  SUBTOPIC: SPECIFIC INDUSTRIES, OCCUPATIONS  SAME AS: S 619  SUMMARY: Relates to the regulation of engineers and land surveyors; provides that graduation form a 4-year engineering technology program may be a qualification for registration as a professional engineer and for certification as an engineer-in-training.  STATUS: 4/14/93 INTRODUCED.

SOUTH DAKOTA  AUTHOR: McGraw  TOPIC: ENERGY  SUBTOPIC: OIL, GAS, PETROLEUM, AND COAL  SUMMARY: Relates to the sale of oil and gas well exploration and production; provides a declaration of public policy regarding management of oil and gas resources; defines certain terms; establishes a well or oil and gas conservation program; provides for the appointment of an administrator; relates to regulation of shallow oil and gas exploration and recovery; relates to promulgation of rules; makes other provisions.  STATUS: 3/31/93 INTRODUCED.

TEXAS 11457  AGENCY: Water Commission  TOPIC: ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL  SUMMARY: Relates to ground water protection design and operation; includes design criteria; leachate collection system; alternate design; special conditions (liner design constraints); geological features; soil and liner quality control plan; and soils and liner evaluation report. Establishes a minimum 30 semester hours geology, five years of experience and examination.  STATUS: Introduced 5/04/93

TEXAS 11458  AGENCY: Water Commission  TOPIC: ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL  SUMMARY: Relates to groundwater monitoring and corrective action; includes applicability; groundwater monitoring systems; groundwater sampling and analysis requirements; detection monitoring program; assessment monitoring program; assessment of corrective measures; selection of remedy; implementation of correctable action program; groundwater monitoring at Type IV landfills and facilities; constitutes for detection monitoring; and monitor well construction specifications.  AGENCY CONTACT: Nancy Frank Oresches, Manager, Groundwater Protection Section, Municipal Solid Waste Division, Water Commission, P.O. Box 13087, Austin, TX 78711-3087, (512) 463-8869  CITATION: 31 TAC 330.230 thru 330.231, 330.232 thru 330.242 Groundwater Monitoring and Corrective Action  PROPOSAL DATE: 3/30/93  COMMENT DEADLINE: 4/08/93

TEXAS 11542  AGENCY: Railroad Commission  TOPIC: TRANSPORTATION  SUMMARY: Concerns the cleanup of spills of crude oil from oil and gas exploration and production activities, including transportation by pipeline; establishes the standards and procedures for the cleanup of crude oil spills into soil; prevents the pollution of surface and subsurface waters of the state.  AGENCY CONTACT: Jane Hoffman, Staff Attorney, Environmental Services Section, Oil and Gas Division, Railroad Commission of Texas, P.O. Box 12987, Austin, TX 78717-2987  CITATION: 16 TAC 3.91 Oil and Gas Division  PROPOSAL DATE: 3/30/93  COMMENT DEADLINE: 4/29/93

UTAH 4935  AGENCY: Department of Environmental Quality/Division of Drinking Water  TOPIC: ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL  SUMMARY: Relates to source development; deletes portion of rule which pertains to Drinking Water Source Protection; includes definitions; authority and purpose; general; surface water; groundwater - wells; ground water - springs; and additional definitions.  AGENCY CONTACT: Williams B. Birkes, Division of Drinking Water, Department of Environmental Quality, 288 North 1460 West, 3rd Floor, Salt Lake City, UT 84114-4838  CITATION: R 099-16-1 thru 7 Source Development  PROPOSAL DATE: 3/15/93  COMMENT DEADLINE: 4/15/93

WEST VIRGINIA H 2710  AUTHOR: Beane  TOPIC: RESOURCE MANAGEMENT AND PRESERVATION  SUBTOPIC: MINERALS AND MINING  SUMMARY: Relates to the recovery of coal and coal bed methane.  STATUS: 3/25/93 INTRODUCED.

WEST VIRGINIA H 2799  AUTHOR: McGraw  TOPIC: ENERGY  SUBTOPIC: OIL, GAS, PETROLEUM, AND COAL  SUMMARY: Relates to oil and gas exploration and production; provides a declaration of public policy regarding management of oil and gas resources; defines certain terms; establishes a well or oil and gas conservation program; provides for the appointment of an administrator; relates to regulation of shallow oil and gas exploration and recovery; relates to promulgation of rules; makes other provisions.  STATUS: 3/31/93 INTRODUCED.

