

# Minnesota Ground Water Association

Volume 10, Number 3: October, 1991

## President's Page

### Caution! Read before opening

As the Minnesota Ground Water Association nears the end of another year and as I draw near the end of my tenure on the Board (initially as Secretary then President Elect/President) I find myself wondering how good a job we are doing on serving the needs and interests of our membership. It is easy to dwell on perceived successes and clearly the MGWA has sponsored or co-sponsored many successful and significant meetings and conferences. As an example, the fall field trip (report on page 2) was enjoyed by over 70 people. A few more attendees and the logistics of herding people on and off the buses would have been unmanageable.

Similarly, our conference last fall on Risk Perception was a great success. The MGWA has co-hosted the Birdsall Lecturer and Darcy Lecturer as well as assembling speakers on a variety of subjects over the past years.

However, throughout, one element has been missing. There has been a noticeable absence of feedback, input, suggestions, or other pleas from the membership at large about the utility and value (if any) of our programs. The MGWA has a large and diverse membership that does support the programs developed and produced by the board and some of our members have contributed time and energy to the success of the activities. With a membership of over 550 it would seem there should be more exchange of ideas and concerns. As your new officers assume their duties I am confident they would welcome your participation not only in attending MGWA functions but also in suggesting topics, speakers, meeting locations, and so on.

In this newsletter (page 17) you are asked to cast a vote for new

board members for positions of Secretary and President-Elect. Although there are only single candidates for each office, (that's another story in itself) you are encouraged to indicate your approval of that person or write in another if you so desire. A concerted write-in campaign could likely produce a winning candidate based on recent election turnouts! This ballot is a chance for you to indicate your approval or disapproval of board actions and selections. **Don't wait, vote now.**

Although a bit premature, I would like to express my thanks to the current board members; President-to-be Sheila Grow, outgoing Secretary Bob Beltrame, and Treasurer Susan Price, for their help and support in assembling programs and plans over the past year.

Jan Falteisek has done an admirable job as editor of the Newsletter and has been persistent but merciful in reminding me when President page notes are overdue. Jeanette Leete has handled a myriad of indispensable tasks relating to mailings, name badges, membership roles, and newsletter preparation. We would truly be a ship without a rudder were it not for Jennie's seemingly boundless energy for organization and management.

Lastly I would like to thank all of you, our members who support and participate in the activities of this organization. The MGWA is a viable organization thanks to your support. I encourage you to continue in your participation, and even to increase it as admonished above. Thanks to all of you for a fun and rewarding year.

- Gordie Hess, MGWA President

## Fall Meeting

Mark your calendar and send in the registration form on page 18 for the Minnesota Ground Water Association November Meeting - Technology Updates - Innovations in Field Screening Methods and Applications of Geotechnical Methods to Soil Stratigraphy. Our Fall Meeting will be held November 26 at the Earl Browne Center, University of Minnesota, St. Paul Campus from 1:00 pm to 4:30 pm. Our social hour will follow the technical sessions.

This is your chance to learn some new and innovative methods in field screening using immunoassay methods, nitrate metering, and applications of geotechnical methods to geologic investigations and stratigraphic interpretations. Case studies and field application examples will be included.

This will be the last MGWA meeting of the year and a chance to learn about some recent technological developments that may be just the ticket for that next project of yours. We look forward to seeing you on the 26th!

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## Fall Field Trip Frolic

More than seventy people enjoyed a beautiful fall weekend in southwestern Wisconsin/south-eastern Minnesota as participants in the Fall Field Trip and Seminar sponsored by the Minnesota Ground Water Association, Minnesota Chapter of AIPG, and Wisconsin Ground Water Association.

Attendees gathered at the LaCrosse Radisson Hotel for the Friday afternoon seminar. Presentations included an overview of the bedrock geology in the area, glacial geology and geomorphology of the Mississippi River Valley, specific case studies and investigations of ground water contamination issues, and a field trip preview. Speakers were Nancy Jannik (Winona State University), Bob Baker (University of Wisconsin River Falls), John Tinker (University of Wisconsin Eau Claire) and Tom Evans (Wisconsin Geological Survey).

The Friday evening banquet was preceded by a social hour where participants had a chance to talk with seminar speakers, renew old acquaintances, and make some new ones. Following the buffet banquet, folks warmed up for the field trip with some dancing in the hotel lounge, pub crawling in LaCrosse, or a swim in the pool at the hotel.

Saturday morning broke cool and clear with some nip in the air but a genuine feel of anticipation for the chance to get out and look at some rocks again. The first stop was at a highway overlook south of LaCrosse where field trippers were greeted by hot coffee and doughnuts as Tom Evans of the Wisconsin Geological Survey described the exposed section (left-hand photo).

Stop #2 was a large quarry (right-hand photo) where everyone found something of interest from fossils and rip-up clasts to mini-alluvial fans in the sediments in the ditch. Following stop #2 the sound of rocks rolling around in the bus could be heard at every bump and corner. Midday found the group overlooking the City of Winona from Garvin Heights where a catered lunch awaited all. After an overview of features around Winona the buses headed west to view outcrops and aspects of the geomorphology of carbonate terrain.

The final stop of the day was at a beautiful exposure of Prairie du Chien-Jordan rocks with features of interest to all, including a generous supply of liquid refreshments. Bruce Bloomgren of the Minnesota Geological Survey provided field expertise for the afternoon stops. After a lengthy debate over the location of the Jordan/PDC contact, time came for the return to LaCrosse. The combination of a beauti-

ful afternoon, interesting rocks, and thirst quenchers made for a group of trippers reluctant to leave the outcrop. Upon returning to LaCrosse, the vote was unanimous to "Do it Again Next Year."

This trip was a great time to view the rocks we all write about and describe in our reports on bedrock aquifers and to get together with others in an informal, fun event with the added benefit of actually learning something. Watch for the announcement next summer for the 1992 field trip. Don't miss it!

- Sheila Grow, MGWA  
President-Elect

## Birdsall Lecture Tour Summary.

Minnesota's ground water professionals turned out in greater numbers for the Birdsall lectures given by Dr. Robert Farvolden than in any of the other 23 cities, with the exception of Saskatoon. This is an indication of the great interest in hydrogeology in the Twin Cities area and of our ability to "get the word out".



Printed on recycled paper



Field Trip pictures by Gordie Hess.

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## Minnesota Ground Water Contamination Susceptibility Map

A four-color map (32"x49") illustrating the regions of Minnesota where ground water resources are most and least susceptible to contamination is available from Minnesota's Bookstore. The map, while depicting areas where ground water may be at risk, is not intended as a basis for decision-making about specific sites because of its broad scale and limited resolution. Rather, the map is best suited as a general planning, management, and educational tool. For example, a local government may decide, based on information from the map, that local ground water resources need to be studied more fully to ensure that local activities do not endanger the quality of ground water.

Development of the map by the Minnesota Pollution Control Agency (MPCA) was made possible through funding from the United States Environmental Protection Agency under the Federal Clean Water Act. The initial printing of the map was made possible by a grant from the Legislative Commission on Minnesota Resources. To find out more about how the map was

made, contact Eric Porcher, MPCA at (612)296-7753. Ground water susceptibility mapping at a county or regional scale is now being done by the Minnesota Department of Natural Resources, continuing mapping begun by the Minnesota Geological Survey. Maps of pollution susceptibility have been prepared for Scott, Winona, Olmsted, Hennepin, Dakota and Washington counties.

The state map sells for \$4.95 plus tax and is available from Minnesota's Bookstore by mail, telephone or fax. For express delivery (one to two weeks), place a credit card order by phone or fax. Call (612)297-3000 in the Twin Cities area or Minnesota toll-free 1-800-657-3757. For fax orders, call (612)296-2265. Please include the credit card expiration date.

