

McLean Thermal Conserves Water, Saves Money

A Twin Cities-area manufacturer, McLean Thermal, recently implemented changes to save money by reducing the amount of water used. The company avoided one-time service availability charges (SAC) proposed by the Metropolitan Council to cover the water being used.

McLean Thermal of Champlin, Minnesota, designs and manufactures cooling systems for electronic enclosures. In 2006, the company was given the opportunity to avoid one-time charges of \$23,500 if they reduced water usage by at least 700,000 gallons per year. The company also was facing increased chemical and labor costs associated with the frequent replacement of their cleaning chemicals. McLean determined that the costs of not reducing water and chemical usage were too great and contacted MnTAP for assistance.

Process description

To increase corrosion resistance and provide a foundation for painting, McLean operates two multi-staged iron phosphatizing pretreatment systems. As the parts pass through each of the stages, the solutions in the tanks are sprayed through nozzles onto the parts. Drainage from the parts is directed back into the tank from which it was sprayed.

Water use intern project

In 2007, a MnTAP intern at McLean researched ways to better use the rinse water to reduce water and sewer costs. The paint pretreatment rinse stages previously consumed 3.5 million gallons of city water per year in the form of continuous overflows. An additional 140,000 gallons of city water were used per year for the weekly cleaning and refilling of the rinse stages.

A recommendation was made for McLean to discontinue the addition of city water to each of the stage 4 rinse tanks. Instead, waste drainage from the deionized halo spray was directed to stage 4 rinse tanks to maintain an overflow of water. Not only did this reduce the amount of city water being used, but also provided stage 4 with purer water. McLean also began to reuse the relatively clean water from the stage 4 overflows for stage



Kyle Dullinger, a MnTAP intern, worked with McLean Thermal to reduce their water use in the cleaning process.

2 rinse water. When compared with the fresh city water being used in stage 2, the stage 4 overflows were as clean or cleaner. As a result, the stage 4 overflows are now used as the stage 2 supply without degradation in product quality. This change has also resulted in less scaling buildup on the stage 2 tank and spray nozzles. Making this change required the installation of two flow meters, a flow regulator valve, and a new water pipe for each of the lines.

While monitoring the conductivity/TDS of the rinse tanks, it was determined that the frequency of rinse tank cleanings could be reduced. Instead of scheduling a rinse tank change each week, operators were instructed to perform weekly tests of the rinse stages and use the results of those tests to determine the proper time for dumping the rinse tanks. Operators have reduced the tank cleaning frequency from weekly to monthly, which is saving water and labor with no loss in rinse quality.

By implementing the recommendations from the MnTAP intern project, McLean Thermal anticipates an annual reduction of 1,380 gallons of chemicals, nearly 1.9 million gallons of water, and 2,600 therms of natural gas. Additionally, the company will avoid one-time SAC charges of nearly \$25,000 and will continue to realize an annual cost savings of \$20,000. ■

Route:

- health and safety
- maintenance
- owner/president
- process engineer
- purchasing

Technology Diffusion Helps Implementation

The Technology Diffusion model is a multi-step process that accelerates the penetration and adoption of pollution prevention technology innovations into the marketplace. MnTAP tested the model to determine if industry would be more likely to implement technologies after demonstrations or technology pilot projects were conducted in-plant, leading to more rapid adoption of the pollution prevention technology.

MnTAP recently completed an EPA-funded project in cooperation with the Kentucky Pollution Prevention Center and the Illinois Waste Management and Research Center that was focused on implementing technology diffusion principles to promote the use of innovative pollution prevention (P2) and energy efficiency (E2) technologies. MnTAP's approach to this project included identifying opinion leaders that would identify innovative technologies, encouraging opinion leaders to mentor within their industries, providing technology demonstrations, and conducting pilots of applicable technologies that result in full-scale implementation.

