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Installation of the Artesian Tolan Farm Well
Montague, Massachusetts

Raymond W. Talkington, Ph.D., CPG, LSP

Abstract

The Tolan Farm well site is located in Montague, Massachusetts on property owned by the Turners Falls Fire District. This well site is unique to the Connecticut Valley because of the extraordinary hydraulic pressure within the Tolan Farm Aquifer. The static water level at the well site is approximately 26 feet above ground surface and the “free-flow” from the well is approximately 1,000 gallons per minute. The Tolan Farm Aquifer is situated within a north-south oriented valley that is approximately 3.5 miles long. It is flanked on the east and west by till covered bedrock hills and bounded on the north and south by Montague Plain and Mount Toby, respectively. The subsurface stratigraphy at the well site includes the Tolan Farm Aquifer which is a layered, gray, fine to coarse sand and cobble gravel unit that is a least 57 feet thick. The aquifer is overlain by an approximately 130 foot thick confining layer which is composed of gray silt, fine sand, and clay horizons. The confining layer is overlain by a brown, fine to coarse sand unit that is of variable thickness.

In order to minimize the effects of the hydraulic pressure contained within the Tolan Farm Aquifer, the well casing was telescoped to a depth approximately 8 feet above the bottom of the confining layer. The well casing was extended to a height of approximately 10 feet above ground surface and clean fill brought in to build a new working surface. The drill rig was positioned on the new working surface and the casing was extended to a height of 30 feet above the original ground surface. Once the confining layer was pierced, the water level in the casing rose to a height of approximately 26 feet above the original ground surface. The 18-inch diameter, stainless steel well screen was then installed under “water table” conditions.

Introduction

The Tolan Farm well site is located in Montague, Massachusetts on property owned by the Turners Falls Fire District (Figure 1). In order to supply future and current water demands, the Turners Falls Fire District needed to maximize the groundwater withdrawal from the Tolan Farm Aquifer. The original district supply well, a 26-inch by 34-inch gravel developed well, was installed to a depth of 117.5 feet below ground surface (bgs) in 1964 (Figure 2). The performance of this well dropped off throughout the years from a yield of approximately 1,000 gallons per minute (gpm) to a yield of 250 gpm. This reduction in the yield was caused by a collapse of the confining layer as evidenced by the filling of the well screen with the silt from the confining layer. In 1975, an 8-inch diameter, naturally developed well was constructed to a depth of 158 feet bgs (Figure 2). The screen length for this well was 10 feet. This well was driven to a depth of 204 feet then pulled back to 158 feet in order to set the screen in coarse to very coarse sand and gravel. The 8-inch diameter well yields 500 gpm and was in service almost continuously for fifteen years while maintaining an approximately 26-foot positive hydraulic head (Figure 3).
The new 18-inch by 24-inch well “free flows” at approximately 1,000 gpm with 26 feet of positive hydraulic head (Figure 4). This well was driven to a depth of 187 feet with 37 feet of varying slot-size screen. Refusal was not encountered. A five-day pumping test was performed at a pumping rate of 1,560 gpm (Figure 5). The drawdown in the well was 27.5 feet or 1.5 feet below the original ground elevation.

The purpose of this paper is to present information on the installation method of the artesian Tolan Farm well.

**Regional Geology and Hydrogeologic Setting**

The Tolan Farm well site is situated within a north-south oriented, V-shaped valley. The north-south orientation of the valley approximately parallels the major fault-bounded troughs that formed as a result of tensional stresses during the early stages of rifting of North America from Africa approximately 200 million years ago. This trough or valley is underlain by predominantly red sedimentary sandstone, conglomerate, and arkose, whereas the hills to the east of the site are composed of Pre-Ordovician schists and gneiss of the Pelham Dome (Willard, 1951). These metamorphic rocks border the fault-bounded troughs. The bedrock is not exposed at the well site, but highly fractured sedimentary rocks crop out approximately 5,000 feet to the south. The metamorphic basement rocks crop out approximately 1,000 feet east of the well site.

The surficial geology of the area is composed of unconsolidated glacial and post-glacial sediments of Quaternary age that include glacio-fluvial, glacio-lacustrine, and ice deposits (Jahns, 1966; 1951). These deposits filled a pre-glacial valley in the area to the south of the well site. Till covered drumlins
crop out in the area surrounding the site and act as impermeable (no flow) boundaries. The glacial deposits at the well site are of two types: 1) brown, fine to coarse sand, which is interpreted as post-glacial; and 2) gray, clay to gravel, which is interpreted as glacial. The brown sand unit is fairly uniform and up to 10 feet in thickness. The gray clay to gravel deposits are divided into two major units: 1) gray silt, fine sand and clay unit that is approximately 120 feet thick (Figure 6); and 2) coarsely layered gray, fine to coarse sand and gravel unit that is at least 54 feet thick (Figure 7). The silt-clay unit is the confining layer, and the sand and gravel unit is the water-bearing formation that underlies the confining layer. The confining layer represents lake bottom deposits related to glacial Lake Hitchcock.

The water-bearing formation is composed of gray, fine to coarse-grained sand and gravel. Rounded to sub-rounded metamorphic cobbles up to 6-inches long were removed from a depth of 180 feet to 187 feet (Figure 8). Based on the well log for the 8-inch diameter well, refusal in the area of the well site is at a depth greater than 204 feet bgs. Aquifer sands and gravels were encountered down to this depth. Thus, the water-bearing horizon is at least 54 feet thick. A generalized geologic cross-section through the Tolan Farm well site is shown as Figure 9.

Based on the geologic relationships shown on the U.S.G.S. surficial geology maps for both the Greenfield and Mount Toby quadrangles, the pre-Lake Hitchcock ice-contact and glacio-fluvial deposits that crop out to the east, west and south of the site should represent good recharge areas. These deposits are exposed from elevations of approximately 260 feet to 400 feet above seal level.

The regional groundwater flow is from south to north with a hydraulic gradient of 0.005 ft/ft.

There is leakage from the aquifer through the confining layer and into the overlying post-glacial material and along fractures in the bedrock that surround the aquifer.
Well Installation

The installation of the Tolan Farm well posed some interesting technical issues because of the confined aquifer conditions. The greatest challenge was how to control the hydraulic head conditions of the aquifer. Fire District personnel informed us that an attempt was made to install a well a short distance from the Tolan Farm well location. However, during drilling, the hole blew out and the drill rig was nearly destroyed. Once the drill rig was removed from the blow out, approximately 50 cubic yards of gravel were required to fill the hole. Fire District personnel did not recall other details of this drilling accident. In addition, no records were available for the installation of the other water supply wells at the Tolan Farm well site.

Several 2 1/2-inch diameter observation wells were installed to obtain information on the thickness of the confining layer. This information proved to be very useful for the installation of the Tolan Farm well casing.

The cable tool drilling method was used for the installation of the Tolan Farm well. This method included the telescoping of the well steel casing (i.e. 36-inch, 24-inch, and 18-inch diameter casing), cleaning out of the well casing with the use of a sand pump, then the installation of the well screen.

A 36-inch diameter well casing was advanced to a depth of 71 feet bgs. This casing was advanced through the post-glacial deposits and into the silt-clay confining layer. This casing could not be driven any deeper into the confining layer because of the skin friction resistance with the clay and buckling of the well casing. Once the 36-inch diameter casing was cleaned out, the 24-inch diameter casing was installed and driven deeper into the confining layer to a depth of 113 feet bgs. The clay and silt was then removed from the casing. Due to the extreme hydraulic pressure in the aquifer, it was not advisable to pierce the confining layer with the existing configuration of the drill rig. A cement sanitary seal was installed from the surface to a depth of 113 feet. It was installed to this depth to minimize the chance of a blow out of the well casing and loss of the well.

In order to simulate water table conditions, the 36-inch and 24-inch diameter casings for the Tolan Farm Well and the casings for the 2 1/2-inch diameter observation wells were extended to a height of approximately 10 feet above ground surface (Figure 10). A 12-inch diameter overflow pipe was attached to the 36-inch diameter well casing (Figure 10) in order to re-direct the flow of ground water once the confining layer was pierced. Clean fill was then brought to the site for the construction of a new working surface to complete the construction of the well. The drill rig was then driven onto the new working surface and positioned over the extended 36-inch and 24-inch diameter well casings (Figure 11). The 24-inch diameter casing was then extended to a height of approximately 30 feet above ground surface in order to account for the anticipated water level rise in the casing once the confining layer was pierced. The 18-inch diameter well casing was placed inside the 24-inch diameter well casing and advanced.

Figure 11. View of drill rig on new working surface for Tolan Farm well.

Figure 12. (below) Driller's well construction log for the Tolan Farm well.

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Figure 10. Steel risers attached to Tolan Farm well (A), 2 1/2-inch diameter steel cased observations wells (B), and 12-inch diameter overflow pipe (C) prior to the placement of the clean fill to build new working surface.

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through the base of the confining layer (i.e. 130 feet bgs) and into the underlying aquifer to a final well depth of 187 feet below the original ground surface. As anticipated, when the confining layer was pierced, ground water flowed up the casings to a height of 26 feet above the original ground surface.

Samples of the aquifer material were collected from the base of the confining layer to the bottom of the well. Sieve analyses were performed on the aquifer samples to determine the slot size for the screen. Based on the sieve analysis results, a 37-foot long, 18-inch diameter stainless steel well screen with variable slot sizes was installed in the well from a depth of 150 feet to 187 feet bgs. The completed well construction is shown on Figure 12.

Once the well construction was completed, the 12-inch diameter overflow pipe was opened and the well allowed to “free flow.” The free flow for the well was approximately 1,000 gpm. With the well free flowing, the casings were cut off to a height of three feet above the top of the new working surface.

A 5-day aquifer-pumping test was performed on the Tolan Farm well at a pumping rate of 1,560 gpm. The drawdown at the end of the pumping test was 27.5 feet or 1.5 feet below the original ground surface. The specific capacity for this well was 56.7 gpm/foot of drawdown.

Summary

The installation of the Tolan Farm well appeared to be a challenge for drilling contractors. The strategy was devised based on available geologic information and drilling experience. This strategy provided the basis for the successful installation of a highly productive public water supply well in the Connecticut Valley of Massachusetts.

Acknowledgements

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Canada’s Growing Gem

Jason Crawley

Key Words
Canada, diamond, Chuck Fipke, Dr. Stu Blusson, Northwest Territories, Yellowknife, mine, mining, kimberlite, BHP Billiton, Rio Tinto, De Beers, Ekati, Diavik, Snap Lake

Abstract
This article gives an overview of the Canadian diamond industry including historical information, current projects, and future impact.

Few items in this world are as prized or recognized as diamonds. The images and symbols abound with just the mention of this mineral, which is a natural crystalline substance that has come to signify wealth, prosperity, status, and everlasting love.

A diamond is carbon in its most concentrated form. It is extremely pure containing only trace amounts of boron and nitrogen. The diamond’s nearest relatives are mineral graphite and amorphous carbon.

According to The Gemological Institute of America, diamonds were formed billions of years ago through a combination of tremendous pressure and temperatures of 2000° – 3000° F at depths between 75 and 120 miles beneath the earth’s surface.

But today’s diamond miners don’t have to dig that deep, because diamond crystals are found in volcanic kimberlite pipes, which carried the crystals closer to the earth’s surface through volcanic activity. Diamonds can also be found in alluvial deposits where the crystals settle after being transported away from the kimberlite pipes by geologic activity.

The first alluvial or riverbed diamonds were probably discovered in India around 300 BC. Dwindling Indian supplies probably spurred the exploration that led to the discovery of diamonds in Brazil, which became the next important diamond source.

Beginning in 1866, South Africa’s massive diamond deposits were discovered, and a worldwide diamond rush was on. The South African diamond output was unrivaled until major deposits were found in Siberian permafrost in 1954. Currently, Western Canada is the site of the world’s newest diamond rush.

This most recent rush follows the 1991 discovery by prospector Chuck Fipke and his partner, Dr. Stu Blusson. In the 1980s, the pair scoured the frozen rock of the Canadian Arctic’s remote tundra for samples that would show minerals often found in association with diamonds.

In 1985, Fipke found what he was looking for in a sample he had taken near Lac de Gras, approximately 185 miles northeast of Yellowknife, capital city of the Northwest Territories (NWT). In 1991, Fipke and Blusson’s company joined forces with Australia’s BHP Minerals and discovered the first economically viable kimberlite.

Drilling at Point Lake found 81 diamonds. Although not the first diamond find in North America, it was the first major commercial deposit. When the discovery was announced, it sparked the biggest staking rush in Canadian history.

Claims were staked over millions of acres. Since then, several of the world’s largest mining companies, including BHP Billiton, Rio Tinto and De Beers, have become actively involved. Currently, there are three main mining operations taking place in Canada’s NWT, Ekati, Diavik, and Snap Lake. It is anticipated that once all NWT mines reach full production around 2006, they will produce from 12% to 15% of the world’s diamonds by value — making

Hard Facts About Diamonds

• “Diamond” comes from the Greek “adamao,” transliterated as “adamau,” “I tame” or “I subdue.” The adjective “adamant” was used to describe the hardest substance known, and eventually became synonymous with diamond.

• Most diamonds are more than 3 billion years old, with the youngest being formed just over 70 million years ago.

• Diamonds were first discovered 4,000 years ago in Indian riverbeds. The first known reference to diamond is a Sanskrit manuscript, the Arthasastra (“The Lesson of Profit”) by Kautiliya, a minister to Chandragupta of the Mauryan dynasty (322 BC - 185 BC) in northern India.

• The practice of gathering them from the sand and gravel around rivers continued until 1870, when a diamond was discovered in the earth far from a river in South Africa, and dry-digging took over.

• According to diamond experts at The Gemological Institute of America (GIA) in Carlsbad, Calif., 250 tons of earth must be mined to produce a single one-carat diamond, and fewer than 20 percent of the diamonds mined worldwide are gem-quality. In addition, only one polished diamond out of a thousand weighs more than one carat.

• International Diamond Grading System™ based on the Four Cs (color, clarity, cut, and carat weight) was developed the GIA.
Canada is the third-largest producer of diamonds, ahead of South Africa.

After a slowdown in activity in the late 1990s, a large number of junior exploration companies are once again active in diamond exploration across Canada. Diamond mine finds are regularly reported as the search for more major deposits on the scale of Ekati and Diavik continues. The large mining houses are also spending the largest part of their diamond exploration dollars in Canada. According to De Beers, the company spent $14 million on Canadian exploration in 2001, and doubled that to $35 million in 2002.

In addition to the work happening in the NWT, feasibility studies are also being conducted in the Arctic at Hadley Bay on Victoria Island, and at Jackson Inlet on Baffin Island. Other Canadian locations include Buffalo Hills in Alberta, Fort à la Corne in Saskatchewan, the Otish Mountains in Quebec, and in Ontario on the northern shores of Lake Superior and Attawapiskat.

Overall, diamond exploration is taking place in about 60 prospecting areas across seven provinces and territories in Canada. About half of these are in the NWT.

According to Canada’s Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories, what separates Canada from other diamond producing countries is their commitment to responsible mining. The companies mining in Canada and the NWT must observe strong Canadian laws that protect the Arctic environment and the miners.

Before diamond companies can build mines in Canada’s Arctic, they are required to make a careful assessment of the environment. Under the permitting process, mining companies must demonstrate that impacts on vegetation, air and water quality, and wildlife populations are sustainable. In addition, social and economic impacts on northern communities are carefully examined.

To distinguish Canadian diamonds in the marketplace, Canadian diamond companies are experimenting with country of origin marketing. Market research has concluded that Canadians would definitely prefer to buy a Canadian diamond. However, it is sales and perception in the U.S. market that are most important considering it accounts for 50% of the world’s $56 billion retail jewelry industry.

