

Minnesota Ground Water Association

Volume 11, Number 2: September 1992

Ten Years And Going Strong

"The Minnesota Ground Water Association is unlike any other professional society in the state. The Association focuses not on one profession, but on one basic resource: ground water. As you are aware, Minnesotans now face serious ground water contamination problems and, as a result, possible water supply problems. Workable solutions to these problems cannot be provided by any one profession. The Minnesota Ground Water Association has been founded to bring together members of the various profes-

sions whose responsibility it is to solve our ground water problems, and to promote intelligent use of ground water resources in the state: not only hydrogeologists, but also engineers, drillers, chemists, consultants, lawyers, academicians, administrators, regulators, and others, working both in government and in the private sector."

The above is the opening statement written in October 1982 for the first Minnesota Ground Water Association (MGWA) newsletter. As one of the founding members and as the first president, I was asked to evaluate if the MGWA had met

the goals envisioned by the founding members. I revisited our opening statement, called a few "old" friends who were first officers (see page 5) and instrumental in starting the organization, and looked back over the many newsletters and seminars in order to respond to this request.

Great news! The MGWA is exceptionally healthy and fulfilling all but one of the original goals established by the founding group.

This is the consensus of the people I called and the honest truth is that we, as founding members, are very proud to have been instrumental in starting the organization. We thank the many people who took our seed and grew it into the organization we have today.

Our discussions have concluded that the only goal MGWA

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President's Page

Often we're overwhelmed by how much is left to be done in our efforts to improve our environment and understand our ground water resources. But as we celebrate the 10th anniversary of MGWA, let's also acknowledge the amount of work that has been done as the result of legislation and education. Each piece of legislation or activity represents thousands of hours of work.

Federal Legislation

(The Minnesota Pollution Control Agency provided the list of the federal major environmental legislation presented below.)

Year	Legislation	Public Law
1970	Clean Air Act Amendments	91-604
	Water Quality Improvement Act	91-224
1972	Federal Water Pollution Control Act	92-500
	Marine Protection, Research and Sanctuaries Act	92-532
	Coastal Zone Management Act	92-583
	Federal Environmental Pesticide Control Act	92-516
	Noise Control Act	92-574
1973	Endangered Species Act	93-205
1974	Safe Drinking Water Act	93-523

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September, 1992

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1976	Federal Land Policy and Management Act	94-579
	National Forest Management Act	94-588
	Resource Conservation and Recovery Act	94-580
	Toxic Substances Control Act	94-469
1977	Clean Air Act Amendments	97-375
	Clean Water Act	95-217
	Surface Mining Control and Reclamation Act	95-87
1978	Outer Continental Shelf Lands Act Amendments	95-372
1980	Comprehensive Environmental Response and Liability Act ("Superfund")	96-510
	Alaska National Interest Lands Conservation Act	96-487
1984	Hazardous and Solid Waste Amendments	98-616
1986	Safe Drinking Water Amendments	98-339
	Superfund Amendments and Reauthorization Act	99-499
1987	Water Quality Act	100-4
1988	Endangered Species Act Reauthorization	100-478
	Federal Insecticide, Fungicide and Rodenticide Act Amendments	100-532

State Legislation

In addition to other statutes and rules, the Minnesota state legislature passed the 1989 Groundwater Protection Act. The goal of this act is non-degradation of the state's ground water resource. The authors of the legislation recognized that because of some human-related activities, non-degradation of ground water currently is not practicable; in those cases, the legislation promotes striving for improvement.

Beyond Legislation

Emphasis in many of the geology departments of our educational institutions has shifted from petroleum exploration to environmental education. The University of Minnesota just filled the Gibson endowed faculty position, a new position created to promote the understanding of hydrogeology. Other universities have expanded their law, engineering, and water resource departments.

Awareness of the impacts of our actions on the environment clearly has grown. Elementary school children are telling their parents about the monitoring wells at gas stations. Recycling is part of our style of living. The number of environmental consulting firms has grown to fill a need generated by laws demanding good stewardship. Prevention of contamination is a high priority as industry recognizes good ecology is good business.

I want to take this opportunity to thank the members of MGWA for their efforts during the last 10 years toward the protection of our ground water resources.

