

# Minnesota Ground Water Association

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## A Summary of The Groundwater Act of 1989 (S.F. 262)

by John Helland, Legislative Analyst specializing in Environment and Natural Resources.

### Article 1

#### Groundwater Protection

- States a goal that groundwater be maintained in its natural condition, free from degradation whenever practicable. (Sec. 1)
- Definitions are provided for the purpose of the chapter created

by article 1 (103H). Terms defined are: agricultural chemical, health risk limits, best management practices, common detection, degradation, fertilizer, groundwater, pesticide, plant amendment, pollutant, pollution, registered use, registrant, sensitive area, soil amendment, water resources protection requirements. (Sec. 2)

- A process is established for the commissioner of natural resources and the Minnesota Geological Survey to designate sensitive areas. Sensitive areas are those areas where because of natural features there is significant risk of contamination of ground

water from activities near or at the surface. (Sec. 3)

- Conservation easements are allowed for areas designated as sensitive areas and land in or immediately surrounding a sinkhole. (Sec. 4)
- A provision for a defense to liability is provided for a person who implements and maintains projects and practices from an adopted soil and water conservation plan that applies to the person's property and protection of groundwater. (Sec. 5)
- The commissioner of agriculture for agricultural chemicals and

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## From the President

by Bob Karls

As we enter the 1990's, an assortment of ground water concerns are confronting our state and or nation. The **1989 Minnesota Ground Water Protection Act** focuses attention on several of those issues which have been identified as highest priority by our legislators, state agencies, and other concerned and involved groups.

Concern and involvement must not be reflected only in the legislation passed by lawmakers but in the efforts of the members of the MGWA. Attendance and participation in MGWA meetings constitutes involvement. But concern and involvement can and should extend beyond MGWA meetings. The cumulative knowledge and understanding of ground water issues and facts which this group possesses should be used to increase the awareness of members of the general public we meet.

The residents of our state obtain opinions, and occasionally facts, about ground water from a variety of sources. It might be the media

talking about the discovery of "yet another hazardous waste site"; a cousin who irrigates his or her farm with ground water; or meetings held by public officials to discuss ground water issues. The most common form of communication is probably the media carrying stories about: aquifers..., water levels..., toxic contaminants..., water shortages..., etc. Although the media does a generally fine job of making residents aware of important issues it does not generally carry an abundance of good news about our ground water resources. Due to the nature of our broadcast and print media they do not often feature stories about the "hundreds of thousands provided with abundant, clean ground water" or "no new toxic waste dumps were discovered today".

As informed members of the MGWA we can make a difference. If each of our members makes an effort to reach out with accurate information to people we come in daily contact with, the public will

benefit. Volunteering to speak at schools and at public events will disseminate information even more broadly. I would like to encourage all of our members to demonstrate concern and involvement by communicating ground water information where ever possible.

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the pollution control agency for other pollutants must develop best management practices (BMP's) for the prevention of groundwater degradation. BMP's are by definition voluntary practices. (Sec. 6)

- All monitoring of groundwater quality by state agencies and political subdivisions must be submitted to the environmental quality board. The board will assess the quality of the data and maintain a computerized database of groundwater data submitted. (Sec. 7)
- The commissioner of health is required to promulgate health risk limits for substances degrading groundwater. The commissioner must review and revise, if necessary, the limits every four years. Existing recommended allowable limits for drinking water may be adopted by the commissioner as health risk limits. (Sec. 8)
- The commissioner of agriculture for agricultural chemicals and the pollution control agency for other pollutants are required to evaluate the detection of pollutants in groundwater. The commissioner or the agency must evaluate whether the pollution results from common detection and continue monitoring and evaluation to determine the pollution frequency and concentration trend. (Sec. 9)
- The commissioner of agriculture for agricultural chemicals and the pollution control agency for other pollutants are required to manage pollutants where groundwater degradation is detected. Where degradation is detected, the commissioner of agriculture or the pollution control agency must promote the implementation of BMP's.
- If BMP's are not effective, the commissioner of agriculture or the pollution control agency must adopt water-resource-protection requirements (WRPRs) that prevent and minimize pollution. The WRPRs can be for the whole state or for a portion designated by order of the commissioner of agriculture or the

pollution control agency. (Sec. 10)

- The pollution control agency and the department of agriculture, in consultation with the board of water and soil resources, are required to conduct a study on nitrogen compounds in groundwater. The study will be submitted to the legislative water commission by July 12, 1991. The commission must provide recommendations to the legislature by November 15, 1991.

## Article 2

### Water Research Information and Education

- A legislative water committee is created to review state water policy and make recommendations to the legislature. The committee will consist of five members each from the house and the senate. The committee will sunset June 30, 1995. (Sec. 1)
- The commissioner of agriculture must establish a clearinghouse and other assistance to agricultural producers on sustainable agriculture and promote the use of integrated pest management.
- An environmental agriculture program is established. The board of water and soil resources, after review by the legislative committee on water and the Minnesota future resources commission, must award contracts for the program. (Sec. 3)
- Conservation easements under the reinvest in Minnesota resources program are allowed for sensitive areas and hillsides used for pasture. (Sections 4 to 6)
- The environmental quality board must prepare and submit a report on water research needs to the joint legislative committee on water and the Minnesota future resources commission by September 15 of each odd-numbered year. (Sec. 7)
- The local water resources protection and management program is established under the board of water and soil resources to provide assistance to counties to develop comprehensive local water plans or to carry out water resource protection

programs identified in the water plans. (Sections 8 to 10)

- Sensitive areas and wellhead protection areas are added as components for which the comprehensive local water plans under statute must address. (Sec. 11)
- The University of Minnesota is added as an ex officio, non-voting member of the board of water and soil resources. (Sec. 12)
- Additional water planning duties are added to the duties of the environmental quality board and the board must have a new plan and strategy by November 15, 1990, and every five years thereafter. (Sec. 13)

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## MGWA Fall Conference

### 1989 Ground Water Legislation in Minnesota

The Minnesota Ground Water Association's fall quarterly meeting will be held November 1, 1989, on the St. Paul Campus of the University of Minnesota at the Student Activity Center.

The conference will provide an opportunity for Association members to learn more about the Minnesota Ground Water Protection Act which was passed this legislative session.

Speakers from various state agencies and departments will present some perspectives on how and why the legislation was passed and how the organizations propose to implement the different portions of the Act for which they are responsible.

The current list of speakers includes: **Judith Ball**, Minnesota Department of Health, **Pat Bloomgren**, Board of Water and Soil Resources, **Greg Buzicky**, Minnesota Department of Agriculture, and **Ron Nargang**, Minnesota Department of Natural Resources, Division of Waters.

Watch for an announcement with more details in early October.

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### Article 3

#### Wells, Borings, and Underground Uses

- The current wells, borings, and underground uses provisions in Minnesota Statutes, chapters 156A, 145A, 105, 84, 469 and 471 are recodified in chapter 103I.
- A permit is required for all non-drive-point wells constructed. Emergency permit exemptions are provided to protect public health or welfare, or to allow a well contractor to begin construction prior to obtaining a permit. Drive point wells are exempt from the permit requirement but after December 31, 1989, the owner of the well must notify the commissioner of health of the installation and location. A maintenance permit is required for a well that is not in use, inoperable, and unsealed. (Sec. 9, subdivisions 1 to 3)
- A well contractor license is required to drill, construct or repair a well except:
  - (1) a registered professional engineer, or certified hydrologist or hydrogeologist may construct a monitoring well;
  - (2) a limited well contractor may modify well casings or screens, construct drive-point wells, or install pumps or pumping equipment.
  - (3) an individual constructing a well on land they own or lease for farming or a place of abode; or
  - (4) an individual performing labor or service for a contractor under the direction of the contractor. (Sec. 9 subdivision 4)
- At grade monitoring wells are allowed for leak detection devices. (Sec. 9, subdivision 7)
- Potential sources of contamination may not be placed closer to a well than isolation distances prescribed by the commissioner of health. (Sec. 9, subdivision 6)
- A well identification label is required for all new wells. (Sec. 9, subdivision 7)
- A report of well completion or sealing must be submitted to the commissioner of health within 30 days of completion. The commissioner of health must send a copy of the report to the com-

missioner of natural resources, the local soil and water conservation district, and the Minnesota Geological Survey. (Sec. 9, subdivision 8)

- Permit fees are established as follows:

For a new well that produces less than 50 gpm, \$50;

For a new well that produces 50 gpm or more, \$100;

For an inoperable well, construction of a monitoring well or dewatering well, a groundwater thermal exchange device, or vertical heat exchanger, \$50;

