

MINNESOTA GROUND WATER ASSOCIATION

NEWSLETTER v.5 n.1 JANUARY 1986

EDITOR'S NOTE: Gil Gabanski recently resigned as President of MGWA after four years in office. The membership of MGWA is indebted to Gil for the time and effort he has expended on behalf of this organization. Gil will continue to serve MGWA as Past-President. As prescribed in the MGWA by-laws the President-Elect at the time of the President's resignation, in this case Jerry Rick, assumes the duties and responsibilities of the Presidency.

PRESIDENT'S INTRODUCTION

On November 25, 1985, Gil Gabanski resigned as President of the Minnesota Ground Water Association (MGWA). As President-Elect at the time of Gil's resignation, I have taken over the duties of President. A call for nominations for a new President-Elect is found in this newsletter.

Gil Gabanski had served as President of the MGWA since September, 1982 when the MGWA was incorporated. During that time, he and a small group of dedicated individuals (including Patricia J. Leonard-Mayer, Dennis Woodward, Kelton Barr, Thomas Clark, and Gretchen Sabel) organized and directed the growth of the MGWA into the extremely successful organization that it is today.

As the new President, I have inherited an organization with an experienced and dedicated Board of Directors and a dynamic membership exceeding 250. The Board of Directors consists of Tom Clark, who has been Membership Chairman since the incorporation of the Association in 1982 and was one of the original board of directors; Gretchen Sabel, Treasurer since 1984; and Jim Stark, Secretary since 1985. In addition to the Board of Directors, Kevin Powers has recently taken over as Editor of the Newsletter from Pat Leonard-Mayer.

With the help of the Board of Directors, Editor of the Newsletter, and the entire membership of the MGWA, I propose that we concentrate on the following two major goals in 1986:

Formation of a Speakers Bureau. A speakers bureau would be a group of ground water professionals willing to volunteer their time and services as speakers on the topic of ground water. A director of the speakers bureau will be required. This position will involve developing a list of speakers, receiving requests for speakers from various organizations, providing those organizations with a list of appropriate speakers, and publicizing the existence of the Minnesota Ground Water Association Speaker's Bureau. The idea for the Speakers Bureau came from Gretchen Sabel.

Establish a working Program Committee to insure the regularity of the four quarterly general membership meetings. However, the organization and execution of these meetings is rigorous and time consuming and, in my opinion, too much for the Board of Directors to perform alone. The MGWA bylaws provide for the formation of a Program Committee. During January and February, 1986, I will accept four volunteers (or I will draft four volunteers) to act as Program Directors for the four quarterly general membership meetings in 1986. Each membership meeting will have one Director. It will be the responsibility of the Program Director to set the topic, arrange for speakers, arrange for the meeting place and supervise the other duties involved in the meeting. I would like to see the fall meeting in either Duluth or Winona.

Finally, let us all remember that the MGWA is an organization which allows an open forum between regulators, consultants, scientists, educators, and others regarding one basic resource - ground water. We have been successful because we have come together and participated with open minds. Let us continue to do so. -Jerry Rick

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 MN Pollution Control Agency
 (612) 296-7791

UPCOMING ELECTIONS

An election for the posts of President-Elect and Treasurer will be held at the MGWA Spring Business Meeting. Nominations for these positions will be accepted up to the date of the meeting. Send your nomination to MGWA, PO Box 362, St. Paul, MN 55165. The time and location of the Spring Business Meeting will be announced shortly.

MIDWEST GROUND WATER CONFERENCE HOSPITALITY SUITE

Many thanks go to the sponsors of the Hospitality Suite hosted by the MGWA at the Midwest Ground Water Conference on October 24, 1985. The get-together was quite well attended and provided a valuable forum for the exchange of ideas and employment opportunities, as well as a pleasant social break from the conference schedule. The sponsors were:

The Illinois Groundwater Association

The Iowa Ground Water Association

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BYLAW REVISION PASSES.