WISCONSIN S 274  AUTHOR: AIPG - Wisconsin Section  SPONSOR: Senator Brian Burke  TOPIC: Registration of Geologists  SUMMARY: Provides for addition of a five-member Professional Geologist Section to the Examining Board of Architects, Professional Engineers, Land Surveyors and Designers. Would require those performing geological work involving public health, safety and welfare or the environment in Wisconsin to be a Wisconsin Registered Professional Geologist. Sets standards for registration including degree, minimum 30 semester hours geology, five years of experience and examination.  STATUS: Introduced 5/04/93

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<td>Brian A. Emery</td>
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Note: Ben Parker Society $1,000 and over; Inner Circle $500 and over; Centurian $100 and over.
It look as though the honeymoon is really over now. The President is berating the opposition for not buying his economic stimulation package, causing loss of jobs, and holding kids hostage. While this is happening, the Republicans are accusing the Democrats and Administration of increasing the deficit by increasing spending, not providing income to cover the spending by cutting the pork and on ad nauseam. Watching the Congress on C-Span is enough to make one ill. It is difficult to relate the childish theatrics of our Congressional representation on TV to the people we voted into office.

In spite of all the rhetoric, there seems to be some common sense among a few of our legislators. Part of the change has been brought about, at least in part, by Kathy Benedetto, CPG-7853, and the ladies who took their case to the hill regarding the proposed changes in the mining law. There is hope.

We now have bills before the House and Senate (H.R. 1708 and S.775) that are reasonable and supportable. These bills are “reform” bills and retain the good features of the original bill while amending the troublesome sections. Both bills provide for increased revenues from fees and royalties, payment of fair market value for the surface of lands patented, assurance mined lands are reclaimed, and establish a hardrock reclamation program for abandoned mines. Royalties would be based on net value of minerals. Reclamation would be required based upon state laws or federal laws if there are no state reclamation laws in place. Sufficient bonding will be required to accomplish reclamation. Activity is not tied to land management plans; and access and land tenure rights are preserved. There will be no occupancy on claims except for mining purposes only. The bills also eliminate the designation of uncommon varieties. It’s my opinion that these bills address the needed changes, are reasonable and workable, and should be supported by all. The alternatives are quite the opposite. Those who are truly interested in conservation and the environment should be able to support these new bills in good conscience. Those who just want to eliminate all mining on federal lands will never be pleased.

The only hitch to all of this posturing is that, after passage, the bills go to committee for reconciliation. That is where the “real” law will be written. Congressman Miller has not changed his mind. He will do all he can to stop mining on Federal lands--so--the fight is not over by a long shot.

And, From The Public Lands News Vol. 18, No. 9, 5-29-93

"President Clinton April 26 fulfilled the dream of Secretary of Interior Bruce Babbitt- he gave the go-ahead to a new biological survey agency in the Interior Department. The National Biological Survey will be populated by existing biological research programs in the department. The agency is designed to prevent conflicts between commodity uses and threatened and endangered species, such as the clash in the Pacific Northwest over the spotted owl. Clinton didn’t actually establish the agency; that will be done formally by an order from Babbitt. But Clinton did okay the agency April 27. The biological survey will be financed by a $179.4 million fiscal year 1994 budget amendment. The amendment won’t really cost the government anything because it will be offset by reductions in other department programs, Clinton said."

Sorry folks, BS by any other name is still BS.

And now, once again, I am reminded that even an agency of the government with the highest of standards regarding the written word, can occasionally stumble. The DOOZY OF THE MONTH belongs to no other than the U.S. Geological Survey. Volume 58, No. 3 of the Federal Register (4-5-93) lists a meeting for all the world to see on page 17623. The Earth Observing System Land Processes Distributed Active Archive Center Science Advisory Panel will meet --- and for those of you who are hung up on acronyms - it is EOSLP-DAACSAP.

This is the longest panel title I have seen in almost 30 years of reviewing Federal Registers. It deserves an award of some type. Fortunately, I can’t think of an appropriate one. By the way, the meeting was held the first week in May and was open to the public.

Vol. 58, No. 67, (4-9-93)

Department of Justice, 41 CFR Part 128-1 - Seismic Safety Program: Proposed Rule. The DOJ proposed to issue rules to implement Executive Order 12699, signed by President Bush on 1-5-90. The E.O. requires all Federal agencies to ensure that any new building which is Federally owned, leased, assisted, or regulated is designed and constructed in accordance with appropriate seismic design and construction standards.


