

Minnesota Ground Water Association

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President's Page

I want to thank you for this opportunity to serve as the president of the Minnesota Ground Water Association and to request your help in establishing the agenda for this organization throughout the coming year. It has been a privilege to work with Gordy Hess and Bob Beltrame, the past president and secretary.

The time and effort these past officers have devoted to setting up conferences and managing MGWA are appreciated. Susan Price, Treasurer, Jeanette Leete, Business Manager, Jan Falteisek, Newsletter Editor and I now look forward to the opportunity to work with Larry Johnson and Bruce Olsen, the president-elect and new secretary.

We need your participation to make sure that MGWA is providing the professional and personal agenda you need and want.

MGWA is a unique professional organization. Speakers from out-of-state attending the seminars this past year have complimented MGWA on the ambitious activity schedule and large active membership as compared to professional organizations in other states. Over 80 percent of the seventy attendees at the fall field trip/conference (a joint Wisconsin, Iowa, Minnesota activity) were from Minnesota. Maybe Minnesota members just like to have fun.

A few ideas for MGWA during 1992 are presented here for your feedback:

- Student outreach: Students from colleges and universities outside the Twin Cities should be encouraged to join in our activities. MGWA intends to

contact different schools to determine the student's interest. (Since as a student I was much more concerned about geology than jobs, MGWA provided an opportunity for me to learn about what kind of jobs were available to apply my skills as well as providing learning opportunities.)

- Educational opportunities: As funding becomes less available in both the public and private sectors for attending out-of-state seminars, learning opportunities from local sources become even more important. MGWA can help keep you informed of classes, lectures, and seminars. You can provide the feedback to MGWA officers which will ensure that the seminars sponsored by MGWA will satisfy your needs. Please make an effort to notify MGWA of upcoming events that should be included in the newsletter.

- Legislative issues and changes: If the membership feels that a legislative update would be useful, an MGWA seminar could be devoted to legislative changes which affect our professions. Ideas for future topics include well code changes, Health Risk Limits, reimbursement issues for Petrofund and for the Agricultural Chemical Response and Reimbursement Account, and revision of Minnesota Rules, Chapter 7060.

A good example of MGWA's involvement in legislative issues is the restoration of funding for MGS. In a time of potential shortfall of funds for the legislature, it is important that legislators and the governor be aware

of your priorities for use of tax dollars. The existence of the Minnesota Geological Survey and its programs was not assured until the legislature restored the funding. The MGWA membership as well as MGWA as an organization have been very supportive of the MGS in letters to state government. Thank You.

- Fall Field Trip: Response from the southeast Minnesota field trip indicates members would be interested in another field trip. Field trips to the Minnesota River Valley or the North Shore have been suggested.

It's your turn. Make sure that this year's MGWA programs meet your needs and interests. I look forward to hearing from you.

Sheila Grow, MGWA President



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New Officers

President-Elect: Larry Johnson

Larry L Johnson is a Senior Hydrogeologist with Dames & Moore in New Brighton. He is married and has 1 daughter who is a senior in High School. His immediate personal goal is to **finally** finish remodeling the kitchen before the graduation party.

As a Senior Hydrogeologist he has extensive experience with environmental investigations, solid and hazardous waste, water supply, construction, permit acquisition, and expert testimony. He holds a B.S. in Geology from Kansas State University (1969) and a M.S. in Science Management from the University of Alaska (1977).

Larry has over 20 years of professional experience, including 14 years of ground water experience in Minnesota and the Upper Midwest. Earlier experiences included duties as a Weather Observer (documenting "pre-ground water") and as a Geophysical Specialist doing oil exploration on the "post-ground water" ice of Alaska's Beaufort Sea.

Mr. Johnson, a Certified Professional Geologist, is a former President of the Minnesota Section of the American Institute of Professional Geologists. He has also served on advisory committees for the Minnesota Department of Health, the Minnesota Department of Agriculture, and several non-profit community organizations.



Secretary: Bruce Olsen

Bruce Olsen is a Senior Hydrologist with the Minnesota Department of Health in Minneapolis. "Sandy and I have been married for 20 years (this coming June 9th). I am always afraid I will forget a wedding anniversary, hopefully it won't be this year. We have two children who sometimes wonder if they are not raising their own parents. As a family we enjoy bicycle riding, cross country skiing, and volksmarching. As a couple we have had a second job for the past 10+ years remodeling the house Sandy's great grandparents lived in."

Bruce has a B.A. in geology from the University of Minnesota (1970) and an M.S. in geology from the University of Minnesota (1976). He was employed by the Minnesota Geological Survey from August 1969 to March 1989. He comments: "Working for the Survey was an "experience" and one that I enjoyed. The 19 plus years I spent there provided a wide variety of jobs ranging from starting as a student worker washing cuttings samples to supervising the county geologic atlas program. My general areas of experience focused on subsurface mapping, well construction, and working with State/local agencies on groundwater protection measures."

At his current job with the Minnesota Department of Health Bruce says he's "coordinating the development of the State's Wellhead Protection program for public water supply wells. This is an extremely interesting job because it allows me to apply my technical background to legal and planning issues related to ground water protection. I have already had the opportunity to work with many of the members of the Minnesota Ground Water Association and I am sure I will meet many more in the next few years as wellhead protection is implemented."

Reducing Lead Levels in Drinking Water

Lead exposure is a major health concern. The media have focused on lead in drinking water although only 20% of lead exposure is caused by drinking water.

