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WGWA ADDRESS:

WGWA
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Eau Claire, WI 54702-1590
President's Message

It's time to mark your calendars for the annual WGWA fall technical meeting. This year's meeting will be held on November 18th at the Paper Valley Conference Center in Appleton. Besides a roster of interesting speakers, we will repeat the popular "door prize" book give away at the end of the conference.

It's also the season when we start recruiting for new WGWA officers and board members. This year we will nominate and elect a new Treasurer for the term 2000 - 2001. This position involves managing WGWA's bank account and membership rolls. Certainly, this is a position of responsibility and trust. Our current Treasurer, Sue Vasey of Ayres Associates – Eau Claire, has done an excellent job during her term and deserves all of our thanks and appreciation. Sue handles inquiries for potential new or current members, an aspect of her role that she particularly enjoys. She's also gained skills using and maintaining our member database.

We're also looking for candidates for President-Elect. This is a "president-in-training" position with duties similar to a vice president. The President-Elect chairs the program committee and is responsible for the spring field trip planning and fall technical conference. Bruce Hensel of Natural Resources Technology – Pewaukee, is wrapping up his term as President-Elect and is looking forward to the challenge of being President next year. (I stick around for another year on the Board as "Past-President.")

WGWA holds Board meetings once every other month. While the physical meetings are held in Milwaukee, all meetings are also teleconferenced so participants can call in from anywhere at no charge. If you are interested in serving on the Board, please contact Bruce Hensel at 414.523.9000.

On a different note, I want to alert our membership that WGWA annual dues are going up beginning next year. Our dues have not been raised in over five years, but we've added a scholarship fund, purchased two sand-tank models, and will launch a website in the next couple of months. We've also hired outside help to do our mailings, type the newsletter, and most recently to assist us with developing a brochure and website content. All of this, and inflation, have driven our costs up. Still, I expect that even with a moderate dues increase, WGWA membership will remain a very good deal.

Nova Clite, President
TN & Associates

Editor's Note: We hope you enjoy this issue of the newsletter, which features articles on manufactured gas plant sites, brownfield changes, and NR 700 focus group insights. Please let us know how we're doing. We'd love to hear from you regarding topics, focused issues, etc.

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WGWA Board Minutes Summary

WGWA 7/21/99 Board Meeting Summary

Attendance: WGWA Board members: Mike Thompson, Bob Pearson*, Nova Clite, Bruce Hensel, Sue Vasey*, Kristen Gunderson* (*joined by phone); WGWA committee members: Debbie Kerr, Scott Brockway

Treasurer’s Report: Sue Vasey reported $7,370.74 in our bank account, after paying for summer newsletter, web domain names, ground water models, all costs associated with spring field trip.

Membership Report: Sue Vasey reported we currently have 341 members. Reminder: Persons not current on their membership will no longer receive newsletter.

OLD BUSINESS:

Web site: Secured web domain names: WGWA.org and WGWA.net. These are now available for our use.

WGWA areas: Scott reported on Southeastern WGWA area meeting held June 9, 1999. North Central Area met for a tour of a wastewater treatment plant.

Scholarship update: Kristen will pull scholarship mailing list and send it to Bob Pearson, Sue Vasey, and Nova Clite for review. August mailing to university and college Geosciences programs is planned.

Newsletter: Deadline for next issue is August 30, 1999. There will be a newsletter committee meeting next week.

Education Committee:
State Fair: Deb Kerr tried unsuccessfully to get WGWA involved in this year’s WDNR building exhibit. Mike Thompson will help us make the connection and work with Deb for next year’s exhibit.

Groundwater Models: Two models are now available for member use; coordinated by Sue Vasey and Debbie Kerr. Draft policy for use of models is under development by Board.

Program Committee: Deferred discussion to new business.

Legislative Committee: Mike Thompson provided an update on important policy developments in the WDNR and Dept. of Commerce’s management of tank sites.

NEW BUSINESS

Fall Technical Conference: Date will be Tuesday, November 9 or 16. Paper Valley Inn in Appleton selected as site. Conference themes and possible speakers were discussed. Technical books will be given away as door prizes again.

NGWA Conference: October 7 – 8, in Chicago. Two free passes will be issued by NGWA for WGWA members to help staff our booth. Board agreed to pay Sue Vasey’s conference fee and hotel for one night to attend conference so that she can help staff booth. Discussed booth content – we need brochure and display board.

Professional Services support: Nova proposed that WGWA contract for outside professional services so that we can relieve our volunteers of tasks and pressure, plus get some time critical things done (brochure, etc.). Services may include website content development, brochure and member materials development, support of database maintenance and database training for Treasurer (as needed), help with newsletter. Debbie Kerr stated that she would be willing to submit a proposal for her time to complete certain tasks for us. Nova will submit a draft professional services request, including services that Debbie Kerr can perform, for Officers to consider/approve before next board meeting.

Fall Elections: Bruce will coordinate outreach efforts. Everyone should begin thinking of potential candidates for Treasurer and President-Elect. Also we need to appoint at least one “At-Large” board member.

Nova Clite
TN & Associates

WGWA 9/14/99 Board Meeting Summary

Attendance: WGWA Board members: Mike Thompson, Nova Clite, Bruce Hensel, Sue Vasey*, Kristen Gunderson* (*joined by phone); WGWA committee members: Debbie Kerr, Scott Brockway

Treasurer’s Report: Sue Vasey reported $7,259.24 in our bank account, only $10 in outstanding invoices. Annual budget report prepared and distributed by Sue. Board meeting conference calls typically cost about $110.

Membership Report: Sue Vasey reported we currently have 351 paid members. Sue is keeping the list of about 700 people total including members and others for conference or recruiting mailings.

OLD BUSINESS

WGWA Area Meetings update: Southeast Area Meeting on October 5 at UWM. Derek Clayton, recipient of WGWA scholarship will present his thesis. Co-Coordinators Larry Wehrheimer and Scott Brockway have been discussing doing a tour of universities in Milwaukee, Madison, and Whitewater for recruitment, scholarship promotion and networking. Board discussed idea and others may get involved.

Scholarship update: Nova and Kristen will coordinate getting a scholarship application mailing out next month. We need to follow-up with those receiving the information afterwards. Once we get the list from Nova, we will divide the schools.

(Continued on page 4)
NEW BUSINESS

WGWA Annual Budget: Sue Vasey presented a draft annual budget for Board review. Costs and income for the annual technical conference and spring field trip will be kept separate, with budgets and fees developed for each event. The Board desires to keep the scholarship fund up to $2000/year.

Member Dues Increase: Nova proposed that membership dues be increased to support new services to our members (scholarships, models, website). Dues have not been raised since at least 1991. Following in-depth discussion, the officers voted as follows: unanimous approval to raise annual individual membership fee to $30, unanimous approval to raise corporate rate to $150 per year with 6 members; unanimous approval to raise student membership dues to $15/year (one-half of regular individual member dues). Other revenue ideas were discussed, such as soliciting more advertising in the newsletter. The Board asked that the Newsletter Committee propose an annual budget.

Next Meeting: Brief board meeting to be held after the Fall Technical Conference on November 18 at the Paper Valley Conference Center in Appleton.

Nova Clite
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among board members for visits/follow-ups. Looking at reimbursement of mileage for the visits at $0.31 per mile.

Newsletter: The theme for the newsletter is manufactured gas plant sites; the next theme is GIS/database management. Discussed covering the Crandon Mine issue and presenting various viewpoints in the newsletter. Bruce suggested the Crandon Mine as a field trip destination with newsletter tie-in. Contact Wayne or Debbie with ideas for future newsletters.

Education Committee: Instructional videos have been ordered for use with the groundwater models. Sue will bring one of the models and video to our Fall Technical Conference to encourage member use.

Program Committee: The Fall Technical Conference will be held on November 18, 1999 at the Paper Valley Conference Center in Appleton, Wisconsin. Madeline Gotkowitz and Liz Heinen will be presenting a talk on groundwater arsenic contamination in Green Bay. Dan Feinstein will present a new USGS model of southeast Wisconsin. Ravi Kolhatker from Amoco/BP will present their latest findings into RNA research from an industry perspective. Also hoping to get additional DNR representatives to give a regulatory perspective. Looking for 2 more talks. Nova has a lead on a presenter for HRC (hydrogen releasing compound) remediation.

Legislative Committee: Tim Melka has resigned from representing WGWA at NR700 Focus Group meetings (and also from the Board). We wish to thank him for his hard work. Dennis Lawton sent an update on regulatory developments for publication in the newsletter.

Professional Services: Between July and September Board meetings, Debbie Kerr submitted a proposal for professional services, which was accepted by the officers. The professional services to be provided by Debbie include design and development of a WGWA brochure, letterhead and membership certificate, writing of website content and arranging website hosting, and setup of a display booth for the October 7-8 NGWA conference. Other ideas for professional services are on hold pending completion of the current tasks.

WGWA Brochure, Letterhead: Progress is being made. Debbie provided a copy of the draft brochure, letterhead and membership certificate that she has developed. The brochure will be printed in time for distribution at the NGWA conference.

NGWA Conference booth. Nova, Bruce, Sue, Kristen, and Debbie will cover booth sitting. Triad Engineering Incorporated will lend WGWA their display booth. Debbie will arrange for the WGWA sign for the booth and other display materials.

Web site: Debbie Kerr presented estimates for maintenance and website hosting fees for a site with 8 pages. It should be up within the next couple of months.

Fall elections: Reminder, we are looking for treasurer, president-elect, and now two at-large board members. We need to expand out of southeast Wisconsin and get some academia representation.
Conferences/Seminars/Short Courses

Wisconsin Ground Water Association Fall 1999 Technical Conference
Thursday, November 18, 1999

WGWA’s Fall Technical Conference is scheduled for Thursday, November 18th, at the Paper Valley Conference Center in Appleton. We have reserved a block of 10 rooms until October 18, 1999 for those of you who may wish to stay over.

Confirmed conference speakers and topics include Madeline Gotkowitz and Liz Heinen, who will present a talk on groundwater arsenic contamination in Green Bay; Dan Feinstein, who will present a new USGS model of southeast Wisconsin, and Ravi Kolhatker from Amoco/BP, who will present Amoco/BP’s latest findings into remediation by natural attenuation (RNA) research from an industry perspective. Additional information, topics, speakers and registration form will be announced in a separate mailing. If you’d like further information or to be considered as a speaker please contact:

Bruce Hensel
Natural Resources Technology, Inc.
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Contaminated Site Closure Under NR 700 Regulatory Update
December 1 or December 9, 1999

A Full-Day Seminar Sponsored By The Federation of Environmental Technologists, Inc. (FET) and Wisconsin Department of Natural Resources

WGWA Members May Attend at FET Member Rates!

WGWA has endorsed the FET training session and contributed financial support so that its members may attend at FET member rates! The training sessions will be held on December 1, 1999 in Milwaukee, Wisconsin and on December 9, 1999 in Eau Claire, Wisconsin. For additional information and a registration form, please see page 30 of this newsletter. Please note that you are a WGWA member on the registration form to pay the reduced workshop fee.