(There should be some seismic contracts for the Engineering Geologists out there).

Vol. 58, No. 72, (4-16-93)

Department of the Army, Corps of Engineers - Page 19806, Wetland Delimiter Certification Program - Training. The purpose of this notice is to announce the availability of training materials developed in conjunction with the Corps Wetland Delimiter Certification Program (WDCP).

A working draft of the training materials will be available this spring. This package has been developed for those who intend to provide wetland delineation training. The Corps intends to provide a list of potential sources for this training for those who wish to receive wetland deline-
ation training for the WDCP. If you want to be on this list, contact the Wetland Research and Technology Center of the Corps Waterways Experiment Station (WES). This list will be provided to Corps District offices nationwide for dissemination to the public.

For further information contact: To request a copy of the draft training materials, and/or be included on the list of trainers of this material, contact the WES, Wetlands Research and Technology Center, 3909 Hills Ferry Road, Vicksburg, Mississippi 35180-6199 phone 601-634-3664. For information on the WDCP, contact Ms. Karen Kochenbach, Office of the Chief of Engineers, Attn: CECW-OR, 20 Massachusetts Ave., NW, Washington, D.C. 20314-1000 phone 202-272-0199.

EPA


NGWA To Hire Washington Representative

We received a press release from NGWA in March announcing that the National Ground Water Association is gearing up to hire a Washington representative (lobbyist). Investing in a Washington representative will be a major financial commitment for NGWA, but according to their President, Pete Thein "Our membership has wanted to do this for a long time. With the changing political climate, it's more important now than ever to have a present in Washington."

According to the release, "NGWA realizes that having someone to speak for the industry from inside the Beltway is crucial. That person will not only understand the industry's needs, but will also have a firm grip on the political climate and process. Constant visibility is crucial to establish and maintain an effective relationship between the ground water industry and the Capital." "Our goal is to improve the ground water industry's relationship with Washington," concludes Thein. "We're well on the way to beginning that relationship."*


Includes 591 government, academic, and corporate libraries in the U.S. and Canada. Lists addresses, e-mail, fax, and phone numbers. Describes collections, access, and services. Provides current ILL procedures. New Feature - Internet addresses and protocols to access online public access catalogs at major university and government libraries.

The Directory sells for $35 per copy. Pre-payment in U.S. dollars is required. Make checks payable to the Geoscience Information Society. Price includes postage: priority mail for the U.S.; airmail for non-U.S. Send orders to: Publications Manager Geoscience Information Society, c/o American Geological Institute, 4220 King Street, Alexandria, VA 22302 USA.*

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Executive Director's Itinerary
(subject to change)

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

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<tr>
<th>Date</th>
<th>Location</th>
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<tr>
<td>Jun. 12-13:</td>
<td>European Federation of Geologists, Helsinki, Finland (?)</td>
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<td>Jul. 17:</td>
<td>AIGP Executive Comm. Meeting, Arvada, CO</td>
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<td>Jul. 20-23:</td>
<td>Council of Engrg. &amp; Scientific Soc. Execs., Baltimore, MD</td>
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<td>Sep. 9-10: (?)</td>
<td>West Virginia Section, Charleston &amp; Morgantown, WV</td>
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<td>Sep. 13-17:</td>
<td>Alabama, Florida, Georgia and Carolinas Sections</td>
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<td>Sep. 22-23: (?)</td>
<td>Kansas Section, Wichita &amp; Topeka, KS</td>
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<tr>
<td>Oct. 12-16:</td>
<td>AIGP Annual Meeting, Springfield, MA</td>
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Where The Jobs Are

William V. Knight, CPG-0153

As I travel around the country, meeting with our Members and others, speaking at various places, attending conventions, I try to keep my ears open. I want to know what people are doing and what they see in the future - both their own and our profession's. I have been hearing some rather interesting things lately.

There seems to be a rapidly increasing range of employment opportunities and styles. This is not to say that more jobs are available. But, it is to say that there seems to be a greater variety than ever before, and it seems to be continuing to expand.

First, the range:
A number of our Members, nearly starving as recently as one year ago, are extremely busy now. Most of these are now consultants whereas, in the past, they were company employees. Most were petroleum geologists, primarily in exploration. Now, those still in petroleum are primarily in development instead of exploration. Others, who used to be in petroleum, have found opportunities in environmental, mining, hydrogeology and engineering geology. At the same time, many of those who have always been in one of those fields have found opportunities in others.

