

2010 Pollution Prevention Evaluation Report

Discussing Minnesota's progress in preventing pollution.



Legislative Charge

Minn. Statutes § 115D.10 Toxic Pollution Prevention Evaluation Report.

The commissioner, in cooperation with the commission, shall report to the Environment and Natural Resources Committees of the senate and house of representatives, the Finance Division of the senate Committee on Environment and Natural Resources, and the house of representatives Committee on Environment and Natural Resources Finance on progress being made in achieving the objectives of sections 115D.01 to 115D.12. The report must be submitted by February 1 of each even-numbered year.

HIST: 1990 c 560 art 1 s 10; 1993 c 172 s 73; 1995 c 247 art 1 s 35; 1996 c 470 s 27; 1Sp2005 c 1 art 2 s 161

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Executive Summary

Pollution prevention (P2) means eliminating or reducing at the source, the use, generation or release of toxic chemicals, hazardous substances and hazardous waste. There are significant economic and environmental benefits when waste is reduced at its source as compared to controlling and managing it after its creation.

Every two years, the pollution prevention program reports to the Legislature on progress being made toward achieving the objectives of the Minnesota Toxic Pollution Prevention Act (Minn. Stat. § 115D.10). This report outlines the broad scope of partnerships and collaborative efforts that meld industry efforts with technical and financial assistance.

Statewide trends for TRI reporting industries

The state evaluates data supplied by reporting facilities to the Minnesota Emergency Planning and Community Right-to-Know Act (EPCRA) program and the U.S. EPA to determine trends in quantities of chemicals generated and released. The 2008 data from Minnesota's 431 reporting facilities suggest that some slight progress in pollution prevention among manufacturers has occurred. Manufacturers continue to make progress in reducing releases, which declined nearly eight percent between 2005 and 2008. However, the same improvement is not being seen in reducing overall TRI chemical generation, which has changed very little from 2005 to 2008. Waste generation by manufacturers was virtually unchanged while the decline seen in waste generated by waste treatment facilities was offset by increases in waste generated by non-manufacturers, primarily electric utilities.

Green Chemistry and Design grant project

In 2009, MPCA was awarded a one-year pollution prevention grant from U.S. EPA, with part of the funding to be used to begin a research project regarding the opportunity to develop a green chemistry and design initiative for Minnesota. The information gained from this research project will be used to develop a summary of preliminary findings to issue for comments and serve as a framework for how to put together a green chemistry and design initiative for Minnesota and what it would cost to implement such an initiative.

Pollution Prevention Activities and Technical Assistance Partnerships

The MPCA engages in a multi-faceted approach to pollution prevention, including providing financial assistance for businesses and institutions seeking ways to reduce waste as well as offering technical assistance directly through our Small Business Environmental Assistance Program and through our technical assistance partnerships. For 2008 and 2009, pollution prevention technical assistance efforts resulted in 6.8 million pounds of waste reduced, 1.3 million pounds of materials reused, 104 million gallons of water conserved, 15.5 million kWh and 780,000 therms of energy conserved for a savings of \$8.7 million.

Governor's Awards: Honoring Excellence in Waste and Pollution Prevention

The Governor's Awards Program provides an opportunity to recognize and honor businesses, non-profits, government agencies, public institutions, and private institutions for their efforts toward protecting the environment. These organizations have developed innovative ways to prevent pollution and waste, improve resource efficiency, and lead to increased sustainability. There are three categories of Governor's Awards; one for businesses, private institutions, and non-profits; one for government and public institutions; and Partnerships for collaboration between private and public organizations. For 2008 and 2009, Governor's Awards winners combined to prevent 16.8 million pounds of waste, conserve 1.6 million gallons of water and save nearly \$8.8 million.

Pollution Prevention Fees

The Minnesota Toxic Pollution Prevention Act (TPPA) assesses fees on facilities required to report toxic chemical releases under the federal Emergency Planning and Community Right-to-Know Act (EPCRA). Fees are also assessed on large quantity generators of hazardous waste that are not required to report toxic chemical releases under EPCRA.

Pollution prevention fee revenues of \$2.58 million for 2008 and 2009 are used to fund Minnesota's pollution prevention programs, primarily in the form of assistance provided by the Minnesota Technical Assistance Program (MnTAP) and the Minnesota Retired Engineers Technical Assistance Program (RETAP), which are funded through annual grants from the MPCA that totaled \$1,915,000 in 2008-2009. The remainder goes into the Environmental Fund to fund other agency grant programs and pollution prevention program administration.

Proposed Change to Evaluation Report Schedule

In 1990, the Legislature passed the Minnesota Toxic Pollution Prevention Act (TPPA), which initially included an annual requirement to submit the Pollution Prevention Evaluation Report by December 15th of each year. This was amended in 1993 to a schedule where the report would be due February 1st of every even-numbered year.

Now that the TPPA has been in place for twenty years and the state's pollution prevention program has matured, staff believe that a more appropriate reporting schedule would be every four years. In addition to freeing up agency resources to devote more staff time to projects such as the Green Chemistry and Design Initiative that will prevent pollution, this reporting schedule would also better reflect the time and commitment that can be required to achieve pollution prevention results. A four-year reporting cycle would allow for a greater focus on reporting outcome-based environmental results.

Materials Accounting

There are currently two states, Massachusetts and New Jersey, which have established a materials accounting approach with respect to the Toxic Release Inventory (TRI). This approach requires manufacturers to report not only the quantities of toxic chemical wastes they generate but also the quantities of toxic chemicals that are used in their manufacturing processes. MPCA staff studied reports from these states to learn how materials accounting data was being utilized. Staff also examined TRI data reported during the 2003-2007 timeframe for these states and others that employ pollution prevention programs to compare trends in toxic chemical waste generation. There is a very wide range of results, with some states seeing significant declines in toxic chemical waste generation and others that saw lesser declines or even increases.

A 2006 report from the Massachusetts' Office of Technical Assistance (OTA) documents the differences in toxics use reduction outcomes among facilities that have taken advantage of site visits compared to those that haven't, as well as comparing performance by facilities before and following their visits from OTA. The study showed that visited facilities reduced their use of toxic chemicals by nearly ten percent more after being visited as compared to before being visited.

Given what has been seen for results from pollution prevention technical assistance efforts in Minnesota, plus what was learned from the research done by Massachusetts into their technical assistance results, MPCA staff recommend that focusing on ways to increase support for Minnesota's effective technical assistance partnerships, in particular, providing more site visits, is a more prudent investment of scarce state resources than starting up a new program to require toxic chemical use or materials accounting reporting at this time.

Introduction

Under the Minnesota Toxic Pollution Prevention Act (TPPA), the policy of the state is to eliminate or reduce at the source the use, generation, or release of toxic pollutants and hazardous wastes.

Pollution prevention is a front-end rather than end-of-pipe solution to waste. When pollution prevention rather than pollution control is used as a means to reduce the use and release of toxic chemicals, significant economic and environmental advantages often result. Preventing pollution can include finding less or non-toxic substitutes for raw materials, redesigning products or production processes, eliminating leaks and spills, and recycling and reusing materials within a system.

Environmental benefits

Reducing the quantity and toxicity of the waste, air emissions, and water discharges that are created through manufacturing products decreases the potential for harm in the event of an accidental or intentional release.

Economic benefits

There are also important economic benefits. As this report shows, Minnesota businesses that have implemented pollution prevention measures that use less toxic materials or more efficient processes have benefited by saving millions of dollars. Businesses benefit through eliminating costly end-of-process pollution control equipment and hazardous waste management; conserving resources; improving worker safety and community relations; improving recyclability of manufacturing materials and products, and decreasing liability and the costs of managing the product in the general waste stream at the end of its useful life.

Report on progress

Every two years, the pollution prevention program reports to the Legislature on progress being made toward achieving the objectives of the Minnesota Toxic Pollution Prevention Act (Minn. Stat. § 115D.10). This report outlines the broad scope of partnerships and collaborative efforts that meld industry efforts with technical and financial assistance.

Although the amount of toxic chemicals generated as waste has not declined significantly, pollution prevention efforts have helped to keep toxic chemical waste generation from increasing. In the case of toxic chemical releases, these efforts have helped to steadily reduce the amount released to Minnesota's air, water, and land. Documented results in this report show that millions of dollars have been saved, and millions of pounds of pollution have been eliminated through these partnerships.

