Major Landslide Occurs on Rio Grande National Forest

F. B. "Ted" Mullin, CPG 1716

West Lost Trail Creek, July 30, 1991

On July 30, 1991, at approximately 2:15 p.m., a major geologic event took place on the Creede Ranger District of the Rio Grande National Forest about 26 miles west of Creede, Colorado. An 80-acre section of the mountain above West Lost Trail Creek slid onto the valley floor creating a massive blockage of the stream bed and valley of West Lost Trail Creek. The blockage extends for about three-quarters of a mile along the valley floor, covering an estimated 120 acres with debris up to 30 to 35 feet deep in places. Approximately one-half mile of the West Lost Trail Creek trail has been covered. The slide complex covers about 200 acres total, and is about three times larger than the Chama Landslide, which occurred in 1985 on the southern end of the Rio Grande Forest.

The slide consisted of large blocks of volcanic breccias that slid on finer-grained loosely-welded tuffs. One of the unusual features of the slide is that it contained blocks of frozen soil and rock materials as big as an automobile.

The landslide blocked West Lost Trail Creek, creating an 8-acre pond above the blockage. The slide material was fairly porous and allowed water to find a pathway through it. This alleviated concerns that water would build to a depth that would pose flash flood threats to the canyon below.

Pole Creek Mountain, (upper right) is 13,740' high while the elevation in the valley floor is approximately 10,000' above M.S.L. The Needle Mountains are seen on the skyline.

Cover photograph credit - U.S.D.A., Forest Service

WANTED

AIPG needs quality articles for future Professional Geologist issues. Members are encouraged to submit articles or call Headquarters and recommend individuals who should be asked to submit articles. Photographs enhance articles and make great TPG covers. Be sure to send photographs when possible with your articles OR send your favorite photograph for consideration as the cover for a future TPG issue.

The editorial calendar is:

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The Professional Geologist
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Executive Director’s Itinerary
(subject to change)

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

Jan. 15: National Research Council, Washington, DC
Jan. 29: AIPG Executive Comm., Arvada, CO
Feb. 21 - 22: Society of Mining, Metallurgy and Exploration, Phoenix, AZ
Feb. 24 - 27: Council of Engineering and Scientific Society Executives, Tucson, AZ
Mar. 4 - 7: Geoscientific Forum, Washington, DC
Mar. 21: AIPG Executive Comm., Arvada, CO
Apr. 11: European Federation of Geologists, Latin American Geological Congress and Spanish Geological Congress, Salamanca, Spain
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An Evaluation of the Current State of the Environmental Database Information Industry
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COVER - U.S.D.A., Forest Service
Major landslide in Cascade Ranger District of the Rio Grande National Forest. (For more details see inside cover.)

DEPARTMENTS

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LETTER TO THE EDITOR
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The purpose of AIGC is to strengthen the geological sciences as a profession with all reasonable actions, to establish professional qualifications, to certify those qualifications to the public, and to evaluate continuously the ethical conduct of its members. Further, the Institute establishes ethical standards to protect the public and geological sciences from nonprofessional practices, promotes governmental and other activities affecting the geological sciences, and communicates with the public.
Project Management View of the Role of Environmental Fate and Transport Analysis In Risk Assessment and Risk Management

Louis P. Bull, CPG, Jim Van de Water, Parviz Montazer, CPG 7654
Fluor Daniel, Inc., Environmental Services Division, Irvine, California

ABSTRACT

The need to quantitatively assess the risk to human health and the environment as a result of exposure to chemicals at and around hazardous waste sites requires the implementation of models which are capable of predicting fate and transport processes in the environment. The implementation of a fate and transport analysis requires, at a minimum, the development of a conceptual model, identification and development of one or more quantitative models, estimation of input parameters for these models, and performance of an uncertainty analysis. These requirements and the implications presented must be understood by the consultants and regulators prior to embarking on a fate and transport analysis.

Introduction

Over the last decade, risk assessment has matured from a purely statistical evaluation of health hazards to one that integrates quantitative methodologies such as numerical and analytical fate and transport modeling. These quantitative methodologies incorporate current understanding of the physical processes that influence the fate and transport of the chemicals-of-concern (COCs). The ongoing development of this refined approach to risk assessment allows for a more realistic, quantitative evaluation of hazards posed by exposure to COCs contained within the various environmental compartments. As quantitative approaches continue to evolve in the realm of site investigation and risk assessment, consultants and regulators need to focus on the conceptual and analytical issues in modeling contaminant fate and transport processes.

Environmental fate and transport analysis is a conceptual and analytical approach for the examination of contamination conditions and risk considerations within surface systems (e.g., lakes and streams) and subsurface systems (e.g., the saturated and unsaturated zones). Fate analysis involves identifying, through the use of analytical models, the environmental compartments (phases) in which COCs tend to accumulate. Examples of environmental compartments are: soil in the unsaturated zone, soil in the saturated zone, surface soils subject to erosion, channel sediments, suspended sediments in lakes and channels, surface water, unsaturated zone water, saturated zone water, and biota. If sufficient data exist, fate analysis can be used to estimate the mass percentage for a given COC in each environmental compartment. Transport analysis involves estimating travel times for the various COCs through the use of analytical and numerical models.

A qualitative and quantitative understanding of the environmental fate and transport of COCs and the geologic and hydrologic characteristics of the surface and subsurface systems is fundamental to the approach. In general, the approach involves, first, the development of a qualitative description (i.e., conceptual model) of the hydrogeologic and chemical conditions of the site, and then a quantitative analysis and interpretation of the surface and subsurface pathways. The advantages of such an approach are: 1) field investigations can be focused to quantify parameters related to fate and transport phenomena, thus strengthening the site investigation, 2) results can be used to quantify risk, and 3) results can be used in the evaluation and development of cost-effective remediation strategies.

At a minimum, the approach to conducting fate and transport analysis should integrate the following components:

1) Development of a Conceptual Model: involves describing the geologic and hydrologic characteristics of the site and surrounding area and identifying the environmental compartments as well as the intra- and inter-compartment transport pathways.

2) Model Development: involves evaluating and implementing the most appropriate models (computer programs) for a given site. The consultants and regulators should agree upon which models will be used.

3) Estimation of Input Parameters: involves assigning values to site-specific COCs and hydrogeologic parameters such as initial COC concentrations in the various environmental compartments, COC-specific properties such as solubility and biodegradation half-lives, annual precipitation, parameters associated with surface and subsurface soil types, aquifer transmissivity, boundary conditions, and dimensions of surface water bodies.

4) Uncertainty Analysis: involves determining the uncertainty in model predictions resulting from the uncertainty in the values assigned to input parameters.

This paper outlines the elements comprising these components and describes the advantages of addressing these components when developing a site investigation and risk assessment/risk management strategy.

DISCUSSION

Development of a Conceptual Model

The development of a site-specific conceptual model entails identifying the environmental compartments that may serve as reservoirs or conduits for hazardous COCs. Proper identification of these compartments requires the regulators and investigators (i.e., hydrogeologist, toxicologist, geostatistician, engineer, etc.) to communicate and integrate all pertinent technical components into the study. These components include, but are not limited to, pathway identification, exposure assessment scenarios, and hazard identification. Such communication is needed for the comprehensive analysis of technical issues that is part of both the remedial investigation and risk assessment process.

The conceptual model may be depicted graphically as a series of interconnected boxes, much like those in the flow chart of a computer program, representing the various environmental compartments. Such a graphic is an effective means of reducing the available data to a form that is readily...
understood by technical and non-technical parties. For simplicity, entire zones (for example, the unsaturated zone) may be used rather than the individual compartments (for example, air, soil, and water) comprising the zones. The most important rule governing this development is that upon completion, all interested parties should understand and agree upon the conceptual model, and it should represent a reasonable estimate of the actual physical conditions.

Model Development

Once the conceptual model is developed, specific computer models are evaluated to determine their applicability to a given site. The selection of appropriate models is an important step in the fate and transport analysis and requires communication between the regulators and the consultants. In the interest of time, money, and frustration, these parties should agree upon the models to be used prior to implementation.

Estimation of Input Parameters

A quantitative, as well as qualitative, understanding of the hydrogeochemical conditions is considered imperative to modeling fate and transport processes within and between environmental compartments, since numeric values associated with these conditions (i.e., input parameters) are used to drive the models. Arriving at agreed-upon values for the various input parameters eliminates random consideration of the various phenomena that are believed to be operative at a given site.

Issues to be considered when estimating input parameters include:

1) Definition of the extent of contamination - Knowledge of both on-site and estimated, future off-site contamination is required for a successful remedial investigation and risk assessment. This issue is especially important if data collected at on-site and off-site locations allow for a comparative analysis of on-site and off-site COC sources. Agreement between the regulators and the consultants regarding "background" contamination is required to perform such an analysis.

2) Soil and ground water data collection - The collection of soil and ground water data is an ongoing activity in the site characterization process. However, the development of conceptual and quantitative models and uncertainty analysis should be considered when devising a plan for the collection of such field data. Doing so will reduce assumptions concerning the input parameters used in models and subsequent risk assessment. One of the goals of data collection is to reduce conservative assumptions that falsely imply the existence of health problems.

In light of this premise, statistically-based monitoring programs should be considered during the development of conceptual and quantitative fate and transport models. However, such programs are often overly conservative and can muddle the goals of present and future site investigations and the risk assessment process. Therefore, an understanding of the input parameters and their relative importance with respect to model predictions will help make statistically-based monitoring requirements more logical.

3) COC- and site-specific processes - COC-specific processes such as biodegradation and bioaccumulation should be quantified since these processes can have a substantial effect on human exposure estimates. An excellent example of how biodegradation can effect human exposure estimates is given by Paustenbach et al. (1990). Other COC-specific processes such as soil/water and water/vapor partitioning also affect the environmental fate and transport. In addition to COC-specific physical and chemical processes, site-specific demographic and meteorologic factors must be quantified if the fate, transport, and hazard potential due to exposure are to be quantified.

Uncertainty Analysis

Uncertainty analysis involves systematically changing the values of input parameters to determine their effect on the model predictions. Uncertainty analysis can save much time and aggravation in debating over a precise value for a parameter that has little effect on the model predictions. For sensitive parameters, additional field work and testing may be required to obtain acceptable, more precise values.

Although an uncertainty analysis may require the refinement of soil and groundwater sampling strategies, the approach rewards such refinement. Future sampling requirements designed to control the uncertainty of input parameters reduces overly conservative assumptions, strengthens modeling conclusions, and increases understanding of geologic and hydrologic characteristics at a site.

