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April, 1994
Volume 31, Number 4

The Professional GEOLOGIST

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COVER - Antelope Canyon outside of Page, northern Arizona. Water has worn this "slot" canyon through fossil eolian sand dunes of Jurassic age. These cross-bedded rocks are part of the Glen Canyon Group, probably the Navajo Sandstone member.
Photograph by Mark A. Koestel, CPG-8307

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LEARNING THE ROPES

Russell G. Slayback, CPG-2305

No matter how much one may have been involved in AIPG, the initial months of being its President are a learning experience. I guess that shouldn't have surprised me.

Several different experiences have pounded home to me how many of our professional colleagues are having a tough time making ends meet. This has been manifested in several ways, some of which sound contradictory at first.

- Membership in AIPG is up, applications are coming in at a continuing strong rate and membership renewals are presently at 97 percent, higher than usual. Surely, these are signs of prosperity. Wrong! If there is any trend, it is that people who have had secure jobs with energy, mining, and environmental consulting firms have been laid off, riffed or replaced by younger and cheaper talent. Most of these people, out of self-preservation, are now "consultants", either as individuals or teamed up with similarly displaced colleagues, and they see AIPG certification and networking opportunities as a plus for their economic prospects.

- Calling previously-active AIPG members to ask them to serve on committees has been revealing. Most accept with pleasure and eagerness to serve, but a surprising number have reluctantly declined assignments they would have readily accepted in past years. The reason: they are focusing all their energies on making a living. Some report that they are busy but can't let up, and others are clearly struggling.

- A third indicator, largely from long-term members, are letters sent in response to receiving their annual dues bills. These are relatively few in number and clearly reflect pain filled choices about personal budget priorities, but several have expressed their long-term dissatisfaction with or disappointment in what AIPG has achieved or not achieved in its 30 years of existence; even suggesting the AIPG membership is not worth the annual dues. Even those few are disturbing because they imply that others who have paid their dues without complaint harbor similar views.

Clearly, our members see AIPG through the lens of the personal experiences, both private and organizational. Nevertheless, for those who are dissatisfied there is a "we" versus "they" dichotomy that is disturbing. "They" haven't prevented the spread of state registration. "They" haven't achieved significant lobbying impact. "They" haven't gotten as much as seven percent of the membership to an Annual Meeting. "They" haven't developed meaningful programs for continuing education. And so on.

At the risk of losing some of my younger readers, I will note that the famous American philosopher, Pogo Possum, said many years ago: "We have met the enemy, and he is us." At almost 5,000 members, AIPG can only reach significant achievements if its individual members think it is important and put forth their individual efforts to make something happen. There is not "they" of any significant numbers, there is only a "we" of members who can make AIPG better.

So, what have you done for AIPG lately?

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North of Climax Mine (Molybdenum) Fremont Pass, Colorado.
Photograph by Peggy J. Richter
Prosperity And Land: Front Range Urban Corridor

Editor's note: Ron Pritchett, the author of the following article, is the general chairman for the AIPG 1995 Annual Meeting, which will be held in Denver. He has written it more for the layman than for the geologist, with the intent of showing the true dimensions of natural resources and the variety of useful natural resources. It is his hope that similar articles can be written for other urban areas by AIPG geologists, and that such articles can then be submitted to local or regional newspapers and magazines as a way of informing the public about the benefits of resources near them.

Ron W. Pritchett, CPG-7063

Along the Front Range Urban Corridor of Colorado shown in Figure 1, land ownership means that people can use the surface of the land, and they can make use of sunlight on the land and wind across the land. Some people can use materials in the land - rocks and minerals, oil and gas - and owners can have access to water in their land. These landowners have title in Fee Simple Absolute, and production from their land is the foundation for prosperity in our communities because land resources multiply in goods and services.

The Resource Volume

Figure 2 shows a drawing of a 160-acre land parcel and the associated volume of rock, fluid, and energy resources available to a depth of 12,000 feet in the earth. Figure 2 represents a typical land tract along the Front Range Urban Corridor - an Area of 11,250 square miles in the Denver-Julesburg sedimentary basin, extending from Colorado Springs to Cheyenne (150 miles), and from Morrison to Fort Morgan (75 miles). The figure represents an environment for people, containing useful energy, fluids, and minerals.

Sedimentary Rocks

Sedimentary rocks near the Front Range are about two miles thick; the sediment volume is 2,000 feet thinner on the eastern side of the Front Range Urban Corridor. Within a few hundred feet of the surface, useful rocks and minerals recovered at places within the Area include: sand & gravel, volcanic rock, coal, lignite (low grade coal), alumina from the mineral kaolinite, and uranium salts. Below youngest sediments, deposited in the Cenozoic Era, and below sandstones containing potable water is the Pierre Shale interval - a mile to a mile-and-a-half thick near the mountain front. Below the Pierre Shale is the Niobrara Formation, rocks distinctive because they are made mostly of calcium carbonate minerals ("calcareous rocks" shown on Figure 2). Under the Niobrara Formation are Dakota sandstones, which form the long, sharp ridge near the mountains west of Denver (Figure 1). Where exposed, Niobrara limestone is used to make cement, and rocks of the Dakota Group are used in landscaping and...
construction, though Niobrara and Dakota formations yield more value as reservoirs for oil and gas deeper in the basin. Below the Dakota Group are blue-green and reddish shales of the Morrison Formation, containing bones and tracks of Jurassic-age dinosaurs. The bones and tracks can be seen and touched where they are exposed at Dinosaur Ridge, north of Morrison (Figure 1). Below Jurassic and Triassic-age rocks, sediments of Paleozoic-age record a climate very much different than the seasons of Denver in 1993; in Permian time the climate was hotter, and evaporite minerals such as chlorides and sulfates formed in marine basins. Evaporite minerals are present underground across the area, and the minerals add to salinity of water in the deep pore-space of sediments. Pore-space within sedimentary rocks is a resource commonly used in the United States; pore-space is used for storage of water, gas, and fluids that can be placed thousands of feet deep, away forever from human activity.

**Groundwater Resources**

Water is abundant in the resource volume. The top of water-saturated sediment is within 100 feet of the surface; the remaining two-mile-thick package of sediment is saturated with water. Water-filled pore-space in sedimentary rock is approximately 10% to 30% of the total resource volume.

Water that can flow to a well through pore-space of sedimentary rock is about 2 1/2 percent to 7 1/2 percent of the total volume of resources (though flow rates vary radically; see water yield trends of Figure 2). From these conservative volume estimates, a landowner of 160 acres sits atop at least 48,000 acre-feet of water. Most of the water is legally classified as non-tributary; most water is too salty to drink, and the energy required to lift and purify the water is expensive, though brines from deeper strata represent a potentially useful resource for water and for pure minerals resulting from treatment. Use of water from the resource volume is more of an energy challenge (and legal challenge) for pumping and purification, than a question of supply.

**Energy Resources**

Energy is abundant on the land surface. Wind energy is intermittent, though predictable in annual accounting; wind energy converted to electrical energy can be utilized for a range of applications including small motors, water pumping, and augmenting electrical energy storage and sale. Energy from solar radiation can be converted to electricity and heat. Photovoltaic

---

**FIGURE 1**

Front Range Urban Corridor
Resource Area - Location Key; Near-Surface Sediments

![Map](image)

*Figure 1. From its center near Denver in Colorado, the Front Range Urban Corridor parallels the Rocky Mountains and extends from Cheyenne in Wyoming, southward past Colorado Springs, accessible by interstate highway I-25. Water and useful rocks and minerals are within a few hundred feet of the surface in sediments of Upper Cretaceous and Tertiary age; sediments are upturned near the mountains on the west side of the Corridor, exposing rocks of Paleozoic and Mesozoic age.*
1994 AIPG Annual Meeting
Flagstaff, Arizona - October 11-15

Aerial view of Meteor Crater with San Francisco Peaks in distance. Flagstaff is located at the base of the mountains. Photograph by Dale Nations, CPO-8364

Field Trips

Flagstaff, Arizona was chosen as the site for the 1994 Annual AIPG Meeting because it has excellent facilities and because it is near the Grand Canyon and other spectacular geologic features. Attendees can, therefore, enjoy some of Arizona's very best geology and scenery, in addition to participating in the technical, professional, and spousal activities. Three all-day field trips are being offered: (1) Grand Canyon -- South Rim; (2) Meteor Crater, Painted Desert, and Petrified Forest; and (3) Oak Creek Canyon, Sedona, Verde River Valley, and Jerome.

