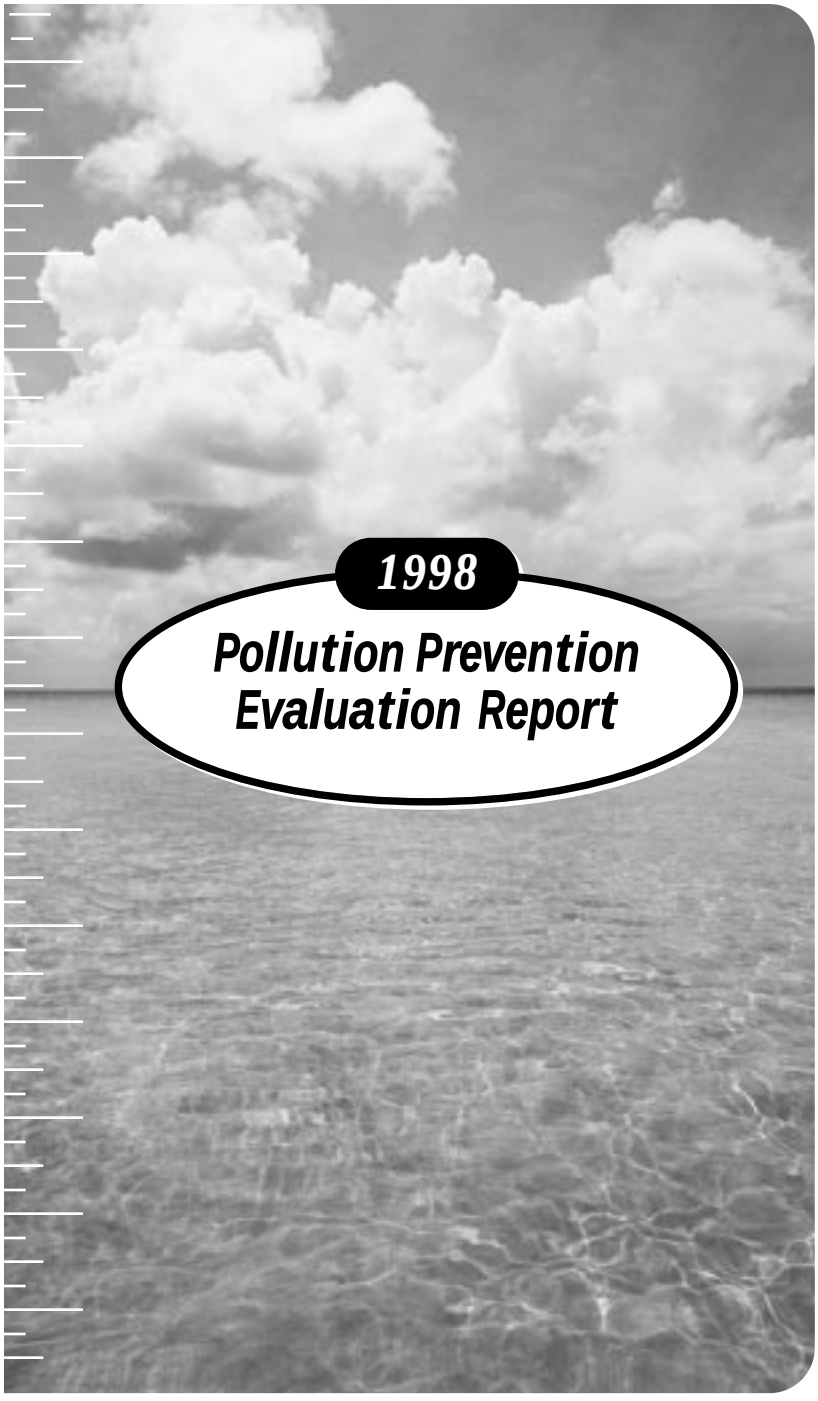

1998 Pollution Prevention Evaluation Report

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Executive Summary

The Toxic Pollution Prevention Act was established in 1990 and defines pollution prevention as "eliminating or reducing at the source the use, generation, or release of toxic pollutants, hazardous substances and hazardous wastes." Methods of preventing pollution 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.

The Office of Environmental Assistance (OEA) submits a report on the state's progress in meeting the objectives of the Act to the Minnesota Legislature by February 1 of each even-numbered year. This fourth *Pollution Prevention Evaluation Report* emphasizes progress and changes that have taken place since the last report was submitted in 1996.

Manufacturing industries are typically the major users, generators and releasers of toxic pollutants. These industries, along with certain non-manufacturing companies, are required to file annual Toxic Release Inventory (TRI) reports if they use certain chemicals in amounts above specified thresholds. These TRI reports are required under state and federal statutes, and are filed with the Minnesota Emergency Response Commission (ERC).

In Minnesota, companies who file TRI reports also prepare pollution prevention plans and annual progress reports, which list the company's reduction objectives, methods of and progress toward achieving those objectives, and barriers to reduction on a chemical by chemical basis. Companies submit their progress reports to the ERC, which provides copies to the OEA and to the Minnesota Technical Assistance Program (MnTAP). The TRI and Progress Reports are explained in more detail in Chapter One.

Expanded analysis

This year, the OEA undertook several new methods of evaluating the data provided by companies in their TRI and progress reports. Past analysis has focused solely on an aggregate level, detailing statewide trends in managing and releasing chemicals, and in preventing pollution. In this report, the OEA expands its analysis to provide a more in-depth understanding of the facilities who manage and release the largest quantities of chemicals. These facility profiles are contained in Chapter Two.

The purpose of analyzing these core facilities is to gain some understanding of the processes that generate toxic chemicals, the best means of reducing or eliminating those chemicals, and barriers to reduction. Based on this analysis, the OEA has identified a number of changes, both to statute and to its own assistance programs, which could increase the state's effectiveness in preventing toxic pollution.