Statewide trends for TRI reporting industries

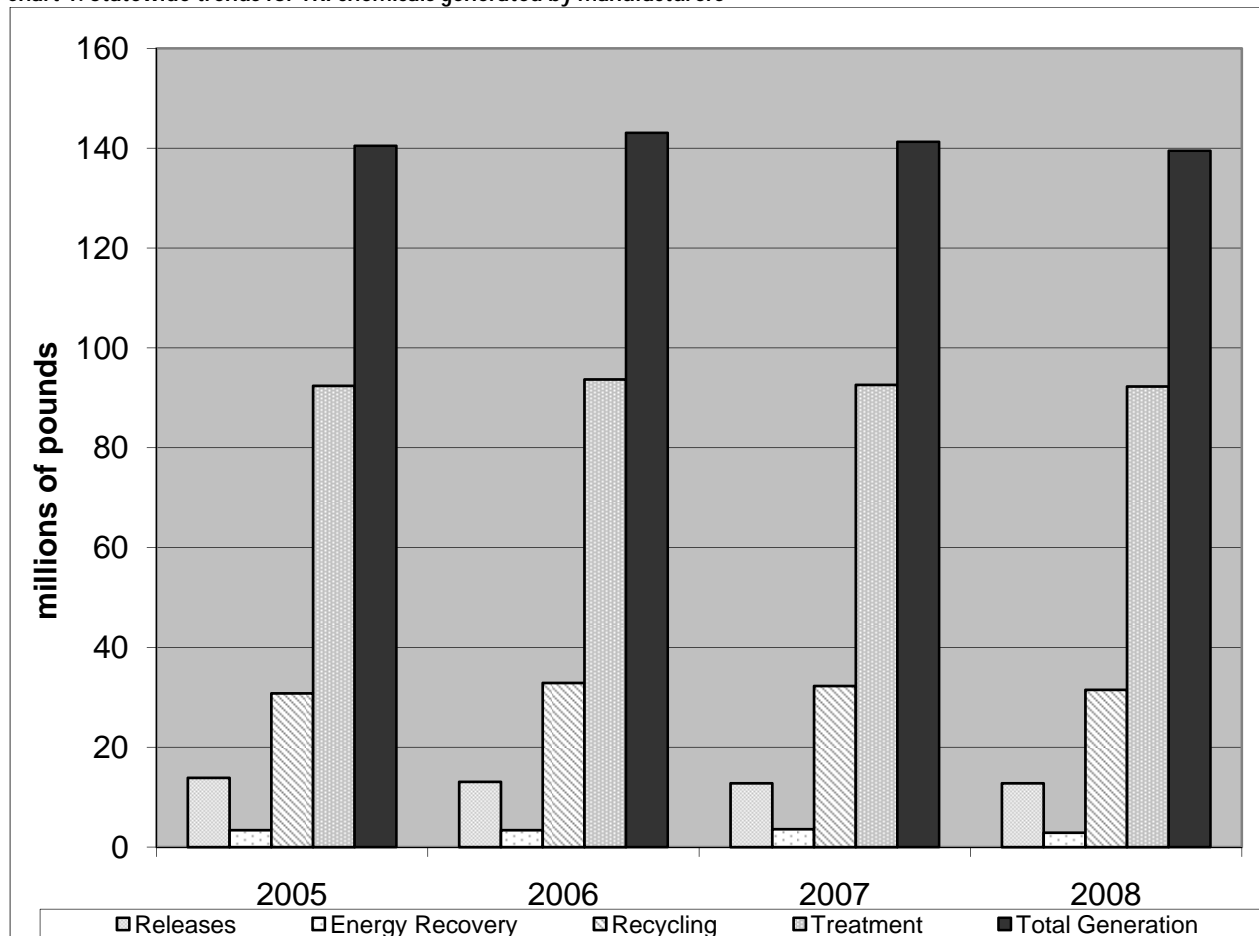
The state evaluates data supplied by reporting facilities to the Minnesota Emergency Planning and Community Right-to-Know Act (EPCRA) program and the U.S. EPA to determine trends in quantities of chemicals generated and released. The 2008 data from Minnesota's 431 reporting facilities suggest that some slight progress in pollution prevention among manufacturers has occurred. However, since the data does not specify whether the reported reductions in amounts of chemicals released and/or generated by some manufacturers are due to discontinued production, moving the manufacturing processes outside Minnesota, or implementation of pollution prevention at the facility, it is not always possible to know the cause of these reductions with certainty.

Generation of TRI chemicals in Minnesota

For the purposes of the Toxic Release Inventory program, toxic chemical generation is defined as the sum or aggregate of the quantities for each waste management method employed, which includes releases (direct release to air, water, or land); recycling; treatment; and burning for energy recovery.

In general, Minnesota’s pollution prevention efforts focus on working with manufacturers to reduce waste through improving the efficiency of production processes or finding ways to use less or non-toxic chemicals in those processes. A look at how Minnesota manufacturers manage the TRI chemical waste they generate is shown in Chart 1.

Chart 1: Statewide trends for TRI chemicals generated by manufacturers



Management method of TRI chemicals generated (in millions of pounds)

Year	2005	2006	2007	2008
Releases	13.9	13.1	12.8	12.8
Energy Recovery	3.4	3.4	3.6	2.9
Recycling	30.8	32.9	32.3	31.5
Treatment	92.4	93.7	92.6	92.3
Total Generation	140.5	143.1	141.3	139.5

As Chart 1 shows, manufacturers continue to make some progress in reducing releases, which declined nearly eight percent between 2005 and 2008. However, the same progress is not being seen in reducing overall TRI chemical generation, which has changed very little from 2005 to 2008.

Overall trends in TRI chemical generation

As seen in Table 1, toxic chemical generation has shown very little change since 2005. Waste generation by manufacturers was virtually unchanged while the decline seen in waste generated by waste treatment facilities was offset by increases in waste generated by non-manufacturers, primarily electric utilities. Waste generated

by recyclers increased 20 percent from 2005 to 2008, but still make up a very small fraction of TRI chemical waste generated in Minnesota.

Table 1: Total amount of TRI chemicals generated by sector (in millions of pounds)

	Year	2005	2006	2007	2008
non-manufacturers (electric utilities, chemical distributors)		13.6	14.7	16.6	15.7
recyclers (metals and solvents)		0.9	0.9	0.8	1.1
waste treatment (incineration)		17.2	16.8	15.9	15.8
manufacturers		140.5	143.1	141.3	139.5
total TRI chemical generation		172.1	175.5	174.6	172.1

Overall trends in TRI releases

TRI chemical releases have continued to decline slightly, 4 percent over the past four years, though there was an increase in releases from 2006 to 2007. The vast majority of TRI chemical releases come from manufacturers and electric utilities.

Table 2: Total amount of TRI chemical wastes released by sector (in millions of pounds)

	Year	2005	2006	2007	2008
non-manufacturers (electric utilities, chemical distributors)		12.1	12.7	13.8	12.6
recyclers (metals and solvents)		0.4	0.4	0.5	0.4
waste treatment (incineration)		1.2	1.2	1.5	0.6
manufacturers		13.9	13.1	12.8	12.8
total TRI chemical releases		27.6	27.4	28.6	26.4

Releases from the coal-fired electric utilities declined nearly 9 percent from 2007 to 2008, although they are still up slightly compared to 2005. Releases from manufacturers continue to decline, down nearly 8 percent from 2005 and 15 percent from 2001, when releases from manufacturers totaled 15.1 million pounds. While releases from waste treatment facilities make up only a very small fraction of the total, it is worth noting that they declined significantly, 50 percent from 2005 to 2008.

Interestingly, releases made up a smaller share of the waste generated by electric utilities in 2008 (80 percent) than in 2005 (89 percent). The difference appears to be a significant increase in onsite waste treatment at these facilities, which rose from 1.4 million pounds in 2005 to 3.1 million pounds in 2008.

To make progress in reducing TRI chemical waste generation in Minnesota, especially among manufacturers, there continues to be a need to increase our focus on providing assistance and incentives to motivate manufacturers to embrace activities such as green chemistry and green design, as well as other approaches that reduce toxic chemical waste generation, not just releases. MPCA has begun work on exploring a Green Chemistry and Design Initiative.