Each trip leader is fully familiar with the local geology, geography, and history. The leaders will also provide non-technical information that will be of interest to non-geologist spouses. There will be many photo opportunities.

If you are planning to attend the meeting and are interested in going on a field trip, please complete and return the form below, if you have not already responded.

Field Trip Interest

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Trips I would attend:
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3. Meteor Crater, Painted Desert, and Petrified Forest Post (Oct. 15)____

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conversion of sunlight directly to electrical energy, or indirectly by process of water to hydrogen gas can serve domestic needs, and solar-to-electric energy can offset the cost of imported energy from utility companies. In an interlaboratory paper (National Renewable Energy Laboratory March 1990), available solar energy is put in perspective: "About 700 times the total annual energy used by the United States falls on this country as sunlight."

Energy is abundant in the resource volume. Below earth's surface and a depth of frost-effect (about 6 feet), the temperature of fluids and rocks remains fairly constant through the seasons (around 55 degrees Fahrenheit). Earth temperature increases with depth to more than 250 degrees Fahrenheit at the bottom of the resource volume. Two aspects of temperature in the resource volume are available for use: a constant-temperature environment, and warm or "hot" environments deep in the earth.

Petroleum

Oil and natural gas is in rocks under the Front Range Urban Corridor, at depths approximately between 4,000 and 11,000 feet; distribution of known productive areas is shown in Figure 3. Oil and gas is produced from
sedimentary rocks of Mesozoic and Paleozoic in age of deposition; most production is from rock reservoirs of Cretaceous age, and few wells have been drilled in the area below 9,000 feet to confirm fluid content in older rocks. Oil and gas is unequally distributed across the area and through the sedimentary volume. Production of oil and gas becomes feasible only after financing, leasing, exploration, discovery by drilling, establishment of a market price high enough to pay production costs, and costs of development low enough to support continued production. Across the Front Range Urban Corridor, useful resources of about 287 million barrels of oil and 1.6 trillion cubic feet of gas have been produced through about 40 years; more oil and gas remains to be found and produced. At wellhead prices of $18 per barrel and $2 per 1000 cubic feet, revenue of 8.4 billion dollars has been generated. From 50% to 90% of oil and gas remains in known fields, though unit costs are higher for recovery of remaining petroleum.

**Taxes**

From the productive acreage - the first point of sale - about 12 1/2% of petroleum revenue is distributed to landowners, and about 79 1/2% goes to oil operator/investors. Before money goes to either landowners or investors, and before break-even of petroleum venture costs, direct taxes of about 8% of the product market value are taken. Petroleum, like all commodities, starts a cascade of taxes in the community levied at many points when products and services are reformatted, delivered, packaged, and sold.

**Resources And Prosperity**

Costs of land ownership for maintenance, insurance, taxes, and good-neighbor obligations create a vital need for resource production from the surface and from under the land in three ways:

1) money can be made from land resources to pay unavoidable costs borne by landowners and communities;

2) water and energy can be produced to offset imports to land and communities;

3) goods and services can be multiplied beyond the landowner to increase prosperity in our growing communities. Population in the Front Range Urban Corridor will likely exceed 3 million by the year 2,000.

Energy and materials are abundant in and on the land. Matched with efficient production for demand in markets, energy and materials are inseparable from prosperity. But not all resources have a current market or a current use. Risk-taking, invention, time, and money is necessary to achieve marketable land resources. When land is condemned to accommodate a growing population along the Front Range Urban Corridor, authorities pay landowners only on the basis of current market conditions, not future market potential nor future utility. And when State and Federal agencies control resources of the land, access depends on politics of the time; opportunities for multiplied goods and services may be lost. Regardless of popu-

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*Figure 3. City areas along the Front Range Urban Corridor are shown in relation to areas of known oil and gas fields in the Denver-Julesburg Basin. Communities can prosper from resource development through recovery of water, petroleum, and other useful minerals prior to condemnation for urban growth.*
lar trends - independent of private or public land ownership - the following will always be true:

Production from land is basic to life and prosperity. Neighbors and regulators will encourage production from land if owners will match resources with new uses and new markets for everyone's benefit.

Data References
Publications about resources and directories of professional geologists are available from:
American Institute of Professional Geologists (AIPG)
7828 Vance Drive, Suite #103
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[On the eastern side of the Front Range Area, the depth to crystalline basement is shallower by 1000 to 2000 feet. The Ogallala Formation is present in the northern part of the Area; depth to the Pierre Shale Formation varies through the Area; the Fountain Formation is about 1,000 feet thicker in the south part of the Area (Key wells: J.S. Abercrombie #1 State, Sec. 16-T.35S-R.67W, Douglas County, and U.S. Army Engrs. Rocky Mt. Arsenal #1, Sec. 26-T25S-R.67W, Adams County.]}]

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Front Range Urban Corridor
Colorado Geologic Highway Map, 1991 revised, published by Western Geographies, P.O. Box 1984, Canon City, CO 81215, with cooperation of the Colorado Geological Survey.

Southern Rocky Mountain Region Geological Highway Map, 1967, American Association of Petroleum Geologists, P.O. Box 979, Tulsa, Oklahoma 74101.

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The Gloves Are Off

Robert O. Russell, CPG-3492, has just written a book (not yet published) about his 30 years experience in the mining and oil & gas industries entitled, "The Gloves Are Off". The following is a short excerpt from the book.

MONEY

Work Procedure - Is The Objective To Find Oil, Or Just To Make Money?

Micro
Keep a chart on the wall with the jobs by number or name vertically and with the trivial progress horizontally. While you wait on drafting on "a" you can spend your time in "b" etc. It teaches you how many functions, parts etc. comprise one job, and how long it takes.

Weigh your priorities vertically on a scale of 1 to 10. If the first two layers satisfy you, then apply "intellectual" brutality and ignore the rest. Otherwise you get stuck with detail.

In exploration you have to decide before you know enough, or there is nothing left to be found.

Macro
Watch out for construction developers as members of your group and watch out for governments who just want a bunch of jobs for their people; see Woodall's study of the mining industry!

Construction companies etc: We got our lesson offshore Greece with the Prinos development, where our partner, a major in the construction industry, got the contract to develop the field and ran up a 300% cost overrun to play it safe. If the oil prices had not gone up, we would have had to produce 75% of our recoverable reserves just to reach payout.

Our next lesson came at Vega offshore Sicily. Vega is a Mesozoic karst field just like Casablanca with one important difference: at Vega the oil is heavy, so there is a risk, that the formation water will bypass the oil. The Italian government company, which was the operator at Vega, paid no attention to that risk, just went ahead and developed the field. So what we feared happened; the water went past the oil, and what was intended as "ten" producing slots (on the seabottom) and "two" slots for injection, ended up being "six and six". Imagine what that did to the economics:

By comparison at Casablanca, offshore Spain, we took no chances, we test produced a million barrels from one well, before we went ahead with the multimillion dollar development of the field - and there was no problem at Casablanca with either water or heavy oil!

As of today, 3/1993, Vega has 24 wells in it, in a 1/4 section spacing. Operating costs are paid, but payout will never be achieved! So the platform will never be paid for. 900 MMS spent, so far.

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GIS a Useful New "Tool" For Geologists

Valton D. Landrum, CPG-8803

A year ago, I was contacted and asked to present a paper at the National Western Mining Conference on a gold project I had worked on in southern Baja California. Although delighted to have been asked, I was daunted by the fact, that, as a consultant, I would have no help with the presentation graphics. Before I could say no, my wife reminded me that through one of her endeavors, we had GIS (Geographical Information System) software and it could be used to prepare professional looking maps.

After having said yes to the presentation, I faced the prospect of sitting down and learning to use this "beast". In two one-half hour study sessions, I was off and running, well, at least setting up files and digitizing maps.