Mail orders are accepted, with checks payable to the State of Minnesota. To order, indicate stock number 12-56 and send \$4.95 (Minnesota residents add 6.5% sales tax), and \$2.00 for postage and handling. Mail orders to Minnesota's Bookstore, 117 University Avenue, St. Paul, Minnesota 55155. Allow four to six weeks for mail order delivery.

*-Eric Porcher, Minnesota  
Pollution Control Agency*

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## Environmental Job Market to Be Explored

The National Water Well Association will sponsor an Environmental Job Fair in Houston, Texas November 22-23.

Companies in the environmental field will display literature describing their employment opportunities. Interviews will be conducted at the discretion of the exhibitors. NWWA suggests that attendees bring multiple copies of their resum.

Seminars will provide techniques to polish career-seeking skills. Sessions being planned include how to market yourself in today's economy, write a professional resum), evaluate potential employers, and fine-tune technical writing.

The Job Fair fee is \$25 per person. For more information, contact NWWA at (614) 761-1711.

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## Changes

As of August 1, 1991, the new IGWMC address will be:

International Ground Water  
Modeling Center  
Institute for Ground-Water Research and Education  
Colorado School of Mines  
Golden, CO 80401-1887  
(303)273-3103  
(303)273-3278 (FAX)

As of August 19, 1991 the address of the St. Paul Industrial Hygiene Office and the St. Paul District Office of **Delta Environmental Consultants, Inc.** is:

3900 Northwoods Drive  
Suite 200  
St. Paul, MN 55112  
(612)486-8022  
(612)486-8021 (FAX)

**Barr Engineering** has relocated to offices on Normandale Lake:

Barr Engineering Company  
8300 Norman Center Drive  
Minneapolis, MN 55437-1026  
(612)832-2600  
(612)835-0186 (FAX)

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## ASFE Releases Pocket Excavation Guide

*The ASFE Pocket Guide to OSHA Excavation Regulations* has been published by the Association of Engineering Firms Practicing in the Geosciences (ASFE). The 19-page reference highlights requirement of the Occupational Safety and Health Administrations (OSHA's) standards for excavation and trenching operations.

The pocket guide outlines general requirements for complying with the new standard, including planning for on-site safety; methods for protecting employees against cave-ins, and safeguarding against secondary hazards, such as falls, falling loads, and mobile equipment.

The guide also discusses related issues, including hazard communication, employees' access to medical and exposure records, recordkeeping, and administration of state occupational safety and health programs. ASFE's pocket guide also lists states with approved plans, related publications, and U.S. Department of Labor OSHA Regional Offices.

*The ASFE Pocket Guide to OSHA Excavation Regulations* originally was published by OSHA. Copies are available for \$5 each from ASFE, 8811 Colesville Rd, Ste. G106, Silver Spring, MD 20910; (301)565-2733. Remittance must accompany each order.

*-reprinted from Water Well Journal, September 1991*

*October, 1991*

## Hydrogeology: It Is

by David A. Stephenson,  
GeoWest Group, Inc. Scottsdale,  
AZ, Bruce L. Cutright, Dames &  
Moore, Milwaukee, WI, and  
William W. Woessner, University  
of Montana, Missoula, MT

### Introduction

The discipline of hydrogeology has been declaimed, criticized, and sometimes dismissed within the geoscience community as too useful, too applied. Maybe this is so, in classical terms. But the fact remains: Hydrogeology is an interdisciplinary science within the geosciences. Concepts and terminology from nongeoscience disciplines incorporated into hydrogeology are perhaps more numerous than for other geosciences. However, as Alvarez (1991) has noted, "There seems to be a close association between interdisciplinary science and revolutionary developments in geology..." The purpose of this article is to present the role of hydrogeology within the geosciences, to discuss the phenomenal growth in hydrogeology, current and future directions for the science, and several issues relating to supply and demand.

In spite of the employment demands for hydrogeologists and society's needs for hydrogeology, what is surprising is the volume of argument in geoscience circles as to the probable longevity of this discipline. In the past and some extent continuing today, many in the academic community have argued about the appropriateness of hydrogeology being taught in a geoscience department (vs. an engineering department). Most geologists historically have been the interpreters of Earth history - a view that remains entrenched today. Geology periodically has seen a succession of applied areas, including ore deposits, petroleum geology, hydrogeology, and "global change." The experience for the traditional geologist includes envy (usually short term) to see so many dollars for research and possibilities for student employment pass them by, disappointment to see

many opportunities for outstanding basic research lost in the stampede to solve industrial problems, and vast retrenchments in schools and programs once the bubble bursts (as it has in ore deposits and petroleum). Will it be any different with hydrogeology? If hydrogeology's fate is the same as that of ore deposits and petroleum, then the traditionalists' view of these applied fields will have been correct.

### Hydrogeology Defined

There is considerable confusion about differences between such terms as "geohydrology" and "hydrogeology". Many recent authors support a concept that geohydrologists are more engineering oriented in that they deal with aquifer mechanics. Hydrogeologists deal with a broader array of topics, including, but not limited to, ground water flow-system analysis. We offer the following definition of hydrogeology: the interdisciplinary science of the study of water and its interrelation with rocks, soil, and humans, with an emphasis on ground water. We supplement this with discussions from several other sources:

Domenico and Schwartz, 1990: "...the study of the laws governing the movement of subterranean water, the mechanical, chemical, and thermal interaction of this water with the porous solid, and the transport of energy and chemical constituents by the flow."

Fetter, 1988: "...the interrelationship of geologic materials and processes with water."

Meyer et al., 1988: "...an interdisciplinary science that is dependent upon many branches of the physical, chemical, and biological sciences. It is an offspring of geology and hydrology..."

AGI Glossary of Geology (Bates and Jackson), 1987: "The science that deals with subsurface waters and with related geologic aspects of surface waters."

Narasimhan, 1982: "...the discipline concerned with those geologic processes that are influenced by water."

The common theme in all the above is that hydrogeology requires geologic understanding.

### Hydrogeology Today

Hydrogeologists work for federal and state research groups, agencies, or surveys, for hundreds of private environmental and engineering consulting companies, in environmental groups for major industries and special interest groups, and as teachers and researchers in colleges, universities, and national laboratories. The actual number of scientists working in the field of hydrogeology is difficult to ascertain for two reasons: (1) all hydrogeologists do not belong to a single professional organization and (2) because of the interdisciplinary nature of hydrogeology, it is difficult to separate the traditional geologically trained professionals from those associated with other related disciplines.

In the hydrogeological community, two major kinds of hydrogeologists can be broadly identified: practicing and research oriented. The research group includes those professionals who are exploring the role of ground water as a geologic agent. They are looking at such issues as single- and multi-component flow and the inter-related processes of mass and energy transport. Many researchers are concerned with the mathematical description of flow and transport phenomena.

The practitioners are applying a rapidly increasing technology and scientific understanding to contemporary problems. The dominant problems concern water quality, closely followed by water supply. Current highly visible efforts are being made in: contaminant hydrogeology; conflicts and competition for supply between agriculture, municipalities, industry, and recreation; aquifer mechanics and ground-water-surface-water interaction; and consequences of mining ground water.

Increasingly, hydrogeologists need to be versed in geochemistry or to team with geochemists and other professionals to characterize the hydrogeologic system. The focus in hydrogeology has shifted from ground-water flow analysis to chemical transport (Konikow and Papadopoulos, 1988).

### Future Directions

Much of the recent growth in hydrogeology has been related to the regulatory drive for environmental protection and cleanup. Remediation and cleanup issues in North America, Europe, and elsewhere will be addressed for the next 50 or more years. As a result, a variety of research efforts will evolve, focusing on the behavior of fluids in all geologic environments and particularly relating to transport of chemicals. An issue confronting hydrogeological practitioners and researchers alike is the restoration of contaminated aquifer systems to required cleanup levels. Travis and Doty (1990) found that, on the basis of the past 10 years of rather unsuccessful remediation efforts, hydrogeologists may be required to concentrate on plume containment rather than on aquifer system restoration.