— *Shiela Grow, MGWA President*

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has not fulfilled in ten years is public education. The public is that group which still thinks ground water is found in underground rivers by water witching. We have worked hard at providing educational opportunities for the diverse professional membership; however, we have not succeeded in developing an educational service for the public.

Several regulatory agencies have contributed to public education and there are exceptional individual efforts, but the MGWA has not succeeded at this goal. Perhaps this goal is not part of the current mission of the MGWA because there are other organizations active in public education. However, I and other founding members disagree. We challenge the current Board of Directors to present a public education program to the membership.

In review, MGWA is a thriving organization which provides more than was ever imagined possible, yet there are concerns about the future of the organization. In 1982 I ended the opening address with a challenge:

"The Minnesota Ground Water Association invites – and challenges – you to work to solve Minnesota's ground water problems. Bring to the Association your experience and professional pride, but not your prejudices. Be generous enough to teach but willing to learn and listen."

The strength and future of the MGWA is its members, members who will participate. MGWA needs active members to participate and to bring their ideas and opinions.

Those who have never served on a committee or as an officer are challenged to volunteer. Say yes next time someone asks for your contribution. This is your organization and its success and future depend on your participation. Let's get busy.

— *Gilbert Gabanski, First MGWA President (1982-1985) and Founding Member*

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FAX (612) 296-0445

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Publications
Dr. Jeanette Leete
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Texas controls aquifer by crying a river

By simply declaring a 180-mile long aquifer an "underground river," the Texas Water Commission has taken an unprecedented control of well water in the state.

After years of trying to settle ground water usage disputes in central Texas and fearing a federal takeover of the situation, the commission issued an emergency declaration that renames the Edwards Aquifer "The Edwards Underground River."

The action essentially voids the Texas tradition of "free capture" rights of subsurface water by private property owners. Both municipal and agricultural interests have expressed outrage over the state seizure of the Edwards Aquifer.

The Edwards is the sole source of drinking water for about one million Texans and has been the focus of recent bitter disputes.

After aquifer-fed springs in Comal and Hays counties dried up, the Sierra Club filed suit in federal court to obtain U.S. control. The environmental group claims that the snail darter, an endangered species that lives in Comal Springs near New Braunfels, Texas, is threatened by mismanagement of the aquifer.

Earlier this year state Attorney General Dan Morales ruled that the commission's authority to regulate ground water is constitutional, even to the extent that it might override the traditional right of capture in the state.

—U.S. Water News, June, 1992

Symposium on Contaminated Soils

A Symposium on Analysis of Soils Contaminated with Petroleum Constituents will be held June 24-25, 1993 in Atlanta, Georgia. ASTM Committee D-18, in cooperation with the American Petroleum Institute, is sponsoring the symposium.

The symposium will provide an opportunity to examine the existing technology used by scientists and engineers to measure and evaluate soil material which has become contaminated with organic derivatives of petroleum hydrocarbons or unrefined petroleum.

For information, contact Dorothy Savini, ASTM, 1916 Race St., Philadelphia, PA 19103-1187, (215)299-5413.

—May 92, Water Well Journal

Clean Water 2000 Conference to be held September 17-18

The U.S. Environmental Protection Agency is sponsoring a two-day conference through the Clean Water Act about nonpoint source pollution and ground water protection. The Anoka Sand Plain Association of Soil and Water Conservation Districts is organizing the conference to be held at the Northwest Inn in Brooklyn Park on September 17-18, 1992. The program speakers will address wetland regulations, ground water protection strategies, wellhead delineation, water quality monitoring programs, health effects of contamination, public education resources, glacial geology, and recent studies addressing ground water quality as it is affected by agriculture.

Registration for the conference will be limited to 250 participants. The fee for the two-day workshop is \$40 and includes the cost of lunch and materials. For more information, call Sara Anderson, coordinator at MASWCD, at 690-9028.

Superfund Network Approved by EPA

The Environmental Protection Agency has approved development of the State Superfund Network, the first computerized information exchange offering direct access states using personal computers. Made possible through a two-year \$25,000 grant by EPA, the Network will be available at no charge to users, except the cost of the phone call. The program will be available to state Superfund staff beginning in May.