Ground Water Modeling Seminars Announced

Environmental Simulations, Inc. is offering 3 courses on ground water modeling this fall. The courses will be held at the University of Virginia Center in Falls Church, Virginia, conveniently located at the West Falls Church Metro stop. This means you can stay at a hotel in Washington, DC and take a ride out to the course in the morning. There are also hotels near the training facility.

The courses we are offering include:

Introduction to Groundwater Flow & Transport Modeling for Remediation Design
October 27, 28, 29

Applied Model Calibration & Uncertainty Analysis
November 1, 2, 3

Advanced Remediation Design Using GW & MODFLOW-SURFACT
November 8, 9, 10

You can get all the details (outlines, cost, directions...) on these courses from:
http://www.groundwatermodels.com/serv02.htm

Keep in mind that we limit enrollment to 20. The University of Virginia center is very nice and unlike many other courses (including some of our own :-), each person gets his or her own computer (most courses these days are 2 to a computer). The room has 20 computers and we cannot add any more so register early.

Submitted by:

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Internet News—Focus MGPs

WAYNE’S WEB WORLD

Manufactured Gas Plants on the Internet

The complexity, variety and history of Manufactured Gas Plants (MGPs) and the environmental consequences of their operation have been well-documented over the past two decades. Most of the information regarding MGPs was contained in consultant reports buried on the shelves of a regulatory agency or in relatively limited-distribution technical reports published primarily for the membership of various utility organizations.

However, as with many topics, a variety of websites contain information specifically focused on MGPs or relevant to MGPs. Probably the foremost website devoted to “all things MGP” is maintained by Dr. Allen Hatheway at the University of Missouri at Rolla (http://www.umr.edu/~hatheway/). Dr. Hatheway’s website is almost more of an avocation for him and will appeal as much to the “history buff” as the scientist. His website is subdivided into five main topics, including the Chronology (History) of MGPs, the Number of MGPs, Gas Plant Components, Gas Plant Waste and Site Waste Characterization. Within each of these topics you’ll find information about the nature of coal-tar residuals, techniques for locating former MGPs, old references that contain surveys and inventories of MGPs, types of manufactured gas, the products and waste types produced by MGPs and a checklist for site investigation.

Another website that, not surprisingly, contains a fair amount of information about MGPs is maintained by the Gas Research Institute in Chicago, Illinois (http://www.gri.org/). This website contains webpages containing GRI Newsletters, Summaries of Research Projects and listings of publications offered for sale by the Gas Research Institute. One of the best-known and often-quoted publications, “Management of Manufactured Gas Plant Sites: Two-Volume Practical Reference Guide From the Gas Research Institute,” is available for sale through this website for $195. Other reports are free to members and typically cost no more than $25 for non-members. Finally, a very useful feature provided by the Gas Research Institute is an interactive outline of “GRI’s Manufactured Gas Plant Site Environmental Program.” The major “clickable” headings include Introduction, History, Regulations, Site Investigations, Risk Assessment, Site Remediation, Systems Analysis/Management and References. However, be warned that when you “click” on any of the topic headings, the new webpage may remain hidden behind the Table of Contents. Be persistent and you’ll be rewarded for your efforts.

The Electric Power Research Institute, or EPRI, maintains a website at http://www.epri.com/. Though primarily focused on the technical, marketing and environmental issues of electrical power production and transmission, there is also a webpage citation for a report on MGP Site Management available from the EPRI. Typically, the reports are available for free to EPRI members but there is no alternate procedure for non-members to obtain reports. However, if you are providing a service for an EPRI-member company you can obtain copies of reports through that company.

Though not focused on MGPs, one additional site that is useful for addressing environmental questions related to MGPs is maintained by the Department of Medical Biochemistry at the University of Minnesota in the Twin Cities. This site contains a wide assortment of microbiological information and references but also maintains a database of very complete degradation pathways for 92 organic compounds, some of which are typically found at MGP sites. The degradation pathways are viewable as text or graphical displays. This website includes a very comprehensive list of Internet Resources for Microbial Biotechnology, with several citations referring to polynuclear aromatic hydrocarbons and other organic chemicals that are typically found at MGP sites.

By consulting the websites I have described above you’ll be able to access some of the most comprehensive sources of information and data regarding MGPs. I’m sure that once you start to research the history, engineering and science behind MGPs, you’ll be fascinated by this precursor to our enormous petrochemical industry.

Wayne Hutchinson
ARCADIS Geraghty & Miller
Reflections On Dealing With Former Manufactured Gas Plants

Allen W. Hatheway
Rolla, Missouri

This past August, Newsletter Editor Wayne Hutchinson, asked me to reflect on dealing with former manufactured gas plant. Wayne gave me several related headings which he has sensed need to be more openly discussed by engineering geologic and hydrogeologic practitioners. Needless to say, I was delighted to respond with this short paper.

Former manufactured gas plants (FMGPs) constitute a special class of uncontrolled hazardous waste sites. FMGPs are characterized by numerous waste types and waste conditions that are poorly understood by many who work in and around these sites. The difference between careful, competent, and complete site and waste characterizations and the flawed and incompetent versions are commonly prepared as part of Risk-Based Corrective Actions (RBCA) to support no-action site closures (Hatheway, 1998). This paper endeavors to raise some critical issues and increase awareness of the need for competent FMGP site and waste characterizations. Without attention to these issues, FMGPs may not receive proper site remediation. These issues are more fully developed in Hatheway (in publication for 2000).

"Former Manufactured Gas Plants"
Also known as "FMGPs," and defined by the author as a now abandoned and/or derelict facility where gas (not gasoline) was manufactured for the purposes of illumination (gas lights), heat or fuel. In the United States, this activity began at Newport, Rhode Island in 1810, as stimulated by British activity of 1805, at Birmingham. The gas was made from nearly any organic material, predominantly wood, wood resin, coal of all types, and oil. Once made, in a variety of iron or ceramic "retrors" or other gas "generators", the gas was cleansed ("clarified", in condensers, scrubbers, washers, washer-scrubbers and tar separators and extractors) to remove tar-particle impurities and ammonia, then "purified" to remove compounds of sulfur and cyanide, along with trace-element metals). All of these impurities were commonly dumped at and around the gas works site and today constitute a class particularly dangerous environmental contaminants known broadly as "tars and tar residuals." This class of contaminants is mainly related to various molecular structures composed of the basic benzene ring of organic chemical affinity and typically have half-lives measured in geologic time. Gas plant tars and their residuals are mainly semi-volatile organic compounds (SVOCs), which are composed of two or more benzene rings. Benzene and those molecules made up of three to six benzene rings are known or suspected carcinogens.

History of Manufactured Gas Plants
Following the introduction of manufactured gas in Rhode Island, in 1810, a large operation came into being at Baltimore in 1816.

By the time of the Civil War, some 400 plants were in operation. Manufactured gas was eventually replaced by natural gas, but not before more than 3,500 MGP had been built and operated in America. The total number of manufactured gas plants, however, is much larger. The total number of FMGP sites is estimated to range from 32,680 to 50,108; at all of which coal-tar residuals can be expected to be found (Hatheway website: http://www.umr.edu/~hatheway/).

MGP Production Processes
Manufactured gas was produced for several reasons, by several dominant types of processes (Table 1).

Contaminants found at MGP
Contaminants associated with FMGPs are classified in two ways; by their chemical molecular composition and more broadly by the waste forms and the various ways in which they were generated. Table 2 lists the wastes in the latter manner, as an assist in recognition of the various gas works components and plant locations at which the waste types are to be expected.

Site and Waste Characterization
It goes without saying that environmental remediation of FMGPs and other tar sites can be no better than the degree of completeness and competence by which the FMGP has been characterized for its geologic conditions as well as on-site and off-site contamination. Contaminant transport at FMGPs is particularly influenced by geologic conditions and the entire worth of the selected remedy can be totally compromised by nondetection of geologic pathways. Likewise, a flawed or incomplete site and waste characterization can lead to an inaccurate application of Risk-Based Corrective Action (RBCA), which are often completed for the purpose of supporting a finding of No-Further Remedial Action Planned ("NIFRAP").

One of the outstanding ways in which site and waste characterization efforts become flawed is by inattention to development of the history of gas manufacturing operations at the site. Workers tend to rely, to an excessive degree, on Sanborn Fire Insurance Maps and Brown's Directory of North American Gas Companies, without recourse to collecting additional historic information to gain a true appreciation of how the plant operated, the nature and magnitude of its residuals, and waste management methods selected by the historic management. Significant changes were common in the years between individual issues of Sanborn coverage.

Selection of Remedy
Since about 1996, the United States Environmental Protection Agency (USEPA) has downgraded FMGP remediation from its major effort conducted between 1984 and 1993. The USEPA has virtually washed its hands of concern for this type of uncontrolled hazardous waste sites.

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Manufactured Gas Plants

(Continued from page 7)

Consequently, the USEPA Regions show no interest in FMGP remediation, except when and if the gas plant was designated as a CERCLA (Comprehensive Environmental Response, Compensation and Liability Act of 1980, colloquially known as Superfund) site some years ago. Nearly all FMGP sites are now handled through the States, as portions of formal Federal Brownfields (EPA site competition for $200,000 in seed money), or under State "brownfield" or Voluntary Cleanup Program (VCP) legislation.

The selection of a remedy is more complicated at FMGP and other tar sites than at other uncontrolled hazardous waste sites for two outstanding reasons:

1) Tars and their residuals have geologic lives and the real risks from their presence and migration in the site environment will have everlasting effects when and where risk-based assessments are inaccurate or have been formulated on flawed geologic and historic information, and

2) Tars are found primarily as such, having been separated as by-products and also as tar impurities in gas plant process waters, known variably as "ammoniacal liquids" and "gas liquors." Often the relatively large bodies to the liquor wastewaters are neglected in site and waste characterization.

3) Remediation workers commonly do not distinguish between chlorinated VOCs and the mostly SVOC tar DNAPLs (dense non-aqueous phase liquids) found at gas works sites.

The selection of a remedy for FMGPs generally breaks down to a fundamental choice between Source Control and/or Source Treatment. Many Responsible Parties (RPs) become entranced early in the process by thoughts of economic risks related to Source Treatment. Fundamentally, any body of gas plant waste left undetected or neglected in the ground greatly flaws the potential success for adequate site remediation.

Remediation techniques (soil and ground water)

Considering the largely viscous, semi-volatile, DNAPL nature of most of the hazardous source areas of FMGPs and their persistence, a conservative approach argues for consideration of source treatment or removal, with backfill of suitable, uncontaminated soils. Many sites have been classified for NIFRAP (no further remedial action planned) through presentation of incomplete site and waste characterization in which the spokesperson invokes RBCA based on faulty information. The result is that the real issues of source areas and contaminant transport are side-stepped because such was not found.

Containment often becomes the question if and when it becomes evident that source areas or contaminant transport is discovered. This situation invokes the installation of groundwater barriers in an effort to keep present contamination from further migration and an argument is developed whereby risk is adjusted to meet the goals of the site owner or developer. These arguments, although basically flawed by reality, are commonly presented in the case of sites now located in the Central Business District and/or at otherwise aesthetically attractive harbor or riverfront properties scheduled for urban redevelopment, especially for the new trend toward sports stadiums in larger cities.

