WANTED - TPG ARTICLES
Instructions to Authors

The TPG accepts articles of modest length for publication. Submittals should be no more than approximately 1600 words, or six typed pages, double spaced. Longer articles may be divided into parts (e.g. part 1 and part II), but this is not encouraged. Articles may be technical or professional in nature. General topics are listed below. Articles containing news of importance to professional geologists will also be considered. Except for news articles, or articles containing dated materials, submittals should be sent to AIPG headquarters twelve weeks in advance of expected publication. Some technical topic issues are planned up to one year before printing, therefore early submittals will be preferred.

Manuscripts should have the following section:

Title
Author(s) with CPG number and address
Text
Tables if included
Figures with captions if included
Appendix(es) if included
Acknowledgements
References Cited

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

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

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

General Topics:

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

**Professional (any issue)**
- Government and the Geologist
- Ethics and Standards of Practice
- Public Perception of Geology and Geologists
- Definition, Certification, and Licensing
- Practicing Geology Internationally

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

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

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J. Dale Nations, Editor
Peer-Reviewed Papers
Risk-Based Corrective Action has Redefined Petroleum Remediation in the 1990s
Jeffrey A. Smith

3-D Visualization Software: A Multi-Purpose Tool for the Interpretation and Analysis of Subsurface Data
Daniel J. Lombardi, CPG-9497

PHILMONT: Embedded Memories; Enduring Tracks
Mona Schermerhorn

Request for Nominations

Tucson Gem & Mineral Show
FRONT COVER: View of the Lower Silurian Shavangunk Conglomerate which forms the prominent Kittatinny Mountains, part of the long, parallel northeast-southwest trending Valley and Ridge Province in northwestern New Jersey. The broad and fertile Kittatinny Valley, ablate with autumn foliage, is underlain by Cambrian and Ordovician age limestones and shales that were folded and deformed by the Taconic, Acadian and Appalachian Orogenies.
Photograph by John W. Jengo, CPG-8139

DEPARTMENTS
PROFESSIONAL ETHICS & PRACTICES - Column 24
LETTER TO THE EDITOR
MEMBERS IN THE NEWS
IN MEMBERS
CALENDAR AND ADVERTISERS INDEX
NEW MEMBERS, APPLICANTS, ETC.

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Introduction

In October 1996, the Oklahoma Corporation Commission’s Underground Storage Tank Department Fuel Division published “The Oklahoma Risk-Based Corrective Action Guidance Document”, and Oklahoma joined the list of states who now support the concept of remediating petroleum-affected sites based on site specific potential risk to human health and the environment rather than predetermined near-background soil standards and/or drinking water standards. An April 1996 article in Soil and Groundwater Cleanup listed 36 states that were then using some form of risk-based criteria to establish cleanup levels at petroleum sites, and the list has since grown (see Figure 1). Most of these states are utilizing some modified version of the “American Society For Testing and Materials (ASTM) Standard Guide for Risk-Based Corrective Action (RBCA) Applied at Petroleum Release Sites.” The trend towards RBCA is positive because remediation dollars are being spent more wisely and in proportion to human health and environmental risks.

What is RBCA

ASTM defines RBCA as a consistent decision making process for the assessment and response to a petroleum release, based on the protection of human health and the environment. The RBCA process takes into account the fact that petroleum-affected sites vary greatly in terms of complexity, physical and chemical characteristics, and in the risk that they may pose to human health and the environment. The RBCA process
uses such factors as present and future land use, distance to potential receptors, chemicals detected and their concentrations, exposure pathways, and fate and transport scenarios to determine site-specific, risk-based cleanup values.

Need for RBCA

In the 1980s, prior to the development and acceptance of RBCA in its present form, only two general methods of remediation were routinely applied at petroleum sites. Soil excavation and off-site disposal, and groundwater extraction and treatment were viewed as the only means of achieving regulatory requirements of near-background soil conditions and/or drinking water standards (Maximum Contaminant Levels or MCLs). For illustration purposes, let's take a look at the State of California.

Petroleum sites in California are regulated by the California Water Code. The Porter-Cologne Water Quality Control Act, Chapter 1 of the Water Code, stipulates that "those activities and factors that may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable." Consequently, many state and local agencies cited this Section in the Water Code as a means to mandate groundwater remediation to MCLs (California MCL for benzene is 1 part per billion) whether the site had affected a 5 foot deep brackish water-bearing zone near San Francisco Bay or a 200 foot deep drinking water aquifer in Sacramento.

Similarly, soil cleanup levels in many cases were mandated to be near background whether the site was used as a paved parking lot or a day care center. Not surprisingly, this practice resulted in extremely high remediation costs. Based on information from the California Underground Storage Tank Cleanup Reimbursement Fund, the average cost for a site involving groundwater remediation in California in 1994 was about $450,000.

In October 1995, a review was conducted by the Lawrence Livermore Laboratory and the University of California at the request of the State Water Resources Control Board that resulted in the publication of "Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks." The Livermore study stated that of the 12,151 public water-supply wells tested statewide, only 48 (0.4%) were reported to contain measurable benzene concentrations and that of 28,051 petroleum-affected sites in the California UST Reimbursement Fund Program, only 136 sites (0.5%) have reportedly affected drinking water wells.

The Livermore study stated that natural attenuation (hydrocarbons degrading as a result of natural processes) and intrinsic bioremediation (microbial activity ingesting hydrocarbons) were viable remediation options after the petroleum hydrocarbon source is removed. This hydrocarbon source may be in the form of tanks, petroleum-saturated soils, and/or separate-phase product on the water table. According to the study, more aggressive and expensive remediation alternatives such as pump and treat are recognized as being ineffectual in attaining MCLs in many geologic and hydrogeologic conditions. The study recommended that petroleum sites in California be remediated using a RBCA process that considers application of natural passive bioremediation processes, eventual land use, and existing and probable beneficial uses of water resources. The Livermore study initially was strongly opposed by many in the regulatory and environmental communities in California, and two years later its application still faces opposition by some local and regional agencies.

The Mace Study in Texas, published in mid 1997, is based on information compiled from the Texas Natural Resource Conservation Commission (TNRCC) files on 605 LPST sites. This study agrees with the Livermore study in that benzene plumes appear to be naturally attenuating and that active remediation such as pump and treat may be appropriate in only special cases with nearby sensitive receptors. The Mace study concludes that 75% of benzene plumes are less than 250 feet long and occupy less than 100,000 square feet. The report also states that these plumes follow 3 stages even without active remediation - plume mass increases, plume stabilization, and plume mass decrease - and that only 14% of the plumes studied are increasing in concentration and only 3% are increasing in length. This report notes that karst topography areas, such as the Edwards Aquifer, are probably exceptions.

Using RBCA

To show how the RBCA process works to protect human health and the environment and save unnecessary remediation dollars, let's look at a couple of former service station sites in Oklahoma.

Example 1: Bartlesville, Oklahoma

Five steel USTs were removed in 1989, soil and groundwater impacts were discovered, and investigative and groundwater monitoring activities were initiated. Elevated levels of benzene and total petroleum hydrocarbons (TPH) were detected. A Corrective Action Plan was submitted to the Oklahoma Corporation Commission (OCC) in 1993 and approved in 1994. A groundwater extraction/soil vapor extraction remediation system was installed in 1995 and began operation in January 1996. The estimated total investigative/remediation costs to attain site closure from the OCC using the predetermined cleanup levels for benzene was $400,000. However, Tier 1 and Tier 2 Risk Assessments prepared and submitted to the OCC in April 1997 illustrated that site benzene concentra-
tions were below risk-based screening levels. As a result, site closure was attained for a total of $280,000. It is important to point out that this cost savings was attained without significantly increasing the risks to human health or the environment posed by the site.