Although site-specific studies will be demanding, interest in regional-scale issues will be renewed. Moreover, the interrelation among areas of classical concern - petroleum, ore deposits, diagenesis, tectonics, sedimentology, and hydrogeology - will expand. Toth (1988), for example, concluded that "factual knowledge concerning petroleum migration is woefully deficient." Toth's research is one example that will certainly lead to additional emphasis on hydrogeological approaches to petroleum exploration.

The use of computers and the application of computer models to ground-water systems has increased greatly during the past 10 years. The linkage of flow, transport, and reaction models will become more common. Modellers of ground water systems have felt that the complexity of the models has progressed beyond the capacity of current field techniques to gather reliable data. New field techniques must be developed that provide spatially distributed data rather than point data for hydrogeological analysis. Economically efficient remote-sensing techniques will be an area of great impact over the next 10 years.

Future work will continue to focus not only on characterizing the

behavior of hundreds of organic compounds in different flow regimes but also on the testing of methods to treat affected groundwater. Some ground-water research will be led by hydrochemists developing techniques to fingerprint ground water and to date water using scales of weeks instead of hundreds to thousands of years.

Our applied research will begin to expand from hazardous-waste sites to further examination of the consequences of cumulative impacts from dispersed or nonpoint sources (e.g., agricultural chemicals, multiple small-scale mining efforts, and waste disposal of domestic wastes by septic systems). Emphasis will also continue on the management of wastes for extreme time periods (i.e. radioactive wastes) and in identifying the pathways and mechanisms for the transport of such wastes. Research efforts will continue to focus on flow and solute transport in fractured systems.

Hydrogeologists are also involved in internationally emerging concerns about global climatic change. Paleohydrogeology and evaluations of potential impacts of hydrologic systems from climatic changes are being investigated.

### A final look

The future of hydrogeology will be one of continuing change and development, but throughout it will be led by broadly based individuals with a through background in geology. The strength of the discipline is in this understanding of the connection between earth processes and fluid systems.

Hydrogeologists have not been highly successful in communicating about their work either to the public or to the geosciences community. This public-relations task deserves attention.

### References Cited

- Alvarez, W., 1991, The gentle art of scientific trespassing: *GSA Today*, v. 1, p. 29-34.
- Bates, R.I. and Jackson J.A. editors, 1987, *Glossary of geology* (third edition): Alexandria, Virginia, American Geological Institute, 788 p.

Fetter, C.W. 1988, *Applied hydrogeology* (second edition): Columbus Ohio, Merrill, 592 p.

Konikow, L.F., and Papadopoulos, S.S., 1988, Scientific problems, in Back W., et al., eds., *Hydrogeology*: Boulder, Colorado, Geological Society of America, *The Geology of North America*, v. O-2, p. 503-508.

Meyer, G. Davis, G., and Lamoreaux, P. E., 1988, Historical perspective, in Back, W., et al., eds., *Hydrogeology*: Boulder, Colorado, Geological Society of America, *The Geology of North America*, v. O-2, p. 1-8.

Narasimhan, T.N., editor, 1982, Recent trends in hydrogeology: Geological Society of America Special Paper 189, 448 p.

Toth, J. 1988, Ground water and hydrocarbon migration, in Back, W., et al., eds., *Hydrogeology*: Boulder Colorado, Geological Society of America, *The Geology of North America*, v. O-2, p. 485-502.

Travis, C.C., and Doty, C.B., 1990, Can contaminated aquifers at Superfund sites be remediated?: *Environmental Science and Technology*, v. 24, p. 1464-1466.

*-reprinted with permission of the authors from GSA Today, May, 1991*

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## Minnesota Ground Water Protection Profile

U.S. EPA - Region 5 has assembled a profile of Minnesota's Ground Water protection programs, including regulations, planning reports and other materials. The *Minnesota Comprehensive Ground Water Protection Profile* is intended to be updated as programs change. The initial update is scheduled for December 31, 1991 and is intended to include updates, comments, corrections and suggestions from Minnesotans. For further information contact:

Glenn Wittman  
EPA Region 5  
5WG-TUB-8  
230 S. Dearborn Street  
Chicago IL 60604

## Well Plan Review Requirements

As required by the Minnesota Department of Health (MDH), construction plans and specifications for new construction or where notification is required for substantial modification of public wells and certain other wells serving the public, must be reviewed and approval granted by the department before construction begins. A list of various facilities where plan review is required is provided below. The list is not an exhaustive list of all facilities where plan review is required, but gives examples of common facilities where plans must be submitted prior to construction.

Plan review is required for all public water supplies. A public water supply is defined as a water supply which regularly serves 15 service connections or 25 or more persons for 60 days of the year.

Plan review must also be completed for wells serving the following types of facilities regardless of the number of persons served by the well.

1. All state and federal owned buildings.
2. All facilities that are licensed by state, local, or federal agencies.
3. All facilities when plan review is required by the Minnesota Plumbing Code.

Examples of facilities where plan review is required include:

- Facilities licensed by the Minnesota Department of Health, e.g., motels, restaurants, bars, bed and breakfasts, resorts, mobile home parks, hospitals, nursing homes, children's camps, migrant labor camps, day care facilities, lodging houses, etc.
- Facilities that meet the definition of a public water supply, e.g. wells that have 15 or more service connections or that regularly serve 25 or more people for at least 60 days per year, e.g., municipal water supplies, supervised living facilities, gasoline stations, housing developments, creameries, churches, marinas, etc.
- Facilities that are open to the general public, e.g., schools,

manufacturing plants, offices, etc., and that are required to submit plumbing plans to the Minnesota Department of Health.

- Facilities licensed by the Minnesota Department of Agriculture, e.g. convenience stores, grocery stores, meat processing, facilities that package products for retail, etc.
- Facilities that are licensed by local health services, e.g., restaurants, bars, motels, etc.

Complete plans and specifications for the well and water system must include:

- The name, address, and telephone number of the well owner and the well contractor.
- The street address and a legal location of the well including the county, township name, township number, range number, section number, and section quarter(s).
- a site plan with an arrow indicating the direction "North" which shows the proposed location of the well, buildings, property lines, utilities, septic tanks, drain fields, buried sewer lines and all other possible sources of contamination.
- A well plan giving the proposed well construction, depth of the well, drilling method, diameter and length of the casing, casing material, grouting materials, pitless unit, wellhead construction, and venting provisions.
- An estimated geologic log with formation contacts and depths.
- Make, model operating range, and location of the pressure tank(s).
- Make, model, size, and type of well pump.

If you have questions on whether plan review is required or questions on well construction, please contact the MDH district hydrologist. If you have other questions, please contact the MDH Engineering Unit at (612) 627-5115. Plans should be submitted to:

Minnesota Department of Health  
Water Supply Plan Review  
P.O. Box 59040  
Minneapolis, MN 55459-0040

*-reprinted from the MDH Well Management Newsletter, June 91*

## Iowa Registration of Ground Water Professionals

Underground storage tank legislation, S.F. 362, recently was signed into law by the governor of Iowa. The new law requires the Iowa Department of Natural Resources to adopt rules to require ground water professionals to register with the department. A ground water professional is a person who provides subsurface soil contamination and ground water consulting services or who contracts to perform remediation or corrective action services and is one or more of the following:

- a person certified by the American Institute of Hydrology, the National Water Well Association, the American Board of Industrial Hygiene, or the Association of Ground Water Scientists and Engineers;
- registered professional engineer in Iowa;
- professional geologist who is certified by a national organization;
- a person who has five years of direct and related experience and training as a ground water professional or in the field of earth sciences; and
- any other person with a license, certification, or registration to practice hydrogeology or ground water hydrology issued by any state or by any national organization, provided the following are met: possession of a bachelor's degree from an accredited college and five years of related experience.

The department provides for a \$50 penalty for failure to register.