CONCLUSIONS

We have illustrated an approach for performing a fate and transport analysis for site investigations and risk assessment/risk management programs. This conceptual/analytical approach is a logical way for consultants and regulators to tackle any site investigation and risk assessment problem. The advantages of such an approach are: (1) field investigations can be focused to quantify parameters related to fate and transport phenomena thus strengthening the site investigation, (2) results can be used to quantify risk, and (3) results can be used in the evaluation and development of cost-effective remediation strategies. Once the problem is qualitatively understood (i.e., the conceptual model is developed), the quantitative aspects of the problem (i.e., obtaining and/or estimating input parameters and implementing various fate and transport models) can be addressed more efficiently. In addition, the advent of high-speed desk-top computers, laser printers, and advanced graphics software has simplified the clear and concise presentation of model results which, in turn, has greatly aided in the public relations aspects of fate and transport analysis.

It is expected that modeling will become more important in the development of the above themes and that the need to understand site-specific, inter- and intra-compartment physical and chemical processes and the resultant effects on the fate and transport of COCs will influence risk assessment more significantly in the future.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. Tom Patterson, Gary Stiles, and Steve Fundingelaid for their critical review of this paper.

REFERENCES/BIBLIOGRAPHY


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In light of this premise, statistically-based monitoring programs should be considered during the development of conceptual and quantitative fate and transport models. However, such programs are often overly conservative and can muddle the goals of present and future site investigations and the risk assessment process. Therefore, an understanding of the input parameters and their relative importance with respect to model predictions will help make statistically-based monitoring requirements more logical.

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It is expected that modeling will become more important in the development of monitoring programs and that the need to understand site-specific, inter- and intra-compartmental physical and chemical processes and the resultant effects on the fate and transport of COCs will influence risk assessment more significantly in the future.

ACKNOWLEDGEMENTS

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INTRODUCTION

The increasing emphasis on environmental protection and regulations has created a demand and opportunity for expertise in the various fields of environmental, health, and safety management. Just as the Professional Geologist (PG) and Professional Hydrologist (PH) designations were intended to verify competence and knowledge in geological and hydrological issues, additional certification/registration programs have been established in recent years to recognize both highly specialized areas of competence as well as broader areas of knowledge and proficiency in the various environmental, health, and safety areas. These registrations are intended to provide two primary benefits: (1) they should provide a method of measurement of professional qualifications in certain aspects of environmental, health, and safety management, and (2) they should provide opportunities for environmental, health, and safety professionals to become recognized for their abilities and enhance their professional qualifications.

These programs generally address the various areas of pollution control (air pollution, ground and surface water pollution, soil contamination, solid and hazardous waste, etc.), health and safety issues, and specialized areas of focus (property transactions, asbestos, radiation, etc.). Traditional registration programs such as the Professional Engineer (PE), Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), and Professional Geologist (PG) serve as indicators of professional competence in these areas. Additional programs now exist such that five distinct areas of registration programs have been created: engineering, earth/atmospheric sciences, hazardous materials, general environmental, and safety/health. These programs are listed in Table 1.

This paper lists most of the registration programs currently in use in the geological, environmental, and health and safety fields. For the programs pertinent from a "geoenvironmental" perspective, a brief discussion is provided which describes the requirements and purpose of the registration program.

1. Earth/Atmospheric Sciences - The professional registration programs for the earth and atmospheric sciences demonstrate expertise and experience primarily in areas of air quality, groundwater quality and surface water pollution, and solid/hazardous waste pollution. Professionals in these areas are able to address a wide variety of pollution scenarios and offer technical/scientific explanations for a variety of problems.

A. Certified Professional Geologist (CPG) - The Certified Professional Geologist (CPG), administered by the American Institute of Professional Geologists (AIPG), recognizes geologists through a national program. Education, experience, references, and sponsors are requirements for certification (after a lengthy review process). The AIPG stresses ethical standards, technical competence, and communication with the public. The AIPG, a voluntary individual membership association, was organized in 1963 to deal with the professional concerns of all geologists. Since its inception, the Institute has grown to a membership exceeding 8000 Certified Professionals. Geologists from industry, academic, and government, in the U.S. and abroad, are organized into 36 regional sections. AIPG membership includes representatives from all geological disciplines, including environmentally related areas such as hazardous waste, waste disposal, environmental geology, hydrology, and hydrogeology. The AIPG is the largest association dedicated to promoting the profession of geology.

B. Professional Geologist (PG) - Some states (19 as of 1989) regulate the practice of geology by statute and implement some sort of registration or certification program required for those wishing to practice geology in that state. A "registration" or "certification" requires an application for permission to practice and, generally, the passing of a written examination. Acceptable experience and references are usually required for registration/certification as well. A distinction between the Professional Geologist (PG) and the PE is the frequent requirement of exams by states, regardless of other PG registrations/certifications. This requires the applicant to become familiar with the geology of the state in which the exam is to be given before the applicant can pass the exam.

C. Certified Engineering Geologist (CEG) - Engineering geology includes the discipline of applying geologic data, techniques, and principles to the study of naturally occurring rock and soil materials or subsurface fluids. The purpose of the Certified Engineering Geologist (CEG) program is to assure that geologic factors affecting the planning, design, construction, operation, and maintenance of engineering structures and the development of groundwater resources are recognized, adequately interpreted, and presented for use in engineering practice. The Association of Engineering Geologists was started in 1957 in Sacramento, California. The applicant must demonstrate considerable experience before being allowed to take the certification examination and, in some states, must be a registered geologist before taking the examination. Engineering geology is a growing profession because of the involvement of Engineering Geologists in groundwater pollution work and environmental and community planning studies, and the increasing demands of engineers for geologic advice and data to use in environmental and engineering projects.

D. Professional Hydrologist/Hydrogeologist (PH) - Certification as a Professional Hydrologist, Professional Hydrogeologist, or Professional Hydrogeologist (Groundwater) is administered by the American Institute of Hydrology, formed in 1981. The certification was intended to strengthen the hydrology field by establishing standards to certify qualified hydrologists; establishing and maintaining ethical standards to protect the public from irresponsible work; and providing education and training in hydrology. The certification process requires that applicants meet specific educational requirements (i.e., college degree in or related to hydrology/hydrogeology or a waiver for professionally competent graduates prior to 1970), demonstrate substantive professional work experience including original investigations, furnish five letters of reference, and pass a written examination.

E. Certified Ground Water Professional (CGWP) - The Association of Ground Water Scientists and Engineers (AGWSE), a division of the National Water Well Association, developed a certification program in 1985 for Certified Ground Water Professionals (CGWPs). The applicant must have at least seven years of progressively more responsible experience after acquiring the baccalaureate degree. Competence must be demonstrated in work involving the occurrence, movement, and composition of groundwater, the management and regulation of groundwater, or the teaching
of groundwater subjects. Explicit descriptions of qualifying work experience must be provided demonstrating initiative, decision-making, and sound scientific and engineering judgement. Two three-person certification review committees judge the application\(^7\). Although no examination is required, the review process is considered very stringent with numerous applicants being denied certification.

**F. Certified Professional Soil Scientist (CPSS)** - The American Registry of Certified Professionals in Agronomy, Crops, and Soils (ARCPACS) was established by the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America in 1977 to evaluate and recognize the professional competence of individuals in its field. The Certified Professional Soil Scientist (CPSS) has evolved from a program requiring a baccalaureate degree in soils and a minimum of five years experience to a certification program requiring a four-year degree (400-question exam required if degree is not in a soils-related curriculum), five years of experience, ethical compliance, and the opportunity to attain an Associate Professional status for those lacking the experience requirement. Soils Specialists and Classifier classifications are also available to the applicant\(^8\).

**G. Certified Consulting Meteorologist (CCM)** - The American Meteorological Society (AMS) established the Certified Consulting Meteorologist (CCM) program more than 30 years ago. The candidate can be certified through one of three mechanisms: knowledge, experience, or character. Qualification by knowledge is primarily through evidence of a college education with courses in meteorology. However, lack of a college degree does not bar the applicant from the certification process. Qualification on the basis of experience requires a minimum of five years of work at the professional level. Qualification based on character requires three professional references, one of which is preferably a CCM. Once the application, transcripts, and references have been received by the AMS, a written examination is prepared for the applicant. Part of the exam requires a report or published paper representing the applicant's professional work. An oral examination follows successful completion of the written examination\(^9\). Currently, no state licensing of meteorologists - such as is done for geologists - exists, but the subject is under discussion within the AMS.

**2. Hazardous Materials** - Several professional certification programs have been developed over the past 20 years to recognize proficiency in the areas of hazardous materials and their management, hazardous substance numbers and their fields, and all aspects involved with the generation, treatment, and handling of these materials. There are four primary organizations which administer these certification programs. The basic requirements involve education, experience, and the successful completion of an examination.

**A. Certified Hazardous Materials Manager (CHMM)** - The Institute of Hazardous Materials Management (IHMMM) offers the Certified Hazardous Materials Manager (CHMM) program, which is intended to provide recognition to those professionals engaged in the management and control of hazardous materials and encourage continued professional development\(^10\). The basic requirements are a college degree in a related field; a demonstration of five years experience in the areas of hazardous materials management; and the successful completion of a three-hour, 150-question examination. Most states have formed chapters to assist in the development of the IHMMM goals and objectives.

**B. Registered Hazardous Substance Professional (RHP)** - The Certified Hazardous Waste Specialist (CHWS) program was developed by the National Environmental Health Association (NEHA) to recognize and promote proficiency in areas related to hazardous substances. In an effort to recognize
the broader areas of knowledge when dealing with hazardous substances rather than just hazardous wastes, the certification has been revised and is now recognized as the Registered Hazardous Substance Professional (RHSP). NEHA requires that the applicant have a college degree in a related field; demonstrate five years of experience in areas of hazardous substances; and successfully complete a four-hour, 250-question exam. The RHSP program was developed under a program funded by the USEPA. Recertification is required every two years.

C. Certified Hazard Control Manager (CHCM) - The Certified Hazard Control Manager (CHCM) program was intended to recognize expertise in the areas of hazard control. Administered by the Board of Hazard Control Management, its requirements are similar to those of the CHMM and RHSP programs: education, experience, and an examination.

D. Certified Hazardous Material Executive/Supervisor/Technician (WOCHM/CHHS/CHMT) - The World Safety Organization (WSO) has implemented a program which provides for increasing levels of recognition for proficiency in areas related to hazardous materials. The initial levels, Certified Hazardous Material Technicians (CHMTs) I, II, and III, require relative education and experience backgrounds related to hazardous materials. As experience accumulates, higher levels become attainable after successful completion of an examination. These levels are the Certified Hazardous Material Supervisor (CHMS) and the Certified Hazardous Material Executive (CHME). The proper designation for the programs include the WSO prefix prior to the applicable certification level, such as WSO-CHMT III or WSO-CHME.