Annually for an unsealed monitoring well, \$50; Annually for a dewatering well \$25. (Sec. 10)

- After July 1, 1990, a seller must disclose the location of known wells before signing an agreement to transfer real property.
- A seller who fails to disclose the existence of a well at the time of sale is liable to the buyer for costs and reasonable attorney fees relating to the sealing of a well. (Sec. 14)
- The statute of limitations for a landowner's cause of action against a person whose action or inaction cause contamination of a well is established at six years after the owner discovers the contamination. (Sec. 15)
- Well sealing requirements are established for a well that:
  - is contaminated
  - was not sealed according to the provisions of this chapter; or
  - endangers groundwater or is a safety or health hazard.
- Monitoring wells and dewatering wells must be sealed when no longer in use. (Sec. 16)
- The commissioner of natural resources must identify the location of abandoned wells located on state property.
- The state is prohibited from purchasing or selling land without identifying the location of all wells. (Sec. 17)
- The commissioner of health may order a well sealed that is:
  - an imminent threat to public health or safety;
  - required to be sealed under section 16; or
  - a monitoring or dewatering well for which a maintenance permit is

not renewed or obtained within 14 months after construction. (Sec. 18)

- Counties must issue sealed well certificates for wells properly sealed. (Sec. 19)
- The landowner liability for a sealed well is removed for contamination of groundwater from the well that occurs after the well is sealed, on wells that have properly recorded sealed-well certificates. (Sec. 20)
- A well-sealing cost-share program is established in the board of water and soil resources to provide grants to counties. The program sunsets June 30, 1995. Grants will be targeted to counties based on: the diversity of well construction, geologic conditions and land use; current use of affected aquifers; and aquifer susceptibility to contamination by unsealed wells. The state cost share is up to 75 percent or \$2,000. After July 1, 1991, only a well sealing that is a priority action identified in approved local water plans will be eligible for assistance. (Sec. 21)
- A property owner may apply to the board of water and soil resources for funding to seal wells. (Sec. 22)
- The commissioner of health and the board of water and soil resources have a governmental services lien for the cost of wells sealed under contract. (Sec. 23)
- Elevator shaft borings may not be made without a permit from the commissioner of health. (Sec. 24)
- Environmental bore holes must be constructed by a well contractor or monitoring well contractor. (Sec. 25)
- The license fee for a well contractor's license is \$250, and an elevator shaft contractor's license is \$50. An application fee for each of \$50 is also required. A statewide surety bond of \$10,000 in lieu of license bonds required by political subdivisions is required. (Sections 30 and 33)
- A limited well contractor's license and a limited well sealing

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contractor's license, with a license fee of \$50 each, are provided for. (Sections 32 - 32)

- After December 31, 1990, monitoring well contractors who seek initial registration must meet examination and experience requirements of the commissioner of health. A statewide surety bond of \$10,000 in lieu of license bonds required by political subdivisions is required. Application fees will be set by the commissioner of health. (Sec. 35)
- Administrative remedies including denial, suspension, or revocation of licensure and administrative penalties are provided. (Sections 44 and 45)

#### Article 4

##### Water Conservation

- Provisions on agricultural irrigation permits and consistency of permits with state, regional, and local water plans, deleted in section 2, are recodified. (Sec. 1)
- The water allocation priorities are amended to place power production that meets contingency planning provisions within the first priority. Power production in excess of a contingency plan remains at fourth priority. (Sec. 2)
- No new appropriation permits may be issued for once-through cooling systems using in excess of five million gallons annually. (Sec. 4)

## Monitoring Wells

Call

## Their Well

1 - 800 - 992 - 8832

MPLS (612) - 464 - 1177

- A water-use processing fee is established for each water-use permit, replacing the current statutory system. Except for once-through cooling systems, the water-use permit fee is 0.05 cents per 1,000 gallons for the first 50 million gallons and 0.1 cents per 1,000 gallons for amounts above 50 million gallons. The maximum is \$2,000. The fee for once-through cooling systems is set at 5 cents per 1,000 gallons until December 31, 1991, 10 cents per 1,000 gallons during calendar years 1992 - 1996, and 15 cents per 1,000 gallons thereafter. The fees are based on permitted capacity and a fee must be \$25 or more. (Sec. 5)
- Rules are authorized for conservation of public water supplies. (Sec. 6)
- Joint powers water management organizations are given authority to require water appropriation permits for nonessential uses below 10,000 gallons per day and one million gallons per year on protected watercourses in the metropolitan area with a drainage area less than 25 square miles. (Sec. 7)
- The commissioner of natural resources must study and report by February 15, 1990, to the legislative water commission, on the impact of consumptive water use on existing aquifers. (Sec. 8)

#### Article 5

##### Pesticide Amendments

- New definitions are provided for collection site, container, corrective action, local unit of government, owner of real property, pesticide end user, returnable container, and waste pesticides. (Sections 1 to 15)
- The commissioner of agriculture must develop a pesticide management plan for the prevention, evaluation, and mitigation of the occurrence of pesticides and pesticide breakdown products. (Sec. 17)
- The state must use integrated pest management techniques on public lands. (Sec. 18)

- Monitoring of urban and rural pesticide use must be done by the commissioner. (Sec. 19)
- The commissioner of agriculture is required to establish a waste pesticide collection program to collect waste pesticides from pesticide end users. The commissioner may assess costs for disposal on the end users and use the money in the waste pesticide collection account to pay for expenses of the program. (Sec. 20)
- a chemigation permit and antisiphon device are required for applying pesticides through an irrigation system from any source of irrigation water. (Sections 25 - 26)
- A fertilizer chemigation permit holder is exempt from the pesticide chemigation permit fee. (Sec. 27)
- After June 30, 1994, pesticide dealers and distributors must accept waste pesticides that remain in the original container unless there is a designated place in the county to return the unused portion. (Sec. 29)
- The annual application fee for pesticide registration is increased from \$125 to one-tenth of one percent of gross sales of the pesticide within the state, with a minimum fee of \$150. (Sec. 31)
- A person intending to discontinue registration of a pesticide in Minnesota must complete a total recall of the pesticide in the state within 60 days. (Sec. 33)
- The commissioner of agriculture, in connection with the extension service, must develop innovative educational and training programs addressing pesticide concerns. (Sec. 34)
- The certification period for a private applicator is reduced from five years to three years. (Sec. 46)
- The department of agriculture, in consultation with the pollution control agency and the Minnesota extension service, is required to develop a pesticide container collection and recycling program. (Sec. 47)

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cling pilot project. The department is required to report to the legislature by November 30, 1991, on recommendations for managing pesticide containers. (Sec. 52)

#### Article 6

##### Fertilizers, Soil Amendments, and Plant Amendments

- The current provisions on fertilizers, soil amendments, and plant amendments from Minnesota Statutes, chapter 17, are recodified in chapter 18C.

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## NRGIS Hydrology Group Examines Data Layers

Is the USGS (U.S. Geological Survey) 1:100,000 hydrography DLG (digital line graph) of stream and lake files an adequate substitute for a 1:24,000 "second-generation data base" lake and stream coverage?

What are the differences between the USGS 1:100,000 DLG file and the DNR/RKI (Department of Natural Resources/River Kilometer Index) 1:24,000 stream trace files digitized in the 70's and early 80's?

How much work is involved in edge-matching all USGS 1:100,000 quad sheets and assigning state identifiers to all hydrologic features?

What would be involved in completing the state lake coverage at the 1:24,000 level?

What would need to be done to turn either the 1:24,000 RKI or the 1:100,000 DLG into a true network for analysis purposes?

Which data set is useful for which applications?

Can hydrology information being digitized from 1:24,000 quads by MnDOT (Minnesota Department of Transportation) for the County Highway Map series be converted and cleaned?

What improvements are needed to the automated watershed information currently available?

These are just some of the questions being asked by the NRGIS (Natural Resource Geographic In-

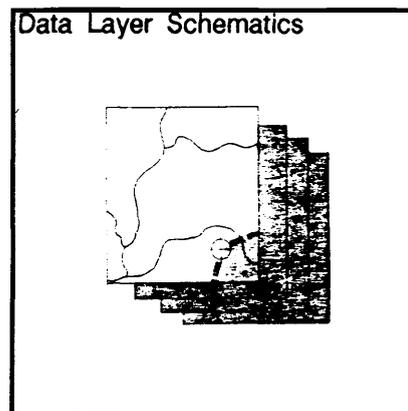
formation Systems) Hydrology Subcommittee as they try to evaluate various data coverages available, with a goal of identifying further data development proposals and opportunities for inter-agency cooperation.