It is like a giant game of musical chairs. But, every chair is labelled with the name of a field of practice. Instead of removing chairs, the labels are changed. In the process, some of the "petroleum" labels are replaced with other names, some old some new. Many of the labels are compound, reflecting the interaction and information transfers between fields. For example, we used to think of geophysics as pretty much limited to petroleum exploration. Now, we find it increasingly used in all the other fields. Thus, we have developing fields of practice such as "environmental geophysics." Geologists and geophysicists who spent years perfecting their science in the petroleum industry are now applying their sophisticated techniques to environmental, mining, water and engineering problems.

Geology is a very flexible and adaptable science. The professional who has a firm grasp of the fundamental principals of geology can adapt to almost any field of practice. It may require some retraining, but most of that is the learning of new vocabulary and techniques and not the learning of a whole new science.

Now, the style:
Once upon a time, most geologists graduated from college, went to work for a major oil or mining company and expected to stay there until they retired with a healthy pension. Something strange happened to many of these individuals once they got a taste of the challenge and romance of exploration. They became entrepreneurial. They decided that they could do the job at least as well as their employer; financial backers were available, and they took the plunge into the swirling waters of the independent. And, several did very well.

Meanwhile, the major companies consolidated, merged, etc., to form a few megafirms. These tended to eliminate duplicated personnel and facilities. Thus, the number of staff geologists was reduced. Then, the companies discovered that they could hire their former employees on a consulting basis and avoid the overhead and responsibilities of maintaining a permanent staff.

This trend has been evolving for several years in the oil and mining industries. But, we are now beginning to see it in the other major fields, as well. We see major consulting firms in the environmental, hydro and engineering fields increasingly "outsourcing" not just their administrative and laboratory work, but also their geological work. As a result, many geologists are becoming increasingly interested in such subjects as marketing of personal services, accounting, business management, etc. They are identifying their various professional niches and selling them in the market place. Some are discovering totally new areas of interest and applications for their technical background. And, in the process, they are rediscovering some things their pioneer ancestors knew very well, i.e., independence and the necessity of being self-reliant.

We still have the problem of underemployment among geologists, but the picture is changing. It is changing in ways that most of us never dreamed of. But, for the geologist who is imaginative, innovative, flexible and industrious, the opportunities are still available - and in greater variety than ever before.

JOIN US!

AIPG 30TH ANNUAL MEETING
"Geologists In A Strained Economy"
Springfield, Massachusetts
October 12 - 16, 1993
Pennsylvania's newly enacted statute provides for the licensure of professional geologists under the newly reconstituted State Board of Professional Engineers, Land Surveyors and Geologists (Act 151 of 1992).

The law, which received the full support of Pennsylvania's engineering community, will prohibit the practice of geology without a license effective February 16, 1994.

A grandfather clause will permit licensing on the basis of education and experience for the two-year period following the effective date of February 16, 1993 without examination. Thereafter examination will be required. Applications for licensure will not be available until late summer or early fall of this year.

Geologist Registration in Pennsylvania
Pennsylvania Senate Bill 963: Act 151 of 1992
Abstract prepared by Reginald Briggs

NOTE: This abstract covers only the bill enacted, not the law that is amended. For brevity, elements of lesser importance in my view are not treated. This abstract was done privately, and is not official. Copies of the act are available from the Senate Documents Room, 544 Main Capitol, Harrisburg, PA 17120, telephone (717) 787-6732 - R.P. Briggs 12/92.

SECTION 1. The act of May 23, 1945, known as the Professional Engineers and Professional Land Surveyors Registration Law as amended December 19, 1990, is amended. Amended short title - "Engineer, Land Surveyor and Geologist Registration Law."

SECTION 2. Definitions - "Board" means the State Registration Board for Professional Engineers, Land Surveyors and Geologists. [NOTE: Hereafter the many references to engineers and land surveyors are not repeated.] "Geology" means the science which treats the earth and the rocks and the other minerals which compose it; and the applied science of utilizing knowledge of the earth and its constituent rocks, minerals, liquids, gases and other minerals for the benefit of mankind. "Practice of geology", states in some detail, means the practice or the offer to practice geology for others for a fee [NOTE: These are the first definitions of geology and its practice in Pennsylvania law.]

SECTION 3. It is unlawful for any person to practice geology unless licensed and registered as a Professional Geologist. Persons shall be construed to practice who practice any branch of geology or who in any way represent themselves to be geologists.