Adjusting for production

This report also incorporates the use of production indicators as a means of determining how changes in production correspond to the amount of chemical waste generated in the state. One way to measure progress in preventing pollution is to measure changes in the amount of waste produced per product. Since the state does not have access to data on the quantities of

products produced by reporting facilities, OEA staff use several factors to approximate changes in production levels. These production-adjusted indicators are explained and utilized throughout Chapter Two.

The production-adjusted indicators show that eight out of fifteen of the facilities that managed the largest quantities of chemicals in 1996 made progress in preventing pollution in their facility as a whole; and that all 15 made progress in reducing some of their reported chemicals. For Standard Industrial Classification codes (SIC codes), production-adjusted indicators show that 14 of 20 industry sectors made clear progress in P2 and that four of the remaining six made some progress.

Adjusting for changes in production is important in terms of assessing whether a facility is reducing the waste it generates per product. However, the environment, wildlife and human health are affected by the aggregate amount of pollution generated.

Findings: Chemical releases

The number of facilities required to file a TRI report continues to decline. This decline is primarily due to two factors. Beginning with the 1995 reporting year, facilities that report less than 500 pounds of a chemical, and use less than one million pounds of that chemical can file a two-page alternate threshold certification instead of a TRI report. In 1996, 61 facilities filed certifications instead of TRI reports. The decline in reporting facilities also may indicate progress in preventing pollution, as some facilities lower the amount of TRI-listed chemicals they use and manage to levels below the reporting threshold.

In 1996, 418 reporting facilities in Minnesota released 22 million pounds of waste chemicals into the state's air, water and soil. This is a 10-percent decrease from 1995, when 454 reporting facilities released about 24.5 million pounds of waste chemicals to the environment.

In 1996, 47.7 percent of TRI-reporting facilities reduced their chemical releases from 1995 levels. Sixty-six facilities reduced releases by more than 10,000 pounds; ten of those facilities reduced releases by more than 100,000 pounds. A table of the facilities that achieved the greatest reductions in absolute quantities of chemicals released is found on page 62.

In the same year, about 36 percent of TRI-reporting facilities increased their chemical releases from 1995 levels. Thirty-nine facilities increased releases by at least 10,000 pounds; only one facility increased its releases by more than 100,000 pounds. That facility started production in the middle of 1995, so 1996 was its first full reporting year. A table of the facilities reporting the largest increases in absolute pounds of chemicals released is also found on page 63. The remainder of the facilities reported no change in quantities released.

Each year, the same 15 facilities are responsible for about 50 percent of the TRI-reported chemical releases in the state. The remaining 50 percent of total chemical releases come from many diffuse sources emitting smaller quantities of chemicals.

Findings: Chemical management

Beginning in 1991, the U.S. Environmental Protection Agency (EPA) expanded TRI reporting requirements to cover the quantity of chemicals a facility manages, in addition to releases, each year. The amount "managed" includes the listed chemicals that a facility recycles, treats, or burns for energy recovery, both on and off-site, as well as releases to the environment.

The amount of waste chemicals managed in the state increased from 1991 to 1996, as companies shifted from releasing large quantities of chemicals to capturing those chemicals and recycling, treating or burning them. Recycling makes up about 69 percent of chemical management by TRI-reporting facilities (See graph on page 19).

In 1996, 418 TRI-reporting facilities managed a little over 242 million pounds of waste chemicals. This amount represents a nine percent decrease from the total amount of chemicals managed in 1995, when 454 reporting facilities managed almost 267 million pounds of chemicals.

In 1996, 58 percent of TRI-reporting facilities reduced the quantities of chemicals they manage. One hundred fourteen companies reduced chemicals managed by more than 10,000 pounds; twenty-four reduced chemicals managed by more than 100,000 pounds; and five reduced chemicals managed by more than one million pounds. A table showing the companies that achieved the greatest reductions in absolute quantities of chemicals managed is found on page 21.

In the same year, 38 percent of TRI-reporting facilities increased the quantities of chemicals they manage. Sixty-two companies increased chemicals managed by more than 10,000 pounds; sixteen increased chemicals managed by more than 100,000 pounds; and three increased chemicals managed by more than one million pounds. A table showing the companies reporting the largest increases in chemicals managed is found on page 21. The remainder of the facilities reported no change in chemicals managed.

Focus on chemicals managed

Preventing toxic pollution at its source means reducing the amount of chemicals a facility uses or generates, whether those chemicals are managed as waste, released to the environment or put into products. A reduction in the overall amount of chemicals a facility manages is a better indicator of progress in preventing pollution than a reduction in the amount of chemicals released. A reduction in releases could indicate that the facility is still generating the same quantity of waste chemicals, but is managing them through means other than release to the environment.

Industry, government and communities are concerned with overall chemical management for a number of reasons. First, generating large quantities of chemical wastes could indicate inefficient production processes and inefficient resource use. Several of the largest-quantity chemical managers in the state are taking steps to simultaneously increase their efficiency and reduce their chemical wastes.

- **3M** has adopted a goal to cut the waste generated, as a percent of the product produced, by 50 percent by the year 2000. Teams of process engineers and chemists will be examining all inputs to 3M's processes, and determining ways to produce more product using less materials, or identifying uses for by-products of a process.

- The **Ford Motor Company's Twin Cities Assembly Plant** is increasing efficiency and reducing waste chemicals through innovative agreements with its suppliers. The plant pays its suppliers of solvents and other chemicals based on the number of trucks Ford paints rather than the volume of chemicals it purchases. Ford's vendors have an incentive to help the assembly plant paint as many trucks as possible using the least possible quantities of solvents.