Example 2: Tulsa, Oklahoma

Five USTs were removed in 1995, soil and groundwater impacts discovered, and investigative activities initiated. Benzene concentrations exceeded OCC predetermined cleanup levels, and remediation costs were estimated to be $200,000. After the extent of contamination was defined, a Tier 1 Risk Assessment was submitted to the OCC in December 1996. Benzene concentrations were found to be below risk-based cleanup levels, and the OCC issued a site-closure letter in February 1997 stating “petroleum levels at this site pose no harm to human health, safety, or the environment.” Site closure was attained for a total cost of approximately $30,000.

Risk Assessments

Any good risk assessment will include a toxicity assessment and an exposure assessment because both toxicity and exposure must be present in order for a chemical to potentially adversely impact human health or the environment. Risk assessments are ultra-conservative by nature, building on a series of worst case scenarios. Realistically the true risk is probably much less than the calculated risk. Dr. Fred Hoeger illustrated this statement during a seminar in 1985:

“It can be said that the upper-bound estimate of rainfall for the United States is 15,000 inches per year. Since yearly rainfall in the U.S. averages from a few inches to 50 or 60 inches in Miami, Florida, my estimate of 15,000 inches per year sounds outlandish. For a moment, let me justify my estimate on the basis of prudent predicting principles. Historical record shows the highest single-day rainfall was 43 inches in Alvin, Texas in 1979. Simply multiplying this number by 365 days per year and extending this to the entire U.S. gives me my estimate of 15,000 inches.”

This extreme example shows how risk assessments, because they are usually so conservative, can instead of worst-case scenarios give us “never will happen in a million years” scenarios. Consequently, if a properly prepared risk assessment concludes that the risks associated with petroleum impacts at a site are acceptable and do not threaten human health or the environment, we can believe it.

Managed Risk vs. Zero Risk

There are those in the environmental community who feel that any amount of environmental risk is too much and that any cleanup level other than non-detect is unacceptable. Many people take risks daily with regard to their health and safety - smoking cigarettes, drink-

ing alcohol, getting a suntan, eating foods high in fat and cholesterol, or driving over 70 mph - and are perfectly willing to live with those risks. However, some of these same people want zero risk when it comes to environmental issues.

Dr. Jay Lehr is a Princeton graduate and self-proclaimed environmentalist who played a major role in the successful passage of federal environmental legislation including the Safe Drinking Water Act (SDWA) and the Resource Conservation and Recovery Act (RCRA) and who has for over 30 years been a leader in our nation’s environmental movement. He believes that environmental extremists are now carrying the battle too far. Dr. Lehr has stated that, “the way science is being practiced by some people today is all but scandalous”, and that it may eventually dawn on the public that they are being “hoodwinked” by environmental zealots who are trying to use the media to aggressively promote a nondetection limit for all undesirable chemicals. He further states that, as analytical methodology gets more advanced and yesterday’s zero is not tomorrow’s zero, requiring remediation to nondetect is unreasonable and may even be unethical (Lehr, 1990).

ABC news reporter John Stossel in an article entitled “Overcoming Junk Science” recently compared some risks that the media has hyped with more mundane risks that are not so “newsworthy.” Mr. Stossel found that the media favorites - for example, toxic waste sites like Love Canal - are at the least dangerous end of the spectrum (shortening the average life span by 0-4 days) and that hyping small risks may cause more harm than the actual risks themselves. For example, plane crashes received much media attention. People frightened of plane crashes (shorten lifespan by 4 days) are more likely to drive (shorten lifespan by 182 days), greatly increasing their risk.

Conclusions

In the 1980s, the movement for soil and groundwater remediation of petroleum sites was towards zero risk. Sites were remediated to predetermined generic cleanup levels using expensive, aggressive methods such as soil excavation and groundwater pump and
treat. In contrast, the 1990s have shown a movement towards managed risk. Petroleum-affected sites are now being addressed based on their potential threat to human health and the environment, and less expensive remedial methods such as natural attenuation are being utilized. This positive trend is expected to continue as even more states recognize the RBCA process. As a result, remediation costs will be proportional to risks, and big dollars will be spent on the sites that pose significant risks to human health and the environment.

References

Acknowledgments: Peter R. Clute, CPG-6038 and Robert A. Stewart, CPG-8332.

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3-D Visualization Software:

A Multi-Purpose Tool for the Interpretation and Analysis of Subsurface Data

Daniel J. Lombardi, CPG-9497

Visualization software has been used to effectively manage large quantities of geological, environmental, and engineering data in order to generate three-dimensional (3-D) images of oil and mineral prospects, geologic sequences and structure, groundwater horizons, and the extent of soil and groundwater contamination. The application of this software in the environmental industry has seen a rapid increase in recent years. Visualization software programs have been used to generate 3-D displays of the contaminants in subsurface soils and groundwater. These displays can be used to delineate the extent of contaminants, identify the source areas and preferred migration pathways, calculate volumes of impacted soil and groundwater for remediation costing purposes, and to select optimal boring and monitoring well locations for subsequent investigations. The software is capable of displaying all of these attributes together, or in any combination, to develop a comprehensive and realistic picture of the subsurface conditions at a contaminated site. Groundwater and fate and transport model data can also be imported into 3-D programs to visualize and predict contaminant movement in the unsaturated zone and groundwater.

A Picture is Worth a Thousand Words

Geographic information system (GIS)-based, 3-D visualization technology has found a unique niche in the environmental industry to characterize subsurface data. 3-D images provide a highly-detailed view and allow a clearer understanding of the fate and transport of contaminants relative to their origin and the geologic medium through which they migrate. This

Plate I: Extent of Methylene Chloride greater than 10 mg/kg in unsaturated soils. Black areas indicated concentrations greater than 1,000 mg/kg. Horizontal Plane is 170 by 360 feet and vertical plan is 60 feet. Viewpoint is towards the northwest.
technology enables the user to characterize the site data more effectively, model the contaminants, identify potential receptors, and develop remediation strategies. The 3-D images integrate small, large, or complex data sets into an effective representation of the subsurface conditions of a site.

Case History

3-D visualization software was used to interpret and delineate the extent of methylene chloride in unsaturated soils beneath a former manufacturing facility located in Illinois. A personal computer-based visualization software program was used to perform the data analysis. The program generated 3-D displays of methylene chloride detected in the unsaturated soils, identified potential source areas and preferred migration pathways, and calculated the volume of impacted soil based on several cleanup scenarios.

The site is located in an industrial park surrounded by residential areas. Residents in the area utilized private wells for drinking water. The shallow unconsolidated sediments consist predominantly of silty clay till with discontinuous lenses and seams of silty sand to sand. An isolated area with perched groundwater was encountered southeast of the site approximately 20 feet below the ground surface. The potable water supply for the nearby residents is obtained from a confined aquifer encountered approximately 70 to 80 feet below the ground surface. The confined aquifer ranges from 5 to 20 feet in thickness and the nearest potential drinking water well is located approximately 300 feet downgradient of the site. Unknown quantities of methylene chloride were released into the soils between 1972 and 1990. Beginning in 1987, several field investigations were performed to determine the extent and magnitude of impacts to soil and groundwater. Interim remedial measures were also designed and have been implemented at the site to address contaminated soil and perched groundwater under the State of Illinois' Site Remediation Program. The remedial measures included soil vapor extraction to remediate impacted soils, and groundwater pump/treatment and limited air sparging to remediate perched groundwater.