MnTAP began using this approach in 2004 and 2005 with the fiberglass reinforced plastics (FRP) and wood finishing industries. Then in 2006 and 2007, MnTAP continued with FRP and added metal casting, metal finishing, and powder coating industries. The objective was to engage these industries using the technology diffusion model by exposing industry to innovative technologies and thereby getting those technologies implemented. As a result of this project from 2004 through 2007, a total of 25 demonstrations were held, 23 pilots were conducted, and 13

facilities implemented an industry technology identified by their peers. Many (18) are still in some process of evaluating technologies for implementation. Half that many (9) have rejected a particular technology for any number of reasons.

So far, MnTAP has been able to document waste reduction of 1,500 pounds of chrome; 3,400 gallons of chrome plating bath concentrate; 30,000 pounds of VOC; and 5,000,000 gallons of water. In addition, energy use reductions include 8,881 MMBTU of natural gas and 399,500 kWh of electric energy. Cost savings to companies total approximately \$178,000.

The waste reduction potential includes over 1,100 pounds of styrene air emissions, energy reduction potential of over 18,485 MMBTU of natural gas and 1,729,000 kWh of electric energy. The cost savings potential is over \$293,450.

Tennant benefits from technology diffusion

As part of the technology diffusion project, MnTAP staff worked with Tennant Company to implement new technologies in their conversion coating line. Due to this work, Tennant has dropped their cleaner temperature to 105°F and the conversion coating now runs at ambient temperature. Tennant has been very interested in conversion coating chemistries which will reduce their energy usage. Several chemistries have been piloted with the help of their chemical supplier and each test has resulted in lower operating temperatures while maintaining the corrosion and adhesion requirements of their coating system. They have been successful in reducing the temperature from 120°F in both tanks to 105°F and ambient temperature. ■

Project Results

Industry Sector	Waste/yr		Energy/yr		Cost Savings/yr (\$)	
	Potential	Actual	Potential	Actual	Potential	Actual
Fiber-reinforced plastics	1,100 lbs	--	185 MMBTU	--	\$5,250	--
Metal casting	--	--	329,000 kWh 9,600 MMBTU	641 MMBTU	\$108,200	\$4,500
Metal finishing	--	3,400 gal 1,500 lbs	1,400,000 kWh 8,700 MMBTU	--	\$180,000	\$48,000
Powder coating	--	5,000,000 gal	--	399,500 kWh 8,240 MMBTU	--	\$125,500
Wood finishing	--	30,000 lbs	--	--	--	--
Total	1,100 lbs	5,003,400 gal 31,500 lbs	18,485 MMBTU 1,729,000 kWh	8,881 MMBTU 399,500 kWh	\$293,450	\$178,000

Steam Trap Testing Can Lead to Big Savings

While steam trap testing and repair should always be on a facility's maintenance to-do list, many facilities do not conduct adequate monitoring to minimize steam leaks. Testing steam traps for leaks requires some knowledge of steam systems and a familiarity with the test equipment required. Facility staff may not feel comfortable conducting their own trap inspections using the sophisticated test equipment. Subcontracting the trap testing may require bringing in expertise from outside the local area, thereby increasing costs to the company. For these reasons, trap maintenance is often ignored.

However, there is a large potential for energy savings when a facility inspects and maintains steam traps. This is the number one best practice listed in the Department of Energy's (DOE) Steam Tip Sheets. The challenge to achieving savings is for companies to implement an appropriate maintenance program to detect trap leaks and repair them as soon as possible. In most instances, the leak is not visible and the steam system continues to run with no immediate indication of a failure.

Testing methods and frequencies vary

As part of the steam trap testing initiative, MnTAP educated facilities on the steam trap testing methods and frequencies, and provided assistance to companies seeking utility rebates for steam trap testing technology. While the methods can vary largely in cost and effort required, any testing method can be effective if used correctly and as often as recommended by the DOE.