Managing toxic chemicals also means a company incurs increased handling, treatment, disposal and liability costs. Some facilities are trying to eliminate their management of TRI chemicals because of these costs. For instance,

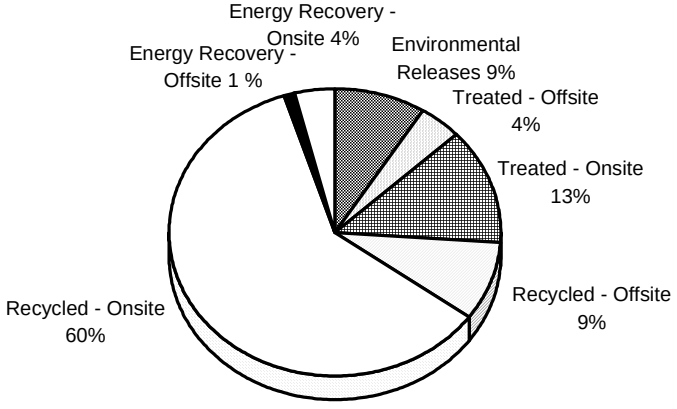
in 1997, Champion International paper mill eliminated its use of two TRI chemicals by finding substitutes or changing production processes. Champion believes the long-term gains of making the changes will outweigh the short-term costs.

Perhaps the most important reason to reduce the amount of chemicals industry manages is the risk of workplace or community exposure and fugitive releases. Recent news articles have raised the question of how exposure to TRI-listed chemicals such as methyl bromide and benzene contributed to human illnesses and deaths in Minnesota.

Recommendations

The TPPA currently requires facilities to plan to reduce their chemical releases. The OEA proposes to expand the focus of pollution prevention planning and progress reports, under Minn. Stat. §§ 115D.07 and 115D.08, from chemical releases to chemical releases and chemicals managed through treatment or burning for energy recovery. Facilities already report on the quantities of chemicals managed through these methods on the TRI Form R, and would use this data in their plans and progress reports.

CHEMICAL MANAGEMENT AS REPORTED FOR 1996



Source: 1996 TRI data

This change would require a reporting facility to focus its progress report objectives on reducing the quantities of chemicals released, treated or burned for energy recovery. With this limited expansion to the plans and progress reports, the OEA continues to encourage facilities to recycle chemicals that cannot be reduced or eliminated. Recycling is not pollution prevention, but is an environmentally preferable means of managing waste chemicals. The OEA already has staff who could review the expanded progress reports; this proposal would not require hiring any new OEA staff.

- The ERC and the OEA will refine the progress reports to further eliminate duplication of the federal data reporting required under Sections 8.1-8.7 of the TRI Form R. In Section 8, facilities report the quantities of each chemical managed for the previous year and the current reporting year, and quantities anticipated for the two years following the reporting year.

The state will work with reporting facilities to determine whether these future year projections, as reported in Section 8, can be used as a facility's numeric reduction objectives for each chemical, rather than asking facilities to state numeric reduction objectives separately in their progress reports. The OEA will analyze whether facilities are reporting the same numbers as both their future year projections and their numeric objectives. This analysis will help the OEA and its partners to determine whether it makes sense to simply use one set of numbers for both purposes.

- Current pollution prevention incentives encourage facilities to reduce chemical releases, but do not encourage facilities to reduce the overall quantities of chemicals managed. In the next year, the OEA will work with the ERC, manufacturers and environmental advocates to evaluate the state's positive and negative incentives for preventing pollution and analyze the impacts of making changes to those incentives.

As discussed on previous pages, businesses incur a number of costs when they generate chemical wastes. These costs can motivate companies to reduce those wastes. Other costs and requirements levied by the state provide further incentives for reduction. Existing incentives include the Governor's Awards, grants, the pollution prevention fee and the "Minnesota 50" challenge program. Potential incentives may include tax credits or loan programs for capital investments that prevent pollution, or a new challenge program that would offer a reduced fee schedule for companies that attain substantial reductions in releases. The OEA will examine existing and potential incentives to identify possible opportunities to further promote pollution prevention.

- The same group of 15 companies is responsible each year for managing about 70 percent of the TRI-listed chemicals in the state. The OEA will work with these 15 companies to determine effective methods of making further progress in reducing the amount of chemicals that are managed and released in the state.

The OEA and company managers have already begun to identify possible topics for discussion. With its industry partners, the OEA also will establish forums for sharing information on these topics, which may include:

- "Best management practices" in the state and across the country.
- Corporate motivations for reducing the amount of waste chemicals generated.
- The true cost of waste.
- Working with suppliers to reduce waste and toxicity.
- Better means of assessing production's impact on waste generation.
- Models for incorporating Design for Environment into the production process.

A broader approach to evaluating progress

The TRI reports and the Pollution Prevention Progress Reports are valuable sources of information on the quantities of chemicals managed and released in Minnesota, and on successful reduction methods. However, there are limits to the information gained through the TRI and Progress Reports.

The data is self-reported by a select group of companies reporting on a select group of chemicals. About 600 of the more than 70,000 chemicals in use in the United States are on the TRI list; fewer than 200 of those 600 chemicals are used above threshold amounts in Minnesota. Many companies are reducing waste and preventing pollution in ways that are not captured by TRI and progress reporting, either because they are reducing chemicals or wastes not on the TRI list, or because they use TRI chemicals in quantities below the reporting threshold. Below are two examples:

- **U.S. Filter** offers its customers a system that removes metals from contaminated water so that the water can be reused in a company's production processes. Businesses such as metal finishing and metal plating companies traditionally use water for rinsing, then treat it and dump it into the sewer. With U.S. Filter's closed-loop system, businesses save money and significantly decrease the burden on their community's wastewater treatment system. The MPCA is working with U.S. Filter to ease regulatory restrictions that apply to the water recycling process.

- **The Southern Minnesota Sugarbeet Cooperative** uses lime to facilitate a reaction that produces sugar from beets, and rids the sugar of impurities. The Cooperative was generating large amounts of lime waste that were sitting in piles on the property. MnTAP assisted the company in researching the optimal amount of lime for the process. As a result, the Cooperative is modifying its recipe to use less lime, generating less waste. Lime is not a TRI chemical, so this example of pollution prevention is not captured through TRI reporting.

