President’s Message

Susan M. Landon

AIPG is continuing to strengthen the bases by which we may advance the profession of geology. There are several significant events occurring that will impact services available to our members and strengthen our position with the public in general. We have also received a record number of applications for membership to date this year and anticipate a significant response to the affiliate status for which the policy and procedures are currently being finalized.

In Washington, on April 2, 1990, AIPG hosted the tenth annual Governmental Affairs Conference. Secretary of the Interior Manuel Lujan introduced the topic of this year’s Conference, The Outer Continental Shelf. Barry Williamson, Director of the Minerals Management Service gave the luncheon address. Although much of the Conference program was a forum to review the current status of federal policy and strategies affecting resource exploration and development in the OCS, the position of the geological profession was well represented by Charles G. Groat, State Geologist of Louisiana. I would like to thank Bill Fisher, CPG 2398, who did the majority of the work on putting the program together. A more detailed report on the Conference will be presented in TPG.

Also on the Washington scene, AIPG was invited to have a representative present at a tree planting ceremony on the South Lawn of the White House on March 20, 1990. Unfortunately, due to short notice we were unable to identify a representative, but at least someone knows we exist and, sometimes, I think that is half the battle.

The Governmental Affairs Committee is off to a good start. Steve Friberg is working with Chairman Phil LaMoreaux and Ernie Lehmann to generate a position paper on potential revisions of the Mining Law of 1872. Executive Director Bill Knight is actively working with several Sections on state legislation which directly impacts the professional practice of geology as a result of exclusion of the profession in proposed legislation and other problems.

Bill Knight, with the assistance of Carol Beckett, Administrative Manager, and Doris Curtis, Chairman of the Membership Services Committee, is also working on a variety of products which our membership may find worthwhile. There was a questionnaire in the March TPG which I hope everyone had the opportunity to complete and return to Bill to help evaluate the needs of our membership.

The Executive Committee, Headquarters Staff, and Committee Chairmen welcome input from the membership. If there is an issue which you as a member feel is important, please contact the appropriate individual or me.
Revision of Section Bylaws

During 1989 the AIPG Executive Committee reviewed several sets of Section bylaws. It became apparent that the bylaws of several of the Sections were out of date, contradictory, or inadequate. Because the members of AIPG approved major revisions of the National Bylaws in December 1989, it appears that now is the most logical time for all 36 Sections to review and revise their bylaws to bring them into conformance and consistency with the National Bylaws.

AIPG Secretary Larry Rhodes, Member Larry Anna, and the AIPG Headquarters staff will be preparing a sample set of bylaws for the Sections to use as guidelines. Ideally, the Sections will be able to use these to review their bylaws without taking an inordinate amount of time and energy.

The sample bylaws will be sent out as quickly as they become available. If you have any questions or if you would be willing to help in this process, please contact Secretary Larry Rhodes or AIPG Headquarters.

Correction:

Colorado Section Officers

President: Stephen A. Sonnenberg
Membership Chairman: Lawrence O. Anna
Program Chairman: Frederick W. Oberholte, Jr.
1990 Advisory Board Delegate: Stephen A. Sonnenberg

LETTER TO EDITOR

Final Words

Today the February issue of TPG arrived on may desk and I automatically wondered, "Why haven't I heard anything of my article about ethics?" Has anybody read it? Lo and behold, Louis Kirkaldie had read it, thought about it and critically wrote. Bless you, Lou.

Yes, there is confusion between pathos and ethos. We have come to lump the two together. Reading the Code of Ethics leaves me in the quandary, but it is not a criticism. Basically, it seems that it is difficult if not impossible to quantify and enforce ethics, so the Code was, for the most part, written using the emotional word "should" to specify what action an individual may perform to conform to the standards set forth. This is largely emotional, pathos, and outside of the more concrete specifics of a law which can be enforced. In some ways this is a regrettable situation stemming from the court decisions which, seemingly, have essentially eliminated "opinion" as a legitimate form of judgement.

Mr. Kirkaldie detected the contradiction between "what we would like to have" and the probable intent of the legal advice guiding the revision of the Code. "Character" of an individual is more predictable than emotion, but becoming less of a part of business practice which has, in many cases, violated ethical conduct, by community standards (judgement), but has remained within the law.

I am in agreement with Mr. Kirkaldie that there is no way to perform under the Code of Ethics without pathos. That and humor separate us from other animals.

Gerald V. Mendenhall, CPG 996

MEMBERS IN THE NEWS

Kelton D. Barr, CPG 6143, has been appointed Director, Hydrocarbon Services, for the Midwest Region of Geraghty & Miller, Inc.

Patricia Billingsley, CPG 6654, has joined Search, Inc. of Norman, Oklahoma, as Site Remediation Manager.

Philip E. LaMoreaux, CPG 880, has been elected a Lifetime Honorary Member of the International Association of Hydrogeologists in recognition of his professional contributions.

Lawrence S. Sims, CPG 6749, has been appointed to the position of Associate with Geraghty & Miller, Inc.

Sherman A. Wengerd, CPG 108, presented the J. R. Berg Distinguished Petroleum Lecture at Wichita State University. Wengerd's topic was "Time Surfaces and Tectonic Analysis of a Subsiding Basin (Paradox Example)."
Energy Security Through Advanced Research and Development

Marcus E. Milling, CPG 4518

The United States has reached a critical crossroads in our nation's supply and demand for energy fuels. In the 1990s Congress and the administration, in cooperation with the states and the nation's oil and gas producers, must face a fundamental choice related to our future energy security. Do we effectively continue to abandon our remaining mature oil and gas resource base in favor of less secure, lower cost sources of foreign imported fuels, or do we create the economic climate and provide for the research and development required to produce the United States' huge remaining unrecovered oil resource base in known reservoirs?