One of the surprises of the early evaluation is the detail reported on the USGS 1:100,000 DLG hydrography files, which were digitized at 1:100,000, but from a base of 1:24,000 quad sheets reduced to 1:100,000 scale. The detail of lake outline and the sinuosity of streams compares favorably with the 1:24,000 RKI data; in fact, the stream sinuosity is often better than that on the RKI file. A probable explanation of this is the age of the RKI data - some of it dates back to an EPA (US Environmental Protection Agency) digitizing effort in the mid-seventies, and to DNR digitizing in PIOS, a predecessor to ARC/INFO (brands of geographic information systems).

Probably both the capture software and the digitizing techniques acceptable at that time were inferior to current practice. On the other hand, the 1:24,000 RKI file does contain many very small streams which are not reported on the 1:100,000 file. Both files would need editing to connect stream traces through lakes to create a true network.

The group's next step will be to look at the data currently being generated by MnDOT at 1:24,000 to see what type of clean-up would be necessary.

For more information contact: Susanne Maeder, LMIC (Land Management Information Center, (612) 297-4986.



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## The Latest Word on Monitoring Wells

The book that everyone has been waiting for will be available this fall. The state-of-the-art reference on monitoring well design and installation will be *Handbook of Suggested Practices for the Design and Installation of Ground Water Monitoring Wells*.

Written under the tireless supervision of EPA project officers by a National Water Well Association team, the 400-page book includes chapters on planning, drilling methods, specifications and contracts, casing types, filter-packs, grout, well development, network management, and abandonment procedures. It offers 76 detailed technical illustrations and 43 tables.

Reserve your copy by sending \$33.95 per copy (shipping is included) to the NWWA Bookstore, P.O. Box 182039, Dept. 017, Columbus OH 43218.

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## New Fiberglass Casing

There's a new product on the ground-water market that may be a welcome improvement. Many published reports show that some commonly-used casing materials can introduce shadow contaminants and sorb/desorb some restricted elements. Apparently, the only way to be sure you haven't compromised the integrity of the water sample would be to use monitoring wells made of glass. Well, now someone has provided them.

ENCO Inc. of Austin, Texas, has designed flush-joint fiberglass-reinforced-epoxy monitor- and recovery-well casing and screens. Test results met or exceeded all comparable results for teflon and stainless steel. ENCO Inc. maintains that these casings and screens are 100% inert, and their price compares favorably with PVC. If you're interested, check the independent test published in ASTM-STP 963 of July 1988 or else give ENCO Inc. a call at (512) 458-6461.

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## Calendar

**September 10 - 15, 1989.**

*American Chemical Society Annual Meeting - Session on Environmental Expert Systems.* To be held in Miami, Florida. Contact Dr. Judith M. Hushon, Roy F. Weston, Inc. 955 L'Enfant Plaza, SW, Washington, D.C. 20024.

**September 11 - 14, 1989.** *National Wilderness Management Conference.* To be held in Minneapolis. Contact the National Wilderness Management Conference, University of Minnesota, College of Natural Resources, Department of Forest Resources, 110 Green Hall, St. Paul 55108.

**September 11 - 14, 1989.**

*Analysis and Design of Aquifer Tests,* to be held in Columbus, Ohio by NWWA.

**September 12 - 14, 1989.** *Haztech International '89.* To be held in Cincinnati, Ohio. Contact Haztech International, 13555 Bel-Red Road, C-96870, Bellevue, WA 98009 (800) 426-5575.

**September 17 - 22, 1989.** *25th Annual AWRA Conference - "Water Laws and Management"; "Wetlands: Concerns and Successes",* to be held in Tampa, Florida by AWRA. Contact AWRA at (301) 493-8600.

**September 22, 1989.** *Legal Implications of Environmental Site Assessments,* to be held in Salt Lake City, Utah by NWWA.

**September 19 - 21, 1989.** *Principles of Subsurface Contaminant Fate and Transport Modeling,* to be held in Salt Lake City, Utah by NWWA.

**September 19 - 21, 1989.** *Microbial Processes in the Degradation of Ground Water Contaminants,* to be held in Salt Lake City, Utah by NWWA.

**September 20 - 21, 1989.** *Theory and Application of Surface Geophysics to Ground Water Investigations,* to be held in Salt Lake City, Utah by NWWA.

**September 25 - 27, 1989.** *Corrective Action for Containing and Controlling Ground Water Contamination,* to be held in San Francisco, California by NWWA.

**September 25 - 27, 1989.** *Fracture Trace and Lineament Analysis,* to be held in San Francisco, California by NWWA.

**September 27 - 29, 1989.** *Haztech International '89 West.* To be held in San Francisco, California. Contact Haztech International, 13555 Bel-Red Road, C-96870, Bellevue, WA 98009 (800) 426-5575.

**September 27 - 30, 1989.** *The Geologic Modeling of Depositional Environments and its Application to the Ground Water Professional,* to be held in Charleston, South Carolina by NWWA.

**September 28 - 29, 1989.** *Basic Ground Water Modeling (on a PC): Transient Flow in 2-D and 3-D,* to be held in San Francisco, California by NWWA.

**October 1 - 4, 1989.** *Third Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst,* to be held in St. Petersburg, Florida. Contact the Florida Sinkhole Research Institute, UCF, Orlando, FL 32816.

**October 3 - 5, 1989.** *Introduction to Ground Water Geochemistry,* to be held in Burlington, Vermont by NWWA.

**October 3 - 5, 1989.** *Treatment Technology for Contaminated Ground Water,* to be held in Burlington, Vermont by NWWA.

**October 6, 1989.** *Using the Laboratory to Study, Evaluate and Design In Situ Soils Remediation Projects.* To be held in Burlington, Vermont by NWWA.

**October 10 - 11, 1989.** *Agricultural Chemicals and Ground Water: An Examination of Important Issues.* To be held in Baltimore, Maryland by NWWA.

**October 11 - 12, 1989.** *Great Lakes GIS Workshop - Solving En-*

*vironmental Problems in the Great Lakes Basin.* To be held at the Presidential Inn in Southgate, Michigan. Contact GIS Workshop Coordinator, EPA Large Lakes Research Station, 9311 Groh Road, Grosse Ile, MI 48138.

**October 12 - 13, 1989.** *A Stronger Voice: Communication Skills for Professionals and Advocates in Natural Resources Management and Environmental Protection.* To be held in Stevens Point, Wisconsin. Contact Continuing Education and Outreach, 2100 Main Street, Stevens Point, WI 54481-3897.

**October 16 - 20, 1989.** *Safety at Hazardous Materials Sites: A Hands-On Workshop.* To be held in Valhalla, New York by NWWA.

**October 17 - 19, 1989.** *Third Annual Midwest/Great Lakes Arc/Info User Conference,* to be held in Madison, Wisconsin. Contact Michael Bohn, Wisconsin Geological and Natural History Survey, 3817 Mineral Point Road, Madison, WI 53705.

**October 18 - 20, 1989.** *34th Annual Midwest Ground Water Conference,* to be held at the Fetzer Business Development Center at Western Michigan University. Contact Alan E. Kehew, Department of Geology, Western Michigan University, Kalamazoo, MI 49008-5161.

**October 19 - 21, 1989.** *Planning for Water Shortages - Drought Management.* To be held in St. Louis, Missouri. Contact Larry D. Stephens, USCID, P.O. Box 15362, Denver, Colorado (303) 236-6960.

**October 23 - 27, 1989.** *Multi-phase Organic Transport Modeling with Emphasis on Pollution by Hydrocarbons,* to be held at Butler University in Indianapolis, Indiana by the IGWMC.

**October 25 - 27, 1989.** *Groundwater and Agrichemicals: Suggested Policy Directions for 1990,* to be held at the Radisson Hotel St. Paul by the Freshwater Foundation.

**October 29 - November 2, 1989.** SEG Conference to be held in Dallas, Texas.

**October 30 - November 1, 1989.** *Hydrogeology: Principles, Problems, and Practical Applications.* NWWA/AGWSE Annual Meeting to be held in Houston, Texas.

**November 1, 1989.** *MGWA Fall Meeting: 1989 Ground Water Legislation in Minnesota.* To be held at the Student Center on the Saint Paul Campus of the University of Minnesota.

**November 1 - 3, 1989.** *The Midwest Groundwater Protection Challenge,* to be held at the Pheasant Run Resort Hotel in St. Charles, Illinois. Contact Erich Ditschman (517) 353-3742; Institute of Water Research, 334 Natural Resources, Michigan State University, East Lansing, Michigan 48824-1222.