References

(1) 
(2) 
(3) 


(12) National Registry of Environmental Professionals - "The Environmental Registry," Glenview, IL.

(13) National Environmental Training Association (NETA), Certified Environmental Trainer/Associate Environmental Trainer, Scottsdale, AZ.


NOTE: References 4, 5, 6, 7, 8, 9, and 11 were obtained from the following: A. I. Johnson, ed., Professional Certification and Registration for Water Resources and Related Disciplines, American Water Resources Association (AWRA), Bethesda, MD, 1988.

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E.O.E./A.A.
An Evaluation of the Current State of the Environmental Database Information Industry

Robert V. Colangelo, President, The Green Corporation

[The Green Corporation conducted an evaluation of the environmental database industry. The following general conclusions apply to most or all of the companies surveyed during our evaluation. Services and products offered by the companies are summarized in the table.]

Information provided by the database companies is used by a wide range of publics. These include: environmental consultants to supplement the record/document review of a Phase I Environmental Property Assessment, attorneys and lending institutions as a preliminary screening tool to identify potential environmental risk, and business as a forecast tool to identify environmental market segments and sales trends.

Less than 15 companies exist which provide some type of environmental data service. The six companies in evaluation were selected because they were in business as of 1989, provide reports for a minimum of one entire state, and advertise services on a frequent basis. The growth pains associated with this new industry, which is self-regulated and undergoing rapid development, have raised questions concerning the comprehensive nature of the data, and nation-wide availability of reports supplied by the companies. All the companies interviewed are in various stages of development. They reported to be adding employees, increasing geographic coverage, and adding new databases and records to their system.

The content and format of reports vary greatly and need improvement to be user friendly. Reports are offered in one of three categories: The Map Based Report, The Zip Code Search and A Site Specific Report. The Map Based Report presents a plot of identified records within a certain search distance from the target site. The Zip Code Report presents a listing of all identified environmental records within the specified zip code. The Site Specific Report lists all identified compliance and enforcement records for the specified site.

A number of companies provide additional services for an additional fee. The services include the supply of current and historic Sanborn fire insurance maps, aerial photographs, and topographic maps. A few companies provide title search capabilities for a limited area. Most companies provide reports within 2-5 working days, or within 24 hours for an additional fee. The standard method of delivery is the postal service. However, reports can be sent by FAX or next-day service. Only one company has the availability of an on-line computer service allowing immediate access.

The data stored in the computer system can be accessed and sorted by a number of parameters. The use of a site address is most reliable and consistent for identifying site specific records. The zip code parameter is dependable for identifying records within a defined search distance from the target site.

Only one third of the companies interviewed carried an Errors and Omissions insurance policy. The disclaimer regarding the use of the information should be read carefully, and the ability to collect on a policy needs to be evaluated.

All companies claim to have a strict quality control/quality assurance program for checking original data against the data entered into the database system. The original data is not scrutinized and therefore can be questionable. The data stored in the original government database records were collected for internal agency use and was not intended to be used for property transfers. The quality and consistency of the original data varies greatly and should be questioned by the end user.

Environmental information companies have carved a niche in the environmental market. They provide a centralized source of government collected environmental information in an expedient manner. As environmental information companies continue to refine their database collection systems and as government agencies become more efficient in their collection, management and dispersal of information, all users will benefit.

To order a copy of the report 'An Evaluation of the Current State of the Environmental Database Information Industry', send a certified check or money order for $18.00 to: The Green Corporation, Educational Programs Division, P.O. Box 31224, Chicago, IL 60631-0224.

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TABLE 1: Comparison of Environmental Information Companies

<table>
<thead>
<tr>
<th>Company Name</th>
<th>ESRISE</th>
<th>EAI</th>
<th>ERC</th>
<th>PI</th>
<th>TOECHECK</th>
<th>VISTA</th>
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<tr>
<td>Coverage (States)</td>
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<td>50 Plus</td>
<td>50 Plus</td>
<td>27</td>
<td>50 Plus</td>
<td>50 Plus</td>
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<td>$295</td>
<td>5-7 Days</td>
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<td>Yes</td>
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<td>Yes</td>
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</tbody>
</table>
Environmental Geology

E. M. McKee, CPG 737

In the words of our oft consulted friend Mr. Webster, the environment is "...the sum total of the conditions and influences which affect the life and development of a person, animal or plant." Basic to any constructive discussion of environmental considerations is the geography of the site, area, region or world. Too often, this essential step one is not considered by populist environmentalists. Heck, they don't know the rocks and soils and H20 matter until they see a small darter or migrating oil spill, and they think in the 2-dimensional surface plane they can look at. Better and more public geological input can make practical and positive contributions to the environmental considerations, even to the question of drill or no-drill on the North Slope or offshore.

Recognizing that the dry land areas are important, since most of us live ashore, I believe the water environments with their land and air interfaces are even greater contributors to the well-being of Earth and the biota and will get prime attention in this essay.

Considering my amphibious years in, on, by, and under lakes and oceans, it is not surprising that various human use environmental situations, unfortunate and avoidable, have been presented to me in the last 30 years. Only a few of the problems can be discussed here.

It continues to be a puzzlement as to why otherwise intelligent planners, managers, and landowners build in a coastal area without asking a web-footed geologist about coastal conditions like current, waves, sediment transport, bedrock, and shore erosion potentials. Without personal contact with the local water or shore, non-geologists have waved their magic witch-hazel wands and sited nuclear power plants basing their expertise on a current survey done in 1834. Big surprise and cries of "Foul!!" when a geologist with current meters and dyes and an actual swimmer has found accelerated currents with the discharge plume entrapped in a longshore current moving past a community water intake system.

The long held notion that out of sight underwater was safely out of the public picture went blooey when oil slicks and garbage sludge backtracked to beaches and barrels of nuclear waste went travelling along into the ocean depths and ruptured. What hadn't the dumpers considered? Currents, offshore bottom terrain features, submarine landslides and earthquakes. In addition, they thought only in the two dimensional plane they could see - the surface of the water. That leaves lot more of the oceans and Great Lakes carrying on as usual.

About the Great Lakes, these have depths greater than 1300' and ore carriers 1,000' long and all that water is sweet and drinkable when far from an industrial area. Some years ago, the tonnage going through the Soo locks was greater than that going through the Panama Canal and the Suez Canal. With mixed cargo ships coming in from all around the world, the Lakes receive more pollutants than anticipated or wanted. Ships coming from the Atlantic via the St. Lawrence Seaway, have brought in biologic pollutants like the Sea Lamprey (which nearly wiped out the Trout and Whitefish), and the Alewives whose population exploded without the Trout to eat them. Now, we are plagued by the Zebra Snails which came attached to the hulls of cargo ships from eastern Europe. Not all the critters should be saved unto the umteenth generation.

Since lake level records have been kept, it is seen that the water in Lake Michigan, for instance, varies 6 feet according to the rain/snow patterns. Even a couple of inches of lower water drastically cuts the cargo tonnage of deep draft ships and causes them to scrape up polluted bottom sediments. Higher water levels result in shore erosion when shore owners have paid no attention to the local geography and water as a geological force. Usually they have ignored augmented and accelerated currents resulting from structures and industrial discharge systems located upstream.

Each lake, sea, or ocean has its own environmental assets and problems, but all have similarities as well, whether salt or fresh water. The water is a 3-dimensional mobile mass that adjusts to the terrain features of the entire land/water interface. There are at least a dozen energy sources, besides Coriolis and winds, which initiate and augment currents. When the surface-to-bottom currents are recognized in nearshore or offshore areas, float patterns of oil spills can be anticipated and early intercept/recuperation efforts can be efficiently started. Landsat enhanced pictures of the spill in the Persian Gulf show oil sweeping offshore with currents at every headland such as Ras al Mishab and then cutting back to shore. There needn't have been such coastal damage if booms, including boats if necessary had been placed to keep the oil moving offshore from the headlands and forming an open water gyre where it could be concentrated and more easily recovered. On average, the Coast Guard is called to handle some 3,000 spills each year and urgently needs better methods of handling the problems. The Polynesian sailed the Pacific using currents avoiding or bouncing off of shorelines or seamounts without knowing the submerged geology.

By applying their professional expertise, geologists can identify problems and often provide solutions to such diversified projects as oil exploration, dams and reservoirs, military operations, shore stabilization, how to site a home on solid ground, and even how to sail a better offshore race. Truly geologists are people for all occasions.**
The Task at Hand

C. W. Houlih, Jr., CPG 3612

In keeping with the theme of this issue, I believe it appropriate to review the following definitions reproduced (with emphasis added) from the AGI Glossary of Geology:

**engineering geology** (en-gi-neer-ing) Geology as applied to engineering practice, esp. mining and civil engineering. As defined by the Association of Engineering Geologists (1969), it is the application of geologic data, techniques, and principles to the study of naturally occurring rock and soil materials or ground water for the purpose of assuring that geologic factors affecting the location, planning, design, construction, operation, and maintenance of engineering structures, and the development of ground-water resources, are properly recognized and adequately interpreted, utilized, and presented for use in engineering practice. Syn: geologic engineering.

**urban geology** (ur'-ban) The application of geologic knowledge and principles to the planning and management of cities and their surroundings. It includes geologic studies for physical planning, waste disposal, land use, water-resources management, and extraction of usable raw materials. See also environmental geology.

**environmental geology** The application of geologic principles and knowledge to problems created by man's occupancy and exploitation of the physical environment. It involves studies of hydrogeology, topography, engineering geology, and economic geology, and is concerned with Earth processes, Earth resources, and engineering properties of Earth materials. It involves problems concerned with construction of buildings and transportation facilities, safe disposal of solid and liquid wastes, management of water resources, evaluation and mapping of rock and minerals resources and long-range physical planning and development of the most efficient and beneficial use of the land. See also: urban geology. Syn: geocology.

Taken literally, these definitions suggest that the reason environmental geologists have so much to do now days is that urban geologists and engineering geologists haven't been doing their job. Sure, we've been trying. The engineers/planners/politicians won't/can't listen, the client/agency can't afford it, etc., and/or the work has been done without the proper geologic input. In any case, we can't let that go on.

Recently, I wrote (emphasis added): "The identification and characterization of environmental contamination, and the design and implementation of remedial action are complex undertakings requiring geologic, geophysical, and remote sensing principles but fault mapping were being told that their environmental geology experience was not applicable to hydrocarbon exploration. The late 80s were a time when petroleum geologists were being told their experience was not applicable to an industry concerned with multi-phase contaminant migration and enhanced recovery of non-aqueous phase liquids.