Our options and the time to formulate and implement a comprehensive national energy plan are limited. If we, as a nation, fail to recognize the importance and immediacy of this issue and do not develop the political base, economic climate, and advanced technology to address it, we will, by default, have selected the resource abandonment option. However, if we act cooperatively by establishing economic climate, and advanced technology to address it, we will, by default, have selected the resource abandonment option. However, if we act cooperatively by establishing economic policy incentives and develop advanced recovery technologies, we can sustain and even perhaps increase our domestic production capacity over the next 50 years until more environmentally sound alternative energy sources and substitute fuels are developed and ready for widespread use.

Oil and Gas Supply Trends and Projections

Oil production peaked in the United States in 1970 at around 9.6 million barrels per day. Over the next seven years production declined by some 1.5 million barrels, dropping to 8 million barrels per day by 1977. However, increased drilling activity from the mid-1970s to early 1980s, after the OPEC embargo, resulted in new reserve additions and, in combination with the Prudhoe Bay startup, arrested the decline and increased production to more than 8.9 million barrels per day by 1985. With the downturn in oil prices in 1986, domestic production rapidly declined to less than 8.1 million barrels per day in 1988. The decline accelerated in 1989 with an additional loss of an average of 500,000 barrels per day producing capacity and is continuing to decline in 1990. As domestic production declined and supply demand rose, foreign imports of crude oil have increased. In 1989 and 1990, foreign crude oil imports have reached one-month spikes above the 50-percent mark. The lack of an adequate domestic oil supply, coupled with our increased dependence on foreign imports, threatens our national energy and economic security.

Likewise, proved reserves of natural gas in the Lower 48 have declined by more than 40 percent, falling from a high of 290 trillion cubic feet (Tcf) in 1970 to less than 177 Tcf in 1988. The decline was particularly rapid in the early to mid-1970s when regulated wellhead prices for gas dedicated to the interstate market were very low and provided little incentive for exploration and field development. Gas reserves, like oil reserve additions, increased in the late 1970s and early 1980s with increased drilling activity after the upswing in market prices. Despite increased reserve additions, proved cumulative reserves have fallen by 24 Tcf, or 12 percent, from 1980 levels. In the 1980s gas reserve additions declined much more sharply than oil reserve additions. This sharp decline may reflect less potential growth for natural gas at the current moderate price levels.

Remaining Oil and Gas Resource Base

It is incomprehensible that while our domestic production continues to decline and foreign imports increase, a huge oil and gas resource base in known U.S. reservoirs remains untapped. About 340 billion barrels, or about 65 percent, of the total original oil discovered is estimated to remain trapped in known reservoirs using current recovery practices. Given development of advanced recovery technologies, AAPG has estimated that more than 50 billion barrels of additional oil and some 280 Tcf of incremental gas could be recovered at moderate prices (Figure 1). Potentially recoverable volumes are obviously dependent on technological advancements, but are equally dependent on price. In the near term, it is generally agreed that a more supportive economic climate is required to optimize recovery of these resources. Some economic measures being suggested include an import fee, floor price on domestic oil, and tax credits. At more elevated prices, the AAPG estimates that 150 billion barrels of oil and 1,000 Tcf of gas could be recovered with application of more advanced technology. This untapped oil resource combined with known reserves would provide the nation an additional 50 - to 60 - year domestic supply of oil at current production rates.

The remaining unrecovered oil resource base consists of both mobile and immobile oil components. The nature of the controls trapping these two classes of oil is different and therefore requires different technological approaches in their recovery. Unrecovered mobile oil is the portion of the resource base that has not been contacted or swept during primary or secondary production; it is estimated to account for nearly 100 billion barrels of the remaining in-place resource. Most mobile oil is left in the reservoir because of reservoir heterogeneities, which cause segments of the oil zone to be compartmentalized and uncontacted or bypassed and unswept by injected fluids. Recovery of this oil depends on development of improved, integrated geological and geophysical imagery methods to effectively
delineate the remaining mobile oil for targeted infill drilling. The key to success of future mobile oil recovery programs is improved reservoir characterization studies that will provide advanced models to delineate, assess, and target the remaining unrecovered oil resource.

Immobile or residual oil accounts for an estimated 240 billion barrels of the remaining unrecovered in-place oil resources. Immobile oil can reside in both swept and unswept zones of the reservoir and is trapped by chemical and capillary reservoir forces. In the swept zone, it consists of residual oil in that portion of the reservoir where conventional production has already displaced the residual oil. In addition, to improve reservoir characterization studies, recovery of the immobile oil resource requires development of advanced enhanced oil recovery (EOR) processes in conjunction with improved resource-targeted infill drilling practices.

Current R&D Recovery Research Effort

It is estimated that in the 1980s an average of about $225 million was spend annually on oil and gas recovery research from all sources in the private and public sectors. The total recovery research expenditure over the period represents less than 2 percent of the value of oil and gas added to the proven national reserves base through reserve growth during the same period. It represents an even smaller fraction of the total federal government R&D expenditure on other longer term energy areas such as coal, nuclear, and renewable energy resource programs.

On the basis of a 1988 National Petroleum Council (NPC) Survey, it was estimated that private industry on average during the 9-year period between 1980-88 spent $160 million per year on upstream recovery research. About half of the total amount was spent on reservoir characterization projects and half on extraction process technology. The Gas Research Institute (GRI) expends about $45 million annually on gas supply research, $25 million being focused on improved gas recovery technology. The federal government spends about $40 million per year on oil and gas recovery research. About 15 percent of this amount directly supports university and state agency recovery research programs, and most of the balance is directed to national laboratories, the federal energy technology centers, and private companies. According to a Geoscience Institute survey in 1988, the oil and gas recovery research level in the nation’s major universities and state research entities, normalized on an overhead basis, is estimated to be approximately $38 million.

Most of the public sector’s nonfederal oil and gas recovery research is conducted by 20 or so of the larger research universities and state agencies in the major hydrocarbon-producing states. Most of the support for this research effort comes from state appropriations and industry grants and contracts. The federal government,
mostly through DOE, provides about $7 million for support of current university recovery research programs.