**November 1 - 3, 1989.** *Practical Environmental Law,* to be held in Coronado California by Federal Publications, Inc. Contact J. K. Van Wycks, Federal Publications, Inc., 1120 20th Street NW, Washington DC 20036

**November 6 - 8, 1989.** *Fundamentals of Ground Water and Well Technology,* to be held in Columbus, Ohio by NWWA.

**November 6 - 9, 1989.** *Use of the USGS Modular Flow Model - MODFLOW,* to be held in Tampa, Florida by NWWA.

**November 8 - 10, 1989.** *Chemical Modeling of Ground Waters,* to be held at the Marriott Inn North in Columbus, Ohio by NWWA.

**November 12 - 17, 1989.** *National Water Quality Symposium,* to be held in Orlando, Florida by USGS Water Resources Division. Contact Gary Pederson, (404) 331-3394.

**November 12 - 15, 1989.** *National Computer Graphics Association Mapping Conference.* To be held in Los Angeles, California. Contact (703) 698-9600.

**November 15 - 17, 1989.** *Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection and Restoration,* to be held in Houston, Texas, by NWWA.

**November 26 - 30, 1989.** *GIS/LIS '89.* To be held in Orlando, Florida. Contact (703) 241-2446.

**November 27 - 29, 1989.** *Superfund '89.* To be held in Washington D.C. Contact: Hazardous Materials Control Research Institute, 9300 Columbia Blvd., Silver Spring Maryland 20910-1702.

**November 28 - 30, 1989.** *Risk Assessment for the Ground Water Scientist,* to be held in San Diego, California by NWWA.

**November 28 - 30, 1989.** *Applications of Environmental Isotopes to Practical Ground Water Studies.* To be held in San Diego, California, by NWWA.

**December 11 - 12, 1989.** *National Symposium on Non-Point Water Quality Concerns - Legal and Regulatory Aspects.* Ground water overdraft protection is one of the topics. Contact Donald L. Pfost, U of Mo, (314) 882-2731.

**February 1 - 3, 1990.** *International Symposium on Borehole Geophysics for Petroleum, Hydrogeology, Mining, and Engineering Applications.* To be held in Tucson, Arizona. Contact: Department of Mining and Geological Engineering, University of Arizona, Tucson, Arizona 85721.

**February 19 - 23, 1990.** *International Symposium on Radon and Radon Reduction Technology.* To be held in Atlanta, Georgia. Sponsored by the USEPA, Office of Radiation Programs, EPA, 401 M Street, SW, Washington DC 20460.

**February 20-22, 1990.** Four conferences to be held under one roof: *Agricultural Impacts on Ground Water Quality, Ground Water Geochemistry, Ground Water Management and Well Head Protection, Environmental Site Assessments: Case Studies*

*and Strategies.* To be held in Kansas City by NWWA.

**February 26 - 27, 1990.** *Colorado Groundwater Engineering and Management Conference.* To be held in Denver, Colorado. Contact: Water Resources Research Institute, Colorado State University, Fort Collins, CO 80523.

**April 1 - 5, 1990.** *International and Transboundary Water Resources Issues - a joint meeting of the American and Canadian Water Resources Associations.* To be held in Toronto, Canada. Ground water use, recycling, and disposal are among the topics. Contact AWRA at (301) 493-8600.

**June 18 - 21, 1990.** *USA/USSR Joint Conference on Environmental Hydrology and Hydrogeology.* To be held in Leningrad, USSR. Contact Dr. Roman Kanivetsky, Minnesota Geological Survey, 2642 University Ave., St. Paul, MN 55114, or AIH at (612) 379-1030.

**July 23 - 27, 1990.** *International Symposium on Tropical Hydrology and Fourth Caribbean Islands Water Resources Congress.* To be held in San Juan, Puerto Rico. Contact: Dr. Munoz-Candelario, Water Resources Research Institute, University of Puerto Rico, Mayaguez Campus, PO Box 5000, Mayaguez, Puerto Rico.

**July 9 - 11, 1990.** *Watershed Management Symposium.* To be held in Durango, Colorado. Contact Robert Riggins, USACERL, P.O. Box 4005, Champaign, Illinois 61824-4005.

**July 30 - August 3, 1990.** *ASCE Hydraulics Division: 1990 National Conference on Hydraulic Engineering and The International Symposium on the Hydraulics/Hydrology of Arid Lands.* To be held jointly at the Catamaran Hotel, San Diego, California. See Call for Papers in this issue.

**August 12 - 15, 1990.** *Conserv 90.* A National Conference and Exposition Focusing on Water Supply Solutions for the 1990s. To be

held in Phoenix, Arizona by NWWA.

**September 3 - 6, 1990.** *International Conference on Ground Water Modeling.* To be held in The Hague. Contact NWWA.

**September 11 - 14, 1990.** *Gas Transfer at Water Surfaces.* To be held in Minneapolis, Minnesota. See Call for Papers in this issue.

**September 18 - 20, 1990.** *5th Canadian/American Conference on Hydrogeology: Parameter Identification and Estimation for Aquifer and Reservoir Characterization.* To be held in Calgary, Alberta, Canada. See Call for Papers in this issue.

**November 4 - 9, 1990.** *26th Annual AWRA Conference - "The Science of Water Resources: 1990 and Beyond", "Symposium - Transferring Models to Users".* Contact AWRA at (301) 493-8600. Deadline for abstracts November 1, 1989.

**November 5 - 7, 1990.** *International Conference on Groundwater Resources Management.* To be held in Bangkok, Thailand. Contact: The Secretariat, International Conference on Groundwater Resources Management, Division of Water Resources Engineering, Asian Institute of Technology, PO Box 2754, Bangkok 10501 Thailand.

*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 IGWMC, contact Margaret Butorac, IGWMC, Holcomb Research Institute, Butler University, Indianapolis, IN 46208 (317) 283-9458.*

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## Arsenic in Minnesota

*reprinted from Minnesota Pollution Control Agency informational brochures*

In the 1930's and early 1940's, Midwestern farms were hard-hit by plagues of grasshoppers (sound familiar?). A federal government program designed to stave off the pests supplied arsenic, which many farmers mixed with molasses, bran or sawdust to produce a poisoned bait.

While this program helped solve the grasshopper problem, it created another problem - leftover arsenic and arsenic-bait mixtures which pose a potential threat to public health and the environment.

### What is arsenic, and what harm can it do?

Arsenic is a poisonous element that can cause health problems even in small quantities if you inhale it, have skin contact with it, or consume it in your food or water over a long time. It has been known to foul surface water and drinking-water wells, and livestock have been poisoned by arsenic-laced bait.

Because arsenic is an element, one of the basic building blocks of chemistry, it can't be destroyed by chemical treatment, natural breakdown or burning. The only way to handle arsenic is to store it in a secure, properly managed hazardous waste landfill.

### Where would I expect to find arsenic?

Leftover arsenic has been reported in locations throughout Minnesota, although the North and Northwest areas of the state were hardest hit by the plagues and may have more leftover arsenic than other parts of the state.

White or colored arsenic powders are often stored in cans, boxes or bags in old sheds or barns. Arsenic-bait mixtures may resemble new sawdust, because arsenic prevents normal deterioration of sawdust. In several known instances, arsenic-laced sawdust was used to insulate buildings. Other

caches of arsenic or bait were buried underground.

### How big is the arsenic problem in Minnesota?

Almost 2,200 pounds of arsenic and arsenic-laden bait were removed from households and farms throughout the state during an arsenic roundup conducted by the Minnesota Pollution Control Agency (MPCA) in June of 1989. The arsenic was collected from 42 locations. Although the majority of pickups targeted farms in the northwest, arsenic was removed from as far north as Roseau, as far south as Blue Earth, in Climax on the North Dakota border, and in Stanchfield near Wisconsin. The state Superfund covered the \$20,000 cost of the collection.

Previous efforts had removed 3,000 pounds of "pure" arsenic and 40,000 pounds of arsenic bait from 250 locations. During these arsenic reporting and collection programs the MPCA has also identified more than 50 areas where arsenic may have been buried.

Calls continue to filter in to the MPCA from property owners who suddenly discover a bag in a storage area, or heard from an elderly relative who buried arsenic somewhere on the land.

If arsenic or suspected arsenic is found, don't touch it, re-package it, or attempt to move it. Proper protective clothing must be used during arsenic removal. Call Dale Trippler, the Minnesota Pollution Control Agency's project manager for arsenic removal, at (612) 296-7821.