For additional information contact:

Paul Nelson  
Iowa Dept. of Natural Resources  
Underground Storage Tank Sec.  
Wallace State Office Building  
900 E. Grand  
Des Moines, IA 50319  
(515)281-8779

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## Environmental Database Operates 24 Hours a Day

The Global Action Network (GAN) is a computerized environmental education and communication system which provides information 24 hours a day. The system is reached by use of a home computer, modem, and local telephone line. Mail memberships are available for those who do not have a computer.

The network consolidates information from environmental organizations, congressional offices, and research institutions. It provides summaries of information relevant to environmental issues, background statistics, reference listings of legislation, recommended resources (including organizational and audio-visual), and a thoroughly researched bibliography for each issue. GAN stores its material on EcoNet, an international computer network.

GAN operates from Lincoln Filene Center's Environmental Citi-

zenship Program at Tufts University in Medford, Massachusetts.

Membership in GAN includes all of the benefits of being connected to EcoNet, the international environmental computer network, which, in addition to storing material for GAN, electronically links many environmental organizations. Mail-based members receive Information Alerts and publications through the mail.

A GAN computer-based membership is available for \$10 a month. This entitles the member to an hour of "off-peak" computer time every month. Mail-based membership is \$10 a year. This includes a year's subscription to all Information Alerts that GAN issues.

For more information, contact the Global Action Network; Environmental Citizenship Program, Lincoln Filene Center, Tufts University, Medford, MA 02155. Phone: (617) 381-3423, FAX: (617) 381-3401.

*-reprinted from Ground Water Monitoring Review, Spring 1991*

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## MPCA Publishes New Guide to Environmental Permitting Process

A New 10-page booklet describing Minnesota's environmental permitting process is now available from the MPCA.

This free publication highlights various types of regulated activities that need permits under Minnesota's environmental laws and rules, the costs of getting permits, and the time involved in the process.

Regulated activities from heavy manufacturing to animals feedlots and waste tire storage facilities are featured in the booklet's reader-friendly format. Some of the questions the booklet answers include, "What is an environmental review?" and "How much is the permit going to cost me?"

For a free copy of "MPCA permits: What you need to know about environmental permits in Minnesota", call the MPCA at (612) 296-6300 or toll free in Minnesota at 1-800-652-9747.

*-reprinted from MPCA Solid Waste Briefing, May/June 1991*

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## Consider Worker Safety in Site Work Plans

A workbook to help design professionals understand and comply with current OSHA regulations is now available from the American Consulting Engineers Council. "Realities of the OSHA Enforcement for Consulting Engineers: A Guide to Construction Site Safety" is available from ACEC by sending a request for document #10111 and \$30 (\$60 for non-ACEC members) to 1015 15th St., NW, Washington, D.C. 20005.

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## Join the Minnesota Ground Water Association!

If you are reading this newsletter second-hand, we'd like to take this opportunity to invite you to become a member of MGWA for 1991. Annual dues are \$15 for professional members and \$10 for students.

Just complete the form below and mail to: Susan Price, MGWA Treasurer, 2177 James Avenue, St. Paul, MN 55108

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Name \_\_\_\_\_  
Affiliation \_\_\_\_\_  
Mailing Address \_\_\_\_\_  
City, State, Zip Code \_\_\_\_\_  
Work Telephone Number \_\_\_\_\_  
Home Address (optional) \_\_\_\_\_  
City, State, Zip Code \_\_\_\_\_  
Home Telephone Number \_\_\_\_\_  
Which Address should we use for Directory Listing? \_\_\_\_\_  
Which Telephone Number should we use for Directory Listing? \_\_\_\_\_



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## Minnesota Geological Survey May Close

The future of the Minnesota Geological Survey is up in the air until January 1992, when the state legislature reconvenes. On June 4, Governor Arne H. Carlson vetoed a line-item of the 2-year University of Minnesota budget that contains funding for the MGS. If funds are not restored by special legislative appropriation and approved by the governor during the spring of 1992, MGS will be abolished effective July 1992.

The possibility of closing the survey reflects a financial decision, according to Robert A. Schroeder, assistant to the governor. It is not based on the usefulness of the survey's work. "The governor's objective with his line-item vetoes was to control overall spending, not to target specific programs," he said. Since MGS is university-affiliated, it is funded under Minnesota's Higher Education bill, rather than as a state agency. Because of overspending in 1991, the state has had to cut back funds, and the university is one area hit by budget cuts. The university may still choose to fund the program and has the flexibility to reallocate funds within the system.

Priscilla Grew, director of MGS, has rallied support to save the survey. She has had a lot of interaction with other state surveys. Dallas Peck, director of the U.S. Geological Survey, in a letter to Governor Carlson, said that USGS has a "critical need for colleagues at the state level." The state surveys, he said, provide site specific information that help in national Earth Science policy making.

Representatives from the Minnesota Ground Water Association said that "the closure of the MGS would have a strong impact on the local consulting community and on many of the state agencies. The MGS provides an important source of information not readily available elsewhere." Other support has come from the Association of American State Geologists.

The MGS is responsible for geologic mapping in Minnesota and operating the state data base on ground water, as well as providing information on where mineral resources might be found in the state. The MGS was established in 1872 and currently employs 2 full-time and 1 part-time tenured professors, 1 continuous appointment academic, 35 civil service personnel, 20 part-time graduate students, and 12 full-time summer undergraduates.

According to Grew, if MGS were abolished, many geological services would be lost, including maintenance of the state database for Minnesota water wells; geophysical logging and geologic interpretation of problem water wells; geologic atlases, regional ground water assessments; and geologic resource distribution related to economic development and state mineral leasing.

In spite of the support Grew has received from other agencies, the survey may not get funded. "If this thing closes," she said, "you are not going to be able to jump-start it. Our staff has over 300 [combined] years of experience working on geology, ground water, and water wells that represents an investment the people of Minnesota have made in the organization. If you disperse this group, that experience cannot be replaced."

If the MGS does close, it will be the first closing of a state geological survey. Rather than abolish the entire survey in Georgia, an attempt was made to abolish 9 or 10 research positions. A decision on this is still pending. The geological survey in New Hampshire consists of a part-time appointment of one individual as the state geologist and an attempt was made to eliminate that part-time position.

A state geologist is named in each state who represents that state in the Association of American State Geologists. Rhode Island and Massachusetts do not have state geologists, and Vermont's survey consists of one position, the state geologist.

- by Susan Bush, reprinted from EOS, October 15, 1991

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## Training for Hazardous Waste Site Cleanup

The Occupational Safety and Health Administration (OSHA) has published a correction to its hazardous waste operations and emergency response rule, 29CFR 1910.120. OSHA clarified its definition of uncontrolled hazardous waste sites to make it clear that "an area may be called an uncontrolled hazardous waste site because of the uncontrolled presence of any hazardous **substance**, not just hazardous **wastes**: (emphasis added). OSHA also clarified that a certificate for equivalent training that was received prior to the effective date of the interim standard must be given to an employee upon request. 56 FR 15832

-Chris Reimer, NWWA

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## Software Handbook Available

*Public Domain Software for Earth Scientists, a Handbook of Public Domain and Inexpensive Software* is a comprehensive summary of PC software programs that are available from government agencies (U.S. and Canada), universities, and individuals, as well as the most popular inexpensive commercial programs. The handbook is divided into over 30 categories, including: economic evaluation, environmental sciences, geology, mapping, geochemistry, coal, geophysics, statistics, mining, surveying, hydrology, earth science bulletin boards, and GIS.

The handbook may be ordered from Gibbs Associates, Energy and Minerals Information Specialists, P.O. Box 706, Boulder CO 80306-0706; (303)444-6032. The cost is \$25 or \$35 outside North America.

-reprinted from the *Lattice* (a publication of the Mineralogical Society of America)



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## Environmental Property Assessments Subject of New Book

*Buyer Be(A)Ware: The Fundamentals of Environmental Property Assessments*, is the title of a new 240-page National Water Well Association (NWWA) book.