The U.S. Environmental Protection Agency (EPA) calls lead, "a highly toxic metal the agency considers a major public health threat."

In adults lead can increase blood pressure and interfere with hearing. Children are at a greater health risk because lead in children can interfere with the formation of red blood cells, delay physical and mental development, and impair mental abilities. High levels of exposure to lead can cause anemia, kidney damage, and mental retardation.

Pregnant women should be especially cautious about lead exposure as it can cause premature birth and reduce the birth weight of babies.

There is cause for optimism, however, for several reasons:

- Determining which homes are likely to have high lead levels in drinking water is relatively easy
- The EPA recently set stricter regulatory standards for lead
- Several in-home water treatment technologies that reduce lead are available to consumers

In fact, the national Centers for Disease Control consider lead exposure to be the country's number one preventable pediatric health problem.

Causes Of Lead Contamination

Lead-based paint, urban soil and dust, and drinking water are the greatest contributions to childhood exposure to lead.

Lead rarely occurs naturally in ground or surface water. Instead, lead contamination usually occurs at some point in the water delivery system. It is most commonly caused by the corrosion of lead service connections, pipes, or lead solder used to join copper pipes in the home.

Homes that are less than 10 years old and have lead solder or

homes that are connected to the water main by a lead service line are likely to have elevated levels of lead in the water, according to the EPA.

In 1986, lead was banned from use in pipes and solder in public water systems and in household plumbing and limited in brass fixtures.

The source of lead in drinking water is most commonly the corrosion of lead plumbing materials.

Several factors cause water to be corrosive. These factors include acidity, low pH, high temperature, low total dissolved solids (TDS) content, and high amounts of dissolved oxygen.

Naturally soft water is typically corrosive. Such water is found in sections of New England and the far Northwest.

Lead levels may be increased in homes supplied with naturally soft water. However, it is important to make the distinction between naturally soft water and softened water from a water softener.

The process of artificially softening water does not affect the characteristics that contribute to corrosion and, therefore, should not contribute to lead exposure. *Water softening does not cause corrosion.*

In fact, if lead is found to be entering the water before it reaches the home, a water softener can significantly reduce the lead level.

New EPA Lead Standards

On May 7, 1991, the EPA set new standards to lower the level of lead in drinking water. This is the agency's most significant effort to reduce lead exposure since it phased out leaded gasoline.

In addition to setting the new enforceable standard, the EPA also set a Maximum Contaminant Level Goal (MCLG) of zero for lead in drinking water. An MCLG is a nonenforceable health goal established by the EPA. It implies the optimal level of the substance in drinking water at which no adverse health effects are anticipated to occur.

In many instances, reducing the contaminant to the MCLG

may not be feasible for economic reasons, therefore, the enforceable standards may be set at a higher level, as is the case with lead. According to the EPA, the enforceable standards are safe but not optimal.

The new enforceable lead standards are 10 times more protective than the present regulations. Currently, the allowable lead level in drinking water is 50 parts per billion (ppb). The new standards call for an "action level" of 15 ppb, which means that water systems that exceed the 15 ppb limit in 10 percent of the homes sampled will be required to take action to reduce lead levels.

Monitoring of the new standards will begin in 1992. Approximately 79,000 public water suppliers in the U.S. will be required to monitor for lead at household taps. The monitoring will be of first draw water, which commonly contains the most lead, and will take place at homes with the highest risk: those with lead service lines or lead solder applied since 1982. Cities of more than 100,000 people will monitor 100 high risk homes twice a year.

The EPA also notes that all 800 large water systems in the U.S. will be required to begin corrosion-control programs by 1993, regardless of how many households show 15 ppb lead in tap water. Lime or soda ash can be added to water to reduce acidity and chemicals that form protective coatings inside pipes can be used. Several large systems have already begun these programs in anticipation of the new standards.

Small and medium systems where more than 10 percent of the monitored household taps contain lead concentrations over 15 ppb will have to install or improve corrosion control by 1994.

Large water systems (serving more than 50,000) are required to begin monitoring lead levels by January 1, 1992. Medium systems (serving 3,300 to 50,000) must begin monitoring by July 1, 1992, and small systems will begin monitoring by July 1, 1993.

A public education program developed by the EPA will inform

consumers how to minimize lead exposure in drinking water. Any water system that exceeds the 15 ppb action level at any time after monitoring begins will be required to participate in this program.

The EPA estimates that approximately 40,000 water systems will fail to meet the new action level standards.

In-Home Water Treatment Units

Several point of use technologies have been proven to significantly reduce lead, in addition to reducing other contaminants. These technologies include reverse osmosis, distillation, water softening, and solid block and precoat adsorption filters, which are made with carbon or activated alumina.

Drinking water treatment units are often a combination of these technologies. The units range in size and may fit under the sink or attach to the faucet.

The new EPA standards will reduce exposure to lead in drinking water for those who get their water from public water supplies. However, those who obtain their water from private wells may also want to test their water for lead.

If the test reveals that lead is entering the system from household plumbing, as opposed to sources outside the home, point-of-use or single tap drinking water alternatives may provide the best solution for reducing lead. Only solid block and precoat adsorption filters in particular are certified to reduce lead.

The National Sanitation Foundation (NSF) tests products for the removal of a number of contaminants, including lead. The Water Quality Association (WQA) tests products for performance claims including durability of the product, performance, longevity, and taste, color, and odor of treated water. Both NSF and WQA produce listings of those products which pass the testing.