The changes to the bylaws, as outlined in the Fall Newsletter, passed (23 votes in favor of the change, 1 in opposition). The major reason for the change was to reorganize the Board of Directors and to resolve organizational problems. Briefly, the Membership and Treasurer positions have been consolidated into that of the Treasurer. The Secretary position has been given responsibilities of the newsletter and will be chairperson of a newsletter committee. The President and the Vice-President positions have been changed and a new position has been added to replace that of Membership. The new directors will be the Past-president and the President-Elect. Each year the MGWA will elect a new President-Elect. That individual will serve for one year and then automatically become the President and serve in that position for one year.

JANUARY MEETING

MGWA's January meeting was held January 15th at the Minnesota Pollution Control Agency. The topic was ground water quality data analysis. Subjects covered included graphical data analysis methods, examination of frequency distributions, significance testing, analysis of variance, non-parametric methods, and trend analysis. This short course was provided courtesy of the National Council of the Paper Industry for Air and Stream Improvement and was hosted jointly by MGWA and the Minnesota Pollution Control Agency. Registration was limited to seventy-five; our apologies to those who could not be accommodated.

DNR CONSIDERS PURCHASING MYSTERY CAVE.

The Department of Natural Resources is giving serious consideration to acquiring Mystery Cave in southeastern Minnesota. Many MGWA members will remember Mystery Cave as one of the highlights of a MGWA field trip in October, 1984. Mystery Cave is a complex joint-controlled maze cave developed in the Ordovician Dubuque and Galena formations in the fluviokarstic terrain of Fillmore County. It has 12 miles of surveyed passage and is the 32nd longest cave in the U.S.

DNR Commissioner Joe Alexander has estimated the cost to purchase and upgrade the cave to meet safety standards to be \$500,000 to \$600,000. Alexander has said that about the only ways the DNR can get necessary funding is for a private group to buy the cave and resell it to the DNR, or through a statewide lottery program or through the proposed Reinvest in Minnesota Program.

RADIOACTIVE WASTE SITING AND DISPOSAL MINNESOTA'S ROLE IN THE PROCESS

by
Gregg Larson and Pat Leonard-Mayer

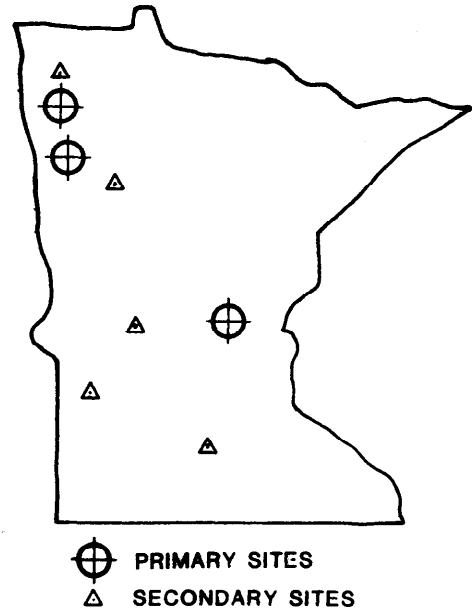
On January 16, 1986 the U.S. Department of Energy announced that three locations in Minnesota had been selected to be studied as possible sites for an underground nuclear waste repository. The sites include a 300 square mile site in parts of Marshall, Pennington, Polk, and Red Lake Counties; a 113 square mile site in Norman and Polk Counties; and a 397 square mile site in parts of Benton, Mille Lacs, Morrison and Sherburne Counties. In addition, 5 more areas in Minnesota have been chosen as backup sites in the event that one of the primary sites is found to be unsuitable.

High-level radioactive wastes, produced as byproducts of defense weapons production and nuclear power generation, require a 10,000 year period of isolation before most of the isotopes have decayed, although some isotopes of iodine and plutonium will remain radioactive for millions of years. The U.S. Department of Energy is currently searching for places suitable for disposal of these wastes and Minnesota appears to be high on its list. This article provides background information and summarizes activities undertaken by the state since being notified that it is under consideration for a nuclear waste repository.

The search for a way to safely dispose of radioactive wastes began soon after the beginning of the nuclear age, but a solution has been elusive. During this 40-year period, the federal government initiated numerous projects and siting efforts. But, as the Nuclear Waste Policy Act states, "federal efforts ... have not been adequate." Initially, the response to the growing volume of radioactive waste was temporary storage in anticipation of a permanent solution. One example of this was the storage of liquid defense waste in single shell storage tanks on the Hanford Reservation in Washington State. Although it was claimed in 1959 that the tanks would not leak for 40 years, they have already begun to leak. In 1973, one tank alone leaked 115,000 gallons of high-level radioactive waste into the ground.