The book, written by Robert V. Colangelo, president of Green Corp. and a participant in more than 150 environmental property assessments since 1983, examines the key topics involved in the process. Subjects explored in this illustrated text include what an assessment is, why assessments are conducted, who participates in a typical study, how proposals are prepared, how an assessment is conducted, and standards being developed.

Appendices include information on typical waste streams generated by small quantity producers, and listings of information sources at local, state, regional, and federal government. Especially useful is an eight-page directory of acronyms and abbreviations.

To order copies of *Buyer Be(A)Ware: The Fundamentals of Environmental Property Assessments* (Catalog No. T724), send complete payment of \$20 (\$25 for non-NWWA members), plus \$3 for handling and shipping, to NWWA Bookstore, P.O. Box 182039, Dept. 017, Columbus, OH 43218. Credit card orders may be telephoned to (614)761-1711 Ext. 1533.

*-Ground Water Monitoring Review, Summer 1991*

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## EPA Finalizes Ground Water Policy Statement

U.S. EPA has released the final report of the EPA Ground Water task force. *Protecting The Nation's Ground Water: EPA's Strategy For The 1990's* sets out EPA policy for protection and remediation of the nation's ground water. Contact EPA's Division of Ground Water (202)382-7077, for a copy.

*-Chris Reimer, NWWA  
October, 1991*

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## Newsletter Advertising Policy

Advertising space is available in this newsletter to businesses and organizations. Display ads (4 issues = 1 year) are charged by fractional page:

Size ..... inches.... Annual  
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business card..... 3.5x2.4..... \$50  
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Copy should be a photostat of your camera-ready artwork.

The Editor has final determination on the acceptance of materials submitted. There are no commissions on ads. Advertising copy must be received by the publication deadlines: February 15, May 15, August 15, or November 15. The ad should be accompanied by a purchase order or a check. Checks should be payable to the Minnesota Ground Water Association. All materials should be sent to the Editor:

Jan Falteisek  
Editor, MGWA Newsletter  
DNR - Division of Waters  
500 Lafayette Road  
St. Paul, MN 55155-4032

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## Hey, What's Up?

The main purpose of this newsletter is to share information among MGWA members. Remember, we don't always see items of interest that might come across, or originate from, your desk. Thanks to all who have contributed. (That wasn't so hard was it?)

Share your news and ideas by sending them to:  
Jan Falteisek  
Editor, MGWA Newsletter  
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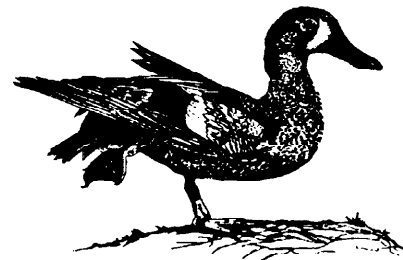
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### Business Management & Publications

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(612) 426-8795



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## Calendar

**November 5-6, 1991.** *24th Annual Water Resources Conference.* To be held at the Earle Brown Continuing Education Center, University of Minnesota St. Paul Campus, In St. Paul Minnesota. Contact Bev Ringsak, 335 Nolte Center, University of Minnesota, 315 Pillsbury Drive, Minneapolis, MN 55455. (612) 625-6689.

**November 5 - 7, 1991.** *A Comprehensive Approach to the Development and Protection of Ground Water Supplies.* To be held at the Tampa Marriot Westshore in Tampa, Florida by NWWA.

**November 5 - 7, 1991.** *Designing in situ Waste Recovery Systems.* To be held at the Fairmont Hotel in Chicago, Illinois by NWWA.

**November 6-7, 1991.** *Applied Drilling Engineering for Rotary and Auger Methods.* To be held at the Tampa Marriott Westshore in Tampa, Florida by NWWA.

**November 18-20, 1991.** *Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, detection, and monitoring.* To be held in Houston, Texas by NWWA.

**November 18-20, 1991.** *Theory and Practice of Ground Water Monitoring and Sampling & Theory and Application of Vadose Zone Monitoring, Sampling, and Remediation.* Both to be held at the Sheraton Dallas Hotel in Dallas, Texas by NWWA.

**November 20-22, 1991.** *Petroleum Hydrocarbons and Organic Chemicals in Ground Water.* To be held at the Westin Galleria in Houston, Texas by NWWA

**December 3-5, 1991.** *Ground Water Contamination Management for Professionals in Industry.* To be held in Denver, Colorado by NWWA.

**December 3-5, 1991.** *Treatment Technology for Contaminated Ground Water.* To be held at the Stouffer Concourse Hotel, in Denver, Colorado by NWWA.

**December 4-6, 1991.** *Third Conference on Hydrogeology, Ecology,*

*Monitoring, and Management of Ground Water in Karst Terranes.* To be held in Nashville, Tennessee by NWWA.

**December 6, 1991.** *Legal Implications of Environmental Property Assessments.* To be held at the Stouffers Concourse Hotel in Denver Colorado by NWWA.

**January 5-10, 1992.** *IBM PC Applications in Ground Water Pollution and Hydrology.* To be held at the Holiday Inn Golden Gateway in San Francisco, California by NWWA.

**February 11-13, 1992.** *Solving Ground Water Problems with Models.* To be held at the Grand Kempinski Hotel in Dallas, Texas by IGWMC.

**April 12-16, 1992.** *Future Availability of Ground Water Resources.* To be held in Raleigh, North Carolina by AWRA.

**April 27-29, 1992.** *International Conference on Ground-Water Ecology.* To be held in Tampa, Florida by AWRA.

**April 30-May 1, 1992.** *GSA North-Central Section Meeting.* To be held in Iowa City, Iowa. Contact Raymond R. Anderson, Iowa DNR, Geological Survey, University of Iowa, 123 N. Capital St., Iowa City, IA 52242 (319)335-1575.

**July 13-22, 1992.** *7th International Symposium on Water-Rock Interaction.* To be held in Park City Utah. Contact Yousif Kharaka, Secretary-General, U.S. Geological Survey, MS 427, 345 Middlefield Road, Menlo Park, CA 94025 (415)329-4535.

**July 13-22, 1992.** *American Institute of Professional Geologists Annual Meeting.* To be held in Lake Tahoe, Nevada. Contact Jon Price, AIPG, P.O. Box 665, Carson City, NV 89702 (702)784-6691.

**October 3-9, 1992.** *Association of Engineering Geologists Annual Meeting.* To be held in Long Beach, California. Contact John Byer, Kovacs-Byer, Inc., 11430 Ventura Blvd., Studio City, CA 91604 (818)980-0825.

**October 17-22, 1992.** *Interdisciplinary Approaches In Hydrology*

and Hydrogeology. To be held at the Red Lion Hotel - Columbia River in Portland, Oregon by AIH. Contact Helen Klose, American Institute of Hydrology, 3416 University Ave. SE, Minneapolis, MN 55414-3328 (612)379-1030.

**October 26-29, 1992.** *Geological Society of America Annual Meeting.* To be held in Cincinnati, Ohio. Contact GSA, Meetings Dept., P.O. Box 9140, Boulder, CO 80301 (303)447-2020.

**November 1-5, 1992.** *AWRA 28th Annual Conference & Symposia: Managing Water Resources During Global Change.* To be held in Reno, Nevada by AWRA.

*For information about meetings and seminars to be held by the AWRA, contact Michael C. Fink, Meetings Manager AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192 (301) 493-8600, Fax (301) 483-5844.*

*For information about meetings and seminars to be held by the NWWA, contact NWWA at 6375 Riverside Drive, Dublin, Ohio 43017 (614) 761-1711, Telex 241302.*

*For information about Short Courses held by the International Ground Water Modeling Center (IGWMC), contact the IGWMC, Institute for Ground Water Research and Education, Colorado School of Mines, Golden, Colorado 80401-1887. (303)273-3103, Fax (303)273-3278.*

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## Sponsor a Recycled Newsletter!