Shortly thereafter, I realized that I could "turn on" various combinations of the many maps I had digitized (Topo Base, Geology, Geochemistry, Geophysics, Land/Concessions, etc.) and use them as "on screen" work maps for data analysis. When a particular combination showed some fundamental or useful relationship, a final, color "hard copy" could be produced in a eight pen plotter. Having full control over scale, I could use any scale appropriate for data analysis and later produce the presentation maps at a common scale.

Before long, I learned to attach databases to maps and query the data to produce anomaly maps for comparison with raw data. I also found I could use the automatic "rubber-sheet" feature for quick and accurate data entry from maps with odd scales or those skewed by reproduction.

Admittedly, I made some mistakes in the graphics for my presentation, but they were mostly through ignorance of the size of the room where the presentations were held and the size of the audience. Line weight, for example, was something I could have easily changed using the GIS software (light lines are hard to see from the back of a large room). Any fault of the graphics was entirely mine!

Subsequent to the presentation, I have found other useful GIS features. One is automatic planimetrting. If someone wants to know the area of ore at various "bench levels" for a reserve estimate, I only have to put the cursor inside the ore outline at that level and "click-on-it" to get the area (in square feet, meters, yards, etc.). Another feature allows me to instantly measure distance and direction on screen; say from the nearest power line to the deposit. I have also found that a lot of information can be attached to any map point, like drillhole assay data. I can ask the database for all the holes having assay intervals above a selectable value and have them highlighted. Finally, with all of the data "tied" to an electronic oblate spheroid representing the surface of the earth, any point on the screen represents a precise latitude and longitude coordinate which is also displayed. This is a handy feature in some applications.

Now, with the above applications in mind, think about what a valuable "tool" this can be for a consultant or company. Of course, there are limitations: it does not contour data, does not do cross-sections automatically, it does not do anything at all unless you first put in the data. However, once that step is accomplished, you can easily make or modify a map or an interpretation. As field work generates new information, it is much simpler to update the computer data than redraft or modify mylar maps. If

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that were not enough, there us no need to store a lot of old mylars.

So, unless you are one of those individuals blessed with the ability to store and juggle vast amounts of graphical data in your head (or happen to enjoy spending a lot of time at your drafting table), you could probably use a "tool" like GIS. The initial work digitizing and entering data is offset by the time saved drafting work maps, then drafting final copies, often followed by a request for drafting smaller, more schematic versions of the maps for a company report.

"Okay", you say, "but it isn't cheap". No, it isn't. But then again, neither is your field vehicle, or the time someone pays for you or someone else to compile or draft. Most of us, for one reason or another, have already invested in a computer. It may be that a couple of "add-ons", like the software, a digitizing tablet and (if you can not find one you can occasionally borrow) a plotter, and you're in business. My set-up (software and hardware, less plotter) runs about $7,500 but it is already paying for itself in a number of ways. Since a lot of variation exists in price and capabilities of hardware and GIS software, I'd advise you to look for something in your price range and that is user friendly. Most people interested in a time-saving tool will not want to devote a lot of time learning to use it. Fortunately, the GIS software I have is very user friendly, and my "spool-up" time minimal. It continues to be a learning experience, to be sure, but worth the effort.

**BOOK REVIEW**


This volume incorporates some of the discussions of a symposium, The Geological Modelling of Hydrocarbon Reservoirs, held as part of the 1990 International Sedimentological Congress at Nottingham, UK. The symposium was designed as a multidisciplinary examination of the realities and needs of reservoir characterization and quantitative modeling of physical rock properties in three-dimensional, inter-well space. I approached this review not as a specialist in modeling of geologic processes, but as a geologist searching for another tool to improve my reservoir characterization skills.

The book is divided into two sections: Quantitative Data Collection (11 paper) and Modelling Methods (5 papers). The emphasis is on clastic reservoirs rather than carbonates. After an introductory paper by the editors on problems and perspectives of quantitative clastic reservoir geologic modeling, four detailed case studies are presented as examples of quantifying subsurface relationships in alluvial, fluvial, coal-bearing deltaic/alluvial plain and turbidity depositional environments. The remaining six papers of the first section discuss more specific applications of analysis of shale smears on fault surfaces, Schlumberger formation micro-scanner (FMS) and dipmeter data, permeability data, 3-D seismic information, and estimation of geologic parameters between wells in densely drilled fields. The modeling section examines the use of high-resolution permeability data to better define flow units for input into reservoir simulators, the theory and application of using shale and sandstone-body length distributions to model subsurface facies volumes, two complementary studies of dimensional analysis and use of stochastic models for fluvial sandstone bodies, and an example of building a 3-D reservoir model.

The papers were uniformly readable, with most of the specialty-specific (e.g. sequence stratigraphy) nomenclature reasonable well defined. The column is well indexed. Some articles are nicely highlighted with color photographs and color diagrams. The formation micro-scanner (FMS) images are particularly valuable in showing the utility of that particular approach.

I found the first section on quantitative data analysis with the accompanying case studies to be of more interest. Four of the five papers of the modeling section provided only a feel for data limitations, use and quality control. Two of the models discussed in the second section are proprietary to specific companies, which certainly limits their assessments and use by the rest of the geologic community.

The identification of flow units on a reservoir scale is receiving a great deal of attention as the domestic oil and gas industry concentrates on development rather than exploration geology. The main benefit that I see to this book is to further the application of principles to obtain quantitative geologic data and use outcrop data to better view the subsurface. This would go a long way towards getting reservoir engineers and geologists on the same page. The engineers' models are somewhat limited in their ability to reproduce the complexities of a natural system, while geologists, with vast amounts of qualitative sedimentological "data," are often not able to communicate their understanding to the engineer in a form suitable for guiding the building and application of predictive reservoir models.

John B. Curtis, Dept. of Geology and Geological Engineering, CO School of Mines, Golden, CO 80401
The U.S. Global Change Research Program

A report from the AIPG National and International Affairs Committee

Robert K. Merrill, CPG-4984

When it was initially funded the U.S. Global Change Research Program (USGCRP) was created to gain an understanding of the processes acting upon the earth. Over the last five years priorities have changed as new politicians have funded their own agendas. The USGCRP was created as an interdisciplinary effort coordinated by the Committee on Earth Sciences of the Federal Coordinating Council for Science, Engineering, and Technology in 1989 "to gain a predictive understanding of the interactive physical, geological, chemical, biological, and social processes that regulate the total Earth system and, hence, establish the scientific basis for national and international policy formulation and decisions relating to natural and human-induced changes in the global environment and their regional impacts. "This goal was to be met by answering three questions: 1. "What global changes have occurred in the past and are occurring now?" 2. "What physical, geological, chemical, biological, and social processes are involved in influencing global change and its environmental impacts?" 3. "How well can global change and its impacts be predicted?"

These questions indicate that the program was designed to establish baseline data for processes affecting the earth, physical, chemical, and social. Once this data was available it would be possible to evaluate what changes are occurring now and their seriousness and finally predict how these processes affect the earth and its inhabitants. As geologists we deal with these issues every day. Few of us ever do anything about promoting our understanding. Programs are designed by the Federal Government, funded, completed, and not enough geologists care as long as they get their piece of the funding. Unless our understanding is transferred to the public and private sectors, the funding dries up, understanding the earth is no longer relevant!

One objective of the USGCRP is to gather baseline data. As geologists this would include geologic mapping. The United States suffers from a lack of adequately scaled geologic maps. With baseline information as scientists we can understand what the status of a process is today, is the process acting in a normal state or is it actually in an abnormal state? Without understanding the "normal" state of a system, it is impossible to recognize when it is in an "abnormal" state. With respect to processes affecting the earth, what is catastrophic to humans represents a perfectly normal event for the earth. What humans consider to be violent forces, shape the earth. As geologists we can recognize where rivers flood, oceans erode, and earth's plates interact. Without geologic maps this information is not generally available. My understanding of the original objective of the U.S. Global Change Research Program was to assess the landscape and the climate so regulations could be promulgated to prevent people from doing damage to others, to themselves, and to the environment.