Through their technical and financial assistance, the OEA and MnTAP encourage industry to take a more comprehensive approach to pollution prevention. The OEA's grant programs and the Governor's Awards for Pollution Prevention provide resources and recognition to companies who undertake reduction efforts that encompass both TRI chemicals and other pollutants. Chapter Three provides summaries of grant recipients and award winners over the last two years.

Likewise, MnTAP's assistance programs, workshops and intern projects incorporate a broad perspective on pollution prevention. MnTAP targets its assistance to smaller and mid-size companies, selected on the basis of their production processes or use of particular chemicals.

In recent years, MnTAP has worked with dry cleaners, printers, and metal and wood finishers. In 1998, MnTAP will work with businesses to improve paint stripping and adhesive processes, and with companies that discharge waste to Publicly Owned Treatment Works (POTWs). MnTAP's programs are described in Chapter Four. The tables in that section provide brief descriptions of projects that helped companies to reduce chemical waste and conserve resources.

The MPCA is taking steps to incorporate pollution prevention into its programs through staff training, revised permitting procedures and Project XL.

- The MPCA worked with MnTAP to develop training modules that help MPCA staff identify pollution prevention opportunities at regulated facilities.

- The MPCA is meeting with the Environmental Quality Board to revise the state's environmental assessment worksheet to include questions on pollution prevention.

- The MPCA is working with industries and local governments through Project XL to provide regulatory flexibility in exchange for reducing emissions or discharges below permitted levels.

These changes and projects are discussed in the chapter on "Pollution Prevention Within Government."

Progress in preventing non-TRI reported toxic pollution

While manufacturing industries bear much of the responsibility for generating toxic pollution, and also deserve much of the credit for reducing pollution, these industries are not the only users and generators of chemicals. Various chapters of this report discuss the roles played by the suppliers of raw materials, small businesses, government, public institutions and citizens in both generating and preventing pollution.

Pollutants that a facility emits from a stack or discharges through a pipe are easier to measure, and thus easier to capture and reduce, than the pollutants that individuals, small businesses and farmers put down their drains, apply to their yards or fields and emit from their vehicles.

Despite being widely dispersed and more difficult to measure or contain, such pollution poses a threat to the state's water, atmosphere and soil.

In the last year, OEA staff have helped target sources of non-industrial toxic pollution for reduction. Several of these projects are highlighted below.

- The OEA provided a grant to the **City of St. Paul and the Neighborhood Energy Consortium** to test the performance of non-toxic cleaning products in the City Hall Annex. As a result of the four-month project, the City approved a supplier of non-toxic cleaning products to be added to its vendor list. Schools and other government offices are now exploring the use of these products in their buildings.

- The OEA worked with the **Department of Administration** to develop criteria to evaluate the environmental attributes of cleaning products used in state offices. In the upcoming year, the Dept. of Administration will issue a new state contract that incorporates environmental and performance criteria in its product list.

- The OEA provided a grant to the **Institute for Agricultural and Trade Policy**, which is developing a pesticide "yardstick" tool to help Minnesota farmers assess the adverse environmental and financial impacts of their pesticide use, and guide them in reducing pesticide use.

These projects are further explained in Chapter Five. In addition, the OEA's sustainable communities team works with citizens to comprehensively address environmental, social and economic issues that affect their quality of life. These community assistance programs are described in Chapter Four.

Future directions

Preventing pollution means eliminating chemicals at the source, before they are used or generated at all. This approach necessitates a commitment not only to change production processes but also to change the products themselves. Such an encompassing view requires greater responsibility on the part of everyone involved in producing, selling, purchasing, consuming and disposing of a product.

The Toxic Pollution Prevention Act does not address the toxic materials that are contained in products, which can be sources of pollution during product use and disposal stages. In the last year, the state and its partners in both the private and public sectors have identified toxics in products as an area of concern and an obstacle to further progress in preventing pollution.

The OEA, with MnTAP and the MPCA, is pursuing policies and projects that build on Minnesota's previous experience and leadership in eliminating toxic materials from products, and thus from the environment. The state's successful and cooperative efforts to reduce mercury in the environment by eliminating its use in certain products provides an excellent example of this approach.

The OEA and its partners in both the public and private sectors are undertaking several projects that employ a similar comprehensive and cooperative approach to reducing pollution at every stage of a product's life cycle. These projects are all in an early stage, but help define an emerging direction for the state.

- The OEA and MnTAP are working with several companies who are testing a "Design for Environment" tool-kit developed by MnTAP staff to help businesses assess and improve their design and production processes.

- The OEA is involved in discussions with local governments, electronics manufacturers, and retailers to develop a pilot project that would enable consumers to return used computers for recycling.

- The OEA will be convening a series of panel discussions with the intent of finding ways to implement product stewardship programs for priority products. Priorities will be based on toxic or hazardous components of those products.

Chapter 1: Minnesota's Toxic Pollution Prevention Act

The Toxic Pollution Prevention Act (TPPA) requires the Minnesota Office of Environmental Assistance (OEA) to report to the Minnesota Legislature on progress toward meeting the objectives of the Act by February 1 of each even-numbered year. The report is to be prepared in cooperation with the Minnesota Pollution Control Agency (MPCA) and the Emergency Response Commission (ERC).

This report describes and evaluates Minnesota's progress in preventing pollution during 1996 and 1997 and suggests ways to enhance the effectiveness of pollution prevention policies and programs.

Legislative context

The Minnesota Toxic Pollution Prevention Act (Minn. Stat., Chapter 115D) was signed into law on May 3, 1990. This law established a new emphasis in environmental policy: preventing pollution at the source in ways that minimize the transfer of pollutants from one environmental medium to another (e.g., from water to air).

The law states the Legislature's intention that the programs developed under this act encourage a greater awareness of the need for pollution prevention and of its benefits. Further, it states that these programs shall "lead to a greater degree of cooperation and coordination among all elements of government, industry and the public in encouraging and carrying out pollution prevention activities."