Source area tars and tar residuals are subject to two general types of candidates for treatment of the polynuclear aromatic hydrocarbons (PAHs) wastes:

1) Solidification/Stabilization using standard "fixation" mixes, for RCRA Subtitle C landfilling or in-place containment, or

2) In-situ Thermal Desorption by which appropriate Percentages of the remaining VOC (as naturally admixed with the SVOC tar mass) are devolatilized to an appropriate extent.

Special Safety Issues

Former manufactured gas plants can be characterized and remediated with observation of the standard safety provisions, precautions, training and equipment required for such actions as are used for RCRA and CERCLA actions. Of particular emphasis, however, are observance of confined-area entry precautions, because almost all gas works waste compounds are highly aromatic and cause asphyxiation.

Summary

Former manufactured gas plants require specific historic and modern technical knowledge in order to adequately characterize their geologic and waste conditions as the basis for the selection of a remedy, or multiple remedies. A large percentage of these environmentally dangerous sites are today being subjected to inadequate site and waste characterizations and many of these are being used as the basis for flawed risk assessments (such as Risk-Based Corrective Action; Hatheway, 1998) that lead to "no further action", while carcinogenic VOCs and SVOCs are left to remain undetected in the ground. FMGP wastes have half-lives measured in geologic time; hazards left unrecognized today will live with us and remain threats.

REFERENCES


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Manufactured Gas Plants

(Continued from page 8)


(Continued on page 10)
### Table 1
**Typical Manufactured Gas Processes**

<table>
<thead>
<tr>
<th>Process Years</th>
<th>Common Characteristics</th>
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<tr>
<td>Coal Gas 1805-1966</td>
<td>Illuminating gas; produced significant tar and tar residuals, along with ammonia and cyanogens</td>
</tr>
<tr>
<td>Oil Gas 1820-1955</td>
<td>Illuminating gas; produced significant tar and tar residuals, along with ammonia and cyanogens</td>
</tr>
<tr>
<td>Water Gas 1845-1895</td>
<td>Illuminating gas; produced significant tar and tar residuals, along with ammonia and cyanogens</td>
</tr>
<tr>
<td>Oil-Enriched Water Gas</td>
<td>Illuminating gas; produced significant tar and tar residuals, along with ammonia and cyanogens</td>
</tr>
<tr>
<td>Carbureted Water Gas 1875-1965</td>
<td>Illuminating gas; produced significant tar and tar residuals, along with ammonia and cyanogens</td>
</tr>
<tr>
<td>Pacific Coast Oil Gas 1890-1945</td>
<td>Illuminating gas; produced significant tar and tar residuals, along with ammonia and cyanogens</td>
</tr>
<tr>
<td>Pintsch Oil-Gas Railroad Plants 1895-1940</td>
<td>German patent, eminently successful in North America plants at railroad division yards.</td>
</tr>
<tr>
<td>Gas Producers 1860-1945</td>
<td>Manufactured low-Btu fuel gas. Found in Factories and large shops.</td>
</tr>
<tr>
<td>Institutional Gas Machines 1840-1940</td>
<td>Hotels, mansions, public institutions, military posts and stations. Displaced mainly by electricity.</td>
</tr>
<tr>
<td>Beehive Coke Coke Ovens 1820-1920</td>
<td>Made only coke as a fuel; released tars Which were disposed to environment.</td>
</tr>
<tr>
<td>By-Product Coke Ovens 1890-present</td>
<td>Manufactured gas and coke, recovered tars, light oils, ammonia and its products.</td>
</tr>
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Compiled by Allen W. Hatheway

(Continued on page 11)
Table 2
Coal Carbonization Industry Classification of Its Wastes

Waste Characteristics

SOLID WASTES: Normally non-hazardous fire brick and retort/generator scurf. Normally non-porous but significant quantities of boiler or furnace ash were generated and could, when fine, and/or porous, could sorb hazardous constituents. None are labeled hazardous by virtue of their plant-use nature, except for purifier box wastes.

Demolition and Maintenance Debris: Basically broken ceramic retort and generator refractory bricks, and coke oven bricks and blocks. Comparatively, bricks lasted 18 months to 3 years for retorts, only a few months for carbureted water-gas shells, and 30 or more years for coke oven batteries. All bricks were subject to rapid damage through incompetent management or from explosions or flooding from nearby creeks and rivers.

Ash and Clinker: Normally sold for industrial fill and site-grading material when plant leveling needs are met or disposal volume has been exceeded. European practice was to crush and re-make as general construction brick; not adopted in the United States. Low-carbon ash commanded best price as capable of compaction to a more dense area-fill material; Hence superior bearing capacity for structurally-loaded areas. Both retort and gas producer ash often retains appreciable coke and is often worth the effort to screen and separate secondary fuel for recycling through the plant. Clinker of all hand-clinkered carbureted water gas plants considered a worthwhile source of recyclable coke fuel.

Soot: Formed in coal-gas retorts that have begun to leak from the outside, through microcracks in ceramics or through door seals. Would tend to accumulate in the ascension pipes.

Retort Carbon: Ingress of air at time of charging or from microfracture leaks in retort walls; Known to form a baked carbon rind on the retort and ascension pipes. Required extensive manual chipping with iron bars to remove.

Spent Lime Box Wastes: Lime-based purification waste traditionally considered as unusable and requiring dumping.

Spent Oxide Box Wastes: Waste of cyanide removal from outgoing gas; Disposal regarded as a traditional problem requiring constant attention; practice of use on driveways or as fill now not recommended due to odors (must be covered) and potential for spontaneous combustion; "Must be disposed by dumping at suitable locations and preferably covered." Plants often paying for removal and hauling to dump sites.

Spent iron oxide wastes were then considered to contain excess organic matter and had become unmarketable as feedstock for recovery of sulfuric acid. No economic conversion process was known in the U.S.

Water-gas purification wastes typically have lowest cyanogen content. Wastes containing > 10 percent cyanogen have value for production of Prussian blue dyestuff.

ca. 1920: Iron oxide waste volume reduced nationally with local adoption of Seaboard iron-oxide purification and recycling process capable of reclaiming about 90 percent of oxide for continued reuse.

1929: Management of purification wastes still considered an overall debit operation in manufactured gas industry.

Coal Carbonization Industry Classification of Its Wastes

LIQUID WASTES

Mainly consisting of process waste waters generated by condensation of moisture in gas vapors (carried from feedstock coal and coke) and by addition to the clarification process treatment waters, including condensing, scrubbing processes, washing and tar separation devices.
Manufactured Gas Plants

(Continued from page 11)

Ammoniacal Liquors: Also known as Gas Liquors, substantial contamination of worthless potential value unrecoverable at non-by-product recovery operations. Means were available after 1890 to recover substantial by-product value to reduce toxicity of these process wastewaters.

Pre-1895 and Smaller Gas Plants operated without by-product recovery. Generally the process waters were employed on a once-through basis in order to control (lower) the gas temperature. Such fouled process waters generally were discharged of in an untreated manner, including ammoniacal liquors (coal gas), gas liquors (any gas process), and tar-water emulsions (carburetted water gas, after about 1910)

<table>
<thead>
<tr>
<th>Post-1890</th>
<th>Phenol-Bearing Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzol Recovery Wastes</td>
<td>Tar Decanter Settlings</td>
</tr>
<tr>
<td>Phenolic Wastes</td>
<td>Saturator Sludge</td>
</tr>
<tr>
<td>Ammonia Still Wastes</td>
<td>Lime Settings</td>
</tr>
</tbody>
</table>

Specific by-product recovery waste waters; often discharged with only minimal pre-treatment.

Acid Sludges: Residuum of conversion of by-product coke oven

Conversion of ammonia to ammonium sulfate agricultural fertilizers beginning in about 1895, and occurring at lead-lined Saturator Boxes.

Tar-Water Emulsions: Condition brought about by reduced quality of feedstock oils and generator reactor media consumed in oil-enriched and carbureted water-gas, and oil-gas processes in which the entrained water content was virtually unremovable by the standard particle-removal condensation and scrubbing processes and which caused considerable problems in the purification process and which ultimately produced unmarketable or starkly less-valuable residual tars

Lampblack Fine-carbon slurry: Formed from oil-gas processes; major amounts formed in Pacific Coast variations, particularly the single shell (single shot) Leon P. Lowe/E.C. Jones designs; sometimes dried and briquetted as fuel.

Compiled from Powell, 1929; Modified by Allen Hatheway
A Resource for MGP Site Characterization and Remediation

"A Resource for MGP Site Characterization and Remediation" is a useful reference for manufactured gas plant (MGP) site management, characterization and remediation that became available in draft form earlier this year. The document was prepared by the United States Environmental Protection Agency (USEPA) with advice from utility groups to provide current information on useful approaches and tools currently being applied at former MGP sites by regulators, utilities and consultants.

The document outlines site management strategies and field tools for expediting site characterization at MGP sites; presents a summary of existing technologies for remediating MGP wastes in soil; provides sufficient information on the benefits, limitations, and costs of each technology, tool or strategy for comparison and evaluation; and provides, by way of case studies, examples of the ways these tools and strategies can be implemented at MGP sites.

Some of the more interesting and useful strategies or techniques discussed include:

- Use of streamlined and generic MGP RI/FS workplans as templates that can then be modified on the basis of site specific conditions
- Early land-use determination and identification of possible Brownfields projects in order to design proper risk assessments, construction, and remediation to fit the development application.
- Managing uncertainty by using an observational (phased) approach to characterization and remediation
- Expedited cleanup of MGP's within the context of voluntary (state) programs
- Use of urban background studies for PAHs in soil in order to help determine appropriate remedial goals

Finally, the document presents a variety of technologies for the particularly unique source materials found at MGP sites (e.g. tars, lampblack, light non-aqueous phase liquids), along with case studies. These technologies include recycling approaches (e.g. asphalt batching), in-situ techniques (e.g. stabilization), and on-site ex-situ methods (e.g. thermal desorption and soil washing). All in all, it’s a very useful reference. It can be found at: http://www.clu-in.org/programs/mgp/

Submitted by:
Jeff Sambat, ARCADIS Geraghty & Miller
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BIOCHLOR
Simulation of Natural Attenuation of Chlorinated Hydrocarbons with Excel

Albert Einstein once said, “Make everything as simple as possible, but not simpler.” Perhaps that’s the philosophy behind the fate-and-transport models developed for use with a readily available spreadsheet program, developed for the Subsurface Protection and Remediation Division of the National Risk Management Research Laboratory (SPRD/NRMRL) in Ada, Oklahoma and the Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB in San Antonio, Texas.

BIOSCREEN, an easy-to-use screening model, simulates remediation through natural attenuation (RNA) of dissolved hydrocarbons at petroleum fuel release sites. The software, available as Version 1.4 since July 1997, is programmed as a Microsoft Excel workbook. Based on the Domenico analytical solute transport model, which is the same transport equation used in many Risk-Based Corrective Action (RBCA) programs, BIOSCREEN has the ability to simulate advection, dispersion, adsorption, and aerobic decay as well as anaerobic reactions that have been shown to be the dominant biodegradation processes at many petroleum release sites.