In the past two years the focus of the project has changed. This change is reflected on what were initially called "Science Elements" and in 1994 are now called "Critical Earth-System Priorities." In the process of

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Figure 1.
implementing this change, geologic funding has suffered and climate studies have gained emphasis. The result is a decrease in the funds available for geological work. The stated goal of the Program in 1994 is "to produce a predictive understanding of the Earth system to support national and international policy-making activities across a broad spectrum of global, national, and regional environmental issues. "This vague language has allowed a redistribution of energy and money to where atmospheric processes dominate the priorities of the USGCRP as shown in the table below:

The change is also reflected in the change from 1989 to 1993 budgets. The climate and hydrologic systems program has gone from 29% of the total to 45% of the total, and funding increased from $37 million to $629 million. Originally defined "as the study of the physical processes that govern physical climate and the hydrologic cycle and the interactions between the atmosphere, hydrosphere, cryosphere, land surface, and biosphere"; this program has changed to climate modeling and prediction study of the global water and energy cycle, and the global carbon cycle. The total USGCRP program has gone from $133 million to almost $4000 million in five years (Figure 1).

Bruce Molnia in his Washington Report in the January 1994 GSA Today indicated that he will report back to the geological community in the December 1996 issue regarding "How are the geological sciences doing in the USGCRP? The descriptions of programs associated with the USGCRP include ozone depletion, climate prediction, past climate cycles, understanding El Nino Southern Oscillation cycles, improving understanding of the sinks and sources of carbon dioxide and methane in the global budget. Where is the geological mapping of flood zones, earthquake hazards, landslide hazards, and swelling soils? When I moved to Houston I used an outdated, inadequately scaled Soil Conservation Service map to determine the soil type where I wanted to purchase a house. Flood plain maps were not generally available! Geologic information should be current and readily available if we are to educate the public to understand the risks inherent to geologic hazards. The interest in geologic hazards is overwhelming whenever I have the opportunity to talk to students or the general public.

Apparently the geological sciences are not doing well under the U.S. Global Change Research Program. Priorities have changed from under-
standing the earth as an integrated system to the political agenda of global warming and changing climates. Global warming is an innocuous agenda. Everyone is affected by geologic hazards. As geologists we have failed to gain continuing attention to our work. How soon the public forgets earthquakes and floods! Only those directly affected remember, even governments don’t remember. If we are to truly understand global change, it is necessary to understand geologic processes and how to avoid geologic hazards or mitigate the risks.

How much will the flooding of the Mississippi River and the recent Northridge Earthquake cost the people of the United States? A portion of the money spent on reconstruction after these tragedies could insure that information is available so the general public can make educated decisions about where to live and work. I recently learned of the U.S. Corps of Engineers plan to build a tunnel with a 30 m opening to drain the flood waters of the Delaware River away from the populated flood plains. Baseline mapping, i.e., flood plain maps, inform everyone where the flood plain is. It is cheaper to purchase all the homes than to build this tunnel. Let us understand our present environment, the interactions of the earth’s surface, atmosphere, and interior through integrated programs. These base studies will allow us to predict future changes and manage our precious resources. I urge you to get involved in how your government spends your money, learn about funding programs, and make your voices heard.

Executive Officer Appointed

On November 17, 1993, the California Board of Registration for Geologists and Geophysicists (Board) appointed John G. Parrish as Executive Officer.

Prior to his appointment, Dr. Parrish had worked for over 20 years in the petroleum industry in a variety of technical and managerial capacities both domestically and internationally. He is a California Registered Environmental Assessor.

Dr. Parrish holds a Bachelor of Science in Geology from the University of Redlands, a Master of Science in Geology from the University of Houston, a Master of Business Administration from California State University at Bakersfield, and a Ph.D. in Marine Geology from the University of Wales, United Kingdom. He is an active member of several professional organizations, and is a Certified Petroleum Geologist by the American Association of Petroleum Geologists and a Certified Professional Geologist by the American Institute of Professional Geologists.

The Board welcomes Dr. Parrish to his new appointment, and is looking forward to continuing its work with consumers and various organizations to effectively advance its programs for professional competency and consumer protection.

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Spoken by BENJAMIN FRANKLIN Nearly 250 Years Ago

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ALABAMA S 558
AUTHOR: Campbell
SUMMARY: Relates to the renewal of certificates of registration for professional engineers and professional land surveyors and exempts licensees 65 years of age or over from the annual renewal fee and from continuing education requirements.
STATUS: 02/24/94 INTRODUCED

ALABAMA H 633
AUTHOR: Mikell
SUMMARY: Provides for the regulation and licensure of geologists; provides for the Alabama Board of Licensure for Geologists; makes an appropriation; prescribes fines and penalties for violations of this act.
STATUS: 02/24/94 INTRODUCED

ALASKA S 320
AUTHOR: Leman
SUMMARY: Relates to occupational licensing boards and commissions; relates to architects, engineers, and land surveyors.
STATUS: 02/14/94 INTRODUCED

CALIFORNIA A 2702
AUTHOR: Fazee
SUMMARY: Increases the penalty for various violations of the Architects Practice Act to imprisonment in the county jail for a period not to exceed one year.
STATUS: 02/18/94 INTRODUCED

CALIFORNIA
AUTHOR: Karnette
SUMMARY: Removes electrical and mechanical engineers from the regulation under the Professional Engineers Act. Provides that a public agency may specify a branch of registration or authority title for professional engineers submitting engineering plans for approval by the public agency. Reduces the number of State Board of Registration for Professional Engineers and Land Surveyors members from 13 to 9. Removes the restrictions on ownership and management of engineering businesses.
STATUS: 02/17/94 INTRODUCED

CALIFORNIA A 3464
AUTHOR: Knowles
SUMMARY: Exempts from the Contractors' State License Law an arborist, certified by the International Society of Arboriculture.
AIPG NOTE: Is this an opening for professional certification of geologists by societies instead of state agencies?
STATUS: 02/24/94 INTRODUCED

CALIFORNIA S 1646
AUTHOR: Rogers
SUMMARY: Requires rules and regulations of boards provided for in the Business and Profession Code to provide for methods of evaluating education, training, and experience obtained in the armed services, if applicable to the requirements of the business, occupation, or profession regulated.
STATUS: 02/23/94 INTRODUCED

CALIFORNIA S 2041
AUTHOR: Rogers
SUMMARY: Requires the operator of a small-scale surface mining operation to perform reclamation of an operation site in accordance with specified requirements by the State Mining and Geology Board. Requires the Department of Conservation to include approved small-scale surface mining operations in the list identifying specified surface mining operations.
STATUS: 02/25/94 INTRODUCED

CALIFORNIA S 2071
AUTHOR: Caldron
SUMMARY: Authorizes the owner of a hazardous materials release site who reasonably believes that a release of hazardous materials at a site has been caused by a person other than the owner, to send a notice of potential liability, as prescribed, to the person who the owner believes caused the release. Requires the recipient of the notice to respond to the owner in writing and by certified mail within 90 days.
STATUS: 02/25/94

FLORIDA H 1093
AUTHOR: Saunders D
LAST AMEND: 02/15/94
SUMMARY: Increases the tax on the severance of certain solid minerals and the severance on heavy minerals over specified periods, revises the distribution of the taxes on production of oil and gas, severance of certain solid minerals, severance of phosphate rock, and severance of heavy minerals, and provides for deposits in a Minerals Trust Fund.
STATUS: 02/08/94 INTRODUCED

FLORIDA H 1237
AUTHOR: Ascheri
SUMMARY: Exempts faculty members at certain accredited schools from requirements for registered engineers.
STATUS: 02/08/94 INTRODUCED

FLORIDA S 438
AUTHOR: Dyer
SUMMARY: Revises various provisions relating to regulation of professions by the Department of Business and Professional Regulation; includes the professions of clinical, counseling, and psychotherapy services, physicians and osteopathic physicians, chiropractors, speech-pathologists and audiologists, physical therapists, psychologists, audiologists, employee leasing services, engineers, land surveyors, veterinarians, real estate and architectural services, among others.
STATUS: 02/08/94 INTRODUCED