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## Ground Water Primer

By DeLynn Hay, Nebraska  
Extension Agricultural  
Engineering Specialist

*This primer could serve as an outline for talks directed at the lay public and as an indication of the level of information appropriate for the lay public.*

Ground water quality can be protected by not allowing moving water to contact harmful contaminants and by restricting the flow of water through contaminated areas.

Understanding how ground water moves is essential in order to effectively manage the use of water and to protect water quality. In Nebraska, ground water is the source for about 95 percent of the irrigation water and provides about 85 percent of the domestic water. Water movement begins at the soil surface when precipitation enters the soil by the infiltration process. The rate that the water infiltrates or enters the soil is determined by soil characteristics and the condition of the soil surface, such as the presence of vegetation or crop residue.

### Two forces

Once water is in the soil, two forces, capillarity and gravity, move it downward. Water moves in the spaces, or pores, between the soil particles. In the small pores, water will move primarily by capillarity, the tendency of the water to adhere to the surface of soil particles. Movement caused by gravity will be most rapid when the pores are large, such as in sandy soils, and when the pores are filled with water.

If enough water is available, it can continue to move downward to become ground water. This ground water is stored in an aquifer, in soil, sand, gravel or rock that has all the open spaces saturated with water.

An aquifer is an underground layer that can store and transmit enough water for a specific use. The top of the saturated zone is called the water table. There is often some type of impermeable layer below the aquifer that prevents any further

major downward movement of water.

One of the mysteries of ground water, because it can't be seen, is how fast and in what direction it moves.

Ground water, like all liquids, tries to achieve a level surface. It flows downhill or moves down the gradient or slope of the water table. Since ground water is moving through the small spaces in an aquifer material, the movement rate can range from less than a foot per year in a fine-grained material like clay, to as much as 1,000 feet per year in coarse-grained material such as gravel.

Because of the slow movement of ground water, the water table seldom achieves a flat surface and some movement occurs almost continuously. Ground water can be discharged into lakes, streams or wetlands as it moves downhill. This downhill movement of ground water also results in the water flowing to an active well.

### Permeability

Ground water speed, or velocity, depends upon the permeability of the aquifer material that it moves through. Pore interconnection and size are the two factors that determine permeability.

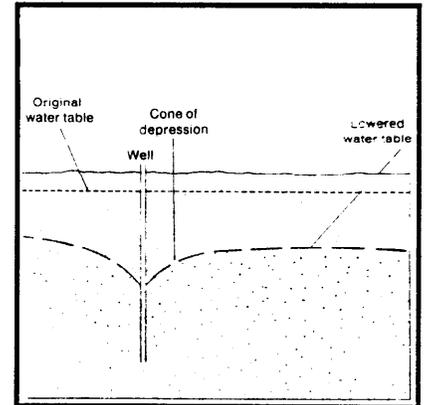
Materials with many well-connected pores transmit water faster than materials with few or poorly connected pores. Also, materials with large pore space, such as sand and gravel, allow for more rapid movement of water than materials with small pores, such as silt and clay.

Limestone and shale, or consolidated rocks, generally have low permeabilities. However, if they are fractured, or cracked, they have higher permeabilities.

Aquifers with high permeability have the best wells since water can move easily to the well. As soon as a well is pumped, the water table level in and near the well is lowered and forms a cone of depression. The cone forms because water is being pumped at a faster rate than it is moving toward the well.

As this cone enlarges, the slope of the cone increases and the water will move more rapidly towards the

well. Eventually the rate of movement toward the well nearly equals the rate of pumping and a stable pumping level is established. When pumping is stopped, flow will continue toward the well until the original slope of the water table is reached.



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## Software Library

The Minnesota Ground Water Association has acquired a set of educational water-resources software programs. These learning tools are to be made available to members on a loan basis at no cost.

The software requires an IBM-compatible PC and a color monitor with an IBM Color Graphics Adapter (CGA), the EGA and VGA monitors won't work.

The four programs cover the following topics:

- Surface Water
- Ground Water,
- Hydrologic Cycle, and
- Moisture in the Atmosphere

Each topic has color graphics, scientific terms, and definitions designed for students high-school level and above. Arrangements to borrow these programs can be made by contacting Lee Trotta at (612) 229-2623 for details.

If you have any software of a similar nature which you could donate to MGWA for this purpose, please give Lee a call at the above number.

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## New Jersey Adopts Hydrogeologist Report Certification Policy

Discharge Investigation and Corrective Action Reports submitted for New Jersey's Underground Storage Tank Program will require certification by a qualified hydrogeologist under New Jersey's new policy. In addition, the Department of Environmental Protection intends to extend this policy to all ground water investigations and studies under the New Jersey Pollutant Discharge Elimination System Program. This program controls most of the ground water regulatory activities in New Jersey.

A qualified hydrogeologist (includes geologists), hydrologists, geohydrologists or soil scientists) is defined by New Jersey as follows:

1. Individuals with the following **educational qualifications:**

a. Graduated from an accredited college with a bachelor's degree in hydrogeology, geohydrology or soil science; or,

b. Graduated from an accredited college with a bachelor's degree in geology including and/or supplemented by a minimum of three credit hours in hydrogeology or geohydrology; or

c. Graduated from an accredited college with a bachelor's degree in one of the natural or physical sciences including and/or supplemented by 30 credit hours in geology of which three credit hours must be in hydrogeology and/or geohydrology; or

d. Graduated from an accredited college with a bachelor's degree in one of the natural or physical sciences including and/or supplemented by 21 credit hours in pedology or soil science and a minimum of six credit hours geology (course work in paleontology or mining will not be considered acceptable); and,

2. Five years of appropriate **professional experience.**

The Department will also accept geologists licensed under state

programs or individuals holding certification from certain listed professional organizations as meeting the preceding requirements. The AGWSE Certified Ground Water Professional Program is one of the listed certifications accepted in meeting the state's requirements.

Any person who meets the education and experience requirements, but does not hold one of the licenses or certifications listed would be considered on a case-by-case basis.

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## An Open Environment

*reprinted from Environmental Forum, Autumn, 1989*

Jim Kerr, national technical advisor for Delta Environmental Consultants, has discovered that when it comes to the environment, industrialized countries have a lot in common. Kerr, who also serves as a senior environmental geologist for Delta's Rocky Mountain Region, presented the introductory paper at a recent joint U.S./U.S.S.R. conference in Moscow on ground water contamination and other types of pollution.

"The similarity of our problems seemed striking, given the long-term emphasis on the differences between our two countries," Kerr said. "I think most U.S. participants left the conference with a commitment to try to work with the Soviets to solve these problems."

During the conference, which was sponsored by the National Water Well Association, ten Americans and eight Soviets presented papers. The American contingent consisted of academicians, consultants, regulators and a representative of NWWA. The Soviets were represented by people from various ministries, state committees, and research institutes.

"This was the first time American hydrogeologists had the opportunity to discuss soil and ground water contamination with their Soviet counterparts," explained Jim Hendry, director of research for the

National Water Well Association.

Common problems identified by representatives from both countries were ground water protection, ground water quality, point source and non-point source pollution. The Soviets appear to be ahead of the United States in ground water protection, based on their extensive aquifer mapping and stringent wellhead protection laws. These laws set out three "zones of protection" and require the use of an environmental impact statement to help determine the type of development that will be allowed in the least stringent zone.

Ground water quality also is a priority in the Soviet Union due to high concentrations of iron, sulfur and other naturally occurring minerals. Some common causes of point source pollution were discussed, including leaking underground storage tanks, industrial complexes and sewage treatment plants. Non-point source pollution universally seemed to come from (acid) rain, snow, and agricultural runoff.

Investigative techniques used by the two countries also are very similar. "This is probably due to a combination of necessity and shared scientific literature," Kerr explained. Kerr's paper provided an overview on "The Investigation and Remediation of Volatile Organic Compounds in Soil and Ground Water"

Based on contacts made at the conference, Kerr currently is working with Soviet officials to arrange a trip to survey selected contamination sites in the U.S.S.R. in preparation for bids by Delta Environmental Consultants on clean-up projects in the region.