Since BIOSCREEN was first made available in the mid-1990s, a groundswell of interest for a comparable program that addresses chlorinated hydrocarbons developed. Groundwater Services, Inc. of Houston, Texas, the developer of BIOSCREEN, has issued the beta-version of BIOCHLOR on their website (http://www.gsi-net.com). A fully functional program, developed for Microsoft Excel 7 or 97, and manual in Adobe Acrobat’s portable document format (pdf) is available for download.

BIOCHLOR uses the same three spreadsheets as BIOSCREEN – Input, Centerline and Array. One unique feature of BIOCHLOR is that on the Input spreadsheet the user is required to choose between degradation modeling of ethenes (e.g., tetrachloroethene and trichloroethene) or ethanes (e.g., trichloroethane). This recognizes that these two classes of chlorinated hydrocarbons degrade under different conditions and produce somewhat different degradation compounds.

An estimate of advection, as seepage velocity (feet/year), is calculated by the program using the hydraulic conductivity (K, in centimeters/second), hydraulic gradient (I, dimensionless) and effective porosity (n, dimensionless). BIOCHLOR estimates a retardation factor (R) for each compound based upon the soil bulk density (rho), fraction organic carbon (foc) and partition coefficient (Koc) the user supplies. The user is also asked to specify the width and length of the modeled area, which should be sufficiently large to include most of the groundwater plume. A simulation time, from 1 to 1000 years, is entered that typically mimics the time since the release or steady-state simulations (~ 1000 years). Estimates of dispersion (in feet), in three dimensions, are either supplied by the user or calculated by the program using one of three methods.

BIOCHLOR allows the user to specify two degradation zones. Two zones may be used to designate different degradation rates, but their greatest application may be to recognize the transition from anaerobic to aerobic degradation as a plume migrates downgradient. As shown on the Centerline spreadsheet, BIOCHLOR predicts the concentration of each ethene or ethane downgradient of the source area, assuming a sequential 1st order decay rate or no degradation. These concentrations may also be compared to concentrations measured in monitoring wells.

Finally, on the Array spreadsheet, a table of concentrations and a 3-dimensional representation for each ethene or ethane is displayed within the width and length of the plume designated on the Input spreadsheet. The Array spreadsheet also makes provision to estimate mass of chlorinated hydrocarbons in the plume, the mass removed through degradation, the percent of chlorinated hydrocarbon mass degraded, the volume of ground water in the plume and the flow rate of ground water through the source zone. A comparison to “pump-and-treat” is available to estimate the number of pore volumes and “clean-up time” required to achieve the clean-up standard shown on the Array spreadsheet.

The BIOCHLOR program is a welcome complement to the BIOSCREEN program. Many practitioners in hydrogeology and ground-water remediation are familiar with the data input and output format through their use of BIOSCREEN. It should be relatively “painless” to obtain realistic simulations of chlorinated-hydrocarbon degradation using BIOCHLOR.

Submitted by: Wayne Hutchinson
ARCADIS Geraghty & Miller
Natural Resources Board Approves Final Version of NR 169: Dry Cleaner Environmental Response Program Rule

According to information available on the website of the Wisconsin Department of Natural Resources (WDNR), the Natural Resources Board (NRB) approved the final version of NR 169, the Dry Cleaner Environmental Response Program Rule on August 30, 1999. As published on the website, "The WDNR presented the final version of NR 169, the Dry Cleaner Environmental Response program rule, to the Natural Resources Board at their August meeting in Hayward, WI. The Board adopted the rule, which establishes the criteria by which reimbursements for dry cleaners conducting environmental cleanups will be made. The rule will not become effective until after the state budget is signed, so statutory changes in the budget can be incorporated into the rule. The WDNR anticipates the rule becoming effective in November 1999. More information on the Dry Cleaner Environmental Response Program is available on-line."

Deb Kerr
Triad Engineering

Revision Proposed for Ground Water Quality Standards

In June 1999, the Natural Resources Board authorized the Wisconsin Department of Natural Resources (WDNR) to hold public hearings on proposed amendments to ch. NR 140 that would revise the existing groundwater standards for toluene and xylenes to coincide with the federal MCL (1 mg/L for toluene and 10 mg/L for xylenes). In mid-August the DNR held four hearings in Green Bay, Rhinelander, Eau Claire and Madison. The public hearing comment period ended August 27, 1999. Attendance at the public hearings was sparse, to say the least. But this is typical for a proposal with little or no opposition.

The WDNR plans to return before the Board in late October to request that the proposed amendments be adopted. If adopted by the Board and approved by the legislature, the amendments would go into effect early next year. Contact Steve Karklins in the Bureau of Drinking Water and Groundwater at (608) 266-5240 if you have questions or desire a copy of the proposed rule.
NR 700 Focus Group Meeting Updates

Combined Focus Group Meetings – July 12, 1999

The following items were discussed at the meeting:

• **R&R Staff Directories**: Remediation & Redevelopment (R&R) staff directories are available on the R&R web site. These include a master telephone list, regional and county contacts, and central office topical contacts.

• **Dry Cleaner Fund**: Robin Schmidt gave a brief overview of the status of the Dry Cleaners Fund. The final version cannot be completed until the Governor signs the budget bill because it will contain several items in the form of notes based on final revisions that will be incorporated from the budget bill.

• **Brownfields**: Mike Prager provided an update of the status of brownfields related items in the budget bill, many of which originated with the Brownfields Study Group recommendations. For information regarding brownfields related issues contact Mike Prager at 608-262-4927, or pragem@dnr.state.wi.us.

• **PECFA**: Pat McCutcheon provided a brief overview of PECFA related issues. At the time of the meeting Pat couldn’t really provide definitive details of where things were at because they were constantly changing. Significant issues affect WDNR including the definition of high priority sites; ones that would stay with WDNR and not be transferred to Commerce, 65% of which need to be transferred to Commerce by December 1, 1999. Low permeability sites (K < 2 x 10^{-5} cm/sec) would be excluded unless there were certain confirmed impacts to public or private wells. Pat indicated that the definition of high priority would likely continue to be revised until only 35% of the sites were still classified as such.

• **NR 746 – Summary of Technical Advisory Committee**: Pat McCutcheon provided a brief overview of the complicated status of multiple versions of COMM 46/NR 746. He indicated that the “greensheet” (official regulatory review transmittal) included several changes that needed to be made to NR 700 to be consistent with NR 746. The plan was to go to the Natural Resources Board in August for approval. There was very little comment at the public hearings on NR 746. Pat indicated that the technical advisory committee was now focusing on the Table 1 values, especially ground water pathway numbers for benzene and 1,2-dichloroethane. There were several comments by Focus Group members regarding inconsistencies regarding depths for determining direct contact values.

• **WDNR Case Closures**: A handout was provided regarding the history of WDNR closures for PECFA sites. Refer to insert provided below.

The next Combined Focus Group meeting is scheduled for Monday, October 11, 1999 at 1:00 p.m. in Room 027 GEF 2.

Consultants’ Focus Group Meeting – August 9, 1999

The following items were discussed at the meeting:

• **BRRTS Data on Web Format**: Alex Turner, Information Specialist for R&R, provided a brief overview of plans to put the Bureau for Remediation and Redevelopment Tracking System (BRRTS) information in a web format to be available on the R&R webpage. This information is currently available through the web page in tables that are not easily useable. The new format will use Oracle Designer and will be much more user friendly. A similar database for the Bureau of Drinking Water is currently available at http://www.dnr.state.wi.us/org/water/dwg/DWS.htm. Alex anticipates that the system will be available in 3 to 4 months.

A brief discussion occurred regarding the R&R web page. While the general availability and amount of information on the web page was considered to be good, some members expressed difficulty at times finding things in an efficient manner. Laurie Egre indicated that they realized this is sometimes a concern and have been looking into reorganizing the format. Anyone with comments or suggestions regarding the web page should contact Laurie Egre.

Laurie Egre also indicated that Tom Fass of the R&R group continues to evaluate the future use of electronic submittals. The likely timing of such a system could not be determined at this time. At this time they are looking at the possibility of .pdf formats.

• **Consultant Days**: The Federation of Environmental Technologists (FET) has agreed to coordinate a seminar similar to what has been known as “Consultant Days” in the past. The seminars are scheduled for December 1, 1999 in Milwaukee and December 9, 1999 in Eau Claire. The seminars will focus on the current status of obtaining site closures under NR 700 and related codes.

• **Utility Corridor Guidance**: Initially it was suggested that ramifications of the June 9, 1999 draft guidance Criteria for Evaluation and Investigation of Utility Corridors be discussed at this meeting. Some members suggested concerns regarding the difficulty of evaluating utility corridors in many cases. Because R&R was in the process of making revisions to the draft, the discussion was postponed until the next meeting. In the meantime, anyone who has specific comments regarding the draft should contact Laurie Egre.

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Technical/Regulatory

(Continued from page 16)

- Updated Deed Restriction and Groundwater Use Restrictions: Laurie Egre noted that the sample deed and groundwater use restriction forms had been revised. The revised copy should be on the R&R webpage. The deed restriction only had minor wording changes and the groundwater use restriction added an optional provision on page 2. A comment was made that the various WDNR regions differ as to who prepares the restriction, the Responsible Party/consultant or the WDNR.

- COMM 46.07(1)(b): A question was raised regarding the intent of the language in COMM 46.07(1)(b). It was not clear whether a Responsible Party (RP) who cannot obtain a groundwater use restriction from an off-site landowner is required to continue monitoring. The language suggests that although the RP cannot obtain closure without the restriction, that further action is not required if other conditions are otherwise met to obtain closure. Laurie Egre indicated that she believed this needed to be clarified because there may be differing opinions as to the original intent of the language.

- Individualized Routes of Migration: A question was raised regarding wording in the August 4, 1999 summary of PECFA in the budget bill, which requires WDNR and the Department of Commerce to develop a method to evaluate risk to public health, safety and welfare, and the environment that considers individualized routes of migration of petroleum contaminants at each site. Specific knowledge of how this will be addressed was not available at this time.

- Classification and Transfer of Petroleum Sites to Commerce: Some concern was expressed as to how WDNR would reclassify sites such that 65% of the sites would be transferred to the Department of Commerce, while still having sites with Enforcement Standard exceedances under WDNR jurisdiction. Laurie Egre indicated that this was still being resolved, but that sites with co-contamination would not count against the total number of sites upon which the percentage will be based.

The next Consultants’ Focus Group meeting is scheduled for Monday, November 8, 1999 at 1:00 p.m. in Room 611A GEF2.

WGWA members (consultants, agency staff and others) who have specific case history examples or general issues with respect to the above issues, including any remediation system wastewater permitting issues, should contact Dennis Lawton at 414-291-8840 (dennis.lawton@triadengineering.com). This is your opportunity to become involved in this interaction process.

Dennis R. Lawton – Triad Engineering Incorporated.

Well Construction Reports Available on CD-ROM and the Internet

Wisconsin well construction reports and high-capacity well information are available on both CD-ROM and the World Wide Web. A copy of the CD-ROM can be obtained by contacting the Bureau of Drinking Water and Groundwater’s general information line at (608) 266-0821. Or, visit the Wisconsin Department of Natural Resource’s website, which is regularly updated, at http://www.dnr.state.wi.us/org/water/dwg/dws.htm.