SECTION 4. General powers of the Board - [1] Approval of geology curriculum for the education of students desiring to be licensed. [2] Licensing Professional Geologists, if such person either holds an unexpired issue by some other state in which requirements are of the same standard as in Pennsylvania [NOTE: reciprocity, which will have to be worked out state by state], or complies with the examination process. [3] Investigation of applicants [4] Provision for biennial registrations and setting fees. [5] Publication of rosters and registrants. [6] Suspension of licenses and reinstatement of suspended licenses when warranted.

CODE OF ETHICS - It shall be considered unprofessional or dishonorable for any professional to: [1] act for their client or employer otherwise than as a faithful agent or trustee, [2] attempt to injure others falsely or maliciously, [3] attempt to supplant other professionals after definite steps have been taken toward their employment, [4] compete with another professional for employment by the use of unethical practices, [5] review the work of other professionals for the same client without the knowledge of such others or unless the connection of such others with the work has been terminated, [6] attempt to obtain or render technical services or assistance without fair and just compensation commensurate with the services rendered, [7] advertise in self-laudatory language, [8] attempt to practice in any field in which the registrant is not proficient, [9] use or permit the use of their professional seals for work in which they are not in responsible charge, and [10] to aid or abet any practice not in accordance with this act or prior laws.

SECTION 4.1. The Board shall consist of the Commissioner of Professional and Occupational Affairs, three members from the public at large, five engineers, two land surveyors and two geologists. Terms of members shall be six years. Seven members shall constitute a quorum. The Board is subject to the "Sunset Act".

SECTION 4.4. The Board shall provide for a licensure examination, except during the first two years after the effective date of this act when the Board shall issue licenses to applicant who meet the requirements of [1], [2], [3], and [5] below. [NOTE: "grandfather" clause.] The Board must be satisfied that applicants are [1] of good moral character, [2] have graduated from an accredited institution with a minimum of 30 semester or 45 quarter hours in geology, geophysics, geochemistry or their subdivisions, [3] have at least five years of professional work in a responsible position, [4] have passed any examination adopted by the Board, and [5] have paid all appropriate fees.

SECTION 5. Exemptions - [1] Practice under the supervision of a Professional Geologist or by an employee of a person lawfully engaged in the practice. [2] Practice not exceeding 30 days in aggregate in one calendar year by a non-resident, if such a person is legally qualified to practice in the state of his residence. [3] Practice by Federal employees of manufacturing, mining, communications, research and development, or other industrial corporations, provided such work is in connection with the products or services of such corporations. [4] Practice in exploration or development of gas or oil.

SECTION 6. Practice being a function of individuals, it shall be unlawful for any firm to engage in such practice, unless officers and employees of such firm in responsible charge of its activities are licensed in conformity with this act.

SECTION 7. Each registered geologist shall use an authorized seal bearing the registrant's name and number and the legend "Registered Professional Geologist".

SECTION 11. Penalties - Those engaging in practice without being licensed or exempted or who otherwise violate this act shall be subject to fines not exceeding $1,000.00 or imprisonment not exceeding 3 months. Additional offenses merit greater punishment. In addition, the board may levy a civil penalty. It shall be unlawful of any person to practice geology without having a valid license.

SECTION 7 (of this act, not the amended act). Within 90 days of the effective date of this act the Governor shall nominate two geologists to the Board.

SECTION 8. This act shall take effect as follows: (1) the amendment of Section 3 relating to the unlicensed practice of geology shall take effect in one year; the remainder of this act shall take effect in 60 days. [NOTE: It is important to recognize that a geologist must have a license to practice one year after the effective date of the act, even though the "grandfather" clause extends to 2 years.]

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Financial Arrangements For Consultants

It is not ethical to make fees contingent upon your conclusions or upon outcome of a trial. That is, the opinions expressed by the professional geologist acting as an expert witness must be independent of the possible outcome of the case involved. This ethic applies whether the services are provided for your regular employer or for an outside client. Be certain this is clearly understood by your client and attorney prior to your acceptance of the case. For these reasons, it is recommended that your employer be an attorney in the case and that this employer be responsible for your billings as a temporary expense of doing business. Keep in mind, however, that you are representing and are actually indirectly employed by the attorney's client.

The law forbids the practice of champertism, which means the subsidizing of all or part of a lawsuit, either directly or through payment of expenses of the litigant, in return for sharing in the benefits of the lawsuit if the supported party is successful.