In 1996, a series of subsurface soil investigations were undertaken to further delineate the extent and magnitude of the methylene chloride, obtain data to calculate site-specific risked-based cleanup objectives, develop a final remedial measure for the impacted soils in order to obtain a No Further Remediation status from the Illinois Environmental Protection Agency, and to provide a basis for estimating the remediation costs. A total of 112 borings were completed using a hydraulic probe unit to depths of 21 to 55 feet. Horizontal control for the subsurface investigation was established using a 15 by 15 foot grid. Soil samples were collected and logged to boring completion depth. Soil samples collected at 2 to 5-foot intervals were analyzed for methylene chloride using a portable gas chromatograph. Methylene chloride was detected down to 55 feet and concentrations across the site ranged from non-detect to 4.3% by weight. The reported concentrations of methylene chloride and associated depths were input into the visualization software program and totaled over 600 discrete data points.

Concentrations of methylene chloride exceeding the most conservative soil remediation objectives established in Illinois were found at depths ranging from 41 to 55 feet at four boring locations. Alternative soil remediation objectives were calculated using risked-based equations established by Illinois Tiered Approach to Corrective Action Objectives (TACO) regulations. The alternative cleanup objectives were
calculated for the inhalation and migration to groundwater receptor pathways using the default soil property values established by the IEPA, site specific soil property data, and a combination of both values. The depth of methylene chloride exceeding the alternative soil remediation objectives was considerably less than 55 feet. The 3-D visualization program was used to display the extent of methylene chloride at various cleanup objective values. The displays were then evaluated to determine the depth, practicality, and cost of remediating the methylene chloride exceeding the alternative soil remediation objectives.

Displays of the subsurface geology at the site were generated to evaluate the presence of preferred migration pathways. However, the complex depositional sequences of the glacial deposits prohibited the correlation and generation of laterally-distinct geologic units by the software program. Instead, values of percent sand obtained from geotechnical data of various samples collected at the site and inferred values based on the boring logs were imported in the software program. According to the geotechnical data, the till deposits characteristically contain less than 25 percent sand, deposits of silty sand contain 45 to 60 percent sand, and the sand deposits contain greater than 60 percent sand. Over 1,000 data points were input into the software program to generate 3-D displays of the subsurface soils containing 40 and greater than 60 percent sand. These displays were used to identify the location and extent of preferred migration pathways or higher-permeability zones in the predominately silty clay till deposits.

The software program generated colorful 3-D images with detailed information about the volume of impacted soils, the location of source areas, and their migration pathways. The occurrences and migration of the methylene chloride correlated with the zones containing moderate to high percentages of sand and perched groundwater. The location of the predicted source areas also correlated with the potential source areas based on the historical operations of the facility.

The 3-D images and costs associated with the remediation of the soils at various concentrations and cleanup objectives were presented to the client. The images generated by the software program facilitated the decision-making process by providing a visual picture of the extent of the problem, making it easier to evaluate the remedial alternatives. Several 3-D displays of the extent of methylene chloride were also included in a remedial action work plan prepared for the state regulatory agency.

Conclusions

3-D visualization technology is a beneficial tool for compiling, interpreting, and presenting subsurface data at hazardous waste sites. The technology provides a basis for synthesizing and interpreting the relationships between chemical and geologic data. 3-D visualization is useful for characterizing subsurface conditions, locating potential source areas, delineating contaminant migration, facilitating subsequent investigations, evaluating and designing remedial alternatives, and monitoring the performance of existing remediation systems. Site owners, regulators, litigators, and the public will benefit from this technology because increased understanding of the nature and magnitude of chemical contamination will allow decision makers to develop timely, effective, and fiscally-responsible alternatives for remediation.

The accuracy of 3-D displays generated by visualization programs is dependent on the quality and quantity of the field data, experience of the user, knowledge of the site, and the quality of the software and computer hardware.

Daniel J. Lombardi, CPG No. 9497 is the Remediation Services Manager for Clayton Environmental Consultants in Naperville, Illinois. He has 11 years experience as a geologist/hydrogeologist and manages remedial investigations, remedial designs, and remedial actions at hazardous waste sites. Mr. Lombardi also specializes in groundwater modeling, fate and transport modeling, risk-based corrective action, and the design of several soil and groundwater remediation technologies. Clayton Environmental Consultants, Inc.; 1240 Iroquois Drive, Suite 206, Naperville, Illinois 60563; phone 630-369-0201; fax 630-369-1279; E-mail Claychieimr@AOL.com.

PHILMONT:

Boy Scout troop, World-Famous Troop 75, of Port Arthur, Texas, at the gold-mining camp of French Henry at the Philmont Scout Ranch. From the left, front row, Ryan Sullivan; Andrew Newton, crew chief; Charlie Pierce; and Erik Martinez. Back row: Steve Walsh, Philmont Program Counselor; John Allison, Scoutmaster; John Howard, CPG-8740, volunteer instructor and Senior Hydrogeologist with Secor International, St. Louis, Missouri; Lucas Liscano, chaplain's aid; Stu Carlson, volunteer, Bureau of Land Management mineralogy instructor program volunteer coordinator; and Robert Gossett.

Embedded Memories: Enduring Tracks

Mona Schermerhorn

Chances encounters with special people occur at Philmont so often one begins to wonder about the grand scheme of things at Philmont — as grand as the never-ending stretch of beauty laid out before us from our perch on Baldy Mountain.

"One such occurrence happened to me while I was sitting on the cabin porch swing reading 'Jurassic Park.' What a perfect setting for reading that book! Intermittently I would glance up and note the color change as the sun outlined the distant east mesa in a pastel purple while forming its own orange arc. The sun's rays were chasing the remaining whispers of last night's rain clouds off the east ridge of Ute Creek. The lower end of the L-shaped valley was filled with fog, a scene not unlike the image described in the book. I was there! The story tells of a time when Tyrannosaurus rex was king of the dinosaurs that roamed a jungle island park. Modern bioengineering brought back the terrible bird-like lizards of 65 million years ago as portrayed in the movie, but the view down the valley shrouded in fog was then! Real!

SHOES' WORTH OF WALKING. After a week or two of hitting the trails of Philmont's backcountry, words alone are not enough to express the relief some Scouts feel when their tracks lead them back to Base Camp. Some of the boots are held together with Philmont's all-purpose panacea: duct tape. They made it! (The Tooth of Time, the highest peak in the background, is a Philmont landmark.)

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"I was mentally transfixed to that time in history until faint screams in the distance brought me back to the present. A group of Scouts emerged from the forest, proud to have made it to Baldy Camp on their way to the top of the mountain. While they were filling their water bottles, one Scout approached me and asked, 'What book are you reading?' When I told him, he was ecstatic. 'ME, TOO!' he exclaimed. Then continued, 'All we need is a couple of those flying dinosaurs over our heads and this scene would be just like Jurassic Park!' Yes! For that brief moment we were one in thought — a joyous 'chance' encounter. Or was it really by chance?

"The whole camping experience, a win-win program for all involved, was much more than I had anticipated and one I will never forget. I speak for all of us when I say I hope to be part of the program again."


This quote sums up the feelings of the Bureau of Land Management’s first mineralogy instructors, an implementation team who helped establish an ongoing collaborative partnership between the Philmont Scout Ranch and the BLM, in 1993. That first summer, all the volunteer instructors used one word to describe their Philmont experience: "Magic."