While most Americans understand that Canadian mined diamonds have come to market through first-world labor standards and ethical means, the unanswered question is how to put a premium price on this value. The country’s cutters and polishers are attempting to do this by using branding to create market position and the selling price.

Beginning with the first diamond cutting factory that was built in Yellowknife five years ago, creating a product with a pure Northern image has been seen as a very important element in the marketing of stones which are cut and polished in the NWT. Furthermore, the NWT government initiative of providing a certificate of authenticity with each stone polished in the NWT has proved very popular with consumers in Canada, and is now making progress in the huge U.S. market.

On January 1, 2003, the diamond industry and the governments of diamond producing and trading countries
launched the Kimberley Process of certifying imports and exports. This agreement aims to put an end to the trade in “blood” or “conflict” diamonds, which had threatened to tarnish the image of all diamonds in the eyes of consumers.

The World Federation of Diamond Bourses (WFDB) and the International Diamond Manufacturers Association (IDMA) have recommended adding a similar “conflict-free” declaration to sales of polished diamonds. They have adopted a Code of Ethics barring members from handling conflict diamonds or buying from any person suspected of being involved with them. While it is estimated that only 4 percent of the world’s production could be considered conflict diamonds, this trade was threatening to tarnish the image of the whole diamond industry.

The development of this northern diamond deposit despite the high infrastructure costs in the Northwest Territories demonstrates the viability of exploration throughout Canada. When coupled with the exhaustion of existing reserves and possible expansion of sales to new markets, the sustainability of a Canadian diamond industry is increasingly apparent.

Canadian diamond exploration remains at a very early stage, with the potential for the discovery of world-class deposits remaining high when compared to producing countries such as South Africa and Botswana. The extent of “prospective ground” in Canada exceeds the southern African standard, with exploration requiring a more focused, multidisciplinary approach due to the impact of past periods of continental glaciation. The relatively unexplored nature of large areas of Canada, along with continuing evolution of geological models for North America, ensures that diamond occurrences will continue to be identified.

These new discoveries combined with Canada’s position in the market in terms of social and political issues will only help to improve its future standing as one of the world’s diamond industry leaders for years to come.

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Relieving Water Shortages with Aquifer Storage and Recharge

Dana Dutson

Aquifers store 97 percent of the world’s unfrozen fresh water and provide drinking water for one third of the world’s population. In the US, half of the population relies on aquifers for drinking water.

In the western part of the country, water shortage is a serious issue. Climate changes, poor water management, and growing populations have depleted water resources, including aquifers, causing the region to look for nontraditional solutions to increase the water supply.

In addition to providing water for people, aquifers sustain lakes, rivers, and wetland ecosystems. Aquifers draw from lakes, rivers, and swamps when the water table is low, and recharge them when the water table is high. Overdrafting affects ecosystems and water quality and causes land subsidence, sediment compaction, and salination of coastal aquifers.

According to the USGS, an aquifer is “a formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs.” Surface water filters through this geologic media and enters the aquifer. The natural recharge of aquifers can take less than one day or more than a million years. However, the rate of recharge is disturbed as the water is consumed by the population.

Aquifer storage and recharge (ASR) stores water underground until it is needed. Artificial recharge moves water into aquifers at a much faster rate. This water comes from streams, runoff, and wastewater treatment plants. Reclaimed water is sometimes the highest quality water available for recharge. When used in aquifer recharge, reclaimed water can lose its stigma and become more acceptable.

Storing water in aquifers is a cost-effective alternative to building more dams. Although dams catch water faster than aquifers, they have many drawbacks. Dams may have to be built far away from the population, but aquifers allow the water source to be closer to the population. According to Walter Swain in an article on ASR on the USGS web site, few large dams will be built in the future because of reasons including construction costs, environmental effects, potential for catastrophic failure, and the proximity of users.

**Recharge methods**

Planning an aquifer recharge project requires an understanding of water quality and the hydrogeologic characteristics of the aquifer. Geologists are continually studying various aspects of groundwater systems including new methods of aquifer recharge. Spreading and injection are the two main methods of recharge and have proven to be successful.

Spreading is the most common method of artificial recharge. Water is “spread” over the land using pits, furrows, ditches, which allows the water to seep into the aquifer.

Aquifer injection is another way to replenish aquifers in areas where spreading is impractical. Water is “injected” into the well through wells drilled into the ground. However, where spreading is a relatively simple concept, injection requires a greater understanding and knowledge of water quality and the hydrogeologic qualities of the aquifer. Injection is also more expensive partly because water quality requirements are higher for aquifer injection.

**The Politics of Aquifers in Developing Nations**

Over one billion people currently lack safe access to drinking water, and the UN predicts that half of the world’s population will face water shortages by 2025. Developing nations feel these shortages most critically. In developing nations, water is necessary for poverty alleviation, health and sanitation, economic growth, and environmental sustainability. Aquifers are an important part of providing an adequate water supply. In some areas, ground water is the only source of water.

However, many of these aquifers cross political boundaries, fueling contentions between neighboring countries. In the Middle East, where water supply is the lowest per capita in the world, Lebanon and Israel are currently feuding over Lebanon’s right to pump water from the Wazzani Springs.

When Lebanon planned to install a pump at the Wazzani Springs, but Israel’s Prime Minister, Ariel Sharon, threatened military action. The pump was installed, and threats from both sides have continued.

The Johnston Agreement of 1955 was created to distribute the waters of the Wazzani Springs between Jordan, Israel, Lebanon, and Syria. Although the Lebanese were allocated 35 million cubic meters (mcm) yearly, they only use around 7 mcm each year. The pump could have increased the water consumption to no more than 15 mcm, well below the maximum amount. However, the Lebanese are drawing only drinking water, even though they are in desperate need of irrigation water.

Similar situations may arise as the water crisis grows across the world. Alternative water resources, such as aquifer recharge, rain harvesting, and desalination may provide a solution, but research and development is not progressing at a rate that will relieve the crisis in the near future.
RELIEVING WATER SHORTAGES WITH AQUIFER (continued)

Effects of aquifer recharge

Although the quality of water for ASR must meet drinking water standards set by the Environmental Protection Agency (EPA), recharge can cause water degradation. Treating water for human consumption requires chlorination. The chlorine reacts with the organic material to produce trihalomethanes (THMs), which are known carcinogens. The most common THM is drinking water is chloroform. Studies have shown that the level of THMs in water can increase when it is in an aquifer. ASR can also result in increased levels of calcium, magnesium, sodium, and sulfate, which can change the taste and the “hardness” of the water.

The success of ASR depends on continued research and development. It requires an understanding of the aquifer characteristics and of the quality of existing ground water and recharge water. ASR combined with other water management strategies like more efficient irrigation, conservation, water recycling, and desalination, can ensure that we have a sustainable water supply for the future.

Works Cited


AIPG’s CPD Program Activated!

by Tom Fails, ex-Chair, Task Force for CPD

The recommendation of the CPD Implementation Committee for a Continuing Professional Development Program for AIPG was adopted in modified form at the 2002 Annual Meeting. Executive Director Bill Siok published an article on the CPD Program adopted in the November 2002 TPG which included copies of the Annual CPD Report forms to be used by Program participants. Since then, very little has happened. A number of CPGs are participating in the Program, maintaining their Annual Record logs and preparing their Annual Summary and Report for CPD. A few are now arriving at Headquarters. But it is difficult for these Participants to obtain answers to their questions and to find out who is in charge of CPD. The simple answer is that since October 2002, no-one has been — until now.

The Task Force for CPD and the CPD Implementation Committee were both abolished in late 2002, but nothing new was created to actually run AIPG’s CPD Program. Until now. Incoming President Bob Corbett asked me at the Glenwood Springs Annual Meeting and again in mid-November to make suggestions “to round out what is still needed for the CPD Program.” Due to an e-mail “failure,” my response was not received by Bob until mid-January, 2004. In it, I proposed establishment of an interim Ad-hoc CPD Committee during the first quarter of 2004 which would function for the remainder of 2004. As Ad-hoc Committees in AIPG have a one-year life, the Ad-hoc Committee will be replaced by the end of 2004 by a permanent CPD Standing Committee. Until then, once set-up, organized and publicized to the membership, this Ad-hoc Committee will start by:

1) publishing the CPD Manual;

2) establishing phone, fax and e-mail contact “numbers” where present CPD participants and those considering participation in the CPD Program can make inquiries, ask questions and get answers; and

3) start receiving completed applications, and after an initial review, sending them back to the applicant’s Section Screening Committee for review and recommendations back to a newly-established National CPD Screening Committee.

All of this will not be in place by the end of the first quarter, but we will have made a start on it by the end of the second.

This necessarily brief article is being placed for publication in the March-April TPG at the last possible opportunity. A more complete article dealing with these issues will appear in the May-June TPG. I will be contacting some former Task Force members to join the Ad-hoc Committee soon, but want to bring in some new blood as well, especially CPGs who are at present participating, or trying to participate, in AIPG’s CPD Program. The frustrating experiences of these folks, and their suggestions for improvements, will be welcome and acted upon.

So, please give us time — help is on the way.

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Personal Reflections on Saratoga Springs, New York: Hydrogeological and Horse Racing ‘Hot Spot’ of the East

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Last year, thoroughbred horse racing once again piqued the nation’s collective interest. An epic battle to win a possible Triple Crown began the year, and a full-length movie was released on the famous Depression-era racing horse, Seabiscuit. Saratoga Racetrack, located in the scenic and historic upstate New York community of Saratoga Springs, is arguably the most famous thoroughbred racetrack in America. There, racing and hydrogeology have been linked for almost 150 years.

Before racing, Saratoga was famous for its unusual salty, excessively carbonated, cold water springs that sometimes discharge in geysers (Figure 1) along a north-south normal fault system. The free-phase carbon dioxide gas occurs at calculated partial pressures greater than one atmosphere in the confined, Paleozoic age, carbonate aquifer hosting the waters (Putnam and Young 1988). The Mohawk, and other Native American Indian tribes, discovered the mineral springs (Back et al. 1995; Davis and Davis 1997) probably from precipitated subaerial travertine cones and other calcium carbonate deposits at the spring heads (Figure 2). After American colonization, the many different kinds of spring water fostered a European Baden-Baden-style spa culture, complete with medical programs designed to treat indigestion, liver and kidney difficulties, rheumatism, gout, and even emotional/psychological conditions (Back et al. 1995). Saratoga spring water sold in New York City for as much as $1.75 per pint in 1856 (Steele and Perry, 1856).

The popularity of “taking the cure” fostered economic development and, by the 1800s, Saratoga had some of the world’s largest hotels, patriotically named the Grand Union, the Congress, and the United States (Figure 3). Some of these edifices had thousands of rooms, much as Las Vegas hotels do today. Visitors to the springs included the writers Henry James, Edgar Allan Poe, Robert Louis Stevenson, and James Fenimore Cooper; and Presidents George Washington and Ulysses S. Grant. Even the famous Marquise de Lafayette of France took the cure (Waller 1966). In summers, the famous Austrian composer Johann Strauss brought his ensemble to play waltzes in the courtyard of the United States Hotel.

The spring culture also attracted Tammany Hall-connected boxer John Morrissey and gambling. Morrissey built the racetrack (1863) and Canfield Casino in the city’s beautifully landscaped Congress Park (Figure 4). Guests could peer through the windows and see mineral water spurting from several springs covered by stately Victorian-style gazebos.

Speaking of gambling, my grandfather, in the 1930s and ‘40s, did business with gangsters including Leo Rothstein (on whom Francis Ford Coppola patterned Hyman Roth of Godfather II fame) and, reportedly, Al Capone. Grandpa sold furniture, not booze. In the early 1980s, my wife and I were the first couple married in the casino’s restored craps room.

Saratoga provided much of the bottled water in the United States in the late 1800s. Dozens of wells were drilled to extract carbon dioxide for the seltzer industry. The New York City expression, “I’d like a two cents plain,” refers to the seltzer drink made by charging flat water with compressed carbon dioxide from Saratoga. Approximately 150 million gallons of Saratoga mineral water were pumped each year to remove gas and, by 1904, the potentiometric surface in the aquifer dropped 30 meters. New York State recognized how unique the springs were, purchased many of them, and prohibited pumping.
Eventually the aquifer potentiometric surface returned to nearly natural levels (Davis and Davis 1997), although many of the spring casings already had been fitted with pumps to help remove the water. The remaining springs are now protected, maintained by the state and city, and free to the public.

My first job as a young teen in the late 1950s was serving bottled mineral waters to tourists at the Drink House, located on Broadway Avenue. The now defunct Saratoga Bottling Company commercially bottled waters from three springs—Geyser, Coesa, and Hathorn #3.

Geyser Water is alkaline and was used as a highball mixer and digestive aid (think Alka-Seltzer). It tastes like club soda with a pinch of salt. I have fond memories of Geyser Water with the green label advertising, "It’s ok to drink."

Coesa Water had enough dissolved manganese and other salts to be a mild laxative, and the bottle had an appropriate yellow label implying "caution."

Hathorn #3 bottles were labeled red—"Stop, unless you know what you are doing!" Hathorn #3 water has half the salinity of sea water and so much carbon dioxide that bottles exploded when they warmed and the carbon dioxide exsolved. At my juvenile urging, naïve tourists would buy a case of Hathorn #3 from me and drive back to New Jersey or New York City, only to discover in their car trunk nothing but shattered glass and salt water seeping into their suitcases. Once, as a practical joke, I almost suggested a drink of Hathorn #3 water to Emile Griffith, the then world welterweight boxing champion. Fortunately, prudence overcame my youthful valor, and I am here today to tell the tale. Hathorn #3 is an extremely effective purgative, which, when taken with a cup of coffee, produces nearly instantaneous results; it probably should have been named "Hathorn #2" based on its particular medical effect on the body system.

Just an aside—the state of New York installed pay toilets in the Drink House, in perhaps the most egregious attempt to earn cash I’ve ever heard. There was a sign in the bathroom stating that anyone leaving a mess would be "persecuted" (sic, prosecuted) and, indeed, we staff would persecute repeat offenders.

The diverse chemical compositions and unusual occurrence of the Saratoga springs have been scientifically studied for more than 100 years (Steele 1840; Cushing and Ruedemann 1914; Kemp 1912; Putnam and Young 1985). High-pressure carbon dioxide discharges are restricted to young orogenic belts (Barnes et al. 1984), but there is no measurable geothermal anomaly in the Saratoga region (New York State Energy and Development Authority 1981, 1983). Mixtures of meteoric water recharge, brine, water-rock interaction, and free-phase carbon dioxide cause the different chemical compositions of the waters (Siegel 1996; Putnam and Young 1985).

Recent geochemical work by Lesniak et al. (2000) resolves some of the major geochemical issues. The strontium isotopic content of dissolved strontium and the stable isotopic compositions of the mineral waters are consistent with a brine component normally found in Canadian Shield crystalline rocks, rather than brine formed from dissolving rock salt or related to hydrocarbons found in sedimentary rocks of the Appalachian Basin of western New York. The closest Canadian
Shield rocks are in the Adirondack Mountains, located at higher elevation and approximately 20 miles northwest of the springs. The stable isotopic composition of the carbon dioxide gas is very similar to that in carbon dioxide from magmatic and mantle sources. These carbon isotopic data, coupled with measurable mantle helium in the spring waters, suggest there is a magmatic source under Saratoga Springs, but too deep to be identified by changes in the geothermal gradient. Rising, deep-seated magma near Saratoga may be consistent with earthquake activity, recent uplift, and geophysical anomalies under the Adirondack Mountains (Isachsen 1975, 1981; Brown et al. 1983; Torgersen et al. 1995).