Attempts at reprocessing the wastes also failed. Of the three commercial reprocessing plant that were built in the U. S. , two never opened. The third operated from 1966 to 1972 and then closed, leaving behind a half-million gallons of high-level waste and a history of chronic breakdowns and leaks.

POTENTIAL NUCLEAR WASTE SITES IN MINNESOTA



These failures, coupled with growing alarm of power utilities over the shortage of storage space at nuclear reactor sites, finally resulted in Congressional passage of the Nuclear Waste Policy Act of 1982. The Act directed that the federal government was the party responsible for the disposal of the wastes, outlined a siting process for two permanent disposal sites or "repositories" as the Department of Energy (DOE) refers to them, and required DOE to accept utility waste beginning in 1998. Congress also directed that disposal be in deep geologic formations, eliminating alternatives such as sea bed, space and polar icecap disposal.

The federal government is currently considering a variety of geologic media for the first disposal site which is to open by 1998. Basalt is under consideration at the Hanford Reservation in Washington, volcanic tuff at the Nevada Test Site, and bedded salt at a site in Deaf Smith County, Texas. The selection process for the second disposal site, projected to be operational by 2006, is focused on granite. DOE is now examining approximately 220 large crystalline plutons in 17 eastern states, including Minnesota. The Minnesota granite under consideration is widely distributed throughout the state, it underlies about 25% of the states surface and includes all or part of 59 counties.

Disposal at a repository would occur at a minimum depth of 660 feet in an area covering about 4 square miles. Surface facilities required to receive and prepare the waste for emplacement in the repository would occupy about 400 acres of the overlying surface. Waste would be transported to the disposal sites by either rail or truck shipment.

Although DOE is aiming for an isolation period of 10,000 years, the canisters enclosing the waste are not expected to last more than a portion of that time. The Nuclear Regulatory Commission, which is responsible for licensing the disposal sites once they have been selected by DOE, assumes that canister containment will be effective for no more than 1,000 years. After that, the natural characteristics of the host media are relied on to prevent radionuclides from reaching the surface. Ground water is the likely means of transport, but it is anticipated that at the repository site selected ground water movement will be horizontal and extremely slow.

The state of Minnesota recognized the need for disposal of nuclear waste and has historically been a leader in the efforts to force the federal government to develop a plan for its safe disposal. The state has closely followed the DOE siting program for several years, reviewing federal work products, proposed rules and regulations, and the site selection methodology for the second repository. The Legislature established the Governor's Nuclear Waste Council in 1985 (replacing the Governor's Task Force on High-Level Radioactive Waste, established in 1983) and has enacted laws that are intended to allow for greater state participation in the federal siting program.

Since the state first became involved with the issue, concern with the federal siting program has grown. The Governor and the Legislature have adopted positions opposing a Minnesota site. Minnesota's opposition is based on a number of factors which include the following:

(1) The role that politics has played in the siting process; for example, Congress, in trying to make the first disposal site more palatable to the western states, promised that a second repository would be sited in the east, regardless of cost or comparable safety. The state feels that politically motivated decisions affect the credibility of the siting program and prevent DOE from arguing that a particular site was selected because it was the safest. If DOE can't make that argument, it is going to have a difficult time convincing a state to take on the burden of a repository.

(2) Flaws in the methodology for selection of sites. The DOE site selection rules have been criticized for many reasons. As just one example, they do not disqualify unsuitable sites early in the process. The most important of the DOE guidelines cannot be applied until extensive shaft excavation and construction are complete, late in the siting process, and after over a billion dollars per site

has been spent. There is concern that, at that late in the siting process, after such an enormous expenditure of time, money and expertise, it would be difficult for DOE to eliminate a site because of technical flaws.

Minnesota, along with other states and parties, has recently files suit in the federal Court of Appeals over inadequate DOE siting guidelines and, in a second action, has filed suit against the Environmental Protection Agency over inadequate radiation protection standards.