Clearly, a good geologist willing to put forth the effort can be a hydrogeologist (or whatever the term in geology of future decades may be). There should be no concern for there being members of APIG who would not put forth the effort but accept the work. There is a broader issue here which cannot be addressed by registration, licensing, or certification but can only be addressed by professionalism/ethics on an individual basis.

The late 80s have been, and the 90s will be, a time when civil engineers design ground-water monitoring programs, geotechnical engineers design systems for the recovery and treatment of contaminated ground water, biologists conduct environmental audits intended to evaluate the potential for subsurface contamination, - the list is too long to complete here, - and lawyers direct the course of these activities via regulation and litigation. We, and they, are at the mercy of their professionalism/ethics on an individual basis.

In my (possibly fortunate) experience, I have seen virtually no intentional wrongdoing and little callous disregard for work quality. What I have observed, to my constant frustration, is a tragic comedy of errors committed by: a) well-intentioned, unqualified people; b) inexperienced, improperly supervised people; c) unqualified people who honestly, but mistakenly, believed they were qualified; or d) all of the above. We can't let that go on.

This is not parochial. The objective is not to have all this work done by geologists with gray hair. There's plenty of work to go around, and much of it must be multidisciplinary. The objective is to see to it that the work gets done properly. See to it!•
Nanjido Municipal-Wastes Disposal Site and Korean Coal Briquette Ash

Dennis D. Han, CPG 6549

Korea Institute of Energy and Resources, Daejeon, ROK

In 1988, the municipal solid-wastes in the large cities of the Republic of Korea amounted to 2.2 kg per capita per day, whilst those in the rural communities to 1.5 kg per capita per day. The waste produced in the city of Seoul alone presently amounts to 28,000 tons per day, accounting for about 40 percent of the total waste produced throughout this country.

Nanjido disposal site is located about 50 miles north of the Han River near the western boundary of the city of Seoul. Nearly all of the wastes collected in Seoul and some neighboring cities have been disposed of at the site of about 3 km² with little regard for pollution control since 1978. The actual landfill area encompasses about 1.75 km². The landfill reached a height of about 18 m in 1984 as shown in Figure 1, and is now about 45 m high.

The geologic and hydrologic conditions of the site are unfavorable for solid-waste disposal. The waste mountain is underlain by alluvium, which is composed of sand and gravel layers ranging in permeability coefficient from 10⁻³ to 10⁻⁵ m/s and in thickness from 10 to 30 m. The groundwater table is generally located within the permeable layers, within the wastes at some depressed or excavated localities. The analysis of the groundwater samples taken at the margin of and near the disposal site is shown in Table 1, revealing that the groundwater was contaminated by the leachate from the wastes. The Nanjido site is going to be closed in 1992, becoming a source of pollution, health hazards, and environmental degradation. The city authority of Seoul is planning to use the site as developable land after controlling solid pollution, liquid pollution, gas pollution, biological pollution, and visual pollution as well as slope stabilization. This project is believed to require one of the most expensive environmental expenditures that the city authority of Seoul must pay.

Table 1. Groundwater quality for the Nanjido disposal site. (Data by KAIST, 1989)

<table>
<thead>
<tr>
<th>Constituents</th>
<th>Concentrations (milligrams per liter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COD</td>
<td>40-200</td>
</tr>
<tr>
<td>Ammonia</td>
<td>55-200</td>
</tr>
<tr>
<td>Chloride</td>
<td>49-1, 300</td>
</tr>
<tr>
<td>Sodium</td>
<td>35-550</td>
</tr>
<tr>
<td>Iron</td>
<td>0.2-1.6</td>
</tr>
</tbody>
</table>

About 43 percent of the solid-waste generated in the Republic of Korea are the ash residues resulting from the combustion of coal briquettes. The briquette is made of the mixture of 85 to 90 percent domestic anthracite and 10 to 15 percent imported bituminous coal by weight, being used as a fuel mainly for heating. It is 15 cm in diameter and 14 cm in height, weighing about 9.6 kg and having 22 holes (Figure 2). The ash residue, also shown in Figure 2, weighs about 1.5 kg and is pale pink in color. When crushed, it is composed of 12 percent gravel-size particles, 65 percent sand-size particles, and 23 percent fines by weight. Most of the ash particles are porous. The main inorganic constituents are Si, Al, and Fe: the oxides of these three elements comprise 80 percent of the ash composition. The minerals identified by X-ray powder diffraction patterns, the examination of thin sections, and electron microprobe analysis are mullite, quartz, magnetite, ilmenite, glass, biotite, and amphibole. The physical, engineering, chemical, and thermal properties of the ash residues are shown in Table 2.

Table 2. Physical, engineering, chemical, and thermal properties of the Korean briquette ashes.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity</td>
<td>2.36</td>
</tr>
<tr>
<td>Atterberg limits</td>
<td>nonplastic</td>
</tr>
<tr>
<td>Unified soil classification system</td>
<td>SM</td>
</tr>
<tr>
<td>Compaction characteristics</td>
<td>maximum dry density, 1.337 g/cm³ and optimum moisture content, 19.4% in accordance with ASTM D 698</td>
</tr>
<tr>
<td>CBR:</td>
<td>57.3 to 70.3% for uns soaked specimens with dry density, 1.336 g/cm³ and moisture content, 10.6 to 22.4%</td>
</tr>
<tr>
<td>Permeability coefficient</td>
<td>5.2x10⁻⁷ to 5.7x10⁻⁷ m/s for specimens with dry density, 1.335 to 1.336 g/cm³</td>
</tr>
<tr>
<td>pH:</td>
<td>5.9 to 6.0</td>
</tr>
<tr>
<td>Sulphate content</td>
<td>1.44 g/liter</td>
</tr>
</tbody>
</table>

Figure 2. Korean coal briquette (right) and its ash (left).

Thermal conductivity: 1.77x10⁻⁹ to 2.84x10⁻⁹ cal/cm.s.C for specimens with dry density, 1.314 to 1.369 g/cm³ and water content, 7.21 to 22.40%. The ash residues have been disposed of in some type of landfill, mainly open dump, together with the other wastes. Based on the characteristics of the ash residues, they appear to be no longer wastes but resources. They may be used as a cover material for sanitary landfill, provided that they are crushed and compacted to have the coefficient of permeability in the range of 10⁻³ to 10⁻⁸ m/s, and as a non-frost-susceptible material for road sub-base, which is generally situated above the level of frost penetration in the Republic of Korea where approximately 98 percent of the land area is affected by seasonal freezing. They may also be used as a backfill material of low thermal conductivity around steam and hot water pipes for minimizing the heat losses from them. For the above utilization, however, the ash residues should be collected separately from the other wastes.
Legislative and Regulatory Framework of the Bureau’s Surface Management and Reclamation Program on Bureau of Land Management Lands in Nevada.


The Secretary of the Interior, through the Bureau, is charged by statute, Section 3022(b) of the Federal Land Policy and Management Act of 1976 (the FLPMA), that, “In managing the public lands, the Secretary shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands.” Under this mandate, the Bureau issued regulations, effective on January 1, 1981, to carry out this mandate. These regulations cover environmental protection and surface reclamation of mining and exploration activities conducted on the public lands under the authority of the General Mining Law of 1872. These regulations are found at Title 43 of the Code of Federal Regulations (CFR), Subpart 3809. The Bureau refers to these as the “3809” regulations.

The 3809 regulations are constructed to recognize three levels of activity, each requiring a different level of response from the operator and the Bureau. These are: casual use activities, notice level activities, and plan of operations activities.

During the 1980's and into the 1990's, Nevada has been the center of the western gold rush. In 1990, Nevada produced 62% of the gold in the United States. Much of the production comes from Federal lands managed by BLM under the authority of the 1872 Mining Law and the Federal Land Policy Act of 1976 (FLPMA).

Casual Use. These are minimal surface disturbing activities not involving the use of mechanized earth moving equipment, explosives, or operating on road vehicles in an area officially closed to the use of off road vehicles. Drilling is not considered a casual use. Casual use activities do not require a Bureau permit or notification by the operator of the activity.

Notice. Exploration or mining activities exceeding the casual use criteria, but not exceeding five acres of unreclaimed cumulative surface disturbance, require a Notice to be filed with the Bureau Authorized Officer (AO, the District Manager) under 43 CFR 3809.1-3. A Notice describes the location and manner of the surface disturbance intended. The operator must wait 15 calendar days from filing the Notice before proceeding with the activities described. The AO has that time to review the Notice and advise the operator of any specific environmental concerns or resource conflicts that may be present in the area, and advise the operator of methods necessary to avoid those conflicts.

A Notice is not considered a Federal action under the National Environmental Policy Act of 1969 (NEPA), but is considered an enforcement tool to ensure the operator’s compliance with the 3809 regulations. See Sierra Club vs. Pendleton, 587 F. 2d 1307 (9th Circuit, 1988). After the 15 day period has expired, the operator may proceed with the proposed activity. A Notice legally binds the operator to reclaim the land disturbed by his operations.

Plan of Operations. These are filed with the AO for operations disturbing more than five acres of permanent surface disturbance. See 43 CFR 3809.1-4 and 3809ab 4(b). Plans are a Federal action and require full NEPA compliance (preparation of an Environmental Assessment [EA] or an Environmental Im-

pact Statement [EIS], as appropriate). Approval of the AO is required and a reclamation bond must be posted by the operator. Operations may not commence until the Bureau issues the authorization to proceed through the AO and the required reclamation bond has been accepted by the Bureau.

The Bureau of Land Management’s National Surface Management Policies.

Since 1981, the Bureau, as the largest of the Federal land management agencies (the others being the US Forest Service, the US Fish and Wildlife Service, and the National Park Service), has been continuously evaluating its public land reclamation policies. When the 3809 regulations were first promulgated in 1981, the regulatory approach was to work with the operators, and to allow established operating procedures of the mining industry to guide the form and manner of reclamation, as long as the statutory prohibition against creating “unnecessary or undue degradation” of the land was complied with.

Recently, on several fronts, the Bureau has implemented a review of its management practices and policies with regard to surface management of mining and exploration activities. This review has identified a number of administrative actions that the Director could implement in the areas of reclamation, cyanide management, reclamation bonding, and tightening of environmental standards as applied to surface mining operations. These can be implemented under existing statutory authorities, either by policy directives or, in some cases, issuing new regulations or modifications of existing regulations.

The BLM has taken several major steps and initiatives to manage the Surface Management program and we continue to strengthen the program, while promoting the Bureau's multiple use philosophy as mandated in the FLPMA.