Green Chemistry and Design grant project

For several years, Minnesota has encouraged and worked with manufacturers to implement Design for Environment (DfE) as a way to weave environmental considerations into product design and avoid raw materials or manufacturing processes that generate toxic chemical waste. Examples of the successes with DfE in Minnesota can be found at www.pca.state.mn.us/oea/p2/design.cfm

A similar approach that has seen growing interest is in the area of green chemistry, which “involves the design and redesign of chemical syntheses and chemical products to prevent pollution and thereby solve environmental problems.”

The 12 principles of Green Chemistry were first proposed in 1998 and since have been adopted by the U.S. Environmental Protection Agency and the American Chemical Society (relating to chemical products and processes):

1. Prevention - better to prevent waste than to treat or clean up waste after it has been created;
2. Atom economy - incorporate all materials used in the process into the final product;
3. Less hazardous chemical syntheses - use and generate substances with little or no toxicity;
4. Designing safer chemicals - effect a desired function while minimizing chemical product toxicity;
5. Safer solvents and auxiliary substances - should be made unnecessary or innocuous when used;
6. Design for energy efficiency – minimize energy use (e.g. use of heat and pressure in synthesis);
7. Use of renewable feedstocks – wherever practicable, raw material should be renewable;
8. Reduce derivatives - should be minimized; extra steps require reagents and can generate waste;
9. Catalysis - catalytic reagents (as selective as possible) are superior to stoichiometric reagents;
10. Design for degradation – should break down into innocuous, non-persistent degradation products;
11. Real-time and in-process monitoring and control - prior to the formation of hazardous substances.
12. Inherently safer chemistry for accident prevention – minimize potential for releases, explosions, fires.

These principles were followed by 12 principles for Green Engineering, adopted by the American Chemical Society in 2003, which mirror those above for chemistry. Both sets of principles support Minnesota's existing Toxic Pollution Prevention Act (TPPA, 115D, 1990) by focusing prevention efforts at their highest-leverage point: the beginning of product and process design.

While federal and state policy for chemical use has not yet taken a precautionary approach similar to Europe, companies and organizations are adopting many voluntary or collaborative frameworks for selecting materials in product and production design. Examples include the Green Screen, the Environmental Defense Fund/Dupont Nanomaterials Risk Framework, and design decision-making frameworks internal to companies such as 3M. Frameworks such as these can be reactive by approving or excluding use of chemicals already listed and assessed for risk, or they can be proactive by guiding designers away from higher-risk potential classes of chemicals being considered for future development.

The positive outcomes of using the Green Chemistry and Engineering principles are illustrated in:

- **Consumer electronics** – where companies like Apple, Seagate, Sony Ericsson and others have reduced or eliminated bromine and chlorine from the production of printed circuit boards, cell phones, personal computers, music devices, disk drives, and semiconductor chips. Bromine and chlorine use in resins or as flame retardants in electronic devices and components have been documented to produce dioxin when these products are smelted or burned at the end of their life.
- **Pharmaceuticals** – with the case study of ibuprofen, which was redesigned after patent expiration and over-the-counter approval in 1984. The original production process was reagent-based, used 6 steps and had an overall atom economy (inputs incorporated into the final product) of around 40%. The new process used catalysts, took 3 steps, eliminated 44 million pounds of waste per year, reduces the use of the non-renewable aluminum trichloride and has an atom economy of 77%.

Whether public, private or a combination, a complete Green Chemistry program would ensure that alternative chemistries considered or used in the examples above or with others (atrazine substitutes, plasticizers in containers, non-stick or stain repellent products, road salt alternatives, etc.) have been selected to deliver low or no toxicity in the final product's life cycle and its production process.

In 2009, MPCA was awarded a one-year pollution prevention grant from U.S. EPA, with part of the funding to be used to begin a research project regarding the opportunity to develop a green chemistry and design initiative for Minnesota. One portion of this research project includes identifying what other states such as California and Michigan have done to develop Green Chemistry and Design plans for their states (benchmarking other states) as well as review recommendations from organizations such as the Green Chemistry and Commerce Council, the National Pollution Prevention Roundtable and the Lowell Center for Sustainable Production.

This research is being used to frame a discussion with Minnesota stakeholders through a series of focus group meetings consisting of small manufacturers, large manufacturers and retailers as well as individual interviews with academic, non-profit and other green chemistry and design experts. The purpose of these focus groups and interviews is to learn more about what experiences Minnesota manufacturers have with implementing green chemistry and design techniques and what tools or resources MPCA could offer to encourage more widespread adoption. These meetings and interviews have been scheduled to take place in December 2009 through February 2010.

The information gained from the focus group meetings and individual interviews will then be used to develop a broader survey for manufacturers to gain data for a summary of preliminary findings to issue for comments and serve as a framework for how to put together a green chemistry and design initiative for Minnesota and what it would cost to implement such an initiative.

Pollution Prevention Activities and Technical Assistance Partnerships

The MPCA engages in a multi-faceted approach to pollution prevention, including providing financial assistance for businesses and institutions seeking ways to reduce waste as well as offering technical assistance directly through our Small Business Environmental Assistance Program and through our technical assistance partnerships.

Pollution prevention technical assistance is a demonstrated means to achieve results. The state sponsors several technical assistance providers in Minnesota, including partnerships with the University of Minnesota and the Minnesota Chamber of Commerce.

Table 3: Summary of Pollution Prevention Assistance Results for 2008 and 2009

	Waste reduced (pounds)	Waste reused (pounds)	Water conserved (gallons)	Energy conserved	Cost savings
MnTAP	5,317,249	918,154	92 million	15,164,611 kWh 782,557 therms	\$4.1 million
MWW	1.47 million	425,781	NA	NA	\$4.6 million
RETAP*	54,000	NA	12 million	323,270 kWh	\$61,995
Total	6.84 million	1.34 million	104 million	15.5 million kWh 782,557 therms	\$8.7 million

* results from 2007 calendar year

NA – not applicable to projects outlined in this area

ND – ongoing projects, results have not yet been documented

Multimedia P2 inspections and assistance

In response to evidence that hospitals were largely unaware of their hazardous waste compliance responsibilities and their overall environmental impacts, MPCA began working with metro counties, the Minnesota Hospital Association (MHA), MnTAP and other partners in 2002 to improve the environmental performance of the state's hospitals.

With the support of the MHA, state and county regulators first used outreach and education to help hospitals improve performance. That was followed within two years by a pre-agreed plan to inspect all hospitals and use enforcement tools as necessary. Metro county hazardous waste programs inspected their hospitals focusing on compliance with requirements under their jurisdiction. For the 121 hospitals outside the metro counties, MPCA managers decided to leverage their single-inspector visits by training participating hazardous waste inspectors in pollution prevention opportunities and other key compliance and performance aspects: sewer discharges; air emissions from incinerators, boilers, generators, and ethylene oxide sterilizers; and properly registered and maintained fuel storage tanks.

Inspectors saved preparation, travel, and follow-up (enforcement) time by combining several programs in one inspection. They also were able to discuss a range of pollution prevention opportunities with the hospitals' various departments, and refer hospital staff to MnTAP for follow-up assistance.

All outstate hospitals have now been inspected, and virtually all have identified previously-unevaluated waste (e.g. lab waste, pharmaceuticals, chemotherapy drugs) and are now accurately reporting waste types and quantities to the MPCA and metro counties. Hospitals have also identified and corrected previously-mismanaged waste (e.g. HW sorted to biohazard waste, solid waste, or improperly sewerred). Hospitals where noncompliance was documented have gone through enforcement and completed specific return-to-compliance activities, including setting up training, management, and prevention procedures for wastes and other impacts.

While waste amounts initially increased as hospitals evaluated and reported wastes previously overlooked, the hospitals inspected earliest are now showing a downward trend in waste generation as they learn to reduce and recycle many of their wastes. A significant proportion of this hazardous waste is lab and pharmaceutical waste washed down the drain to public sewers. With referrals by MPCA inspectors to MnTAP for pollution prevention assistance, this sewerred waste has a high potential for reduction, in turn reducing the burden on treatment plants and aquatic life. The accompanying table presents some year-to-year hazardous waste data trends (in pounds, from generator reports), focusing on two waste streams of concern (lab and pharmaceutical) with continuing potential for reduction through pollution prevention techniques.