—Water Science and Technology Board Newsletter, National Research Council, April 1992

September, 1992

New EPA Software for Tracking Ground Water Information

The EPA will be offering a new free software package this summer designed to streamline solutions to ground water problems. Developed by Alliance Technologies Corp., the new package, GRITS (Groundwater Information Tracking System), is intended to improve the efficiency of ground water modeling by enabling federal and state regulators and facilities to better identify where ground water remediation efforts are needed.

The idea is to allow regulatory authorities electronic access to comprehensive ground water data. Facilities will be able to plot out and identify problems on its properties while EPA will be able to cross-reference and plot data to compare problem areas.

GRITS software and user manuals may be obtained by calling the EPA/ORD Center for Environmental Research Information and ordering document number 625/11-91/002/GRITS/STAT 4.2. Training workshops are also being offered by EPA.

—*Water Well Journal June '92*

Member News

The St. Paul offices of **EnPro Assessment Corp.** have moved. Please note the change of address:

EnPro Assessment Corp.
821 Raymond Ave. Ste. 330
St. Paul, MN 55114-1525

The fax and phone numbers have also changed: (612)645-5747 (fax) and (612)645-6330 (phone).

Sheila Grow and **Bob Beltrame** have joined Camp, Dresser & McKee.

Sponsor a Recycled Newsletter!

The reality of using recycled paper is that it costs more. We need \$100 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.

GSA Internships for Advanced Students

The Geological Society of America Institute for Environmental Education has initiated an internship program to inform student geoscientists of environmental and geotechnical employment opportunities and to meet the needs of industry and government. The program will coordinate the placement of advanced students in limited-term positions of supervised training in environmental practice prior to completion of their degrees.

The internships will provide an opportunity for the student to evaluate possible interests in working in geoenvironmental science, and will also provide insight into specific areas of knowledge that are particularly valuable in pursuing those interests. The selected work environments will expose the interns to activities that both utilize and complement their academic training and that provide guidance for additional coursework when they return to school to complete their degrees.

Student and professionals who are interested in the program should contact the Institute to indicate this interest. Students should provide a brief summary of their training to date, availability, and possible interests. Professionals should provide information about their geoenvironmental program and describe the possible opportunities for interns in their organization.

Send a letter of interest and requested information to Fred A. Donath, Executive Director, Institute for Environmental Education, Geological Society of America, P.O. Box 9140, Boulder, CO 80301, or fax (714) 366-0601.

—*GSA Today, March 1992*

Newsletter Advertising Policy for 1992

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 Rate
business card	3.5x2.4	\$50
quarter page	3.5x5	\$90
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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:

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Editor, MGWA Newsletter
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1984	Gil Gabanski	Gil Gabanski	Dennis Woodward	Gretchen Sabel	Kelton Barr	Tom Clark	Pat Leonard-Meyer
1985	Gil Gabanski	Gil Gabanski	Jerry Rick	Gretchen Sabel	Jim Stark	Tom Clark	Kevin Powers
1986	Gil Gabanski	Jerry Rick	Rick Johnston	Gretchen Sabel	Jim Stark		Kevin Powers
1987	Jerry Rick	Rick Johnston	Linda Lehman	Pat Bloomgren	Jim Stark		Kevin Powers
1988	Rick Johnston	Linda Lehman	Bob Karls	Pat Bloomgren	Gordy Hess		Lee Trotta
1989	Rick Johnston	Linda Lehman	Bob Karls	Don Jakes	Gordy Hess		Lee Trotta
1990	Linda Lehman	Bob Karls	Gordy Hess	Don Jakes	Bob Beltrame		Lee Trotta
1991	Bob Karls	Gordy Hess	Sheila Grow	Susan Price	Bob Beltrame		Jan Falteisek
1992	Gordy Hess	Sheila Grow	Larry Johnson	Susan Price	Bruce Olsen		Jan Falteisek

- The positions of Membership Coordinator and Secretary were combined in 1986; the office of Vice President became President-Elect in 1986.

Tests of "Magnet" Technology at Contamination Sites

A field test is planned to start to study the use of electric "magnets" that may speed the cleanup of ground water contamination at hazardous waste sites. The magnets, actually positive and negative electrodes placed in wells to attract pollutants with the opposite charge, could substantially reduce the cost of ground water cleanup. Laboratory tests of the technology, designed by Don Runnells of the University of Colorado Geology Department, have proven to be successful.