Provide your attorney with a detailed fee schedule before beginning your services. Obtain an advance retainer unless experience indicates otherwise. Charge a substantial retainer since it will eliminate those looking for "something for nothing" and it will at least discourage "dog in the manger" tactics.

Submit monthly invoices, particularly if substantial expenses are incurred. The invoices may include itemized summaries of your services by calendar dates. The invoices should show overall figures for hours and days spent on the assignment and the fee thereof computed in accordance with your standard fee schedule. The invoice should list expense items of significance for identification and reimbursement. Do not attempt to allocate fee and expenses for each item shown on an invoice.

Advise your attorney that you expect prompt payment of your invoices. Follow up if necessary. Understand that your relationship with your attorney can be stained if the case goes to trial, and there are substantial, long term, outstanding billings.

Charge fees which are commensurate with the professional services furnished.

Apply your fee schedule uniformly to all clients and all assignments.

Well in advance, advise your client of the estimated total cost of your services, including trial costs. This will give your client the option to consider and possibly use other alternatives.

Investigations And Preparation

Express an opinion only when it is founded on adequate knowledge. This means, in most cases, that you must make a substantial detailed investigation and study.

Personally inspect the site and evidence whenever possible. Witness all tests where practical and have them made to your instructions or be prepared to have the tester called as a witness. Understand the test results and their limitations.

Verify that you are qualified competent to deal with the pertinent subject matter. Inform your attorney if you feel that a specialist should be retained either in place of or in addition to yourself.

Make thorough detailed inspections, measuring dimensions and taking pictures when possible to provide documentation and study material.

Review all pertinent depositions, manuals, standards, literature and specifications.

Advise your attorney of the necessity for your making all calculations, analyses and tests necessary to establish and confirm opinion, and stress the possible consequences if such work is not authorized.

Explain to your attorney the need for timely preparation of trial exhibits and demonstrations. Cooperate in scheduling this work so as to minimize the possible expense to your attorney, and explain their probable value in either negotiations or trial. Be aware that the attorney in the case is the final judge as to whether to use an exhibit or demonstration in the trial proceedings.

Do not exaggerate in order to explain or clarify a point on an exhibit. Be careful of charts and curves relative to scale and boundaries. Do not prepare or use misleading exhibits.

If it becomes necessary to make evidence into your custody to preserve it, get a witness and record its prior condition and the circumstances under which it was obtained.

Preserve the chain of custody of all significant items to insure their positive identification and knowledge of their physical condition.

Provide the attorney in the case with a resume of your education, work history, registrations, professional affiliations and related experience, patents and publications.
and any other information which will assist him qualifying you as an expert witness.

Advise the attorney in the case that you recommend a review and rehearsal of your testimony just prior to trial. Practice and clarify wording on key questions and answers in your testimony, but do not memorize them. The sequence of questions, introduction of evidence and use of exhibits should be worked out with the attorney in advance.

The text of this booklet was originally prepared by a Committee of the American Institute of Professional Geologists (AIPG) consisting of: James R. Dunn, George A. Kiersch, Robert H. Paschall and Henry H. Bailey.

After Washington Meetings,
Women Miners Still "Deeply Concerned" Over Likely Job Losses

Kathleen Benedetto, CPG-7853, Western Resource Associates, Inc.

WASHINGTON, D.C.—After five days of meetings with members of Congress and Clinton Administration officials, a grassroots group of nearly 100 mining industry women from 25 states reported today that they are still "deeply concerned" over Washington's lack of knowledge of today's mining industry.

"There is no way that Congress can develop responsible mining law legislation without a better understanding of this issue," said Kathleen Benedetto, president of Western Resources Associates, Inc. and founder of the grassroots women's group, which includes geologists, environmental experts, engineers, metallurgists, equipment operators, and mining industry suppliers.

The group has just completed its second visit to Washington on behalf of the 8,000 women in hard rock mining whose jobs - along with many others - are threatened by current Congressional proposals introduced by Sen. Dale Bumpers (D-AR) and Rep. Nick Rahall (D-WV) that would force many western mines to close down.

Among the most common Washington misconceptions noted by the women's group were:

• A belief that there are still no environmental laws governing mining when, in fact, mining is governed by more than two dozen federal environmental laws and scores of state and local laws.
• An almost total lack of knowledge of the difference between hard rock mining, coal mining, or oil and gas development and why royalty programs for coal, oil and gas cannot be applied indiscriminately to hard rock mining.
• An alarming lack of knowledge regarding the huge revenues already being collected by the federal government from western mining.