The well construction report file contains information provided by the driller (e.g., location, separation distances, drill hole dimensions, casing, screen, geology, pump test, static water level, sealing, date of construction). High-capacity well approval records include well location, approved pumpage, usage type, geology summary (if provided to WDNR), hole depth, casing, screen, and other information.

The CD-ROM contains both interlinked and non-interlinked files. The interlinked files include:

- Well Construction Report Files submitted by well drillers from 1988 through October 1998. Many pre-1988 municipal wells have also been recently added.
- Comment File, which contains additional information such as abandonment, special driller’s notes and variances issued for wells.
- Hi Cap File, which contains a copy of the high-capacity well approval file as of the update from December 1998.
- Bacti File, which contains results of bacteria sampling for wells with unique well id numbers. There are also data for other contaminants (e.g., nitrate, other bacteria). Most of the results are for newly-constructed wells.
- Variances File, which lists wells that have variance approval given to allow them to be in compliance.
- Landfill File, which contains variances issued due to landfills, and VARTRAK, which contains other variances. Questions about these files can be directed to Mr. Roger Gerhardt at 608.267.7655.

The non-interlinked files include the following:

- WDPI file, which contains a copy of the well driller and pump installer license file as of January 1999.
- Well Abandonment Contractors File, which can be used to list contractors by county, or to select contractors that perform well abandonment. This was last updated March 1998.
- Well Inspection Contractors File, which can be used to list by county or select contractors that perform well inspections. This was last updated March 1998.
- Approved Water Treatment Device File, which contains the list of water treatment devices that have been approved by the Wisconsin Department of Commerce. Questions about this file can be directed to Mr. Robert Schaefer at 608.266.3415.

For questions or comments concerning the records, you may contact Judy Adams (608.266.0153, adamsja@dnr.state.wi.us) or Sandy Hershberger (608.267.7605, hershs@dnr.state.wi.us), both of the Private Water Systems Section, Bureau of Drinking Water and Groundwater, Wisconsin Department of Natural Resources.
Brownfields Grant Program May Be Revised

The Round III Brownfields Grant Applications administered by the Department of Commerce were submitted on April 15, 1999. They have been initially reviewed and the Department of Commerce is requesting additional information to verify and/or supplement the information provided in the applications. The Department of Commerce anticipated announcing the awards by mid-July 1999, assuming the new biennial budget was passed by the legislature and signed by the Governor. This resulted from the funding for Round III coming from fiscal year 2000 appropriations. However, the Joint Finance Committee introduced potential changes to the Brownfields Grant Program that may impact the Department of Commerce's ability to make awards based on its original planning. In addition, the Conference Committee has not progressed on this issue due to budget stalemates. As the Round III funding is coming from the budget that may contain these changes, it is possible that the Department of Commerce may need to revise the application requirements for Round III applicants depending on the final budget language and any resulting administrative rules. This means the Department of Commerce may need to request addendums to the already-submitted applications. The Department of Commerce may also require a revised scoring procedure and a second scoring of the applications. If so, this will obviously delay the timing of the awards.

The proposed changes included:

1. Require the Department of Commerce to award one-half of the annual Brownfields Grant funding for projects, such as recreational or housing development, that are scored without considering the number of jobs created by the project;
2. Authorize the Department of Commerce to award grant funding for projects that address area-wide ground water contamination;
3. Require grant applicants to document that they were unable to secure funding that was sufficient to support the project from another source, and
4. Specify that grant recipients could be awarded other state grants or loans if they were eligible.

The Department of Commerce has contacted the applicants to make them aware of the delays.

Information provided by: John Stricker; Wisconsin Department of Commerce and the NR 700 Focus Group (WDNR)

Update on Brownfields Issues in the State Budget

Many of the statutory changes and new programs from the Governor's budget were passed by the Joint Finance Committee. A number of these issues are still being negotiated in the legislature and none are final until the budget bill has been signed into law.

The Joint Finance Committee did make some additions and deletions to the Governor's budget. Some of the key changes from the Joint Finance Committee are listed below:

- **Sustainable Urban Development Zone (SUDZ) Program** -- This new pilot program is to be developed by the Wisconsin Department of Natural Resources (WDNR) in conjunction with the Departments of Commerce, Transportation, Revenue, Administration, and Health and Family Services [formerly DHSS] that would promote financial incentives to cleanup and redevelop properties in cities with area-wide contamination. The program would provide $2,250,000 to four cities: Milwaukee, Green Bay, Oshkosh and La Crosse. The Legislature also is considering adding Beloit to the list. Responsible Parties (RPs) that conduct remediation in a SUDZ would be eligible to receive a 50% remediation tax credit. The Wisconsin Department of Transportation (WDOT) is directed to work with these cities to develop transportation access, planning and infrastructure improvements to be included in WDOT's budget request for 2001 - 2003.

- **Department of Commerce Grants** -- The Joint Finance Committee took the following actions regarding Commerce Brownfields Grants:

  Removed proposal to add $5 million on an annual basis to the Brownfields Grants program from the federal Temporary Assistance for Needy Families (TANF) provided employment was generated for needy families.


  Half of the money awarded would be to projects, such as recreation or housing projects, which would be scored without consideration of jobs created.

  The Department of Commerce would be authorized to award grants to address area-wide ground water contamination.

  Grant recipients would be required to demonstrate they were unable to obtain funding from another source.

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Grant recipients would be authorized to receive other state grants or loans if they are eligible.

- **Development Zone Tax Credits** -- The Joint Finance Committee recommended deleting the requirements that 25% of all development zone tax credits be claimed based on creating or retaining full-time jobs when environmental remediation tax credits are used.

- **WHEDA Brownfields Loan Guarantee** -- The Brownfields Loan Guarantee administered by the Wisconsin Housing and Economic Development Agency was eliminated by the Joint Finance Committee. The funding from the Loan Guarantee was transferred to other brownfields financial incentive programs.

- **Department of Transportation** -- The Wisconsin Department of Transportation (WDOT) is required to market several of its programs to assist with cleanup and redevelopment of brownfields properties.

- **Annual Report on the Effectiveness of Brownfields Initiatives** -- The Departments of Natural Resources, Commerce, Transportation, Administration and Revenue would be required to prepare an annual report that evaluates the effectiveness of brownfields initiatives.

- **Land Recycling Loan Program** -- The Joint Finance Committee earmarked $3 million in Land Recycling Loans for the City of Kenosha to explore alternative ways to administer the program.

- **Site Assessment Grant Program** -- Funding for this new grant program was reduced from $2 million to $1.45 million for the biennium. The following changes to this new grant program include:
  
  Deleted the requirement that local governments must repay the grant they receive if they receive a Land Recycling Loan
  
  Added underground storage tank removal to the list of eligible costs
  
  Allow rules to limit the amount of grants that are applied to certain categories of eligible costs

- **Brownfields Staff** -- Provided funding and authorization for the WDNR to add 13 positions to work on brownfields (Note: Based on resource changes in other programs, these new positions may be filled by existing staff transferred from other program)

- **Local Government Cost Recovery** -- The Joint Finance Committee modified the statutory language that determines the share of the cleanup costs that may be covered from different RPs. Other changes are currently being negotiated.

- **Voluntary Party Liability Exemption** -- The provision which authorized the WDNR to require any voluntary party to obtain insurance was removed. However, the environmental insurance requirements for Natural Attenuation at VPLE sites and for interim liability protection remain in the budget.

- **Interim Liability Protection/Protections Discovered After Environmental Investigation** -- The statutory language creating this liability protection section was modified. Reference to a “second” environmental investigation was removed.

- **Local Government Negotiation and Cost Recovery Process** -- The WDNR was directed to submit revised statutory language to the Legislature by January 1, 2001 to make this process more efficient and clear.

- **Area-wide Ground Water Characterization** -- The WDNR was allocated $50,000 annually to develop a bibliography of available information that relates to ground water information on a geographic basis.

- **Environmental Remediation Tax Incremental Financing** -- A number of minor statutory changes were made to improve the ER-TIF law. The Joint Finance Committee also passed an additional motion which requires that if the estimated remediation costs are greater than $80,000, the contract must contain a guaranteed maximum cost or the local government must obtain environmental insurance.

- **Clarification of Blight Elimination and Slum Clearance Authority** -- The change to this law to add “environmental pollution” to the definition of a blighted area was deleted by the Joint Finance Committee.

- **Cancellation of Delinquent Taxes** -- The Joint Finance Committee amended this statutory section to require counties to charge back delinquent taxes as special charges that are spread among all governments who levied taxes on a property.

For further information on brownfields issues and the budget contact Michael Prager at the WDNR (608/261-4927 or pragem@dnr.state.wi.us).
Technical/Regulatory

Wisconsin Department of Natural Resources Increases Number of Case Closures Above Standards

The Petroleum Environmental Clean-up Fund Act (PECFA) audit report questioned the willingness of the Wisconsin Department of Natural Resources (WDNR) to close sites with groundwater analyses above the Preventive Action Limit (PAL) under Wisconsin Administrative Code (WAC) NR 140 -- the regulatory goal of groundwater cleanups. As a result, the WDNR has begun self-monitoring both its rate of case closures with groundwater contamination above a PAL and above an Enforcement Standard (ES). The WDNR can issue variances to meeting the PAL, which is 10% of the ES for carcinogens and 20% of the ES for non-carcinogens. The WDNR can also close sites with groundwater contamination in excess of an ES, after the consultant for the responsible party (RP) demonstrates that natural attenuation will eventually bring the contaminants below the ES. The rule allowing closure of sites where a groundwater contaminant exceeds an ES became effective in November 1996. However, few sites could be closed quickly because the data needed to demonstrate natural attenuation had not been collected at many sites. More recently, the WDNR can also close certain sites with groundwater contamination above an ES if the criteria of Comm 46 are applicable and conditions at the site meet those criteria (read below for further information).

In 1997, the first year in which case closure was possible when groundwater contamination exceeded an ES, 10% of the WDNR’s final case closures were for sites where groundwater contamination exceeded a PAL or ES (13% for Petroleum Environmental Clean-up Fund Act [PECFA] sites). In 1998 the rate climbed to 23% (38% for PECFA sites) and in first four months of 1999 the rate of closures above the PAL or ES was 35% (56% for PECFA sites).

**WDNR SITE CLOSURES -- PECFA SITES**

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<thead>
<tr>
<th>Year</th>
<th>Final Closures Issued</th>
<th>Final Closures Above PAL</th>
<th>Final Closures Above ES</th>
<th>% of Final Closures Above Groundwater Standards</th>
<th>Conditional Closures Issued</th>
<th>Total Closures Issued</th>
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<td>49</td>
<td>36</td>
<td>56%</td>
<td>193</td>
<td>346</td>
</tr>
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</table>

(4 mos.)