Although more hydrogeologic work needs to be done to test whether the spring water chemistry partly reflects deep tectonic processes, I recommend hydrogeologists visit Saratoga Springs some August for simply gustatory reasons and a day at the nation's most beautiful racetrack. Recently, the track drilled its own mineral spring and you can now experience the highest quality horse racing while quaffing down a glass for me. Don't worry. It's not Hathorn #3.

References


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Erratum: Don's wife Bette has pointed out to him that he was married in 1975, not in the early 1980's, in the restored Canfield Casino. Don says it was but a senior moment...

For almost any project we undertake, we are looking for easier, faster, and cheaper ways of getting them done. In today's economy in particular, cost savings can mean the difference between boom and gloom. This alternative can be implemented in the area of surface use agreements (SUA), and with respect to energy development issues in general. With respect to coal bed methane (CBM) extraction; not that the process is not applicable to all other mineral and energy extraction activities, but CBM extraction seems to present the greatest current need. With CBM extraction we must deal not only with the owner of surface rights, but often with others in the same industry, namely those wishing to extract the coal. Increasing federal regulation of public land practices that have an affect on private land use, and the increasing challenges, frustrations and stress brought on by the court actions of environmental groups and property rights advocates requires alternatives to the status quo.

The alternative that can meet your needs for expediting SUAs is mediation, also known by other terms, such as collaborative problem solving, constructive confrontation, and negotiation. There are differences between these terms to be sure, but the bottom line objective is to solve problems in a peaceful and constructive manner. More importantly, it is to have agreements in place before problems occur. This process may be more accurately described as partnering. Many of you have heard of these terms, but not tried one or more of the processes, others may not have heard of them at all. For the purpose of this article, I briefly describe what mediation is, is not, and how it may be useful to you in your operations. These aspects of mediation will apply in large part to other peaceful problem solving methods.

Mediation is a unique process that provides the parties an opportunity to fully discuss and craft their own solution to the issues at hand with the assistance of a professionally trained neutral third party. The mediator does not mandate a particular agreement (as would an arbitrator or Judge) but rather facilitates the parties in creating a detailed comprehensive agreement. Because all the parties are involved in the crafting of the agreement it guarantees all issues are addressed to everyone's satisfaction. In addition, the parties are more apt to abide by the agreement because they crafted the solution. The outcome is a detailed written agreement that reflects the most creative resolutions to any issue that is raised. Any dispute that may occur during operations can be further addressed in mediation using the prior agreement as a basis for resolution.

How may mediation be useful to you? If you are working to get an agreement for access to drill, you have many issues to confront. These issues might include ingress-egress routes, drainage, pit location, fence issues, tank location issues, wildlife, trash and litter, wetlands, schedule, noise remedia-
tion, etc., and last but not least, there are the reclamation issues. When involved with CBM extraction, there are these issues plus those related to produced water. Mediators do not provide legal services. You as the extractor know what your needs are and what you are willing to do. The surface owner is best able to represent what his concerns and needs with you to create specific protocols that are acceptable to all involved. Mediation provides a more effective way for all parties to get their needs met. As noted above, mediation affords you the opportunity to deal directly with the issues.

The difficulty with the process is getting a representative, with decision making authority, from all stakeholders to attend meetings without pay after having already put in a long day at work. The second difficulty is getting adversaries to shift from positions to interests, avoid people bashing, and to engage in relationship building and trust. All are doable. The positives are that collaborative problem solving processes are less expensive, more beneficial to long term relationships among entities involved, and they allow the parties directly affected to have a say in the outcome.

Environmental and natural resource conflicts as we all know are not new. With the decrease in agricultural land and the increase in energy demands, conflicts are inevitable. This does not mean that conflict has to be negative. On the contrary, conflict reflects the changes that occur everyday in our personal lives as well as in our national and international relations. These changes can be positive if we so endeavor.

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Corralling Graphics in MS Word®

David M. Abbott, Jr., CPG-04570, Consulting Geologist

Geoscience reports usually contain graphics of one sort or another, sometimes lots of graphics. Microsoft Word® (Word®) is the most commonly used word processing software. However, Word can become frustratingly weird in its behavior if you start adding too many graphics and associated captions and/or do a lot of further writing and editing after having inserted the graphic. This article provides a method of dealing with Word’s tendency for weirdness with graphics and their captions.¹

The cause of the weirdness is a Word design characteristic—some view this as a feature, others as a bug—that places graphics and their captions in a separate layer from the text. Layers can be thought of as two or more overlapping transparencies laid down one over the other. Each transparency constitutes a “layer.” While this is not what really happens inside your computer, it’s a good analogy. CAD software, advanced drawing, and photo editing software also use layers, which can be fairly handy. But the graphics layer is not useful in Word because, in my experience, the graphics layer does not scroll properly with the text layer. This is particularly true in longer documents containing a number of graphics and associated captions.

The solution to the weirdness—if you have encountered the problem, you understand the use of “weirdness”—is to corral graphics and their captions on the text layer by using 2-cell tables. Tables are part of the text layer and scroll nicely as text is added or deleted above them. Whether you want a 1-column, 2-row table or a 1-row, 2-column table depends on whether you want the caption to be on the side of or below the graphic. Figure 1 illustrates the two possibilities.

Creating the 2-Cell Table

1. Create the table by clicking on either the “Table→Draw Table” menu item or by clicking on the “insert table” icon on the menu or tool bar at the top of the screen.

2. Create the desired two-cell table.³

Inserting the Graphic

3. Insert the graphic into the appropriate cell. This can be done by either:

3.a. copying and pasting the graphic directly from a graphics program, or

3.b.1 by placing the cursor in the graphic cell and then

3.b.2 moving the mouse pointer to the “Insert” menu at the top of the screen and selecting “Picture”→“From File” as illustrated in Figure 2.

Figure 2: the “Insert→Picture→From File” menu

Resizing the Graphic Cell

4. As with most tasks in Word, this can be done in at least two ways.

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¹ Word and MS Word are registered trademarks of Microsoft Corporation.
² L. Graham Cloos, Edward M. Baltzer, and Sue P. Abbott reviewed this paper and suggested various improvements in the text. I particularly appreciate Sue’s suggestions because she works as a technical writer (aside from being my wife). She urged breaking up the steps into discrete, numbered instructions.
³ The detailed instructions given here are for Windows versions of Word, specifically Word 2002 (or XP). As pointed out by one reviewer, a couple of the items discussed later do not work in Word 97, which lacks the features discussed. The details will differ somewhat for Mac users of Word, in part because Mac computers have single-button mice. However, because MS Word is available for Macs and Windows and Mac Word files can be freely exchanged, I assume that the general concepts in the instructions are the same.
4.a You can left click on the cell containing the graphic and a box surrounding the graphic, with sizing boxes at the corners and the middles of the box lines, appears. You can use the corner sizing boxes to adjust the size of the graphic in the cell.

4.b If your graphic is the size you want, and is smaller than the table cell, then you can fit the cell size to the graphic by:

4.b.1 right clicking in an empty part of the cell (or in the caption cell, if it is empty—it should be at this point).

4.b.2 selecting “AutoFit” from the pop-up menu and then selecting “AutoFit to Contents.” Note: Word 97 does not have the “AutoFit” menu; you have to re-size cells manually.

4.b.3 If you use the AutoFit to Contents method, then immediately move the cursor to the empty caption box and change your AutoFit selection to “Fixed Column Width.” If you do not, then the table will AutoFit to a long caption.

4.c If you want the graphic to be a particular size, move the cursor to the caption cell and right click to bring up a menu and select the “Table Properties...” item, which brings up the menu shown in Figure 3. Unfortunately, the “Table Properties...” menu is not part of Word 97.

**Selecting Borders and Shading, and Positioning the Graphic**

5.1 After opening the “Table Properties...” menu (Figure 3), make your “Borders and Shading...” selections first.

5.2 Next choose the “Positioning...” to bring up the “Table Positioning” (Figure 4) submenu and select and change items as needed.

5.3 Clicking on the “Borders and Shading...” box on the “Table Properties” menu (Figure 3) allows you to decide if the cell containing the graphic and the cell containing the caption are surrounded by a box and/or are shaded. Some drawn figures have included borders while others, including digital photos do not. Which you should use depends on your layout preferences, although captions are normally neither shaded nor enclosed in boxes.

5.4 You can select how both the graphic and the caption are aligned and justified in a cell by right-clicking on the caption cell and selecting the “Cell Alignment” option on the “Table Properties...” menu (Figure 3). This allows for left, center, or right horizontal justification and top, center, and bottom vertical alignment.

As shown in Figure 3, you can choose to align the table to the left, center, or right of the margins and to wrap text around the figure. The “Positioning...” submenu, Figure 4, provides more precise control on the location of your figure and caption on a page. Your choice depends on the size of the figure and your layout preferences.

**Working with Two Adjacent Graphics**

If you have two figures that will have a half-page width (or less), you can use a 4-cell table rather than the two-cell table illustrated in Figure 1. If you do a lot of text and/or layout editing after you have inserted your graphic, you may need to reposition your graphics as part of the final edit. Unlike the
CORRALLING GRAPHICS (continued)

normal “floating” graphics and captions in Word, those contained in tables stay together. In order to keep adjacent graphics that are vertically positioned one above the next, insert a line between the two tables to prevent the graphics from merging into a 4-row table. This may interfere with proper separation of the graphics on separate pages as additional text is added or deleted to your paper.

Inserting the caption

Clicking on the caption cell allows you to insert the caption using the appropriate fonts or style. This allows the caption (at least the portion included in the caption style) to appear in a table of contents. Select only the caption’s “title” or initial description for the “Caption” style if the caption is long. For longer captions, you can use another style for the balance of the caption’s text.

Using a manual

Regardless of your facility with Word, it is always wise to have one or more “manuals” to consult. The companies that develop and sell software stopped including manuals with the programs for three reasons. First, most programmer-produced manuals were not very useful for those who did not thoroughly understand the software. Second, software now comes with electronically included “Help” instructions accessible through the “Help” tab on the right-hand side of the top menu bar of the program. Unfortunately, these instructions are no better, and may be worse, than the printed manuals that came with the software. Sometimes, you can find the answer you want, but frequently not. And third, a market for better written, more comprehensible manuals developed, which produced better returns on the manuals. The (program name) for Dummies series is a well-known example of beginning- to intermediate-level manuals. Microsoft Corporation has its own publishing company that print manuals for Microsoft products. Que, Sybex, O’Reilly, and others publish advanced- and other-level manuals.

If the foregoing seems to complex, there is another solution; use WordPerfect. WordPerfect is a far better word processing program than Word. It does not have the graphics problems discussed in this article. It is much better at handling long, complex documents, like books with multiple chapters. And it has Reveal Codes, which allows easy and quick editing of styles, which Word forces on people and which can cause no end of frustration of various sorts.

Why then have I learned about Word? Many people with whom I collaborate use it because it came with their computers.

4. The mention of style in this sentence brings up a subject that Word users must become familiar with: Word’s formatting is based on styles, whether you like it or not, so you need to learn how to use them. A discussion of styles is beyond the scope of this paper.
As you know, 30 states have some form of licensure for the practice of geology. Many AIPG members recognized the need for and spearheaded the efforts to establishing such licensing. We realize that there would be little need for state licensing if all practicing geologists in a state had become Certified Professional Geologists through AIPG and subscribed to our expectations of competence, integrity, and ethics.

AIPG has established a Continuing Professional Development (CPD) Program. It is now functioning. In ten of the 30 states requiring licensure, continuing education has become a requirement, generally for license renewal. We anticipate that more states will enact continuing education requirements for state licensure.

If one meets AIPG's CPD requirements with care, he or she will also satisfy state continuing education requirements. Of interest is the observation that our CPD program in general exceeds the continuing education requirements for engineers.

We believe that AIPG now has additional responsibilities to the members. This president's message shares with you the planning stages and the challenges we foresee in providing AIPG members and others with a proper spectrum of continuing education opportunities, not only for our CPD Program, but to meet some renewal requirements of the states.

As our CPD Program was implemented, we listed examples of continuing education possibilities. We considered keeping such a list current on our website. Where can one find such opportunities? Take a look at my article entitled "Sources of Information for Continuing Education Opportunities" that appeared in The Professional Geologist, May/June 2003, p. 13-14.

What topics are important to AIPG members?

Several senior members of AIPG met and compiled a list of what we thought would be subjects of value and interest. To test this list, we conducted a survey of our members at the last national meeting in Glenwood Springs.

We listed 11 course or workshop topics and asked for others to be suggested. The way the survey was structured, respondents indicated level of interest for themselves and what they felt would be attractive to their colleagues. For this brief summary, I have tabulated results of our survey on the desirability of these course topics. Bear in mind that this is a type of market survey, and represents only a small and possibly non-representative sample of the population of AIPG members. However, it is a start.

Respondents were asked to answer for themselves and again for colleagues. Course topics that were of interest (individuals may take the course) and of strong interest (individuals are almost certain to sign up) are shown by percent positive response. The first set of courses gathered 70% or higher positive response for respondents and/or for their colleagues.

- Principles of Environmental Law
- Effective Communication between Geologists and the Media
- Refresher course: ASB0G Exam
- Professional Ethics in the Practice of Geology
- Refresher course: Hazwoper
- Refresher course: Critical Thinking and Writing
- Global Issues for Geologists
- Other courses receiving a positive response of 31 to 51%
- Landslides
- How to Find Upstream Oil and Gas Information on the Internet
- Refresher course: Career opportunities and trends
- Advocacy

No one found a course on Resume Preparation of interest.

Advocacy was a write-in course, and as such shows strong interest. There were 11 other topics that received either one or two votes as write-ins, and 6 other topics suggested, but did not receive a vote. It appears that there is considerable interest in these topics.

Are these continuing education topics readily available?

Several, yes, and others, no. Unfortunately, most of these topics are not widely available as workshops, and are virtually non-existent as distance learning opportunities. I have picked the brains of several persons involved with distance learning, and present some generalities later in this article.

As current examples of workshops, our colleague David Abbott offers a workshop on ethics (next sponsored by AIPG's Arizona section) and Tom Fails was one of several presenters in the half-day Political Relations session in Glenwood Springs. I have attended an expanded version of Tom's workshop, and found the information of considerable use.

Undoubtedly you are aware of other presentations, many involving AIPG colleagues. At some point we will need to create a list of willing presenters, their subjects, and their financial requirements. If you are such a person, please let national headquarters know (aipg@aipg.org). We hope that you can make suggestions, step forward to provide short courses or workshops, and consider providing them in a distance learning mode.

www.aipg.org
Special nature of distance learning

In general, distance learning involves the instructor and the student being at different sites, and possibly at different times. Originally, distance learning referred to correspondence courses, but now refers more generally to courses using audio, video, or computer technologies. Examples include courses on videotape and telecourses on PBS. Reference to distance learning in the minds of many means online courses.

Online courses, a special type of distance learning, are provided over the Internet and range from interactive videoconferencing to course segments offered as the student calls them up. They can be very expensive to provide or relatively economical.

Cost estimates are relatively simple for on-site workshop course offerings. You take into account income (fees charged and anticipated number of participants) and expenses (venue rental, prepared material to hand out, travel costs of instructor, fee of instructor, rental of equipment, advertising, clerical costs, costs of registration, and refreshments during the break). The main variables are the number of registrants and fees.

Costs for offering a distance learning course include some of the above factors, but also costs of delivery over the Internet. Here are the extremes.

One instructor at a Michigan school says the only way he can offer such a course is to rely on a textbook and communicate with students using e-mail. He provides a list of questions per chapter (from his hard drive), and expects each student to answer each question and reply, and then he sends another page with his preferred answers (also from his hard drive). He admits that he may not read each student's response in careful detail when he gets busy. He gives students the opportunity to discuss specific items by e-mail correspondence at their initiative, but receives few such inquiries. He says the key is a really well-designed textbook, and he has written several.