IS IT GOLD? Ryan Sullivan and Robert Gossett listening to John Howard, CPG-8740, and Steve Walsh explain the content of their find: mica. "Because of it's shiny, bronze-yellow color, it's often mistaken for gold," Howard said. In the top photos Ryan Sullivan, Charlie Pierce, Andrew Norton and Lucas Liscano, are seen panning for gold (left). In the right photo, Howard is looking through his geologist’s hand lens to determine the content of Sullivan’s find.

The Philmont Scout Ranch, covering 214 square miles of wilderness, is located in the Sangre de Cristo Mountains in northeastern New Mexico near Cimarron, and is the nation’s largest high-adventure camp. With its 32 backcountry camps, each offering a different experience and challenge, BLM’s professional mineralogy program is a natural counterpart. Real-life geologists greet Scouts when they arrive at remote backcountry camps, such as Camp Baldy, a thriving gold mining community in the 1800s. They inform the Scouts of the mineral resources of the area and explain the vast terrain as far as the eye can see. The Scouts are introduced to the career field of earth science which is open to them. In the French Henry camp where Scouts have an underground mining experience, they will be led by a professional geologist through the process of gold panning.
Bill Wagner, BLM’s National Minerals Outreach Coordinator, at the Philmont Scout Ranch demonstrating the size of a fossilized track of the hind foot of a *Tyrannosaurus rex*, located in Philmont’s backcountry. Wagner’s hand and wrist approximate the size of a human foot by comparison to the footprint, which is 33 inches long by 28 inches wide. The depth of the infilling was about nine inches. After sketching an outline of the track on clear plastic, scientists made a latex mold of the track. This replica was made from a latex mold of the footprint. It is presently recognized as the only known fossilized track made by *Tyrannosaurus rex*.

and identification of the minerals that they find. Last year a Scout actually found a gold nugget worth about $300! The story of this “find,” which gets better with each telling, makes for earnest gold panners. Philmont staff tell Scouts of the camp’s history and dress in interpretive clothing of the 1800s. Cabins and utensils are exact replicas of that period of time.

Every summer some 20,000 Scouts from across the nation (and other countries) arrive at Philmont for their once-in-a-lifetime wilderness experience. With Steven Spielberg’s sequel to “Jurassic Park, The Lost World,” coming out this year, there had to be a number of Scouts among them with visions of *T. rex* country in their minds.

While numerous dinosaur tracks are located on Philmont’s grounds, only recently was the largest one (33 inches long by 28 inches wide), identified by Dr. Martin Lockley, a dinosaur track specialist at the University of Colorado at Denver, as the only known fossilized track made by a *Tyrannosaurus rex*. A replica of the track hangs in the trading post — the last place visited by souvenir-seeking campers. Departing Scouts, with memories of tracks they have seen in Philmont’s backcountry, will carry with them the vision of herds of dinosaurs whose footprints now blend with their own.

Mona Schermerhorn, (Assistant/publicist to BLM’s National Minerals Outreach Coordinator located in BLM’s New Mexico State Office at Santa Fe)

For information on the professional volunteer instructor program call Bill Wagner, BLM’s National Minerals Outreach Coordinator, Utah State Office at 801-539-4062 or Mona Schermerhorn, New Mexico State Office at Santa Fe at 505-428-7515.

Photos by Mona Schermerhorn/BLM.

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An Example of Apparent Plagiarism and One Way to Address It

Robert G. Corbett, CPG-4502, wrote, "As I read through Abstracts with Programs for a forthcoming national meeting of the Geological Society of America, I was surprised to see an abstract involving comparison of surface water quality for two remote and parallel valleys in the Yellowstone area. What caught my attention was that this was the topic of a presentation by a former student of mine at the national GSA meetings four years earlier. As abstracts generally do not reference earlier work, my curiosity was to see what the poster presentation would be about, and to share it with my former student, now employed in the Oil and Gas Division of a state geological survey.

"Both studies relied upon interpretation of water analyses from the USGS; both indicated that the lack of pre-[1988 forest] fire data made interpretation difficult; both noted the similarity in the parallel valleys. The more recent study included two additional years of data for water collected and analyzed since the original abstract. Both poster presentations properly credited the source of the analyses, and some information about water quality interpretation and local geology. The more recent presentation did not refer to the earlier presentation by my former student, a situation that I found startling.

"Because abstracts generally do not include attributions, there was no violation as far as preparation of the abstract goes. If these authors had seen the earlier abstract, then its omission from a list of credits (even if only in a poster presentation) was, I thought, a breach of ethics.

"What should I do? I asked the presenter whether he had seen the earlier work, and his answer was, 'Yea.' Why, then, didn't his list of credits include the earlier work? Because they hadn't gotten anything from it,' was the answer.

"My next step was to notify my former student and describe what had happened. I asked him what more, if anything, should be done as follow-up. After some review, he pointed out to me that his earlier background information search represented a massive effort on his part. He used diverse sources to identify equivalent sites, matched information on the burn from unpublished sources, and retrieved useful water data. He supposes that the new authors probably 'borrowed' the idea and the sites from his abstract, and simply updated the topic with the more recent data. He, also, considers leaving him off the credits to be unethical and involves plagiarism. However, there is currently no permanent written record of the breach. However the newer authors might continue the practice of lack of attribution in a published article.

"So, perhaps my actions were the appropriate ones. I confronted those involved in the plagiarism, received an explanation (however weak), and notified the original author, who was the person whose ideas had not been credited. Because the original author chose to let it pass, with the thought that my confrontation was sufficient to let them know that they were on shaky ground, I feel that my role in the matter is complete. However, should we see a publication with the same omission, I would write the journal charging plagiarism, and the academic department chair at the authors affiliation and present the situation for his/her consideration.

"This was a gray area. It could yet become a better defined situation of breach of ethics. I do not go out of my way to find such situations, but when I run into them, I feel the responsibility to take appropriate steps."

Corbett's example illustrates two important considerations of ethical practice in addition to the specific issue of plagiarism. The first is that individuals are at the front line of ensuring that ethical practice occurs. Not only are individuals obliged to act in an ethical manner themselves, they should identify ethically problematic situations around them and do something about it. The AIPG Ethics Committee can only act if it knows about a situation. Individuals must let the Ethics Committee know about situations.

The second ethical practice consideration raised by Corbett's example concerns the actions Corbett took to resolve the issue. He made inquiries about the facts and then acted to correct the situation. In this specific case, the AIPG Ethics Committee was not involved (assume for the sake of argument that the plagiarizer was an AIPG member) nor should it necessarily have been. Corbett's actions apparently provided a satisfactory resolution to the situation. I suspect that most ethically questionable matters are dealt with in this manner and believe this is entirely appropriate.

A consequence of handling ethical problems individually is that the Ethics Committee only becomes aware of the more serious problems. This has the negative effect of making it appear that the only resolutions of ethical questions are the most serious available, expulsion, suspension, etc. On the other hand, the Ethics Committee is a volunteer group with consequent limitations of time and other resources. As Chair of the
Ethics Committee, I appreciate those of you who take care of matters individually. I would appreciate receiving examples, like Corbett's, of actions individuals have taken to illustrate both the ethical issues and that individual counseling corrective actions do occur.

Re-application by a Formerly Expelled Member

John W. Rold, CPG-448, contributed the following scenario for our consideration. Some fifteen years ago a member of AIPG admitted to embezzling funds from an employer. After a criminal case was settled, AIPG began disciplinary proceedings towards expulsion. The member resigned rather than go through the disciplinary process. Since then the individual paid his debt to society and successfully renewed his geologic career. What should AIPG do if this ex-member applies to reinstate his AIPG membership?