To achieve these goals, the Toxic Pollution Prevention Act:

- Established a pollution prevention assistance program.
- Created a matching grant program to study or demonstrate innovative pollution prevention methods and technologies.
- Authorized the OEA to administer the Governor's Awards for Excellence in Pollution Prevention.

The TPPA also requires facilities reporting releases of Toxic Chemical Release Inventory (TRI) chemicals under the federal Emergency Planning and Community Right-to-Know Act to develop pollution prevention plans and to submit annual progress reports to the ERC. Copies of the progress reports go to the OEA and MnTAP. Minnesota law expanded these requirements to additional facilities in 1993.

The TPPA assesses pollution prevention fees on facilities reporting TRI chemical releases and on large-quantity generators of hazardous waste. The fees raise revenue to fund pollution prevention programs.

Defining pollution prevention

The TPPA defines pollution prevention as "eliminating or reducing at the source the use, generation, or release of toxic pollutants, hazardous substances, and hazardous wastes." The key phrase in this definition is "at the source," meaning that a waste or emission is not generated in the first place.

Pollution prevention approaches range from simple methods and techniques to advanced technologies. Simple preventive applications may include such activities as covering exposed containers of volatile chemicals or tightening loose and leaking pipe connections. Other low-technology options include personnel training, good housekeeping, improved business operations and inventory control practices.

High-technology pollution prevention applications include redesigning manufacturing processes, substituting raw materials (e.g., switching from hazardous solvents to water-based solvents), increasing the efficiency of production, or redesigning and reformulating products.

Pollution prevention is an environmental protection method that is fundamentally different from approaches that focus on managing or controlling pollution after it has been generated. Pollution prevention occurs before the creation of a waste or a pollutant, and thus before the implementation of waste management alternatives such as pollution control, treatment, recycling or disposal.

Pollution prevention does not include end-of-pipe treatment, waste management, disposal, recycling, or energy recovery. These methods for managing wastes may protect the environment and result in other benefits, but do not prevent the creation of a waste in the first place.

Benefits of pollution prevention

The most obvious benefit of pollution prevention is that it can lead to a cleaner environment and lower health risk for Minnesota's population. Pollution prevention can, however, yield benefits that go beyond the goal of safeguarding the environment.

Implementing pollution prevention measures can strengthen companies economically, improving their profitability, competitiveness and ability to sustain and generate jobs in Minnesota's economy. For many companies, pollution prevention is an integral part of continuous quality improvement efforts and cost-containment programs. Generating waste or releasing pollution may mean that a company is using costly chemicals or other raw materials inefficiently.

Potential benefits of pollution prevention include:

- Reduced waste treatment and disposal costs, since less waste is generated.
- Decreased liability costs resulting from waste disposal (e.g., Superfund).
- Lower raw material and energy costs, since chemicals may be used more efficiently.
- Higher quality products or services resulting in increased customer satisfaction.
- Potential competitive marketing advantage by offering "green" products and services.
- Compliance with environmental laws and regulations.
- Avoidance of costs associated with pollution control and waste treatment equipment.
- Lower environmental fees, especially based on the quantity of wastes generated.
- Avoidance or minimization of worker and community exposure to chemicals.
- Reduction of chemicals entering the solid waste stream.
- Reduced reliance on pollution control devices and lowered resultant releases of pollutants if control equipment fails.
- Lower exposure of companies to future environmental regulations.
- Community relations benefits.
- Greater employee pride in companies receiving recognition as environmental success stories.

Pollution prevention leads to benefits for many constituencies: companies, workers, citizens and the environment. Pollution prevention offers a "win-win" strategy through which Minnesota can succeed in addressing its environmental challenges. Economic and competitive benefits of pollution prevention give it an important role in helping move Minnesota towards a more sustainable future.

Toxic Release Inventory reporting requirements

The TPPA applies to all facilities currently filing Toxic Release Inventory Reporting Form R (TRI) required under Title III, Section 313 of the federal Superfund Amendments and Reauthorization Act (SARA), enacted in 1986. SARA Title III, Section 313, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), mandates TRI reporting.

Facilities that meet all of the following criteria established under EPCRA and the expanded Pollution Prevention Act of 1990 are required to submit TRI Form R:

- Facilities in Standard Industrial Classification (SIC) codes 20 through 39 are required to report under federal law. As of 1993, Minnesota law requires additional SIC codes to submit reports. (The complete set of SIC codes is shown in Table 1.)
- Facilities with ten or more full-time employees.
- Facilities that manufacture or process more than 25,000 pounds or use more than 10,000 pounds of any listed chemicals during a calendar year.

Facilities meeting the above criteria report on their management and releases of about 600 chemicals of the more than 70,000 chemicals registered for use in the United States. The quantities of chemicals managed are reported in Section 8 of the TRI Form R, and include the listed chemicals a facility recycles, treats or burns for energy recovery, as well as releases to the environment.

Beginning with the 1995 reporting year, facilities who report less than 500 pounds of a chemical, and use less than one million pounds of that chemical, can file a two-page alternate threshold certification instead of a TRI Form R.

TRI reporters in Minnesota are required to prepare and maintain pollution prevention plans. Plans are to be updated every two years. Plans are not required to be submitted to a governmental agency and remain non-public documents at the facility. The Pollution Prevention Progress Report (P2PR) is a