FLORIDA S 1496
AUTHOR: Committee on Professional R
SUMMARY: Relates to the regulation of professions and occupations; requires the regulatory boards to establish a plan for resolving investigations and disciplinary proceedings conducted by the boards; provides limitations on the period during which a complaint may be filed alleging a disciplinary violation; provides for the costs of an investigation and disciplinary proceeding to be assessed against the licensee.
STATUS: 02/08/94 INTRODUCED

IOWA S 2165
AUTHOR: Banks
SUMMARY: Provides for the allocation of moneys appropriated to support soil and water conservation practices, supports levee reconstruction and repair.
STATUS: 02/17/94 INTRODUCED

IDAHO S 1549
AUTHOR: Committee on Jud and Rules
SUMMARY: Relates to labeling of lubricants blended with re-refined/recycled oil and the size of type on containers; provides labeling requirements for containers of lubricants blended with recycled oil.
STATUS: 03/01/94 INTRODUCED

KANSAS 2377
AGENCY: Board of Agriculture/Division of Water Resources
TOPIC: ENERGY -- 7
SUMMARY: Concerns the definitions of "battery of wells", "household purposes", "industrial use", "irrigation use", "municipal use", and "stockwatering use"; sets standards of "standby well", deletes a reference to a hearing procedure that was changed by statute; requires that whenever a flow meter has been required, the owner report the beginning and ending meter readings on the annual water user report; sets well spacing requirements for all areas that were previously not set by regulation or intensive groundwater use control area orders.
AGENCY CONTACT: Chief Engineer, Division of Water Resources, Kansas State Board of Agriculture, 901 S. Kansas Ave., 2nd Floor, Topeka, KS 66612-1283
CITATION: KAR 5-1-1, -1-2, -3-4a, -3-5e, -4-4, -7-1, -7-3, -7-4, -11-1, -11-2, Definitions
PROPOSAL DEADLINE: 02/10/94
COMMENT DEADLINE: 03/12/94
HEARING DATE: 03/17/94

KENTUCKY H 439
AUTHOR: Geveden
SUMMARY: Requires the Geological Survey to develop a long-term seismic monitoring network to characterize seismic activity, creates a technical advisory board, and makes appropriations.
STATUS: 02/03/94 INTRODUCED
KENTUCKY H 577
AUTHOR: Bentley
SUMMARY: Allows the Department of Mines and Minerals to require of any oil and gas operator the running of geophysical logs on any well.
STATUS: 02/15/94 INTRODUCED

KENTUCKY H 619
AUTHOR: Ridley
SUMMARY: Relates to oil as an gas; requires a well operator to submit a restoration, reclamation, and abandonment proposal and a proposal to prevent liquids which may be a contaminant from escaping into the waters of the Commonwealth at the time he files an application for permit to drill, deepen, or rework a well; specifies contents of the proposals; requires that the proposal be submitted within 30 days after the day the permit is first issued.
STATUS: 02/18/94 INTRODUCED

KENTUCKY H 707
AUTHOR: Jensen
SUMMARY: Relates to the permitting of surface coal mining operations; relates to surface coal mining; allows an extension of the underground mining area through a major revision to the permit if the extension does not cause unplanned subsidence or new surface disturbance.
STATUS: 02/25/94 INTRODUCED

KENTUCKY H 771
AUTHOR: McEnroe
SAME AS: S 2150
SUMMARY: Relates to engineers and land surveyors, defines and redescribes terms; refers to registered engineers and land surveyors as professionals; specifies exemptions to the prohibition on engaging in the practice of land surveying; delineates the qualifications for registration as a professional land surveyor; prohibits persons convicted of a felony involving fraud or deceit from practicing land surveying; establishes the conditions under which an engineer or land surveyor registered in the state may practice.
STATUS: 02/28/94 INTRODUCED

MASSACHUSETTS H 3554
AUTHOR: Earene
SUMMARY: Regulates the registration of professional engineers.
STATUS: 02/08/94 INTRODUCED

NEW JERSEY A 615
AUTHOR: McEnroe
SUMMARY: Relates to unlawful solid waste disposal; provides that if the Commissioner determines that any activity occurring relating to the disposal of solid waste presents an imminent threat to the environment or public health and safety, the Commissioner may issue an emergency order to the owner or operator of the offending solid waste facility, recycling center or other site; provides for the administration of the emergency order.
STATUS: 01/11/94 INTRODUCED

NEW JERSEY A 929
AUTHOR: Amone
SUMMARY: Provides an investment tax credit under the corporation business tax for the cost of purchasing and installing devices and equipment to produce methane gas from sanitary landfills.
STATUS: 01/11/94 INTRODUCED

NEW MEXICO SM 78
AUTHOR: Rutherford
SUMMARY: Requests the New Mexico Oil and Gas Association to convene a task force to study the problems associated with abandoned oil and natural gas production sites.
STATUS: 02/09/94

NORTH CAROLINA 2645
AGENCY: Occupational Licensing Boards
TOPIC: BUSINESS AND CORPORATIONS -- 2
SUMMARY: States that the upper limit on examination fees is being set to allow the Occupational Licensing Boards to utilize a national examination which now costs $350.
AGENCY CONTACT: Board of Licensing of Geologists, 3733 Benson Drive, Raleigh, NC 27609, (919)680-9680
CITATION: 21 NAC 21 :0107 Board of Geologists

PROPOSAL DATE: 02/01/94
COMMENT DEADLINE: 03/03/94
HEARING DATE: 03/04/94

OKLAHOMA H 2549
AUTHOR: Rice
SUMMARY: Adds methane to the definition of gas; declares gas from coal seams to be the property of the gas owners or gas lessees; effective date is September 1, 1994.
STATUS: 02/07/94 INTRODUCED

PENNSYLVANIA H 2566
AUTHOR: Sauman
SUMMARY: Provides for environmental audits and environmental audit reports and for the exclusion of same as evidence.
STATUS: 02/28/94 INTRODUCED

RHODE ISLAND S 3106
AUTHOR: York
SUMMARY: Relates to state purchases--architects, engineers, and consulting services.
STATUS: 02/17/94 INTRODUCED

SOUTH CAROLINA H 4773
AUTHOR: Sharpe
SUMMARY: Provides for the general permitting of certain mining activities; relates to restraining orders, injunctions, and civil penalties pertaining to violations by explorers and miners, a as to authorize cease and desist orders and civil penalties for not complying with requirements of a general permit.
STATUS: 02/17/94 INTRODUCED

UTAH H 358
AUTHOR: Burroughs
SUMMARY: Creates a Utah seismic safety commission; defines membership; provides duties and responsibilities; and provides a sunset date.
STATUS: 02/14/94 INTRODUCED

VIRGINIA H 444
AUTHOR: Murphy
LAST AMEND: 02/08/94
SUMMARY: Removes the prohibition oil and gas drilling in Tidewater, Virginia, but if the Director of the Department of Mines, Minerals and Energy finds that production of commercial quantities is likely, he is required to report this fact to the Secretary of Commerce and Trade, and Natural Resources; provides that the Secretary is responsible for developing a joint report for the Governor, analyzing, among other factors, the environmental risks and safeguards of such an activity.
STATUS: 01/24/94 INTRODUCED

VIRGINIA S 375
AUTHOR: Wampler
SUMMARY: Relates to pooling of interests in storage well units.
STATUS: 01/25/94 INTRODUCED

VIRGINIA S 587
AUTHOR: Wampler
SUMMARY: Relates to a tax credit for the production of natural gas in the Commonwealth of Virginia.
STATUS: 01/25/94 INTRODUCED

WEST VIRGINIA S 131
AUTHOR: Withers
SUMMARY: Relates to sheriff's sale of delinquent minerals, reverting title to minerals to owner of surface at time of sale, provides for forced pooling and utilization for shallow oil and gas well exploration and production, defines certain terms, establishes a shallow well oil and gas conservation program, and numerous other provisions.
STATUS: 01/27/94 INTRODUCED

WYOMING S 30
AUTHOR: Committee on Mines/Basin/Eco
SUMMARY: Amends mining reclamation standards and repeals definitions creating specified categories of lands.
STATUS: 02/22/94 INTRODUCED
TODAY IN WASHINGTON

F. B. "Ted" Mullin, CPG-1716

Well, the Administration and the Congress are really rolling. Rushing to aid the victims of the southern California earthquake disaster, Congress pushed through a package of emergency transportation, housing, education, and health benefits in the first two weeks of February.