Section 6.3 of the Disciplinary Procedures provides that "A member who has resigned during the pendency of disciplinary proceedings or who has been terminated as a result thereof, or an applicant who has withdrawn an application or who has been rejected on disciplinary grounds, shall not be permitted to reapply for membership in the Institute for a period of three years. A reapplication by such former member or applicant shall be referred to the Executive Committee, which may, in its discretion, defer readmission for an additional period not to exceed three years on the basis of the violations indicated in the Complaint. Thereafter, in the absence of a showing of subsequent additional violations, prior disciplinary action shall not be considered."

Therefore, the former member can re-apply for membership and, given the current rules, would be accepted. What is your view of this situation? Are there circumstances for which rehabilitation should not be possible? Please send in your thoughts.

Is "Geobasket Weaving" Contributing to the Falling Pass Rate? If Pass Rates Are Low, Should We Question the Test and Not the Test-Takers? (Column 22, Sept '97)

Neill H. "Vic" Ridgely, CPG-5138, wrote, "The recent discussion (column 22) by Bruce Darling, CPG-9636, and R.E. Whittemore, CPG-9077, about the indicated failure rates of registration candidates on ASBOG exams prompts me to revisit the issue as described by Robert E. Tepel in his Professional Licensure for Geologists: An Exploration of Issues (AEG Special Publication#7), and briefly mentioned by me in an earlier issue of TPG. [Ridgely's review is in the May '97 TPG].

"Tepel fully discussed testing issues in his Chapters 13-17, including:

- how to create a valid exam (13)
- what question formats are appropriate (14)
- what guidelines are relevant for multiple-choice exams (15)
- how to set a passing score (16)
- should state-specific questions be permitted (17).

"In my earlier review, I briefly touched on Tepel's Chapter 16 explanation of 3 common types of grading systems. Let me elaborate on how a 'passing score' can be established:

"(1) Fixed Percentage: This method designates an arbitrary number, say 70%, of successfully answered questions as passing. The main drawback is that the proportion of candidates passing is highly dependent on the difficulty of the examination' (Tepel, p. 59).

"(2) Norm-Referenced (grading on the curve): The main disadvantage of this method is that it causes candidates to compete against other candidates, not against a standard of minimum competency' (Tepel, p. 59).

"(3) Criterion-Referenced: This method attempts to construct an exam of fair questions by having a panel of Subject Matter Experts (SMEs) determine '...what percent of minimally competent candidates will answer this question correctly' (Tepel, p. 60).

"Tepel discounted Norm-Referenced scoring as a factor in modern licensing exams, and focused his attention on Fixed Percentage and Criterion-Referenced scoring systems. Fixed Percentage systems are in widespread legacy use by licensing boards, largely as a consequence of the requirements of the legislation authorizing registration. Fortunately, Tepel maintained, the new direction in testing—including ASBOG testing—adopts Criterion-Referenced exams.

"A passing score on an ASBOG exam is established by:

1. Having a group of SMEs take the practice exam.
2. Having the SMEs review exam questions afterwards with a psychometrician (test designer), and agreeing on a correct answer or answers.
3. Having each SME individually assess what percentage of minimally competent candidates would get that item correct, and then discussing the items en groupe to learn what degree of consensus is achieved.
4. Having the SMEs fine-tune their assessment by learning from the psychometrician what the candidate performance actually was on each item.
5. Determining the raw passing score by first averaging the individual SME estimates of minimal competency pass rates, and then scaling this number to 70.

"Tepel's premise (p. 49) is that exams designed in this way will be fair if they are constructed around what experienced practitioners in the field actually do (How much time is spent on the task? How important is it? How necessary is it for a licensed geologist to be able to do this?).

"The low pass rates anecdotally reported by TPG correspondents (32%, 40%, 52%, etc.) suggest that either the test construction methodology adopted by ASBOG is flawed in some way, or that the quality of students and/or recent graduates now being tested is demonstrably inferior to practitioners' expectations.

"Having no direct experience with ASBOG, but having a working familiarity with the caliber of graduate students I routinely encounter at work, both as summer hires and thesis candidates, I find it hard to believe that the explanation for poor exam performance is to be found in either a lousy pool of candidates or a legacy of 'geobasket-weaving' course work.

"On the other hand, licensing exams in other fields (accounting, law, medicine and engineering) are routinely considered to be brutal and rite of passage. To me, the relevant question is, 'How do the pass/fail rates for geologic registration compare to rates in these other specialties?'

Ridgely's review of Tepel's test grading and validation criteria are certainly worth continual evaluation by those giving the tests. I'm also pleased that Ridgely is continually encountering high caliber students. However, Seena Hoose of the California Board of Registration of Geologists & Geophysicists identified a clear correlation between failure rate and the number of "geobasket weaving" courses included on test-taker's transcripts (see column 22). Hoose's observations have been mirrored by a number of letters to Geotimes decrying changes in required course work for geologists. While periodic re-evaluation of required courses is appropriate, is there nevertheless a core of geologic courses which all geologists should take regardless of specialty? Are too many students now graduating without having this basic foundation?

Robert E. Tepel, Past President of AEG, also wrote regarding Darling's and Whittemore's comments. "I have served as a Subject Matter Expert on the ASBOG exam for many years, and am also a grader of the constructed-response problems on the California exams. My book, Professional Licensure for Geologists: an Exploration of Issues, provides extensive discussion of many of the points raised by the writers whose letters you printed.

"Is the ASBOG exam 'out of kilter?' The ASBOG exam, as is the case with any valid licensure exam, is based

on a Job Task Analysis of the profession. Using a statistically valid methodology, professional psychometricians (with the help of the Subject Matter Experts who write and grade the exam) survey the profession to determine the range of tasks typically performed at licensure by geologists. From this information, obtained from a large number of practicing geologists across the nation, a list of principal tasks is developed. The respondents also rank the tasks by time spent and by criticality. From the task list an exam blueprint is developed that governs the number of questions on each task. Thus the profession itself tells the Subject Matter Experts what topics to cover on the exam and how extensive the coverage should be. Because the exam is broadly representative, some candidates will perceive that the topic content of the exam does not mesh with their own range of knowledge and experience. However, a license to practice geology is a license to practice all of geology and it is therefore logical for the exam to do what it does: cover all of geology in a way that is representative of practice around the country as reported by real geologists. ASBOG publishes the task list (free) in a pamphlet titled Tasks of a Licensed Professional Geologist.

"I think that the pass rate on part 1 of the ASBOG exam would be improved by allowing students to take it in their senior year in college. (The engineering licensure exam is split this way). I am working to promote this, and I invite the readers to take up this cause. Some interesting studies of pass rates over time are now under way. I would not be surprised if the recent decline in breadth of geology courses needed for a college degree turns out to be a major factor in declining pass rates.