## **Bylaws of the Minnesota Ground Water Association**

*(revised June, 1989; mail  
approval ballots to Don Jakes)*

### **Article I.**

#### **Name:**

1. This Organization shall be known as the "Minnesota Ground Water Association" hereinafter referred to as MGWA.

### **1990 Board of Directors**

**Past-President**  
**Linda Lehman**  
**L. Lehman & Associates**  
**(612) 894-0357**

**President**  
**Bob Karls**  
**Delta Environmental**  
**Consultants, Inc.**  
**(612) 636-2427**  
**FAX (612) 636-8552**

**President-Elect**  
**vacant**

**Secretary**  
**Dr. Gordon Hess**  
**ERM-North Central**  
**(612) 454-0808**  
**FAX (612) 454-0759**

**Treasurer/Membership**  
**Don Jakes**  
**MN Pollution Control Agency**  
**(612) 296-7736**

**Editor**  
**Lee Trotta**  
**U. S. Geological Survey**  
**(612) 229-2623**

**Business Management**  
**& Publications**  
**Dr. Jeanette Leete**  
**Watershed Research, Inc.**  
**(612) 426-8795**

### **Article II.** **Purposes:**

1. The primary objectives of MGWA are the promotion and encouragement of the science of ground water hydrology; the education of the general public regarding ground water resources; and the pursuit of charitable, educational, and scientific purposes within the meaning of section 501(c)(3) of the Internal Revenue Code.

2. To further these stated objectives, MGWA may disseminate information on ground water through meetings of the membership, newsletters, and participation in any other activities not enumerated herein that are designed to encourage the exchange of information relating to ground water resources.

### **Article III.** **Definitions:**

1. The definitions used in these bylaws shall be as follows unless the context requires otherwise:

a. "Approved or approval by the Board" shall mean a majority of Board members voting.

b. "Quorum" shall mean those members in good standing attending any publicized meeting of MGWA.

### **Article IV.** **Board of Directors of MGWA:**

1. The Board of Directors shall consist of four elected officers which are the President, President-Elect, Secretary/Membership Chairman and Treasurer. Officers may serve more than one term.

2. Terms of officers have a duration of two years, commencing on January 1 and ending on December 31 of the following year. The first year of a President's term is served as President-Elect, the second as President. Elections for President are held annually, elections for Secretary/Membership Chair and Treasurer are held in alternate years.

3. The President shall call and conduct meetings of the Board and of MGWA, and shall be the primary operating officer of MGWA.

4. The President-Elect shall be the Program Chair, shall perform

the presidential duties in the absence of the President, and may be assigned other responsibilities as directed by the Board.

5. The Secretary/Membership Chair shall keep and report the minutes of the Board and of MGWA, shall keep and report to the Minnesota Secretary of State any revisions or changes in the Articles of Incorporation, shall keep a list of property belonging to MGWA, and shall keep all books, correspondence, and papers relating to the business of the corporation (except those of the Treasurer). The Secretary/Membership Chair shall also keep an active membership list and shall keep a list of prospective members to be included in subsequent mailings.

6. The Treasurer shall maintain the accounts of MGWA including: all financial transactions, dues information, tax statements, necessary reports to the IRS (both State and Federal), and funding information, and shall present a financial report at each meeting of the Board and of the Association.

7. All officers shall be responsible for such other duties as the Board may prescribe.

8. Vacancies on the Board shall be filled as follows:

a. President: The President-Elect shall become President should the position be vacant.

b. Other vacancies on the Board shall be filled by appointment by the President with approval of the Board at its next regular meeting. The appointment of the new officer shall be announced in the next regular newsletter and the new officer will be introduced at the next meeting of MGWA.

c. The term of appointed officer(s) shall be limited to the unexpired term of the vacated position.

9. The regular business meetings of the Board may be attended by any member in good standing.

10. Any officer may be removed from the Board by an affirmative vote of the majority of directors present at an official meeting of the Board. Notice of the proposed removal will be given to members with the notice of the meeting. The officer involved will be given an opportunity to be present and be

heard at the meeting at which his or her removal is considered.

#### **Article V.**

##### **Membership:**

1. Members shall be persons who have an interest in scientific, technical or legal aspects of ground water resources.

2. Condition of membership shall be payment of annual dues prescribed by the Board.

3. Membership is on a calendar year basis. The Board may authorize partial-year rates for members who join after June 30.

4. A member-in-good-standing is one whose dues are paid for that year.

5. There are two types of memberships: regular and student. Student members may join for one-half the price of a regular membership. The Board may determine additional membership categories (e.g. retiree or institutional categories) for which the required dues payment differs from that for regular members.

#### **Article VI.**

##### **Election of Board:**

1. The Board shall annually appoint a nominating committee to prepare a slate of candidates for officers. The slate shall be announced at a meeting prior to the annual meeting. Additional nominations from the floor, duly seconded, may be made following announcement of the slate. Nominees must agree to serve if elected. Election of officers shall be by a mail ballot completed before the annual meeting, and the outcome of the election shall be announced at the annual meeting. Those candidates who receive a plurality of ballots for each position shall be declared elected. Ties shall be decided by a majority vote of the Board. They shall take office at a subsequent meeting designated by the Board, but no later than four (4) months after the annual meeting.

#### **Article VII.**

##### **Management and Finances:**

1. The business and property of MGWA shall be managed by the Board, which shall meet as often as it deems necessary for efficient operation of MGWA, but at least

once a year. The Board is empowered to appoint from among the members of MGWA such committees as it considers necessary to conduct any phases of MGWA business.

2. The operating funds of MGWA shall be derived from annual dues, any residual funds arising from advertisements, sponsored meetings, and from grants, contributions and endowments.

3. The President and/or Treasurer are empowered to expend funds for MGWA to an extent, and for purposes, approved by the Board.

4. The editor shall be a volunteer position for a two-year term. He/She shall be directed by the Secretary for preparation of the newsletter and other communications as requested.

5. The Board may contract for professional business management assistance or services. Specific functions of and all actions of such professional management assistance or services shall be directed by and performed under the direction of the Board in order that actions of the professional management always reflect the goals of MGWA.

#### **Article VIII.**

##### **Affiliation:**

1. MGWA shall be affiliated with the Association of Ground Water Scientists and Engineers of the National Water Well Association. Cooperation or affiliation with other organizations may be arranged by the Board as it deems such action consistent with the objectives and interests of MGWA.

#### **Article IX.**

##### **Amendments:**

1. Proposed amendments to the bylaws may be made by petition to the Board signed by at least 10 percent of current members in good standing.

The Board must present the petition to the membership at the next MGWA meeting. Ballots should be available at that meeting or be mailed out to all members within 30 days of the meeting in order to vote on the proposed amendment.

3. The bylaws of MGWA shall be so amended if the proposed amendment is approved by a majority of meeting or mail ballots cast by members of MGWA. Ballots must be returned to MGWA within 30 days to be counted.

#### **Article X.**

##### **Nonprofit:**

No part of the net earnings of MGWA shall inure to the benefit of, or be distributable to members, officers, or other private persons except that MGWA shall be authorized and empowered to pay reasonable compensation for services rendered.

#### **Article XI.**

##### **Operational Limitations:**

Notwithstanding any other provisions of these articles, the organization shall not carry on any other activities not permitted to be carried on (a) by an organization exempt from Federal Income Tax under section 501(c)(3) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law) or (b) by an organization, contributions to which are deductible under Section 170(c)(2) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Revenue Law).

#### **Article XII.**

##### **Dissolution Clause:**

Upon the dissolution of MGWA, the Board shall, after paying or making provisions for the payment of all of the liabilities of the organization, dispose of all the assets of the organization exclusively for charitable, educational, or scientific purposes as shall at the time qualify as an exempt organization or organizations under Section 501(c)(3) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law), as the Board shall determine.

Any such assets not so disposed of shall be returned to the Association of Ground Water Scientists and Engineers, a division of the National Water Well Association as repayment of startup monies given to MGWA by that organization.

## Workshop: Assessing Groundwater Sensitivity to Contamination

by Kerry L. Keen, L. Lehman & Associates

On April 11, 1989, over 100 scientists, agency personnel, governmental officials, and specialists in the ground water field gathered at the Earle Brown Conference Center on the St. Paul Campus of the U of MN for a workshop on recent developments in ground water sensitivity assessment methods. The meeting was sponsored by the Water Resources Research Center, U of MN, (WRRRC) along with the Minnesota Geological Survey (MGS), Center for Agricultural Impacts on Water Quality, and MGWA.

Patrick Brezonik, WRRRC and CE, U of MN, moderated the morning session, which focused on the connections between geological sensitivity and governmental response at various scales, from statewide assessments, to regional, county, and local involvement.

Calvin Alexander, Geol., U of MN, began the morning by pointing out the problem of scale in assessing groundwater sensitivity. He cautioned the audience in the interpretation of maps based on data collected at kilometers or 10's of kilometers for assessing ground water flow processes that can operate at microscopic scales.

John Wells, MN State Planning Agency, provided an overview of state ground water legislation and then raised some practical political concerns about how ground water regulations should be applied to sensitive areas in Minnesota. Local government must be included in regulating activities in sensitive areas.