Reported Hospital Waste Before and After Project (in pounds)

	2004	2005	2006	2007	2008
Lab Waste	4,727	942,819	1,109,684	587,344	618,110
Pharmaceutical Waste	6,776	531,235	807,266	678,070	677,390
Other Wastes	382,785	12,359,139	13,798,844	3,822,204	4,289,309
Total Waste	394,288	13,833,193	15,715,794	5,087,618	5,584,809

MPCA data shows that much of the drop in total waste from 2005/2006 levels to 2007/2008 levels was due to the elimination of nearly seven million pounds of wastes per year that were previously discharged to the sewer without treatment.

MPCA inspectors discussed pollution prevention measures (most commonly, reduction of mercury-containing equipment, lab reagents and pharmaceuticals) with all hospitals inspected and made sure hospital staff were aware of MnTAP as a free assistance resource. MnTAP then reached out to all hospitals inspected in 2008 and 2009. Hospitals were increasingly responsive over the 2-year period, and MnTAP's 2009 data provides a good snapshot of their pollution prevention interest:

- MnTAP made 67 suggestions to 12 hospitals, offering potential reductions of 103,027 pounds of waste generated and \$311,537 in costs;
- Of the 67 suggestions offered by MnTAP, 29 were implemented, reducing waste by 46,169 pounds and cost by \$168,211;
- Two suggestions were planned for implementation, with projected reductions of 15,000 pounds waste and \$68,831 in costs;

As of fall 2009, the status of 32 MnTAP suggestions was unknown and three were not planned for implementation, missing potential reductions of 41,858 pounds of waste and \$74,485 in costs. MnTAP will continue to follow up.

Minnesota Technical Assistance Program

The Minnesota Technical Assistance Program (MnTAP) is an environmental assistance provider of free, non-regulatory pollution prevention services to Minnesota manufacturers and industry. MnTAP helps businesses become more efficient by providing industry tailored pollution prevention, energy efficiency and waste reduction assistance; conducting applied research; and offering training and education opportunities. To enhance the reach and quality of its programs, MnTAP partners with trade and industry associations, educational institutions, and state and local agencies.

Table 4: 2008-2009 MnTAP Environmental and Economic Impact Results

Service Provided	Waste Reduced (Pounds)	Water Conserved (Gallons)	Energy Conserved	Waste Reused (Pounds)	Cost Savings (\$)
Site Visits	5,115,855	66,373,196	756,590 kWh 543,697 therms		\$2,119,847
Student Interns	201,394	25,828,400	14,408,021 kWh 238,860 therms		\$1,410,689
Materials Exchange				918,154	\$581,254
Total	5,317,249	92,201,596	15,164,611 kWh 782,557 therms	918,154	\$4,111,790

Located at the University of Minnesota, MnTAP is funded through an annual state grant from the MPCA which totaled \$1,850,000 in 2008-2009. Over the last two years, facilities receiving MnTAP assistance have saved over \$4,116,790, prevented 6.2 million pounds of waste through reduction or reuse, and conserved 92.2 million gallons of water. Every dollar of state funding to MnTAP results in over two dollars in annual savings for Minnesota businesses.

Site Visits

Site visits are a preferred way of working with companies due to the one-on-one interaction that MnTAP has with the company, and are a practical way to help businesses with pollution prevention. Site visits are also an important way to promote team formation, identify potential student intern projects, and identify potential grant or loan opportunities.

A total of 441 site visits were conducted in the past two years, primarily at food processing, chemical manufacturing, fabricated metals, primary metal manufacturing, marinas and healthcare facilities. These site visits were conducted at 181 different industrial facilities. Through energy efficiency training and resource development, MnTAP staff have become more familiar with identifying energy conservation opportunities while conducting site visits, including use of the Department of Energy Best Practices tools.

Student Internships

Companies not able to research pollution prevention projects due to lack of time or money can apply for a MnTAP student intern for help. By developing effective, specific solutions to reduce waste, interns help companies save operating costs and reduce regulatory compliance burden, as well as decrease their environmental impacts. Each summer, MnTAP sponsors about 6 interns.

Materials Exchange

The Minnesota Materials Exchange Alliance, coordinated through MnTAP, is a service that connects businesses that can use another company's waste as their raw material. The materials exchange online listings and personal assistance helps facilities find low cost or free materials, save money on disposal costs, and find new markets for surplus materials.

For more information about MnTAP, visit the web at www.mntap.umn.edu, or call 612-624-1300.

Reducing Waste from Manufacturing Medical Devices (Sponsor: U.S. EPA Region 5)

Minnesota is a leader in medical device technology, ranking first or second in the nation as the leading location for the medical devices industry. A strong cluster of medical technology corporations are headquartered in Minnesota including 3M, Boston Scientific, Medtronic, and St. Jude Medical. According to the Minnesota Department of Employment and Economic Development, in 2001 Minnesota employed more people (21,000) in the manufacture of medical instruments and supplies, more than all but one other state, with a concentration of employment that is more than three times the U.S. average.

Medical device manufacturers use a variety of materials and chemicals in the development, production, cleaning, sterilization and shipment of their products. Some of the materials are used in large quantities providing opportunities for resource efficiency. Chemicals, such as chlorinated solvents and ethylene oxide, are highly toxic and provide opportunities for toxicity reduction. This industry is highly regulated by FDA, but new green initiatives if proposed and enacted by the European Union present opportunities for pollution prevention.

MnTAP developed this project to educate medical device manufacturers and the medical device component manufacturers that supply them about source reduction options and implement them through technical assistance approaches. This work added to MnTAP's knowledge of the medical device manufacturing industry and its supply chain. It has helped build our capacity to provide pollution prevention support to the medical device industry for the coming years.

The medical device manufacturing team at MnTAP held a stakeholder meeting with eight attendees from six companies. During the meeting, attendees learned more about MnTAP and pollution prevention opportunities. The attendees discussed their waste issues and identified the following technologies/projects as priorities for the industry:

- Ethylene oxide replacement (sterilant)
- Design for sustainability
- Roundtable discussions about making products green
- More education for engineers at the University about chemicals
- Miniaturized clean room environments
- Energy efficiency

In summer 2008, Atritech, Inc., in Plymouth, Minnesota, hosted an intern project to redesign product packaging and reduce packaging waste. Implementation to date has resulted in a reduction of 1,640 lbs of waste, and saved the company \$23,840, based on assumed production levels for 2009. Other recommendations have the potential to result in reductions of 3,800 pounds and savings of \$23,200. Five site visits were conducted with other medical device companies to assist with pollution prevention and energy efficiency identification and implementation. A set of two videos titled "Engineering a Better World" were produced from this project and have been used at technical conferences and to recruit interns for summer 2010. MnTAP received the University of Minnesota Communicators Forum Maroon Award for these videos.

Minnesota Waste Wise

Minnesota Waste Wise (MWW) is a nonprofit, member-supported program that helps Minnesota businesses reduce waste, recycle materials and save money. MWW was formed in 1994 as a private/public partnership between the Minnesota Chamber of Commerce and the Minnesota Pollution Control Agency. MWW received a grant for \$35,000 from MPCA for 2008 and has an annual budget of approximately \$250,000.

MWW provides the opportunity for Minnesota's business community to reduce waste by joining MWW and receiving technical assistance and other waste reduction services. This assistance includes:

- Performing on-site waste assessments
- Assisting members in obtaining information about waste reduction, reuse, recycling and proper disposal
- Creating waste reduction plans for reducing waste
- Investigating waste exchange opportunities in partnership with the Minnesota Materials Exchange Alliance and through business to business connections
- Directing members with environmental concerns not addressed by MWW to the appropriate agencies, programs or organizations

MWW delivers accurate and timely information and assistance regarding waste reduction, management and compliance. In addition to site visits, MWW meets additional needs of its members through presentations, follow-up calls, research, roundtable discussions and through various fact sheets and publications.

Table 5: 2008-2009 Environmental and Economic Impact Results

	Waste Reduced (lbs)	Waste Reused (lbs)	Waste Recycled (lbs)	Waste Composted (lbs)	Cost Savings
2008	677,167	115,781	12.25 million	428,880	\$1.62 million
2009	800,000	300,000	10 million	400,000	\$3 million
Total	1.47 million	425,781	22.25 million	828,880	\$4.62 million

MWW also manages special programs, such as *It's in the Bag*, a voluntary recycling program that collects plastic bags from consumers and shrink wrap from businesses. To date, this program has recycled over 5.5 million pounds of plastic from the Twin Cities since 2004. In 2009, this program began expanding beyond the Twin Cities metro area to include Duluth with additional efforts underway in Sandstone and St. Cloud.