"It is natural and healthy for those outside the circle to question the bases of ASBOG's work. My experience with the ASBOG Council of Examiners and with the ASBOG leadership tells me that all ASBOG participants are doing a difficult job and are proceeding with great dedication and good faith (and with considerable unreimbursed personal expense in some cases). Here is the good news: if you, dear reader, would like to improve the ASBOG examination and contribute as a Subject Matter Expert to the fairness of ASBOG and state licensure board operations, you will be welcomed to the exam workshops with open arms. The only prerequisites are that you must be licensed as a geologist in an ASBOG state and sign a confidentiality agreement. The next workshop will be held May 15-16, 1998 in Chicago, Illinois. For information, contact:

Ms. Sam Swinehart, Executive Director
National Association of State Boards of Geology
P.O. Box 11591
Columbia SC 29211-1591
voice (803) 799-1047, fax (803) 252-3432
e-mail 102667.2674@compuserve.com

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"ASBOG Exam Workshop participants receive extensive reports and analyses of the prior exam. While these are best understood with the explanations provided during the workshop by the psychometricians, they are not confidential. Readers who would like a sample workshop report may write to me at my home address, 767 Lemonwood Ct., San Jose CA 95120 or fax me at (408) 997-6932. Abandoning modesty, I would say that those who are seriously interested in the issues of licensure should buy a copy of my book at $15.00 plus $2.00 shipping from the Association of Engineering Geologists, phone 508-443-4639."

An article, "Registration and Testing of Practicing Geologists: Implications for Academic Programs," by Robert Whitsonant and John C. Philley, CPG-4322, in the May '97 issue of TPG addresses the subject as well. Whitsonant and Philley's article contains tables outlining the 12 major areas or content domains covered in the ASBOG exam and the relative weights given each area in the fundamentals of geology and practice of geology examinations.

From the discussion in this column regarding state bias in licensing exams, it seems clear that recent ASBOG exams avoid this problem.

Tepel makes a major point when he suggests that the exam ought to be taken at the end of one's academic career, or at the end of the baccalaureate. Most of us were probably more "up" on more areas of geology then than we have been at any time since due to the focus developed in our professional lives. This is one reason I liked the suggestion made by Tom Fails, CPG-3174, that the Graduate Record Exam (GRE) be considered as the measure of knowledge of geologic fundamentals. The great advantage of the GRE for many of those of us, who like me, have been out of school for many years is that many, if not most of us took the GRE back then. I even have my scores. Perhaps some of the fear many of us feel when faced with the prospect of an exam (which may have more than a little to do with resistance to testing) would be lessened if ASBOG and licensing states would accept a documented GRE score as means of "testing" the "grandfathers" without requiring re-testing.

Thank You for a Good Two Years—Now Send in Your Contribution

In closing, this column completes a full two years of Professional Ethics & Practices columns. I thank all of you who have contributed to it, I appreciate the enthusiastic comments of readers, and, as always, urge you to contribute your thoughts, experiences, and questions without hesitation. A short question or situation can lead to one of the more interesting threads of discussion. I never know which item will trigger lots of discussion, but it's a lot of fun to see what unfolds. As the ad says, "just do it."

Request for Nominations

Officers

The 1998 AIPG Nominating Committee, chaired by Jonathan G. Price, is looking for suggestions for the slate of officers to be elected in 1998. If you know of a member whom you feel is especially qualified for the office of President-elect, Vice-President, or Treasurer of AIPG, please send his or her name in along with a brief statement as to why the person should be considered. Contact: Jonathan G. Price, Nevada Bureau of Mines & Geol., University of Nevada, Reno/178, Reno, NV 89557-008, (702) 784-6691, fax: (702) 784-1709, e-mail: jprice@nbmg.unr.edu.

Awards

The 1998 AIPG Awards Committee is seeking nominations for future recipients of the Ben H. Parker Memorial Medal, the Martin Van Couvering Memorial Award, the John T. Galey, Sr. Memorial Public Service Award, the Presidential Certificate of Merit, and Honorary Membership. The qualifications for these awards are found on pages 26 and 27 of the 1997 Membership Directory. Nominations for these awards, accompanied by supporting statements, should be sent to the AIPG Honors and Awards Committee, chaired by William L. Fisher, University of Texas at Austin, Department of Geological Sciences, Geology 118, Austin, Texas 78712-1101, (512) 471-5600, Fax (512) 471-9425.
Discussion

May I first say regarding R. Alan Welch's article on "Predicting Earthquakes" that I have lived in California for 76 of my 80 years. I now live two miles east of the Sierra Nevada fault system and three miles west of the Owens Valley fault, on which the Richter-7.9 quake of 1872 occurred. Two rolled maps parked conveniently by my desk are titled "Earthquake Map of California" and "Owens Valley Seismic Hazard Map." In the past three years I have read more than 5,000 pages of papers dealing with the geology of California.

With that introduction, I seriously question the usefulness of earthquake prediction, especially regarding its most important use, namely the prevention of deaths on a large scale. If it does not serve that purpose, it amounts to little more than scientific fun- &-games. I suggest that it does not serve that purpose for these reasons:

1. Unless the time of a quake can be predicted to within a few hours, prediction is useless. For example, there is no point in telling the public: "There is an 80% chance of a 7.0 earthquake occurring in this area within the next ten years."

2. It is equally doubtful that a rather exact prediction would serve a useful purpose in a loosely constructed society like the United States, as opposed to a rigid one like China. It's not possible to tell the 12,000,000 people in the Los Angeles Basin that all dangerous structures should be evacuated as of a given hour, and that all vehicles should avoid elevated freeways.

A more general problem attends earthquake prediction. Kobe was supposed to be in a seismically quiescent region. Since Kobe, the Japanese have abandoned as useless their 30-year-long program of prediction. A similar problem appears to prevail in southern California. In the face of repeated predictions of an ultimate "Big One" on the San Andreas fault, "surprise" quakes have occurred on thrust faults at San Fernando in 1972, Whittier in 1987, and Northridge in 1994. The last-named quake occurred on a "buried" thrust that no one knew existed, in a region of fairly well-exposed and intensively studied geology.

Some of the reasons for these doubly shocking events are evident in Alan Welch's paper. He said: "The accumulation of stress and the weakening of rock that precede an earthquake have measurable consequences." and also that: "For prediction purposes, it is important to know that the strain has built up to the point that the system of rocks is approaching failure by sudden slip."

Well, yes, but what can one do with those measurements? Consider a rock mass 30 by 5 km in an area and 10 km deep, that is stressed by fault movement. That volume of 1,500 cubic km weighs about 4.4 trillion tons, and may contain several rock units with notably different compressive and tensile strengths. Who is to say with confidence what their effective rupture strain is, or what the surface effects will be when that strain occurs? No one I know.

It is apparent, then, that I am dubious about Welch's conclusion that "Through a combination of modern geological exploration, compilation of records of historical seismicity, and growth of the science of seismology, the ability to accurately predict an earthquake cannot be far away."

Geologists and seismologists can, however, make an important contribution toward saving lives in a major earthquake. That can be done by continually working to demystify earthquakes in the public mind, and by telling people what to do to prepare for them. Unlike floods or hurricanes, quakes still pose a large element of mystery in many people's minds. They should therefore be told exactly how and why quakes occur, as simply another, if unpredictable, natural hazard that mankind must endure.

I attempted to do this three years ago with a series of three articles that were published in our local paper. Also: The day after we moved into our present home, I bought "L-braces" at the hardware store and attached several six-foot-high bookcases in our library to the walls. If a quake hits while we are downtown, we will not rush out to our car and drive home at flank speed. I can assure you that we do not have a large glass-framed picture of Great-Grandpa hanging above our bed. And so on.

Doing -- or not doing -- things like those will mitigate the loss of both lives and property. Much more so, I believe, than any program of earthquake prediction will ever accomplish.

Robert H. Paschall, CPG-118

Reply

I read with some interest the response of Mr. Paschall to my article on predicting earthquakes. While I firmly agree with Mr. Paschall, that preservation of human life is the single most important goal of earthquake prediction, I cannot agree that anything that does not serve this noble purpose is "little more than scientific fun- &-games."
I believe that any information which increases our understanding of our world and the manner in which it works has intrinsic value. To assume that anything beyond the realm of life-saving predictions is merely for our own amusement is a slap-in-the-face to every individual who studies geology.