For more information about lead and the treatment processes that reduce it, please write:

Water Quality Association
Post Office Box 606
Lisle, Illinois 60532

Disney Waste Water Is No Threat to Floridan Aquifer

Water from spray irrigation of treated waste water from Wall Disney World facilities in Florida probably does not penetrate the surficial aquifer system to the Floridan Aquifer system, according to a report by the United States Geological Survey, United States Department of the Interior, prepared in cooperation with the Reedy Creek Improvement District.

The 43-page report describes results of a three-year study to determine direction of movement of the waste water and its effect on water quality of the surficial aquifer system in and around the disposal area.

Waste water applied to the land surface was equivalent to about 41 inches of rainfall for the 4-year period, October 1980 through September 1984. This waste water, though treated, still has high concentrations of nitrogen and phosphorus that can cause nuisance growths of algae if disposed into lakes or streams.

Vertical movement of the applied waste water is slight, so that the water probably does not reach the underlying Floridan Aquifer system, the source of the area's drinking water. Instead, it probably flows laterally, eventually reaching nearby boundary canals.

A significant part of the nitrogen in water beneath the application areas is apparently being converted to the nitrate form in areas where the water table is at least 8 feet below the land surface.

Copies of the report, "Effect of Spray Irrigation of Treated Waste Water on Water Quality of the Surficial Aquifer System, Reedy Creek Improvement District, Central Florida," United States Geological Survey Water Resources Investigations Report 88-4174 by Edward R. German, may be purchased from:

US Geological Survey
Books and Open-File Reports
Box 25425
Denver, CO 80225

Exploring Landfill Leachate Disposal and Treatment Options

Leachate from lined municipal solid waste or industrial landfills usually ends up in wastewater treatment plants for treatment and disposal. While the volume of leachate produced by Minnesota's 11 lined municipal and 4 industrial facilities is relatively small, contaminant concentrations can be high, causing problems for wastewater plants when handling leachate.

A team of MPCA staff decided to explore other leachate-treatment and disposal options. This Leachate Treatment and Alternatives Committee produced a report on their findings, *Leachate Disposal and Treatment Options*, the following are the seven treatment and disposal recommendations:

1. Wastewater treatment

Leachate is released into a wastewater treatment plant from a tanker truck or through a direct sewer link from the leachate collection system to the treatment plant. Few plants can accept raw leachate without exceeding effluent limits for toxics or inhibiting plant biological and chemical treatment reactions. Pre-treatment can make leachate more acceptable. The addition of leachate to stabilization ponds would require a pilot test and additional monitoring of ground water, residual sludge, and organisms.

2. Regional and on-site treatment plants

A regional facility for full treatment or pre-treatment could be used. Technology exists to treat the volatile organic compounds (VOCs), metals and other contaminants. The resulting effluent could be added to wastewater treatment plants or land-applied.

3. Land application

Leachate would be land-applied during warm months. Acceptable concentrations are based on calculations of how

much pollution the microbes in the soil could break down, how much would remain in the soil, and how agriculture would be protected at the site.

4. Reapplication to a landfill

Leachate could be reapplied to a landfill. The U.S. Environmental Protection Agency has proposed stricter liner requirements for such landfills. Application to a landfill cover is a short term, seasonal solution and may require a different cover design. Injection under the cover may form leachate seeps and leachate movement beyond or around a fill area. The MPCA would require a pilot project before fullscale use would be approved.

5. Incineration

MSW or ash leachate could be added as conditioning water at incinerators. Ash leachate is best suited for use as quench water at incinerators burning refuse-derived fuel. Metal levels in leachate used at incinerators should be monitored over time, as well as stack emissions at the incinerator for compliance with air quality permits.

6. Evaporation

Leachate could be vacuum-heated to evaporate water. Remaining pollutants would be concentrated in a sludge. Ash leachate is probably the best candidate for evaporation because it seldom contains VOCs. This option may have high capital and maintenance costs.

7. Moisture source for compost

Leachate could be mixed with yard waste in a specially designed treatment facility during warm months. Mature compost could be used as daily or final landfill cover, but not for public use.

For more information or to request a copy of the report, contact Gene Soderbeck at (612) 296-8280 or Lanny Peissig (612) 297-1781 at the MPCA.

reprinted from Solid Waste Briefing, Fall 1991

AMTROL Scholarship

AMTROL, of West Warwick, Rhode Island, is a leading manufacturer in the ground water industry and is strongly committed to support education. The company has endowed the American Ground Water Trust's Scholarship Initiative. In recent years, the Trust's Scholarship Initiative has awarded non-renewable scholarships of \$2000 each. The number of scholarships and their amount is reviewed by the Trustees of AGWT each year.

Thirty-five scholarships valued at more than \$61,000 have been awarded since the inception of the program in 1975.

Applicants must complete and submit an AMTROL/American Ground Water Trust Scholarship Application by **April 1** to be eligible for funds that could be awarded for that following academic year. To be considered, you must hold at least a 2.5 cumulative grade point average (GPA). Official academic transcripts must be provided.

A requirement of the application process is the submission of a 500-word or more explanation of how the student's academic training will be applied to the benefit of America's ground water resources.