(3) Uncertainties regarding the use of granite as a disposal media. If Minnesota were chosen for a high-level waste disposal site, the underground portion of the repository would be in the saturated zone and once the repository was closed and pumping stopped, the repository would become flooded. Compliance with federal standards requires ground water travel times from the repository to the surface of at least 1,000 years, and ideally, more than 10,000 years. The uncertainties and technical difficulties involved in predicting flow in fractured crystalline rock over these time frames, creates a concern over our ability to select a suitable site. This concern increases with the realization that the waste is irretrievable. At the end of a relatively short operating period (50-85 years), the shafts and drifts will be backfilled and sealed and the surface facilities dismantled. Further access will not be possible. Some monitoring activities that could provide an early indication of trouble will not be undertaken because such monitoring could create a radionuclide pathway to the surface.

(4) The need to protect our extensive surface water and ground water resources. Minnesota's lakes cover nearly 5% of its surface area, while extensive wetlands cover an additional 11% of the state's area. The state lies at the head of three great North American watersheds: the Great Lakes Basin, which drains to the Atlantic Ocean; the Red and Rainy River Basins, which drain to Hudson's Bay in Canada; and the Mississippi River Basin, which drains to the Gulf of Mexico. In addition, the state's high quality ground water is widely available for all potential uses.

Using funds that Congress ordered DOE to make available to the states and Indian tribes under siting consideration, Minnesota has developed a program to inform citizens and public officials about the federal repository siting process, and has laid the groundwork for a more effective citizen and state voice in the decisions that lie ahead. In addition to the actions described above, Minnesota has been active in the following:

- providing public information and education (brochures, fact sheets, information packets, a slide-tape show and public speakers are available)
- providing a means for citizen participation on councils and committees
- enacting legislation and promulgating rules
- providing technical review of reports, rules, studies and policy documents.
- providing testimony at Congressional and NRC proceedings
- initiating legal action and obtaining documents through the Freedom of Information Act.
- promoting international and interstate communication on the issues.

Additional information can be obtained from:

Governor's Nuclear Waste
Council
500 Cedar Street
St. Paul, MN 55101
(612)296-2603.

Outside the Twin Cities Metropolitan Area: call toll free 1-800-652-9747 and ask for "Radioactive Waste".

JOURNAL OF FRESHWATER FOCUSES ON GROUND WATER

The 1985 *Journal of Freshwater*, published by the Freshwater Foundation, is entitled "Groundwater: New Perspectives, New Initiatives." This 40-page, 4-color, journal provides a four-part overview of groundwater:

What is groundwater?

How much do we depend on groundwater?

How do we affect groundwater?

How are we protecting groundwater?

Copies of the Journal are available from the Freshwater Foundation (\$10.00 plus \$1.00 postage), 2500 Shadywood Road, Box 90, Navarre, MN 55392. Bulk discounts are available. Call (612) 471-8407 for additional information.

MGWA WINTER MEETING

On a frigid Friday the 13th afternoon in December, about 45 hearty MGWA members braved the elements to attend the winter meeting. The guest speaker was Dr. Bob Taylor, associate Professor in the Department of Geology and Geophysics at the University of Wisconsin - Milwaukee. Dr. Taylor described a number of interesting and innovative geophysical techniques that can be used in ground water studies. The talk was followed by a question and answer session and by informal discussions, concerning the growing interest in use of the techniques here in Minnesota.

For members who requested additional information, here are a number of references:

Lake studies:

Bradbury and Taylor. 1984. Determination of the hydrologic properties of lake beds using offshore geophysical surveys. *Ground Water*. 22(6).

Taylor and Cherkauer. 1984. Application of combined electrical and seismic methods to the determination of hydraulic conductivity of a lake bed. *Ground Water Monitoring Review*. 4(4).

Logging and use of the automated system:

Proceedings of the 2nd Conference of Surface and Borehole Geophysics Methods in Ground Water Investigations, a conference sponsored by the National Water Well Association, Fort Worth, Texas, Feb. 12-14, 1985.

Azimuthal resistivity surveys:

Leonard-Mayer, P. 1984. A surface resistivity method for measuring hydrologic characteristics of jointed formations. Bureau of Mines RI 8901.