The new technology could substantially reduce the volume of water that must be pumped at conventional pump-and-treat sites by using an electric field, instead of only hydraulic forces, to pull contaminants toward extraction wells. This approach would only be suitable for charged contaminants such as copper, zinc, lead, manganese, iron and mercury. Industrial solvents such as trichloroethylene are neutral and therefore not strongly attracted to the electrodes. However, even a neutral molecule can move in an electric field if its positive and negative charges are distributed asymmetrically.

—*Water Science and Technology Board Newsletter, April, 1992*

September, 1992

New Jersey Issues Interim Procedures on Implementing UST Certification Program

The New Jersey Department of Environmental Protection and Energy issued an Interim Procedure to implement the state's Underground Storage Tank Services Certification Law. The Interim Procedure defines the following service classifications: installation, closure, tank testing, subsurface evaluation, and corrosion protection system analysis. Among the issues discussed in the Interim Procedure are grandfathering, exemptions, initial certification, fees, exams, and training. In order to be qualified to take the exam for subsurface evaluation classification, and individual must have a bachelor's degree from an accredited institution in a natural science, or related engineering discipline, appropriate health and safety training, two years of experience, and participation in at least five subsurface evaluations for the purpose of identifying and evaluating ground water and soil contamination, aquifer characteristics, measurement and analyses of ground water flow gradients, and classification of soils during each year of experience.

—*NGWA Briefings - Summer 1992*

Update on Professional Geologist Registration in Wyoming

The Wyoming Board of Registration for Professional Geologists' notes that the deadline for registration under the "grandfather clause" ended at midnight on June 30, 1992. During this 'grandfather' period, a qualifying geologist with four years of professional geological experience could apply for registration as a Professional Geologist without taking any examination. Also, a recent graduate in geology, who does not have four years of experience, may apply for certification as a Geologist-in-Training without taking one of two examinations. The application fee for the Professional Geologist registration is \$94; the fee for a Geologist-in-Training is \$47.

Approximately 250 geologists have received their registration as Professional Geologists in Wyoming.

In Wyoming, geologists only need to register if they want to use the title, Professional Geologist. Geologists not using the title are free to practice in Wyoming without licensing. For an application packet or more information, write or call: Wyoming Board of Registration for Professional Geologists, P.O. Box 3008, University Station, Laramie, WY 82071, (307)766-2490.

MDH Tritium Study

Final drafts of a Minnesota Health Department report describing the results of 212 tritium analyses of ground water are out for final review, according to Jim Walsh, project hydrogeologist at the MDH. The tritium tests focused on public water supplies and the results are used to assess well vulnerability.

The 212 analyses extend the current database of 600+ state-wide tritium analyses.

Tritium is an isotope of hydrogen that has proved to be especially useful for estimating short term ground water recharge (decades or less).

The data collected will be transferred to the Land Management Information Center. The report is expected to be available this fall.

For more information contact Jim Walsh, at 627-5166.

Don't Forget!

- Fall MGWA-AIPG Seminar/Field Trip, September 11-12, 1992, Duluth.
- Fall MGWA Workshop on Aquifer Characterization, November 7, 1992, St. Paul.

New USGS District Chief for Minnesota

George Garklavs has been named chief of water resources operations in Minnesota for the U.S. Geological Survey.

As chief of the Minnesota District office, Garklavs is responsible for managing the \$4.2 million program. The USGS monitors stream and ground water resources at more than 700 locations in Minnesota and is currently conducting 24 cooperative investigations with 25 state, local, and federal agencies.

Garklavs joined the USGS in 1977 and has worked in DeKalb, Illinois; Bismarck, North Dakota; and Denver, Colorado. He has a bachelor of science in geology from Illinois State University.

New Offices for USGS

The 58 employees in the Minnesota District office have a new home. The office has moved from the Post Office Building in St. Paul to the Mounds View Business Park, 2280 Wooddale Drive, Mounds View, MN 55112. The Mounds View Business Park is at the intersection of U.S. 10 and County Road H. Their new phone number is 783-3100 and the new district fax number is 783-3103.