Table 1: Standard Industrial Classification (SIC) Code Descriptions

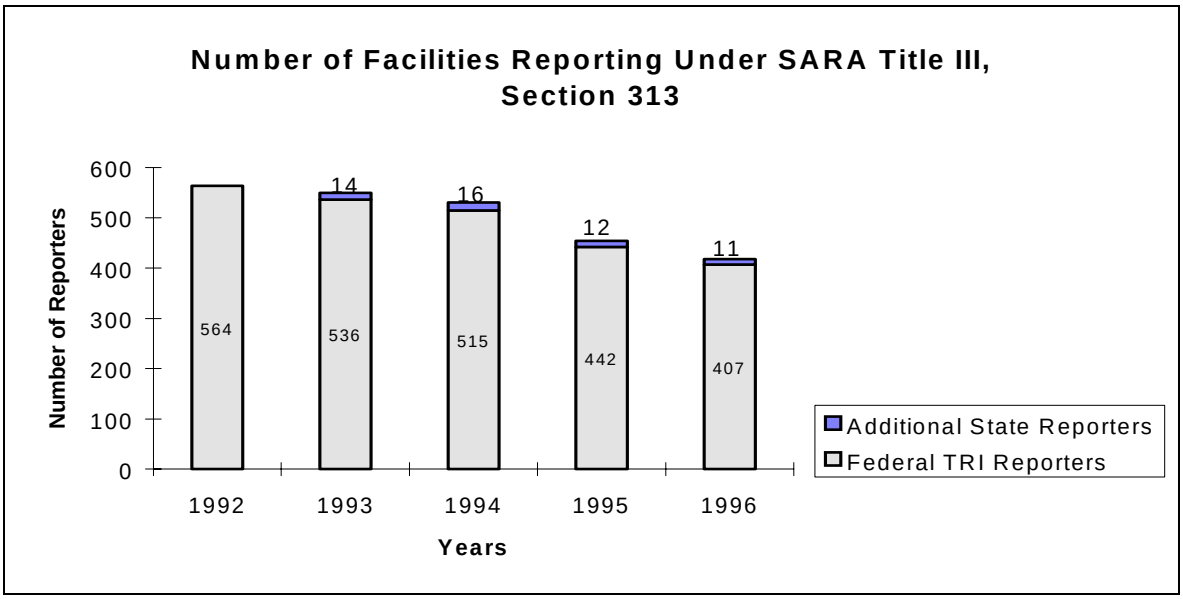
SIC Code	Description
10	Metal Mining
20	Food & Kindred Products
21	Tobacco Products
22	Textile Mill Products
23	Apparel & Other Textile Products
24	Lumber & Wood Products
25	Furniture & Fixtures
26	Paper & Allied Products
27	Printing & Publishing
28	Chemicals and Allied Products
29	Petroleum & Coal Products
30	Rubber & Misc. Plastic Products
31	Leather & Leather Products
32	Stone, Clay, & Glass Products
33	Primary Metal Industries
34	Fabricated Metal Products
35	Industrial Machinery & Equipment
36	Electronic & Other Electric Equipment
37	Transportation Equipment
38	Instruments & Related Products
39	Misc. Manufacturing Industries
40	Rail Transport
45	Air Transport
49	Utilities
806	Hospitals
807	Medical & Dental Laboratories
822	Colleges & Universities
8734	Testing Laboratories
5161	Wholesale Trade, Non-durable Goods; Chemicals & allied products not elsewhere classified
5162	Wholesale Trade, Non-durable Goods; Plastics materials & basic shapes
5169	Wholesale Trade, Non-durable Goods; Chemicals & allied products not elsewhere classified
7384	Photofinishing Laboratories
7389	Business Services; Solvent Recovery
9223	Correctional Institutions

summary of this document. Progress reports are submitted to the ERC and are available for public review. The OEA uses data supplied from Section 8 of the TRI Form R, as well as data from facilities' progress reports, to assess progress in pollution prevention. (See Appendices A and B.)

Number of facilities reporting

In 1996, 418 facilities filed TRI reports in Minnesota. Reporting facilities account for approximately one third of the total number of employees within the reporting SIC codes.

The number of facilities who are required to file a TRI report continues to decline. This decline is partly due to changes in reporting criteria, but also may indicate progress in preventing pollution, as facilities lower the amount of TRI-listed chemicals they use and manage below threshold reporting levels. In 1996, 61 facilities filed alternate certifications instead of TRI reports.



Source: 1996 TRI, Section 8

Pollution prevention planning

Pollution prevention planning is a critical element of the TPPA. The development of a pollution prevention plan is an opportunity for facility managers and employees to examine processes that use, generate or release Toxic Release Inventory (TRI) chemicals and to evaluate pollution prevention options. This evaluation is a significant step toward realizing the full potential for pollution prevention.

The planning process is an excellent method of increasing awareness of the benefits of pollution prevention: saving money, improving efficiency, increasing safety and protecting the environment.

An increased awareness of the benefits leads to greater commitment to pollution prevention. The planning process offers an opportunity to become more familiar with the full spectrum of methods and techniques that can be implemented to prevent pollution.

Overview of planning requirements

TRI reporters in Minnesota are required to prepare and maintain pollution prevention plans. Plans are to be updated every two years. Plans are not required to be submitted to a governmental agency and remain non-public documents at the facility.

Contents of the plan

Plans must establish a pollution prevention program identifying specific technically and economically feasible steps that could be taken for the following three years.

Plans must include the following elements:

- A policy statement articulating upper management support for pollution prevention.
- A description of processes that generate or release TRI chemicals and a description of the types, sources and quantities of TRI chemicals that are managed or released.
- A description of current and past pollution prevention activities and an evaluation of the effectiveness of these activities.
- An assessment of technical and economical feasibility of pollution prevention options.
- A statement of pollution prevention objectives and a schedule for achieving these objectives.
- An explanation of the rationale for each objective.
- A listing of options considered not economically and technically feasible.
- A certification signed and dated by the facility manager and an officer of the company.

Pollution prevention progress reporting

Progress reports are an important component of the TPPA. Plans are not public documents, but progress reports are. These progress reports provide a way for citizens, business and government to assess industries' progress in pollution prevention.

The process of preparing progress reports provides an opportunity for facilities to evaluate the implementation of pollution prevention plans and to identify areas where new efforts or more assistance is needed. Finally, progress reports are a tool for identifying technical assistance needs.

Overview of progress reporting requirements

Facilities that prepare pollution prevention plans are required to submit annual progress reports to the ERC by July 1. The first reports were due in 1992. The ERC reviews the progress reports for completeness and forwards them to the OEA, MPCA and MnTAP for further review.