The fiscal 1994 supplemental appropriations act (HR3759-PL 103-211) funnels money far beyond the communities rocked by the Jan. 17th earthquake.

Midwestern farmers inundated by the Mississippi River last year will receive hundreds of millions of dollars in additional aid, the Defense Department collects emergency funding for its humanitarian and peacekeeping operations in Bosnia, Iraq, Somalia, and Haiti.

And beyond the $10 billion in emergency funding not subject to budget limits, the law provides $1 billion in routine supplemental appropriations for 17 federal programs plus one years pay for the widow of Rep. Paul Henry, R-MI, who died July 31.

There were a number of the members who took the opportunity to use their influences to advance pet projects (read that as PORK). More about this later.

Here's how it worked--In late January, the Clinton administration submitted a request for $6. 2 billion in emergency spending authority and $659 million in loan authority. A week later this was increased by an additional $1. 6 for spending and $550 million in loan authority.

Some House Republicans and conservative Democrats offered two amendments to offset most or all of the appropriations costs ($7. 5 and 9. 7 billion). In return, the House Democratic leadership tried to preempt major spending cuts by offering their own package if $2. 66 billion in rescissions. It worked, as the House rejected the amendments on favor of the leaderships proposal and the bill passed by a vote of 337-74.

The Senate Appropriations Committee added some supplemental appropriations and increased the rescissions to $3. 4 billion from existing federal programs.

And now for the PORK ROAST--

Senate Majority leader Mitchell, (D-ME), added $1. 4 million to help battle the Late Blight Potato fungus in Maine. MITCHELL HAS ANNOUNCED HIS RETIREMENT.

FDA got $2. 3 million to cover the agencies pay increases.

Sen. Robert Byrd, (D-WVA), appropriated $20 million to hire 500 employees for the fingerprint laboratory in Clarksburg, WV, plus open hiring authority--so much for downsizing.

US Information Agency was funded $2 million for "certain security construction projects".

The Labor Dept. was funded $61. 4 million to cover unemployment and job-training claims, plus the Bureau of Labor Statistics got $10. 1 million "to continue testing a new method of measuring unemployment". What's wrong with the old method--counting?

The Senate provides themselves with more than $1.0 million to cover the cost of the Office of Senate Legal Counsel for Employee-Management Relations--including $600,000 to retain private lawyers. At last count there were about 58 Senators with degrees in law. One wonders why they would ever need a lawyer--Two to paddle the canoe and 56 to keep them out of whitewater--

Sen. Moynihan (D-NY), provided for $10 million to adapt a post office to use as an AMTRAC station.

There are too many more to add here. You should be able to have some idea why the budget runs rampant.

And now for the other reason the budget adds up--as the late Senator Ev Dirksen said,"A billion here, a billion there--pretty soon it adds up to real money". Regulations, regulations--


"The only known existing Pacific Pocket Mouse population is imminently threatened by a land development project and by depredation by feral and/or domestic cats". Apparently there are about 3.75 acres on Dana Point Headlands that house the little beasties and a development is scheduled. Meanwhile, the cats are doing what comes naturally: catching mice. It seems to me that listing the mice as endangered may be appropriate, but will they read the notice and hide from the cats who can't read either. What a quandary!!


This Proposal Rule deals specifically with those risks associated with uranium mill tailings.

For further information contact: Gale C. Bonanno; Air Standards and Economics Branch, Criteria and Standards Div. . Office of Radiation and Indoor Air, EPA, Washington, DC 20460 (202) 233-9219
Vol. 59, No. 28, 2-10-94, Part II Environmental Protection Agency 40 CFR part 141
Monitoring Requirements for Public Drinking Water Supplies; Proposed Rule
This proposed rule applies to public water systems serving 10,000 or more people, and will require monitoring of both surface and groundwater sources.
For further information contact: The Safe Drinking Water Hotline (800) 426-4791, or for technical Info Stig Regli, Office of Groundwater and Drinking Water, U. S. E. P. A. (202) 260-7379

Vol. 59, No. 32, 2-16-94, Part III Department of Agriculture Forest Service 36 CFR Parts 261 and 262 Prohibitions: Law Enforcement Support Activities; Proposed Rule
Among other things this proposal prohibits—261. 9 (c) Disturbing, damaging, excavating, digging, removing, transporting, possessing, buying, selling, bartering, or offering to buy, sell, or barter, any fossil or other paleontological resource:

The current wording found at 36 CFR 261. 9(i) is as follows: 261. 9(i) Excavating, damaging, or removing any vertebrate fossil or removing any paleontological resources for commercial purposes without a special use authorization. Some of you may remember that we have been down this road before. If this wording remains, you and/or your students can be cited and fined for picking up a common fossil in a National Forest. It has happened before and you can be assured that it will happen again if the wording isn’t changed.

Send written comments to: Jack Ward Thomas, Chief (5300), Forest Service, USDA, P. O. Box 96090, Washington, DC 20090-6090, by April 18, 1994.

The purpose of these reviews is to insure that all significant DOI regulations are efficient and effective, impose the least possible burden upon the public, and are tailored no broader than necessary to meet the objectives of the program being implemented.

Written comments must be received by May 2, 1994. Send comments to Bill Vincent, Deputy Director, Office of Regulatory Affairs, Department of Interior, Mail Stop 6214 MB, 1849 C Street NW, Washington D.C. 20240. For further information, call Bill Vincent at (202) 208-5271.

Here’s your chance to comment to the Bur. Mines, U.S.G.S., BLM, NPS, BOR, OSM, MNS or the BIA. It’s a good idea, and I hope that you will comment. Then we will just have to see if “they” listen.

New Book On The Geology Of Wyoming Honors Two Distinguished Wyoming Geologists

From the office of the Wyoming State Geologist, Gary B. Glass, CPG-2503
Two well-known geologists from Laramie, Dr. Donald L. Blackstone, Jr., CPG-0317, and Dr. J. David Love, have recently been honored for their contributions to Wyoming geology by the dedication of a new two-volume book. The book, entitled Geology of Wyoming, was prepared and published through a cooperative effort of the Wyoming State Geological Survey and the Department of Geology and Geophysics at the University of Wyoming.

The new publication, Memoir 5 of the Geological Survey of Wyoming, consists of two hardbound volumes totaling 938 pages plus a map pocket containing 7 oversize plates, a stratigraphic nomenclature chart, a basement configuration map of the State, and a highway geologic map of Wyoming. Thirty-two technical papers, authored by geoscientists at the University of Wyoming, the Wyoming State Geological Survey, and other organizations or institutions, appear in the two volumes, along with dedications to Dr. Blackstone and Dr. Love.
The publication is currently available over-the-counter or by mail from the Department of Geology and Geophysics, University of Wyoming, Box 3006, University Station, Laramie, WY 82071, phone (307) 766-3386. A flyer listing the articles contained in the publication plus an order form can be obtained from the above address or from the Wyoming State Geological Survey in Laramie.
With the beginning of a new legislative year and a new committee on National and International Affairs, I have asked the Chairman of that committee to present a guest column. This will serve as his introduction to our members. --William V. Knight, CPG-0153

--- GUEST COLUMN ---

The National And International Affairs Committee

Robert K. Merrill, Chairman, National and International Affairs Committee

The National and International Affairs Committee is charged with the responsibility of monitoring Federal and foreign legislative and regulatory matters that have implications for professional geologists. The Committee is structured to represent the full spectrum of AIPG membership interests which probably represents its greatest challenge. The easy part of the challenge is to oversee the issues affecting Mining, Petroleum, Engineering Geology, Hydrology, Environmental Geology, and Academe and Public Service. The difficult part of the charge is to represent AIPG on these issues and simultaneously balance regional interests of the membership.