MGWA Scholarships Available

In celebration of the 10th anniversary of the Minnesota Ground Water Association, the MGWA is offering ten scholarships, each for \$200, to Minnesota institutes of higher education to help finance geology field trips for undergraduate students. The scholarships are intended to encourage field trip opportunities that will capture the excitement and imagination of potential future geologists and hydrogeologists.

To qualify for the scholarships, schools should submit a short letter of application describing the proposed field trip and estimated costs. All of Minnesota's Geosciences Departments have been invited to apply.

After the field trip is completed, a paragraph about the trip and a picture should be provided to the MGWA for inclusion in this newsletter.

Scholarships will be awarded based on the merits of the field trip experience described in the application, as judged by the MGWA officers. The MGWA would like to award the scholarships in early fall 1992, but field trips may be taken any time during the 1992-1993 school year.

For more information, call Sheila Grow at Camp, Dresser & McKee, 293-1313.

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.

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Calendar

1992

September 11-12, 1992. *MGWA-AIPG Fall Seminar and Field Trip.* To be held in Duluth.

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 8, 1992. *Integrating Tomorrow's Future. Minnesota GIS/LIS Consortium Third Annual Conference & Workshops.* Contact: The Management Company, Inc. 1700 North Skyline Drive, Burnsville, MN 55337.

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 & Symposium: Managing Water Resources During Global Change.* To be held in Reno, Nevada by AWRA.

November 6-7, 1992. *Environmental Education Conference: The Citizens, The Schools, The Environment.* Contact Pat Hutchinson, Minnesota Department of Education/Environmental Education, 550 Cedar Street, St. Paul, Minnesota 55101.

November 7, 1992. *MGWA Fall Workshop on Aquifer Characterization.* Contact: Bruce Olsen, 627-5167.

November 9-13, 1992. *MOD-FLOW (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.

1993

January 3-8, 1993. *IBM-PC Applications in Ground Water Pollution and Hydrology: A Hands-On Short Course.* To be held in San Francisco, California by NGWA.

More details available from:

For information about meetings and seminars to be held by the American Water Resources Association (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 National Ground Water Association (NGWA), formerly the National Water Well Association, 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 (303)273-3278.

Wisconsin DNR Clarifies New Rules

There has been some confusion in Wisconsin, especially in its geotechnical well industry, regarding what rules apply to well and drillhole(borehole) abandonment and to whom the rules apply. Proper abandonments of wells and drillholes, including geotechnical boreholes, is now governed by the newly revised State Private Well Code (NR 112, Wisconsin Administrative Code). The newly revised well code defines a "drill-hole" as "any excavation or opening ... deeper than it is wide that extends more than 10 feet below ground surface.."

The new private well code applies to all wells and drillholes (boreholes) in Wisconsin regardless of well or drillhole type, except when another state code applies. For example, certain monitoring wells are governed by ch. NR 141 which applies to monitoring wells constructed at DNR-regulated facilities or constructed under DNR contracts. However, if for some reason a monitoring well is not appropriately abandoned under the rules of NR 141, then NR 112 would apply.

New criteria in the revised well code indicates when and under what conditions a well or drillhole must be properly filled. Under the new criteria, a well or drillhole (borehole) must be abandoned and properly filled if it poses a hazard to health or safety, has non-complying construction or location, is uncontaminated, or if it has been taken out of service.

When a well or drillhole (borehole) is properly filled, a well/drill-hole abandonment form (Form #3300-5B or 5W) must be completed and submitted to the appropriate DNR district office within 30 days of completion of the work.

The new well code rules apply to everyone in Wisconsin, including licensed well drillers, firms that construct geotechnical drillholes (boreholes), engineering consulting firms, elevator shaft constructors, and property owners.

EPA vs. Minnesota Solid Waste Regulations

Last fall, the United States Environmental Protection Agency (EPA) finalized its long-awaited landfill regulations. MPCA landfill permitting and enforcement staff have reviewed the new federal requirements and compared them with Minnesota's existing landfill rules.

Design Standards

EPA rules

- New landfills and horizontal expansions must be constructed in compliance with a design required by an EPA-approved state program, which ensures ground water standards are not exceeded; or
- With a composite liner consisting of 60 mil thick polyethylene and two feet of clay with a permeability of 1×10^{-7} cm/second.