Applications can be obtained from:

AGWT/ Attn: AMTROL Scholarship
6375 Riverside Drive
Dublin OH 43017

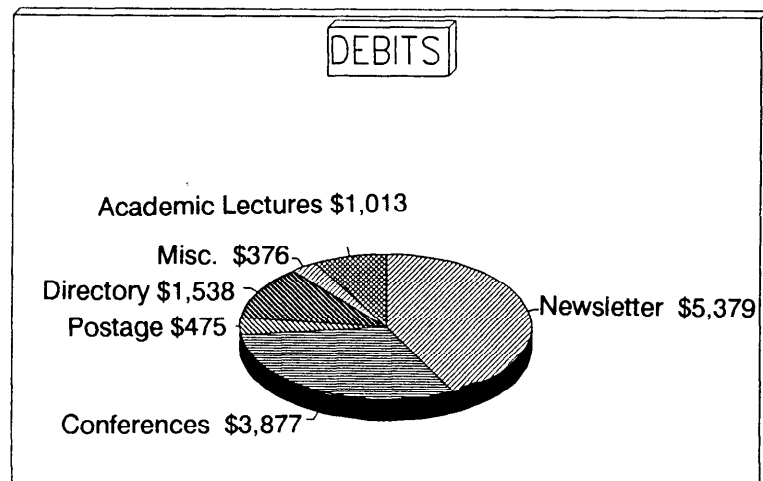
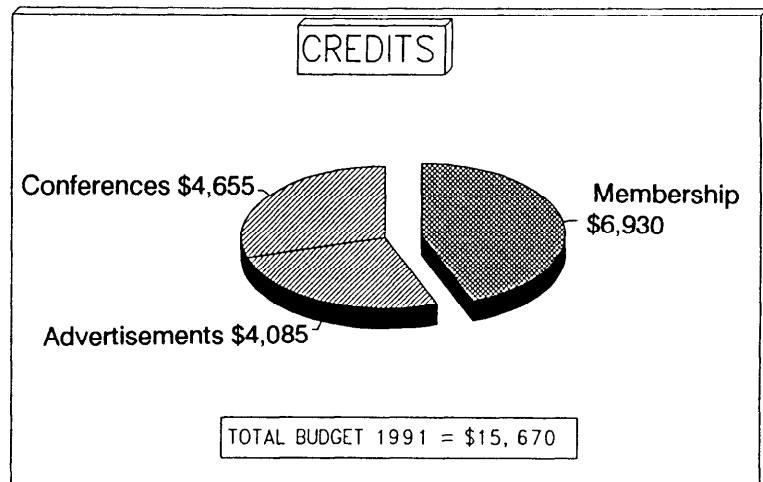
Update on MGS - In Case You Haven't Heard

The Minnesota Legislature has voted to restore \$23 million in funding for the University of Minnesota which includes the Minnesota Geological Survey. Governor Arne Carlson has said he will sign the special appropriations bill to restore funding he vetoed last year.

reprinted from the Pioneer Press, January 15, 1992

January, 1992

MGWA Finances - 1991



Chrysalis Scholarship

The Association for Women Geoscientists Foundation is pleased to announce that three Chrysalis Scholarships will be awarded on March 31, 1992. The \$500 awards will be given to geoscience Masters or Ph.D. candidates to cover expenses associated with finishing their theses. The Chrysalis Scholarship is for candidates who have returned to school after an interruption in their education of a year or longer.

Applications should be made by February 28, 1992. The applicant should write a letter stating her background, career goals and objectives, how she will use the money, and an explanation of the length and nature of the interruption in her education.

The applicant should also submit two letters of reference. The first, from her thesis advisor, should include when the candidate will finish her degree, what requirements are as yet unfinished, and a statement of the candidate's prospect for future contributions to the geosciences.

Please send the described application materials to:

Chrysalis Scholarship
Association for Women Geoscientists Foundation
Macalester College Geology Department
1600 Grand Ave
St Pual MN 55110-1899

Liability Issues and ASFE

The Association of Engineering Firms Practicing in the Geosciences (ASFE) has published five new case histories of professional liability losses, with emphasis on geoenvironmental issues.

ASFE case History No. 56 describes the experiences of a firm retained to provide a geotechnical exploration, develop foundation recommendations and grading specifications, and observe grading for a single-family residential subdivision. The ASFE member estimated the exploration would take four to five weeks, but unexpected delays arose. Approximately one year after the ASFE member was asked to take on the project, construction began. The grading contractor reached the site before the engineer's technician, however, and disposed of surface organics on site rather than off site. The technician failed to document that the site was cleared and never determined if the strippings had been disposed of properly. After large quantities of grasses and weeds were brought up during drilling of the first pier holes, the developer sued the ASFE member for negligence.

The importance of written documentation is exposed in ASFE Case History No. 57. As part of its contract with EPA, the ASFE member was required to access numerous sites. Site owners agreed to cooperate only if they would be indemnified for any cleanup costs. Although EPA was authorized to gain access to privately owned sites, it asked the ASFE member to indemnify the reluctant owners to the extent the ASFE member was indemnified by EPA. The EPA gave oral assurances that, if problems developed, EPA would honor the indemnification. After complications resulted in the flooding of a business establishment, the ASFE member asked EPA to defend the claim. Ultimately, the ASFE member paid \$10,000 to the shop owner; EPA paid nothing.