For more information about Minnesota Waste Wise visit the web at www.mnwastewise.org, or call (651) 292-4663.

Retired Engineers Technical Assistance Program

Minnesota's Retired Engineers Technical Assistance Program (RETAP) is a program administered by MPCA that focuses on waste and energy use reduction assistance to non-manufacturing commercial and service facilities. RETAP fills a need in Minnesota to provide energy and waste assessment services to smaller companies and non-profits that are not otherwise likely to pay for such assistance. The assistance is provided by retired engineers and scientists, each with many years of experience. Upon request, a team performs a site assessment and can also provide other specific technical assistance in the areas of pollution prevention, waste reduction, and energy use reduction.

For 2008 and 2009, the program performed 81 on-site assessments, including grocery stores, a public ice arena and the State Office Building in St. Paul. RETAP also entered a partnership to support the Buildings, Benchmarks and Beyond (B3) Public Building Benchmarking database and has assisted four public entities in meeting their statutory requirements. State statute requires that all public buildings over 5,000 square feet must enter energy use data into a state database for purposes of benchmarking buildings and prioritizing efficiency improvements.

For the state's investment of \$29,560, RETAP's 2007 recommendations saved clients \$61,995, as well as 323,270 kWh, 27 tons of solid waste and 12 million gallons of water. Every dollar of state funding to RETAP results in over two dollars in annual savings for Minnesota businesses. This represents a six-month payback of the state's investment in environmental and cost savings. For 2008 and 2009 the MPCA provided a total of \$66,376 to fund RETAP. Latest client savings are expected to be available in March, 2009 and will be posted at the RETAP website at <http://www.pca.state.mn.us/retap>

RETAP helps Garlough School in West St. Paul achieve Energy Star Status

One particular highlight took place in 2008 during an assessment of Garlough School (an environmental magnet school in West St. Paul). RETAP found that the school was paying more than necessary for electricity and gas because their operating procedures were causing high demand charges and suggested changes in operations that could reduce the peak electricity demand. By following RETAP's recommendations, Garlough lowered their demand charges from \$1.08/sq ft to less than \$.93/sq ft – the U.S. EPA Energy Star benchmark. As a result, Garlough recently achieved Energy Star status from the U.S. EPA.

Environmental Assistance Grant Program

The Minnesota Legislature established the environmental assistance grant program to provide financial assistance in the development of environmentally sustainable practices in Minnesota through voluntary partnerships and goal-oriented, economically-driven approaches to pollution prevention and resource conservation. For 2008 and 2009, grants totaling \$525,769 were awarded to 16 organizations. Details on awarded grants can be found at www.pca.state.mn.us/oea/grants/awarded

Grant Project: Manure Utilization Strategies to Reduce Fecal Coliform Impact:

In 2006, MPCA's Environmental Assistance Grant Program awarded a grant of \$29,672 to the Cannon River Watershed Partnership to build and demonstrate equipment which could apply hog manure at low rates and then incorporate it through strip tillage in one pass. The purpose of the project was to test if the technology and practice could maintain crop yields and profitability while reducing fecal coliform impacts to surface waters.

As Minnesota's hog herd increased, high-rate application of hog manure to crop land became prevalent. More recently, the rising cost of commercial fertilizers has increased the value of manure as a nutrient source and driven interest in finding lower rates of manure application which maximize profitability. Overapplication and full-width, deep-till incorporation of hog manure can increase the potential for soil erosion, overland runoff and tile drainage to carry fecal material into surface waters.

This project funded fabrication of a manure applicator prototype which strip tills, distributes hog manure within the furrow, and covers the application in one pass, allowing much lower per-acre application rates. The project also compared corn yields for acres where hog manure was applied at 1,500 gallons per acre in strips to high rates of 7,000 gallons broadcasting under conventional tillage. Yield results for three years showed lower application rates grew corn equally well while increasing profit. We presume reduced availability of bacteria, silt and excess nutrients to move to surface water, energy savings (depending on tillage type, speed and number of passes) and greater soil carbon retention. The prototype is now licensed and six additional units are operating in Minnesota as of fall 2009 (referred to in the Project Results as "Post-project reduction.") Most users of the equipment designed under the project now use manure to meet phosphorus and potassium needs (instead of nitrogen needs) and supplement the manure as needed with commercial nitrogen.

Following is a presentation of reductions achieved within the project (where all baseline conditions were known) and reductions projected for acreage now using the prototype technology. All assumptions are presented in the post-project reduction summary so that readers considering adoption can plug in the proper values in calculating their own farm's cost/benefit.

Cannon River Grant Project Results

	Project reduction (1 unit)	Post-project reduction (7 units) Assumes <i>average</i> of 5000 gal/acre as benchmark rate
Application area	4 acres	13,532 acres
New application rate	1,500 gallons/acre (79% reduction)	<i>Average</i> 3,427 gal/acre (31% reduction); <i>Range</i> 1,500 to 4,000 gal/acre
Manure reduction	22,000 gallons	21,283,730 gallons
Energy conserved – diesel (one pass eliminated at 1.5 gallons diesel per acre)	6 gallons	20,298 gallons, assuming all previous application required a second pass for incorporation
CO2 impact per year <ul style="list-style-type: none"> reduced diesel use (22.39 lb CO2/gallon diesel) soil carbon credit for continuous strip till (Chicago Climate Exchange credits 0.5 metric tons per acre per year) 	Diesel use: 134 lb reduction Continuous strip till CO2 credit: 4,410 lb	Diesel use: 206 metric ton reduction (assuming a reduction of one pass) Continuous strip till CO2 credit: 6,766 metric tons (assuming users maintain continuous strip till)
Cost savings	\$848	\$816,959 (21,283,730 gallons manure at \$0.036/gallon + 20,298 gallons diesel at \$2.50 per gallon)

Small Business Environmental Assistance Program

The Small Business Environmental Assistance Program (SBEAP) provides free, confidential, multi-media environmental assistance to small businesses. This includes maintaining compliance with new and existing environmental requirements while helping them to reduce regulatory burden by reducing the amounts of emissions and wastes generated.

SBEAP provides assistance through a variety of approaches, including site visits, workshop presentations and exhibits, telephone and email contacts, in-person meetings and online through the program web page.

Table 6: 2008-2009 SBEAP Outreach and Contact Results

	2008	2009
Site visits	81	45
Workshop presentations	9	10
Exhibits	8	2
Telephone*	2,603	1,979
Email*	32	83
In-person meetings	16	76
Web page hits	7,328	5,792

*Represents number of topics/issues addressed (e.g. five phone calls regarding one issue was counted as one phone contact)

Industrial Stormwater Permit -- No Exposure Project

Facilities with certain primary activities or Standard industrial Classification (SIC) Codes are required to obtain and comply with the Industrial Stormwater Permit. These facilities need to develop and implement a stormwater pollution prevention plan, obtain an industrial stormwater permit and pay an annual \$400 fee.

An affected facility can avoid the permit requirement if they are able to certify No Exposure. All significant industrial materials must be protected by a storm-resistant shelter to prevent exposure to rain, snow, and runoff in order to qualify for this exemption.

In cooperation with Industrial Stormwater Program and Pollution Prevention staff, the Small Business Environmental Assistance Program (SBEAP) staff conducted an outreach effort to raise awareness of the no exposure exclusion option in the Industrial Stormwater permit. SBEAP targeted industrial sectors where stormwater exposure to business operations can likely be eliminated. These industry sectors include: chemical manufacturers, printers, metal fabricators, electrical equipment manufacturers, and transportation equipment manufacturers.

One example can be illustrated by their work with a local manufacturer who had Industrial Stormwater (ISW) permit coverage, which was referred to SBEAP by the Industrial Stormwater Program and asked for a site visit to see if they would be eligible for the no exposure exclusion. SBEAP staff identified possible stormwater pollution sources, and recommended that the company paint some rusting beams, follow loading and unloading Best Management Practices (BMPs), void the ISW permit, and apply for the no exposure exclusion. The customer was able to eliminate a \$400 annual fee, plus the cost of staff time for recordkeeping and future monitoring costs with the upcoming permit. In total, obtaining the no exposure exclusion will save the company approximately \$5,800 over the 5-year permit term.