Eric Porcher, MN Pollution Control Agency, presented the computer methodology (similar to DRASTIC) and data that went into making the statewide groundwater contamination susceptibility map.

Pam Hunt, Zumbro/Root River Joint Powers Board, spoke on needs and planning considerations

for a regional hydrogeologic susceptibility evaluation in Southeast Minnesota.

Panel discussion focused on county needs for ground water sensitivity evaluation. Howard Hobbs, MGS, explained the resources of the MGS, including state and regional geologic and hydrogeologic maps, the well log file, expertise of the staff, and especially the county geologic atlas program.

The merits of the county atlas program were championed by Gunnar Isberg, Planning Director for Olmsted County. He stressed that all citizens are involved in the general ground water contamination problem, not just agricultural or industrial sectors. Isberg pointed out the need for the 1990 Farm Bill to encourage crop rotation.

Hennepin County has recently completed a county atlas, and James Piegat, Hydrogeologist for the Hennepin Conservation District, pointed out that local governments can play an expanded role in dealing with ground water issues through local water planning.

The morning's final speaker, Bruce Olsen, MN Department of Health (formerly at MGS), discussed the new wellhead protection program that he is implementing. This program is especially important in Minnesota where 2.54 million Minnesotans (65% of the state population) use ground water as drinking water, as do 940 of the 976 public water systems.

The afternoon session, moderated by Jim Anderson, Center for Agricultural Impacts on Water Quality, U of M, addressed site-specific assessment methods.

Dwight Brown, Geog., U of MN, described the role of geographic information systems in site specific approaches.

John Nieber, AgEng., U of MN, discussed flow and transport in the vadose zone and presented an overview of the Subsurface Flow and Solute Transport model he and Otto Strack developed.

Ian Moore, AgEng., U of MN, presented environmental sensitivity modeling of landscapes based on topographic data.

Roko Andricevic, U of MN, discussed how spatial and temporal

sampling are optimized to determine ground water flow fields.

David Breitbach, USDA SCS, sees the SCS as a medium for technology transfer to assist and guide land users in environmentally sound management practices.

Pierre Robert, Soils, U of MN, explained a computerized and user-friendly Soil Survey Information System, SSIS. This is a menu-based system that allows the user to retrieve, sort and display data.

Hans-Olaf Pfannkuch, Geol., U of MN, spoke on approaches the Europeans use to assess ground water vulnerability. In Europe, where both population density and fertilizer use can be 10 times greater than in the U.S., the potential for ground water contamination is very high. For example, France uses a sophisticated taxing scheme on users and polluters that provides funds for research, technology development, and installation of supply and treatment plants.

The afternoon discussion panelists were: Don Jakes, MPCA, Christiane Saada, EPA Region 5; Jim Piegat, Hennepin County; and Rondi Erickson, Bay West, Inc. They discussed the problems of sensitivity, the steps that the state has already taken, and the role of local governments in addressing the issues of ground water sensitivity.

Rondi Erickson pointed out the potential for interagency confusion as ground water legislation becomes more comprehensive.

Jim Perry, Forest Resources, U of MN, ended the session after pointing out two overall themes to the workshop. One is the problem of defining sensitivity at various scales and the second is that we need to improve the linkage between technical information and political application.

The talks were of high quality and the response of the audience appeared to be very favorable, though we wish we'd had additional time for questions of the speakers which would have been beneficial. We congratulate the organizing committee and staff at the Water Resources Research Center on a very fine conference.

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## Call For Papers

### Second International Symposium on Gas Transfer at Water Surfaces

*Sponsors: U.S. Army Corps of Engineers Waterways Experiment Station; University of Minnesota, St. Anthony Falls Hydraulics Lab.*

*Dates: September 11 - 14, 1990.*

The first International Symposium on Gas Transfer at Water Surfaces, held at Cornell University in 1983, focused primarily on an improved understanding of the physical and chemical processes controlling gas transfer. As a natural progression, the Second International Symposium will focus on:

- improvements in the ability to describe the physical and chemical processes associated with gas transfer, and
- applications of process knowledge to the solution of engineering problems.

The purpose of the Symposium is to provide a forum for interdisciplinary exchange of knowledge about the physio-chemical processes that influence gas transfer and the subsequent engineering applications of the state-of-the-art knowledge to solve or mitigate environmental quality problems and improve process design.

The abstracts should consist of 2-3 pages (the specific format required is shown in the announcement provided upon request). All accepted abstracts will be published as a report of the Waterways Experiment Station and provided to each symposium participant.

Abstracts should be sent to the chairman of the Organizing Committee:

Mr. Steven Wilhelms, U.S. Army COE Waterways Experiment Station, P.O. Box 631, Vicksburg, Mississippi 39180; (601) 634-2475.

Additional contact: John Gulliver, University of Minnesota, (612) 627-4600.

January 31, 1990 is the final date for receipt of abstracts.

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### 1990 National Conference on Hydraulic Engineering and the International Symposium on the Hydraulics/Hydrology of Arid Lands.

*Sponsors: ASCE Hydraulics Division, the Irrigation and Drainage Division, and the Association of State Flood Plain Managers.*

*Dates: July 30 - August 3, 1990.*

The objective of the National Conference on Hydraulic Engineering (NCHE) is to provide a forum for discussion and exchange of information on all aspects of Hydrologic and Hydraulic Engineering. The Technical Council of Cold Regions Engineering is a cosponsor.

Topics for the International Symposium on the Hydraulics/Hydrology of Arid Lands (H<sup>2</sup>AL) include: Water Supply; Drainage; Mud, Debris, and High Concentration Flows; Salinity; Hazardous Waste; and Cold Region Topics.

Abstracts two pages in length including any figure, should be submitted before December 1, 1989. For NCHE submit to: Dr. Howard H. Chang, Department of Civil Engineering, San Diego State University, San Diego, CA 92182. For H<sup>2</sup>AL submit to: Dr. Richard French, 2268 East Hacienda Avenue, Las Vegas, Nevada 89119.

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### 5th Canadian/American Conference on Hydrogeology: Parameter Identification and Estimation for Aquifer and Reservoir Characterization.

*Sponsors: The Alberta Research Council and the Association of Ground Water Scientists and Engineers.*

*Dates: September 18 - 20, 1990. To be held in Calgary, Alberta, Canada.*

This conference is to review the latest developments in the fields of parameter identification and estimation for porous and/or fractured media, to present new work and approaches, and to bridge the gap between hydrogeologists and

engineers. The conference features invited speakers who are widely recognized leaders in their fields, submitted papers and poster sessions, and informal discussions.

Abstracts (< 300 words, typed, double-spaced) and short biographical sketches (< 100 words) must be submitted to Dr. Stefan Bachu, Conference Convener, Alberta Research Council, PO Box 8330 Station F, Edmonton, Alberta T6H 5X2, Canada, by April 1, 1990.

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## New Members

**Paul Bulger**, STS Consultants, Ltd.

**Steve Fritts**, Leggette Brashears & Graham, Inc.

**Robert J. Kadwell**, Tellus Consultants.

**Amy J. Loiseau**, DNR-Waters, Eveleth.

**Tim McGlennen**, GMW Consultants, Inc.

**Barry D. O'Flanagan**, Delta Environmental Consultants, Inc.

**Patricia Ruble**, Ruble Consulting.

**Melinda Salisbury**, University of Minnesota.

**Gary Oberts**, Metropolitan Council.

**Evan Drivas**, DNR-Waters, Ground Water Unit, St. Paul Central Office.

**Cindy Bartolerio**, Ramsey Soil and Water Conservation District.

**Pete Storlie**, Conestoga Rovers.

**Karin Goff**, University of Minnesota Geology Department

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## Changes

*Very few of you reported changes directly to us. If we got it wrong, it's because we had to use the grapevine!*

**Dr. Amal Djerrari and Terry Kaiser** have joined Barr Engineering.

**Rich Soule and Gary Hokannen** have switched to Geraghty and Miller.

**Tom Sinn** is going with TCT.

**Cathleen Villas-Horn** has joined HDR Engineering, Inc.

**Gary Costanzo** has joined Biotrol.

**Betty Socha** has moved to the Minneapolis office of Foth & Van-Dyke.

**Bill Johnson** went to Wenck Associates.

**Scot Johnson** has been recruited by DNR.

**Janet Rowe, Julie Myhrer, Mark Larson, Collette Wolf, Earl Windahl, Ron Weaver, Dave Russell, Doug Schuller, Steve Terhaar, Robert Frykeman, Mary Ann Baumgart, and Matt and Laurel Kania** all have joined Braun Environmental Labs.