Information gathered through accurate earthquake prediction can result in significant savings -- preventing the loss of both property and life. If, for example, we can predict within a certain degree of accuracy, that an earthquake of some magnitude will occur in a region like Kobe, which has been seismically quiescent for some time, we can use that information in the construction of new buildings and roadways. While this may not keep people off of elevated roads at the exact moment when an earthquake occurs, it could ensure that the structures which we add are built to survive the shake, rattle and roll of the earth's crust.

R. Alan Welch, CPG-8546

Dictionary of Mining and Mineral Related Terms

The second edition of the Dictionary of Mining and Related Terms is the culmination of a five-year effort between the U.S. Bureau of Mines and the American Geological Institute (AGI) to produce an up-to-date reference book to serve the needs of today’s mining industry. The Dictionary is published in cooperation with the Society for Mining, Metallurgy, and Exploration (SME). Technological developments and environmental laws and regulations that affect the mining industry have proliferated since 1968, when the previous edition of the mining dictionary was published. Concomitantly, the need for a modern mining dictionary -- one that incorporates not only standard mining-related terms but also references to the environmental, pollution, automation, health, and safety - has grown more acute.

The second edition contains approximately 28,500 listings, focusing on mining industry terms. Geological terms that relate to mining are also included, as well as new terms on marine mining, leaching automation, pollution, and the environment. Many of these terms now have a legal definition based on law or regulation.

More than 100 minerals and mining specialists at the U.S. Bureau of Mines as well as outside experts joined AGI’s publications team to produce the Dictionary. Although the bureau has closed, its minerals information functions have been transferred to the U.S. Geological Survey.

The Dictionary of Mining and Mineral Related Terms, 2nd edition, can be ordered from AGI’s publications Center, P.O. Box 203, Annapolis Junction, MD 20701. Telephone: (301) 953-1744; fax (301) 206-9789. ISBN 0-922152-36-5. Hardbound 8-1/2" x 11", 800 pages. List price $110.00; AGI Member Society price, $88.00, plus shipping and handling.

Tucson Gem and Mineral Show

The Arizona section of AIPG invites you to join us at our section activities scheduled during the Tucson Gem and Mineral Show. Arizona section activities include sponsoring a public talk by a NASA researcher who is bringing the Mars meteorite with signs of life (AHS84-001) and possibly a prototype of the Mars rover, a section meeting with the 1998 AIPG National President Stephen Testa as the featured speaker, a "behind the scenes" tour of the Tucson Gem and Mineral Show lead by AIPG member Erick Weiland, and an evening dinner.

The Gem and Mineral Show will start with wholesaler's shows the week of February 2nd, followed by the public show at the Tucson Convention Center February 12-15. AIPG activities will start on Thursday, February 12 with the NASA talk. The section meeting and tour will be on Saturday, February 14. The date of the dinner has not been determined at the time of this submittal, but will be either Friday or Saturday night. All AIPG members and their guests are welcome at the activities.

For additional information please contact the following:

General Show Information:  www.rockhounds.com/rockshop/scripts/toc/toc.cgi
Section Activities:  1998 Arizona section president Richard Allen (602) 481-9001 or rallen@msn.com
Dawn Garcia, Tucson AIPG member (520) 326-1898 or kdgarcia@flash.net

IN MEMORY

Ralph J. Bernhagen, CPG-0476, Honorary Member, member since February 16, 1965, Worthington, Ohio.

Bernard J. Esunas, CPG-2878, April 14, 1997, Dallas, Texas.

Wallace W. Hagan, CPG-4866, passed away on July 18, 1997 following an extended illness. Dr. Hagan served as director and state geologist for Kentucky from 1958 to 1978. During his tenure, he initiated and completed a statewide aerial geologic mapping project in cooperation with the U.S. Geological Survey. Due to Hagan's perseverance, this monumental program resulted in the publication of more than 700 detailed geologic maps, the first such state maps in the country. Hagan was also well known for his activities as a petroleum geologist. He received his Ph.D. from the University of Illinois and was a lifetime member of the American Association of Stratigraphic Palynologists. He was the recipient of the first Kentucky Section Lifetime Achievement in Geology Award in 1996 and along with Dr. William C. MacQuown, CPG-3915, played a very important role in the history of passage of registration legislation in the state of Kentucky.

N. R. Lamb, CPG-3189, August 18, 1997, Artesia, New Mexico.

Kenneth Wilson, CPG-0122, Charter Member, member since August 27, 1964, passed away on January 4, 1997, Menlo Park, California.
MEMBERS IN THE NEWS

Michael P. Convery, CPG-6773, has been appointed by Governor Arne Carlson to be the geologist member of the Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience, and Interior Design. In addition, Mr. Convery was elected chair of the Section of Engineering, Land Surveying, and Geoscience; one of two sections of the board. He replaces Ms. Jane Willard, CPG-6979, who was the first geologist appointed to the board. Mr. Convery is a supervisor in the well management program of the Minnesota Department of Health, involved with administering the regulations of wells and borings, well disclosure, and contractor licensing.

Florin Gheorghiu, CPG-8959, was chosen in the annual selection of Principals and Associates for the Atlanta-based firm of Golder Associates Inc. (Golder). Golder annually identifies those individuals who have contributed significantly to the growth and expansion in new arenas. Each Golder employee named has demonstrated a track record of professionalism, expertise and leadership within the company and strong partnering capabilities with clients. Florin has been with the Golder Philadelphia, Pennsylvania office for 8 years and is Project Director specializing in engineering geology and geophysics.

Dennis Goldman, CPG-4546, a registered geologist and certified hydrogeologist with more than 24 years of practice throughout North America, has been named Science and Education Counsel to the National Ground Water Association (NGWA) by Executive Director Kevin McCray. Dr. Goldman has been the principal of Earth Science Applications, Mukilteo, Washington and a variable employee for ENSR, Irvine California, but has also worked for several other private consulting firms. Dr. Goldman obtained his Bachelors degree in mathematics from the University of Illinois, followed by a Masters in computer science from the same school. He was awarded a Masters in hydrology from the University of Idaho, where he also obtained his Doctorate in geology.

Robert D. Goldman, CPG-7293, has been named the new President of Lexicon Environmental Associates, Inc. (Lexicon). The announcement was made by CEO Joyce A. Rizzo, who has held the position of Lexicon President since the Company’s inception in 1989. Mr. Goldman has been a Vice President of Lexicon for 8 years with responsibility for managing the Hydrogeologic and Remedial Services Group, and Corporate Health and Safety Program. As President, Mr. Goldman’s responsibilities will broaden to include overall business management of the Company. Goldman has over eighteen years of experience in varied hydrogeological, geological and geophysical disciplines including hazardous waste site investigations involving development and implementation of remedial programs. Before joining Lexicon, Rob was Manager of Geosciences for Hart Environmental Management Corporation. Prior to the, he held various geological and geophysical consulting positions for several firms in Colorado.

David W. Hupe, CPG-6474, was named General Manager of the Pittsburgh (Monroeville) office of TolTest, Inc. Mr. Hupe, a registered professional geologist in Pennsylvania, Alaska, Kentucky, and Delaware, received a bachelor’s degree from Slippery Rock University and for the last 11 years held the position of geological Sciences Department Manager in Michael Baker Corporation’s Environmental Division. Mr. Hupe brings 23 years of combined experience as a hydrogeologist, project manager and group manager to TolTest, primarily in the areas of groundwater protection and contamination investigation/remediation. Mr. Hupe got the lead for this new job by attending an AIPG Pennsylvania Section meeting. TolTest is a 70 year old, full-service environmental, geotechnical, drilling and testing company with primary offices in Toledo (corporate), Detroit and Pittsburgh.