As Secretary I became aware of some of these regional interests and at the invitation of the 1994 AIPG President, Russ Slayback, I planned and facilitated a brainstorming session on national affairs as part of the 1993 Advisory Board Meeting. The session was as successful as I had hoped and provided an opportunity for members of the Advisory Board to review the issues affecting their constituency. I recommend that this forum continues at future annual meetings. Advisory Board delegates have an opportunity to represent their regional interests and AIPG can better serve our members by understanding these issues. The discussion centered around five Federal issues including: Ecosystem management, Environmental regulator process, Federal statute enactment or revision, Federal appropriations support, and political activism. Other issues that were presented had to do with state registration and education issues. Partly as a result of this meeting the National and International Affairs Committee was restructured in 1994 in a regional context, ten members from various parts of the country and different geologic disciplines. Subcommittees are expected to focus on specific issues when they arise like mineral appraisal or the mining law revision.

Ecosystem management is the latest buzzword for land management. Obviously the issue is with us as Federal organizations like the National Biological Survey are established. Issues for planning and growth management include mining rights and surface water rights. The lack of basic understanding was brought forth frequently. What are the water quality baselines, or atmosphere quality baselines? Are statutes and regulations being promulgated that are more strict than natural occurrences of substance? Carol Browner, EPA administrator, promises to make science the centerpiece for environmental regulation. Ms. Browner enjoined her staff in November to "employ the best possible science" while making regulatory decisions. AIPG is just one group trying to affect these decisions. Historically the EPA, like so many other organizations, has lacked specific focus. Priorities have changed so frequently that no one, including the EPA researchers and employees, has understood the position of the EPA. The result is that inadequate scientific analysis exists prior to decisions

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<th>Executive Director's Itinerary</th>
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<td>(subject to change)</td>
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<td>The Executive Director is visiting various Sections, agencies, campuses, and other organizations. He is talking, listening, and exchanging information and ideas. Members are encouraged to attend these meetings wherever and whenever possible. His itinerary for the next several months, as presently scheduled, is:</td>
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<td>Apr. 23: Executive Committee, Arvada, CO</td>
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<td>May 26 &amp; 27: Pennsylvania Section, Pittsburgh (Tentative)</td>
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<tr>
<td>Jun. 11 &amp; 12: European Federation of Geologists, London (Tentative)</td>
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<td>Jul. 16: Executive Committee, Arvada, CO</td>
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<td>Jul. 25-28: National Conference of State Legislatures, New Orleans, LA</td>
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being made. The air quality standard that commuters will have to meet in many cities illustrates this inadequate decision-making. I live less than 5 miles from my office and drive more on weekdays; yet to meet the commuter standard of 1.47 people per vehicle for the Houston area, I will be forced to car pool. Obviously environmental regulators are thinking of commutes longer than mine, but no consideration is given to commuting distance or time on the highway.

The National Affairs Committee must keep abreast of Federal statutes as they are enacted or statute revisions. Examples for 1994 are the 1872 Mining Law revision, the Clean Water Act, Endangered Species Act, Superfund, and Real Property Appraisal. At the request of AIPG, the AGI Executive Committee approved, in principle, a position statement that real or personal property appraisal should be performed by qualified professionals and that Federal and state laws, regulations, and policies that govern such appraisals should reflect this philosophy. Cooperation with AGI offers the opportunity to bring a larger group to bear on issues, in other words, create coalitions with other interest groups. In addition this cooperation helps AIPG stay on top of issues because AIPG has no presence in Washington DC.

One focus for the National Affairs Committee will be on the budget process. This is the lifeline of all Federally mandated projects. Without budget support, projects will not proceed. On these matters we are looking at NASA-EOS projects like multispectral imaging. We continue to push for support of the National Geological Mapping Project. This is critical to the issue of Ecosystem Management because geologic maps help establish baselines that can be measured against in the future. Generation and preservation of all sorts of geological spatial data is an important issue. To illustrate the types of data available for the National Geoscience Data Repository System, the Committee recently provided AGI with seismic lines in the Santa Barbara Channel that show the Oakridge Fault as a blind thrust. This is part of the effort to "capture and preserve valuable geoscientific data" as the US energy and mineral's industry focuses more strongly on exploration in other countries. The budget process is obscure. Funding is hidden in many categories, yet we hope to be able to track and prepare position paper on levels of funding and funding priorities.

I see much of the National and International Affairs Committees charge as one of education. The focus of this education are members of Congress and their staff, as well as the staff of various governmental organizations. On this end the Committee has distributed copies of "The Citizen's Guide To Geologic Hazards" to selected Congressional staff members. The intent is to make them aware of what geological information might give them with a rudimentary understanding of geological processes to both minimize the impact on the citizenry through proper planning and efficiently deal with disasters after they occur.

Finally, the Committee is looking for ways to expand AIPG's horizons. Established cooperation exists with The Geological Society of London and the Irish Geological Society, providing AIPG membership with access to the European Chartered Geologist certification. We try to have at least one member represent AIPG at the European Federation of Geologists (EFG) meetings, and they have attended our annual meetings for a number of years. Inquiries are being made with other countries such as Australia about similar relationships. We are looking for ways to support geologists from Vladivostok to attend the 1994 Annual Meeting in Flagstaff.

Gunnar Hultquist, President of EFG, said in a recent newsletter, "One main task for EFG is to encourage its members to use their knowledge as professionals and scientists in the public debate about manage-
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February 1994, c. 326 pp., $45.95/ISBN: 0-12340027-0

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January 1994, 427 pp., $139.00/ISBN: 0-12402948-7

Design Hydrology and Sedimentology for Small Catchments

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This book provides the basic information and techniques required for understanding and implementing design systems for control, runoff, erosion, and sedimentation. It will be especially useful to those involved in urban and industrial planning and development, surface mining activities, storm water management, sediment control, and environmental management.

March 1994, c. 580 pp., $89.95/ISBN: 0-12301231-0

Atmospheric Sulfur and Nitrogen Oxides

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George M. Hidy

This book addresses the importance of long range air transport and the role of ozone and oxidant chemistry, and examines analytical methods and pollutant transport models.

February 1994, 447 pp., $125.00/ISBN: 0-123472558
The Art of Giving Instructions

In telling how to follow any procedures, you first need to find out the reader’s background and limitations. This obvious piece of advice is overlooked with dismaying frequency.

Hugh Hay-Roe, CPG-3291

If you’ve ever travelled overseas or south of the Rio Grande, you surely know the frustration of trying to give instructions to a hotel maid or cab-driver whose English was limited. You quickly realized the importance of knowing the limitations of your “audience” and of making your instructions as simple and direct as possible—even drawing a map or picture, if necessary, to supplement your words. When these measures weren’t enough, perhaps you turned to a foreign phrase-book to try to communicate in words your audience would recognize.

After analyzing readers, their background and limitations, (1) break the procedure into small steps, giving them in sequence; (2) phrase instructions as simply and directly as you can; and (3) use illustrations and other techniques to improve clarity.

These same techniques turn out to be very effective in any kind of “how-to” writing, from a half-page safety memo to a huge training manual. Start by listing your readers (or classes/groups of readers) and their backgrounds. If you don’t know how well your audience understands the general subject of the instructions, take time to find out before you go on.

Why did “user-friendly” become a buzz-phrase in the computer industry? Because so much software and so much documentation have been written by experts who figured their readers were experts, too: Plug the appropriate end of the connecting cable into the modem’s RS-232 jack. (Even if you know what an RS-232 jack looks like, what do you do if both ends of the connecting cable appear to be the same? Are they actually the same? Which end is “appropriate”?)

Caution should be exercised in attempting to use this option. One mistake could cause problems with your program diskette (Oh, just great! How do I go about “exercising caution” in attempting to use this option? Is it going to make my computer blow up? Or merely ruin the applications disk?)

Those instructions were taken verbatim from the communications manual of a company with a reputation for user-friendlyliness (name withheld to protect the guilty). Clearly the experts who wrote it did not know their audience.