This outreach effort helped minimize the regulatory burden to many businesses and the amount of industrial pollution carried to the state's lakes and streams. When the number of regulated facilities is reduced, stormwater program staff can better focus their energy on the remaining facilities.

As a result of SBEAP's work, approximately 1,000 businesses qualified for the no exposure exclusion saving \$400,000 a year in avoided permit fees. In addition, 75 businesses received the Industrial Stormwater permit. In total, at least 2,590 acres of industrial land are now covered by the permit or can qualify for the no exposure exclusion.

Environmental Calendars

SBEAP also prepares environmental calendars as tools businesses use to help them comply with environmental requirements and prevent pollution. The calendars provide information specific to each sector. They prompt businesses to conduct proper inspections, perform equipment maintenance, keep records and submit reports associated with environmental requirements.

For example, the construction stormwater calendar promotes regulatory compliance while educating users about practices to prevent erosion and control sediment. Approaches focusing on infiltration/filtration and low-impact development are introduced to build awareness of environmentally friendly construction practices.

The calendars are distributed directly to regulated parties upon request and to trade organizations, and compliance staff for redistribution to regulated parties. The calendars are also posted at www.pca.state.mn.us/programs/sbeap-publications.html#calendars

Table 7: SBEAP Environmental Calendar Distribution

	2008		2009	
	Printed	Downloaded	Printed	Downloaded
Construction Stormwater	250	959	150	1,171
Dry Cleaner	240	391	220	527
Vehicle Maintenance	150	550	175	654
Aboveground Storage Tanks	100	692	100	800
Aggregate (sand and gravel)	140	353	75	456
Hot Mix Asphalt	120	343	110	401

Small businesses in Minnesota can contact the SBEAP at (651) 282-6143 or visit www.pca.state.mn.us/sbeap for more information.

Small business program spotlight: Notch Manufacturing cuts permit fees

Notch Manufacturing, a small Minnesota business which specializes in the manufacturing of farm and construction equipment, worked with staff from SBEAP to eliminate the use of paints and primers containing hazardous air pollutants. By switching to HAP-free paints and primers, an annual potential release of 4,780 pounds of these toxic emissions was avoided. This means a healthier workplace for their employees and a big win for the environment. SBEAP also helped the company through the complex process of determining if an air permit is required. This process included completing a Potential to Emit (PTE) calculation, which can be confusing for small businesses. With SBEAP's help, Notch was able to understand how to take credit for essential bottlenecks in their manufacturing process. This in-depth analysis helped the company determine that they do not need an air permit, resulting in reduced regulatory burden (including administrative or consulting fees) and savings of an estimated \$3,705 in air permit fees.

Governor's Awards: Honoring Excellence in Waste and Pollution Prevention

The Governor's Awards Program provides an opportunity to recognize and honor businesses, non-profits, government agencies, public institutions, and private institutions for their efforts toward protecting the environment. These organizations have developed innovative ways to prevent pollution and waste, improve resource efficiency, and lead to increased sustainability. There are three categories of Governor's Awards; one for businesses, private institutions, and non-profits; one for government and public institutions; and Partnerships for collaboration between private and public organizations. More information on specific projects completed by Governor's Award winners can be found at www.pca.state.mn.us/oea/p2/govaward

Table 6: 2008 & 2009 Summary of Governor's Award results

	Waste reduced (pounds)	Waste composted (pounds)	Water conserved (gallons)	Energy conserved	Cost savings
Business/Non-profit	6,516,025		1,000	13,397 kWh 440,987 therms	\$3,472,341
Government		700,000			\$5,037,000
Partnerships	10,281,400		1,600,000		\$259,000
Total	16,797,425	700,000	1,601,000	13,397 kWh 440,987 therms	\$8,768,341

2008 Governor's Awards for Excellence in Waste and Pollution Prevention

Business/Non-Profit

Children's Dental Services

Children's Dental Services (CDS) is a private, non-profit corporation that has provided dental care to low-income children since 1919. CDS expanded their primary clinic building using many best management practices to reduce the environmental footprint of the clinic including: raingardens, energy star appliances, high efficiency heating and air conditioning, high efficiency lighting, natural lighting, photo voltaic solar panels, hot water solar panels, and recycled materials. Their environmental benefits include annual reductions of 1,000 gallons of water, 1200 kWh of energy, 25 pounds of hazardous waste, and 1,000 pounds of solid waste for a total cost savings of approximately \$7,000. Their payback for the project will be approximately 6 years.

Lubrication Technologies, Inc.

Lubrication Technologies has over 30 years of experience in developing lubricants. Lubrication Technologies developed a product for Ford that would reduce volatile organic compound (VOC) emission levels incurred from cleaning their paint booths. Ford Sludge Remover reduces VOC emissions and also improves cleaning efficiency at a substantial cost savings. The total annual reductions include 72,000 pounds of hazardous waste, and 173,000 pounds of VOC emissions for a total cost savings of approximately \$200,000.

Government (MnGREAT)

Carver County- Innovative Approach to Collecting and Composting Organics

The Carver County organics project has given residents in select areas of Carver and Hennepin Counties an opportunity to divert their organics from the waste stream. In 2007, 124 tons of organic material was diverted from the landfill and the projection for 2008 is 350 tons. Estimated cost savings from waste hauling total \$37,000 per year.

Dakota County- Dakota County Farmland and Natural Areas Program

The Dakota County Farmland and Natural Areas Program (FNAP) is a multi-year project addressing citizen concern over the loss of open space in rapidly growing Dakota County. FNAP protects farmland and natural areas through acquisition of permanent conservation easements or fee title from willing landowners. FNAP

has protected approximately 36.6 miles of shore land along lakes, ponds, rivers, and creeks. The County's investment of \$16 million has leveraged an additional \$57 million of non-County funding and landowner donation for direct and indirect pollution prevention associated with permanent land protection.

United States Postal Service, Duluth Vehicle Maintenance Facility- Duluth VMF

The Duluth Auxiliary Vehicle Maintenance Facility is a small vehicle maintenance shop. Through the efforts of the VMF crew, they eliminated all hazardous waste generation, recycled all available materials and eliminated some waste streams outright. They have reduced their hazardous waste disposal costs to zero, reduced their solid waste trash bill and generated revenue from recycling.

Partnership

Great River Energy's Green Building and Corporate Recycling Initiatives

Great River Energy worked with Tegra Group, McGough Construction, Dunham Engineering, and Perkins & Will Architects to construct Great River Energy's new world headquarters which is projected to be certified platinum LEED. In addition to the new LEED headquarters, Great River Energy has an aggressive recycling program that includes beverage containers, paper products, fluorescent lamps, mercury containing equipment, batteries, scrap metal, wood, concrete, sheetrock, and electronics. Their total annual savings include 1,600,000 gallons of water, a 50% reduction of energy, and 7,400,000 pounds of solid waste, for a total cost savings of approximately \$89,000 per year.

Project Green Fleet

Minnesota Environmental Initiative, Minnesota Chamber of Commerce, and Minnesota Center for Environmental Advocacy partnered to reduce diesel emissions and children's exposure to diesel exhaust by installing EPA-verified pollution control equipment on school buses throughout the state. The total annual emission reduction for the 500 buses is 8,000 pounds. Economic benefits are difficult to assess. The retrofit costs approximately \$2,000 per bus. Health related cost savings are estimated to be between \$3 and \$16 million.

SECIA's Air Pollution Reduction Project

Southeast Como Improvement Association (SECIA) collaborated with Ritrama, Inc., Waldorf Corporation (Rock-Tenn), and Greatbatch to reduce air pollution in their neighborhood. SECIA entered into good neighbor agreements with all three partners. Cumulatively this project has reduced hazardous air emissions by 1,399 tons which is a 90% reduction by the three industries. Rock-Tenn is saving \$170,000 per year as a result of this effort. Ritrama and Greatbatch have not calculated their savings at this time.