**Incentives for an Expanded Recovery Research Initiative**

In 1989 the Geoscience Institute for Oil and Gas Recovery Research, a national consortium of 24 universities and states agencies, completed a major study of the technology and research priorities required to improve recovery efficiency from existing domestic oil and gas fields. The study, a joint industry-public sector effort, was conducted on behalf of the U.S. Department of Energy's Office of Fossil Energy. More than 500 engineers and scientists from industry, academia, and federal and state agencies participated in the effort. The study report, "Major Program Elements for an Advanced Geoscience Oil and Gas Recovery Research Initiative," is the most comprehensive document of its kind developed in the public sector. It describes incentives and outlines priorities for establishing an expanded interdisciplinary joint industry-university oil and gas recovery research initiative.

Historically, the industry's oil and gas research effort in the United States has been substantial, and the state of the art in recovery technology is significant. University and state-based research has traditionally complemented and supplemented many of industry's technology program efforts. However, given the remaining huge resource base potential in known reservoirs, an expanded and more integrated research and development effort is justified. The Institute's program study recommends that an expanded recovery research effort be primarily aimed at developing a more thorough understanding of the nature and character of reservoir types, including improved prediction of multiphase fluid flow behavior in heterogeneous media, coupled with advanced techniques for detection and targeting the distribution of remaining oil and gas resources, and testing more cost-effective advanced extraction processes.

There are clearly certain advantages for establishing a joint industry-Institute recovery research initiative. Such an effort would significantly increase the national oil and gas recovery research base and help better focus university and state-based programs. It would expand cooperative technical interfaces with the major operating companies, the independent producers, and universities. In addition, it would increase opportunities for graduate student research and help stabilize enrollment in university engineering and science programs. In summary, the key incentives for establishing a joint program effort are:

- Strong industry participation assures DOE that their funding support will be directed toward projects of the highest technical integrity with the greatest probability of success.
- Increased opportunities for cost-shared, joint projects with DOE, state, university, and industry support will better leverage limited research program support.
- Improved coordination between industry, university, and state agency research efforts will provide better integration of engineering, geological, and geophysical program components.
- Supplementing industry's oil and gas recovery research effort will provide for better focused technical cooperatives with universities, major operators, and independent producers.
- An expanded research effort will provide support for graduate student research to help better train and stabilize the supply of engineers and scientists recruited by industry.

**Recommended Program Scope and Approach**

The Geoscience Institute, in conjunction with participating company members, proposes to establish a joint industry-university recovery research consortium. The university and state agency members offer broadbased multidisciplinary state-of-the-art research staff groups that with industry and DOE support can significantly supplement the private sector's recovery research program effort.

Five major research categories are recommended for program development. The highest priority research need identified in the Geoscience Institute's study was an improved understanding of the controls of reservoir heterogeneity on oil and gas producibility. The proposed program therefore includes a major interdisciplinary effort devoted to a study of the nature and character of reservoir systems. Further, a need is recognized for supporting a program effort for certain high-priority basic research in individual discipline areas. Environmental regulatory and resource analysis components have also been included in the program. To assure that newly developed tools and concepts are being effectively applied, a technology transfer component is recognized to be a vital part of the effort.

- **Reservoir Systems**: The program category includes interdisciplinary research activities aimed at providing improved understanding of the nature and character of...
character of reservoir heterogeneities for a range of reservoir types in order to better delineate distribution of mobile and immobile oil and natural gas resources in existing fields. Reservoir architecture and heterogeneity are largely controlled by reservoir genesis, which is a function of depositional, diagenetic, and tectonic processes. Integrated reservoir field studies provide the best opportunities for developing the interdisciplinary synergism required for development of improved predictive models. In addition, methods for defining and developing techniques to reduce the effect of matrix and fluid heterogeneities on extraction processes as well as techniques for improving the qualification and scaling of reservoir data for simulation modeling are proposed.

2. Basic Research Activities: Certain high-priority research activities in support of recovery technology do not require or lend themselves to an interdisciplinary team approach. The proposed basic research is oriented more toward individual contributor projects. Such activities include a variety of projects that for the most part address more basic and fundamental research issues. There is a heavy emphasis on laboratory bench tests, tool design, and instrument development in the basic research category.

3. Environmental Regulation Research: The exploration, development, and production of the oil and gas resources of the United States have created a variety of concerns that range from improper subsurface disposal of brine to improperly abandoned and unplugged boreholes. Many of these problems result from earlier production practices in industry operations before state and federal regulations were developed. However, increased environmental concerns and regulations require that new monitoring and detection methods be developed to more cost effectively meet future regulator requirements.

4. Resource Analysis: A national oil and gas resource data base is required to quantitatively assess and document the nature and distribution of unrecovered oil and gas resources in existing fields. To date, the most detailed studies have been conducted in New Mexico, Oklahoma, and Texas, where a huge, strategically important remaining oil resource exists. Similar studies are required in other oil and gas producing states. Such analysis will allow a determination of the distribution of oil and gas resources by reservoir type and ranking of reservoir types on the basis of their remaining recovery potential. Such a system would help focus and guide future recovery research for optimal deployment.

5. Technology Transfer: An effective technology transfer function is critical to the success of the entire recovery research initiative. New concepts and technologies must be passed on to operating companies in a timely fashion so that advanced methodology can be tested and verified. The technical level among operators is highly variable. Major oil companies with internal research staffs maintain a high level of technical expertise. The technical capabilities of smaller companies and independent producers are more limited. To communicate research results to smaller, independent operators it may be necessary first to introduce state-of-the-art existing technology before presenting new research results. Technology transfer to major companies will be more focused on basic, fundamental research results. Joint projects with operators will provide one of the most cost-effective and efficient mechanisms for technology transfer.

