

MnTAP's keys to success unlock savings

Inside...

- Team reduces water use
- Intern increases transfer efficiency
- Facility lowers wastewater loading levels
- Demo features infrared heating for FRP shops

MnTAP has developed and utilized keys to success that companies can use to unlock savings. These strategies have helped a number of companies, some of which are featured in this newsletter, reduce waste, energy use, and costs while preventing pollution.

Over the last 24 years, MnTAP technical specialists have developed a number of strategies to help companies realize cost savings while maximizing resource efficiency, increasing energy efficiency, and preventing pollution. Each year, companies work with MnTAP to take advantage of the keys to success in pollution prevention (P2) and energy efficiency (E2).

As business expenses such as energy, equipment, materials, and water continue to increase, it can be vital for Minnesota companies to evaluate their environmental impact in order to reduce costs and improve their bottom line. Companies can do so by utilizing MnTAP's site-specific resources such as internal teams, interns, and site visits. Demonstrations, often coordinated by MnTAP, can help companies explore new technologies and equipment. These activities can be advantageous for facilities in terms of moving forward with P2 and E2 opportunities.

"MnTAP's specialists have developed site-specific keys to success in pollution prevention and energy efficiency," MnTAP Director Cindy McComas said. "We believe that when a company works with MnTAP, cost savings can be increased while lessening environmental impacts."

Internal Teams

MnTAP has been coordinating internal teams within the food processing sector for more than 15 years. These teams, like the one featured on page 2, have been successful because they engage facility staff in investigating and implementing P2 and E2 opportunities. To build upon the success of teams in food processing, MnTAP specialists are beginning to develop the team concept in other industrial sectors.

Route:

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



Interns

Summer interns, hired and paid by MnTAP, can make a difference in nearly all facilities as they provide an extra set of eyes to investigate P2 or E2 solutions. Each year, companies across Minnesota host MnTAP interns and realize real cost savings and lessened environmental impacts. The intern featured on page 3 was successful in improving one company's process and reducing raw material costs.



Site Visits

MnTAP staff members regularly visit facilities to gain a better understanding of processes and to identify strategies and tools for improving efficiency and reducing waste. These site visits result in P2 and E2 suggestions that are specific to each facility and can be implemented to realize savings. MnTAP also provides continued support through implementation, if needed. One recent site visit, detailed on page 4, led to an equipment change and resulted in less energy use and happier, healthier employees.



Demonstrations

When MnTAP specialists learn of a new technology that may help a company reduce pollution and save money, they often set up technology demonstrations. These demonstrations allow companies to see first-hand how a new technology might fit within their facilities.

Success Stories

In addition to those featured in this newsletter, other companies that have worked with MnTAP in 2008 have realized considerable savings, both in waste and costs. Since January 2008, companies have seen a reduction of nearly 400,000 pounds of solid waste, over 23 million gallons of water, and approximately 230,000 kWh. Cost savings to these companies have totaled almost \$1 million. ■

Team at Northern Star reduces water use

Northern Star Company, a subsidiary of Michael Foods Inc., is a potato processing facility in Minneapolis, Minnesota. The facility processes refrigerated potato products 24 hours per day, seven days per week, for retail and food service clients.

Water: A Major Input

Food processing facilities generally use large quantities of water in their production processes. At Northern Star large volumes of water are needed to wash, peel, cook, and move potatoes through the plant. Additional water is used to sanitize equipment, to clean the facility, and for employee hand washing to meet state and federal sanitation requirements.

Water is a major cost in a food processing facility as companies pay twice for water; they pay for the volume of water provided to the processing facility and for the amount

of water discharged to the local treatment facility. Every three years the Metropolitan Council Environmental Services (MCES) reviews the amount of water Twin Cities metro area companies discharge to determine if their service availability charge (SAC), a one

time fee, needs to be reassessed. Officials at Northern Star were aware the facility had high water usage, but did not realize the actual amount until they brought in a corporate environmental director, Shane Menefee.

In August 2006, Shane conducted an internal water assessment and determined the facility used 550,000 gallons of water per day and would be facing a seven figure SAC charge if water use and discharge levels were not reduced. Although this assessment was conducted while the company was preparing for the high demand of the upcoming holiday season, it was still a good indicator that water usage needed to be addressed.