The importance of written documentation also is noted in ASFE Case History No. 58. The ASFE member was retained by a private solid waste company to design and observe construction of a new industrial nonhazardous waste landfill cell on an existing landfill site. The client indicated it wanted to increase cell capacity to improve profitability. The ASFE member said the cell could be built using another design, but slopes would be far steeper than usual; it would be critical to maintain ground water levels below the bottom of the cell and keep surface perimeter drainage ditches dry during construction and operation of the landfill. The ASFE member did not document these discussions nor did it document the client's oral agreement to operate the dewatering system needed during construction. Problems arose due to mistakes made by the owner and the contractor and the east slope failed. The client felt the ASFE member was responsible, however, and the member ultimately agreed to settle the matter by extending a \$150,000 credit to the client, realizing the cost of litigation would exceed that amount.

In ASFE Case History No. 59, an ASFE member was retained by a shopping center owner to conduct a preliminary site assessment (PSA) on a portion of the property near a store formerly occupied by a dry cleaner. The owner wanted to sell the center. The PSA found no evidence of hazardous materials in the area reviewed. Later, the owner received an offer for the center, but the buyer discovered contaminated ground water in an area that intentionally was not included in the PSA study. The buyer then retracted its offer and sued the ASFE member to recover the value of the deposit it had to forfeit, even though the member's report emphasized the study's limited nature. The case has not yet been resolved.

ASFE Case History No. 60 also involves a PSA. During the Phase One assessment, the ASFE member learned that an old under-

ground tank existed somewhere on the site. A Phase Two PSA was performed and, as time was a serious consideration, the ASFE member decided to find the tank on its own rather than wait for input from the client. The firm located the tank using a magnetometer and then took three borings. Subsequent integrity testing showed the tank was leaking from a crack. The ASFE member's site representative said the crack was caused by the member's boring operation. He admitted responsibility for the damage and the contaminated soil was removed and disposed of at an authorized disposal facility. The ASFE member believed it could not enforce its contract's indemnification provisions because the firm located the tank itself without formal changes to the contract, as a favor to the client. The member compounded the problem by admitting error. Eventually the firm had to sign an agreement admitting responsibility and agreeing to provide whatever additional remediation authorities felt necessary.

ASFE Case Histories 56-60 are available for \$3.50 each or all five for \$15 from ASFE, 8811 Colesville Road, Suite G-106, Silver Spring, MD 20910. Remittance must accompany each order.

ASFE was established in 1969, principally to help its members resolve the many professional liability problems that threatened their existence. The programs and publications created to help members lower their liability have proven so successful, ASFE members reportedly have the lowest professional liability insurance rates of all consulting engineers and architects. Today, ASFE's membership comprises engineering firms practicing in many areas of the geosciences, including geotechnical engineering, geoenvironmental engineering, geohydrology, and geochemical engineering.

reprinted from an ASFE News Release, December 27th 1991

Update on the ASTM Subcommittee on Ground Water and Vadose Zone Investigations

Three standards directly related to ground water and vadose zone investigations have recently been approved through the ASTM consensus process and are currently available through the ASTM headquarters office in Philadelphia, Pennsylvania. They are available now as "separates" or as part of the 1991 Annual Book of ASTM Standards (Volume 04.08). These three standards are:

- D-5088 Standard Practice for Decontamination of Field Equipment Used at Non-Radioactive Waste Sites (Subcommittee D-18.14)
- D-5092 Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers (Subcommittee D-18.21)
- D-5126 Standard Guide for Comparison of Field Methods for Determining Hydraulic Conductivity in the Vadose Zone (Subcommittee D-18.21).

For additional information contact:

ASTM
1916 Race St
Philadelphia, PA 19102

Report on Economic Implications of Ground Water Contamination

The case studies in this 80-page report published by the Freshwater Foundation form a microcosm of a nation dilemma. The 21 cities and 18 companies included collectively spend over \$67 million in a five year period on ground water cleanup and remediation.

Included are recommendations for creative management approaches and effective actions by cities, counties, and businesses to prevent future contamination problems and illustrates the need for strong private-public partnerships to redevelop contaminated properties.

It should be read by city and county administrators, business executives, state and federal officials, consulting engineers, realtors, environmental lawyers, commercial lenders and developers, ground water scientists, and utility investors.

Economic Implications of Ground Water Contamination to Companies and Cities is available for \$10 and may be ordered from:

Publications Dept
Freshwater Foundation
725 County Road 6
Wayzata, MN 55391

NWWA Changes Name to NGWA

On Monday, October 21, 1991, the NWWA Board of Delegates met in Washington, D.C., to vote on the proposed name change of the National Water Well Association. After discussion, the delegates voted and the Association name was changed to National Ground Water Association (NGWA).

The NGWA is a professional organization composed of scientists, regulators, educators, consultants, tradesmen, manufacturers, and suppliers that services all members. The membership represents the spectrum of persons actively involved in the ground water industry.

*reprinted from AGWSE
Newsletter, December 1991*

Dues for 1992!

It is time to pay your dues for 1992. Members were sent a dues billing. If you have not received this mailing, perhaps we have lost track of you. Send your payment and new address to the address listed on the form below. Dues must be paid by February 29th to guarantee your listing in the 1992 MGWA Directory.

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 1992. Annual dues are \$15 for professional members and \$10 for students. Additional donations toward the use of 100% recycled paper will be gratefully accepted.

Just complete the form below and mail to: MGWA, c/o WRI, 4779 126th St. N, White Bear Lake, MN 55110-5910

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? _____

Technology Update at MGWA Fall Meeting

The MGWA Fall Meeting was held the afternoon of November 26th at the Earl Brown Center. The meeting provided a good opportunity for members to catch up on some of the newest technology as well as hear Dr. Jacob Bear discuss the proper use of various kinds of models by regulators. About 50 members attended the fall meeting.