Here are five techniques for giving instructions.
1. Use the imperative (command) form of the verb (as we’ve just done), don’t say, “the command form of the verb should be used” or “in the presentation of clearly intelligible instructions, it is generally considered preferable to employ verbs that are expressed in the imperative mood.”
2. Break your instructions into small individual steps. Number them in the sequence in which they have to be carried out. If it makes no difference, say so, (unless that’s obvious).
3. Use the plainest language you possibly can. Prefer short sentences. If you must use technical jargon, explain all unusual terms, either the first time you use them or in a glossary at the front of the manual.
4. Don’t jump abruptly from one subtopic to another. Use transition words (next, then, after, finally, while, also, in the same way, otherwise) and headings to help the reader figure out how to get from A to B.
5. Never leave users guessing. Anticipate problems and “What if..?” questions. Cover all reasonable eventualities (remember Murphy’s Law). Don’t write merely to be understood; write so that you cannot be misunderstood.

Use Illustrations and Eye Appeal
- Especially if you are dealing with equipment, use illustrations to describe things that are hard to make clear in words. Line drawings are often preferable to photographs that may not show clearly what seems obvious to you as the expert.
- Try for wide margins and clearance around headings to maintain white space. If you can call on a specialist in page makeup for help in making your pages attractive, do it.
- If your budget can stand it, use color—not only in the illustrations, but to highlight safety instructions and other key information.
- To organize information, use tables and numbered or “bulleted” lists like this one.
- If the procedure you’re talking about is long or complex, a flow diagram may help users to get a feel for where they’re being taken.
More Ways to Help the User

- If the document is long enough to merit it, help readers find their way around with a table of contents, plenty of bold headings, cross-references, index tabs, and a complete subject index.
- Don’t clutter up the main sequence of instructions with a lot of highly specialized detail that most readers will never use. Put it in an appendix.
- Find a couple of “guinea pigs” among your colleagues: give each a draft copy of your instructions with a request to try them out. Chances are they’ll come up with improvements.

Hugh Hay-Roe, CPG-3291, is with Global Energy Operators in Kingwood, Texas.

This article originally appeared in the AIPG Texas Section newsletter and is reprinted with permission of the author.

BOOK REVIEW

Forensic Engineering: Environmental Case Histories for Civil Engineers and Geologists

Published by Academic Press, Inc., 1250 Sixth Ave., San Diego, CA 92101
Price $54.95

Review by Lyle G. Bruce, CPG-7714, Amoco Corporation,
Groundwater Management Services, Tulsa, Oklahoma

Don’t let the title fool you. Although geologists are mentioned last in the title, throughout the book geologists play a prominent role in the forensic investigations. What’s this I hear? “Why should I be interested in this book? I’m a petroleum geologist (or geochemist, or hydrogeologist, or paleontologist, or whatever). The real question is - are you a GEOLOGIST? If you are, chances are that you will be involved in litigation involving some aspect of your specialty some time in your career, if only to advise management or your attorney on the merits of your side of a case (or the fallacies of the other side). In addition, all those who call themselves a geologist should have at least a nodding acquaintance with the broad base of knowledge that makes up our science.

The book begins with a background on the need for and growth of forensic investigations made by civil engineers and geologists. It describes the role of an expert witness in civil (and some criminal) investigations, and discusses the qualification desired. The middle of the book, and the dominant part of it, includes several case histories of projects the authors participated in. Finally, the book gives an overview of forensic investigating and testifying, and discusses the future of the practice of forensic geology and civil engineering. Although the emphasis is on subjects involving construction, environmental geology, and land use, the principles can be extended to most forensic applications of the sciences.

The cases primarily involve litigation stemming from landslides (including very slow earth movements), floods, land subsidence, and stream erosion resulting from land-use practices. In the first case history, involving a landslide, the authors state “geologists are the professionals who eventually determine the geometry and causes of the slide and thus become the pivotal expert witnesses”. That geologists were the pivotal expert witnesses tended to be true in nearly all of the case histories. Of course, many of the cases cited took place in California, a particularly litigious state, but also a state that recognizes geologists as vitally needed professionals. In another case history, outside of California, the authors state “the sole criticism of D&RGW (a railroad company) might be termed a lack of understanding of the importance of geologic expertise in evaluating the potential hazards of ancient landslides”.

Other aspects of geology critical in the other cases included evaluating pore pressure in the subsurface; subsurface movement of fluids (particularly ground water); infiltration and surface runoff; stream morphology and geomorphology; stratigraphy and its relation to subsurface flow of fluids and to structural integrity and load bearing capacity of rocks; structural geology; interpreting recent and historic air photos with an eye toward geologic events; and reconstructing recent geologic history, particularly water levels prior to land development. These aspects of the investigations were described in a practical and understandable manner that included their importance and the effect each had on a case.

For example, the first case gave a description of how slope movements, including landslides, are classified. The authors discussed various aspects of identifying historic slides and identifying land that would be susceptible to slope movement given certain circumstances such as an abnormally high water table caused...
by anomalous rainfall or by certain land-use practices such as a high density of septic tank systems. The reader comes away from these discussions with a basic working knowledge of how these events occur, what to look for if one were required to predict the susceptibility of an area to the geologic hazards discussed, and ways to mitigate the hazard before loss of life or property. The authors state "it is the geologist who must ultimately interpret these data in relation to their own findings to arrive at the most reasonable hypotheses and opinions in connection with (the event), that is, a) why it happened at all; b) why it happened when it did; c) its geometric configuration; d) the prognosis... if no mitigation measures are undertaken; and e) what mitigation techniques, if any, are most appropriate.

It is unusual for a book on engineering to put this much responsibility in the hands of geologists. But this is an unusual and enjoyable book. In a few instances, the actual discussion of the litigation becomes tedious, but it is generally necessary. In most cases the technical discussion is quite adequate and very understandable. It is a must read for those who really care about the title "geologist" and want to do the right thing.

LETTER TO THE EDITOR

Opinion

Dear Editor:

It may surprise Mr. Sullwold to realize that his "Ruminations" (Ruminations Of An Old Timer In The Oil Patch Who Has Recently Been Exposed To Water Well Drilling And Hydrogeology) [TPG, Nov. 93], offended some of his colleagues. First, his viewpoint and his vocabulary, on water well drilling is centered on, and may be restricted to, California. In Florida, where I worked for nine years before moving to Tennessee, we drilled and abandoned water wells. No one ever heard of destroying them.

Second, if down-hole logs for a well include caliper, neutron, and gamma, as well as resistivity and S-P, shouldn't they be called geophysical rather than electric logs? After all, gamma and neutron logs certainly have little to do with electric properties. Third, Mr. Sullwold says "We don't take geology seriously. "Well, that is often the matter of the scale of the project. Water supplies for a single family residence often do not require a detailed, technical understanding of the local geology. However, projects contracting large diameter high-yield wells for major municipal/industrial supplies darn well do take geology seriously, in my experience, and they are usually directed by a geologist or (horror!) an engineer. And obviously the multitude of environmental and ground water clean-up projects which are going on all across the country must, and do, take geology seriously. Finally, in Florida and many states, water well permits are public information. California may have more CPG's than any other state, but they are only one state out of fifty, and they are certainly not representative. Florida depends more on groundwater than any of the other fifty states.

But what bothers many hydrologists and environmental geologists ("Young folks in the water geology business") the most, is that old-timers from the oil patch are trying to transfer into an area that is similar, but obviously not the same, many of them without re-training. Not only is this flooring the market for hydrogeologists and environmental geologists and lowering salaries, it also has the potential to put untrained professionals in environmentally responsible positions. The following is quoted (with an obvious name change) from a recent issue of an environmental newsletter regarding a major national consulting firm, "John Doe has joined as an environmental engineer. Doe has 16 years of experience as a petroleum geophysicist. 'I fail to see how one relates to the other."

You are right, Mr. Sullwold, there are some similarities, and, what is more important, many significant differences between petroleum geology and hydrogeology. The AIPG Code of Ethics, in Rule 3.3.1, says 'A member shall perform professional services or issue professional advice which is only within the scope of the education and experience of the member and the member's professional associates, consultants, or employees, and shall advise the employer or client of any professional advice is outside of the member's personal expertise. 'I would hope that all of the "old-timers," and the many younger geologists, from the oil patch who are now entering the fields of hydrology and environmental geology would conscientiously bear that in mind.


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

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

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

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

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


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

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

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

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