Taking a Team Approach

Northern Star began addressing water issues immediately and formed a water conservation team in January 2007. This team was formed to address all aspects of water usage, not just the SAC charge. The company chose to use a team approach to make long-lasting changes. Shane had worked with MnTAP on past pollution prevention projects and contacted MnTAP food processing specialist, John Polanski, to facilitate the team.

Making teams work

John Polanski, MnTAP food processing specialist, facilitated the Northern Star water conservation team meetings. John helps companies create internal waste reduction teams and assists them with isolating problem areas. When facilitating monthly on-site meetings, John works with teams to implement P2 strategies and assists them with overcoming obstacles to meet their goals.

“My past experiences with MnTAP have been very positive. It’s often that teams such as this will get bogged down by unrelated issues. MnTAP provides technical experience and an external presence that helps maintain focus on the team’s original purpose,” Shane said.

When MCES conducted their assessment in February 2007, the team had already implemented several changes, resulting in reduced water usage. MCES confirmed that the company would still face a \$416,100 SAC charge in the upcoming year, a substantial cost for the company and evidence that the team had more work ahead of them.

The team, comprised of representatives from all areas of the company including corporate management and line workers, met on a monthly basis to discuss areas of improvement, prioritize projects, and develop an implementation plan. Each team member was given a water reduction kit: a bucket, stopwatch, and blue slips. Blue slips were also made available to all employees. An employee reported a water leak/overuse location on the blue slip and handed it to a water conservation team member. The team members placed a two gallon bucket under the reported leak and used the stopwatch to record the time it took to fill the bucket. This data was used to calculate gallons of water lost per minute and to prioritize repairs.

Success

In less than one year, the team implemented 47 projects throughout the Minneapolis facility. Not all projects required capital investments; many were maintenance or employee awareness related. For example, the top three water saving projects the team implemented are highlighted below.

Installing Larger Recycled Water Pumps

To increase the volume and pressure of recycled water throughout the plant, Northern Star installed larger recycled water pumps. This recycled water is used instead of fresh water to keep drains clear of debris, move waste products through the system, and clean potato washing areas.

Installing Auto Level Controls

Auto level controls were also installed on a significant number of cook, process, and holding tanks that exist throughout the facility. These tanks must be full of water anytime they contain product. When product is moved through the process, it brings

NORTHERN STAR continued on page 5

Intern helps facility increase transfer efficiency

As a custom powder coating job shop, Ultra Image Powder Coating of Big Lake, Minnesota, finishes large and small metal parts for a variety of companies. The company has numerous part profiles and several of the parts are able to be coated by automatic powder application. However, a significant percentage of the products are deep parts with complex geometries that can only be hand-sprayed. Prior to working with a MnTAP intern, Ultra Image was operating a conveyORIZED powder coating system in a spray-to-waste mode.

In this mode, Ultra Image was spraying an average of 55,000 lbs. of powder each year, wasting nearly 32,000 lbs. of the sprayed material. This corresponds to a transfer efficiency of 42%, which means that over half of the powder purchased and sprayed was wasted. Ultra Image determined that significant changes were needed as the dust collection system was oversized for the work space and created poor plant airflow around the powder coating spray area. Additionally, maintaining the dust collector and removal of waste powder was labor intensive. Therefore, Ultra Image purchased a used powder coating line and then applied for a MnTAP intern to help economically justify operational changes in the powder coating process.

Waste Reduction Project

Ultra Image had an old powder coating system with a high air flow which pulled much of the powder away from the parts, resulting in poor transfer efficiency. Additionally, the powder that was pulled from the system was not able to be reclaimed.

The MnTAP intern identified two major causes of low transfer efficiency for Ultra Image's coating process: high booth airflow and poor operator training. Several different options were suggested and implemented to address the issue including precise airflow control, powder room pressurization, and suitable manual operator training. The MnTAP intern also investigated the feasibility of purchasing a new powder booth.

Airflow Control and Powder Room Pressurization

The MnTAP intern determined that ducting the air conditioner unit intake air supply to the outside would place the powder room under a positive air pressure, and reduce the costs associated with changing filters. A positive pressure in the powder room and outside air source for the air conditioner unit reduces the amount of wear on intake filters. With the assistance of Ultra Image staff members, the MnTAP intern

also trialed several positions of air deflection plates, which are used to reduce the flow of air near the part. The deflectors that were installed change the airflow and prevent the collection of powder before it reaches the parts.