Another instructor at an Illinois college has, over several years, developed an elegant presentation using WebCT. It includes dynamic diagrams, review questions, and instantly graded quizzes. However, it is used only on campus as an 'enhancement' of his lecture course. However, I have reviewed several chapters and they could constitute a stand-alone course. This instructor has no motivation or desire to use it as a stand-alone course and he prepared it to demonstrate the pedagogical value of the technique. He has spent much time over three years in preparing it (and says that if you can make a home page you can do this, you just need an enormous investment of time). The real drawback is the cost of WebCT, an annual rental for his university of about $35 K. This effort is not economically viable the way it is structured, even though several hundred students per year are involved. For more information, look at literature about WebCT <http://www.webct.com> and Blackboard <http://products.blackboard.com>.

I spoke with a representative of WebCT, and he told me that the minimal annual cost for AIPG to lease their system is $10,000. Given the realities of economics, I conclude that the first instructor's approach is a distinct possibility for courses created for and offered by AIPG, but the second is not unless some arrangement can be made with a benevolent university. If we sought to teach a traditional college course using appropriate materials for WebCT, McGraw-Hill http://www.mhhe.com/catalogs/solutions/webct.html provides materials (but not WebCT access) for free upon adoption of a text for one of twenty-five traditional undergraduate geology courses.

So, if you have experience in offering workshops covering topics that are of interest to your professional colleagues, or if you are willing to set up a distance learning activity, please let the national office know.
Occasionally you'll find an article or a other feature in TPG which makes an earnest appeal to you to submit articles for publication. A few members prepare regular articles, but TPG would be greatly enhanced if you provide additional material.

At this time, Editor Ray Talkington and Publications Manager Wendy Davidson devote much time and effort to procuring worthwhile articles for TPG. Members are encouraged to help by writing short pieces about technical projects, opinions about the practice, perspectives on political activities which affect a geologist's ability to find work as a geologist, or news of section activities which may be insightful to other members and sections. Some articles appearing in TPG are reprinted with the permission of sister societies. The truth of the matter though, is that TPG is most enjoyable when it contains fresh material from AIPG members and friends.

Everyone finds it difficult to fit every obligation into an increasingly tight schedule. Volunteerism does come with a price.

Every column written by professional of every stripe regarding the status of volunteerism within their respective professional organizations emphasizes many conflicting demands upon the time of the practitioner. Geologists are not exempt from the increasing demands placed upon them, particularly by their employers and clients. In spite of the fact of time-in-short-supply, a small amount of effort can go a very long way. You are in a position to take advantage of the opportunities accorded you and your section via TPG with expenditure of very little time.

Many AIPG members may not realize that TPG is in fact available for their use. For AIPG, TPG is an excellent medium for disseminating information both specific to AIPG and of general interest to the profession. TPG is intended to be a forum for exchange of useful information among AIPG members and other geologists. In years past, columns have been designated for the specific purpose of exchanging section news, particularly news regarding subjects of mutual and universal interest, such as registration efforts.

The circulation of TPG is over 5,500. Its pages are available for you to expostulate or report. The activities undertaken within your section or in your region of the country are of value to other AIPG individual members and sections. Sharing critical information through TPG is one means of assuring that the lessons which were learned with such difficulty by you and your section can assist other sections, attempting similar accomplishments, in avoiding pitfalls.

Do it now! Send a newsworthy item to headquarters, write up your experiences in dealing with state registration, or voice an opinion about global warming or the national energy situation from your unique perspective as a practicing geologist. By all means, share useful information through TPG. Your observations will help all AIPG members make their professional activities that much more productive.

(ATS Hello!)
NC Bid-rigging Firm in Trouble for Kickbacks

One of the North Carolina engineering firms that was charged in April 2003 with rigging bids to the State of North Carolina (column 86, Aug '03) was charged in November with engaging in a kickback scheme for lab analyses. News reports, kindly forwarded by Brad Newton, MEM, state that the firm had arranged for future discounts on analytical work but billed the North Carolina Department of Environment and Natural Resources the full price for analyses without disclosing the existence of the discount arrangement.

These additional allegations do not surprise me. In my experience, a firm that engages in one form of unethical conduct usually engages in several forms of such conduct. Such ethical problems, particularly when perpetrated by or with the knowledge of management, as was the case here, tend to be systemic problems. This case provides a perfect lead into the next topic.

Referral Fees and Kickbacks

As I mentioned at the end of column 89, Rules 3.1.4 and 3.1.5 were deleted from AIPG's Code of Ethics in October because of problematic language. President Bob Corbett asked me to draft new rules to cover kickbacks. In this discussion, I like to begin an exploration of kickbacks and what it is that makes them unethical. Your comments and amplifications are requested.

The North Carolina case described in the preceding paragraph is an excellent example of a kickback. A firm received subcontractor (laboratory) work at a lower rate than was charged to the client for that work.

This example is what most of us would call a kickback. My dictionaries define a "kickback" as payment or rebate made due to a confidential agreement or coercion. They also note that kickbacks are usually illegal. I see the key point of the definition as being the confidential or undisclosed nature of the payment. The other key point, as brought out in the North Carolina case, is that a client is effectively charged more for something than would otherwise be the case.

Note: this example does not address the issue of standard firm overhead mark-up charges. Nor does the example cover a volume discount that the laboratory may offer if more than a specified number of samples are received. For example, suppose a lab offers a $1 per sample price break if more than 100 samples of the same type are received at a time and this discount is stated in the lab's price list. If only 90 samples are submitted, then the discount is not triggered.

The confidential nature of the payment combined with the increase in charges over what otherwise would have been charged appear to be the key points here. The problem with terming such payments as referral fees, as was done in the deleted Rules 3.1.4 and 3.1.5, is the failure to clearly include both elements, particularly the effective overcharging.

The previous version of the AIPG Code of Ethics (1983-1989) contained the following provision (Section 3.9), "A Member shall not accept a fee for referring an employer or client to a specialist or for recommending geological services other than his own." An earlier version of the AAPG Code of Ethics stated (Section 3.1), "A member shall not accept a concealed fee for referring a client or employer to a specialist or for recommending geological services other than his own." (See column 61, Jan '01, for a more detailed discussion.) These earlier statements strike me as better, particularly the AAPG's which includes the words "concealed fee." Both allow for charging for work actually done. For example, if I'm asked to spend time identifying a specialist for a particular job, I can charge for the time spent doing so.

The overcharging aspect of kickbacks implies that the client pays more for the service than would otherwise be the case. Does the following situation constitute overcharging? A consulting firm's standard billing rate is 33% higher for licensed professionals than the hourly rate at which these professionals are paid. The extra 33% goes to cover firm overhead. Does this arrangement constitute a kickback? Why or why not?

Coercive Payments

As noted above, another feature of some kickbacks is that they are coercive. Payments to gangs to "protect" one's property are a classic example of this type of payment. Similarly, payments made to government officials in order to move equipment into an area or to obtain a permit or concession are coercive in nature.

Coercive payments are commonly viewed as being part of life in third-world countries noted for their corrupt practices. However, I was recently told of an example involving a combination of a US land management agency and a state agency who together required natural resource companies to pay sums into a particular account in order to proceed with planned work. The fund into which the payments were directed was not part of the normal fee system nor directly associated with the planned work. The manager in charge of the operation for one of the companies made the payment as directed in order to proceed with the plans, whose delay would cost more than the request-
ed payment. However, the manager promptly contacted his firm's legal department about the payment. The natural resource firm's legal department contacted the legal departments of the relevant agencies and explained that the payments would be reported as part of the natural resource firm's obligations under the Foreign Corrupt Practices Act. This resulted in some quick backtracking and repayment of the fee. Subsequently, other natural resource firms contacted the origi-
inal firm about the incident as they had had similar experiences.

This example should shake us out of our complacency about what goes on in countries where such coercion supposedly does not occur. It obviously can. The example also demonstrates one method of dealing with such problems. Do you know of similar experiences? How were they handled? Do you have any suggestions on how one should proceed when faced with a similar situation?

**Professional Titles and Licensing**

(Columns 88 & 89, Nov '03 & Jan-Feb '04)

Wesley McCoy, CPG, wrote, "The on-going discussion regarding Professional Titles and Licensing has prompted me to put in my 2 cents. I have been continuously employed for 24 years now as a hydrogeologist for the state of Texas. Over the years I have worked with and for some wonderfully competent engineers and my father and one of my brothers are both degree civil engineers and licensed as professional engineers in Texas, so I am very familiar with the engineer/geologist controversy. Only in the environmental field have I seen any dispute, and mainly because engineers in Texas have been licensed long before geologists and there are a lot of firms performing environmental work.

"From a professional prospective, this is why I am a member of, and support, professional societies. From a legal standpoint, I am licensed in Texas and registered in Mississippi. I believe it is imperative for both geologists and engineers to demand accountability from our licensing boards. Two troubling trends I have noticed are: 1) people granted waivers from meeting the educational requirements for a Geoscientist License being licensed under the 'Geology' category; and 2) licensing boards allowing individuals to practice specific subdisciplines of geology or engineering outside of their degree and training. I have always thought that it would be a good idea to have a separate licensing discipline for the waivers; it is demeaning to degree geologists to be part of the 'catch-all' category and certainly misleading to the general public as to who exactly is a 'geologist'. Licensing boards, in general, are normally set up under statute with the authority to grant waivers, but I am not satisfied with how this is currently being accomplished."

McCoy's comments highlight the need for continually watching the professional licensing provisions in all states. Attention must be paid not only to geologic licensing but also the licensing provisions for related professions. Are individuals being licensed to practice in areas they unqualified to practice in? Are legitimate professional overlaps permitted? Are the licensing boards actually protecting the public's health, safety, and welfare by investigating allegations of incompetent practice and taking action where warranted? Passage of a licensing bill is the beginning, not the end of the professional regulation process. Similarly, are those professional associations to which you belong that profess to having an enforced code of ethics enforcing it?

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**Do E&O and Other Forms of Professional Liability Insurance Invite Lawsuits?**

(Columns 88, Nov '03 and 85, Jul '03)

Martin J. Andrejko, CPG, wrote, "I'd like to comment on Hugh Robertson's points on E&O insurance. He is correct the professional liability is getting more expensive. There are a number of reasons for this. The overall litigation environment in the US is not good. Nuisance claims are routinely filed. Typically it is judged that it is easier to settle a claim for a nominal amount rather than pay substantially more to vigorously defend the claim. Insurance carriers also look at the claims frequency and severity for the services provided and the project types. Residential geotechnical jobs are both high frequency and high severity potential. In California, the building defect claim has become an 'art form.' I have had one insurance broker in Orange County tell me of finding a flyer from a plaintiff's firm placed on her windshield that was soliciting building defect business. In another case, a former insured was named in a claim on a residential project in Nevada simply because the plaintiff's lawyer found a local office address of the insured in the phone book. The lawyer postulated that if they had a local office then they must have done some work on this large project. It turns out that the insured did not work on the project but significant costs were incurred in extricating them from the lawsuit. There was a study of claims expenses for design professionals that was done in the late 90s. The study found the average cost to defend a claim was in excess of $140,000. This represents only the defense costs, not any indemnity or settlement payments issued as a result of the claim. It also doesn't reflect the internal costs to the design firm of taking employees away from chargeable time in order to develop the claim defense. Even nuisance claims cost money.

"Another reason for the rising prices is related to the inadequacy of the pricing relative to the risk exposure for the carrier. You have to remember that insurance companies are in the business of making a profit. I complain about "those 5&8" insurance companies as much as the next guy when I see my homeowner's or auto renewal and the rates go up even though I claim free. But if the carrier isn't profitable they might not be there when a claim needs to be paid. The professional liability industry was impacted by the 'soft' market cycle in the mid to late 90s where, in general, premiums went down while a firm's revenues went up. Combine this with the losses that were experienced and you have many insurance carriers that had loss ratios in excess of 100%. Add in another 30% for expenses and you have carriers losing 30% a year. You can't stay in business with losses like that. Witness the demise of Reliance and Kemper over the past few years. In late 2000, the market started to 'harden' in that carriers started looking for rate increases to restore profitability. The events of September 11, 2001 accelerated the hardening of the market and there have been substantial rate increases on all types of policies. Only time will tell whether current pricing is going to bring the insurance industry back to profitability.

"With regard to the question of whether it is unethical to offer professional services without E&O coverage, I would say that it is not unethical. As Robertson noted, the client is not buying the insurance policy. They are purchasing the profes-
sional services. From a risk management standpoint it would be wise for the client to deal only with insured professionals, but that decision is left to the client.

"Now to the 'deep pocket' issue. There is no question that being the 'deep pocket' can cause problems. I have design professionals in British Columbia who have been impacted by the 'leaky condo' problems in the Province. Their current policies now have very limited coverage for water ingress. There are plaintiff's legal firms who, once they realize that there is no coverage available, are willing to release the design professional from the claim. They freely admit that they are looking for the insurance proceeds. I am sure this is leading some people to scream out 'Tort Reform'! I don't disagree but do you really expect our legislative branch of government which is highly populated with attorneys to pass any kind of meaningful reform? Am I being a bit cynical? Perhaps."

**Computing Security—Eliminating Metadata**

In column 61 (Jan '01), I addressed the issue of metadata, hidden information of various sorts saved in your data files. Metadata includes information on who created the file, edited the file, and when the changes were made. It also includes the previous versions of the file that allow the Undo feature to work, the feature that allows you to back up and undo something you wish you had not done. There are times when Undo can be a real life saver. However, as with everything else, there are consequences of having the Undo feature and other forms of metadata in files, which have their utility in various way.

Metadata has two potentially adverse consequences. First, it makes the file bigger because all that Undo and other data must be saved. The Undo feature is the biggest contributor to file bloat. The second adverse consequence is that it is possible to get at the metadata with programs that allow one to examine the byte by byte contents of the file. Such programs are common parts of utility suite software. While the file remains within your organization, this metadata probably is not causing any problems beyond taking up extra storage space. The problem arises when the file moves outside your organization, perhaps in response to a subpoena.

The problems faced by the British government and the BBC over who leaked what to whom and what sorts of editing occurred in documents this past fall highlighted the problems of metadata, for it was the metadata in the files that revealed information about who did what and when.

The printed version of a file does not contain any metadata. It shows only what you want printed. Paper copies of documents are great, but increasingly the people to whom you are sending files want electronic files. This is where Adobe's Acrobat program, which produces Public Document Format (PDF) files shines. As far as your software is concerned, Acrobat is a printer. The program simply creates an electronic version of the printed document. PDF files are usually a good deal smaller than the original datafile because of the elimination of the metadata and other file-size reducing consequences of printing. Because Acrobat Reader is available for all operating systems, you do not have to worry about whether the recipient of your PDF file has the same operating system you do or the software used to create the file, which is why so many documents posted on the web are in PDF format.

**Electronic Report Copies**

Should you issue electronic copies of your reports to clients? If you do, how do you ensure that recipients receive a true and correct copy? How can a reader identify an original of a report? These questions were the topic of a recent discussion with Robert Colpitts, CPG. In PE&P Column 2 (Dec '95), Colpitts commented on the proposed use of electronic seals in reports and these same questions were addressed. Eight years later, technology, computer use, and client expectations have changed although the problems have not. At least some states permit the use of electronic seals on work that require that seals be affixed to the report. In my own practice, most clients are now requesting electronic copies of reports even when paper copies are provided, and in some cases only an electronic copy is provided. In all cases, the electronic copies are in PDF format—see the preceding topic.