Program Development Opportunities

The Bush Administration recognizes the need for a new interdisciplinary public-sector oil and gas recovery research program approach, as indicated by DOE’s FY91 budget request of $17 million for base support of joint industry-university consortia programs. In addition, many of the oil-producing states are supportive of increased funding for oil and gas recovery research. A recent study conducted by Texas State Governor Bill Clements’ Energy Council Research and Development Committee recommends producing states increase their current $10 million aggregate appropriations for oil and gas recovery research by 100 percent to $20 million. The committee, chaired by John F. Bookout, former president and chief executive officer of Shell Oil Company, focused on assessing opportunities for substantially increasing oil and natural gas production recovery efficiency over the next five decades. Through development of advanced technology, the committee set a goal of increasing average recovery of oil in known reservoirs from the 35-percent level to 45 percent of original oil in place over the next 50 years.

DOE’s proposed new FY91 federal oil and gas recovery research implementation plan was presented for public review by the Office of Fossil Energy in January. The program effectively incorporates near-term objectives with mid- and long-term program goals. The estimated federal cost of the proposed 14-year program is on the order of $500 million. The new program will be cost-shared and includes opportunities for joint industry-university consortia participation and shifts emphasis to end-user needs.

Improving efficiency and increasing recovery from our nation’s oil and gas resource base necessitate this expanded joint industry-university interdisciplinary research effort. Further, the national need for stabilizing production is great in terms of the economy, the balance of trade, and national security. With continued support of the new recovery research program and favorable economic climate, our short-term domestic oil and gas supply can be stabilized to meet the growing energy needs of the 21st century.
DOI Reports 1989 Strong Year for U.S. Nonfuel Minerals

The value of materials produced from raw nonfuel minerals mined in the United States rose to an estimated $315 billion in 1989, according to a recent report released by Interior Secretary Manuel Lujan, Jr. The five percent increase in value for 1989 marks the third year of recovery for the mineral industries following their 1982-86 slump.

Much of the turnaround can be attributed to streamlining of operations and modernization of facilities, according to T S Ary, Director of the Interior Department's Bureau of Mines. "The steel industry alone has invested some $9 billion since 1982 to bring its facilities up to date," said Ary. "This has let our domestic steel producers triple their casting rates and reduce steelmaking costs over 25 percent."

Internationally, the world's minerals industries registered advances in almost all measurable areas of activity compared with 1988 performance. The very roughly estimated value of world crude mineral production was $1,125 billion (in terms of constant 1983 dollars). Mineral fuels accounted for about 81 percent of this total and nonfuel minerals about 19 percent.

Selected report highlights

Advanced materials: Production of advanced ceramics, polymer composites, electronic materials, and new alloys and metal matrix composites continued to grow steadily. Ford, General Motors, and Chrysler are cooperating in research and precompetitive development of polymer composites. In 1989, for example, Ford began testing a Taurus automobile that had all body structural components made of glass-fiber-reinforced plastic. Overall, however, the encroachment of plastics into the metals market will be gradual, because of the drastic changes required for manufacture and the need for heavy capital investment.

Aluminum: Primary aluminum smelters in the United States and throughout the world operated near capacity for the second straight year, bringing world supply closer to demand. Hurricane Hugo caused substantial damage to two U.S. aluminum facilities.

Construction materials: U.S. demand for construction aggregate increased for the fourth consecutive year and was at a near-record level. For gypsum, increased wallboard exports and a healthy remodeling market offset the impact of declining housing starts.

Copper: U.S. copper mine production increased in 1989. Because world production dropped due to problems in other producing countries, supply should be tight through early 1990.

Fertilizer chemicals: With fertilizer chemical manufacturers operating at near capacity, demand for sulfur and chemicals derived from sulfur, was at the highest level since 1980. Other fertilizer sector consumption was somewhat lower than normal, largely reflecting the aftereffects of the recent drought.

Gold and silver: U.S. gold mines continued to produce at record levels and domestic silver production increased for the third consecutive year. The newly opened Greens Creek zinc-silver-lead mine in Alaska is expected to be one of the largest U.S. silver-producing mines when it goes into full-capacity operation.

Lead and zinc: World zinc production and consumption were at record high levels, as were zinc prices both domestically and globally. U.S. mine production of zinc rose for the third straight year and may double in 1990. World demand for lead was also at a record high.

Steel: As noted previously, profitability in the steel industry has increased over the past two years. Private industry experts caution, however, that the increased profitability marks only a small step toward total recovery from the decline of the mid-1980s.

Superalloys: Industry analysts were confident of a growing market for at least the next several years because of known orders for commercial aircraft and expected replacement of parts in existing engines.

Additional details on preliminary year end statistics for 1989 nonfuel mineral production appear in the new Bureau of Mines "1990 Mineral Commodity Summaries." This year's edition marks the first time this report will include salient data on the international minerals scene. Single copies of the 1990 Mineral Commodity Summaries can be obtained without charge from the Publications Distribution Section, Bureau of Mines, Cochrans Mill Road, P.O. Box 18070, Pittsburgh, PA 15236; telephone 412-892-4338. Requests should specify the title of the publication.

[DOI News release]

Bush 1991 Budget Proposal Promotes Environmental Jobs

Jobs in federal environmental programs could get a boost if the Administration's 1991 budget proposal were enacted.

EPA is contemplating a 6% staff increase to approximately 16,500 positions. DOE plans a staff increase
of 2,000 over the next five years, and BLM and NPS also could be subject to staff increases.

The Administration budget calls for more than $2 billion in new spending for environmental programs. Superfund and "global warming" research are the high ticket items. In addition to an increase for Superfund to $210 million, global change research is proposed to increase to more than one billion dollars.

The Bush budget proposal contains the following environmental initiatives

- $4.5 billion for clean up of federal facilities; a 21% increase above current funding levels;
- $88 million for wetlands protection programs;
- a $91 million increase for DOE to "maintain environmental infrastructure";
- $269 million for an "America the Beautiful" program to manage park, wildlife, and other public lands, including a reforestation program; and
- a $104 million increase for natural resources research.

**MMS proposes increases in surety bond rates for offshore operators**

The Minerals Management Service wants to increase the bond coverage required for offshore oil and gas leaseholders because the amount now being charged is considered insufficient.