Operator Training

An important method to improve paint efficiency is ensuring that operators understand the process. Proper set-up of the fluidized bed, spray techniques, part grounding, gun setting, and booth maintenance are all factors that can determine how much powder is applied to the part. Therefore, the MnTAP intern recommended operator training. The company worked with its spray equipment supplier to hold a customized operator training class at Ultra Image's facility. This training allowed the painters to practice with and ask questions about the equipment and parts they work with on a daily basis. Several of the company's lead painters also attended a training hosted by Ultra Image's powder coating material supplier.

New Powder Booth Installation

In addition to evaluating the causes of low transfer efficiency, the MnTAP intern explored the feasibility of installing a new powder booth to further increase transfer efficiency. From the recommendations, Ultra Image purchased a new custom powder booth, which allows the company to reduce its waste powder while both automatically and manually applying powder to parts. ■



The MnTAP intern at Ultra Image tested the airflow in the powder coating booth to determine transfer efficiency.

Benefits Overview

Waste Reduction Option	Waste Reduced/ Materials Savings	Annual Cost Savings
Airflow control with deflector plates, powder room pressurization, operator training courses	11,000 lbs/yr	\$30,000
New powder booth*	4,000 lbs/yr 230 hours/yr	\$33,000

* Resulted in reduced booth maintenance labor and filter replacement parts

Site visit leads to phosphorus reduction

Ver-tech Labs in Rockford, Minnesota, manufactures a wide variety of heavy duty cleaners, degreasers, and brighteners for car and truck wash operations, restaurants, printing plants, and other businesses needing cleaning products. Additionally, Ver-tech provides custom and contract blending services to a wide variety of customers and packages both liquid and powder products in various container shapes and sizes.

Making site visits work

When conducting a site visit, MnTAP specialists tour the facility to learn more about the process, and spend time talking with company representatives including operators. This in-depth look at a facility's process and waste streams allows MnTAP to provide customized recommendations.

In 2007, the City of Rockford asked Ver-tech to reduce phosphorus and biological oxygen demand (BOD) in the facility's wastewater discharge. This request was made based on the results of the City's monitoring of Ver-tech's

discharge, which indicated high phosphorus and BOD levels.

To help Ver-tech identify phosphorus and BOD reduction opportunities, Cindy McComas, MnTAP director, conducted a site visit to Ver-tech's facility and made a number of recommendations related to the company's discharge to the wastewater treatment facility. By engaging Ver-tech employees and working with Rockford, the company has implemented some changes, thereby reducing the amount of phosphorus and organic loading leaving the facility.

Wastewater Loading

Until recently, most of the cleaning products (liquid and dry) that Ver-tech blended contained phosphorus, a nutrient that enhances algae growth in natural water systems. This accelerated algae growth results in rapid decomposition, using up oxygen in the water and increasing the potential to kill fish. As a result of the cleaning product formulation, the facility was discharging significant levels of phosphorus and wastewater with high BOD to the local treatment facility.

Following liquid product blending, Ver-tech used a hose to clean the mixing tanks to remove any residual cleaner. Prior to the site visit, the residual cleaner and rinse water, containing high levels of phosphorus, were discharged as wastewater. This process wasted water and raw materials, which increasing the loading to the wastewater treatment facility.

On the dry formulation line, the company was experiencing caking problems with the mixers. The humidity in the mixing room caused the dry components to harden in the screw

mixers and along the tank walls, making it impossible to remove the product from the mixing tank. The mixers needed to be completely cleaned to prevent cross-contamination of other products. To restart the mixing, Ver-tech used a hose to loosen the material and clean the tanks. The formulation and rinse water were then discharged as wastewater, thereby wasting valuable raw materials and money.

The wastewater from the two cleaning methods is diverted to a pH neutralization tank prior to being discharged to the wastewater treatment facility. This step is necessary as Ver-tech's formulated cleaners are alkaline in nature, thus requiring that the company adjust the pH with an acid to a neutral range for discharge to the wastewater treatment facility. Prior to the site visit, the company used phosphoric acid in the pH neutralization tank to lower the pH, which increased the amount of phosphorus in the wastewater discharged from Ver-tech's facility.