I am curious about what you and your firms are doing. How do you handle the questions asked at the beginning of this discussion? Have you experienced problems with alteration of your reports by unscrupulous clients? If so, how was the problem identified and what did you do about it? What steps, if any, do you take to ensure that your reports cannot be altered or that readers can ensure that they have legitimate and complete copies? What do you do when seals are required on reports that are filed with regulatory agencies and additional copies are requested by the client for internal use? Please contribute your answers to these questions? Those who would like a copy of PE&P Column 2 and don't have the issue, send me an email and I will send you a copy.

**Computing—Whether and When to Upgrade?**

A frustrated colleague called the other day for help. He was trying to access a PDF file posted on a government agency website, and was getting gibberish instead. I asked him which version of the Adobe Reader (see above) he was using and he was using version 3. It turns out that the document he wanted was created with Adobe Acrobat, version 6, and cannot successfully be opened with earlier versions of the Adobe Reader.

A similar problem cropped up when I was compiling the field trips for this past fall's AIPG Annual Meeting in Glenwood Springs. I formatted the field trips using desktop publishing software, something most people do not have (the advantage is real control over layout not offered by word processing software). Therefore, the final files for distribution were in PDF format. When the person who was doing the CD reproductions for the meeting tried to open my files, he got partial gibberish. As with the case above, the version of Adobe Reader being used.

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1. I have mentioned Adobe's Acrobat program in various previous columns. I do so simply because it is an increasingly recognized and used program for the purposes described: particularly as the Adobe Reader (revised name with version 6; formerly Acrobat Reader) is distributed free from www.adobe.com. Neither I nor AIPG receive anything for mentioning the programs.
makes a difference, and so the installation file for Adobe Reader 6 for Windows was included on the field trip and abstracts CD.

Returning to my first case, the colleague with Adobe Reader, v. 3, I advised him to upgrade to a newer version. However, Adobe Reader 6 for Windows requires Windows 98SE, Windows 2000, or Windows XP. My colleague’s computer was running Windows 98; therefore, the most recent version of the Adobe Reader that would work on his operating system was version 5. My colleague faces a problem. Because his computer hardware and software are aging, they are being technologically left behind even though they are still working. More recent hardware and software can require more hardware capability and a more modern operating system in order to work. For example, digital cameras, printers, and a whole host of other peripherals require a USB port, if not a USB2 port, on the computer they are peripheral to. Windows operating systems prior to Windows 98SE lacked the hardware and software support required by USB ports.

My colleague faces a dilemma. Should he buy a new computer system and go through the process of learning a new operating system and updated software, or should he try to upgrade the existing hardware and software, or should he stick with what he has got? Sticking with what he has got and understands will increasingly result in technological isolation as increasing numbers of colleagues use hardware and software my colleague can no longer access, even in formats like PDF, which, like everything else, evolves with the hardware and operating systems. The middle route of upgrading works for a while but finally the point comes where purchasing a new system with current hardware and software is the least expensive solution. Either the upgrade or new purchase route involves the issue of learning to use the new operating system and software.³

Deciding when to upgrade or when to buy new depends on both economic realities and personal character. However, using hardware and software that exceeds 5 or so years in age risks the obsolescence problem. If your work does not need to be shared with colleagues, older hardware and software will satisfy longer. However, the information you may want from the web may only be available in a format that presumes more modern hardware and software.³

Two Earthquakes Occur in Southern Colorado

Two minor earthquakes (M 3.5 and 3.1) occurred Saturday (January 24, 2003) evening 17 miles south of the Great Sand Dunes National Park where a seismograph was installed just a year and a half ago. Analysis of the data indicates that the earthquakes were most likely centered on the Sangre de Cristo Fault located along the southern base of the Sierra Blanca mountain complex of the Sangre de Cristo Range. This is in an area of the Sangre de Cristo Range where both the range and the fault make a right angle bend to the east.

This fault was first recognized as an active fault in the 1970s. Geologic evidence shows that the fault has had more than four miles of vertical displacement during its history. It forms the boundary between the Sangre de Cristo Range and the San Luis Valley and is responsible for the creation of both. The fault is responsible for uplifting the Sangre de Cristo Range to heights that include ten peaks over 14,000 feet above sea level.

In an effort to help unravel the fault’s history, several groups have recently conducted geologic studies along the fault. Geologists from the Colorado Geological Survey have conducted detailed, geologic mapping in the nearby vicinity during the past three summers. Last summer, scientists from the U.S. Geological Survey dug trenches across the fault south of where the earthquakes occurred. Scientists from the Crestone Science Center also dug trenches across the fault north of the earthquakes as part of their ongoing research to better understand the fault’s behavior.

This fault is considered to be one of the more dangerous faults in the state. It is included in the USGS’ National Seismic Hazard Maps as capable of generating an earthquake as large as M 7.5.

Colorado Geological Survey, (303) 866-2611
Press Release 12/29/03

Topical Index to the Professional Ethics and Practices Columns

I have prepared a topical index covering columns that have been placed on the AIPG web site in the ethics section. The index is in PDF format. The original file is in Microsoft Excel format. If you would prefer the Excel file, send me an e-mail and I will send it to you. I will update this index periodically and post the new copy on the AIPG web site. If you have suggestions on organization, please let me know.

David M. Abbott, Jr., CPG-04570, 2266 Forest Street, Denver, CO 80207-3831, 303-394-0321, fax 303-394-0543, DAGeal@msn.com
The "Cardinal" Risks; Construction, Operation & Maintenance

Allen W. Hatheway, CPG-02426

The overwhelming rationale for employment of geologic expertise by our clients stems from the proposition that a competent professional geologist should be able to save out-of-pocket costs and frustration in the pursuit of the client’s objectives in or on the ground. It follows that the geological fees normally are saved many times over by the professional geologic consultant.

Defined: “Risk,” as measured in geologic terms, is the detrimental outcome of encountering negative situations, conditions or events, of geologic origin, that result in experiencing unanticipated, unfavorable, and/or unwanted conditions, during the pursuit of a client’s objectives in the conduct of actions or activities in or on the ground. Risk commonly is measured both in terms of frequency and impact of detrimental occurrence.” (Author, 2004)

In fact, when the consulting geologist is selected on the basis of expertise (rather than on price) the client should garner project savings well in excess of the fees and expenses paid to the consulting geologist.

It is therefore appropriate that each of us develop a personal philosophy of how we view geologically-associated risk and how it is that our services will be of superior value to our clients, as a means of reducing geologically-oriented risks facing the client. Basically inherent to this philosophy is the proven fact that our professional work product nearly always is based on site characterization, itself the description of the place where the project is to take place. The overriding purpose of site characterization is to detect and reduce the degree of unknown site conditions, their nature and character, and lead naturally to reduction in risks associated with construction, operation and maintenance (Table 1).

The author has long felt that clients deserve an early statement from the consultant, at the beginning of the proposal process, to the effect that the consultant should strongly consider informing the client of geologic risks which the consultant feels may possibly be present at the site.

Risk as Generally Perceived by Our Clients

Almost uniformly, our clients for professional geological services are motivated by factors of economics, regulation, law, and prestige. We respond to their needs (real or perceived) by attempting to offer our services as a means of reducing “risks” to the success of their project or operation.

Table 1
Nature of Geologic-Based Risk in Terms of Geologic Constraints

<table>
<thead>
<tr>
<th>Geologic Constraint</th>
<th>Construction</th>
<th>Operation</th>
<th>Environmental</th>
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</thead>
<tbody>
<tr>
<td>Field Mapping Blunders</td>
<td>Leads to changed conditions claims by the contractor, for which extra payments are requested</td>
<td>Could lead to undetected geologic conditions which may later impair function of the project</td>
<td>Project may lose functionality of its environmental protection or remediation features</td>
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<tr>
<td>Undetected Contacts</td>
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<tr>
<td>Undetected Subcrops</td>
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<tr>
<td>Misidentified Stratigraphy</td>
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<tr>
<td>Stratigraphic Anomalies</td>
<td>May lead to design feature selections unfavorable to client's purpose for project</td>
<td>Possible deformation of foundation material and unfavorable stresses to project components</td>
<td>Possible pathways for contaminant transport off the project site or bounds</td>
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<td>Hiatial Unconformities</td>
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<tr>
<td>Facies Changes</td>
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<tr>
<td>Holidays (Gaps)</td>
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<tr>
<td>Structural Anomalies</td>
<td>Worst case condition places excessively costly construction ground in contractor path, causing additional costs for time, material, and schedule extensions</td>
<td>Worst-case condition leads to stress concentrations at points of comparative weakness of project components and possible failure of function</td>
<td>Possible over-stressing of containment or drainage features, resulting in release of water contaminants</td>
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<td>Zones of “Bad Ground”</td>
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<td>Shear Zones</td>
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<td>Fault Zones</td>
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<td>Bedding-Plane Faults</td>
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<td>Fault Displacements</td>
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<td>Growth Faults</td>
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<td>Folds as Changing Attitude</td>
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<tr>
<td>Fold-Axis Fracturing</td>
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<tr>
<td>Geomorphic Anomalies</td>
<td>Tends to represent bodies of earth material of unexpected characteristics and possible additional contractor costs</td>
<td>May allow ingreses of unexpected quantities of ground water requiring management through additional constructed features</td>
<td>Generally alters the ground water regime and may do so to the detriment of designed environmental protection features</td>
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<tr>
<td>Buried Fluvial Channels</td>
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<td>Buried Fluvial Clay Plugs</td>
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<td>Buried Shoreline Features</td>
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<td>Porous Features</td>
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<tr>
<td>Glacial Debris Pockets/Zones</td>
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<tr>
<td>Evidence of Liquefaction</td>
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<tr>
<td>Geologic Constraint</td>
<td>Construction</td>
<td>Operation</td>
<td>Environmental</td>
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<tr>
<td>Bedrock Irregularities</td>
<td>May escalate rock excavation costs; could impair construction use of material excavated in course of site preparation</td>
<td>Could result in ingress of unexpected quantities of ground water requiring management by engineered design</td>
<td>Could impair design control of ground water or perhaps may release natural elements that may create anomalies in groundwater quality</td>
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<tr>
<td>Top-of-Rock Elevation</td>
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<tr>
<td>Structural Domain Contacts</td>
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<tr>
<td>Metamorphic Damage</td>
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<tr>
<td>Unsound Earth Materials</td>
<td>Additional costs wherever site preparation and foundation construction efforts are impeded</td>
<td>Generally represents the greatest relatively negative impacts of this category (this table)</td>
<td>Capable of resulting in a number of physically and/or disruptive conditions related to ground water control and chemistry</td>
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<tr>
<td>Compressible Soils</td>
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<td>Collapse-Prone Soil</td>
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<td>Expansive Soil</td>
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<td>Unstable Marine Clay Soil</td>
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<td>Weak Rock</td>
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<tr>
<td>Deleterious Minerals</td>
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<tr>
<td>Hazardous Geologic Processes</td>
<td>Represents potential for disruption of the construction process in terms of physical force or from encountering previously undetected but related damage requiring additional work effort</td>
<td>Generally considered to represent the most severe physically-oriented conditions of stress activated against the engineered design; may overcome certain components where design capacity is exceeded</td>
<td>Usually detrimental wherein physical forces defeat design components of drainage or containment; all of which should have been predicted on risk analyses of such threats</td>
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<td>Flooding</td>
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<td>Mass Wastage (Instability)</td>
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<td>Lahars</td>
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<td>Mudflows</td>
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<td>Volcanism</td>
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<td>Earthquake Motion</td>
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<td>Tsunamis</td>
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<td>Karst; Ancient or Active</td>
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<td>Piped Soil Removal</td>
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<td>Mannmade Ground Hazards</td>
<td>These are among the most difficult of risk-related exploration targets; they require additional expenditures that are not popular with clients who wish to cut exploration expenses</td>
<td>Where not detected and accommodated for in design, likely will represent the most vulnerable aspects of performance of the facility</td>
<td>Related physical damage may compromise the environmental protection integrity of the project</td>
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<tr>
<td>Previously-Mined Ground</td>
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<tr>
<td>Unabated Tunnels &amp; Caverns</td>
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<td>Buried Foundations</td>
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<td>Abandoned Oil &amp; Gas Wells</td>
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<td>Soft-Ground Dumps</td>
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<td>Toxic Waste Dumps</td>
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<td>Migrated Contaminated</td>
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<tr>
<td>Ground Water</td>
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</table>

It is here, in this jungle of marketing contacts, that clients select consultants. We would hope that AIPG’s basic ethical and professional tenants are being observed by the consultant in attempting to convince the would-be client to select their own services as being a combination of “best,” “most reliable,” and “most affordably effective.”

You say I am preaching to the choir! Yes, of course, but it always helps one to maintain “balance” by considering the options.

In this connection, there are two basic types of clients; those whom you come to value and those whom you should not consider having any contact with. Worthwhile clients will value your contributions and will come to rely on your services to make their ventures more successful. Worthless clients will attempt to beat your project budget town to a level not worth the effort, will pay late, and likely will jump at the first opportunity to involve you in litigation.

Enough said of the worthless variety!

Now, on to convincing the worthy client base to select your services over those of the competition. In order to convince the worthy client to select your service, you must somehow demonstrate that your approach to the project will reduce risk and that the scope of work that you propose (including budgeted costs) will result in savings of time and money, and, in the end, always money (Table 2).

“Risk” Viewed as Exposure Rather than Threat

“Risk” is a term that takes on multiple meanings and various shadings in its use across our profession. The reader can easily see that this author is not enamored of methods or attempts to quantify risk, or “to make risk go away.” Rather, my emphasis is to strongly emphasize a far more fundamental and primary attraction toward reduction of risks by proper funding of a reasonable scope of site characterization completed in the hands of a competent geological professional.

Summary

Since 1974 the North American market for applied geological services has been racked by the outright foolishness of Federal governmental meddling in the nature of professional services provided by professional geologists and by professional engineers practicing in the applied earth sciences. Most of us know the story only too well; commoditization of professional services foisted on the professions by Federal bureaucrats who have no reality of appreciation of the quality of our performance is linked to education, background, training and experience, all of a calling to lifelong learning and improvement.

Clearly, professional expertise never will be safely secured on a “price-quote,” “bid-shopped” basis and those of our clients who cannot see beyond saving $50 by comparing priced pro-
<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Risk Exposure</th>
<th>Elements of Risk Reduction</th>
</tr>
</thead>
</table>
| Insufficient Site Geologic Information for the Contractor | 1.) Unexpected bedrock removal quantities to bring site to design grade  
2.) Additional ground water control  
3.) Efforts associated with construction | Educate the client that money spent on related exploration effort should return magnified savings in contractor bid value and in protection from later potential variable site conditions claims                                                                                           |
| Undetected Geologic Anomalies       | 1.) Premium site preparation costs  
2.) Unstable ground at footprint  
3.) Unstable ground on surrounding land  
4.) Ground incapable of supporting intended construction; hence premium foundation costs | Have the client on record as having considered these eventualities and as reported evidence of such possibility in contract documents so that unrealistic variable site conditions claims by the contractor are thwarted |
| Undetected Cultural Structural Anomalies | 1.) Abandoned concrete, stone or steel foundation elements below ground  
2.) Abandoned water supply and transit tunnels, as well as historic sewer mains | Brownfields environmental legislation, regulation and general real estate transaction laws have become more and more reflective of this need                                                                                       |
| Undetected Solid Waste Dumps        | 1.) Represents “bad ground” from standpoint of foundation integrity  
2.) Most solid waste dumps created prior to Federal RCRA of 1976 may be considered potentially contaminated with toxic industrial wastes | Inform the client of these possibilities as soon as such evidence presents itself. Consultant should declare these potentials at some time prior to completion of work for client, in order to be relatively free from possible associated litigation. |
| Undetected Toxic Waste Dumps        | 1.) Clearly to be expected in the context of Brownfields land.  
2.) Historic dumping was widespread and conducted with full knowledge of its harmful impacts, nonetheless undertaken | Endeavor to educate the client, in its best interests, also representing an action toward protection of the consultant. The subject will require sensitive treatment in order not to lose the confidence of the client and to have the contract transferred to the competition |
| Dealing with Geologic “Constraints” | Any negative geologic condition related to site geology or to geologic processes active on or impinging on the property or on the immediately surrounding ground | Educate the client toward appreciation of its risk exposure, as related to specific conditions and that additional scope of work will be required to define such risks for reduction of client exposure, both in construction and later in operation and maintenance of the project |

posals are indeed fair game to the masses of marginally-qualified would-be consultants who operate on bids rather than on quality of offered services.