Manual inspections can be a cost-effective way to inspect steam traps. Recognizing a leak immediately and repairing or replacing problematic steam traps will likely result in energy and cost savings. Facilities that follow DOE recommendations should see trap leak rates of less than 5% and minimized cost of the leaks because the inspection frequency is adequate. However, if the cost of manual inspections becomes too high or the recommended inspection frequency of inspections cannot be maintained, leak rates and costs will increase and may justify the installation of a testing technology such as the SteamEye system, which has the lowest expected trap leak rate.

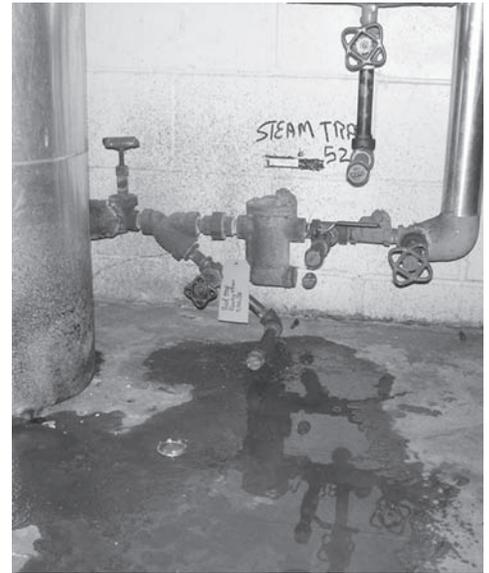
While more costly than manual inspections, the SteamEye system can be an ideal technology to use for traps that are hard to inspect manually due to their location such as in tunnels or confined spaces. If the traps are in an area that is inaccessible, the costs for inspection on an annual basis may be prohibitive.

In the summer of 2007, 3M applied for a custom rebate from Xcel Energy for their SteamEye installation and offered MnTAP their most recent trap testing data for review. This data resulted from the tests of 5,600 traps ranging from 10 to 285 psig conducted using sophisticated equipment. The facility reported that traps were tested annually; however, high failure rates were detected. DOE recommendations are to inspect such traps weekly to monthly versus annually. 3M needed to determine where the SteamEye system could be justified to bring the failure rate to 0%. From the data provided, MnTAP determined that expected energy savings for installing SteamEye will be dependent on the failure rate, trap pressure, and annual cost of steam loss for a specific trap. MnTAP was able to assist 3M with their successful rebate application and the facility has installed the SteamEye system.

Assessments shed light on leaking traps

During the past year, MnTAP has worked with Xcel Energy customers and conducted over 35 steam trap assessments at facilities in Minnesota. From this testing, MnTAP found that a number of facilities had steam traps that are in need of repair or replacement. Once MnTAP conducts a steam trap assessment, the facility receives a detailed report outlining traps that are problematic and options for repair or replacement. Often, this report also includes information about potential rebates from the facility's utility provider. Recognizing a leak immediately and repairing or replacing problematic steam traps will result in energy and cost savings and may qualify for such rebates.

MnTAP worked with ISD 622 and conducted steam trap assessments for school buildings in the district. From those assessments, the district realized that a number of traps needed to be repaired or replaced. "We continue to work on the schools that were assessed...The report that was provided was thorough and has continued to be an energy savings tool for our team," Laurie Hawkins said.



[see Steam Traps, next page](#)

Maintaining Steam Traps Can Save Energy and Money

(Steam Traps continued)

Saint Anthony Park United Methodist Church, another site MnTAP visited, has already recognized the cost savings associated with steam trap testing. “We ended up replacing 21 traps this winter, which was more than the 12 originally planned. We have applied for an Xcel Energy rebate to help with the additional cost,” Pastor Donna Martinson said. “However, we have had a \$4000 month for heating in the past, but not this winter. I think that’s a sign of the improvement due to the repairs.” The church is also planning to purchase a steam trap tester to stay on top of their steam system.