The progress reports must include:

- A summary of each objective established in the facility's pollution prevention plan, including the schedule for meeting the objective.
- A summary of progress made during the past year toward meeting the objectives established in the pollution prevention plan.
- A statement of methods through which elimination or reduction has been achieved.
- If necessary, an explanation of the reasons that objectives were not achieved, including impediments the facility faced.
- A certification, signed and dated by the facility manager and an officer of the company, attesting that a complete pollution prevention plan has been prepared and attesting to the accuracy of the information in the progress report.

Requiring certification by the facility manager and a corporate officer indicates that an objective of the TPPA is that pollution prevention be given a high priority by senior management at reporting facilities.

1996 Progress report findings

For 1996, 378 of the 418 TRI-reporting facilities also filed progress reports. The difference in number is largely due to different reporting thresholds for the federal TRI reporting requirements and the state's progress report requirements. Companies who file TRI reports based on their chemical use, but do not release those chemicals to the environment do not have to develop a pollution prevention plan or submit a progress report. Companies which file alternate threshold certifications also do not file progress reports. For 1996, only one facility that was required to file a progress report failed to comply.

Of the 378 facilities filing progress reports for 1996, 51 percent contained numeric reduction objectives, while the other 49 percent contained non-numeric objectives. Of the 378 facilities, 203 (54 percent) reported meeting at least one reduction objective for one chemical, while 145 (38 percent) reported meeting all their reduction objectives for all their reported chemicals.

One hundred forty six facilities (39 percent) filing progress reports reported meeting none of their reduction objectives. The remaining 29 facilities (eight percent) did not set any objectives for any chemical in their progress reports.

Pollution prevention fees

The TPPA (Minn. Stat. § 115D.12) requires the OEA to collect pollution prevention fees by January 1 of each year. The revenue raised is allocated to pollution prevention programs established in the TPPA.

Facilities subject to fee

Two categories of facilities are required to pay the pollution prevention fee:

- Facilities required by the federal Emergency Planning and Community Right-to-Know Act (EPCRA) or the state Hazardous Chemical, Emergency Planning and Response Act (Minn. Stat. Chapter 299K) to report releases of toxic chemicals through the Toxic Chemical Release Inventory (TRI).
- Facilities that generate more than 1,000 kilograms of hazardous waste per month (large-quantity hazardous waste generators).

Amount of fee

The pollution prevention fee for TRI reporters has two parts: a flat fee per chemical released and a fee based on the total pounds of toxic chemicals released from the facility. Calculations are based on toxic chemical releases that are reported through the TRI.

All facilities required to report through the TRI must pay $150 per chemical released. In addition:

- Facilities that release less than 25,000 pounds are assessed a fee of $500.
- Facilities that release more than 25,000 pounds are assessed a fee of two cents per pound of toxic chemicals released.

Large-quantity generators of hazardous waste that do not report releases through the TRI are assessed $500 per year.

Fees collected

Approximately $1.1 million was raised from pollution prevention fees each year from 1993 through 1995. Approximately $1 million was collected in 1996 and in 1997. More than 90 percent of the funds raised are collected from

TRI reporters, less than 10 percent from other hazardous waste generators.

The TPPA and the Hazardous Chemical, Emergency Planning and Response Act (Minn. Stat. Chapter 299K) were amended in 1993 to add more facilities from non-manufacturing sectors to those already required to report on toxic chemical releases, prepare pollution prevention plans and report on progress. These facilities first paid pollution prevention fees in January 1995.

The OEA and the Minnesota Emergency Response Commission (ERC) have cooperated to consolidate billing for the TRI portion of the pollution prevention fees since 1994. This portion of the fee is collected by the ERC along with the hazardous materials incident response fees which the ERC collects from some of the same companies. The ERC's consolidated billing of pollution prevention fees has allowed facilities required to pay both fees to receive only one statement and pay with one check. The OEA continues to collect fees from other large-quantity hazardous waste generators.

In addition to streamlined administration for the state and convenience for fee payers, this consolidated billing effort for TRI-based fees promotes pollution prevention because companies can see the financial impact of all fees based on their TRI releases and off-site transfers. As a result, facilities may be motivated to reduce releases and transfers to lower their fees.

Evaluation

The fee program has maintained excellent compliance with the fee requirement, with nearly all of the facilities subject to the requirement paying the fee. Administrative costs are low, with approximately one-tenth full-time staff equivalent required to manage the program.

From 1990 to 1996, the number of facilities required to report releases and transfers of TRI chemicals has decreased from 587 to 418. In addition, the quantities of chemicals released to the environment has generally been decreasing. As fewer facilities are required to report and the quantities of chemicals released continue to decrease, the amount of revenue generated also is decreasing. Due to decreasing fee revenue, the OEA cut $100,000 in pollution prevention programs from its 1997 budget.

Recommendations for changes to P2 planning, progress reports and fees

- The TPPA currently requires facilities to plan to reduce their chemical releases. The OEA proposes to expand the focus of pollution prevention planning and progress reports, under Minn. Stat. §§ 115D.07 and 115D.08, from chemical releases to chemical releases and chemicals managed through treatment or burning for energy recovery. Facilities already report on the quantities of chemicals managed through these methods on the TRI Form R, and would use this data in their plans and progress reports.

  This change would require a reporting facility to focus its progress report objectives on reducing the quantities of chemicals released, treated or burned for energy recovery. With this limited expansion to the plans and progress reports, the OEA continues to encourage facilities to recycle chemicals that cannot be reduced or eliminated. Recycling is not pollution prevention, but is an environmentally preferable means of managing waste chemicals. The OEA already has staff who could review the expanded progress reports; this proposal would not require hiring any new OEA staff.

- The ERC and the OEA will refine the progress reports to further eliminate duplication of the federal data reporting required under Sections 8.1-8.7 of the TRI Form R. In Section 8, facilities report the quantities of each chemical

managed for the previous year and the current reporting year, and quantities anticipated for the two years following the reporting year.