William MacQuown, CPG-3915, a retired faculty member of the University of Kentucky was presented the Lifetime Achievement in Geology Award by the AIPG Kentucky Section at its Spring meeting in April. Dr. MacQuown
was very instrumental in the organization and promotion of the earliest attempts at passage of registration legislation in the State of Kentucky.

**John S. Moore**, CPG-6042, has been promoted to National Hydrogeologist/Fluvial Geo-morphologist, Conservation Engineering Division, Natural Resources Conservation Service, U.S. Department of Agriculture, Washington, DC. He will be responsible for the development of new policies that support the agency's national and international programs in the conservation, protection, and wise use of ground water and related surface waters. He recently completed an 8-week assignment with the Ministry of Agriculture, Eritrea, east Africa, to provide technical training and support in the development of irrigation water supply dams. While in "the neighborhood", he took a side trip to Tanzania to climb Mt. Kilimanjaro, Africa's highest peak at 19,340 feet in elevation.

**Darryll Pederson**, CPG-2723, has been elected to chair the Hydrogeology Division of the Geological Society of America, the Hydrogeology Division's highest office. Pederson a research hydrogeologist with the UNL Conservation and Survey Division (CSD), Geology, has been twice elected secretary-treasurer of the Hydrogeology Division, has served on the historical committee, has chaired the division's distinguished service award committee and was vice chair of the division last year. Each chair serves for one year, from the fall annual meeting until the next such meeting, which was October 19-25, 1997, in Salt Lake City and Toronto in 1998. The second vice chair, vice chair, chair and past chair constitute the management board of the Hydrogeology Division. Pederson, also a professor in UNL's Department of Geology, is a Fellow in the GSA and was given the Hydrogeology Division’s distinguished service award in 1994.

Chair duties involve planning the Hydrogeology Division's technical, business and award activities for the annual meeting, as well as nominating new committee members and being a spokesperson for the division and representing it to the rest of the GSA. Pederson has served on the Registration Board of the American Institute of Hydrology for the past 15 years, as well as chairing that board for four years. He has helped write the first exams for AIH certification and chaired the committee that rewrote the constitution and bylaws of AIH and is an AIH-certified hydrogeologist.

**John C. Philley**, CPG-4322, after a 37-year career at Morehead State University retired June 30, 1997, from full-time service to the institution. He began as an Instructor of Geology in the fall of 1960, ending his career as the Executive Vice President for Academic Affairs and Dean of the Faculty. Along the way he was promoted to full professor, served 12 years of Chair of the Department of Physical Sciences, six as Dean of the College of Arts and Sciences, and the last seven as vice president.

**Martin (Mort) Schmidt**, CPG-8432, has recently joined Cox-Colvin & Associates, Inc. Mort holds a B.S. and M.S. in geology and has worked as an environmental consultant and has experience in investigating water, soil, and air pollution, with an emphasis on radionuclide contamination. Cox-Colvin & Associates, Inc., located in Columbus, Ohio, is a full service environmental consulting firm providing technical support, regulatory support, and professional services to industrial and private-sector clients.

**Stephen M. Testa**, CPG-6464, has been selected to receive a honorarium for outstanding contribution to the applied sciences as part of the Geological Society of America Roy J. Shlemon Mentor Program in Applied Geology. Testa will be conducting a one-day workshop at the forthcoming GSA Cordilleran meeting scheduled for April, 1998. The workshop will be aimed at geoscience students soon to be entering the employment market and will include technical discussions in certain aspects of environmental geology, building and managing a consulting business, marketing, government regulations, contracts, litigation and expert witnessing.

**Jay A. Winters**, CPG-8134, is a new Associate of Golder Associates Inc.'s Houston, Texas office. Mr. Winters has been with Golder for 8 years and is Senior Geologist specializing in geology and environmental science.

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**AEG Appoints Executive Director**

The Association of Engineering Geologists (AEG) has appointed Norman R. Tilford, Professor of Geology and Consulting Engineering Geologist, the new Executive Director of the Association of Engineering Geologists (AEG). Professor Tilford's nomination by the Search Committee and ratifications by the Executive Council and Board of Directors of AEG followed a deliberate search extending over several months and involving a number of highly qualified candidates. In addition to a forty year history in AEG and in professional practice, Professor Tilford brings to his new post a decade-long association with the Engineering faculty of the Department of Geology and Geophysics at Texas A&M University.

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**Change of Address?**

Your monthly magazine The Professional Geologist does not get forwarded and costs the institute fifty cents each time it is sent back. When you or your business office is planning a move please send in your address change as soon as possible.

Jan. 17. World Wide Web Short Course for Geologists and Geotechnical Engineers, Fluor Daniel GTI, Martinez, California. Sponsored by the San Francisco Section of the Association of Engineering Geologists. Contact: Jack Alt at (510) 791-1986 or jjalt@home.com

Jan. 26-29. 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) 491-6081, e-mail: lhinshaw@vines.colostate.edu.

Jan. 28-30. Exploration Methods '98: Pathways to Discovery, conference and workshop, Vancouver, B.C. Contact: British Columbia and Yukon Chamber of Mines Technical Chr., 840 W. Hastings St., Vancouver, B.C. V6C 1B9, Canada.
Fax: (604) 681-2363.


Feb. 5-8. The Petroleum Landman's Association of New Orleans Ninth Annual Oil and Gas Seminar - PLANO, Beaver Creek, CO. Contact: David W. Rusch, 1795 W. Causeway Approach #203, Mandeville, LA 70471, Ph.: (504) 626-6484, Fax (504) 626-9416.

Feb. 15-20. Int'l. Erosion Control Assn., 29th Annual Conference and Trade Exposition, Reno, NV. Contact: 1998 IECA Conference Program, P.O. Box 774904, Steamboat Springs, CO 80477, Ph.: (800) 455-4322, e-mail: ecinfo@ieca.org.

Feb. 17-19. SPE India Oil & Gas Conference and Exhibition, , Hotel Ashok - New Delhi. Contact: Society of Petroleum Engineers, William Anderson, P.O. Box 833836, Richardson, TX 75083, Ph.: (972-952-8393, e-mail: spedal@spelink.spe.org


May 14-18. Linking Spatial and Temporal Scales in Paleontology 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: jeilms@aol.com.

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


1998

Jan. 11-16. American Meteorological Society Annual Meeting, Phoenix, AZ. Contact: M. Tolson, AMS, 1200 New York Ave., NW, Washington, DC 20005, Ph.: (202) 682-9006, Fax: (202) 682-9298, e-mail: toolson@ams.org

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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 Members 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.

1997
Nov. 20-22: Denver, Colorado, National Science Teachers Assn. Regional Meeting
Dec. 5: Washington, D.C., Geoenvironmental Forum - GeoCouncil Joint Meeting
Dec. 18: Reno, AIPG Nevada Section annual meeting on mineral exploration outlook

1998
Jan. 17 (tentative): Arvada, Colorado, AIPG Executive Committee Meeting
Convention Headquarters: Baton Rouge Hilton

Professional Geology, Mineral Resources and Our Environment

Baton Rouge, LA
October 3-5, 1998
Hosted by the Louisiana Section-APG and the
35th Annual APG National Meeting