A bond is required before exploratory drilling can begin in order to ensure that a company complies with all financial obligations on royalty payments and with regulations governing well abandonment. MMS has not increased the bond rate in 20 years, and it is "...clearly insufficient to cover increased costs of compliance with the conditions and terms of a lease in the event of a significant default."

MMS referred to a study by the National Academy of Sciences that indicated that smaller structures in the Gulf of Mexico could be removed for up to about $400,000, but that costs escalate for deeper water depths and complex structures. Removal and site clearance can be at least $15 million for deepwater structures, the report noted. The current requirement of $50,000 bond per lease or $300,000 per Outer Continental Shelf area is out of date, MMS stated.

The suggested changes to the bonding requirements would be applicable at the time an exploratory plan or related development and production plan is submitted to MMS, unless the applicant has a $1 million area-wide bond. A $300,000 lease-bond would have to be submitted before or with a development and production plan, unless a $3 million area-wide bond is maintained.

**New BLM Rules on Produced Water Disposal**

The Department of the Interior's Bureau of Land Management (BLM) has issued proposed rules governing the disposal of water produced in conjunction with oil and gas operations on federal and Indian leases. The rules were published in the January 19 issue of the Federal Register.

Onshore Oil and Gas Order No. 7, "Disposal of Produced Water," establishes BLM's uniform national requirements and minimum standards for technically and environmentally sound disposal of produced water.

Safe disposal of produced water is accomplished by either injecting it back into a secure geological formation, or by storage in lined pits and evaporation.

Order No. 7 specifies the requirements and standards for the design, construction, and maintenance of acceptance disposal facilities. The Order also identifies violations of these standards, corrective actions, abatement periods, and enforcement actions that result when violations are not corrected in a timely manner.

Order No. 7 will supersede NTL-2B, "Notice to Lessees and Operators of Federal and Indian Oil and Gas Leases 2B." NTL-2B was issued in 1976 and contains the standards under which oil and gas operators currently dispose of produced water.

BLM administers approximately 79,000 onshore oil and gas leases covering 70 million acres, and is responsible for inspection and enforcement activities on approximately 23,000 producing leases. During Fiscal Year 1988, BLM issued approximately 9,234 leases totaling 12.2 million acres of federal land. Onshore oil and gas leases generated in FY88 about $785 million in bonus, rent, and royalty payments.

**Wyoming/OSM Highwall Controversy**

Wyoming's request to leave "highwalls" from strip mining in place after coal is removed so that birds of prey would have more nesting places was turned down by the Office of Surface Mining, as expected.

"The (OSM) Director agreed that, under certain conditions, highwall remnants could restore or enhance premining wildlife habitat and related environmental values," the agency said in the rejection notice. Although the Bureau of Land Management and other federal and state agencies supported the proposal, OSM didn't agree that the state provided enough legal argument for what would, in essence, be a violation of the Surface Mining Law, the statement said.

It was the second time in a year that the department rejected the state's proposal. OSM considers eliminating highwalls one of the most basic requirements of the law. Regardless of the proposal's good intentions, letting operators in one state leave highwalls would set a dangerous precedent for the rest of the country, is the DOI position.
Federal-state plans for EEZ

Federal-State teamwork in mapping the exclusive economic zone in the 1990's was the topic of a recent symposium at the U.S. Geological Survey National Center, Reston, Virginia. Federal, state, industry, academic, and congressional representatives were in attendance.

Discussions included plans to map the offshore zone's sea floor over the next 10 years and to eventually explore and develop its mineral and energy resources. Sponsoring the meeting were USGS, NOAA, and the Association of American State Geologists.

The EEZ, which was proclaimed in 1983 by former President Reagan, gives the U.S. jurisdiction over the minerals and other ocean resources in areas extending seaward for 200 nautical miles off continental and island territory coasts. The zone covers about 3.4 million square nautical miles (4.5 million square miles), an area about 30 percent greater than the dry land area of the U.S. It is expected to be an important frontier for development of future energy and mineral resources. USGS and NOAA now are doing preliminary mapping of EEZ's sea floor.

Principal speakers at the symposium were John Knauss, Undersecretary of Commerce for Oceans and Atmosphere and Administrator of NOAA; Dallas Peck, Director of USGS; and Peter Lucas of Shell Development Co., who chairs the National Research Council's Committee on EEZ Information.

Geo-modeling for Enviro-understanding

Computers are being used to create models of climates and geochemical weathering cycles of prehistoric environments. Scientists using the computers are trying to determine the carbon dioxide content of ancient atmospheres to gain better understanding of today's environmental problems.

Because the amount of carbon dioxide in the atmosphere depends on the amount of carbon in organic matter and in rocks such as limestone, scientists at Pennsylvania State University believe that the location of continents and the type of exposed rock may have determined carbon dioxide levels throughout geologic time.

The model is examining geologic formations and climate that occurred during Permian and Cretaceous time. According to the study, the orientation of continents affects not only climate but also the amount of carbon dioxide in the air. For example, large land masses occurring at the equator will have greater rainfall, higher temperatures, and more carbon dioxide released from rocks. Where continents are covered with ice sheets, weathering may not occur and smaller amounts of carbon dioxide will be emitted.

The geochemical model now employs only simple topographic maps, but further research is needed to examine how mountain building and climate affect carbon dioxide levels in the environment.

One Last Word

Enviro-nifty Problem Solving

A decade ago, federal officials had to close Long's Peak - the highest in Rocky Mountain National Park - to campers, because there is little soil in this austere environment to aid normal decomposition of human waste. Today, the peak is open again to campers, thanks to the success of an innovative solar experiment sponsored by a National Park Service grant. A National Park Service team designed a high-tech toilet that features a passive hot air solar panel, a photovoltaic panel, fans, and tray evaporators to dehydrate the debris. The result is greatly reduced desiccated waste product that can be packed out for disposal - by llamas.

Who said bureaucrats aren't innovative and resourceful?

Selected Federal Register Notices

NRC

Proposed rule 10CFR Part 40 Custody and long-term care of uranium mill tailings sites. Contact: Mark Haisfield (202) 492-3877. 55FR 3970.