**WDNR SITE CLOSURES -- ALL SITES**

<table>
<thead>
<tr>
<th>Year</th>
<th>Final Closures Issued</th>
<th>Final Closures Above PAL</th>
<th>Final Closures Above ES</th>
<th>% of Final Closures Above Groundwater Standards</th>
<th>Conditional Closures Issued</th>
<th>Total Closures Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>1443</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>120</td>
<td>1553</td>
</tr>
<tr>
<td>1997</td>
<td>840</td>
<td>52</td>
<td>31</td>
<td>10%</td>
<td>95</td>
<td>935</td>
</tr>
<tr>
<td>1998</td>
<td>818</td>
<td>109</td>
<td>82</td>
<td>23%</td>
<td>320</td>
<td>1138</td>
</tr>
<tr>
<td>1999</td>
<td>307</td>
<td>60</td>
<td>42</td>
<td>33%</td>
<td>269</td>
<td>575</td>
</tr>
</tbody>
</table>

A conditional closure means that the WDNR has approved the closure, pending action by the RP. Such pending actions may include abandonment of monitoring wells or recording a groundwater use restriction with the County for sites where at least one groundwater contaminant exceeds an ES. The “Total Closures Issued” is the sum of Final and Conditional Closures. As the above tables show, WDNR variance to meeting the PALs and closure for sites where a groundwater contaminant exceeds an ES are increasingly common.

The new Comm 46 rule further increases the rate of closure for sites with groundwater contaminants in excess of an applicable ES where low-permeability (clay) soils predominate. The rule “carves out” a group of petroleum contaminated sites as eligible for closure through natural attenuation following completion of an adequate site investigation. Although these sites were eligible for closure under existing rules, the demonstration of natural attenuation required under NR 726.05(2)(b) could take a long time at low-permeability sites due to their slow groundwater movement. This slow rate of groundwater movement, plus the low probability of water-supply wells in these “tight” soils also reduces the risk to human health and the environment from petroleum contamination. So although natural attenuation will require a rather long time period, Comm 46 allows closure of these sites without the site-specific demonstration of natural attenuation required by NR 726, contingent on contamination levels within the concentrations prescribed in Comm 46.

Information provided by WDNR NR 700 Focus Group (7/12/99)
Submitted by: Dennis Lawton, Triad Engineering, Inc.
Get Ready for This Semester’s School and Community Presentations -- Reserve the Ground Water Sand Model Now!

One of the benefits of your WGWA membership is that it entitles you to borrow one of WGWA’s ground water sand models for community or school presentations. The sand model resembles an ant farm, and contains media of different grain sizes to demonstrate ground water flow, drawdown, and the effects of pollution to audiences.

The models have been used by members to provide educational outreach to schools (grades 1 through 12), community groups, and other public forums. Based on the response, participants have enjoyed the presentations and found that the sand models helped them understand ground water (e.g., it does not flow through underground rivers and lakes, and does not always come from springs).

This is a great opportunity to teach our children, teachers and communities about ground water and ground water protection. To reserve a ground water model for your school or community presentation, contact Sue Vasey (715.834.3161, vaseys@ayres-eau.com) in Eau Claire or Deborah Kerr (414.291.8840, deborah.kerr@triadengineering.com) in Milwaukee. If possible, please allow sufficient time to have the model shipped to you via UPS standard delivery.

For additional information about the groundwater sand model, you can visit U.W.-Stevens Point’s web site, at http://www.uwsp.edu/stuorg/awra/h2omodel.html.

Deborah Kerr
Triad Engineering Incorporated

Education Committee

David Senfelds
EarthTech Inc.

Deborah Kerr
Triad Engineering, Incorporated

Bob Pearson
Wisconsin Department of Transportation

Dennis Lawton
Triad Engineering Incorporated
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- E-Z Tray™ & E-Z Stacker air strippers

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WGWA Newsletter, Fall 1999
Page 22
North Central WGWA Breakfast Meeting

The North Central Area breakfast meeting was held on August 10, 1999 at the Best Western Midway Hotel in Wausau. Thirteen members and four visitors were in attendance. The meeting sponsor was Mr. Brian Hahn with Becher-Hoppe Associates of Wausau.

Dr. Ken Bradbury of the Wisconsin Geological and Natural History Survey (WGNHS), Madison, presented an overview of the Dane County Regional Hydrologic Study being undertaken by the WGNHS, the USGS, and the Dane County Regional Planning Commission. Dr. Bradbury described how the WGNHS utilizes a 3-dimensional model to evaluate the effect that more than 100 existing and planned high-capacity municipal and industrial wells has on the shallow and deep aquifer systems. The regional nature of this model requires a tremendous data gathering effort and should be viewed as a great resources not only to local and regional planners but also to others interested in specific areas within the model boundaries.

The WGNHS also is involved in a similar study in southeastern Wisconsin and is in the planning stages of a modeling project in Sauk County. You can learn more about the interesting projects at the WGNHS by visiting their web page at http://www.uwex.edu/wgnhs/.

The North Central Area will next be meeting on October 12, 1999 at the Best Western Motel in Wausau. The meeting sponsors will be Mr. Tod Roush and Mr. Tom Normington of Maxim Technologies. They have arranged to have Ms. Yvonne Freix with Maxim discuss "Site Safety Plans." Members and non-members are encouraged to attend.

Future meeting sponsors and subjects include:

October 12, 1999 Tod Roush and Tom Normington, Maxim Technologies, Site Safety Plans
December 14, 1999 Keith Laszewski, Boart-Longyear, Drill Rig Safety

The North Central Area is requesting volunteers to sponsor our February, April, and June 2000 meetings. Meeting sponsors typically are responsible for arranging a speaker of their choice to present a topic of interest at our meetings. If interested in sponsoring a future meeting, please contact me at 715-355-4304 or strobel@stsintl.com. Field trip presentations of your facility or project would be especially welcome.

Mark Strobel: Area Coordinator

Southeast Area

The Southeast Area meeting will be held on Tuesday (October 5, 1999) at the University of Wisconsin - Milwaukee (UW-M) Geosciences Building - Lapham Hall Room 260 (southwest corner of building), Milwaukee, Wisconsin.

There will be an informal gathering before the meeting at the Gasthaus (Sports Bar) in the basement of the Student Union which is located across the street from Lapham Hall from 5:00 to approximately 6:45.

The topic will be "Determination of U-238, U-234, Th-230 and Ra-226 in the Maquoketa Formation" and will be presented by Derrick Clayton of CH2M Hill. Derrick was a recipient of one of the WGWA scholarships.

Larry Weirheim and Scott Brockway: Area Coordinators

Southern, Western, and Northeast Areas

There were no meetings held for the above areas.

Bruce Housel
Bob Pearson: Acting Coordinator

WGWA AREA COORDINATORS

Western Area (LaCrosse, Black River Falls, Eau Claire, Chippewa Falls and surrounding area)
Position Open—please contact Scott Brockway if you are interested.

Southern Area (Madison, and surrounding area)
Position Open—please contact Scott Brockway if you are interested.

North Central Area (Stevens Pt., Wis. Rapids, Wausau, Rhinelander and surrounding area)
Tod Roush 715.845.4100
Mark Strobel 715.355.4304/strobel@stsintl.com

Northeast Area (Green Bay, Appleton, Oshkosh, Fond du Lac and surrounding area)
Position Open—please contact Scott Brockway if you are interested.

Southeast Area (Milwaukee, Sheboygan, Racine, Kenosha and surrounding area)
Larry Weirheim 414.375.4750/weirheim@execpc.com
### Corporate WGWA Members

- ARCADIS Geraghty & Miller, Inc.
- Ayres Associates
- Boart Longyear, Environmental Drilling Division
- BT2, Inc.
- Central Wisconsin Engineers & Architects
- Century Products Inc.
- CH2M Hill
- Cooper Environmental & Engineering Resources, Inc.
- Dames & Moore
- DPRA Inc.
- Earth Tech, Inc.
- Fischer Environmental, Inc.
- Foth & Van Dyke & Associates
- GZA GeoEnvironmental, Inc.
- Handex
- Key Engineering Group, Ltd.
- Leggette, Brashears & Graham, Inc.
- Microbac-Biorenewal Division
- Miller Engineers & Scientists
- Montgomery Watson
- MSA Professional Services
- Northern Lake Service, Inc.
- Ramaker & Associates, Inc.
- REI
- RMT, Inc.
- RREM-A Division of MSA
- RUST Environment & Infrastructure
- STS Consultants, Ltd.
- Schneider Consultants, Inc.
- Stiles Environmental, Inc.
- Tetra Tech EM Inc.
- Triad Engineering Incorporated

### New WGWA Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
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<tbody>
<tr>
<td>Chris Armes</td>
<td>Handex</td>
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<tr>
<td>Kim Carr</td>
<td>Handex</td>
</tr>
<tr>
<td>Dr. C.W. Fetter, Jr.</td>
<td>CW Fetter, Jr. Associates</td>
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<tr>
<td>Scott Freimark</td>
<td>Handex</td>
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<tr>
<td>Douglas Hallum</td>
<td>Sites Environmental, Inc.</td>
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<tr>
<td>Dave Hitchins</td>
<td>Microbac-Biorenewal Division</td>
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<tr>
<td>John Jensen</td>
<td>Layne-Northwest</td>
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<td>Tom Kettinger</td>
<td>Handex</td>
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<td>Dave Klinger</td>
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<td>Ross Kroeger</td>
<td>GZA Environmental</td>
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<tr>
<td>Jim Krohelski</td>
<td>USGS</td>
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<tr>
<td>Nicholas Loomis</td>
<td>Stiles Environmental, Inc.</td>
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<tr>
<td>Irvin G. Mossberger</td>
<td>Twin Ports Testing</td>
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<td>Tammi Nagel</td>
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<td>Andrew Reimer</td>
<td>Handex</td>
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<tr>
<td>Jacob V. Saeger</td>
<td>Stiles Environmental, Inc.</td>
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<tr>
<td>Richard Schneider</td>
<td>Schneider Consultants, Inc.</td>
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<tr>
<td>Toni Schoen</td>
<td>TN &amp; Associates</td>
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<tr>
<td>Doug Stiles</td>
<td>Stiles Environmental, Inc.</td>
</tr>
<tr>
<td>Craig Workman</td>
<td>Handex</td>
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</table>
Support Your Association

ADVERTISE IN THE NEWSLETTER

Advertising in WGWA's newsletter is a simple and cost effective way for presenting professional services or products your business can offer to those segments WGWA members represent throughout Wisconsin and the Midwest. Our membership includes nearly 400 groundwater professionals in environmental consulting firms, private industries, laboratories, law practices, state agencies, federal agencies, and universities.

Advertising rates are dependent on the size of the ad and the length of time the ad is placed, as shown below:

<table>
<thead>
<tr>
<th>Size</th>
<th>Inches</th>
<th>Rate/Issue</th>
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<tr>
<td>Business Cards</td>
<td>2.5 x 3.5</td>
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<td>Quarter Page</td>
<td>3.5 x 5</td>
<td>$35</td>
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<td>Half Page</td>
<td>5 x 7</td>
<td>$65</td>
<td>$175</td>
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<tr>
<td>Full Page</td>
<td>7 x 10</td>
<td>$125</td>
<td>$320</td>
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To place an ad, please contact:
Sue Vasey, Treasurer
Ayres Associates
Phone: 715.834.3161
Fax: 715.831.7500
vaseys@ayres-eau.com

Watch for Our New Web Site at www.wgwa.org!