At Minnesota State University - Moorhead, MnTAP conducted an inspection of steam traps in the residential buildings, steam tunnel and heating plant, which represents only 12% of the facility’s system. Tom Schmidt reports that during the follow-up from MnTAP’s inspection, the facility found that most traps had

a plugged inlet strainer. Therefore, he installed valves on the strainers to allow them to blow down while at operating pressure.

Inspect traps to save money

MnTAP found that facilities are not conducting steam trap inspections as recommended by the DOE. When facilities do not follow DOE inspection recommendations, the trap failure rate and associated energy costs will increase. Therefore, facilities with steam traps should review the DOE testing frequency recommendations and implement a maintenance schedule to lower the likelihood of failure and save money and energy.

For more information about steam trap testing or SteamEye technology, call Nancy Kelly at 612.624.1300 or visit our web site at <mntap.umn.edu>. ■

Event: Making the Case for Efficient Energy Management

MEI - Business and Environment Series

Making the Case for Efficient Energy Management

Wednesday, May 28, 2008

8:00 a.m. to 11:30 a.m.

Great River Energy Headquarters

12300 Elm Creek Boulevard

Maple Grove, MN 55369

The Minnesota Environmental Initiative (MEI) is hosting an innovative forum to provide practical information about systematic energy management to business representatives, consultants, energy service providers, state agencies, and nonprofit organizations.

The focus of this event will be on energy efficiency strategies in mid- to large-sized businesses and the associated benefits businesses can realize by improving energy efficiency. Members of the Minnesota business community sometimes struggle to “make the business case” for systematically increasing energy efficiency and may have difficulty finding ways to engage upper-level management in energy-related decisions. This event will offer suggestions to help businesses take steps to cut costs and save energy by featuring guest speakers highlighting current legislative requirements and potential regulatory changes, energy service companies’ perspective on reducing energy consumption, and stories from leaders who have risen to the challenge and reaped the benefits of designing efficient energy management systems.

Attendees will tour Great River Energy’s newly opened headquarters, which is projected to be platinum LEED-certified. State-of-the-art sustainable technology at Great River Energy’s headquarters includes an on-site wind turbine, solar energy

generated from roof-mounted photovoltaic cells, and a geothermal heating and cooling system.

Who should attend

Anyone interested in learning more about energy management strategies, including:

- Business Representatives: Energy Managers, Environmental Managers, Corporate Responsibility Professionals, Operations Managers, Facility Managers, Business Executives
- Utility Representatives
- Agency Staff
- Consultants
- Nonprofit Organizations

Follow-up discussion

Participating business representatives are also invited to join a follow-up discussion on Wednesday, June 4 at the University of Minnesota where those responsible for implementing or influencing energy management strategies will have the opportunity to share with and learn from their peers.

How to register

\$40 for MEI members; \$60 for non-members. A limited number of scholarships are available. Please contact Ellen Gibson at 612.334.3388 ext. 101 or egibson@mn-ei.org for more information. Reserve your place today at <www.mn-ei.org>. ■

Jeff Becker Joins MnTAP, Provides Solutions



Jeff Becker, Engineer
612.624.4633
800.247.0015
beck0254@umn.edu

Industrial Sectors

Fiber-reinforced plastics

Medical devices

Pulp and papermaking

Semiconductor fabrication

Machining

Jeff Becker recently joined MnTAP as an engineer specializing in fiber-reinforced plastics, medical device manufacturing, pulp and papermaking, semiconductor fabrication, and machining. His background is in bio-compatible and bio-based products material research and includes over seven years of process engineering experience in medical device manufacturing and semiconductor foundries. Jeff will rely upon over a decade of experience in industry and research that has provided him with a solid understanding of regulatory compliance, process and product qualification, and quality manufacturing practices. Most recently, Jeff consulted with a packaging and machine company to provide hands-on and tailored production solutions and initiated renewable container sales and marketing efforts in the Midwest.