The reality of using recycled paper is that it costs more. We need \$80 per newsletter to cover the additional costs. Please consider sponsoring all or part of the additional cost for a newsletter in exchange for thanks and recognition in the newsletter which you sponsor. Contact Jan Falteisek at (612)297-3877.

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## Message from Jay Lehr

To: All Ground Water Professionals Everywhere

From: Jay H. Lehr, Ph.D.

Re: Summary of the activities that led to my imprisonment by the federal government and my firing by the National Water Well Association.

In 1988, the U.S. EPA began an investigation of a \$170,000 add-on contract to NWWA's initial U.S. EPA contract to develop the Drastic mapping system to delineate ground water vulnerability. The additional money was intended to develop an expert system within 18 months for remediating leaking underground storage tanks in cooperation with the Honeywell Computer people. We finished the project in about 17 months, quite successfully, and found that \$29,000 in time had not been charged. I knew all the work had been done and the project could not have been completed significantly under budget; so I requested that the NWWA controller adjust the accounting accordingly. EPA ended up disallowing \$100,000 in charges and penalizing the company an additional \$100,000 as well. There has never been any question in my mind that all the money was spent and properly earned and the government received an outstanding product. But without consulting me for my opinion, the NWWA Board, at the direction of the NWWA legal counsel, chose to pay U.S. EPA the full amount they requested without filing my objections. Concurrently, the NWWA legal counsel advised my to plead guilty to a charge of signing a document I knew to be incorrect rather than chancing an indictment and trial. They believed that from the evidence they were told the U.S. EPA possessed that a trial would cost me, personally, in excess of \$200,000, last 18 months to two years and could result in a prison sentence. They advised my that a simple guilty plea to a lesser charge would result only in a community service punishment that

*-continued on next page*

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## NWWA Chairman's Corner - A Look At the Past

*-by James P. Gibb, Chairman,  
Board of Directors of the  
Association of Ground Water  
Scientists and Engineers*

The past several months have created a great deal of curiosity, speculation, and strong feelings concerning the charges leveled against Jay Lehr and Keith Lelux of the NWWA staff by the EPA. I have received letters from many of you expressing either support for retaining Jay as a senior scientist or stating that he should have been fired or removed from the NWWA staff immediately upon having charges filed. I thank those of you who took the time to write or call to express your opinions and to support the actions of the NWWA Board of Directors.

Final legal actions concerning Jay's and Keith's cases took place on September 18, 1991. Jay was ordered to pay a special assessment of \$50, fined \$25,000, is subject to two years supervised release, and ordered to serve six months in the federal prison system. Keith was similarly ordered to pay a special assessment of \$50, fined \$5000, is subject to two years supervised release, and ordered to serve six months in the federal prison system.

Following sentencing and completion of court deliberations, the NWWA Board met in Columbus on September 20th and 21st and terminated the employment of both Jay and Keith.

Neither individual is to serve the Association in any capacity in the immediate future. These actions were taken after Jay and Keith had completed their due course at law and without NWWA biasing the legal system or incurring any additional potential liability by taking precipitous actions.

The following is to more clearly, yet briefly, inform you of the events that led to the legal actions against Jay and Keith and their dismissals. Near the end of the term of EPA contract CR-910715-02-3 it report-

edly came to the attention of Jay and Keith that not all of the time spent on the contract had not been charged to the project. In an effort to receive payment for services that they felt had been rendered, Jay and Keith apparently modified employee time sheets and submitted them to the EPA for payment. The moneys received from EPA were paid to NWWA; neither Jay nor Keith personally benefitted from their actions.

It is not absolutely clear how EPA learned of the falsified documents. However, Jay and Keith were charged as follows:

..."the defendants Jay H. Lehr and Keith Lelux falsified and caused to be falsified the employee time sheets to reflect that the employees worked a total of 2270 hours on EPA Project Number CR-910715-02-3 when, in fact, as they knew, the employees did not work a total of 2270 hours on EPA Project Number CR-910715-02-3."

Jay and Keith were personally charged and sentenced as indicated above. AGWSE and NWWA do not now, nor have they at any time during the past six months, condoned the actions taken by Jay and Keith.

To end this communique on a more optimistic note, the events of the past few months have forced the officers of NWWA and AGWSE to look very hard at the operations of the Association and division and to seriously consider what kind of an organization we want to be and where we want to be in the future. I feel that considerable progress has been made and that you will be pleased with the choice of the new executive director and additional changes that will likely be implemented in the future.

Please join me in welcoming David Schmitt to NWWA and providing him with the information he needs to serve our needs effectively.

*reprinted from the AGWSE  
Newsletter, October, 1991*

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## Jacob Bear to Hold Workshop in December

Dr. Jacob Bear of Technion - Haifa, Isreal Institute of Technology, will hold a two-day workshop on December 12-13, 1991. Further details will become available shortly and MGWA members will be kept informed. During his stay in Minnesota, Dr. Bear can be contacted through the Department of Civil and Mineral Engineering at the University of Minnesota.

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... continued from page 11

would allow me to retain my job with the National Water Well Association. NWWA then obtained a criminal attorney for me and I followed their guidance.

At no time during this entire investigation was I ever interviewed either by a federal investigator or the NWWA Board. When the sentence was handed down on September 18, 1991, the prison sentence and immediate firing by NWWA was a devastating shock to me.

I feel I have committed no crime and yet I am suffering the ultimate destruction of my life and my career. I am presently serving my six-months prison term in a federal prison camp in Morgantown, W V.

Most Sincerely,  
Jay H. Lehr, Ph.D.  
2268 Worthingwoods Blvd.  
Powell, OH 43065  
(614)792-8221

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## Call for Papers

### Managing Water Resources During Global Change, AWRA 28th Annual Conference and Symposia

To be held in Reno, Nevada November 1 - 5, 1992.

#### Call for Abstracts

The ability to manage water in today's global environment is often constrained by our narrow focus. Conference and symposia discussions will highlight our understanding of nature and occurrence of water within the geosphere and biosphere. To assist our progress toward solutions to the complex ecological and environmental problems of water management, interdisciplinary efforts to develop an understanding of linkages between climate, the hydrologic cycle, chemical processes and the biota, will be presented and discussed.

#### Conference Topics

- Watersheds and River systems
- Water Modeling and Watershed studies
- Management of Water Resources
- Ground Water - Surface Water Interactions
- Forecasting Water Use
- Interbasin Water Transfer / Conflicting Use
- Water Resources Data Collection
- Sedimentation, Erosion and Salinity
- Institutional and Legal Issues, Water Rights, Policy, and Law

#### Symposia Topics

- Use of Climatic Information by water/land managers
- Sustainability of use of regional water resources
- Defining and acquiring adequate water resources data
- Ramifications of climate change scenarios
- Assessing global risk; new techniques for hydrologic forecasting
- Transboundary water conflicts: the challenges of hydro diplomacy

#### Deadline

The deadline for submission of abstracts for both the Conference and Symposia is January 15, 1992.

Send abstracts and direct inquiries to: Raymond Herrmann, NPS, WR-CPSU, WRD, Colorado State University, Fort Collins, CO 80523.

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## Pesticides Leaching into Ground Water Still Issue

Congress is pushing the Environmental Protection Agency to step up its regulation of pesticides that leach into ground water. A new study of EPA's progress in this sensitive area by the General Accounting Office does not put the EPA in a good light. Released at a hearing held by the House Energy & Commerce Committee's Investigations & Oversight Subcommittee, the GAO report faults EPA in several areas. Among those cited are the Agency's lack of research into how pesticides leach into ground water, inconsistent use of regulatory measures, lack of consideration given to ground water contamination in pesticide risk assessments and the placement of too much responsibility on state programs.

EPA has identified 46 different pesticides in ground water since the problem was first discovered in 1979. Of these, only three compounds have been banned to date: dichlorobromopropane, dinoseb, and ethylene dibromide. Others are in various stages of review.