"Today our industry has unprecedented capabilities to develop environmentally responsible mining projects," said Debra Struhsaker, an environmental permitting expert. "Yet we must face a public whose vision of us is colored by outmoded images of the past."

This type of misinformation and anti-mining rhetoric on the issue of mining law reform only serves to polarize the issue, according to the women's group.

"It's time for the recrimination and finger pointing to stop, and for all of us to work together to develop legislation which minimizes job losses, maximizes revenues and promotes environmental protection," said Susie Mason, land manager of Independence Mining Company in Reno, Nevada.
1993


August 1-5, 1993. International Symposium on Hydrometallurgy, Salt Lake City, UT. Contact: Meetings Dept., SME, P.O. Box 625002, Littleton, CO 80162, Ph.: (303) 973-9550.

August 8-12, 1993. SEPM Meeting, The Stratigraphic Record of Global Change: Climate, Eustasy and Life. State College, PA. Contact: Julie Ball, SEPM, P.O. Box 4756, Tulsa, OK 74159-0756, Ph.: (918) 743-9765.


September 7-9, 1993. Randol Gold Forum, Vail, CO. Contact: Randol International Ltd, 21578 Mountsfield Dr., Golden, CO 80401, Ph.: (303) 526-1626.

September 9-10, 1993. Appraisal of Oil & Gas Properties, Houston, TX. Contact: The University of Tulsa, Div. of Continuing Education, 600 South College Ave., Tulsa, OK 74104, Ph.: (918) 631-2347.

September 12-15, 1993. AAPG Rocky Mountain Section, Salt Lake City, UT. Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101, Ph.: (918) 584-2350.

September 15-17, 1993. WORLDTech 1 - International Congress on Mining Development, Philadelphia, PA. Contact: SME, P.O. Box 625002, Littleton, CO 80162, Ph.: (303) 973-9550.

September 19-22, 1993. AAPG Eastern Section, Williamsburg, VA. Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101, Ph.: (918) 584-2555.

October 3-6, 1993. Society of Petroleum Engineers, Oil & Gas Strategies in the 21st Century, Houston, TX. Contact: Programming Dept., SPE, P.O. Box 833836, Richardson, TX 75083.


October 10-12, 1993. AAPG Mid-Continent Section, Amarillo, TX. Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101, Ph.: (918) 584-2555.


October 20-22, 1993. AAPG Gulf Coast Section (GCAGS), Shreveport, LA. Contact: AAPG Convention Dept. P.O. Box 979, Tulsa, OK 74101, Ph.: (918) 584-2555.

October 20-22, 1993. Overthrusting Into Foreland Basins: Sedimentologic Consequences. Contact: Gerald M. Friedman, Northeastern Science Foundation, Rensselaer Center of Applied Geology, 15 Third St., P.O. Box 740, Troy, NY 12181-0746.

October 24-28, 1993. 5th International M.G.L.S. Symposium, Tulsa, OK. Contact: James K. Haltenburg, Symposium Chair, 336 E. 29th St., Tulsa, OK 74114-3905, Ph.: (918) 749-7224.


November 9-11, 1993. Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Restoration, Houston, TX. Contact: National Ground Water Association, P.O. Box 182039, Dept. #017, Columbus, OH 43218-2039, Ph.: (614) 551-7379.


1994


May 4-6, 1994. Rocky Mountain Section Meeting of the Geological Society of America, Durango, CO. Contact: Jack A. Ellingson, Technical Program Chair., Geology Dept., Fort Lewis College, Durango, CO 81301, Ph.: (303) 247-7244.


June 12-15, 1994. AAPG Annual Meeting, Denver, CO. Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101, Ph.: (918) 584-2555.

August 21-24, 1994. AAPG International Conference/Exhibition, Kuala Lumpur, Malaysia. Contact: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101, Ph.: (918) 584-2555.

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JUNE 1993 • The Professional Geologist
IN MEMORIAM

Robert B. McKeagney, Sr., CPG-0931

Robert B. McKeagney, Sr., CPG-0931, passed away on January 6, 1993 in Birmingham, AL at the age of 72. A Massachusetts native, he was raised in New Hampshire and earned a bachelor of science degree in geology from the University of New Hampshire. He also studied at the Massachusetts Institute of Technology.