Solutions

During the site visit, phosphorus and BOD loading were identified as areas for improvement. To reduce the phosphorus loading from the liquid formulation line, Ver-tech began reusing the rinse water containing residual product in future formulations. To overcome the problems associated with the dry formulation line, Ver-tech first experimented with dehumidifiers. This, however, did not reduce the amount of product that clung to the tank walls and mixers. Therefore, two steps were taken. First, the facility installed new mixing equipment which reduced the caking in the tanks. Product remaining in the tanks is now vacuumed and used in future formulations. Second, production scheduling and batch sizes were reviewed, resulting in reduced clean-up between similar products and optimized batch production volumes. Overall, residual from 80% of the company's products are used in future formulations, thereby eliminating raw material waste on approximately 100 products.

To address the phosphorus loading issues from the pH neutralization tank, the company switched from using phosphoric acid to hydrochloric acid. By evaluating opportunities and implementing phosphorus- and BOD-reducing strategies in these three areas, Ver-tech has reduced the phosphorus and BOD loading in the wastewater discharged to Rockford's treatment facility.

VER-TECH LABS continued on page 6

FRP demo features IR heating technology

In October 2006, MnTAP hosted a focus group to discuss fiber reinforced plastics (FRP) manufacturing in Minnesota. One pollution prevention and energy efficiency topic was of particular interest to participants: keeping molds warm overnight without heating the entire building. FRP molds must be kept warm to ensure product quality.

In cold climates, shops use rooftop makeup air heaters to heat outside air before bringing it into the building to compensate for air forced out of the building by ventilation fans. The fans are needed to keep styrene levels low enough to meet OSHA standards during the production day. To ensure that the molds stay warm, shops run makeup air units overnight, even though the high ventilation rate is not needed when production is down. This practice wastes energy and money.

One method of keeping molds warm during non-production time is to use infrared radiant (IR) heating. This technology heats surfaces that are in the line of sight from the heater, but does not directly heat the room air. IR heating allows shop owners to turn off the makeup air units during non-production hours, which saves energy.

IR heating was discussed as a potential solution and representatives from Carstens Industries of Melrose, Minnesota, explained their installation of a natural gas-fired IR heating system. Another participant, Sunrise Fiberglass of Wyoming, Minnesota, expressed an interest in potentially installing an IR heating system.

Sunrise Fiberglass hired a consulting firm to design a system for the plant, which became operational for the 2007-2008 heating season. Since implementing the system, employees at Sunrise have positively embraced the change. They have stated that the IR heating creates a more climate-controlled workspace and reduces the amount of dust kick-up in the finishing area.

Sunrise applied for and received a \$1,200 rebate for the system. By installing the IR heating system, the company lowered their energy consumption by 13.5% and is saving an estimated \$6,000 annually. ■

Making demos useful

A demo can be a key step in implementing a new technology. Once a waste issue is identified, MnTAP staff can conduct research and work with industry leaders to identify a technology that addresses the issue. A technology demo allows companies the opportunity to see the technology and imagine it working in their facility.

Internal team finds success in water conservation efforts

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water with it from these tanks. The auto level controls installed allow only the required amount of water to be added in order to keep the tanks full. Previously, employees had to open bleed valves to continuously add water to the tanks. Anytime production lines stopped, water overflowed from these tanks.

Measuring Water Use and Waste

Once employees began measuring and became aware of where water was being wasted and how to avoid wasting it, usage went down. For example, prior to the project potato peels and scraps were sprayed down the drain, which required a lot of water, increased the amount of solids in the waste stream, and increased water treatment costs. Now, solids are shoveled into the waste bin and used as cattle feed supplement, eliminating the need for water and also solid waste disposal.

Michael Foods invested in the team in the form of time and labor spent on training employees on alternate techniques, water usage assessment, and the environmental and financial costs associated with excess water use. However, the company

believes that it was money well spent, as Shane credits the success of the water reduction efforts to the conservation team's efforts to increase employee awareness on water use.

"Without the involvement from front line employees, the team would have been limited to smaller short-term successes. By involving everyone at the facility and investing time educating them on the issue, we were informed of many items that would have otherwise gone unnoticed. The vast majority of problems and solutions came from hourly employees that see them everyday," Shane said. Education is important as many of the controls put in place can be overridden by employees.

Seven months after the water reduction team formed, it has been successful in avoiding the \$416,000 SAC charge. If Northern Star is able to maintain the reduction in water usage, water costs will also be reduced. Currently, daily water use has been reduced by an average of 125,000 gallons per day.

Following the success of the project at Northern Foods, Michael Foods recognized the value and success of the team approach to pollution prevention and has implemented similar teams in other facilities to examine waste issues. ■



Each team member at Northern Star got a bucket as part of their water conservation kit. These buckets were used to gather data on the amount of water lost at certain locations in the plant.