OSHA


Office of Government Ethics


OSHA


MMS

EPA

Final rule and proposed rule 40CFR Part 228 Ocean dumping regulations; de-designation of un-needed, expired, or terminated sites. Effective date: February 2, 1990. Contact: John Lishman (202) 475-7177. 55FR3688.

EPA


Forest Service

Notice Seismic exploration permit fees. Effective date: March 1, 1990. Contact: Ruben Williams (703) 235-2412. 55FR5248.

Dept. of Army


EPA


Office of Management and Budget


Head'em Off At The Pass

by Stephanie Hrabar, President-Elect
Texas Section AIPG

The Texas Section of AIPG has offered pro bono services (for the public good and at no cost) of its members for 1990 to assist Texas communities and environmental groups answer questions or direct them to others, through our network of contacts, who can provide data, information, or direct answers to their questions.

Things happen. Sometimes we make them happen; sometimes we don't. Professionals can be distinguished by how they act to make things happen and how they react to things that "just happen."

The environment "just happened," we did not create it. Environmental issues happen because some members of our communities are negligent, that is they fail to exercise reasonable care and competence. Their negligence in turn offers opportunity to others to engage in activities that result in the loss and devaluation of property and possibly life, if not the quality of life. Gross negligence (acts done with a wanton disregard to the facts) and fraud follow close behind negligence. White collar crime is not okay with all the members of the community.

Environmental issues and problems can be addressed and resolved without litigation - in most cases. To do so requires:

- knowledgeable members of the community sharing their information with the community
- professional geologists becoming more visible - available to answer questions or provide direction in locating data and information on environmental issues.

Geological professionals do not sit back and wait for issues that affect the public health to come to their doorstep and set their houses on fire before they decide to buy fire insurance.

As part of the program for the Texas Section's 1990 annual meeting we have begun to gather information on:

- digital and non-digital geoscience databases that various public institutions own
- projects and people at universities and government agencies that are directly and indirectly related to the environment
- the amount and types of information technology, and computers, that geoscience departments, and agencies currently use.

New Brochure on Geoscience Careers

"Careers in the Geosciences" summarizes for high-school students what geoscientists do and where they work. The colorful new brochure shows geoscientists collecting samples from streams and volcanoes, investigating caves and glaciers, interpreting maps, and using computer models. Brief descriptions of work in 21 specialized fields, such as environmental geology, will increase a student's awareness of career options.

"Do you like to know why and how things work?" That is one of a series of questions that will help a student relate his or her interests to the geosciences. The text outlines high-school prerequisites and undergraduate courses for a geology major. It also includes job and salary outlook and sources of more information.

Single copies are available at no charge from the National Center for Earth Science Education at the American Geological Institute. Bulk order rates are 25 copies for $10. For bulk orders and to determine postage and handling charges, contact AGI's Customer Service Department, 4220 King Street, Alexandria, VA 22302. Phone: (800) 336-4764.
Look Out the Window  
by William V. Knight, Executive Director

Last month I participated in a panel discussion on professional registration and specialty certification. It was sponsored by the American Institute of Hydrology at their national meeting in Las Vegas, NV. Several of the organizations that are concerned with registration in the earth sciences were represented. AIPG Members participating, besides myself, were Larry Woodfork, CPG 2370, representing the American Association of Petroleum Geologists (AAPG) and Phyllis Garman, CPG 3228, representing the Association of Ground Water Scientists and Engineers (AGWSE).

Of special note there was another participant, Neil Norman, PE, President-Elect of the National Society of Professional Engineers (NSPE). This meeting gave us an opportunity to get acquainted and to observe that we have much more in common than we sometimes realize.

In answer to a question from the audience, Mr. Norman acknowledged that the NSPE has a problem with discipline that is common to all volunteer organizations. (This is just as true with AIPG as with NSPE.) That is that the organization cannot control the actions or utterances of its members in the public arena. Nor do all of the members of an organization always agree on what should be done or said. In fact, as we have experienced in AIPG, they sometimes vehemently disagree. Recognizing this common problem, the stage is now being set for conferences to try to overcome some of the differences between our professions that have arisen, partly, as a result of this problem.

There were a number of differences of opinion (and policy) acknowledged and aired by the panel members and the audience. Although there was general agreement on the identities of the problems associated with registration and specialty certification, there was almost total disagreement on how they should be handled. I am sure that, to some in attendance, many of the experiences recalled and points of view described were revelations. We do not always see the same things in the same way. Yet, we have to live and work in this world together. In order to do this, we must try to see what is going on around us.

Which brings me to the title of this column. Prior to our panel presentation, we were treated to an outstanding address by Dr. Luna B. Leopold. He recounted how, during World War II, he had taught meteorology to military personnel. He said that they sometimes became so intent on working with their instruments and maps to analyze and predict the weather that they totally ignored the reality of what was actually going on outside. He said he would tell them to "look out the window."

We all need to "look out the window" to see what is going on around us in the constantly changing environment in which we practice our profession. We must look not just in our own circle, whether it is the large circle of petroleum geology, the relatively new and smaller circle of archeological geology, or any of the growing number of other specialties. We must look at our total environment. As geologists, we all know what happens to species who ignore the changes in their environments and fail to adapt to them.