Taylor, Evaluation of Geophysical surface methods for measuring hydrologic variables in fractured rock units. Open File Report, Bureau of Mines, Twin Cities Research Center, Minneapolis.

Research results were also presented at a NWWA Conference on Surface and Bore Hole Geophysics in Ground water Investigations held at San Antonio, Texas, February, 1984.

RESULTS OF MGWA SALARY SURVEY

Earlier this year the MGWA Newsletter carried a confidential salary survey to help the ground water profession determine what constitutes the prevailing wage scales. This was done to assist both employers and employees in setting salaries in a discipline where the actual duties performed blur the distinctions made by the titles of occupational slots and degrees majors. There were 26 responses to this survey, about 19% of the membership. These responses are summarized below. Because the number of responses is modest, there is only a limited amount of breakdown analysis. It is hoped that this survey will become an annual feature of the MGWA Newsletter and, with better response from our growing organization, can help establish equitable monetary recognition for members of the ground water profession.

1. Place of Employment (26 responses)

- 1 - Local government
- 10 - State government
- 4 - Federal government
- 1 - Self-employed consultant
- 8 - Private consulting firm
- 2 - Other

2. Occupational Title (25 responses)

- 1 - Geologist
- 8 - Hydrogeologist
- 9 - Hydrologist
- 3 - Engineer
- 1 - Ground water geologist
- 3 - Other

3. Educational Level Attained (26 responses)

- 8 - BA / BS
- 17 - MA / MS
- 1 - PhD
- 1 - JD

4. Educational Institution of Highest Degree (23 responses)

- 9 - University of Minnesota
- 2 - University of Texas (Austin)
- 2 - University of Wisconsin (Madison)

- 1 - Colorado State University
- 1 - Cornell University
- 1 - Macalester College
- 1 - Northern Illinois University
- 1 - St. Cloud State University
- 1 - University of California (Davis)
- 1 - University of Cincinnati
- 1 - University of Illinois
- 1 - University of Wisconsin (Milwaukee)
- 1 - William Mitchell College of Law

5. Years of Professional Experience (25 responses)

Mean 6.5
 Median 6
 Maximum 19
 Minimum 0.1

Breakdown by Highest Degree Attained

B.A./B.S.: Mean 7.1 years
 Median..... 6
 Maximum 19
 Minimum 1
 Sample size 8

M.A./M.S.: Mean 5.9 years
 Median..... 5.5
 Maximum 13
 Minimum 0.1
 Sample size 17

PhD.: Mean 5 years
 Sample size 1

6. Registration Status (22 responses)

5 registered
 17 not registered

7. Certification Status (24 responses)

6 certified
 18 not certified

8. Overseeing or management of others (26 responses)

15 no
 11 yes

people supervised:

Mean 5.2
 Median 7
 Maximum 15
 Minimum 1

9. Current Annual Salary Plus Other Cash Benefits (26 responses)

Mean	\$30,768
Median	\$32,000
Maximum	\$48,000
Minimum	\$16,000

Breakdown by Highest Degree Attained

B.A./B.S.: Mean \$27,257	
Median.....	26,000
Maximum.....	36,000
Minimum.....	16,000
Sample size	8
M.A./M.S.: Mean \$32,328	
Median.....	32,000
Maximum.....	48,000
Minimum.....	21,800
Sample size	17
Ph.D.: Mean \$33,000	
Sample size	1

MEMBERS' PROMOTIONS, CHANGES AND NEWS

Jane Willard, of Twin City Testing Corporation, was recently elected to serve as the president of the Minnesota Chapter of the Association for Women Geoscientists for 1986. She is also a delegate to the national board of AWG. She spoke on "Ground Water Quality - A Regional Perspective" at a conference held October 10th in Bemidji and will be a part of the U of MN winter seminar series on Environmental Engineering. She will be a panelist on the topic of ground water cleanup at the seminar with Bob Karls and Fay Thompson.

Other MGWA members who have been elected or appointed to AWG offices include: Shiela Grow, Treasurer; Mike Convery, Membership Chair; Sarah Tufford, Bylaw Chair; Pat Bloomgren, Past president.