Minnesota rules

- Currently, Minnesota rules allow the above listed composite liner or a four-foot clay liner.

Ground Water Monitoring

EPA rules

- Compliance boundary for ground-water standards can be up to 150 meters from the waste
- Wells are sampled twice annually and tested for 62 parameters
- If there is an increase over background levels, there must be four independent samplings of each well for an expanded list of 213 parameters.

Minnesota rules

- Compliance boundary for ground water standards is no more than 200 feet (about 60 meters).
- Wells are sampled three times annually for similar parameters.
- If there is an increase over background levels, there is no expanded list of parameters tested.
- Since EPA ground water standards are not clearly defined, it is difficult to assess how they compare with Minnesota's ground water standards.

—MPCA Solid Waste Briefing - Winter/Spring 1992

U.S. Government Goes Metric

A statute that went on the books on July 28, 1975 will soon be implemented by the federal government. Last summer, President Bush signed Executive Order 12770, which requires federal agencies to begin using the metric system on September 30. That means that Bush put his name to the bill 125 years after Congress legalized the measurement standard for use in the U.S. and 11 years after it passed the Metric Conversion Act of 1975.

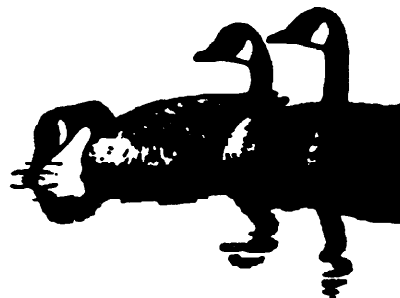
Private sector use of grams, meters, liter, and so forth will still be voluntary, but those doing business with the federal government should stock up on those metric conversion kits. The law says Uncle Sam will use metric measures even in "procurements, grants, and other business-related activities."

—Water Well Journal, August '92

Radium in Mt. Simon-Hinckley Aquifer Report Available

The Minnesota Geological Survey has recently issued a report on radium in the Mt. Simon-Hinckley Aquifer of east-central and southeastern Minnesota. Samples were taken from sole-source Mt. Simon-Hinckley wells to identify the distribution of radium within the regional geologic framework. Base-level data were also acquired on other radionuclides, the age of the water, and the water chemistry. Previous data indicated high radium levels associated with deep Cambro-Ordovician sandstone aquifers such as the Mt. Simon-Hinckley. Many communities in the southern half of Minnesota drawing their water supply from the Mt. Simon-Hinckley aquifer exceeded the EPA maximum contaminant level for radium, indicating a potential health risk.

Results of the study indicate the source of the radium is within the aquifer matrix itself and in some areas is concentrated in specific zones corresponding to original depositional environments. Some of the variation seen in radium levels may be associated with faults or other structural features in the underlying Precambrian rock. Since high radium levels in the Mt. Simon-Hinckley aquifer are widespread, any new wells drilled into this aquifer are likely to also have high levels of radium.



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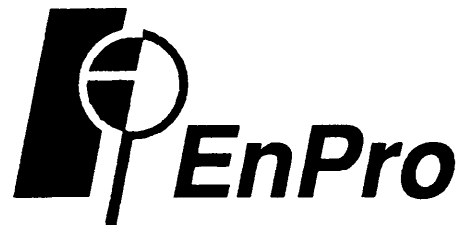
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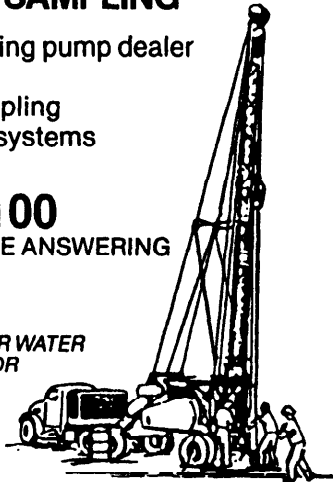
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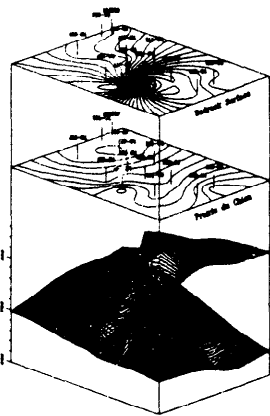
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