EXECUTIVE DIRECTOR'S ITINERARY  
(subject to change)

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

April 1-2: Government Affairs Conference, Washington, DC
April 2: National Society of Professional Engineers, Alexandria, VA
April 3-8: Northeast Section Members, universities, and agencies
April 19: University of Texas, Austin, TX
April 20-21: Texas A&M Univ. and Texas Section AEG
April 28 - May 1: Minnesota Section and universities
May 3-4: Wisconsin Section and universities
May 6-11: Michigan Section and universities
May 16-18: Utah Section, agencies, and universities
June 2-6: American Association of Petroleum Geologists, San Francisco, CA
June 13: Florida Registration Board, Tallahassee, FL
June 24-26: American Petroleum Institute, Exploration Committee, Colorado Springs, CO
July 14-15: Executive Committee, Arvada, CO
July 21-23: Washington Section, Seattle, WA
August 6-22: Meetings with geologists in Moscow, Tbilisi, Khar'kov, and Leningrad, USSR
September 10-12: Kansas Section, agencies, and universities
September 25-28: Indiana Members, agencies, and universities
CONSULTANTS' COLUMN
Fred L. Fox, CPG 1273

Have you noticed recently that the quality of language in the media, especially TV, but also radio and others, has changed? I would have said deteriorated, but I've yet to make the point. I noticed it a year or so ago, with an occasional profanity being heard on cop shows. Last night there was a lot of it right there on one of the better prime-time evening shows (not a soap) on national TV. This morning a radio host on a family show didn't know "what the hell was going on." We're seeing a spate of sensationalized created news shows. There are those of you who say "So what, it's only entertainment." Maybe you're right. I, on the other hand, think otherwise. It's a bad thing.

I think it's a perfect example of a rather steady erosion of our cultural standards that's been going on for some 20 years under the guise of First Amendment "rights." The truth is that we're being herded toward the lowest common denominator by a vociferous and tenacious minority under the guise of "freedom of expression." The role of the family has been eroded. So have our educational and political standards. The function of the media has been eroded. And, the point of this tirade, ethical standards have been eroded, and the law has been the vehicle by which they have been eroded. Some of you might interpret these changes in terms of "enlightenment" or "awareness." You might even think that "we can handle it." You'd be dead wrong.

The results of this misguided drift are documented in the media, the decreasing number of real families, the inability of MS-level techno-geni to spell simple words (or even know where Ecuador or Zimbabwe are), and the fall-from-grace of major elected figures (like presidents, speakers, and innumerable legislators), and in laws which bequeath more "rights" on the criminal than the victim. That our oh-so-sophisticated society has become inured to these trends is the greatest failing of all. And the dissector to these trends is shouted down as a bigot, racist, or worse for daring to speak his/her mind.

I submit that any deterioration of our ethical/moral base is unacceptable. How then can we continue to accept it? As professionals, we can't. In fact, we're bound to improve it. That's what professional is all about. It doesn't mean "doing the profession thing." It's a state of being. Having the title of "professional geologist" or "professional engineer" does not make you professional. Knowing your subject helps. Being moral is absolutely necessary.

Man is not servant to society. It's the other way around-united we can accomplish more than we can alone. But true progress demands that we remain on the right track to begin with. Unless society is pointed in the right direction, the inertia of the mob can pressure the basically moral individual into at least passive acceptance of "the will of the people." Tell most people something long enough, and they'll begin to accept it.

Look what our society is accepting, then step back and evaluate if it's really in our best interests-if we're doing the right thing. You'll see a lot of things that need fixing.

I suggest that our role as consultants carries the obligation to stand up and be counted. Even more than that-to make the world a better place. Being professional involves the whole person. The results of behaving otherwise are everywhere apparent (see foregoing). Closer to home, we see the high costs of inferior work by incompetent others, exorbitant insurance rates to protect us from frivolous (but often successful) lawsuits, reports we can't read, and maybe even our own broken family.

We can't be insular-devoted only to our own profession. The consultant must operate in a society. It's part of our professional responsibility to improve that society. Your influence counts-use it!

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Warning From Georgia

The Georgia State Board of Registration for Professional Geologists has become concerned lately about registered geologists who sign geological reports without having prepared them or directly supervised their preparation. Such a practice is unethical and circumvents the spirit and intent of the Georgia Registration of Geologists Act. For example:

(1) A site assessment of a sanitary landfill was submitted to Georgia EPD by a consultant. The assessment was not signed by either a registered geologist or registered engineer. EPD returned the consultant's report noting the deficiency. The consultant, in turn, resubmitted the report unchanged except that the transmittal letter was now signed by a registered geologist.

(2) A site assessment for an industrial waste landfill was submitted to EPD by a consultant and signed by a registered geologist. A review of the manuscript indicated that persons other than the registered geologist had prepared and checked all of the plates and boring logs.

(3) A hydrogeological assessment of a large municipal aquifer test was submitted to EPD by a consultant. The consultant, in turn, subcontracted portions of the work to a registered geologist. The consultant's report makes no mention of this subcontractural relationship. Moreover there is no information in the report that the registered geologist ever performed any meaningful work.

The wording of the Georgia Registration of Geologists Act is quite clear on this matter. Specifically the Act states:

It shall be unlawful for an person other than a registered geologist, a registered certified specialty geologist, or a subordinate under the direction of one of the above to prepare any geologic plans, reports, or documents in which the performance is related to the public welfare or safeguarding of life, health, property, or the environment.

Very clearly, the board will take aggressive enforcement action against any geologist who is found to be merely selling his signature. The Board expects any registered geologist who signs a geologic report to play a meaningful role and have clear responsibility to direct the geologist portion of the investigation.

Georgia State Board of Registration for Professional Geologists
MEMORIALS

HARRY F. FERGUSON

Harry F. Ferguson, CPG 1270, passed away on November 4, 1989 after a long illness. Harry graduated from the University of Pittsburgh in 1949 with a B.S. degree in geology. After graduation, Harry joined the U.S. Geological Survey, Ground-water Branch, in Baltimore and conducted ground-water investigations throughout Maryland. In 1955, he transferred to the USGS Military Geology Branch in Washington, D.C. There he was part of a team that developed terrain intelligence reports on strategic foreign areas. Harry's career shifted to engineering geology in 1956 when he returned to Pittsburgh to work for the Pittsburgh District, U.S. Army Corps of Engineers. For the next decade he worked as an engineering geologist under Shaller Philbrick. With a relatively small staff, Harry and Dr. Philbrick handled all geological and geotechnical aspects for the subsurface investigation, design, and construction of numerous flood control dams, navigation locks, and flood protection projects. Harry became District Geologist in 1966, succeeding Dr. Philbrick. Geologic observations made by Harry during the excavation of numerous rock foundations for civil engineering projects throughout the Allegheny Plateau led to his pioneer work on valley stress relief. Harry was named Chief of the Foundations and Materials Branch (later Geotechnical Branch) of the Pittsburgh District in 1972. Notably, Harry was one of the first two geologists to serve as Chief of a Foundations and Materials Branch within the Corps of Engineers. Following his retirement from the Corps in 1980, Harry practiced full-time as a geotechnical consultant on a wide range of projects until the time of his death.