Dr. Bear was in Minnesota while on sabbatical from the Israel Institute of Technology. He stressed that a model, whatever kind, is a management tool which is appropriately used to compare alternatives and to assist in decision-making. Dr. Bear explained that the simplifying assumptions of any model, even the roughest conceptual "back of the envelope" model, should be written down to ensure that some important factor, behavior, or property has not been overlooked.

Uncertainty and the use of sensitivity tests was another topic addressed by Dr. Bear. He listed the many sources of uncertainty in ground water models, for example initial conditions, boundary conditions, sinks and sources, and various parameter values, including transmissivity. He explained that sensitivity tests help identify which data are critical to model performance and which data have little effect.

Andy Strutnsky of Stratigraphics described the use of the cone penetrometer for shallow environmental investigations. A hydraulic ram pushes a small diameter rod vertically downward while geotechnical information is recorded by sensors. The apparatus has recently been modified to acquire other data necessary for environmental investigations including soil, soil gas and water samples. The equipment is capable of grouting the small penetrometer holes, which is essential if it is to be used in contaminated areas.

Kevin Carter of Ensys, Inc., provided a good background and introduction to what immuno-assay testing is and why it might be the preferred analytical choice. Kevin explained that immuno-assay tests have been developed and used in the medical field over the past 20 years.

The FDA has approved 150 immuno-assay tests for the medical field. The tests require the identification or synthesis of a specific antibody for a specific chemical of interest, a "lock" that will only respond to a specific "key". Currently, immuno-assay tests are available for relatively few contaminants, but include PCB's, PCP, phenol, triazines and some specific industrial applications. Costs are relatively low for screening, about \$50/sample for field tests and about \$10/sample for lab screening.

Bill Breitzman of Terracon Environmental, Inc., discussed his experience in using immuno-assay tests. He said the best use of immuno-assay tests is in those cases where real-time, same-day data are needed at low detection levels and perhaps for both soil and water. At present only a few kits are available for field use. The procedure requires a trained, qualified operator and a clean, enclosed environment.

-Jan Falteisek

Fifth Edition of Ground Water Bibliography Printed

A new fifth edition of Geraghty & Miller's Groundwater Bibliography, by Frits van der Leeden, has been published by Water Information Center Inc. and Lewis Publishers Inc. The 507-page paperback contains 5600 selected references to both classic works and significant new papers. This new fifth edition contains approximately 600 more entries, reflecting the tremendous growth of interest in ground water that has occurred in recent years. Areas of current interest and research such as ground water contamination, modeling, and legal issues are included. Also new to the fifth edition is the inclusion of a 58-page author index. The cost is \$69.95 plus \$2 p&h. Orders are taken by:

Water Information Center Inc, 125 E Bethpage Rd., Plainview, NY 11803

East Europe's Pollution Control Market Outlined

Joint ventures appear the most effective way of breaking into the fast-growing market for pollution control equipment and services in Eastern Europe and the Soviet Union. This is the view of international market research publishers Frost & Sullivan.

The region comprising Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia faces a massive environmental crisis. There is potential demand for pollution control goods and services but an acute shortage of money, technology and expertise.

The report says success will require partnerships involving local companies, national or local authorities, and national or international funding agencies.

The report examines the total market within Eastern Europe for water pollution, air pollution, and waste management. Expenditures on all environmental goods and services is predicted to increase from \$2.15 billion in 1991 to \$11 billion by 1995.

The report also looks at the present market in the Soviet Union which it estimates at \$3.08 billion.

Fastest growth in Eastern Europe will be seen in waste management, which is identified as "potentially the most serious problem facing the region."

Huge volumes of industrial and municipal waste have accumulated on industrial premises or have been dumped illegally. They now pose a serious threat to soil and ground water. The market is forecast to grow from \$285 million in 1991 to \$2.55 billion by 1995.

The East German pollution control market has expanded rapidly the last two years. The market, worth \$206 million in 1991, is forecast to be worth more than \$967 million by 1995.

The price of report E1508 is \$3900. For more information, contact:

Frost & Sullivan International
106 Fulton St
New York, NY 10038

Commerce Department Plans East European Mission

The U.S. Department of Commerce is organizing an Environmental Technologies Trade and Investment Mission to Poland, Rumania, and Bulgaria, March 10-21, 1992. The mission will cover air, water, and soil pollution abatement, waste water and hazardous waste treatment, energy recovery, and monitoring/measuring technologies.

The mission will provide contact with ministries of the environment, privatization, and industry. Participating companies will also meet with industrial concerns. Commercial officers at each U.S. embassy will arrange private meetings to complement group sessions.

Eastern European governments have begun to show their resolve to clean up their environments and to engage in trade. Poland, Romania, and Bulgaria have changed their laws to facilitate trade and investment. They are also recognizing international standards for the protection of the environment.

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For a fee of \$2800, U.S. Department of Commerce commercial officers will provide meetings with future contacts in Poland, Romania, and Bulgaria.

For further information, call Frederica Wheeler at (202)377-3509, or fax a request for information to (202)377-5665. Include information about your company's products or services.

*reprinted from Water Well Journal,
January 1992*

January, 1992

Newsletter Advertising Policy for 1992

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Size inches..... Annual
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quarter page..... 3.5x5.....\$90
half page..... 7x5.....\$170
full page..... 7x10.....\$320

Copy should be a photostat of your camera-ready artwork.