2009 Governor's Awards for Excellence in Waste and Pollution Prevention

Business/Non-Profit

East Metro Clean'n'Press

East Metro Clean'n'Press is a large dry cleaning and shirt laundry facility located in West St. Paul, MN. Clean'n'Press used equipment modification and upgrades along with process heat exchange to lower their carbon footprint and reduce energy costs at their facility. The facility focused on heat recovery and energy efficiency. In order to recover heat, they installed heat exchangers in the condensate return lines of their boilers, they insulated all of their steam lines, they used the cooling coil to heat the neighbor tenant during winter months, and they replaced their boilers with higher efficiency boilers. In order to save energy, they replaced all bulbs in the facility with higher efficiency bulbs and they replaced neon signs with LED signs. Finally, they encourage customers to return the hangers to the facility so that they can be reused. Their total annual reductions include 126,000 hangers reused, 20,987 Therms of heat and 12,197 kWh of energy for a total cost savings of approximately \$15,341.

Sappi Cloquet, LLC

Sappi Fine Paper North America's Cloquet Mill is an integrated pulp and paper mill. The mill produces wood-free bleached kraft pulp and coated fine paper. Their goal for fiscal year 2007 was to reduce community odor. Through the process, the primary sources of odor were identified and addressed. Many of the sulfur containing emission sources also contained high concentrations of methanol. The methanol that was collected provided energy to the incinerator that was being used to treat the sulfur sources, which reduced the amount of natural gas needed for the incinerator. Finally, Sappi Cloquet, LLC has a long history of environmental leadership in the industry. Their total annual reductions include 42,000 MMBTUs, 2,400 tons of CO₂, and 6,270,000 pounds of methanol for a total cost savings of approximately \$3,250,000.

Government

City of Buffalo

There is no other wastewater treatment facility in the United States like the one in Buffalo, Minnesota. Along with the need to expand wastewater treatment capacity to serve a rapidly growing population, the City faced increasing resistance from nearby residents to the hauling and land application of biosolids. In addition, Buffalo recently implemented an Energy Conservation Program to reduce overall consumption within the community. The solution is a state-of-the-art system that virtually eliminates biosolids by converting them into a renewable energy source. An airtight, closed-loop biosolids drying process allows for the capture of heat to be reused in a continuous cycle. This heat energy replaces 80 percent of the natural gas that would otherwise be necessary for drying. In this respect, it is both an eco-friendly and extremely cost efficient system. The system is expected to generate \$5 million in fuel cost savings over the next 20 years.

Minnesota Department of Natural Resources

This application is regarding an ongoing initiative by the Department of Natural Resources (DNR), to implement and utilize renewable energy in facilities across the state for energy conservation, education, and to reduce the agency's carbon footprint. The following are projects that have been completed: Net-zero building at Camden State Park, photovoltaics at the McQuade Public Water Access, geothermal at Itasca State Park, a fleet of neighborhood electric vehicles, and the creation of a Legacy Grant Program with a solar energy component.

City of St. Anthony

The St. Anthony Water Reuse Facility collects filter backwash water, which is a waste byproduct of the City's water treatment process, and stormwater runoff in a half-million gallon reservoir located underground. This runoff contains several pollutants and elevated runoff volumes that are typically found in urban runoff. Water collected in the reservoir is recycled to irrigate a 20-acre site. This innovative project provides a multitude of

environmental benefits that substantially protect and improve the region's water resources. Prior to the project, pollutants and water volumes from the filter backwash water and stormwater runoff were discharged directly into Mirror Lake and the Mississippi River. Capturing and reusing these waste products eliminates the pollutants and excess volumes discharged to the downstream receiving waters. In addition, the project also reduces the need to use potable water for irrigation, which protects groundwater resources and reduces irrigation costs.

Partnership

Community Clean-Ups for Water Quality

Friends of the Minnesota Valley developed the Community Clean-Ups for Water Quality Program along with 12 partner organizations. The concept of the clean-ups program is that citizens can be shown how they can take action through clean-up efforts to reduce pollution in the Minnesota River and its watershed. The program educates them about how grass clippings, leaves and, sediment from rains and runoff, end up in city storm sewer systems and eventually into the Minnesota River. Community Clean-Ups are conducted in the critical time period from March 15-April 15, between the snow melt and heavy rains. The program has been incredibly successful since its inception seven years ago. The partnership has hosted 66 clean-ups, resulting in the removal of about 8,400 pounds of phosphorus (equal to 8.4 million pounds of harmful aquatic growth) and 47,000 pounds of trash from the Minnesota River and its watershed. The 12 partner organizations are as follows:

- The Coalition for a Clean Minnesota River (CCMR)
- Clean Up the River Environment
- Xcel Energy
- The McKnight Foundation
- Bloomington Noon Rotary Club
- Minnesota River Valley Audubon Chapter
- City of Arlington
- City of Le Sueur
- City of New Ulm
- Lockheed Martin
- The Freshwater Society
- Minnesota Pollution Control Agency

Pollution Prevention Fees

The Minnesota Toxic Pollution Prevention Act (TPPA) assesses fees on facilities required to report toxic chemical releases under the federal Emergency Planning and Community Right-to-Know Act (EPCRA). Fees are also assessed on large quantity generators of hazardous waste that are not required to report toxic chemical releases under EPCRA. Facilities reporting to the Toxic Release Inventory pay \$150 per chemical reported released and \$0.02 per pound of toxic chemicals reported as released and/or treated off-site, with a minimum fee based on quantity of releases and off-site transfers for treatment of \$500. Hazardous waste large quantity generators that do not report to EPCRA are assessed a \$500 fee per year.

Compliance with the pollution prevention fee has been excellent, with better than 99 percent of TRI reporters and 95 percent of large quantity generators paying their fees. Administrative burden has been very low, with approximately 0.05 FTE required to manage the fee program.

For fees due in 2008 and 2009, the total collected was \$1.29 million dollars each year. Fees due in 2008 were assessed to 528 facilities and 540 facilities for fees due in 2009. More than 94 percent of the revenues raised are collected from TRI reporters, with slightly less than six percent collected from large quantity generators. Over half of the revenues raised from TRI reporters comes from just ten of the approximately 380 facilities that were assessed the fees.

Pollution prevention fee revenues are used to fund Minnesota's pollution prevention programs, primarily in the form of assistance provided by the Minnesota Technical Assistance Program (MnTAP) and the Minnesota Retired Engineers Technical Assistance Program (RETAP), which are funded through annual grants from the MPCA that totaled \$1,915,000 in 2008-2009. The remainder goes into the Environmental Fund to fund other agency grant programs and pollution prevention program administration.

Proposed Change to Evaluation Report Schedule

In 1990, the Legislature passed the Minnesota Toxic Pollution Prevention Act (TPPA), which initially included an annual requirement to submit the Pollution Prevention Evaluation Report by December 15th of each year. This was amended in 1993 to a schedule where the report would be due February 1st of every even-numbered year. The reasoning behind this change was the need to allow more staff time for analysis and evaluation of the Toxic Release Inventory data that was provided at the time by the Emergency Response Commission as the December 15th annual deadline gave staff approximately two weeks to prepare the report.

The current reporting language reads as follows:

115D.10 TOXIC POLLUTION PREVENTION EVALUATION REPORT.

The commissioner, in cooperation with the commission, shall report to the Environment and Natural Resources Committees of the Senate and House of Representatives, the Finance Division of the Senate Committee on Environment and Natural Resources, and the House of Representatives Committee on Environment and Natural Resources Finance on progress being made in achieving the objectives of sections 115D.01 to 115D.12. The report must be submitted by February 1 of each even-numbered year.

Now that the TPPA has been in place for twenty years and the state's pollution prevention program has matured, staff believe that a more appropriate reporting schedule would be every four years. In addition to freeing up agency resources to devote more staff time to projects such as the Green Chemistry and Design Initiative that will prevent pollution, this reporting schedule would also better reflect the time and commitment that can be required to achieve pollution prevention results. For example, the intern program results provided for the Minnesota Technical Assistance Program in this report include follow-up from projects that took place as far back as 2004. Pollution prevention efforts that require material substitutions or product redesigns often require testing and evaluation that can easily take more than two years to complete. A four-year reporting cycle would allow for a greater focus on reporting outcome-based environmental results.