The author operates strictly on a “take it or leave it” basis and does not knowingly participate in consultant selection based on price. That is a matter of choice and many of you know that it is a luxury in today’s world. There is only one road toward this end for the discriminating consultant and that is to develop and offer expertise that clearly is not available by bid shopping.

The reader therefore has this opportunity to ponder how it is that his or her expertise is unique enough to separate oneself from the individuals (“hamburgers”) who routinely respond to solicitations of “bid-shopping.”

You have two chores ahead of you:

1.) Discover what it is about your services that is unique

2.) Devise ways to show that your services will reduce client risk and that

3.) Your Scope of Work and Fees will result in ultimate savings of time and money for the client.

---

Allen Hatheway (allen@hatheway.net and www.hatheway.net) is an early-retired Professor of Geological Engineering who has practiced for 42 years, in his native Los Angeles, and at San Francisco, Boston and in Missouri. He has served his profession as a teacher, soldier, public servant, and consulting firm staff and partner and is professionally licensed as a Geologist and/or Engineer in several States (AZ, CA, MA, ME and MO), but swears to his geological origins (UCLA ’61) and that his formal education has been strongly tempered in the School of Hard Knocks. He serves as one of AEG’s ambassadors to AIPG, as an Honorary Member (2002) and past president of the former (1985). He and wife Dina split their time between Big Arm Montana and Rolla, Missouri, with indulgences in urban Virginia.
Job Site Safety and the Geologist

Martin J. Andrejko, CPG-08512

The question of a geologist’s responsibility for safety of others at project sites is an interesting and controversial one. Due to Workers’ Compensation laws, site workers cannot sue their employer, but can file suit against third parties, such as geologists who are present at the job site. In deciding these suits by injured parties against the geologist, the courts will look to answer four questions in determining the firm’s liability.

Did the geologist have control over the project site?

There are two ways the courts can establish that a geologist had control over the site. The first is simply based upon language contained in the contract. Does the project contract contain language that states the geologist is responsible for construction means and methods, or safety precautions used by the contractor? Does the geologist have authority to shut the job down? If either of these questions can be answered “yes,” then the courts could assert that the geologist assumed control of the site through the project contract.

The second way the courts could establish that the geologist was a controlling entity is through the actions of the geologist at the project site. Is the geologist providing directions as to construction means and methods? Is the geologist providing suggestions on how to correct safety deficiencies? If the answer to either of these questions is “yes,” then courts could assert that the geologist assumed control of the site through his or her actions.

Did the geologist have knowledge of the unsafe condition?

A geologist performing periodic site visits or working on a large site will need to show when and where he or she was on the project site. The unsafe condition in question may not have been visible at the time of the site visit or in the vicinity of the work area of the geologist. Detailed field notes kept in the bound log book as well as photodocumentation could help establish that the geologist could not have reasonably known about the unsafe condition.

Did the geologist have a reasonable opportunity to prevent the injury?

There may not have been sufficient time to notify the appropriate parties before the safety violations led to an injury. Again, detailed documentation may help establish that the geologist did not have sufficient opportunity to prevent the injury.

Was the risk of injury foreseeable?

Based upon what the geologist observed at the site, could it be expected that the injury would occur? Once again, field notes documenting site conditions as well as photodocumentation could help in showing whether or not the injury was foreseeable.

What the courts say

Recent court cases involving site workers filing suit against design professionals have had differing outcomes. While these cases did not involve geologists, they could very easily have been geologists. The Supreme Court of New Jersey rendered a decision in the Carvahlo vs. Toll Brothers case where an engineer was held liable for negligence in the death of a contractor’s employee in a trench collapse. The contract stated that the engineer was “not to have control over or charge of construction means...or safety precautions used by” the contractor and that the contractor would be “solely responsible for all construction means, methods, techniques, sequences and procedures utilized in connection with the work” and “responsible...for acts or omissions of its employees, subcontractors and their agents and employees.” Based upon the contract language, it would appear that the engineer bore no responsibility for job site safety. However, the court pointed out that the engineer was to “ensure that the work is performed in accordance with the requirements” of the contract documents and had the right to stop work of the contractor.

In 1997, the United States Court of Appeals ruled on a Utah case against a design professional where a worker was killed in an unshored trench. The worker’s family had filed suit against the design professional claiming that the design professional assumed a duty of responsibility when it agreed to monitor site operations and because it had been consulted about excavating the trench, and had knowledge about the safety problem but had failed to act upon it.

In ruling in favor of the design professional, the court asserted the following:

1. The contract specifically and explicitly stated that the design professional was not responsible for maintaining worker safety at the site.
2. There was no evidence that the design professional assumed control over worker safety at the job site. Though consulted about excavating the trench, the design professional played no role in the actual excavating of the trench.

The court stated, “We do not believe Utah would impose a duty on an engineer on the basis of knowledge and inaction alone, when the engineer contractually declines to accept responsibility for worker safety and does not in fact exercise control of worker safety at the job site.” Also, the court noted that no one else at the site seemed to be aware of any danger in the trench.
Five Steps To Improve The Ability To Defend A Claim

With court decisions on the either end of the spectrum, it is hard to predict what will happen when a suit is filed. There are steps a geologist can take to improve the ability to defend a worker injury claim.

1. Make sure project personnel know what the contract says with regard to safety responsibilities and control of the job site.

2. Do not assume additional safety responsibilities beyond those required by the contract through employee actions at the job site.

3. Maintain detailed documentation of where and when personnel are on the job site.

4. If an unsafe condition is noticed, report it to the construction superintendent and the client. If the unsafe condition is not an imminent danger, the notification can be verbal, but be sure to document the notification in the project field book. Critical safety issues should be expressed in writing. In either case do not make suggestions on how to correct the safety violation, unless the contract states otherwise.

5. If the danger is immediate, then quick action is required and the affected workers should be told to remove themselves from the danger zone. The decision of whether or not the danger is imminent is admittedly a judgment call. While this could be construed as exerting control over the job site, a design professional is more likely to have problems if he or she does nothing about an immediately dangerous condition.

Liability Case Study No. 2 – Subcontractor Safety

A field geologist was working on project installing monitoring wells with a drilling subcontractor hired by his firm. The locations of the monitoring wells were marked in the field by the geologist. The driller was instructed to place each well as close as possible to the marked areas. One of the holes was located in a between two buildings beneath a high capacity electric line. The driller set up the rig on the mark and raised the boom even though it was less than 10 feet horizontally from the electric wire. Drilling commenced for a time with no issues. The driller’s helper, while standing on the drilling platform, leaned out from the rig and touched a junction box on the exterior of the one building. This caused an arc between the power lines and rig which then sent electricity coursing through the helper. The helper suffered such severe burns on his arm that it had to be amputated. The field geologist and his firm were included in a personal injury claim filed by the helper. The firm’s contract with the client required that the insured develop a site-specific health and safety plan (SSHASP) which was not done. In the agreement with the drilling subcontractor the firm took responsibility for confirming utility locations. The entities included in the “one-call” notification did not include the company that owned the overhead transmission lines. This claim was settled for several million dollars prior to getting to court because of the clear liability on the part of the firm.

Liability Reduction Tips

- Be aware of what your contractual requirements are. This firm did not complete a SSHASP as required by the contract with the client. A completed SSHASP might not have prevented this incident, but it does not help with the defense of a safety related claim.

- Take extreme care when responsible for utility markouts. Maintain documentation of the confirmations received from the various utilities. Be sure to be aware of other utilities that might have to be contacted individually because of their not participating in the “one call” system.

- Look up! Not all hazards are at or under the ground.

- Make sure employees are properly trained in recognizing job site hazards. A raised boom within 10 feet of high capacity wires is an imminent danger. The drillers should never have been allowed to begin work in this situation.

Martin Andrejko, XL Design Professional, 520 Eaglevie Blvd., Exton, PA 19341, (610) 321-9596, fax (610) 458-8667, martin.andrejko@xldenvironmental.com.

NEW CORPORATE MEMBER

It is with great pleasure that AIPG and the Executive Committee welcome Leggette, Brashears & Graham, Inc. as a Corporate Member.

Congratulations to Leggette, Brashears & Graham, Inc. and its owners and employees!

Leggette, Brashears & Graham, Inc.
126 Monroe Turnpike
Trumbull, CT 06611
(203) 452-3100 • Fax (203) 452-3111
www.lbgweb.com

For more information regarding the AIPG Corporate Membership Program call AIPG Headquarters (303) 412-6205, aipg@aipg.org or www.aipg.org.
Dear Editor:

The Jan-Feb '04 issue of TPG was superb! I enjoyed many articles; most notably colleague Allen Hatheway's cogent advice to geology students just entering the profession. His advice is based on his extensive real-world experiences, and should be disseminated widely, possibly by AIPG mailings to universities for posting on Geology Department bulletin boards.

James Mellett's Viewpoint on Evolution was a brilliant refutation to the Creationists dismal attempt to malign and refute scientific inquiry and progress, simply by espousing dogma.

The several articles of and by college students was encouraging. This leads to the following comment on the dwindling locations available for student field mapping.

I agree with Robert Paschall's Letter (p. 37) giving his views why a newly proposed huge (1,300-square-mile) White/Inyo Mountains "wilderness" area in California is a political ploy, unrelated to the true meaning of wilderness. Robert knows whereof he speaks, as he lives at the base of these mountains, and he and I would like to continue to be allowed to drive to favorite secluded spots. Robert and Allen Hatheway (above), and I are UCLA alumni, recalling that the White/Inyo Mountains was and is a student Summer Field Camp locality. However, these mountains would be off-limits if this were to become a designated wilderness. This is so because federally declared wilderness is totally different from our National Forests, Parks, and Monuments. A designated wilderness means exclusion of the general public, discriminating against the young, the old, and the handicapped, and the denial of geologic investigations, even taking rock samples. (In questionable "wilderness" areas, existing roads have been bulldozed to help create a pristine region!) Rather than designate more official wildernesses, wouldn't it please more citizens by allowing us to continue to visit and enjoy such areas?

Richard J. Proctor, CPG-05091

Dear Editor:

I really enjoyed reading the student essays that were published in the January/February TPG. They were delightfully refreshing and reminded all of us why we became geologists. Quotes from Sarah Coker like "geology seemed to offer the perfect mixture of work and play," and "I have never met a geologist who did not love what he/she was doing," hit a chord with many of us. I'll look forward to great things from our scholarship winners as they become professional geologists. One thing was clear; they all have the right attitude to enjoy the profession they have chosen. Thirty years into the profession and I still find myself chuckling and saying, "And they pay me to do this."

Sally Bilodeau, CPG-07121
ENSR International

Dear Editor:

Regrettably, Trevor Ellis' story on "Philosophy and Application of the International Valuation Standards for Minerals and Petroleum" omitted the differences between valuation of mineral properties and valuation of residential and commercial properties. I will later address those differences, but will first give my qualifications for doing so.

I am CPG No. 118, California Registered Geologist No. 8, and more to the point, a Senior Member of the American Society of Appraisers (ASA), and an Honorary Life Member of ASA for my contributions to appraisal literature, especially with reference to oil & gas and mines & quarries. My appraisal of the Prudhoe Bay oil field for the North Slope Borough was accepted by ASA as part qualification for Senior membership. I later appraised the Red Dog zinc and lead mine north of Kotzebue, first for the State of Alaska and later for the Internal Revenue Service. I have also appraised U.S. Borax & Chemical Corp's mine at Boron and Kaiser Steel's now-defunct iron mine at Eagle Mountain, both in California. My biggest job involving undeveloped minerals was the appraisal of 840,000 acres on the Seward Peninsula in northwestern Alaska. I was recently asked by the I.R.S. to appraise a copper mine in Chile, but declined because it is simply a bigger task than I now care to undertake.

As Senior Petroleum & Mining Appraisal Engineer, I appraised several dozen oil and gas fields in California, and served as editor and major co-author of State valuation handbooks on both oil & gas an mines & quarries. For several years I taught a course on the latter subject, and later presented similar short courses to the Alaska Assessors Association, the Texas State Property Tax Board, and to members of AIPG at its annual meeting in Flagstaff in 1994. I have worked as a consultant for several Federal agencies and state government and innumerable private clients. I have testified on minerals valuation before Federal Tax Court, Court of Claims, and Bankruptcy Court; before Superior Courts in Alaska, Arizona, California, and Texas; and before administrative bodies in six states.

And now, having established my bragging rights in the field of minerals appraisal, I will note three things about Mr. Ellis' references. The first is that five of the twelve were published in foreign countries, thereby posing the probability that they reflect different laws concerning minerals ownership than those that prevail in the United States. The second is the fact that six of the publications cited, or fifty percent, were written by Mr. Ellis himself. And the third is the unwarranted absence from the list of the Society of Mining Engineers' "Mining Investment Analysis" by Donald W. Gentry, a professor at Colorado School of Mines, and Thomas J. O'Neil, then Manager of New Business Development for Amoco Metals Company and formerly a professor at the University of Arizona.

In the course of my career I noted these striking differences between minerals and non-mineral properties that bear or indirectly on their valuation, differences that were not cited by Mr. Ellis:

Unlike ordinary real estate, mineral properties have finite lives. Namely, when all the oil is produced or all the ore is mines out, there ain't no more. This simple fact is commonly neither understood nor even known by most flatland appraisers.

The price to be used in appraising a mineral property is the price of the raw material, not a finished product. That may seem obvious, but I once encountered a Bureau of Mines appraiser who had used the $40 per ton price of sand fine-
crushed in a rod mill in appraising a deposit whose raw material sold at $6.00 per ton.

Sales-derived rates of return on investment in ordinary real estate are often nominal but not real. That's because, first, such properties enjoy equity build-up as mortgages are paid off, while the equity in mineral properties declines as the minerals are produced. Second, investors in flatland real estate commonly anticipate, and often enjoy capital appreciation, namely, the value of such properties increases over time. In contrast, the value of mineral properties typically declines over time as deposits are depleted. The net result of these two elements is that market-derived discount, or capitalization, rates for flatland real estate are lower than analogous rates for mineral properties. The former rates are nominal and the latter are real. What you see in mineral property discount rates is what you get.

Rent paid for commercial or agricultural land is commonly economic rent, which when capitalized yields an estimate of the land’s market value. But rent on mineral lands, called royalty, does not equate with economic rent. If it did, nothing would be left for operators’ leasehold, or equity interest.

All the above differences between mineral properties and flatland real estate reveal why rules set by certain organizations that Mr. Ellis cited may present a serious menace to rational valuation of mineral properties. He failed to make it clear why an appraiser of such properties in the United States should be concerned about the conclusions of the International Accounting Standards Board, or for the matter even the rules of America’s Uniform Standards of Professional Appraisal Practice, or USPAP.

On that score: California’s legislature enacted a law requiring appraisers of real property to be licensed. The sole aim of this law was to prevent the overvaluation of residential properties that had led to the collapse of savings and loan companies. I resolutely refused to acquire a State license. I was later amused when a California State agency first refused for the reason to employ me, and later came back in some desperation and asked me to appraise a mineral property because State bureaucrats couldn’t find a licensed appraiser who knew how to do it. Some comments on specific items in Mr. Ellis’ article:

Under the subject of “Guidance Notes in IVS 2003” he listed Real Property Valuation, Valuation of Lease Interests, Valuation of Plant and Equipment, Valuation of Personal Property, and Business Valuation. I trust that the people who composed those notes are aware that the appraisal of a major mine may embrace all of those elements, including Business Valuation, whose principles apply to an integrated copper mines and mill.