Pursuant to the Director’s position on the Bureau’s ability to manage mining and exploration activities on the public lands in an environmentally sound manner, he has issued three policy directives that concern mining operations on public lands administered by the Bureau.

1. Inspection and Enforcement. The Bureau will now be inspecting each notice and plan of operations twice a year for compliance with the approved operating plan or terms of the Notice. Operations using cyanide or other leachates will be inspected on a quarterly basis. Operations found in violation of their permits or Notice will be served with a Notice of Noncompliance and be given a specified number of days to begin correcting the deficiencies stated in the Notice of Noncompliance. Operators not bringing their operations into compliance will be taken into Federal court and enjoined from further operations until compliance is achieved. If necessary, monetary damages will be assessed of the operator if the Bureau must implement the corrective action on its own account.

2. Cyanide Management. The Bureau has issued a cyanide management policy which sets minimum performance and safety standards for operations using cyanide or other leachates on the public lands.
3. Reclamation Bonding. Reclamation bonding is now required of all plans of operations (not Notices). The Director's policy (and the existing 3809 regulations) allow the Bureau's State Directors to either adopt a State reclamation program if the State program meets or exceeds the level of environmental protection and reclamation standards required by the 3809 regulations, or use the minimum National standards.

The Nevada Bureau of Land Management signed a formal Memorandum of Understanding (MOU) with the State of Nevada, Division of Environmental Protection (NDEP) on September 27, 1990, adopting the State of Nevada reclamation law and requirements for Federal purposes upon the public land administered by the Bureau. The NDEP regulations, which became effective October 1, 1990, also require mandatory reclamation bonding of plan level operations. These are found at Chapter 519A of the Nevada Administrative Code (NAC 519A).

Nevada's Surface Management and Reclamation Program and Policies.

Nevada BLM has also stepped out to manage surface mining and exploration activities on public lands in Nevada. Nevada's program is based upon a strong cooperative with State regulatory agencies. BLM has formal cooperative management agreements with the State Division of Environmental Protection on water quality control, reclamation actions, and cyanide management. We have additional agreements with the State Department of Wildlife for protection of wildlife at mine sites, and with the State Department of Minerals on other joint regulatory matters.

Nevada BLM has developed the first Statewide Cyanide Management Plan in the Bureau and is working with other Federal and State agencies to ensure that operations using cyanide are environmentally sound.

In Nevada, the operator will file his plan of operations and reclamation plan with the Federal agency if located on Federal lands or if the land package contains both Federal and private lands. The operator must also simultaneously file a copy with the State Division of Environmental Protection (NDEP). The Federal agency is the lead agency and will deal directly with the operator on all aspects of the plan of operations, reclamation plan, and reclamation bond. The NDEP will funnel its requirements through the lead agency. At the end of this joint review process, the operator will receive both Federal and State permits within a few working days of each other.

In 1991, the General Accounting Office (GAO) reported that BLM had taken several strong management actions to address the issue of cyanide management. BLM is also committed to assure excellent reclamation and revegetation of the public lands. With the regulatory and management tools now available, BLM is administering the Surface Management program to assure that all goals of the law and regulation are carried out on the public lands.

Bonding for Reclamation Purposes

1. Exploration and mine plans within sensitive areas will be bonded at 100% of the reclamation cost (Wilderness Study Areas, Areas of Critical Environmental Concerns, Federal Threatened & Endangered species habitat, mineral withdrawals, and Wild and Scenic Rivers).

2. Operators who are currently in active noncompliance, will be bonded at 100% of the cost of reclamation. Active noncompliance is defined as an operator who has been served a Notice of Noncompliance, the response period has passed, and the operator has not commenced the actions required by the Authorized Officer in the Notice of Noncompliance.

3. All cyanide areas of use, storage, and transport are bonded at 100% of reclamation cost, including detoxification and heap flushing.

4. All reclamation estimates will be based on 100% of reclamation needed, using the joint BLM-NDEP checklists and summary sheets. Reduction in reclamation bond coverage may be given by the District Manager, if the operation does not fall within numbered paragraphs 1-3 above, in the following circumstances:

A. Exploration operations. With the exception of paragraphs 1-3 above, it is Nevada BLM's policy to reduce exploration bond amounts from 100% to $1,000 per acre or 75% of the estimated cost, whichever is the lower number, if the operator requests the reduction in writing at the time of bonding. We expect the request process to become a routine process.

B. Mining operations. With the exception of paragraphs 1-3 above, the District Manager may consider a reduction in bond amount from 100% to a lower number using the following formula: Estimated cost per acre - (Estimated cost per acre - $2,000 per acre) 2 = bonded amount per acre. The criteria for consideration here are given in Nevada Instruction Memorandum No. 90-436, pp. 6-7. If the estimated cost is less than $2,000 per acre, the lesser cost will be used for bonding purposes.

Reclamation Bond Processing

1. All bonds will be filed with, processed by, and accepted or rejected by the Nevada State Office only. See Nevada Instruction Memorandum No. 91-028. The District Manager will set the reclamation bond amount. Nevada State Office will handle the rest of the bond process.

2. Bond language. All bonds submitted will be accompanied by the proper Nevada 3809 bond contract and power of attorney (Nevada form NV 3809-1 and NV 3809-2). The language of these bond contracts has been approved by the Solicitor. Alternate language from an operator requires Solicitor approval, and consequent delays in bond acceptance by the Nevada State Office.

3. Bond instruments. The Nevada State Office currently accepts as financial guarantors for bonds the following:

A. Insurance policies (sureties), if surety company is on U S Treasury Circular 570, list of approved surety companies authorized to do business with the United States. The surety company must also be authorized to do business in the State of Nevada.

B. Irrevocable letters of credit, if drawn on a FDIC insured bank, or a bank that is a Federal Reserve Branch Bank.

C. Certificates of Deposit, if placed through an FDIC insured bank or a bank that is a Federal Reserve Branch Bank.

D. Other negotiable Federal securities (U S Treasury Bonds and U.S. Treasury Bills, but not U.S. Savings Bonds). These must be placed through an FDIC insured bank or a Federal Reserve Branch bank.

E. State of Nevada Reclamation Bond Pool coverage, issued under NAC 519A.510 et seq. These are issued by the State Department of Minerals.

F. Corporate guarantees for up to 75% of bond coverage, if approved by the State Division of Environmental Protection under NAC 519A.350.

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G. Reclamation trust funds, placed into a BLM account.
H. Cash, in the form of a certified or cashier’s check.

In summary, the Nevada BLM has initiated a joint Federal-State permitting process to streamline the operator’s plan and bond approval process. The process is predicated upon a Federal lead agency role, with the NDEP acting through the Federal agency. Bonding programs are joint, so that the Federal bond will suffice for the State bond. The operator will normally only deal with the Federal agency, making life easier for the operator, and the Federal and State agencies.

Questions concerning the operating plan and reclamation plan approval and bonding process on BLM lands in Nevada can be directed to the Division of Mineral Resources at (702)-785-6576 or FTS 469-6576.

Footnote
1. Roger A. Haskins, CPG 6598, and Larry L. Steward are geologists and mineral examiners with the BLM Nevada State Office in Reno, Nevada. Thomas V. Lesnendok is the Deputy State Director for Mineral Resources in the Nevada State Office. They coordinate and oversee the Nevada BLM’s Surface Management and reclamation programs, including liaison with the State Division of Environmental Protection for joint reclamation matters.

Developing Qualification Criteria for Nevada’s Environmental Consultant Certification Program

Debra W. Struhsacker, CPG 8259
Nevada Certified Environmental Manager - Interim Certification No. 0004

ABSTRACT
Nevada's newly adopted regulations for certification of environmental consultants are landmark regulations with many implications for the environmental consulting profession. This paper examines the complex issue of evaluating technical competence for environmental professionals, and developing qualification criteria under the certification regulations. One of the key issues considered is whether a professional registration should be a prerequisite for certification. Because there is currently no professional registration program in Nevada for geologists or many other environmental professionals, this remains a partially unresolved and controversial issue. This paper also examines whether the current regulations satisfy the legislative intent of the certification program to provide protection to consumers of environmental consulting services.

Introduction
In January 1991, the Nevada State Environmental Commission adopted regulations requiring certification of all consultants providing information or services related to hazardous waste and underground storage tanks. This certification program will be administered by the Nevada Division of Environmental Protection (NDEP). These regulations are precedent setting; no other state has similar requirements, and many states considering a certification program have carefully monitored the development of the Nevada regulations.

Developing these regulations was difficult and controversial, and the first draft was rejected by the Commission at a hearing in August, 1990. The adopted regulations are not ideal, but represent a significant improvement over the first draft. The following summarizes the salient aspects of the regulations:

Certification Classification Scheme - The regulations contain four classifications for certification: an environmental manager, a specialist in the management of hazardous waste, a handler of underground storage tanks, and a tester of underground storage tanks.

Qualification Criteria - A combination of minimum education and experience, and professional and character references will be required to sit for the certification examination. The environmental manager requires a college degree in a field relating to the environment and three years of relevant experience, or a professional registration or certification and at least three years of relevant experience, or an equivalent combination of education and/or experience. The specialist in the management of hazardous waste requires a college degree in a field relating to the environment and two years of relevant experience, or a professional registration or certification and at least two years of relevant experience, or a high school diploma and at least six years of relevant experience, or an equivalent combination of education and/or experience. The two underground storage tank classifications also specify minimum educational and experience criteria.

Certification Examination - All classes of certification will be required to take a written examination. The regulations are silent regarding the contents and format of the examination, and the nature of the examination is currently being developed by the NDEP.

Schedule - As of July 1, 1991, anyone providing services in Nevada relating to hazardous waste must obtain a temporary certification. This will entail satisfying all qualification criteria except passing the appropriate examination. This temporary certification will be valid through July 1, 1991. After July 1, 1992, full certification, including passing the examination, will be required.

Reporting Requirements - The regulations include a requirement for consultants to provide written notification to owners or operators of facilities with "...discovered...release of a hazardous substance or an unregistered underground storage tank" of any applicable reporting requirements. Similarly, consultants are required to notify the Division of Emergency Management "of a release of hazardous substances which presents an imminent and substantial hazard to human health, public safety or the environment as soon as possible."