At MnTAP, Jeff will focus on working with Minnesota businesses and developing tailored solutions for pollution prevention and energy efficiency. "I am excited about the challenges and opportunities at MnTAP to not only provide cost-saving solutions to businesses but also to help them reduce their environmental impacts," Jeff said.

Questions to ask Jeff

What alternatives are available to styrene resins and acetone cleaning solutions?

How do we streamline our qualification process to introduce environmental factors?

Are there chemical additives that will increase pulp yield at our mill? What are the energy and process benefits and challenges of introducing new chemical technologies?

How can I reduce or reuse machining waste?

What is the ROI or payback of an energy-saving or waste-abatement investment? ■

Grant Program Offers Assistance to Small Manufacturers

Minnesota Technology, Inc. (MTI) recently announced a new opportunity for small manufacturers that are looking to grow. The Growth Acceleration Program (GAP), a new MTI grant program, allows manufacturers with fewer than 100 employees to apply for up to \$25,000 per year toward projects to help the company grow. The business must match any GAP money awarded.

The funds set aside for GAP were designed to help small businesses get up to speed with the technology they need to expand the business. While the program does not have many restrictions, it does stipulate that the money cannot be used for capital investments.

GAP began in July as the result of legislation by a bipartisan group of legislators including Minnesota State Senator David Tomassoni of Chisholm. The \$750,000 approved for GAP as one-time monies over a two-year period will be funded through the Minnesota Department of Employment and Economic Development and administered by MTI. To learn more about GAP or to see if you qualify, contact Glenn Pence, 320-492-7996, 800-325-3073, or gap@mntech.org.

How to apply for MTI's GAP grants

Firms interested in GAP must fill out and submit to MTI a complete application that includes documentation of the company's overall plan for technology and business improvement, a prioritized list of the company's improvement needs, and the anticipated economic benefits. The application must also document the company's financial need for GAP funding in order to carry out the highest-priority components of the plan.

Upon receipt of the application and verification of eligibility, MTI will determine funding priority. Funding approval will be confirmed by e-mail and followed by a service agreement that articulates the scope of work, economic benefits, deliverables, schedule, investment, and reporting requirements. Send completed applications to: [GAP at Minnesota Technology, Inc., 310 Fourth Ave.S., Suite 7050, Minneapolis, MN 55415.](mailto:GAP@MinnesotaTechnology,Inc.) ■

Seven Minnesota Companies to Host Interns

Each summer, MnTAP interns develop solutions to industrial waste problems for companies that are unable to tackle pollution prevention projects due to lack of time or money. Interns are able to develop effective waste reducing solutions and save operating costs, reduce regulatory compliance burden, and decrease environmental impacts of Minnesota companies.

By participating in the **MnTAP intern program**, businesses gain well-developed options for improved efficiency, cost savings, reduced waste, and decreased regulatory burden. Students, typically juniors or seniors studying engineering or science, gain hands-on experience in an industrial setting and an understanding of pollution prevention strategies for problem solving. MnTAP gains knowledge and information about specific pollution prevention and energy efficiency strategies used to solve waste problems.

The following companies have agreed to work with a student intern from MnTAP during the summer of 2008 to help solve a variety of issues.

- **Atritech, Inc., Plymouth.** This medical device manufacturer is looking to develop a new packaging concept to reduce packaging waste.
- **Granite Falls Energy, Granite Falls.** The intern will work at the ethanol plant to determine the feasibility of installing a steam turbine to recover energy lost through the pressure-reducing valve.

- **Hitchcock Industries, Bloomington.** In this metal casting facility, interns will determine feasibility of using a fluidized bed system and the capability of replacing sulfur hexafluoride in the process.
- **Metropolitan Council Waste Water Treatment Plant, Saint Paul.** An intern will investigate the efficiency of the current blower operation and how that operation could be improved with different controls or strategies.
- **Minnesota Energy, Buffalo Lake.** An intern will conduct testing to determine appropriate treatment to recycle water within the process.
- **St. Luke's Hospital, Duluth.** The goal of this project is to minimize hazardous materials by incorporating environmentally preferable purchasing protocols.
- **Twin City Die Casting, Minneapolis.** The facility wants the intern to recommend ways to reduce energy use in facility including in the compressed air system.