Harry will always be remembered as an outstanding practitioner in the field of engineering geology. He was a professional who consistently emphasized the fundamentals - core logging, development of site stratigraphy, correlation of rock defects - all necessary to develop the geologic framework of a site and relate it to the engineering requirements of the project. Through his many contributions with the Corps of Engineers and in private practice he has had a major influence on the practice of engineering geology in the Upper Ohio Basin.

Harry also influenced many young geologists and colleagues through discussion at technical meetings and field trips. He was an active participant in many professional and community organizations and served as chairman of the Geological Society of America's Engineering Geology Division in 1982.

Harry will be deeply missed by his many friends and colleagues within the geologic community. He is survived by his wife Vivian, his son Michael, and three daughters, Sandra, Jill, and Andrea.

Richard E. Gray, CPG 1257

WALTER H. WHEELER

Late in the afternoon of Tuesday, November 21, 1989, Walter H. Wheeler, CPG 1143, Emeritus Professor of Geology at the University of North Carolina at Chapel Hill, died within hours of suffering a massive heart attack. Walter had collapsed in the department the preceding day and was taken to Memorial Hospital, but seemed to be making a speedy recovery and there seemed to be a good chance that he and Eula would spend Thanksgiving at home.

There can be few alumni or friends of Carolina geology who were not in some way touched by the keen mind, spirit, and courage of this remarkable man. A gifted and adored teacher, an irrepressible wit, a devoted field geologist in spite of all obstacles thrown his way, Walter was the embodiment of the intellectual geologist. I suspect that Walter would like to be remembered as the last of the breed of stratigraphers and vertebrate paleontologists of the classic school. With his passing goes an encyclopedic knowledge of North American stratigraphy, to say nothing of one of the masters of sports, movie, and historical trivia.

Walter had retired three years ago and, except for the summer months spent in his summer home on Sebago Lake, Maine, still came to Mitchell Hall daily to read, write, and gently harass the rest of us. It will be a long time before Mitchell Hall rings with the same warmth and spirit again. A great, good man has left us.

Walter is survived by his wife, Eula, his two children, Diana and Roger, and by his father and a brother. The family requested that contributions be made to the Walter H. Wheeler Teaching Award fund in the Department of Geology.

Geoffrey Feiss

CHARLES G. DOLL

Retired state geologist Charles G. Doll, Sr., CPG 2164, of Essex Junction, who compiled a detailed geologic map of Vermont that is still used and praised by geologists, died at the Medical Center Hospital of Vermont.

Doll, 91, taught at the University of Vermont from 1927 through 1964. There he earned the reputation of an earnest, hard-working geologist who went about his work quietly. He also was state geologist from 1947 through 1976.

"He was a very quiet, gentle kind of person," said one of his colleagues, George Kidder, who retired as dean of the College of Arts and Sciences in 1967. "He didn't put himself forward particularly."

One of Doll's most-remembered accomplishments was compiling a detailed bedrock map of Vermont. Developed over many years and published in 1961, the map is still used by geologists, geology students, planners, and civil engineers, said Judith L. Hannah, chairwoman of UVM's geology department.

"The bedrock geologic map was world-famous," UVM geology Professor Rolfe Stanley said. "It was a map that showed in considerable detail the complexity that you get in a mountain range."
The map is used widely for teaching and research and is cited often in scientific publications, Stanley said. To compile it, Doll recruited many people to work in Vermont, including scientists from Harvard, Yale, and Cornell universities.

Doll was born in Providence, RI, on August 22, 1898. He is survived by his wife, Ruth Wells Bailey of Essex Junction; a son, Charles G. Doll, Jr., of West Newton, MA; and a daughter, Linda Doll Vincent of DeWitt, NY.

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**New Hampshire Registration News**

**Dennis Sasseville, CPG 6814**

There is no geology registration bill being considered in this year's legislative session. Activity has centered on obtaining statutory modification to the Board of Natural Scientists to permit the inclusion of science disciplines other than soil science. A Study Committee formed in 1989 (with representation from geologists) to explore this issue produced a report and apparent consensus. However, the Executive Committee of the Joint Board of Engineers, Architects, Land Surveyors and Natural Scientists desired additional time to investigate specific organizational issues. A new study committee is, therefore, proposed (amendment to New Hampshire Senate Bill 380) with the specific charge of:

1. Establishing procedures to modify the Board of Natural Scientists to include the discipline of geology and the appropriateness of including other natural science disciplines such as forestry and wetland science. If the study committee concludes that the latter two disciplines are not appropriate for inclusion under the jurisdiction of the Board of Natural Scientists or these disciplines do not wish to be included, the committee shall consider provisions for changing the Board of Natural Scientists to the Board of Soil Scientists and Geologists should legislation permitting the licensing of geologists be enacted at some future date;

2. Produce a committee report and, through a Senate sponsor, draft appropriate legislation for the 1991 legislative session to accomplish the above objectives.

Geologists would be represented on this new committee through individuals representing consulting geology and academic or state/federal service.

Contact Dennis Sasseville at (603) 472-7320 for additional information.

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**Applications Received**

(as of March 31, 1990)

Applicants for certification must meet AIPG's standards as set forth in its Bylaws on education, experience and competence, and personal integrity. If any member has any factual information as to any applicant's qualifications in regard to these standards, whether that information might be positive or negative, please mail that information to Headquarters within thirty (30) days. This information will be circulated only so far as necessary to process and make decisions on the applications.

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IN MEMORIAM

James E. Nichols, CPG 686, January 14, 1989

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