Bob became one of the premier construction materials geologists in the country, as well as an outstanding engineering geologist. Bob’s first employment was with the U.S. Army Corps of Engineers, Boston District, where he benefitted from his contacts with a number of outstanding soil scientists in the district. Bob applied his knowledge to the design and construction of foundations for dams, airfields and heavy structures in New England and eventually to Virginia, Maryland and North Carolina during his service with the Norfolk, Virginia District as District Geologist. In 1952 he was assigned to the North Atlantic Division of the Corps to control construction materials for airfields being constructed in Greenland and North Africa.

The latter experience led to private employment which he would continue until his retirement. Bob was employed by the Asphalt Institute and later for New Haven Trap Rock Co., now Ticonn-Tomasso Co. He joined Vulcan Materials Corporation in Birmingham, Alabama in 1979 where he was employed in the Construction Materials Group. Bob retired in 1992 as Director of Technical Services and later served as a Consultant to the company. Bob served the public and private materials sector for 45 years.

For his work on the "Aggregate Handbook", a comprehensive work directed toward the materials business Bob received an award from the National Crushed Stone Association, the sponsor of the text.

Bob McKeagney was a Past President of the Alabama Section of AIPG and Past President of the Birmingham Chapters of the American Concrete Institute and the Construction Specification Institute. His civic activities were many including serving as a Chairman of the Sewer Commission and Chairman of the Elderly Housing Commission of Connecticut Kiwanis Club and active in the Inverness Kiwanis Club of Birmingham, Alabama.

Bob is survived by his wife Blanche McKeagney of Helena, Alabama, seven children and eleven grandchildren.

Adolf U. Honkala, CPG-0007

"Living Benefit" Added To AIPG Term Life Plan

A new feature of the AIPG Group Insurance Plan is designed to provide insured members or insured spouses with a terminal illness the option to use a portion of their life benefit while they are still alive. This feature is available when the insured has a life expectancy of twelve months or less. This life expectancy must be verified in writing by a physician.

The insured can select an amount ranging from 25% to 75% of their death benefit for payment. The choice may only be made once. The benefit will be paid in lump sum. All payments will be made to the insured individual.

Certificate Riders reflecting this benefit enhancement were mailed to insured AIPG members participating in the Term Life Plan with the March 1 renewals. If you would like further information about this benefit or any of the insurance coverages available from the AIPG Group Insurance Program contact the Office of the Administrator at 800-424-9883 or 202-457-6820.

Alamo Rent A Car To Join USAir Frequent Traveler Program

Alamo Rent A Car has become a partner in the USAir Frequent Traveler Program starting January 1, 1993.

This partnership means members will earn 500 miles every time they rent a car from Alamo in conjunction with a qualifying USAir flight.

Alamo currently serves 66 popular travel destinations in the USAir system and provides on-airport service in more than half of these co-served locations. "USAir is proud to add Alamo to its distinctive list of Frequent Traveler Partners which include Air France, Air New Zealand, Alitalia, All Nippon Airways, British Airways, Carnival Cruise Lines, Hertz, Hilton Hotels, Hyatt Hotels & Resorts, KLM, Lufthansa, Marriott Hotels & Resorts, National Inter- rent Car Rental, NationsBank, Northwest Airlines, Omni Hotels, Radisson Hotels, Sabena, Stouffer Hotels & Resort, Swissair and Westin Hotels & Resorts," said Don Witte, USAir’s director, marketing services.

Other airlines with mileage awards include Alaska (500 miles), Delta (1,000 miles), Hawaiian (100 miles for each car rental day), and United (500 miles).
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### Great Gift Ideas!

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<tbody>
<tr>
<td><strong>Tee Shirt</strong>&lt;sup&gt;1&lt;/sup&gt;, Russell, 50% cotton, white with royal blue silk screen AIPG seal. Sizes M, L, XL, add $2.00 for XXL.</td>
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<td><strong>Certificate</strong>&lt;sup&gt;3&lt;/sup&gt; (Add $2.00 for mounting - plaque sold separately).</td>
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AIPG certifies the qualifications of professional geologists prior to admitting them into membership. By means of a rigorous and thorough peer review process, the Institute investigates applicants who voluntarily apply for self-regulation through the Institute. This screening carefully evaluates their education, experience, technical competence, and ethical conduct. If they meet AIPG’s high standards, applicants are granted Certification and the title of "Certified Professional Geologist" (CPG). When the letters CPG follow an individual’s name, they proclaim to the public that this person has met the standards and subscribes to the Institute’s Code of Ethics and Bylaws.

Representation
Members are represented by qualified 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

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