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

Hey, What's Up?

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EPA Orders Closure of Injection Wells in Region 5

U.S. Environmental Protection Agency Region 5 recently notified operators of 200 Class V underground injection wells in Indiana, Michigan, and Minnesota that they must discontinue well operations because they lack the proper permits.

The notices state that because the operators do not have federal permits, they must cease injection and submit either permit applications or plans for permanent closure of the wells. Additionally, the operators must submit data for EPA to determine whether injected fluids have contaminated the ground water.

"Some operators may have been unaware that they were operating Class V injection wells," Miguel Del Toral, an EPA engineer, said. "But, floor drains and sinks which are connected to septic tanks or dry wells and receive anything other than domestic waste are considered Class V wells."

EPA divides injection wells into five classes with Class V being a "catch-all" category that incorporates all those that don't fit into other groups. Class V injection wells, sometimes called shallow injection wells, often discharge fluids above or directly into underground sources of drinking water.

Operators of Class V injection wells were required to submit inventory information about their wells by 1985; if they did not, they lost authorization to operate the wells.

reprinted from Water Well Journal, September 1991

Editors note: What follows is the latest information from Gretchen Sabel of the MPCA.

The Minnesota Pollution Control Agency is in the process of developing an Underground Disposal Control Program which will address Class V injection wells.

The goals of this effort are to:

1) prevent new Class V well installations at motor vehicle mainte-

nance and other industrial facilities, and

2) work with federal and local governments and the regulated community to develop an equitable and effective way to deal with existing facilities with Class V wells.

Program staff have been meeting with groups including county planning and zoning administrators, on-site sewage treatment contractors, and building inspectors. The focus of these talks has been to develop an awareness of the federal program and to create relationships necessary to the development of the state program.

A policy basis for the state program has been drafted, and will be available for public comment in March. For more information, contact Gretchen Sabel of the MPCA Ground Water Unit at (612)296-0550 for more information.

Older Americans Useful at Finding Abandoned Wells

Someone who knows where all the bodies are buried is generally perceived as having a political advantage. In El Paso, Texas, the assistance of a group of older volunteers who knew where the abandoned wells were buried proved to be a real plus for the environment.

Early last year for the first time in the United States, private citizens took part in an inventory of possible sources of ground water contamination, a survey aimed at protecting the community's drinking water.

The pilot project was a joint effort by the Texas Water Commission, the U.S. Environmental Protection Agency and the El Paso Senior Volunteer Program.

"Older persons were targeted for the project because they have historical knowledge of where old wells, old gas stations, and other potential sources of contamination might be located," says Brad Cross, the Texas Water Commis-

sion geologist who headed the project.

About 30 volunteers surveyed 140 city water wells after attending a seminar on ground water contamination. They were briefed on how to take an inventory of existing wells and how to recognize potential pollutants.

For example, Cross says, "If they spotted a gas station, they knew it contained underground storage tanks. The next step was to ask the station operator how many tanks there were. They also were advised to ask the operator if the station had a dry well or pit for disposing of used oil or anti-freeze.

If an operator was uncooperative, volunteers were asked to write down the number of pumps so we could estimate the number of underground tanks."

Finding abandoned water wells was trickier because they are often hard to notice unless the observer is right on top of them. Fortunately the older volunteers remembered where many of these wells were located. They also knew that the existence of a windmill meant a well was nearby.

The public proved to be cooperative, and assessment of the targeted areas was completed in only four days. Officials and others connected with the project attribute at least part of the citizens cooperation to the volunteers maturity.

Several of the volunteers have since formed a committee to continue monitoring possible ground water contaminants and to address other environmental concerns. Programs modeled on the El Paso project are under way in other states, and information about the project has appeared in several environmental publications.

"The kickoff in El Paso has the potential to start a national movement," says EPA's Larry Graham, an AARP member.

reprinted from Water Well Journal, November 1991

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New Members are listed here, as are "old" members whose addresses were not included in the last directory.

Copy this page and add it to your copy of the directory.

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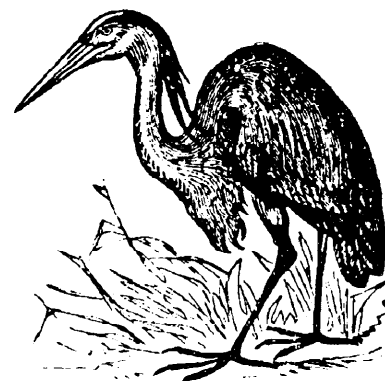
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Calendar

March 10-12, 1992. *Understanding Migration, Assessment, and Remediation of Non-Aqueous Phase Liquids.* To be held in St. Louis, Missouri by NGWA.

March 10-12, 1992. *Microbial Processes in the Degradation of Ground Water Contaminants.* To be held in St. Louis, Missouri by NGWA.

March 10-12, 1992. *Hazardous Materials and Environmental Management Conference & Exhibition.* To be held in Rosemont, Illinois. Contact Tower Conference Management Co., 800 Roosevelt Rd, Bldg. E - Suite 408, Glen Ellyn, IL 60137-5835.

March 13, 1992. *Environmental Property Assessments (EPRA), One-Day Course.* To be held in St. Louis, Missouri by NGWA.

March 24-27, 1992. *Analysis and Design of Aquifers Tests.* To be held in Columbus, Ohio by NGWA.

March 29 - April 3, 1992. *Practical Approaches to Ground-Water Contamination.* Contact the School of Geology, Oklahoma State University, 105 Noble Research Center, Stillwater, OK 74078-0451.