Other news at Twin City Testing: David Luick has joined the St. Paul office as a Project Manager, John Fulton and Alex Fischer joined as Hydrogeologists and James Bailey has joined as a Technician.

Derric Iles, former project manager at Twin City Testing Corporation, has resigned to return to the South Dakota Geological Survey in Vermillion, South Dakota.

At Leggette, Brashears and Graham: Kevin Powers and Jim Pennino have been promoted to Senior Hydrogeologists. Kristin Kennedy has been promoted to Hydrogeologist and Kevin Miller has joined the firm as a Hydrogeologist.

Linda Bruemmer is the new Supervisor of the Ground Water Unit in the Program Development Section, Division of Solid and Hazardous Waste, Minnesota Pollution Control Agency. Linda was previously with the Environmental Division at the State Planning Agency.

At Barr Engineering: Melissa F. Pollock and Rich J. Palm have joined the staff as geophysicists; Steven W. Rovertson has joined as a Geochemist and Gary E. Hokkaner and Gregory Kell have joined as Ground Water Hydrologists. Kelton Barr wishes to announce that he is now the representative of the Geology Department on the Institute of Technology Alumni Board, and he is otherwise lying low while managing the current investigation at the South Andover CERCLA site for the EPA.

Pat Leonard-Mayer is relieved to report that she is graduating from William Mitchell College of Law on January 19th. Pat has been selected to serve on the Editorial Board of Ground Water for the term January 1986 to December 1988.

Scott Fox, currently with the Office of Surface Mining in Knoxville, Tennessee, has been offered a position with the Minnesota Pollution Control Agency. Are you coming back, Scott?

WHAT WOULD YOU LIKE TO SEE IN YOUR NEWSLETTER?

The purpose of this Newsletter is to provide an instrument for the exchange of ideas and information about ground water and ground water related issues in Minnesota for the membership of MGWA. You are the membership of MGWA! We are interested in your ideas, your thoughts, and your concerns! We would like to hear from you! Everyone is encouraged to submit articles or items to the newsletter; whether it is a discussion of a topic of concern to you, a field technique that may be of use to others, a program or subroutine that has been found to be useful, or virtually anything else. Everyone is also encouraged to submit ideas and comments; a quick note or call provides us with valuable feedback to guide the contents of the Newsletter and the topics of future programs. Contribute today -- drop a line to the Editor or any of the directors.

CALENDAR

February 2 - 7 *Eighth Annual Symposium on Geotechnical and Geohydrological Aspects of Waste Management.* Contact the Geotechnical Engineering Program, Civil Engineering Department, Colorado State University, Fort Collins, Colorado.

February 20 & 21 *DRASTIC: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings.* Introduction to a system of assessing the ground water pollution potential of an area. To be held in Denver, Colorado by the National Water Well Association. Repeated **March 10 & 11** in Washington, D. C.

February 25 - 27 *Ground Water and Unsaturated Zone Monitoring and Sampling Short Course.* To be held in Boulder, Colorado by the National Water Well Association.

April 3 & 4 *Reflections on the Environment - A Cleaner View of the Future.* Ninth Annual Meeting of the Wisconsin Section, American Water Resources Association. Several technical sessions will include papers on ground water and surface water hydrology, regulations, modeling, sampling and analytical techniques, acid rain, wetlands and more. To be held at the Chula Vista facility in Wisconsin Dells, Wisconsin.

May 19 - 22 *Sixth National Symposium and Exposition on Aquifer Restoration and Ground Water Monitoring.* To be held in Columbus, Ohio by the National Water Well Association.

TREASURER'S REPORT

December 10, 1985

Assets:

Cash on Hand.....\$1750
(interest-bearing checking account
at Minnesota Federal Savings & Loan)

Postage:.....\$55
(stamps for newsletter mailing)

Total\$1805

Liabilities:

National Water Well Association
Start-up Loan\$500

Balance:\$1305

Gretchen V. Sabel,
Treasurer

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Rebecca Allen, Winona State University

William P. Johnson, Jr., Winona State University

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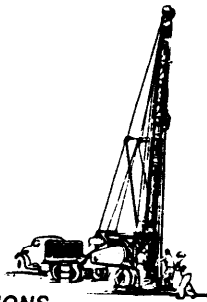
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