Account Summary
Wisconsin Ground Water Association
June 1999 to August 1999

<p>| | |</p>
<table>
<thead>
<tr>
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<td>Ending Balance</td>
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DEPOSITS

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WITHDRAWALS

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<td>General Purchases</td>
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<td>Board Meeting</td>
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<tr>
<td>TOTAL WITHDRAWALS</td>
<td>($2,221.42)</td>
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</tbody>
</table>
ENVIRONMENTAL PROFESSIONALS

ARCADIS Geraghty & Miller, Inc., a leader in environmental and infrastructure engineering, is seeking the following environmental professionals for our Milwaukee office:

SR ENVIRONMENTAL ENGINEER
The ideal candidate will possess a BS or MS in Civil or Environmental Engineering with a minimum of 8 years of experience and will be a registered PE. Responsibilities will include design, client interaction, project management, workload distribution and planning. The candidate must have excellent interpersonal and organizational skills as well as proven written and verbal communication skills. Solid waste facility design, remediation design, water/wastewater treatment system design and/or construction management experience is required. Staff management experience and familiarity with PECFA, NR 700 RCRA (Subtitles C and D) CERCLA, CWA and SDWA regulations is preferred.

GEOLOGIST/HYDROGEOLOGIST
ENTRY-LEVEL
This position’s duties will include, but not be limited to, field and office activities as assigned, including soil and groundwater sampling, drilling supervision/oversight, and data reduction, analysis and report preparation. A BS in Geology (MS preferred) or related Environmental Science field and up to 2 years of experience is required, although we will train the right candidate for the position. Strong oral and written communication skills are essential, and advanced computer skills are a plus.

ENVIRONMENTAL ENGINEER
ENTRY-LEVEL
This position will support engineering and geologic services related to groundwater, soil investigations and remediation, solid waste management, industrial wastewater treatment and construction oversight/management. The position will involve both field and office work. A BS degree in Civil/Environmental Engineering (MS preferred) or a related field is required. Strong oral and written communication skills are essential, and advanced computer skills are a plus. The ideal candidate will also have one to two years of professional experience and be 40 hour safety trained.

We offer a competitive salary and a comprehensive company-paid benefits. Minorities and women are encouraged to apply. For immediate consideration, please mail, or send via facsimile, your resume in confidence to Roxanne M. Pranger, ARCADIS Geraghty & Miller, Inc., 126 North Jefferson Street, Suite 400, Milwaukee, WI 53202. Facsimile number 414-276-7603. No telephone calls please.

ARCADIS GERAGHTY & MILLER

WGWA Officer Nominations for Fall 1999 Elections

Nominees are being solicited for President-Elect and Treasurer. If you are interested or you know of anybody who may be interested in these positions, please contact Bruce Hensel. The election will be held at the WGWA Fall Technical Conference on November 18, 1999.

The Association is also soliciting a volunteer for the third At-Large Board Member position. This position is appointed, so all we need is someone who is willing and able.

Bruce Hensel
Natural Resource Technology, Inc.
414/523-9000
bhensel@naturalrt.com

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services

PRESS RELEASE
Northern Lake Service announces the appointment of Jeffrey S. Gearhart to a sales/marketing position in southern Wisconsin. Jeff has experience as an environmental chemist and in sales of laboratory services. He will provide sales consultation, client services and project management to NLS clients in southern Wisconsin and northern Illinois.

Northern Lake Service, Inc. is an environmental laboratory located in Crandon, WI and established in 1974. They provide analysis of groundwater, drinking water, wastewater and soils/sludges for the detection of most environmental pollutants/contaminants.

For more information, contact:
Mal Gross
Sales/Marketing Director
800/278-1254
E-mail: mcgns@northernlakeservice.com
State Grant Add One

Dr. John Jansen of AST, and Dr. Robert Taylor of UWM are the principal investigators that will be heading this effort. Beginning this summer, they will conduct the geophysical survey to identify the location and depth of saline pockets in the aquifer, estimate the thickness of the aquifer and identify wells that are at risk of rising salinity in the future. This information should help local water utilities manage their well fields more efficiently and plan future expansion wisely. The survey will also provide more data for the regional groundwater model of southeastern Wisconsin being conducted by the Southeastern Wisconsin Regional Planning Commission.

The survey work will be completed this summer and report presenting the results will be issued in January 2000.

The sandstone aquifer consists of several layers of sandstone, dolomite and shale from which water is supplied to most municipal water systems in the County. It is the major water source in eastern Wisconsin. In 1995, the aquifer supplied about 90% of the municipal water in Waukesha County and over 28 million gallons per day from over 90 municipal wells in eastern Wisconsin. The water systems in Waukesha, Brookfield, Menomonee Falls, New Berlin, Sussex, Pewaukee, Muskego, Oconomowoc and Mukwonago each obtain all, or a major portion of their water supply from the sandstone aquifer.

State Grant Awarded Study Aquifer

Several municipal wells in the deep sandstone aquifer in Waukesha County are experiencing increasing levels of dissolved minerals. If the levels continue to increase, the water from these wells will become unusable without expensive treatment. Over time, additional wells could be affected. The cause and extent of this problem is unknown, but a local water consultant, Aquifer Science & Technology (AST), a division of Ruckert & Mielke, Inc., and the Department of Geosciences at the University of Wisconsin-Milwaukee have received a State grant to assess the cause and magnitude of the problem.

The State grant from the University of Wisconsin Water Resource Center, will fund a Time Domain Electromagnetic Induction Survey (TEM). The survey will consist of a series of TEM soundings conducted along several east-west profiles across Waukesha County. TEM is a geophysical surveying method that uses pulses of weak radio waves to measure the electrical properties of the subsurface to depths of over 2,000 feet. The measured electrical properties can be interpreted to estimate relevant aquifer properties such as the content and levels of dissolved minerals and the thickness of the aquifer. Water containing high levels of dissolved minerals is not suitable for use as drinking water. In addition, portions of the aquifer that are too thin supply insufficient water for municipal wells optimal use.

Ruekert/Mielke Adds Staff

Jason Jacobson
Ruekert/Mielke is pleased to announce the addition of Jason Jacobson to their staff. Mr. Jacobson has a B.S. degree in Industrial Technology from the University of Platteville and is an experienced AutoCAD technician with a strong background in drafting and product design. He will be responsible for drafting and design of water towers, pumping and booster stations and various projects for R/M’s Water Supply and Facilities Design Department.

David Arnott
Ruekert/Mielke is pleased to announce the addition of David Arnott to their staff. Mr. Arnott is an Industrial Environmental Engineer and will be working in the firms’ Wastewater Department.

Ruekert/Mielke of Waukesha, WI, is a professional engineering and land surveying firm, offering a broad range of engineering and municipal services. R/M assists clients with water and wastewater management, storm water management, municipal and financial planning, landscape architecture, electrical engineering, computer software design, and GIS and SCADA control system projects. In addition, R/M provides professional land surveying and construction review services. R/M has been offering their services to numerous municipalities in southeastern Wisconsin since 1946.
For Immediate Release
August 10, 1999

Green Bay, WI

Effective August 2, 1999, Robert E. Lee & Associates, Inc. acquired the Green Bay Division of Northern Ecological Services, Inc. (NES) of Reed City, Michigan. The firm specializes in biological and ecological assessment services. Their expertise includes wetland ecology, botany, fisheries and wildlife biology and hydrology. Projects that have been completed by NES include wetland studies, watershed management plans, lake studies, threatened and endangered species surveys, environmental impact assessments and landscape and stream restoration. Clients of NES include developers, municipalities, utilities, mining companies and local, state and federal agencies. NES will continue to provide natural resource consulting services under the name “NES, Ecological Services Division of Robert E. Lee & Associates, Inc.”

Mr. Ronald F. Steg will continue to manage the NES Division and will be supported by all of the technical staff that previously worked out of Northern Ecological Services’ Green Bay office. Mr. Steg has nearly 20 years of experience in natural resource management. He has a Masters degree in Water Resource Management from Duke University and a Bachelors of Science degree from the State University of New York, Cortland, in Biology. Mr. Steg is also a Certified Professional Wetland Scientist through the Society of Wetland Scientists.

According to Robert E. Lee & Associates’ company President, Richard Swiontek, “The acquisition complements the engineering, land use planning, surveying and laboratory testing services that are currently offered by Robert E. Lee. We look forward to offering our clients comprehensive services to evaluate sensitive environmental resources, while at the same time providing well planned development.”

Robert E. Lee & Associates, Inc. is a consulting firm providing environmental engineering, surveying, planning and laboratory services from offices located in Green Bay and Milwaukee. The firm provides these services to public and private clients throughout Wisconsin, northern Illinois and upper Michigan.

For Additional Information Contact: Gary M. Sikich, Director, Business Development; (920)336-6338, or e-mail at g.sikich@releeinc.com.

For Immediate Release
August 24, 1999

Green Bay, WI

Robert E. Lee & Associates, Inc. is pleased to announce the addition of two new staff members to the Green Bay, Wisconsin office.

Mr. Bryan S. Wedin, P.E. is a new Project Manager in the firm’s growing Water and Wastewater Engineering department. Mr. Wedin has ten years of experience in planning and design of municipal and industrial water and wastewater treatment projects. Mr. Wedin’s municipal experience includes project management and engineering design of wastewater treatment facilities, sanitary sewer collection water and distribution systems. His industrial experience includes engineering design of water and wastewater treatment facilities for four paper mills. He also has designed soil and groundwater treatment systems for remediation of contamination from leaking underground storage tank sites. Mr. Wedin has a Bachelors of Science Degree in Environmental Engineering from Michigan Technological University, in Houghton, Michigan. He is a Registered Professional Engineer in the states of Wisconsin and Michigan.

Mr. Harvey Malzahn joins the firm as a Senior Transportation Consultant in the firm’s Transportation Engineering Department. His duties will include development and maintenance of transportation clients and general consulting on transportation engineering and construction issues.

Previous to joining Robert E. Lee, Mr. Malzahn was the Door County Highway Commissioner since 1989. As highway commissioner, Mr. Malzahn was responsible for the planning, construction and maintenance of Door County highways and bridges. In addition, he was also responsible for the operation of the Door County Solid Waste Department, which included a county-wide recycling program and landfill operations. Prior to serving as the Door County Highway Commissioner, Mr. Malzahn served as Town Supervisor and Town Chairman for the Town of Gibraltar. He was also elected as a Door County Board Supervisor and Door County Board Chairman.

Robert E. Lee & Associates, Inc. is a consulting firm providing environmental, engineering, surveying, planning and laboratory services from offices located in Green Bay and Milwaukee. The firm provides these services to public and private clients throughout Wisconsin, northern Illinois and upper Michigan.