Mark your calendars to come hear how the 2008 MnTAP student interns helped their companies prevent pollution and increase energy efficiency. The presentations will be held at the University of Minnesota on **Monday, August 25, 2008**, starting at 1:30 p.m.

For more information about the MnTAP intern program and the presentations, visit MnTAP's web site at <mntap.umn.edu> or contact Krysta Larson, 612.624.4697. ■

An Answer for Used Solvents Questions: Recycling

The coating industry in Minnesota has an option for reducing their solvent purchasing and disposal costs: WRR Environmental Services, Co., Inc.

WRR recycles a variety of organic, industrial solvents from a wide range of industries. The solvents that WRR recycles include aromatics, aliphatics, ketones, chlorinates, alcohols, chlorofluorocarbons, and non-regulated solvents. Once WRR has recovered the solvents, the company returns them to their clients or the market place as reclaimed product for reuse. WRR annually recycles over 25 million pounds of solvent waste into reusable material.

One of WRR's clients is Larson/Glastron/Seaswirl Boats, Inc. in Little Falls, Minnesota. The company works with a non-hazardous/non-acetone based solvent in the production of

boats. WRR has contracted with Larson/Glastron/Seaswirl Boats Inc. to recycle the solvent by running it through one of their thin film evaporation units and then returning the product back to the manufacturing facility for reuse.

By using WRR's recycling service, Larson/Glastron/Seaswirl Boats, Inc. annually recycles 32,000 gallons of the non-hazardous/non-acetone based solvent and has saved \$44,000 per year in product and disposal costs of their solvents.

Not only does recycling save companies direct dollars, but it also contributes to the collective good of the environment, because it reduces carbon dioxide greenhouse gas emissions. For more information about WRR and their solvent recycling services, visit <www.wrres.com>. ■



Materials Exchange

The Minnesota Materials Exchange program lists one company's unwanted material and makes it available for use by another company. For more information, call MnTAP at 612.624.1300 or 800.247.0015. View listings and learn more about the Exchange at <www.mnexchange.org>.

Alliance sites make exchanges local

Minnesota is served by nine exchange programs, eight in greater Minnesota and one in the metro area. These nine sites work together to make up the Minnesota Materials Exchange Alliance. Alliance sites were started to provide local service to a particular area of the state.

Chisago County Exchange

Chisago County, located an hour northeast of the Twin Cities, has just hired a new environmental technician with a conservation background, Chris Demko. Chris will be managing the Chisago County Exchange as part of his new position.

Growing up, Chris was fascinated with wildlife and the environment. His many camping trips enhanced this love and, as he got older, also helped him focus on a Bachelor of Science degree in conservation. Chris says he finds his work with Materials Exchange rewarding because, "...it's my time to give back and make a difference and this program is another way to reduce waste and my "footprint" on the environment."

The Chisago County Exchange, like other Alliance Sites, helps save money on disposal or material costs, while helping the local environment by keeping reusable items out of the waste stream. Chris plans to revamp the residential and business programs this year with a personal goal of trying to find items a new home within a week or two of the posting.

The Chisago County Exchange is open to all residents and businesses in Chisago County including residents of the cities of Center City, Chisago City, Harris, Lindstrom, North Branch, Rush City, Shafer, Stacy, Taylors Falls, and Wyoming.

Items can be found on the Chisago County web site at <www.co.chisago.mn.us> on the Environmental Services Department page and under Chisago Exchange. For more information contact Chris at 651.213.8925 or cademko@co.chisago.mn.us.