Legislative Intent for the Certification Regulations
Nevada's Environmental Consultant Certification regulations implement legislation which was promulgated in response to an incident involving illegal and fraudulent disposal of hazardous wastes. As a result of this incident, a number of hazardous waste generators are faced with significant environmental cleanup costs. In an effort to provide consumers of hazardous waste consulting services with some measure of consumer protection, the Nevada Legislature enacted legislation which required the NDEP to develop a certification program for environmental consultants who provide advice or services regarding hazardous waste.
Developing regulations which satisfy this legislative intent for consumer protection, proved to be complicated and confusing. The first draft of the regulations included both consumer protection and environmental protection provisions, making the proposed regulations poorly focused and internally inconsistent. This was one of the principal reasons that the first draft of the regulations was rejected by the State Environmental Commission. The adopted regulations more clearly focus upon consumer protection but still include a few environmental protection provisions. In order to clarify the focus and intent of the adopted regulations, the State Environmental Commission added a section entitled “Intent of Provisions” which states “The intent is to protect persons who employ consultants concerning hazardous materials and wastes.”

Developing Certification Criteria and Examination Format and Content

Now that the regulations have been adopted, the NDEP is charged with the difficult task of evaluating certification criteria and developing the content and format for the examination. This is a complex and challenging endeavor due to the multimedia and multidisciplinary nature of most environmental work. Because many environmental problems involve soil, water, and air, multidisciplinary skills are typically required to address all aspects of a problem, and few individual environmental consultants are technically qualified to perform all of the work. With this in mind, developing a test to determine an individual’s technical qualifications as an environmental consultant is a very complex and difficult issue.

The NDEP is currently soliciting proposals from contractors to develop and administer the certification examination. The agency has considered two examination philosophies for the environmental manager classification. The first philosophy is to develop an examination which tests an individual’s knowledge of applicable State and Federal environmental and health and safety laws and regulations, and rely on other credentials such as professional registrations, educational background, and reputation to provide a measure of an individual’s technical qualifications. The second philosophy is to try to develop a two-tiered examination which covers both an understanding of environmental regulations and technical issues.

The Issue of Registration

During the development of the regulations, there was considerable discussion whether a professional registration should be required in order to become certified as an environmental manager. Proponents of this provision asserted that this is the best way in which to evaluate an individual’s technical qualifications. Registration proponents also contend that requiring a professional registration may also prevent individuals from offering services for which they are not qualified.

The proposed requirement for a professional registration is a complex and controversial issue because there are a number of environmental fields for which professional registration does not exist in the State of Nevada. For example, Nevada does not presently have a registration program for geologists. If a professional registration were required for certification as an environmental manager, this provision would adversely affect those environmental consultants in Nevada who are geologists. Similarly, a registration requirement would pose significant problems for other environmental professionals, such as industrial hygienists, for whom there is no professional registration program available either in Nevada or nationwide.

For the time being, the registration issue has been partially resolved by including professional registration as one of several acceptable qualification criteria for certification as an environmental manager, but registration is not a requirement. NDEP is also considering using a professional registration as a screening tool in reviewing certification applications. As presently proposed, NDEP may require an interview for those professionals without a professional registration. All applicants, with or without professional registration, would have to take an examination.

Future Options for the Registration Issue

Given the inherent difficulties in developing an examination which determines technical competence for a diverse body of environmental professionals, relying upon a professional registration as a measure of technical qualification in one’s field has some appeal. From a legal perspective, however, a state certification program cannot require a professional registration for which no state registration program exists. Until there is a Nevada registration program for geologists, it is unlikely that the environmental certification program will require registration. If a registration program for geologists is adopted, a professional registration could become a future requirement or at least a heavily weighted credential for certification as an environmental manager.

There are several geologic professional groups presently discussing the pros and cons of registering geologists in Nevada, and a professional registration program for geologists may be developed in Nevada in the next few years. It should be noted that developing a registration program for geologists in Nevada may be a controversial issue. The bulk of the geologists in Nevada are mineral exploration geologists who have conflicting views regarding registration. A recent poll conducted by the Geologic Society of Nevada of its membership revealed that 69 percent of the respondents, most of whom are mineral exploration geologists, were not in favor of registration.
The availability of a registration program for geologists would not solve the problem of what to do about other environmental professionals for whom there is no Nevada registration program available. Regardless of whether the environmental certification program places increased importance and reliance on the future upon a professional registration, this author feels that the NDEP will still have to maintain certification criteria for environmental professions without a professional registration program. The program may also have to include certification criteria for professionals for whom a professional registration program is available but who elect not to become registered.

It is this author's opinion that a professional registration should not be a required credential for certification as an environmental manager. The certification program includes criteria attesting to an individual's education, training, experience, and professionalism which should be adequate to assess that individual's qualifications. Assuming that the certification review process successfully identifies professionals and eliminates those applicants with questionable education, experience, or references, there should be no need for a professional registration. The very definition of a professional presumes that one does not perform services for which one is not qualified. The certification regulations are very clear on this issue and include a standard of practice which states that a certified consultant "shall secure the services of a qualified person to perform any part of his job which requires a level of service or skill which he is not qualified to provide".

Do the Regulations Provide Consumer Protection?
Although the environmental consultants certification program may improve the caliber of environmental consultants practicing in Nevada, it is this author's opinion that the regulations do not fully satisfy the legislative intent to provide consumers with protection from companies or individuals engaged in fraudulent and criminal hazardous waste disposal practices. The present regulations will mainly affect reputable companies and individuals in the environmental consulting industry. Faced with the reality of an examination on regulatory and/or technical issues, it is likely that many environmental consultants will commit significant review and preparation time studying for the examination. This may benefit the State and consumers by improving the overall quality of environmental consulting in the State.

However, for those inclined to commit fraud and criminal acts, registration requirement will have little meaning, and these regulations will have no impact upon their activities. Moreover, these regulations provide inadequately defined censure mechanisms or enforcement actions against those who provide environmental services without being registered. In my opinion, the only way to stop criminal practices, and thereby to provide consumer protection, is to advertise and enforce a very onerous program of fines and jail sentences for illegal hazardous waste disposal activities.

Ultimately, the issue of consumer protection for hazardous waste generators is burdened with complex legal questions. Given the structure of federal hazardous waste statutes and regulations, the responsibility for proper treatment and disposal of hazardous waste remains with the generator. Acting upon the advice of a state-certified hazardous waste consultant may not mitigate the generator's exposure to potential long-term liability for that waste. Moreover, the State's involvement in certifying environmental consultants may create a potential liability for the State.

Conclusions
Nevada's certification regulations for environmental consultants create landmark regulations with complex implications for the environmental consulting profession, the State, and consumers of environmental consulting services. In adopting these regulations, both the State Environmental Commission and the NDEP recognized that there are potential ambiguities, problems, and omissions in the adopted regulations, and that future modification of the regulations will probably be necessary. Among the many issues that may require additional consideration is the importance of a professional registration as a qualifying criteria for certification as an environmental manager.

Computer Use in Ground Water Science
Understanding Computer Use in Ground Water Science is the latest edition in the National Water Well Association (NWWA) Anthology Series.

Some 24 papers are included, covering topics such as aquifer analysis/pumping tests (10 papers), chemistry (2), contaminant transport (6), regional hydrology (3), statistics (1), and the unsaturated zone (3).

The anthology attempts to provide an overview of how computer technology is applied to solve ground water-related problems or to illustrate concepts.

To order Understanding Computer Use in Ground Water Science (Catalog No. K810), send complete payment of $31.25 ($25 to NWWA members), plus $3 for handling and shipping, to: NWWA Books, P.O. Box 182809, Dept. 017, Columbus, OH 43218. Credit card orders may be telephoned to (614) 761-1711.

Internship Opportunities
The National Air and Space Museum (NASM) offers 10-week internships to college undergraduate and first-year graduate students for Summer 1992 (June 9 through August 8). Applicants must be enrolled in a degree-granting program at an accredited college or university and have at least a 2.5 GPA.

To be considered for the program, applicants must submit a completed application form, an essay of between 500-1,000 words in length, an official transcript from post-secondary schools attended, and two letters of academic recommendation.

The deadline for completed application materials is February 15, 1992. Materials received after February 15 will not be considered. FAXed materials will not be accepted.

Applications may be requested from: Intern Coordinator, Education Division, MRC 305, National Air and Space Museum, Washington, DC 20560, (202) 786-2106, (202) 357-1505 (TDD).*

Economic Geology of Bolivia
Radisson Hotel, Denver, Colorado, February 7, 1992

A new compilation of data on the geology and mining in Bolivia is being released by the Ministry of Mining and Metallurgy under the direction of GEOBOL, the Bolivian Geological Survey. The Compendium will be officially presented to the international mining industry in connection with the National Western Mining Conference and Exhibition in Denver, Colorado. The presentation is set for Friday, February 7, 1992, at 2:00 in the Vail Room of the Radisson Hotel following the final luncheon of the NWMC. There is a nominal registration fee of $10 per person.

For further information on registration and to reserve a copy of the Compendium, please call Gustavson Associates (303) 443-2209 or FAX (303) 443-3156.*
STATE NET

TOPIC: ENERGY 
SUBTOPIC: AGRICULTURE - Misc. 
SUMMARY: Amends the Atomic Energy Act of 1954 to provide a nuclear regulatory commission for radioactive substances. 
STATUS: 11/25/93. INTROD. TO SENATE Committee on ENVIRONMENTAL WORKFORCE.

U. S. 1206: AGENCY: Interagency Task Force on Drug War. 
TOPIC: ENERGY 
SUBTOPIC: AGRICULTURE - Misc. 
SUMMARY: Requires the Secretary of Agriculture to provide for the disposal of radioactive waste. 
STATUS: 11/25/93. INTROD. TO SENATE Committee on ENVIRONMENTAL WORKFORCE.

U. S. 1208: AGENCY: Labor Department. 
TOPIC: ENERGY 
SUBTOPIC: AGRICULTURE - Misc. 
SUMMARY: Requires the Secretary of Labor to provide for the disposal of radioactive waste. 
STATUS: 11/25/93. INTROD. TO SENATE Committee on ENVIRONMENTAL WORKFORCE.

TOPIC: POLITICS AND GOVERNMENT 
SUMMARY: Extends the term of the United States Congress to the contiguous zone of the United States. 
STATUS: 11/25/93. INTROD. TO HOUSE Committee on MERCHANT MARINE AND FOREIGN COMMERCE.

U. H. 1586: AGENCY: Kingston. 
TOPIC: ENVIRONMENT, PROTECTION AND POLLUTION CONTROL 
SUBTOPIC: WATER QUALITY 
SUMMARY: Amends the Solid Waste Disposal Act to require the reporting of produced water from oil and gas exploration, development, and production. 
STATUS: 11/25/93. INTROD. TO HOUSE Committee on ENERGY AND COMMERCE.