Mr. Ellis said that in the Extractive Industry Guidance Notes: “The concept is introduced that the main basis of value for mineral and petroleum properties is Reserves/Resources or the expectation of finding such.” I find that statement ambiguous and misleading, since the main basis for the value of producing mineral properties is, beyond doubt, the present worth of their estimated future cash flow. As a result, the present value of a given mineral reserve depends in part on the rate at which it is produced. Mineral “resources”, on the other hand, are apt to be pie-in-the-sky, and their values are often determined by negotiation, not computation.

Another case of ambiguity occurs in a “Guidance Note” that says: “A Market Valuation of an Extractive Industries Real Property must be based on the Highest and Best Use of the property. This may require consideration of a non-Minerals or non-Petroleum use for the property…”

I will first say that the term “highest and best use” is both socially and financially misleading. It was invented long ago by the American Institute of Real Estate Appraisers, who really meant “most profitable use” but thought that sounded too mundane. Second, a non-minerals use of a property obviously requires a non-minerals type of appraiser. I have encountered this several times where a quarry has a prospective post-mining use as a site for rubbish fill.

And finally, in discussing future input to the Guidance Notes by mineral property appraisers Mr. Ellis said: “Submissions that do not provide constructive criticism or advice for improvements to the GN should be rejected, even if they are strongly worded.” He didn’t say who would determine whether a submission is[is] constructive. I don’t know whether Mr. Ellis will judge my remarks to be “strongly worded,” but this statement of his smacks of professional authoritarianism.

Robert H. Paschall, CPG-118

AIPG Membership Totals

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TRUMBULL, Connecticut — Leggette, Brashears & Graham, Inc. (LBG), a professional ground-water and environmental engineering services firm, has named Rob Good, CPG-09454, vice president and principal of the firm.

Based in LBG’s Trumbull office, Mr. Good has almost 25 years of project management experience with complex geologic and hydrogeologic investigations. He has been responsible for conceptual design, implementation and reporting of detailed field assessments for all types of ground-water supply and ground-water remediation projects.

Mr. Good is a certified professional geologist by the American Institute of Professional Geologists (AIPG), a licensed environmental professional in Connecticut, and is active in several professional organizations, including the Association of Ground-Water Scientists and Engineers; American Institute of Mining, Metallurgical and Petroleum Engineers; Connecticut Business and Industry Association; and the Connecticut and Metropolitan Golf Course Superintendents Associations. Mr. Good earned a B.A. degree in geology from Franklin and Marshall College.

DRAGOON, Arizona, Jan. 9, 2004 (PRIMEZONE) — Nord Resources Corporation (Other OTC:NRDS.PK - News) is pleased to announce that in the course of drilling an environmental monitoring well hole at its Johnson Camp SX-EW Copper Mine south of the existing Burro Pit, significant copper oxide mineralization was encountered. The monitor well hole was drilled in conjunction with Nord’s Aquifer Protection Permit with the State of Arizona.

The monitor well boring was drilled 1,500 feet south, southeast of the Burro Pit, the source of essentially all of the previous 150 million pounds of copper produced at Johnson Camp. The copper oxide mineralization was encountered in the Lower Abrigo and Bolaa formations, both important sources of the previous Johnson Camp Mine copper ore production.

Drill cuttings were collected and sampled at 5-ft intervals by Clive R. G. Bailey, Certified Professional Geologist, and the analysis was conducted in the Johnson Camp laboratory by Gary Lindross, State of Arizona Registered Assayer.

Mr. Bailey, Nord’s Exploration Manager, stated “We are very encouraged by this intercept of copper oxide mineralization in monitor well hole MW-8b. The ground surface in this area is highly altered and prospective. The unexplored strike length of the mineralized trend between the Burro Pit in the north and the Keystone claim in the south is over 3,300 feet. A comprehensive exploration plan is currently being developed with the goal of significantly increasing current ore reserves at Johnson Camp.”

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IN MEMORY

Craig Ferris, Sr.
CPG-03456 (1976-1998)
January, 2004
Tulsa, Oklahoma

Dorion Fleming, Jr.
CPG-03090
December 19, 2003
Montgomery, Alabama

Ted H. Foss
September 7, 2003
Friendswood, Texas

Robert A. Vargo
CPG-07069
January 9, 2004
California, Pennsylvania

Craig Ferris, Sr.
CPG-03456 (1976-1998)

Craig Ferris, a geophysicist and president of GraviMetrics Inc., died in January 2004. He was 90.

Ferris was born March 22, 1913, in Los Angeles. He moved with his family to Wichita, Kan., when he was 4.

He graduated from Friends University in Wichita in 1934 with a degree in physics and completed graduate work at the University of Oklahoma.

Ferris began working at the American Seismograph Co. in 1936 and then the Mott-Smith Corp. in 1938.

In 1943, Ferris and the chief geophysicist for Mott-Smith Corp. founded E.V. McCollum & Co., a geophysical contracting company in Tulsa.

The company conducted operations on three continents before it was dissolved in 1980.

 Shortly thereafter, Ferris and his wife founded GraviMetrics Inc., where he worked until his death.

Ferris was president of the Geophysical Society of Tulsa in 1963. He was a member of the Society of Exploration Geophysicists, the Canadian Society of Exploration Geophysicists and the American Association of Petroleum Geologists.

He was also a Mason and an Eagle Scout.

He was awarded an honorary doctorate in law in 1974 from Friends University.

Ferris is survived by his wife, Sue Ferris; a son, Jon Ferris of Tulsa; and two granddaughters.

Friends are making memorial contributions to the Tulsa Scottish Rite Charitable and Educational Foundation, the Indian Nations Council of the Boy Scouts of America and the Society of Exploration Geophysicists Foundation Museum in Tulsa.

Tulsa World, 1-17-2004

Abbreviated Memorial of Dr. Ted H. Foss, P.G.

Dr. Ted H. Foss died September 7, 2003 of complications arising from cardiovascular issues and associated kidney disease. The Foss family held a memorial on September 10th at the Palmer Memorial Episcopal Church next to Rice University in Houston, Texas.

Since I have been closely associated with Ted professionally for the last 30 years, I have been encouraged to write his professional memorial, as difficult as that may be. I am honored to write it and hope I do justice to his memory.

During the Spring of 1952, Ted took a Chicago area aptitude test, more or less as a lark. To his surprise, but not to others, he scored high enough to receive a scholarship and he sent the scores to the University of Illinois. Within days, he recounted, a Dean from the University called him to advise that he had been accepted. He entered college in the Fall of 1952, took a geology course and decided to major in the field because he was interested in all the sciences and geology incorporated them all. Ted worked in the Stratigraphic Laboratory as an undergraduate research assistant for the State Geological Survey, Urbana, Illinois, and graduated with a B.S. degree in 1956. He spent the summers of 1955 and 1956 mapping the igneous and metamorphic rocks in the area in and around Acadia National Park for Dr. Carleton Chapman. During his second summer in Maine, he met a charming and witty young lady named Kathryn. Ted returned to the University of Illinois to pursue his Master's degree in the Fall of 1956 and worked as a Field Geologist for the U.S. Geological Survey in the summer of 1957 based out of Denver, mapping in the Ouray Quadrangle, San Juan Mountains of Colorado.

In 1957, Drs. John W. Rodgers and John A. S. Adams encouraged Ted to enroll in the advanced degree program at Rice University. Ted began his coursework for a Ph.D. at Rice University in September of 1957, while completing the writing of his Master's thesis titled: A textural and mineralogical study of hornblende granite (Maine), for which he was awarded a Master's Degree from the University of Illinois in 1958.

In December of 1957, Ted married Kathryn in Michigan.

Ted spent the summer of 1958 mapping geology in the mountains outside Ouray, Colorado. In September of 1959, Ted took a position as an Assistant Professor at the Lamar College of Technology in Beaumont, Texas, where he taught numerous geology courses as well as field camp; while also working for Shell Oil Company in the summers of 1959 and 1960 mapping in central and western Montana and Wyoming, including parts of Glacier National Park. In 1964, he finished his Ph.D. His dissertation was titled: Chemical and mineralogical variations in the radial dikes of the Difficult Creek Intrusive Center, San Juan Mountains, Colorado. Ted taught at Lamar until 1963 when he joined NASA, at the Manned Spacecraft Center in Houston, as Chief of the Geology & Geochemistry Branch of the Science Directorate. He participated in the early design and testing of lunar equipment and exploration techniques. He was responsible for the design and implementation of the astronaut field-training program and related responsibilities, including teaching geology.
and lunar-sampling methodology to the original Apollo astronauts.

A few years later, he left NASA in 1970 "in order to do more geology than paper work," he once told me. He joined General Crude Oil Company, Division International Paper Corporation, Houston, Texas, as Manager of Mineral Exploration.

In 1978, he joined Watts, Griffis and McOuat, Inc. (WGM), Houston, Texas, as President of the U.S. subsidiary of a Canadian mining consulting group and was responsible for activities within the U.S. and for management of major mineral exploration programs in Alaska, New Mexico, Arizona, Colorado, California, Nevada, South Dakota, Georgia, and Mexico.

In 1983, Ted left WGM to form a new company (Campbell, Foss, and Buchanan, Inc. (CF&B)) with me and an ex-staff member of WGM. CF&B engaged in domestic and international natural resource management involving all phases of mineral exploration, mining economics and analyses, and ground-water evaluation.

In 1986, after screening numerous properties for a Norwegian-Swiss consortium and making new discoveries in the vicinity of one property in Nevada, the consortium formed Norse Windfall Mines, Inc., near Eureka, Nevada, where CF&B served as the Project Manager and Principal Consultant. Ted served as leader of the CF&B management team that initiated project development, arranged project financing for gold and silver mining and heap-leach extraction, and a multiple mine-central mill project. He also served as a financial and operations consultant, primary negotiator for lease acquisitions, chief administrator for mine development and production, and was the representative of the Project Manager on the Norwegian-Swiss Joint-Venture Management Committee.

Ted then accepted a teaching position at the University of Houston - Clear Lake City, as Adjunct Professor in Geology and taught graduate-level courses in environmental geology and hydrology over the ensuing three years. In 1989, however, Ted was enticed to join a local environmental consulting company, Envirocorp Services & Technology, Inc., as Director of Geology and Ground Water where he participated in projects relating to deep-well injection of hazardous waste, ground-water supply, ground-water contamination and remediation, flow and transport computer modeling, environmental assessments and audits, and underground storage tank removal and remediation.

In 1991, Ted was recruited by DuPont Environmental to be Manager of the Geology Section. He helped to select and manage geologists and hydrogeologists during implementation of numerous environmental programs. Ted also served as a Regular Guest Lecturer for the Institute of Environmental Technology (IET) in Houston, Texas.

His professional registrations and memberships included: American Institute of Professional Geologists (C.P.G. No. 6393); The Geological Society of America (Fellow); Society of Economic Geologists (Fellow); AIME - Society of Mining Engineers; Houston Geological Society; and OSHA Supervisor and Manager Certificate.


He published a number of technical papers on various geological subjects involving paleontology, vulcanology, precious metal mineralization, and on many environmental subjects. He prepared or contributed significantly to hundreds of publications, project reports and economic assessments over the years. He also chaired many conference sessions.

Ted's experience spanned almost 50 years in a range of projects: environmental geology, hydrogeology, ground-water flow, transport and geochemical modeling, natural resource management, supervision and management of large technical groups, contract negotiation and natural resource economics, with specialization in CERCLA and RCRA-driven projects in large industrial sites and mining districts. These activities were combined with university teaching at graduate and undergraduate level as well as guest lecturing for continuing education programs, such as at the IET, the University of Wisconsin, University of Alaska, University of Texas, University of Alabama, the AAPG 50th Anniversary Meeting, and at the International Press Corps with Neil Armstrong in Reykjavik, Iceland during the 1960s.

As was usual in previous projects where Ted and I worked together, his well-considered insight was invaluable. His capacity for work, for helping others in their time of need, his enthusiasm, and overall compassion made for an outstanding professional partner and friend.

So when one adds up the qualities of Ted's life, one concludes that he was a loving husband, father, and grandfather. He was also a gentleman and about the best friend and professional partner one could have. He was direct and honest. An older brother I never had. What more could one ask in a man? But Ted is gone now. Only his memory remains. I miss him. I still need his advice and counsel. And I am sure those of you who knew him will feel the same.

Michael D. Campbell, CPG-03330, P.G., PH.
Houston, Texas
December 15, 2003

The complete version of Dr. Foss' memorial can be found at http://www.ela-iet.com/fossmem.html.
NEW APPLICANTS AND MEMBERS
(12/02/03 - 02/10/04)

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

Applicants for
Certified Professional Geologist
NY-Christopher J. Boblin
HRP Assoc., Inc., 100 Saratoga Village Blvd., Ste. 27, Malta, NY 12020

NV-Victor R. Calloway
466 Santa Barbara Ave., Sparks, NV 89436

MI-Todd C. Campbell
10548 Abigail St., Portage, MI 49022

OH-Jonice A. Dener
1850 Oakland Hills Ct., Springboro, OH 45066

HI-Megan J. Donahue
Earth Tech, Inc., 841 Bishop St., Ste. 500, Honolulu, HI 96813

NM-Michael S. Fulp
2431 Tospa Blvd. SW, Albuquerque, NM 87105

NV-Donald A. Harris
Newmont Mining Corp., PO Box 669, Carlin, NV 89822-0669

CO-Richard D. Johnson
666 South Newland Way, Littleton, CO 80123

NV-Paul D. Klipfel
4861 Ramcreek Trail, Reno, NV 89509

MT-Ulivo Peter Kurisu
PO Box 4844, Missoula, MT 59806

MI-Kevin L. Larr
516 Alger SE, Grand Rapids, MI 49507

MI-Norman A. Lowan
5740 N. 36th St., Richland, MI 49083

CO-Scott H. Miller
44 Union Blvd., Ste. 300, Lakewood, CO 80228

CO-Carolyn E. Randolph Loar
LACHEL & Assoc., Inc., PO Box 5266, Golden, CO 80401

IL-William F. Rowell
956 Ringwood Rd. N, Lake Forest, IL 60045

TX-Kevin J. Smart
Ct for Nuclear Waste Reg Analyses, 6220 Culebra Rd., San Antonio, TX 78238-5166

NV-Wayne S. Trudel
5 Shadybrook Dr., Spring Creek, NV 89615

NV-David C. Wehn
5016 Ridge Rd., Lockport, NY 14094

Applicants Upgrading To
Certified Professional Geologist
NE-Donna S. Erickson
Thistle Geotech, 13478 Chandler Rd., Omaha, NE 68138

MI-Robert J. Jathayre
1834 Hamilton Rd., F-12, Okemos, MI 48864

MN-Charles C. Tiller
American Engrg, Testing, Inc., 550 Cleveland Ave N, St. Paul, MN 55114

AK-Allen C. Tompkins
13421 Baywind Dr., Anchorage, AK 99516-3450

New Certified Professional Geologists
FL-David F. Volkert
10759

MI-Thomas M. Cecil
10765

TN-Bronnie A. Hartman
10766

LA-George D. McDonald
10768

FL-Scott H. Nyhoff
10770

NJ-Cheryl L. Coffee
10772

MI-Doyle D. Young
10773

NY-Lyle M. Farnam, III
10779

CO-William B. Blair Jr.
10805

OH-Laura A. Bibe
10810

NM-Euanus L. McCauslin
10813

OH-Bruce A. Pletsch
10813

MI-Frank H. Schultz
10818

MI-Michael R. Robison
10875

MI-Roger D. Harpe
10882

AK-Robert F. Svenson
10883

CO-Raul H. Borrasco
10884

NV-William S. Jaycock
10885

CO-Carl E. Nelson
10886

New Members
CO-Thomas M. Staatz
MEM-0573

AK-John K. Norman
MEM-0574

TN-Tammy E. Keim
MEM-0575

GA-Nicole M. Badon
MEM-0576

GA-Peter T. Kailly
MEM-0577

IL-Carla W. Montgomery
MEM-0578

KY-David R. Dockstader
MEM-0579

GA-Kelly B. Adams
MEM-0580

WA-Rob Teissier
MEM-0581

GA-Duane A. Fulton
MEM-0583

KY-Kari Petersen
MEM-0585

KY-Michael T. Marks
MEM-0586

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CA-Richard M. Field
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MO-Eric T. Mosley
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MI-Allan Braspenninx
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CA-Lawrence R. Cunn
MEM-0600

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MEM-0601

WI-Brandon S. Halmiak
MEM-0602

LA-Herberto F. Lafayatte
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SECTION NEWS

Colorado Section

The Colorado Section of the American Institute of Professional Geologists (CO-AIPG) is hosting the Annual Legislative Reception for our State Legislators on Wednesday, March 3, 2004, from 5 p.m. to 7:30 p.m. The Reception will be held at the University Club, 1673 Sherman Street, Denver, Colorado. CO-AIPG sponsors the Reception annually to create an opportunity for geoscientists from industry, academia, and state and federal government to meet Colorado Legislators. The event is designed to be educational for legislators. It is also an effective way of introducing them to potential sources of geoscience information for future reference and access. No lobbying is permitted at this reception.