MnTAP interns help find solutions for waste

In 2007, MnTAP interns worked with nine companies and provided them with site-specific pollution prevention and energy efficiency recommendations. Currently, these companies have implemented a number of the recommendations to realize reductions totalling 7,000 lbs of air emissions, 746,000 kWh, and over 4 million gallons of water. Collectively, these companies have saved nearly \$400,000.

Why interns work

“While our facility is extremely concerned about our environmental impact, we could not find the time to investigate new projects such as an environmental purchasing program. With Holly (MnTAP intern) leading the project, we were able to gather much-needed data that otherwise never would have been analyzed.”

Mike Marturano, St. Luke's, Duluth

Next summer, your facility could be realizing costs savings and waste reduction. If you have a specific waste-related project that you would like investigated, but do not have the time, a MnTAP intern may be your answer. An intern can make suggestions that improve efficiency, save money,

reduce waste, or decrease regulatory compliance burden. Also, an intern has the time to research alternative equipment, procedures, chemicals, and raw materials.

MnTAP recruits and interviews intern candidates so your company does not have to spend time on the selection process. After we identify the best student match for your project, the company and student have a confirmation interview to

make sure that both parties are comfortable with the match. As MnTAP employees, the interns have their payroll and workers compensation covered by the University of Minnesota. Companies are required to provide a cost-share for the project, which is provided to the student as a stipend upon successful completion of the project.

A MnTAP engineer or science-related professional with experience solving problems in your industry helps guide the project. He/She helps the intern by discussing reduction ideas, offering resource leads, keeping the project on track, and coaching him or her on how to work well within the company.

Project Ideas

In the past, interns have evaluated a variety of waste-related challenges including:

- Energy use
- Raw material use
- Solid or hazardous waste
- Defects / scrap
- Wastewater / water use
- Air emissions, VOCs, HAPs

To apply

Applications are currently being accepted through February 1, 2009. If you would like to discuss a potential intern project, call Krysta Larson at 612.624.4697 or 800.247.0015. Additional information is available online at <www.mntap.umn.edu>. ■

Ver-tech Labs reduce phosphorus, BOD in wastewater

VER-TECH LABS from page 4

Moving to Green Cleaners

In addition to improving the production process, Ver-tech has begun actively reformulating their products to replace phosphorus-containing cleaners with green cleaners. Through the reformulation of two products, the company has reduced the use of over 100,000 pounds of phosphates in their formulations. Additionally, Ver-tech has begun using a green cleaner in another process at the facility: filter bag cleaning. Ver-tech cleans filter bags for a variety of clients and was previously using a phosphorus-based cleaner in the process.

Results

The site visit and subsequent implementation of phosphorus-reducing practices at Ver-tech has resulted in a reduction of 8,650 lbs per year of phosphorus discharge to the City. Additionally, the company has reduced the BOD and total

suspended solids (TSS) loading by over 15,000 lbs per year. Overall, Ver-tech has saved \$100,000 in costs associated with the avoided purchase of chemicals and discharge to the treatment facility. Ver-tech is currently meeting all discharge standards and is not required to pay surcharges to the City.

While the City of Rockford does not currently have a phosphorus limit, they are anticipating a limit of 1 mg/L when their permit is renewed. Currently, the Rockford is using enhanced biological phosphorus removal at the treatment facility, which is helping keep the phosphorus levels down. However, should a limit be imposed on the facility, additional chemicals will be needed to meet that limit. The City worked with Ver-tech in anticipation of the future limit. If Ver-tech had not reduced its phosphorus loading, the City would have needed to incur additional treatment costs to meet the future phosphorus limit. Anticipated savings from the avoided treatment costs in the future are approximately \$86,500. ■



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>.

Successful Exchanges

- A mid-sized manufacturing company in the metro area set up a continuous exchange of **ten 55-gallon steel drums** per week with another manufacturer in the Twin Cities, saving them approximately \$350 in purchase costs.
- A medium size marketing company in Duluth donated **260,000 envelopes** to two Minnesota businesses. Purchase costs avoided were approximately \$6,000.
- A tool manufacturer in out-state Minnesota donated **30 gallons of hydrogen peroxide** to a Western Minnesota farm.

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.