Successful exchanges

- A small textile covering business donated 25,000 zippers to an out-of-state livestock company, saving the disposal cost. The livestock company saved nearly \$75,000 in purchasing costs.
- A small manufacturing company in southern Minnesota donated 2,000 pounds of titanium dioxide to a small chemical company in the Twin Cities.
- Three pallets or 236 square feet of carpet tile was donated from a large Minneapolis-based company to a small non-profit organization in Litchfield, saving them over \$800 in purchase costs.
- A community group received 1,000 expandable folders from a local university saving approximately \$800 in purchase costs.

New items are listed on the Materials Exchange web site daily. While many items are free, some items listed may be sold for a nominal fee, 20% or less than the value of an item. An item's value must be based on its current condition. ■

Material Exchange FAQ's

Q: What kinds of materials can be exchanged through the program?

A: Business-related items in good, usable condition (e.g., business overruns, seconds, outdated inventory, empty containers, office furniture) otherwise destined for disposal.

Q: Where do I drop items off if I'd like to make a donation?

A: This depends on your location. Most of the material exchange programs in Minnesota do not have a drop off site. Items are listed online and the transfer of goods is handled between the interested parties. Call your local alliance site for specific information.

Q: Can I take a tax deduction for my donation?

A: It depends on whom you donate your item to. You can specify in your listing that your item is only for nonprofits. The recipient organization will give you a receipt.

For more information, call 612.624.1300.

MINNESOTA TECHNICAL ASSISTANCE PROGRAM

UNIVERSITY OF MINNESOTA

helping businesses implement industry-tailored solutions that maximize resource efficiency, prevent pollution and reduce costs and energy use

The Minnesota Technical Assistance Program (MnTAP) helps businesses and industries develop and implement industry-tailored solutions that maximize resource efficiency, prevent pollution and reduce costs and energy use to improve public health and the environment. As an outreach program at the University of Minnesota, MnTAP provides free technical assistance tailored to individual businesses. By reducing waste and increasing efficiency, companies save on disposal and raw-material costs and make working conditions healthier and safer for employees.

MnTAP is funded primarily by the Minnesota Pollution Control Agency's Prevention and Assistance Division and is located at the University of Minnesota in the School of Public Health, Division of Environmental Health Sciences.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status or sexual orientation.

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Calendar

May 8, 2008. **Minnesota Ground Water Association (MGWA) Spring 2008 Conference.** University of Minnesota, Continuing Education and Conference Center, St. Paul, MN. Call 651.276.8208 for more information.

May 8, 2008. **Lead Time Reduction for Competitive Advantage.** Sponsored by the Manufacturer's Alliance. Dakota County Technical College. For more information, visit <www.mfrall.com/events/>.

May 13, 2008. **Green Practices for the Hotel & Restaurant Industry.** Crowne Plaza in St. Paul, MN. For more information, visit <www.mntap.umn.edu/resources/Brochure.pdf>

May 14-16, 2008. **Minnesota Safety & Health Conference.** Minneapolis Convention Center, Minneapolis, MN. 800.444.9150.

May 16, 2008. **Hennepin County Hazardous Waste Management Training.** Eden Prairie Library, Eden Prairie, MN. Sponsored by Hennepin County Department of Environmental Services.

May 19-22, 2008. **National Environmental Partnership Summit.** Sheraton Baltimore City Center, Baltimore, MD. Sponsored by the National Pollution Prevention Roundtable, the Compliance Assistance Providers' Forum and the Performance Track Participants Association.

May 21-22, 2008. **CleanMed 2008.** Hilton Pittsburgh, Pittsburgh, PA. Catherine Zimmer, MnTAP, will present on pharmaceutical waste and green cleaning.

For more information, visit MnTAP's online calendar at <mntap.umn.edu/resources/cal.htm>.

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Minnesota Technical Assistance Program
McNamara Alumni Center • University of Minnesota
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