As of one year ago, EPA had only reviewed 110 studies that pesticide registrants had prepared on these chemicals and 40% of these were found unacceptable by the agency due to questionable data or poor study design. The GAO says EPA is understaffed for this review and has not given ground water pesticide contamination a high priority.

- The National Environmental Journal, September/October 1991

## Directory Update

New Members are listed here, as are "old" members whose addresses were either not in the directory or changed since the last directory.

Save this and add it to your copy of the directory.

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## Cathodic Protection of Wells

Cathodic protection is not "cathodic protection" or "cathartic protection", nor does it "drain off the electrolysis". But cathodic protection does protect buried pipelines and tanks. It is a technique to prevent or minimize electrolytic corrosive action by redirecting the current to a substitute or "sacrificial" metal body which deteriorates instead of the pipeline or tank. Horizontal anodes are not always suitable due to space and other constraints, thus these metal bodies are sometimes stacked in a well-type emplacement perhaps hundreds of feet deep, as reported in a series of several articles in *Briefings*, Summer 1991, issued by the National Water Well Association. California, Wisconsin, and Colorado regulations are discussed.

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## Environmental Data Credibility and the Twin Cities Round Robin Program

Earlier this year, the Twin Cities Round Robin Program released a white paper reporting a survey of laboratories that generate environmental data. The members of the program, which include both private and government labs, cooperate to maintain and improve laboratory data quality.

Performance samples to be analyzed were also part of the survey. Common problems related to the performance samples reported in the white paper were exceedance of holding times, use of non-acceptable analysis methods, and reporting errors such as improper rounding.

Survey recommendations include establishing a lab certification program, registration of lab directors, development of continuing education programs and development of a statewide voluntary inter-laboratory testing program.

For more information, contact William O'Connor, PACE Laboratories, Inc.

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## Changed Your Job or Career Lately?

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## Bibliography Examines Ground Water Issues

Basic information about ground water; its contamination, and the regulations and methods being used or being considered to protect it is located in a bibliography published by the Council of Planning Librarians.

The 22-page document, titled *Groundwater: Overview of Issues, a Partially Annotated Bibliography*, is divided into two sections. The first consists of annotated monographs. The second section lists articles that are not annotated. All publications listed were examined at the main office of the Council of Planning Librarians (the Merriam Center Library in Chicago) and are available for interlibrary loan. Most of the 200 cited items were published between 1985 and 1990 and consist of research monographs, professional journal articles, ground water primers, information bulletins, government documents and technical reports, and local projects and planning guides.

*Groundwater: Overview of Issues, a Partially Annotated Bibliography*, #261, was written by Elaine Gray of the Merriam Center Library. It is available for \$16 plus \$4.50 for shipping and handling from the American Planning Association's Bookstore, 1313 E. 60th St., Chicago, IL 60637.

(reprinted from *Water Well Journal*, July 1991)

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## Vote for New Officers for Your Association

Gordie Hess, President, is joining that distinguished group, the MGWA Past-Presidents. Bob Beltrame, Secretary, is ready to hand over all the files. Many thanks for all their hard work. Keep your Association serving you, the member, by voting for a new President-Elect and Secretary. The President-Elect will serve for one year while Shiela Grow is president, and assume the presidency the following year. The Secretary will take over from Bob Beltrame January 1, 1992 and serve for two years.

Fill out the ballot below and mail by November 19 to: Minnesota Ground Water Association, P.O. Box 65362, St. Paul, MN 55165. Ballots will be counted and the results announced at our Fall Meeting on November 26th, 1990.

---

Mark one choice in each category:

Candidate for President-Elect:

\_\_\_\_ Larry Johnson, Dames & Moore, Inc.  
\_\_\_\_ write-in candidate

Candidate for Secretary:

\_\_\_\_ Bruce Olson, Minnesota Department of Health  
\_\_\_\_ write-in candidate

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**Registration**

**Fall Meeting**

**Technology Update**

**Innovations in Field Screening Methods  
and  
Geotechnical Applications**

**November 26, 1991  
Earl Brown Continuing Education Center  
on the  
St. Paul Campus of the University of Minnesota  
1890 Buford Avenue**

**1:00 pm to 4:30 pm**

---

**Program**

**Dr. Jacob Bear, Technion - Haifa, Israel Institute of Technology**  
*Special speaker - Modelling for Regulators*

**Mr. Andy Strutnsky, Stratigraphics**  
*Piezometric Cone Penetrometer Theory and Application*

**Mr. Kevin Carter, Ensys, Inc.**  
*Immunoassay screening tests for Hazardous Chemical Determination - Theory and Soil Applications*

**Mr. William Breitzman, Terracon Environmental, Inc.**  
*Immunoassay Screening - Pesticide Applications*

**Mr. Michael Thurow, Spectrum, Inc.**  
*Development of Nitrate Metering for Field Screening Applications.*

---

**Attend the Fall Conference on Technology Developments**

The conference fee of \$15 (if postmarked by Nov. 19; \$25 late and day of conference registration) pays for the facility, break refreshments, and social hour at the close of the meeting. Please send in your registration today! **Note: A vote on the reverse side will be counted if your registration is postmarked by Nov. 19.**

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Please mail this form and your check, payable to the Minnesota Ground Water Association, to: MGWA, P.O. Box 65362, St. Paul, MN 55165. If you must have a receipt other than your cancelled check, please check here \_\_\_\_\_. Receipts requested in advance will be available at the registration desk.

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## Deadline Approaching for Harmful Substances Compensation Claims

The January 1, 1992 deadline for filing personal injury or property damage claims with the State Harmful Substances Compensation Board is fast approaching. After this deadline, a two year statute of limitations will go into effect for all applications filed with the Board and claims which are more than two years old can not be accepted.

The five member Board was created in 1985 to compensate victims of personal injury or property damage due to chemical contamination of the environment. The Board gives people a chance to recover damages for an injury or loss, while avoiding the costs, delays and uncertainty of filing a lawsuit. It also gives them a way to be compensated even if the persons responsible for the problem are unknown or are unable to pay any damages.

Among the damages the Board can cover are the costs to homeowners of replacing a contaminated well, connecting to a municipal supply, installing a carbon filter unit for a contaminated well, or abandoning wells required to be sealed because of ground water contamination.

In cases where a homeowner is forced to sell a home because of a work transfer or other hardship but does not receive the appraised market value due to chemical contamination on the property, compensation can be awarded for up to 75% of the loss in home value.

The Board can also compensate injured persons for medical expenses, lost income, and the value of lost household labor, as well as providing death benefits to the family where an injury or death has been caused by environmental contamination.

Interested parties should apply for reimbursement soon, because the Board has a January 1992 deadline for old claims. After that date, applications must be submitted within two years of the damage or injury.

For more information about how to file a claim with the board, and to find out if you are eligible, call (612) 642-0455, or write to the Harmful Substance Compensation Board, 2700 University Ave. West, Suite 115, St. Paul 55114.

*(reprinted from a news release of the State Harmful Substance Compensation Board)*

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## Back to the Middle Ages - Leeches as Water Samplers

Leeches may have gone out of fashion in the medical profession, but they are showing great promise as water quality monitors.

Dr. Ken Hall, environmental chemist with the Westwater Research Centre at the University of British Columbia, has enlisted the aid of the leech to test for the presence of chlorophenol in the Fraser River.

Leeches were suspended in containers in the river for a week, then removed and dissected to determine the presence of the chlorophenols in their tissues. Because leeches bioconcentrate the chemical, they can betray even small concentrations in the water in which they have been suspended.

Hall points out that while the monitoring chemist may take only a few samples during a week, the leeches can take "100,000 samples in a week." While he has employed the leech so far only to test for chlorophenols, Hall believes that this versatile lab assistant may be used to monitor a wide range of organic chemicals.