Continuous Listings

Listings can be created on the Materials Exchange web site for available and wanted materials in good condition. When creating a listing, you must choose the quantity generated: one-time, per day, per week, or per year. Any item that is generated more than one-time is counted as a continuous listings. These listings often are matched up with another company that needs the item and a long term exchange relationship is formed. In other instances, many companies benefit from the listing as numerous exchanges are generated. We've included a sampling of current continuous listings, please visit the web site <www.mnexchange.org> for contact information and to view all available/wanted items.

AVAILABLE

- **Pallets.** 20/mo. Wood. 30" x 30". Sturdy and in excellent condition. Free. [20753]
- **Cardboard Core.** 80/mo. Round. 64.5" long x 7.5" OD. 3/8" wall. Free. [20326]
- **Corrugated Pads.** 100/month. 40X48". Fee charged. [20640]

- **Sulfuric Acid.** 4,800 gal/yr. From anodizing process. 18%. 1,600 per load. Up to 2 oz/gal aluminum. Very small amounts of chrome and copper in acid. No organics. Must pay shipping. [20737]
- **Lubricating Grease.** 10-50 gal/mo. This is a mixture of various lubricating greases, unused. Nothing harmful such as lead or chlorinated solvents. Free. [20553]

WANTED

- **Polystyrene.** 30 yds/wk. EPA expanded. Will haul and recycle. [20686]
- **Packing Peanuts.** Any amount. [20584]
- **Window Door.** 10/year. Sliding patio doors can be with or without frame. [20467]
- **Straps/Webbing.** 100/month. 1" - 3" wide. Any length or material (cotton, nylon, polyester) from any application. [20378]

Current Listings

AVAILABLE

- **Desks.** 40. Elementary size. Desk top 19" x 24". Adjustable legs. Free. [20734]
- **Glycerin.** 500+ gallons. From biodiesel production. Free. [20184]
- **Rolling Ladder.** Two. Industrial metal. With platform. 6' and 8'. Fee charged. [20633]

WANTED

- **Orange Traffic Cones.** 25-50. [20775]
- **Racks.** 25. To fit up to 750 banker's boxes. [20635]
- **Laminator.** One. Hot or cold. [20596] ■

Help us reduce our impact

If half of the subscribers to the *Source* newsletter opted to receive their pollution prevention and energy efficiency news online rather than in printed form, we could reduce our annual environmental impact by:

- 1,500 lbs. CO₂
- 4,300 gallons of water
- 500 lbs. solid waste

Subscribe today to receive future issues of the *Source* via email. Simply send your email address to mntap@umn.edu. Past issues of the *Source* are available online at <www.mntap.umn.edu>.

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

September 19, 2008. **Hennepin County Hazardous Waste Management Training.** Eden Prairie. 9 a.m. – 3:30 p.m. Topics include waste evaluation, licensing requirements, proper labeling and storage, selecting transportation and disposal companies, emergency planning, record keeping, waste minimization, and pollution prevention. Sponsored by Hennepin County Department of Environmental Services. Free.

September 22, 2008. **Blue Flame Industrial/Commercial Committee's Annual Fall Energy Seminar.** Four Points by Sheraton, Minneapolis. 8:30 a.m. – 1:00 p.m. Sessions include Natural Gas: Blue is "Green," Minnesota LEED Project, Domestic Hot Water, and Boiler System Optimization. A special afternoon session will be hosted by Xcel Energy from 1:00 p.m. – 4:00 p.m. Sponsored by the Blue Flame Association and Xcel Energy. Morning session: \$60 for members, \$80 for non-members; afternoon session: \$30 for members.

October 3, 2008. **Deadline: Call for Papers for the 7th Minnesota Paint and Powder Coating Expo.** Century College, White Bear Lake. The Expo is seeking people to present on topics related to metal finishing. Suggested topics include new technologies/processes, cleaning pretreatment, cost savings, energy use reduction, environmental issues, and case studies. Sponsored by Twin Cities Chapter of Chemical Coater Association International (CCAI) and MnTAP. Contact Krysta Larson at 612.624.4697 for more information.

March 18 & 19, 2009. **CCAI, Twin Cities Chapter, Annual Symposium & Minnesota Paint and Powder Coating Expo.** Century College, White Bear Lake. The Expo will include a vendor show, hands-on demonstrations, and technical seminars. At the last expo, over 400 participants attended the 15 technical seminars and a vendor show featuring over 50 exhibits. For more information, visit <mntap.umn.edu/paintexpo>.

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

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