Georgia Section

We have two field trips in different stages of planning but the dates are set. On Saturday March 13, 2004, we have a one-day trip to north Georgia where we will visit Lookout Mountain and then explore a few caves. You don’t need prior experience to go into these caves. We are limited to 20 people and there will be a $10.00 fee for rental of equipment. Please sign up soon because we will open this to Atlanta Geological Society and Georgia Ground Water Association. I will also e-mail the announcement to the AIPG Alabama and Tennessee Sections.

The other field trip we are presently working on will be a combined AIPG field trip with Alabama, Georgia, and Tennessee. At the national convention I met the current Alabama president and now the past president for Tennessee. We are planning on a one-day field trip on Saturday April 24, 2004. The trip will visit the Ocoee Gorge and Ducktown, both in Tennessee. We have a few trip leaders lined up and starting to work the logistics. We need to hear from you as to your interest level. We plan to open this one up to other geology organizations but we need to determine approximately the number that will attend in order to determine if we can caravans or will we need to rent a bus. Parking will be a concern in the gorge. There shouldn’t be much rafting on the river so that may help some on the amount of traffic.

I’m still working on the six Georgia universities that offer geology degrees in giving one free AIPG student membership per school. I recently sent letters to the department chairman requesting this information. We have students from State University of West Georgia and Georgia Southwest State University and I’ve heard from the other four universities and they each provide a name.

The state legislature is now in session. The big legislation is the Statewide Water Plan. It looks like they are going to keep it strictly a water plan and not have the controversial provisions dealing with the sale of water permit rights and the restrictions concerning intrabasin and interbasin transfers. House Bill 1047 is for the registration of professional soil scientists. It deals with people that design septic systems, land treatment systems, and erosion/sediment control systems.
For geologists that are registered in South Carolina, the governor has proposed to eliminate the PG Board. I don't know if this will go anywhere. If anyone has friends in South Carolina that are watching this, please let me know.

Ron Wallace, CPG-08153

Hawaii

Hawaii will soon be an official AIPG Section due to the efforts of Mark Rogers, CPG-08926. Mark moved to Hawaii from Alaska and starting setting in motion the members to start a section for the first time in Hawaii. Bylaws are currently being drafted and once approved by the AIPG National Executive Committee Hawaii will be official. The members in Hawaii were polled last November to elect officers and the results are as follows: President - Mark W. Rogers, CPG; President-Elect - Kenton L. Beal, CPG; Secretary - Glenn R. Bauer, MEM; and Treasurer - Robert Chenet, CPG.

Mark Roger reported that the up and coming Hawaii Section held a meeting January 21st at the Honolulu Airport Hotel. Their featured speaker, Mr. Joe D'Aquila, P.E. (Parsons-UXB) did a great job in presenting "Kahoolawe Unexploded Ordnance Clearance Project Update", which was well received by those in attendance. Glenn Bauer will have to decline his nomination as section secretary due to his obligations as state geologist, so the spot will need to be filled at a later date. The February section meeting is tentatively scheduled for Wednesday, February 18, 2004 at a location to be determined.

Kentucky Section

In 2002, AIPG President-Elect, Tom Spalding, acting on behalf of the Kentucky Geological Community did a bit of what he refers to as "maintenance" work related to registration and affiliation.

It seems that some geologist members of state government were concerned that their credential as a PG was not receiving proper emphasis during hiring and promotion. The AIPG Kentucky Section in particular received comments from these geologists at one of our executive committee meetings. I wanted to report that I met with a commission of one of the key Cabinets in state government and noted that geologist need to get promoted where they have management potential so that training can take place from older to younger practitioners in state government. This would be way to assure that quality work product happens without new laws, more money etc.

The commission was apparently happy with the conversation and I followed up with a letter thanking him for the meeting.

Minnesota Section

As a service to AIPG members, the following employment position has been submitted to AIPG for publication - Hydrogeologist.

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Minnesota Section (continued)

Nonprofit Fund Raiser Scramble

Date: August 23, 2004
Time: 1:00 PM Shotgun Start
Sponsor: AIPG - MN Chapter
Club: Stillwater Country Club (Private Club)
City: Stillwater, MN
Benefit: K-12 and College Education Committee & 2006 National Convention Committee
Questions?: Contact/Host: Curtis M. Hudak, Committee Chair - Work Phone: (651) 452-4396; E-mail- chudak@stoth.com
Jennifer Wolff - Work Phone: (651) 227-6500; E-mail- jwolff@dpra.com
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Foursome: $500 - 4 golfers plus dinner & silent auction

Dinner & Silent Auction Admission:
Individual: $35 - 1 dinner & silent auction admission
Couple: $70 - 2 dinners & silent auction admissions

Keep up to date on this and other events at www.aipgmn.org

Virginia Section

The Spring 2004 AIPG Virginia Section meeting is set for April 17, 2004 at Stolings Trucking No. 3 mine on Rum Creek in southeastern Logan County, West Virginia. The meeting place has not been confirmed, but some good meetings places would be Bob Evans at the Shopping Center, Chief Logan State Park Lodge, or Shoneys. We will see a Superior Highwall Miner in operation during mid-morning of April 17, 2004. Please mark your calendars for this date and make plans to attend what will be a very interesting field trip. For more information contact: Virginia Section President – Todd Church at 703-713-1500 or todd.church@urscorp.com.

(Sections are encouraged to submit section news via e-mail to wjd@aipg.org.)
Georgia Section Sponsored One Day Short Course

Ronald J. Wallace, CPG-08153

The Georgia Section sponsored a one day short course on “Introduction to Fate and Transport Modeling: 1-D, BIOSCREEN” in November 2003. The President of the section, Ron Wallace, works for the Georgia Environmental Protection Division, Underground Storage Tank Management Program. He recognized that many environmental consultants were not submitting groundwater models correctly and invited Dr. Yo Sumartojo of Rindt-McDuff Associates, Inc. in Marietta, Georgia to partner with him to develop a short course in groundwater modeling. The Section rented a computer classroom from Georgia State University, which holds 40 PCs, for the day to hold the class. They designed the class with the first part being an introduction to basic hydrogeology and the input parameters in running the different models. A case history was presented where the models were demonstrated and the students could follow by inputting the data into their copy of the models. BIOSCREEN was chosen because it is a public domain program that is used by many consultants. The students were told that the Georgia EPD does not endorse any one modeling program. The second part of the class was showing the students how the model should be run by proper calibration of the model to field data and then running the model into the future to predict if contamination will impact a drinking water well or a surface water body. There was also a section on how to present the results to the EPD. The rest of the class time was devoted for hands-on modeling by giving the students some basic information on real examples pulled from the EPD files and letting them setup and run the models.

The Georgia Section is now working with the EPD Solid Waste Program and would like to develop a short course on using Biochlor for chlorinated compounds. The class is proposed to be set up similar to the BIOSCREEN class and will be designed with input from the Solid Waste Program on how models should be submitted to their program.

The class has been very successful in raising money for the Section enabling us to sponsor one geology student for AIPG membership from each Georgia university that offers a geology degree. We also give a membership plaque and offer the modeling class to the sponsored students for free. The class has also been great for recruiting new members. By bringing the blue card to class we registered 14 new members. We gave a discount to members that sign up for the class and had one person join prior to the class to pay a lesser fee.

The Georgia Section highly recommends to the other Sections that they contact their state environmental regulatory agency to see how they may assist them in training.
Colorado Section AIPG Annual Meeting

William H. Bellis, CPG-03982

The Annual Meeting for the Colorado Section was held December 9, 2003 at the University Club in Denver, Colorado. David Abbott, Section President, recognized the service of the 2003 Executive Board which included: Logan MacMillan, President-elect; Tom Cavanaugh, Vice-president; Larry Anna, Treasurer; Qingping Deng, Secretary; Jim Russell, Editor; and Advisors Susan Landon, Bill Bellis, and Dave Lipson.

David presented the Section's Distinguished Service Award to Pete Clute for his many years of selfless help, aid, and guidance to the Colorado Section, promoting geology in Colorado, and his involvement in saving the Colorado Geologic Survey from political obsolescence, in addition to his many years of service on the Executive Board.

President Abbott reported the National AIPG Annual Meeting held in Glenwood Springs, Colorado in October 2003 was a successful endeavor resulting in numerous compliments as to the organization, the number and variety of field trips, and the quality of the invited presentations. Formal recognition was given to the two co-chairs for the meeting Susan Landon and Tom Fails, as well as John Kaufman, Travis Hughes, Laura Wray, Sue Abbott, Larry Anna, Tom and Robyn Fisk, Dawn Schippe, Cathryn Stewart, Larry Cerrillo, David Abbott, Doug Peters, Jim Russell, and Bill Sink, Wendy Davidson, and Cathy O'Keefe from National AIPG Headquarters. Thanks to all these volunteers and their hard work the National Meeting was educational and enjoyable.

The Section's Officers for 2004 were introduced: Logan MacMillan, President; Doug Peters, President-elect; Bill Bellis, Vice-president; Tom Fisk, Secretary; Qingping Deng, Treasurer; Jim Russell, Editor; Larry Anna, John Rold, and David Glater, Advisors.

The scheduled guest speakers for the meeting were Colorado State Representative (House District 23) Ms. Ramey Johnson and Executive Director of the Colorado Department of Natural Resources Mr. Greg Walcher. Mr. Walcher has proposed the consolidation of the Colorado Oil and Gas Conservation Commission (COGCC), the Division of Minerals and Geology (DMG), and the Colorado Geological Survey (CGS) into one division; the Division of Minerals, Energy and Geology (DMEG). This proposed consolidation is part of the "DNR Core Mission Project" which is being embraced as saving Colorado tax payers $30 million over a three year period. Many in the
Several Section members voiced concern about the Bill. John Rold, former Colorado State Geologist, listed a number of changes he would like to see in the Bill. Among these changes are the Colorado Geological Survey Advisory Board consist of six professional geologists, five with backgrounds in various geological specialties and one from an academic institution that grants a degree in geology other than the Colorado School of Mines. John voiced concern about capping the annual appropriation from the total moneys available in the operational account of the Severance Tax Fund for CGS programs at the amount of the 2003-04 fiscal year until 2014.

It was evident there was support along with some reservation among AIPG members about the purpose and timing of Representative Johnson’s proposed Bill.

Space does not permit in depth analysis of the proposed Bill. Persons interested in viewing the Draft Bill should contact Logan MacMillan (litchmusepo@aoi.com) or David Abbott (dimageol@msn.com).

The Executive Board of the Colorado Section AIPG will discuss the proposed Bill at their January 6, 2004 meeting. Member’s input will be incorporated in the discussion and the Board will decide the type and level of support or nonsupport. It appears it will be an interesting 2004 for the Colorado Section.

Mr. Walcher, although scheduled to speak, was a “no show”. Granted there are situations that require cancellation of scheduled talks, however there was evidently no effort to even have some minion present his proposed plan.

Representative Johnson is sponsoring a Bill “Concerning the Colorado Geological Survey” which she plans to submit to the soon to be convened session of the Colorado General Assembly. In essence the Bill will transfer the CGS from the DNR to the Colorado School of Mines. Ramey stated during her presentation at the Colorado Section Annual Meeting that the objective of the Bill is to re-establish a stable and viable geological survey that can best serve citizens of Colorado. Points in the Bill that Ramey considers non-negotiable are: the CGS budget will not be merged with another Division, particularly a regulatory Division (it should be noted that the COGCC and the DMG are regulatory divisions); qualifications of the CGS staff members will not change; the CGS will remain a non-regulatory organization; the CGS will not lose Severance Tax funding; CGS staff members will remain state employees with all the associated benefits that they have been accorded in the past and expect to have in the future. In addition, the CGS will have an Advisory Board that will report to the President of the Colorado School of Mines. An Advisory Board existed for the CGS prior to being eliminated by the DNR.

Representative Johnson pointed out that the move would allow the CGS to have a close relationship with the educational and academic community that will help attract external funding such as grants from the National Science Foundation. She emphasized there is no intention to commingle School of Mines money with CGS money and visa versa. Another plus is the excellent geology library that the School of Mines possesses. The CGS will be more stable under a university umbrella as opposed to the state’s political system.
Call For Undergraduate and Graduate Student Papers

It's a great time to be a geologist and AIPG wants to help you get in on the excitement! Mineral exploration - geologic hazards - the environment - energy - all have benefited from incredible advances in technology that have allowed the development of new concepts on how the earth formed and now operates. What will your contribution be? Are you ready to make and defend a point of view about an ore deposit, a landslide, a contaminant plume, or a natural gas play? The AIPG annual meeting offers a variety of interesting and geologically relevant technical sessions, field trips, short courses and social events.

As the host of the 2004 AIPG annual meeting, the Northeast Section of AIPG (NE-AIPG) challenges you, graduate and undergraduate students, to present your research to a national audience of professional geologists from academia, industry and government. Take advantage of this chance to discuss with experts the significance and applicability of your research. Hone your presentation skills in front of potential employers, colleagues, teachers, and mentors.

NE-AIPG is waiving the registration fee for any student submitting an abstract for a paper or poster. Cash prizes will be awarded for best paper or poster - $1,000 and $500 to the runner up in each of two categories, undergraduate and graduate.

Submission Process:

The theme for the 2004 meeting is “From Extraction to Restoration - Geological Management of Natural Resources.” Papers or posters are being sought on topics that broadly reflect the diverse fields of research and practice that engage geologists in the Northeast, although other topics may also be accepted.

Abstracts should be no more than 250 words, 12-point font, not including title or contact information: author(s) names, affiliation, mailing address (including email) telephone, and fax numbers. There is no submittal fee. The principal author must be enrolled as an undergraduate or graduate student at an accredited college or university at the time of submittal and presentation. Only one submittal per principal author will be accepted.

E-mail a Windows-compatible Word or WordPerfect form of the abstract for posters to Tom van Biersel (vanbiersel@ southernct.edu) and for oral presentations to Bob Blauvelt (bob_blauvelt@urscorp.com). Deadline for submission is June 1, 2004.

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