For Additional Information Contact: Gary M. Sikich, Director, Business Development; (920)336-6338, or e-mail at g.sikich@releeinc.com.
### Conferences/Seminars/Short Courses

(Continued from page 5)

<table>
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<tr>
<th>Date</th>
<th>Conference/Meeting/Location</th>
<th>Cost</th>
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</thead>
</table>
| October 7-8, 1999 | The 1999 Midwest Focus Ground Water Conference  
Radisson Hotel Schaumburg, Chicago, Illinois |            |
| October 22, 1999 | Innovative Initiatives  
The Pyle Center, Madison, Wisconsin |            |
| October 27, 1999 | 1999 Geological Society of America Annual Meeting  
Effective Expert Witnessing  
Instructed by Jack V. Matson, Ph.D.  
Colorado Convention Center  
700 14th  
Denver, CO 80202  
Karen Alexander, Registration Coordinator  
Phone: 303-447-2020, Ext. 113 / Fax: 303-447-0648  
E-mail: meetings@geosociety.org | Various    |
| November 2-4, 1999 | Innovative Clean-up Approaches: Investments in Technology Development, Results and Outlook for the Future  
Indiana Lakes Resort, Bloomington, Illinois  
Contact: SAIC c/o Rebecca Gos  
11251 Roger Bacon Drive  
Reston, VA 20191  
Phone: 412-741-5462 / Fax: 703-736-0826  
E-mail: www.epa.gov/tnbnnrl |            |
| November 12, 1999 | Supply-Chain Environmental Management  
The Alumni Partnership Center, Milwaukee, Wisconsin |            |
| December 6-10, 1999 | Environmental Bioechnologies, Site Remediation Technologies and Gas Industry Environmental Issues and Strategies  
Hotel Royal Plaza, Orlando, Florida |            |
| December 10, 1999 | Emerging Trends: Green Design  
The Pyle Center, Madison, Wisconsin |            |
| April 25-27, 2000 | NWQMC National Monitoring Conference  
Hyatt Regency, Austin, TX  
Registration Information:  
Online: nwqmc.site.net  
or call GWPC at 405-516-4972  
E-mail: Jeff@gwpc.site.net | $195       |

#### Short Courses/Workshops

| Date             | Conference/Meeting/Location                                                                 | Member: $795  
Nonmember: $945 |
|------------------|-------------------------------------------------------------------------------------------|---------------|
| October 5-6, 1999 | Natural Attenuation for Remediation of Contaminated Sites  
Holiday Inn Chicago Mart Plaza  
350 North Orleans Street  
Chicago, IL 60654  
Phone: 312-836-5000 / Fax: 312-222-9508 |               |
| October 5-6, 1999 | Assessment and Management of MTBE-Impacted Sites  
Holiday Inn Chicago Mart Plaza  
350 North Orleans Street  
Chicago, IL 60654  
Phone: 312-836-5000 / Fax: 312-222-9508 |               |
| October 7-8, 1999 | NGWA Midwestern Focus Ground Water Conference  
Radisson Hotel, Schaumburg, IL  
Phone: 800-551-7379 / Fax: 614-898-7786  
E-mail: tcadv@ngwa.org |               |
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<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>Cost</th>
<th>Contact Person</th>
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<td>October 8, 1999</td>
<td>Advances in Characterizing Groundwater Movement Through Glacial</td>
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<td>October 12-13, 1999</td>
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<td>Chicago, IL</td>
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<td>October 12-13, 1999</td>
<td><strong>Risk-Based Corrective Action (RBCA) Applied at Petroleum Release Sites</strong></td>
<td>Dallas, TX</td>
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<td>Geostatistics and the Data Quality Objectives Process for Environmental Remediation Decision Making</td>
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<td>Member: $995 Nonmember: $1145</td>
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<td>October 19-21, 1999</td>
<td><strong>ISO 14001 for Internal Auditors</strong></td>
<td>San Francisco, CA</td>
<td>$895</td>
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<td><strong>Visual MODFLOW: The Most Widely-Used Software Package for MODFLOW, MDPATH, and MT3D</strong></td>
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<td>Member: $925 Nonmember: $1075</td>
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<td><strong>Comprehensive Ground Water Management Using Microsoft Access</strong></td>
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| November 1-2, 1999 | *Fundamentals of Ground Water Geochemistry*                                        | Hyatt Regency Minneapolis  
On Nicollet Mall  
1300 Nicollet Mall  
Minneapolis, MN  55403  
Phone: 612-370-1234 / Fax: 612-370-1463 | Eileen Finn | 610-832-9686 | 610-832-9686 | efinn@astm.org | Member: $475  
Nonmember: $625 |
| November 9-10, 1999 | *Risk-Based Corrective Action (RBCA) Applied at Petroleum Release Sites*            | Phoenix, AZ            | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $695 |
| November 9-10, 1999 | *Environmental Site Assessment Practices for Commercial Real Estate: Transaction Screen and Phase I Site Assessment* | Phoenix, AZ            | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $595 |
| November 16-17, 1999 | *Risk-Based Corrective Action (RBCA) for Chemical Releases*                         | West Conshohocken, PA  
(ASTM Headquarters) | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $695 |
| November 16-17, 1999 | *Risk-Based Corrective Action (RBCA) Applied at Petroleum Release Sites*           | New Orleans, LA        | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $695 |
| November 16-17, 1999 | *Environmental Site Assessment Practices for Commercial Real Estate: Transaction Screen and Phase I Site Assessment* | New Orleans, LA        | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $595 |
| November 16-17, 1999 | *ISO 14001 Implementation for Managers*                                           | San Francisco, CA       | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $695 |
| November 16-17, 1999 | *Phase II Environmental Site Assessment Process*                                    | Atlanta, GA             | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $695 |
| November 18, 1999   | *RBCA Tool Kit*                                                                     | New Orleans, LA         | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $395 |
| through November 1999 | *Environmental Site Assessment Practices for Commercial Real Estate*                | various locations       | Eileen Finn | 610-832-9686 | 610-832-9668 | efinn@astm.org | $395 |
| December 1-2, 1999  | *Natural Attenuation for Remediation of Contaminated Sites*                         | San Francisco, CA       |                  |                  |                  |                  | Member: $795  
Nonmember: $945 |
| December 1-2, 1999  | *Assessment and Management of MTBE-Impacted Sites*                                  | San Francisco, CA       |                  |                  |                  |                  | Member: $795  
Nonmember: $945 |
| December 6-10, 1999 | *The Princeton Remediation Course*                                                  | Orlando, FL             |                  |                  |                  |                  | $1295 |
| December 7-8, 1999  | *Phase II Environmental Site Assessment Process*                                    | New Orleans, LA         |                  |                  |                  |                  | $695 |
CONTAMINATED SITE CLOSURE UNDER NR700

REGULATORY UPDATE
A Full Day Seminar Sponsored By
The Federation of Environmental Technologists, Inc. (FET) & Wisconsin Department of Natural Resources (WDNR)
Endorsed by

December 1, 1999
Midway Hotel Hwy 100
251 N. Mayfair Road, Milwaukee, WI 2703 Craig Road, Eau Claire, WI
414-774-3600 715-835-2211

8:00 a.m. - 4:15 p.m. FEE: $75 Member/$90 Non-Member Fee includes lunch and printed material

8:00 - 8:25 a.m. REGISTRATION - Contributions to refreshments by Petroleum Marketers Association of Wisconsin/Wisconsin Association of Convenience Stores

8:25 - 8:35 WELCOME AND INTRODUCTIONS
• George Maier, FET & Mark Giesfeldt, WDNR

8:35 - 9:35 REGULATORY UPDATE: NR746 & COMM46
• Mike Collentine, Montgomery Watson & Pat McCutcheon, WDNR

9:35 - 10:35 PLANNING: FROM SITE INSPECTION TO CLOSURE
• David Scherzer, Sigma Environmental Services & Don Gallo, Michael, Best & Friedrich

10:35 - 10:50 BREAK - Contributions to refreshments by Triad Engineering

10:50 - 11:50 NATURAL ATTENUATION
• Terry Evanson, WDNR

11:50 - 1:00 p.m.
LUNCH

1:00 - 1:45 INSTITUTIONAL CONTROLS & PERFORMANCE STANDARDS
• Sally Kefer, WDNR & Kris Krause, RMT

1:45 - 2:30 CASE CLOSURE: CERTIFICATES OF COMPLETION AND NR726, NR746
• Mark Tusler, B T Squared: Darsi Foss & Kathy Sylvester, WDNR

2:30 - 2:45 BREAK - Contributions to refreshments by Sigma Environmental Services

2:45 - 3:30 BUDGET UPDATE: BROWNFIELDS, DRY CLEANERS REIMBURSEMENT, PECFA
• Pat Stevens, Wisconsin Manufacturers & Commerce

3:30 - 4:15 WEB SITE DEMONSTRATION AND ELECTRONIC SUBMITTALS
• Gary Kulbert, WDNR

NOTE: WGWA Members get in at FET Member Rate!!

***Wisconsin DNR Wastewater Credit, CLE, CEU and CHMM hours applied for***

Remit payment & this form to: Choose Location: _____ December 1, 1999 Milwaukee OR _____ December 19,999 Eau Claire NR 700 Update
FET Fee: $75 Member/$90 Non-Member
P.O. Box 185
Milwaukee, WI 53201

Name: __________________________________________________ Company: __________________________ Phone: __________________________

Address: __________________________________ City/State: __________________________ Zip: __________________________

Make check payable to: FET. Reservations are due by Nov 23, 1999 for Milwaukee; Dec 1, 1999 for Eau Claire. For late reservations, fax your registration form to FET 414-644-7106 or call 414-644-0070. Cancellations for refund must be received in writing by Nov 29, 1999 for Milwaukee; Dec 3 1999 for Eau Claire. Registrants who fail to attend and do not cancel prior to dates listed are liable for the entire registration fee. A substitute may be sent. Cash or check payments accepted, credit cards are not accepted; billing available.
Join the Wisconsin Ground Water Association Today!

Please take a few moments and become a member of WGWA starting January 2000. Annual dues are $15 for students, $30 for individuals, and $150 for corporate memberships and are payable to WGWA. Corporate memberships allow companies to register six members at a discounted rate.

For new members, just complete the following form and send to: Wisconsin Ground Water Association, Attn: Sue Vasey, C/O Ayres Associates, P.O. Box 1590, Eau Claire, WI 54702-1590.

Individual Membership:

Regular Member: ___ $30  Student Member: ___ $15

Name: ____________________________________________  Firm: _____________________________

Position: _________________________________________

Mailing Address: ________________________________________  City ____________________________

State _____________________________  Zip Code (9 digits) ______

Telephone Number: ____________________________  FAX: ____________________________

E-Mail: ____________________________

Are you interested in participating in any WGWA Committees?

_____ Newsletter  _____ Legislation

_____ Membership  _____ Program & Education

_____ Special Interests: _______________________________________________________________

_____ Please check if you do not wish to be listed in a WGWA membership directory.

Corporate Membership: ___ $150

Firm: __________________________________________

Mailing Address: ________________________________________  City ____________________________

State _____________________________  Zip Code (9 digits) ______

Telephone Number: ____________________________  FAX: ____________________________

E-Mail: ____________________________

Corporate Members:

1.) ____________________________________________

2.) ____________________________________________

3.) ____________________________________________

4.) ____________________________________________

5.) ____________________________________________

6.) ____________________________________________

_____ Please check if your company does not wish to be listed in a WGWA membership directory.
If you move or change jobs, make sure you contact Sue Vasey at 715.834.3161 or fax to 715.831.7500 with your new address to make sure you continue to get meeting flyers and the Newsletter.

HIGHLIGHTS:

Manufactured Gas Plants
Brownfield Issues
Professional and Company News
Regulatory Issues