Materials Accounting

In 1993, the former Minnesota Office of Waste Management prepared a Toxic Chemical Use Report that discussed the idea of requiring manufacturers to report not only the quantities of toxic chemical wastes they generate but also the quantities of toxic chemicals that are used in their manufacturing processes, which is known as the materials accounting approach, or toxic chemical use reporting. The primary difference in this approach is that facilities would report the quantities of chemicals that end up in their products as well as what ends up being managed as waste. The report recommended not requiring toxic chemical use reporting, due partly to progress in pollution prevention that was being achieved as a result of the enactment of the Toxic Pollution Prevention Act at that time. As discussed previously, progress in reducing the generation of toxic chemical wastes has stalled in recent years, and re-examining the feasibility of this option may be warranted.

At the time of the Toxic Chemical Use Report's writing, the data collected by the Toxic Release Inventory had just expanded from releases to also include other forms of waste management, such as wastes recycled on- and off-site, wastes burned for energy recovery on- and off-site and wastes treated on- and off-site. Staff at the time felt that, while materials accounting would provide a more "complete" picture of what and how chemicals are used at a manufacturing facility, the additional data from the Toxic Release Inventory, along with other data sources such as air emission inventories, hazardous waste manifest records and hazardous materials storage (Tier II) data could be better utilized before requiring Minnesota manufacturers to comply with an additional reporting requirement for materials accounting.

Even today, the state has yet to incorporate these various data sources available for industrial facilities into a format that allows them to be fully utilized. Related concerns expressed during this current research effort were that should the collection of materials accounting data become a compliance requirement, how can it be ensured that this data will actually get utilized and who should collect it? Currently, Toxic Release Inventory and Tier II data are collected by the Emergency Planning and Community Right-to-Know program at Department of Public Safety, while air emissions inventory data is collected by MPCA and responsibilities for licensing hazardous waste generators are shared by MPCA and metropolitan county hazardous waste programs.

There are currently two states, Massachusetts and New Jersey, which have established a materials accounting approach with respect to the Toxic Release Inventory (TRI). MPCA staff studied reports from these states to learn how materials accounting data was being utilized. One distinction between the two state programs is that Massachusetts collects information about chemical use at the manufacturing process level while New Jersey collects information at the facility level without requiring it to be broken down to specific production processes. This gives Massachusetts an advantage of more detailed information to use in targeting technical assistance, but also increases the reporting burden on facilities required to comply.

Massachusetts primarily uses materials accounting data to assess pollution prevention progress and target technical assistance on chemicals used and wasted in greatest quantities. Materials accounting data is also used to demonstrate economic benefits of pollution prevention. Massachusetts is very proactive in sharing and making public the materials accounting data they collect, going so far as to hold media events to publicize their annual data release reports.

New Jersey uses materials accounting data to identify priorities for their agency programs by analyzing significant contributors to releases, variations over time, geographic patterns and other trends. Materials accounting data is also used to provide a better understanding of facility operations during permit reviews and compliance inspections. Additionally, New Jersey has started using risk screening to go beyond just looking at the quantities of chemicals used or generated as waste and also consider the "potency" or toxicity of each chemical. This is similar to what was presented in the 2000 Pollution Prevention Evaluation Report with our discussion on Priority Facilities.

Staff also examined TRI data reported during the 2003-2007 timeframe for these states and others that employ pollution prevention programs to compare trends in toxic chemical waste generation. As can be seen in the table below, there is a very wide range of results, with some states seeing significant declines in toxic chemical waste generation and others that saw lesser declines or even increases. While New Jersey was among those with significant declines, so were Illinois and Michigan, which have no materials accounting reporting requirements. Massachusetts showed a lesser decline, on par with states such as Indiana, Ohio and Wisconsin.

While Minnesota generation from 2004-2007 was relatively stable, Iowa showed a significant increase in toxic chemical waste generation.

Table 7: TRI Data Trends for Minnesota and Neighboring States compared to States Using Materials Accounting (MA)

Source: TRI.NET Data Engine (U.S. EPA)

Year	Minnesota	Massachusetts (uses MA)	New Jersey (uses MA)	Ohio	Illinois	Indiana	Iowa	Michigan	Wisconsin
2003	160.8*	86.5	337.2	1,149.5	2,109.1	1,074.9	202.4	634.9	311.3
2004	167.1*	89.0	301.8	1,091.0	2,057.8	1,101.9	214.4	604.5	326.5
2005	167.8	75.3	296.3	1,068.8	1,282.1	1,133.8	239.9	548.9	324.3
2006	175.1	65.6	294.1	1,080.9	1,340.2	1,040.5	239.5	547.5	330.9
2007	173.3	83.8	257.7	1,086.1	1,559.2	1,041.0	246.0	497.9	306.7
percent change	7.8%	-3.1%	-23.6%	-5.5%	-26.1%	-3.2%	21.5%	-21.6%	-1.5%

Note: Minnesota generation trends for 2003 and 2004 are estimated to account for reporting changes by Gopher Resources beginning in 2005.

In March 2009, New Jersey released their “Release and Pollution Prevention and Community Right to Know Annual Report for Reporting Years 2005 & 2006” which showed 25.3 billion pounds in toxic chemicals used for 2005 and 21.1 billion pounds for 2006. The primary reasons for the decline appear to be a reduction in the amount of chemicals manufactured that took place in 2006 (9.8 billion pounds compared to 13.9 billion pounds in 2005), corresponding with a reduction in the quantity shipped in products (16.7 billion pounds compared to 20.7 billion pounds in 2005). For waste generation, there were 274 million pounds in 2005 and 256 million pounds in 2006. The report notes that these changes may represent pollution prevention in practice, changes in market demand for products or some combination of these and other factors.

An earlier report issued by New Jersey in 2007, “Industrial Pollution Prevention in New Jersey: A Trends Analysis of Materials Accounting Data 1994 to 2004” discusses how toxic chemical reductions were primarily in non-product output (NPO) or waste, which was attributed to the nature of industry sectors in New Jersey such as petroleum refineries and metal fabrication, which have limited options for reducing toxic chemical use in the products they manufacture compared to other industry sectors. For the period of 1994 to 2004, toxic chemical use declined by only four percent, while waste decreased by 45 percent even with production levels increasing by 25 percent. It was noted that in 2004, toxic chemicals shipped in products accounted for over 77 percent of reported use.

In February 2009, Massachusetts issued their 2006 Toxics Use Reduction Information Release” report, which showed 1 billion pounds of toxic chemicals used in 2006, down from 1.1 billion in 2005. Waste generation declined from 94 million pounds in 2005 to 87 million pounds in 2006 and toxics shipped in or as products declined from 410 million pounds to 342 million pounds. While this report does not go into specific details regarding the causes for these reductions, a 2006 report, “The Effect of Providing On-Site Technical Assistance for Toxic Use Reduction” documents the differences in toxics use reduction outcomes among facilities that have taken advantage of site visits provided by Massachusetts’ Office of Technical Assistance (OTA) compared to those that haven’t, as well as comparing performance by facilities before and following their visits from OTA. The study showed that visited facilities reduced their use of toxic chemicals by nearly ten percent more after being visited as compared to before being visited. Visited companies had much greater reductions than both those not yet visited and those that would never be visited, in the year of the visit and the year following. More visited companies made progress in reducing toxic chemical use than companies in either non-visited group. More significantly, visited companies were able to “drop out” of the toxics use reporting requirement due to successful implementation of toxics use reduction, at a rate of 1.7 times greater than those not visited.

Given what has been seen for results from pollution prevention technical assistance efforts in Minnesota, including over 6 million pounds in avoided waste and \$4 million dollars in documented savings for 2008-2009, plus what was learned from the research done by Massachusetts into their technical assistance results, MPCA staff recommend that focusing on ways to increase support for Minnesota’s effective technical assistance partnerships, in particular, providing more site visits, is a more prudent investment of scarce state resources than starting up a new program to require toxic chemical use or materials accounting reporting at this time. However, should a federal requirement for materials accounting be proposed, Minnesota should support it, as

the additional information provided would improve our ability to target and deliver pollution prevention technical assistance.

In addition to the demonstrated results shown by pollution prevention technical assistance activities, a survey of Minnesota businesses conducted by MnTAP and the Office of Measurement Services at the University of Minnesota in early 2009 showed that on-site assistance in identifying manufacturing process improvements and on-site help with comparing technology options are among the preferred technical assistance methods selected by the 450 survey respondents.