April 6-10, 1992. *MODFLOW (USGS Modular Flow Model) for Simulation of Ground Water Flow and Advective Transport.* To be held in Boston, Massachusetts by NGWA.

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. Capitol St., Iowa City, IA 52242 (319)335-1575.

May 11-14, 1992. *Practical Approaches to the Evaluation and Remediation of USTs.* Contact the

School of Geology, Oklahoma State University, 105 Noble Research Center, Stillwater, OK 74078-0451.

May 12-14, 1992. *Corrective Action for Containing and Controlling Ground Water Contamination.* To be held in Durham, North Carolina by NGWA.

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.

August 25-27, 1992. *Microbial Processes in the Degradation of Ground Water Contaminants.* To be held in Portland, Maine by NGWA.

August 28, 1992. *Environmental Property Assessments (EPRA), One-Day Course.* To be held in Portland, Maine by NGWA.

September 15-18, 1992. *Analysis and Design of Aquifers Tests.* To be held in Columbus, Ohio by NGWA.

September 22 - 24, 1992. *Understanding Migration, Assessment, and Remediation of Non-Aqueous Phase Liquids.* To be held in San Antonio, Texas by NGWA.

September 25, 1992. *Environmental Property Assessments (EPRA), One-Day Course.* To be held in San Antonio, Texas by NGWA.

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 5-7, 1992. *Capture-Zone Analysis for Contaminant Remediation and Wellhead Protection.* To be held in Burlington, Vermont by NGWA.

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.

November 9-13, 1992. *MODFLOW (USGS Modular Flow Model) for Simulation of Ground Water Flow and Advective Transport.* To be held in San Francisco, California by NGWA.

November 10 - 12, 1992. *Understanding Migration, Assessment, and Remediation of Non-Aqueous Phase Liquids.* To be held in San Francisco, California by NGWA.

December 1-3, 1992. *Corrective Action for Containing and Controlling Ground Water Contamination.* To be held in Orlando, Florida by NGWA.

For information about meetings and seminars to be held by the AWRA, contact Michael C. Fink, 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 NGWA, contact NGWA at 6375 Riverside Drive, Dublin, Ohio 43017 (614) 761-1711.

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

Commerce Department Plans East European Mission

The U.S. Department of Commerce is organizing an Environmental Technologies Trade and Investment Mission to Poland, Rumania, and Bulgaria, March 10-21, 1992. The mission will cover air, water, and soil pollution abatement, waste water and hazardous waste treatment, energy recovery, and monitoring/measuring technologies.

The mission will provide contact with ministries of the environment, privatization, and industry. Participating companies will also meet with industrial concerns. Commercial officers at each U.S. embassy will arrange private meetings to complement group sessions.

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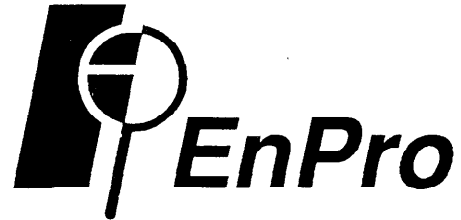
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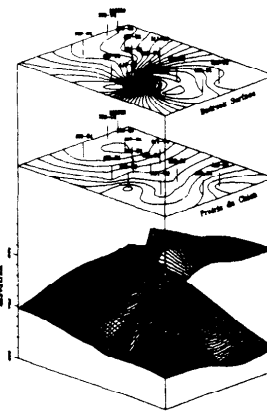
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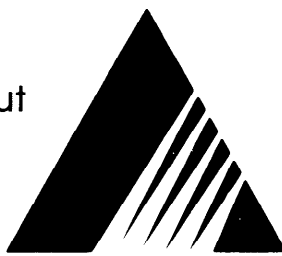


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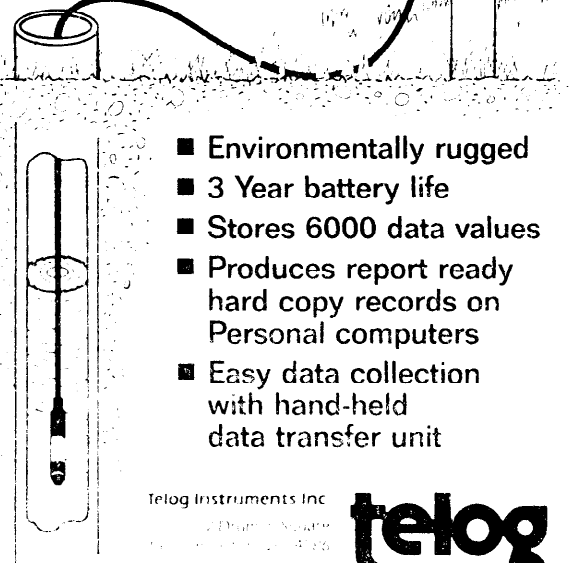


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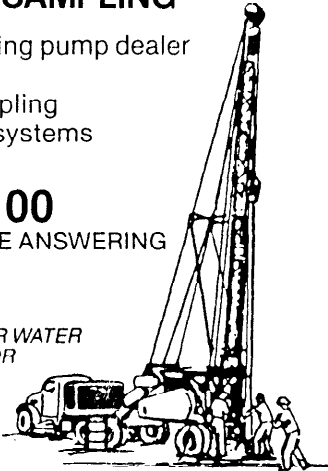
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