*(reprinted from Hydata)*

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## Geologic Sensitivity Report Available

The Minnesota Department of Natural Resources (DNR) has issued a report describing the general criteria and guidelines for assessing geological sensitivity of ground water resources to contamination. Developed by a multi-agency work group, the general criteria are based on how long it takes a contaminant at the land surface to reach (or travel to) a ground water resource: the shorter the time of travel, the greater the geologic sensitivity. The time of travel is estimated from geologic factors and can be checked using water aged chemical tests.

These criteria allow an area to be given a rating of its geologic sensitivity to ground water contamination. The guidelines explain how criteria are applied to prepare maps of geologic sensitivity, especially for local water planning. The report is one of several products of a recently completed Legislative Commission on Minnesota Resources (LCMR) project which studied factors related to ground water contamination sensitivity.

For more information, contact Jan Falteisek, DNR, Division of Waters at (612) 297-3877.



## State Underground Storage Tanks Rules Become Effective

The Minnesota Pollution Control Agency (MPCA) has adopted permanent rules relating to underground storage tank (UST) systems, effective July 12, 1991 (Minn. Rules Ch. 7150). The rules are based on the federal UST law at 40 CFR Part 280 and they establish state-enforceable technical criteria and safeguards necessary to protect human health, safety and the environment in the following areas:

- 1) design, construction, installation and notification of UST systems;
- 2) general operating requirements for UST system owner/operators;
- 3) release detection requirements for operating USTs; and
- 4) closure of UST systems.

Release reporting and corrective action requirements of the federal law are addressed elsewhere in state statutes (Minn. Stat. sec. 115.061 and Minn. Stat. ch. 115C, respectively). The new UST rules are codified as Minn. Rules ch. 7150.

In general, the new state rules include all federal requirements and timetables for upgrading existing UST systems. There are several areas where the state rules are more inclusive:

- 1) UST systems used for storing fuel oil that is used to heat buildings at the tank site are excluded from federal regulation. Minnesota excludes by statute and these rules, only heating oil tanks of 1,100 gallons or less capacity where the fuel is used for heat at the tank site.

Owners and operators of state-regulated heating oil tanks must meet certain requirements. For details, request the fact sheet "About Underground Heating Oil Tank Regulations in Minnesota" from the MPCA.

- 2) By statute (Minn. Stat. secs. 116.46-50), Minnesota includes within the definition of "regulated substance" any hazardous materials listed in 49 CFR Part 172.101. This is a more extensive list than the federal requirements of 40 CFR Part

280.

In addition to the above general requirements, following are some specific highlights of ch. 7150:

### Notification Requirements

- 1) In addition to federally-regulated UST systems, heating oil tanks larger than 1,100 gallons and tanks storing hazardous materials that are regulated by the state must be registered with the MPCA.

- 2) When a tank or property that a seller knows contains a tank is sold, the seller must notify the purchaser of the tank in writing of the owner's obligation to notify the MPCA.

### New Tank Installation

- 1) Owners and operators of new UST systems must ensure that the contractor complies with the state certification rules (Minn. Rules ch. 7105) and completes all work listed in the tank manufacturer's installation checklist.

- 2) Notice of intent to install a tank is required at least 30 days prior to the start of installation. Notification of putting the tank into service or making a change in service is required within 30 days of installing the tank or making the change.

- 3) Owners and operators, as well as installation contractors, must certify on the state UST notification form that the methods used to install tanks and piping comply with the rules for installation and certification requirements.

### Reporting and Record-keeping

- 1) Minnesota does not have a "de minimus" requirement for reporting spills and overfills. Owners and operators must report, investigate and cleanup all spills and overfills.

- 2) In addition to the reporting and record-keeping requirements of the federal rule, Minnesota adds the following:

- notification of the discovery of an abandoned tank or a change in the uses, contents or ownership of a tank;
- a copy of the MPCA Commissioner's determination that alternative corrosion protection or spill and overfill equipment may be used.

- 3) Minnesota extends the time which owners and operators must keep the following release detection records:

- written performance claims, maintenance and calibration schedules, and documentation of the Commissioner's approval of any alternate release detection methods must be maintained for as long as they are being used to comply with requirements of the rules;
- results of any sampling, testing or monitoring, and documentation of calibration, maintenance and repair of release detection equipment must be maintained for at least ten years.

### Tank Closure

- 1) The MPCA must be notified ten days in advance of a tank closure. For details, request the fact sheet "Planning Ahead for UST Removal" from the MPCA.

- 2) Owners and operators must ensure that persons performing UST system closures or changes in service meet the certification requirements.

- 3) Certified contractors must furnish copies of current certificates to the owner and operator before beginning either a closure or change in service.

- 4) Owners and operators must ensure that the contractor certifies on the notification form that the methods used comply with the rules.

- 5) In assessing an UST site upon closure or change in service, laboratory analysis for the presence of a release where contamination is most likely to be present is required. This requirement does not apply to state-regulated heating oil tanks.

For more information concerning interpretation of UST rules, call 612/297-8617 or 1-800/652-9747 (greater Minnesota) and ask for the MPCA, Tanks and Spills Section.





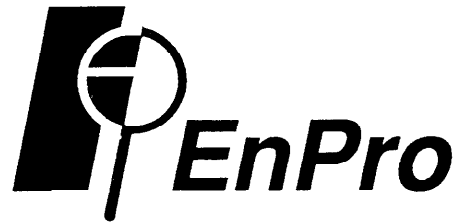
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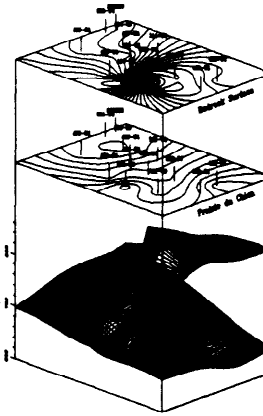
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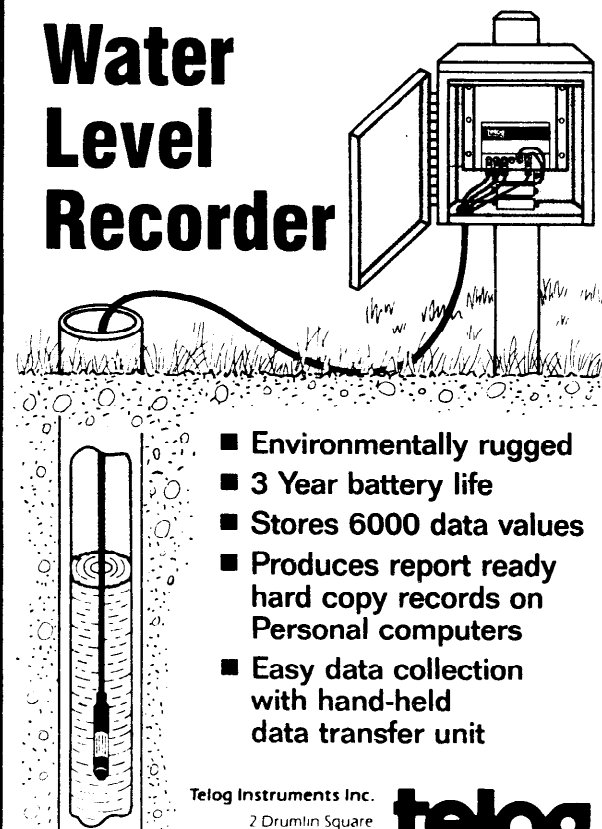


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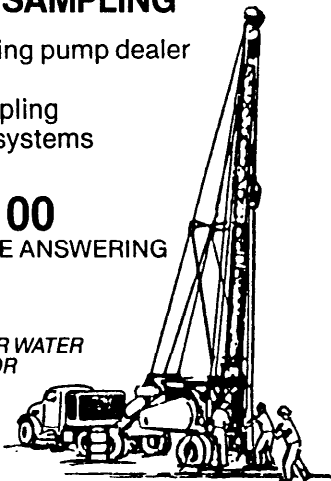
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