U. H. 1587: AUTHOR: Kingston. 
TOPIC: OIL, GAS, PETROLEUM 
SUMMARY: Amends the Mineral Leasing Act with respect to the acquisition of a lease of a lands, or other solid waste disposal facility to obtain authorization from the affected local government before accepting waste generated outside the State. 
STATUS: 11/25/93. INTROD. TO HOUSE Committee on ENERGY AND COMMERCE.

TOPIC: ENVIRONMENT, PROTECTION AND POLLUTION CONTROL 
SUBTOPIC: SOLID WASTE 
SUMMARY: Amends the Solid Waste Disposal Act to require the issuance of a permit to any operator of a landfill, incinerator, or other solid waste disposal facility to obtain authorization from the affected local government before accepting waste generated outside the State. 
STATUS: 11/25/93. INTROD. TO HOUSE Committee on ENERGY AND COMMERCE.

U. H. 1587: AUTHOR: James. 
TOPIC: MINORUR QUEMAMENT AND PROTECTION SUBTOPIC: LAND 
SUMMARY: Directs the Secretary of the Interior to enact rules to prohibit the disposal of solid waste on or near the coastal barrier resource systems. 
STATUS: 11/25/93. INTROD. TO HOUSE Committee on MERCHANT MARINE AND FISHERIES.

U. H. 1586: AGENCY: James. 
TOPIC: ENERGY 
SUMMARY: Requires the Secretary of Energy to provide for the disposal of radioactive waste. 
STATUS: 11/25/93. INTROD. TO HOUSE Committee on ENERGY AND COMMERCE.

U. H. 1586: AGENCY: Thomas. 
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION SUBTOPIC: LAND 
SUMMARY: Provides for the protection of coastal communities impacted assistance agreements. 
STATUS: 11/25/93. INTROD. TO HOUSE Committee on CONSERVATION, RECREATION AND ENVIRONMENT.

PL. S. 889: AGENCY: Federal Register. 
TOPIC: ENERGY 
SUMMARY: REQUIRE: NUCLEAR ENERGY & RADIOACTIVE SUBSTANCES 
SUMMARY: Requires certain entities with facilities or operations to provide information to the National Nuclear Data Center. 
STATUS: 12/23/93. PUBLISHED.

PH. H. 1043: AGENCY: Dole. 
TOPIC: ENERGY 
SUMMARY: REQUIRE: NUCLEAR ENERGY & RADIOACTIVE SUBSTANCES 
SUMMARY: Requires certain entities with facilities or operations to provide information to the National Nuclear Data Center. 
STATUS: 12/23/93. PUBLISHED.

ID 999: AGENCY: Land Board. 
TOPIC: ENERGY 
SUMMARY: REQUIRE: NUCLEAR ENERGY & RADIOACTIVE SUBSTANCES 
SUMMARY: Requires certain entities with facilities or operations to provide information to the National Nuclear Data Center. 
STATUS: 12/23/93. PUBLISHED.

KY 7937: AGENCY: Cabinet for Health and Family Services. 
TOPIC: HEALTH AND SAFETY 
SUMMARY: Provides for the remedial recognition of radioactive materials inside the Commonwealth. 
STATUS: 12/23/93. PUBLISHED.

LA 949: AGENCY: Dept. of Revenue and Taxation. 
TOPIC: ENERGY 
SUMMARY: Amends Real Person Property rules and regulations in regards to oil, gas and associated wells, covers portion of the well subject to ad valorem taxation. 
STATUS: 12/23/93. PUBLISHED.

LA 937: AGENCY: Dept. of Revenue and Taxation. 
TOPIC: ENERGY 
SUMMARY: Provides for the protection of surface mining operations. 
STATUS: 12/23/93. PUBLISHED.

LA 929: AGENCY: Dept of Revenue and Taxation. 
TOPIC: ENERGY 
SUMMARY: Amends Real Person Property rules and regulations in regards to oil, gas and associated wells, covers portion of the well subject to ad valorem taxation. 
STATUS: 12/23/93. PUBLISHED.

NY 1525: AGENCY: Board of Oil and Gas Conservation. 
TOPIC: ENERGY 
SUMMARY: Requires new rules and amends rules pertaining to the issuance of oil and gas drilling permits, drilling procedures, and the classification of waste gasesposes, the rinse of reports, logs, and other information, in outdoor waste prevention and saving requirements, spill notification requirements, regulations, hydrocarbons, and associated rules, requirements. 
STATUS: 12/23/93. PUBLISHED.

NY 1525: AGENCY: Commissioner of Conservation. 
TOPIC: ENERGY 
SUMMARY: Amends Real Person Property rules and regulations in regards to oil, gas and associated wells, covers portion of the well subject to ad valorem taxation. 
STATUS: 12/23/93. PUBLISHED.
STATE NET (continued)

TODAY IN WASHINGTON...

F. B. "Ted" Mullin, CPG 1716

This was the time for Congress to take their annual Holiday recess. All has been relatively quiet on the legislative front.

Not so with the Administrative Branch of the government however. Proposed Rules and Regulations are being ground out by the mills of the EPA and other agencies.

On December 3, 1991, Vol. 56, No. 232, the Federal Register contained the proposed new rules (349 pages) to reduce the adverse effects of acid rain. Of course, the notification and scheduling of hearings was closed before the holidays so as to afford opportunity to respond and attend. The hearings were scheduled at various locations on January 6, through 10, 1992. At least you will have until February 3 to provide written response. These regulations involve 40CFR parts 72, permits; 73, the allowance system; 75, continuous emissions monitoring; and part 77, excess emission penalties regulation.

For information, contact Brian McLean, Director, Acid Rain Division (ANR-445) U.S.E.P.A., 401 M St., S.W., Washington, DC 20460, (617) 641-5377.

So much for that. A Happy New Year to all.*

LETTER TO THE EDITOR

Mesa State College Geology Department now offers courses on hydrogeology and engineering geology. Our library, however, lacks journals relating to groundwater and engineering geology because of lack of funds to purchase back issues. Many students are deprived of these journals for their research projects or term papers. If any of you have back issues of any groundwater or engineering geology journals and are willing to donate these items, please send these journals to: John V. Tomlinson Library, Mesa State College, P.O. Box 2647, Grand Junction, CO 81502.

Additional inquiry can be made contacting Ms. Julie Woods, Library Director, at the above address. Her telephone number is (303) 248-1862.

Thank you and we appreciate your help.*

Wetland Design for Mining Operations

Practical design methods for constructed wetlands for the on-site treatment of acid/metal drainage is the topic of the SME short course, Wetland Design for Mining Operations, February 22-23, 1992, Phoenix, Arizona, prior to the SME Annual Meeting and Exhibit.


Course instructors include: Thomas R. Wildeman, Colorado School of Mines; James J. Gusek, Knight Piesold Co. of Denver; and Gregory A. Brodie, Tennesee Valley Authority. For additional information contact Meetings Dept., SME, P.O. Box 625002, Littleton, CO 80162, (303) 973-8550, Fax (303) 979-9461.*

Environmental Impact Statement

In June of 1991, the Medicine Bow National Forest began scoping for an environmental analysis on the impacts of oil and gas leasing on the Thunder Basin National Grassland.

The Forest Service and the Bureau of Land Management are cooperating on the environmental analysis as joint lead agencies. The Bureau of Land Management with expertise in minerals and geology has developed a Reasonable Foreseeable Development (RFD) Scenario to be used in predicting environmental impacts as a result of future oil and gas leasing. These interests in reviewing the RFD may be seen by requesting a copy from the Forest Supervisor, Medicine Bow National Forest, 2468 Jackson, Laramie, WY 82070.

The Draft Environmental Impact Statement (EIS) was originally scheduled to be available for public review in January 1992. Because of the large amount of analysis involved the Draft EIS will now be available in March 1992. The Final EIS is estimated to be completed in October 1992. For more information contact: Terry Ollis, Oil & Gas Team Leader at (307) 745-6971.*
Mineral And Water Rights Appraisal: Update

William V. Knight, CPG 153

In 1989, Congress passed the Financial Institutions Reform, Recovery and Enforcement Act, sometimes referred to as the "Savings and Loan Bailout". Title XI of this legislation requires the states to license real estate appraisers who appraise real properties in transactions involving federally insured institutions. The significance of this to geologists is that the definition of real property includes "rights issuing out of, annexed to, and exercisable within or about land." (Black's Law Dictionary) Among such rights are mineral and, in some western states, water rights. These have commonly been appraised for banks and others by geologists and/or engineers.

All of this has been reported, and commented on, from time to time, in The Professional Geologist. Also, our various Sections have been alerted to watch for implementing legislation in their states. Some have been very active in this. Others have not. As a result, some of the states incorporate in their statutes some provision to exempt mineral and, in some cases, water rights from their definition of real property for the purposes of this legislation.

AIPG's Governmental Affairs Subcommittee on Professional Affairs, chaired by Colorado's Logan MacMillan, and assisted by Colorado lobbyist, Lynn Graf, has been working very diligently and effectively to preserve this field of employment for geologists. They deserve our appreciation. In addition, we have had close cooperation and assistance from the National Society of Professional Engineers (NSPE), who recognizes the importance of this issue to both geologists and engineers. While AIPG is taking the lead, NSPE's considerable lobbying strength has been made available to us.

The current situation is this: Several of the states have enacted legislation to implement the federally mandated requirement. Some of these have exempt mineral and water rights. However, some have not. Meanwhile, at the federal level, six agencies have been developing rules which they either have proposed (one), or intend to propose shortly (five). AIPG has commented on the proposed rules and expects to comment on those to come. None of the proposed rules has yet been finalized. In addition, AIPG is offering to assist all of the agencies in writing their rules. The reception has been good. Concurrently, bankers have been developing interim policies to follow until rules are forthcoming from the agencies which oversee them. AIPG has begun working to influence the banks to recognize the historic position of geologists in appraising mineral and water rights.

The six agencies are:
- Federal Deposit Insurance Corporation
- Federal Reserve Board of Governors
- National Credit Union Administration
- Office of the Comptroller of the Currency
- Office of Thrift Supervision
- Resolution Trust Corporation

All of these, except the Resolution Trust Corporation, are bank regulators and, as such, are members of the Federal Financial Institutions Examination Council (FFIEC). One of FFIEC's creations is the Appraisal Subcommittee, which works closely with the Appraisal Foundation. The Appraisal Foundation is a private sector, not-for-profit, organization which has established standards, qualifications and examinations for various kinds of appraisers, e.g., real estate, jewelry, etc. In a highly irregular move, it was specifically named in the federal legislation as the standard-setter for real estate appraisals. AIPG has requested the Foundation's standards documents for examination at the January meeting of the Executive Committee.