**Peter Raschig and Brenda Winkler** are now at EnPro Assessment Corp.

**Paul Lucas, Steve Cummings, and Rita Schild** have joined Delta Environmental Consultants.

**Brad Birkelo** went over to Phillips Petroleum (has the tide turned?).

**Jim Jaques and Chris Haas** moved to Dames & Moore.

**Chris McElligott** is now with Malcom Pirnie, Inc.

**Bob Struve, P.E.** has been named head of Twin City Testing Corporation's Geotechnical/Construction Materials Division.

**James C. Rudd, P.E.** has rejoined Twin City Testing Corporation as geo/environmental business development manager.

**Dr. Gordon R. Hess** has joined ERM-North Central as Manager of the Minnesota-based office. The address of the new ERM-North Central office is:

ERM-North Central  
3470 Washington Drive,  
Suite 101  
Eagan MN 55122

phone (612) 454-0808  
FAX (612) 454-0759

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## Ground Water and Agrichemicals: Suggested Policy Directions for 1990

The Freshwater Foundation's fourth national conference on ground water and agrichemicals will focus on policy constraints and potential solutions related to agrichemical use and ground water protection, addressing such issues as institutional barriers, economic incentives (and disincentives), funding sources, and suggestions for modification of policies to better assure a balance between ground water protection and agrichemical use.

The timing of the conference will be critical, as the U.S. Congress looks to formulation of the 1990 farm bill. Recommendations from this group will contribute to policy discussions regarding the farm bill -- to help assure that legitimate goals are accompanied by reasonable policies, appropriate incentives and the flexibility needed to make them implementable. A pre-conference questionnaire, panel discussions, generous Q-and-A periods, and written input from attendees will all allow for the greatest possible amount of interaction.

Conference recommendations will be compiled and summarized in a bound report for national distribution. The conference outcomes will also be presented at a Congressional briefing early in 1990. This three-part effort should provide valuable information to policymakers as they consider the 1990 farm bill and its potential role in providing a reasonable frame work for balancing agrichemical use and ground water protection.

Conference attendees will include policymakers, agricultural and regulatory agencies, environmental groups, the agrichemical industry, farmers and farm organizations, and other concerned groups. The conference format will seek to encourage constructive discussion and consensus among these groups on suggested directions for formulation of the 1990 farm bill.

Conference cosponsors include the Soil Conservation Service-USDA, the U.S. Environmental Protection Agency and the National Water Alliance.

To receive a program agenda and registration information, write the Freshwater Foundation: 2500 Shadywood Road, Box 90, Navarre, Minnesota 55392, or call (612) 471-8407.

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## Humphrey Named to National Task Force to Speed Environmental Cleanups at Federal Facilities

*reprinted from a Press Release from the Attorney General's Office*

Attorney General Hubert Humphrey III has been named to a joint Governors and Attorneys General Task Force to find solutions to problems that have delayed needed hazardous waste cleanups at government-owned energy and defense facilities.

The Task Force will identify recommendations for Congress and the Bush Administration on environmental management and cleanups at federally-owned facilities across the country. The Task Force will examine the need for quicker identification of priority cleanup sites, how federal and state laws apply to cleanup sites and how to pay for the costs of cleanups at federal facilities.

An interim report was issued by the Task Force at the National Association of Attorneys General summer meeting July 9. A final report will be released in the fall.

The Task Force will be co-chaired by Idaho Governor Cecil D. Andrus, former U.S. Interior Department Secretary from 1977-1980, and Washington Attorney General Kenneth Eikenberry. In addition to Humphrey, other members include Colorado Governor Roy Romer, New Mexico Governor Garrey E. Carruthers, South Carolina Gover-

*continued on following page....*

nor Carroll A. Campbell, Jr., Ohio Attorney General Anthony Celebrezze Jr. and Colorado Attorney General Duane Woodard.

Humphrey has had experience in solving a hazardous waste problem at a federal facility. For months, Humphrey negotiated with the U.S. Army in an attempt to force the cleanup of contamination that resulted from the improper disposal, storage and handling of hazardous waste from its Twin Cities Army Ammunition Plant in Arden Hills, a northern suburb.

After a dispute between the state and the federal government over the interpretation of environmental laws and a threat by Humphrey to file a lawsuit, which would have required costly and lengthy litigation, in July, 1987, Humphrey secured a landmark settlement requiring the federal government to clean up the contamination at the arsenal.

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## Water Resources Education Materials

The AWRA Education Committee is trying to gather up as much water resources teaching material as possible. They are primarily interested in grades K - 12, but they admit they'll take anything K through death. Please send copies of anything available for free to: Richard A. Herbert, c/o AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, Maryland 20814-2192.

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## California Seeks Supervisory Geologists

The California Department of Conservation, Division of Mines and Geology is seeking outstanding geoscientists to lead its programs. As the State's geological survey, the Division of Mines and Geology applies earth science to help solve public-policy issues.

Each Supervising Geologist leads one of the five major programs of the Division. The programs are: Mineral Resources Development, Environmental Protection, Geologic Hazards Assessment, Earthquake Engineering, and Geologic Information and Support.

Seasoned managerial capabilities and proven technical expertise in geology, geophysics, seismology, or mining engineering are required. At least three of the five positions will be filled in early 1990. Oral interviews in October and November, 1989 will be used to establish a list of eligible candidates. The list will be used to fill vacancies for the next four years.

Minimum qualifications include California registration as a geologist at time of appointment, degree in the geological sciences or mining engineering, and at least 5 years of increasingly responsible professional experience. Master's or doctorate degree may substitute for some of the experience. The salary is currently \$49,620 to \$59,952 per year. Cost of living increases are expected. Applications will be accepted from September 1 to 29, 1989. The Examination Bulletin contains information on the scope and format of the examination. The Bulletin and Application forms can be obtained from Janis Williamson, Personnel Office, Department of Conservation, 1416 Ninth Street, Room 1347, Sacramento, California 95814.

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## Internship Opportunities Sought

Students from Minnesota Colleges and Universities are seeking paid and unpaid internship opportunities for a semester or for the school year. MGWA has received inquiries from students who would like to work in the environmental and geology fields.

If you or your firm can employ an intern or if you can provide an educational opportunity for a volunteer, or if you are a student who wants to get experience, please send a description of the position (or your resume) to Dr. Jeanette Leete at the DNR - Division of Waters, 500 Lafayette Road, St. Paul, MN 55155-4032.

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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**. Annual dues are \$10 for professional members and \$5 for students.

Just complete the form below and mail to: Minnesota Ground Water Association, c/o Don Jakes, 943 Lydia Drive, Roseville, MN 55113

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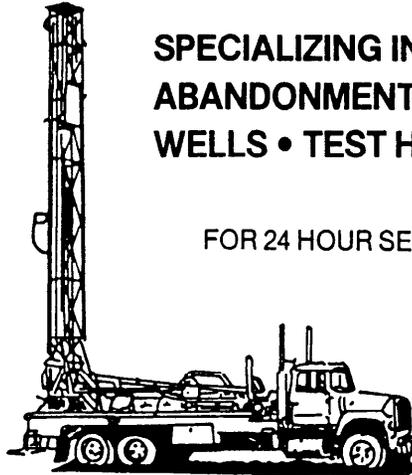
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## Vote for New Officers and to Approve the Minnesota Ground Water Association Bylaws!

A typical **MGWA** election brings in an embarassingly small number of ballots. Please help change this tradition of inertia. Fill out the ballot below and mail to: Minnesota Ground Water Association, c/o Don Jakes, 943 Lydia Drive, Roseville, MN 55113. Ballots must be postmarked by October 15, 1989 to be counted.

The results of the balloting will be announced at our Fall Meeting on November 1, 1989.

Mark one choice in each category:

Candidates for President:

Dr. Gordon Hess, ERM-North Central \_\_\_\_\_

Eric Mohring, Minnesota DNR, Division of Waters \_\_\_\_\_

Candidates for Secretary:

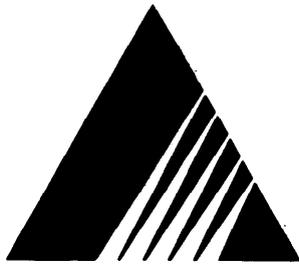
Bob Beltrami, Donohue \_\_\_\_\_

Dave Chrisman, Delta Environmental Consultants, Inc. \_\_\_\_\_

Approval of Bylaws:

I approve \_\_\_\_\_

I do not approve \_\_\_\_\_



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