AIPG's current official policy on appraisals is: "AIPG's position is that appraisals of interests in real or personal property should be performed by those best qualified. Thus, appraisals of mineral, or other geologically related interests should be performed by geologists, or in some cases engineers, who are qualified to do so by appropriate training and experience. Federal and State laws which govern such appraisals should reflect this philosophy."

This policy is being pursued vigorously.

This issue affects many of our Members and stands to affect many more in the future. All are encouraged to inquire of their Section Regulatory and Legislative Committee as to the situation in their state. If geologists are not adequately provided for, Members should volunteer to help their committee Chairman to correct the situation. Headquarters can provide information and advice, but state issues are most effectively addressed at the state level. Experience has shown that direct interference or influence from outside a state tends to be counterproductive. Meanwhile, National is working hard at the federal level.

Good luck!!

Innocent Landowner Defense Amendment (H.R. 1217)

This proposed legislation would amend the Comprehensive Environmental Response, Compensation and Liability Act (1980) to define more clearly the requirement that a purchaser of real estate has made "appropriate inquiry" into previous ownership and use of that property by obtaining an "environmental audit." The bill was introduced originally in 1989 by Rep. Weldon (R-Penn.). The 1991 version contains language addressing who conducts the audit or assessment, that is, "environmental professional," but is rather general about the qualifications of that individual. AIPG recommends that geologists be specified in the bill, as engineers and attorneys have been.

There is no plan for imminent action, but there is some interest in the bill due to related banking issues. Rep. Weldon's legislative associate for environmental issues is interested in receiving commentary. Contact Eunice Groark, 316 Cannon Bldg., 1st St. & Independence Ave., SE, Wash., DC 20515. (202) 225-2011. Please send a copy of your commentary to AIPG Headquarters, Attn: HR1217.

AGI Geosciences Advocacy Program

Dr. Craig Schiffries has accepted the position of Advocate of the AGI Geosciences Advocacy Program. Dr. Schiffries began his duties January 2, 1992.

Schiffries, recently on the staff of Senator Patrick Leahy, holds a Doctorate in Geology from Harvard University. In addition to having a Bachelor's Degree from Yale (double major in geology/geophysics and economics/political science), Schiffries holds an Honors B.A. in philosophy, politics, and economics from Oxford University (London). His Capitol Hill experience includes nine months as the 1990-91 GSA Congressional Fellow, during which he served on the staff of the Subcommittee on Technology and the Law, Senate Judiciary Committee.

AIPG strongly supports, and participates in, this program and is represented on the Advisory Committee.
For the New Year

Why is it that any number of the general populace can pass themselves off as "amateur geologists"? (I've chosen to accept the synonyms incompetent, fumbler, blunderer and unskilled for the word amateur, but that doesn't slow them down.) There are any number of people out there who think that living in the environment makes them an expert in it. We all know of the problem with engineers (who can solve any problem, even the wrong one), but there also exist, for instance, the PhDs in optics who predict the weather (and smile when people believe it), and when they speak (more and more often) on any scientific subject (including geology), are assigned expert status by the media/public (same thing). Even worse, we have those nebulous 'environmentalists' and political figures who speak knowingly on complex geologic phenomena at the drop of a vote.

We can laugh, but in this age where every kid's an all-star and dogs and goats can be classified gifted and talented, and a general public predilection exists toward assigning expert status to anyone who makes politically/environmentally correct sounds (same thing, unfortunately), it's kind of sick. It's making my life difficult. And yours too.

Global warming, for instance. Global warming/cooling has been going on for eons. What's the panic? Must we change our entire way of life because some dim-bulb who can't understand cause and effect just found out about geologic time? The hole in the ozone layer. The poles have been melting for eons, too, and the hole's been changing as well, but we found it five years ago and learned how to measure it, so let's all believe predictions based on 1/1 zillionth of the data base. Nitrates and blue babies (which brings up the question(s) of hazard levels and how safe is safe). Radon. Plunging ground water levels leading to "disappearance" of the resource. Tell the zealots that water doesn't go away, it just moves. Locally, we have rising "concern" (a nebulous term used to "raise our consciousness") regarding the "unknown" hazards of building over karst to humanity and the ground water resource. Two years ago, they didn't know what ground water was (they still don't have a clue regarding karst), and now they're legislating the zoning gospel according to the "Activists" (another neat term).

And what about wetlands? (another type of question used to muddy the waters, along with "can you guarantee that?".) And don't you just love the no-risk mentality?

Have you noticed that the positivity of people's statements is inversely related to their understanding of the subject?

Spare me the amateurs, but help me guard against becoming one. We have to speak up lest the clods of the world usurp what (fragile and tenuous) power we may have. I find it a challenge just trying to stay abreast of what might be classified as environmental geology, not to mention trying to fight off the unethical others who invade our turf, at the same time trying to keep my own mouth shut regarding things that I understand only imperfectly.

These are challenging times to be a consultant, and not only from the point of view of hammering out a living. Much of the work we have to do carries no current economic value, but it's part of our job to try, at least, to keep the ship of state on an even keel and course. This means we have to speak up—do the public thing. Like it or not, we're into education of the public. In my case, it's become a trap. I tend to get involved. There's no money in it, but it certainly keeps life from getting boring.

Seems to me there's enough extra-geologic material out there for a newsletter, let alone a column. Any ideas? Please feel free to communicate by mail, phone or fax (908) 735-2160. HAPPY NEW YEAR!*

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Consultants who provide preliminary site assessment or underground storage tank services will be listed in the second edition Directory of Preliminary Site Assessment and Underground Storage Tank Consultants. Work is starting on the new directory at this time and on April 1992 publication date is anticipated. The directory will again be sponsored by ASFE/The Association of Engineering Firms Practicing in the Geosciences. Sponsors have been increased to include HWAC/an association of engineering and science firms practicing in hazardous waste management, American Consulting Engineers Council, American Institute of Professional Geologists, Association of Engineering Geologists, and Association of Ground Water Scientists and Engineers. Only members of these organizations will be listed.

As the 1991 version, the new edition will provide an alphabetized listing of all firms, followed by a state-by-state listing. Information also will be provided about the services provided by these consultants, the need for due diligence, techniques for selecting a consultant, and sources of additional information.

According to ASFE Executive Vice President John P. Bachner, "We will continue the policy of providing the directory free of charge, except that we ask for $1.00 to help offset part of the cost of postage and handling."

He said that ASFE will this year permit display advertising in the directory, but only on the part of organizations that offer something other than consulting services, e.g., insurance or replacement storage tanks. The cost of producing the directory is borne principally by the firms that are listed.

More information about the 1992-1993 Directory of Preliminary Site Assessment and Underground Storage Tank Consultants can be obtained by contacting ASFE at 8811 Coleville Road, Suite G105, Silver Spring, MD 20910, (301) 565-2753.*
APPLICATIONS RECEIVED - (as of December 31, 1991)

Applicants for certification must meet AIPG's standards as set forth in its Bylaws on education, experience, competence, and personal integrity. If any Member has any factual information as to an 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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240 Forest park, Lexington, KY 40509-1192. Sponsor: C. Edward Harris, Gene Brandenburg, Tim Perritt.

In Volume 28, Number 12 - November, 1991 issue of The Professional Geologist the following applicant's name was spelled incorrectly:

FOULTZ, Walter L.,

Candidates for Certification

GANNON, J. Michael
2118 Rosemont Drive, Coralville, IA 52241. Sponsor: Bob Brac GER, Jesus Juquin.

HINCE, Eric C.

MC VEY, Michael D.

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TWEDDALE, John B.
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JANUARY 1992 • The Professional Geologist
AIPG 1992 ANNUAL MEETING

SOUTH LAKE TAHOE, NEVADA
September 27 - 30, 1992

THEME: GEOLOGICAL REASON, A BASIS FOR DECISIONS AFFECTING SOCIETY

HIGHLIGHTS:
- Five technical sessions over three days (Monday - Wednesday)
- Business meetings scattered from Monday - Wednesday
- Five field trips, tied to theme sessions
- Three workshops, one tied to field trip
- Keynote Speaker: T S Ary, Director, U.S. Bureau of Mines

TECHNICAL SESSIONS:
(1) Modeling Geological Phenomena - from ore reserves to acid rain to global warming: Geo-statistician, Global Warming Pro, Con. Moderator: Jim Taranik, President, DRI.
(2) Role of the Geologist in Predicting Earthquakes - geotechnical investigations in the West, East, and in between. Moderator: Steve Wesnousky, UNR.
(3) Role of the Geologist in Siting and Cleaning Up Waste - including what should be done with nuclear waste, municipal garbage, and mine tailings: DOE official/State of Nevada official/EPA official. Moderator: Don Haney, Kentucky G.S.
(4) Geological Common Sense Regarding Environmental Hazards - from asbestos to radon to water and air quality: EPA official/Health Scientist/Geologist.
(5) Management of Federal Lands - wilderness issues; new leasing, claim, and reclamation policies and laws; plus impact of endangered species on geologists: BLM official/Environmentalist/Mountain States Legal Foundation or Pacific Legal Foundation.

Each technical session will consist of three invited speakers giving 20-minute presentations, followed by a panel discussion, with written questions from the audience, then poster sessions with both volunteered and invited contributions.

FIELD TRIPS:
Pre-Meeting Trips:
- (1) - 2 days: fits with Theme Session 3, Yucca Mt. Beatty
  (Saturday from Las Vegas to Lake Tahoe, Sunday)
- (2) - 2 days: fits with Theme Session 2, Loma Prieta
  (Saturday from San Francisco to Lake Tahoe, Sunday)
- (3) - 2 days: fits with Theme Session 5, Sleeper plus Cove-McCoy
  (Saturday from Reno to Lake Tahoe, Sunday)

Post-Meeting Trips:
- (4) - 1 day: fits with Theme Session 4, Virginia City (Thursday from Lake Tahoe)
- (5) - 3 days: tied to Workshop 3 and fits with Theme Session 1, Carlin
  (Friday or Saturday at Lake Tahoe to Winnemucca/Elko, to Reno on Monday)

TENTATIVE WORKSHOPS:
- Rights and Responsibilities of the Professional Geologist (Tom Erwin)
- Preparation for the California Registration Exam
- Challenges with Deep Open Pits - Acid Rock Drainage, Mine Dewatering (Earl Abbott, Jeff Parshley)

For information on registration, exhibiting, or presenting a poster, please contact:
Jonathan G. Price, Nevada Bureau of Mines and Geology, Mail Stop 178, University of Nevada, Reno, Nevada 89557-0088, (702) 784-6691 • FAX: (702) 784-1709