The state will work with reporting facilities to determine whether these future year projections, as reported in Section 8, can be used as a facility's numeric reduction objectives for each chemical, rather than asking facilities to state numeric reduction objectives separately in their progress reports. The OEA will analyze whether facilities are reporting the same numbers as both their future year projections and their numeric objectives. This analysis will help the OEA and its partners to determine whether it makes sense to simply use one set of numbers for both purposes.

- Current pollution prevention incentives encourage facilities to reduce chemical releases, but do not encourage facilities to reduce the overall quantities of chemicals managed. In the next year, the OEA will work with the ERC, manufacturers and environmental groups to evaluate the state's positive and negative incentives for preventing pollution and analyze the impacts of making changes to those incentives.

Businesses incur a number of costs when they generate chemical wastes. These costs can motivate companies to reduce those wastes. Other costs and requirements levied by the state provide further incentives for reduction. Existing incentives include the Governor's Awards, grants, the pollution prevention fee and the "Minnesota 50" challenge program. Potential incentives may include tax credits or loan programs for capital investments that prevent pollution, or a new challenge program that would offer a reduced fee schedule for companies that attain substantial reductions in releases. The OEA will examine existing and potential incentives to identify possible opportunities to further promote pollution prevention.

Public access and information

To assess their resources, problems and opportunities, communities need data that is easily accessible and organized in a way that makes sense. Currently, there is a wealth of information available from numerous federal, state and local agencies and organizations, but it is hard to find and nearly impossible to integrate into a meaningful and comprehensive document that citizens can use to help guide their decision-making.

There are a number of concurrent initiatives underway in Minnesota to integrate data on environmental, social, economic and health factors into easily accessible, readily understandable databases that are organized on a geographic basis. The Minnesota State Planning Agency, the OEA's Sustainable Communities Network and the Minnesota Pollution Control Agency are among the public entities who are working on data integration and community assessment projects. The OEA is supporting these efforts, and intends to utilize these cross-program databases to better target its own assistance programs.

Current information sources

For further information on the companies who file TRI reports in Minnesota, including information specific to each facility and to each county, citizens can contact the Minnesota Emergency Response Commission at 612-296-7372.

The U.S. Environmental Protection Agency maintains a website with information on the Toxic Release Inventory which is searchable by facility or zip code. The Internet address is:

http://www.epa.gov/epahome/r2k.htm

The Minnesota Department of Health has made its county health profiles available on the Internet. Each profile contains five major collections of information: demographic and vital statistics, morbidity and health care utilization data, chemical health indicators, environmental health data, and maternal and child health data. The Internet address for the county health profiles is:

http://www.health.state.mn.us/factsfig/factsfig.html

Future information source

In 1997, the Minnesota Pollution Control Agency (MPCA) received a federal grant to integrate all its environmental data into one cross-program database that will also incorporate geographic information. The MPCA will make the database available to the public on the Internet.

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Chapter 2: Assessing Industrial Progress in Pollution Prevention

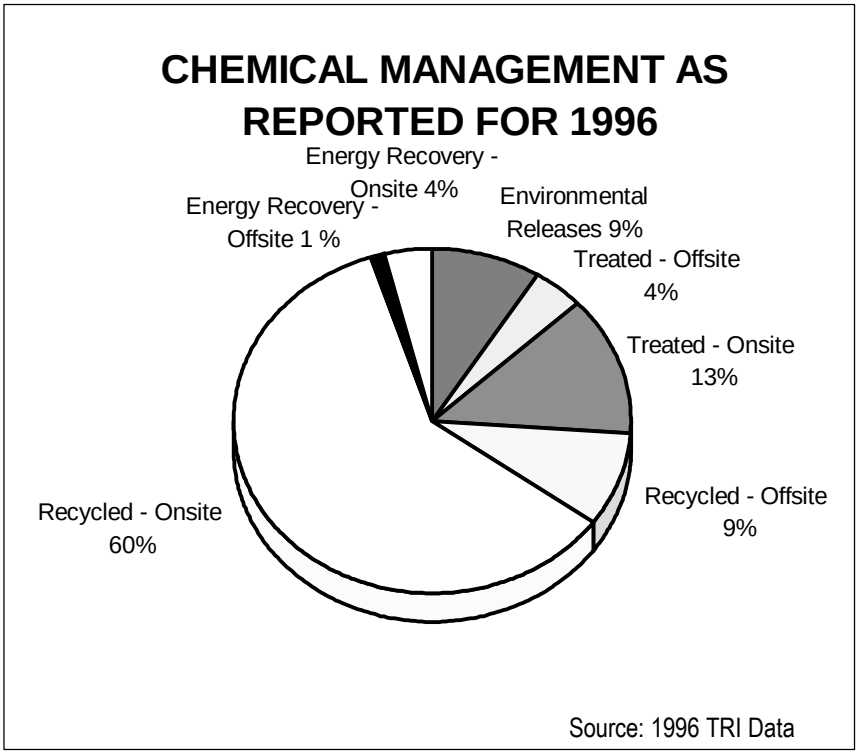
Chemical management

Beginning in 1991, the U.S. Environmental Protection Agency (EPA) expanded TRI reporting requirements to cover the quantity of chemicals a facility manages in addition to releases. Chemicals "managed" is a term coined for all the activities reported under Sections 8.1 to 8.7 of the Toxic Release Inventory form. Chemicals managed includes not only the chemicals released to the environment, but also chemicals recycled, treated or burned for energy recovery, either on- or off-site.

Preventing toxic pollution at its source means reducing the amount of chemicals a facility generates, whether those chemicals are managed as waste, released to the environment or put into products. A reduction in the overall amount of chemicals a facility manages is a better indicator of progress in preventing pollution than a reduction in the amount of chemicals released. A reduction in releases may mean that the facility is still generating the same quantity of waste chemicals, but is managing them through means other than release to the environment.

In 1996, 418 reporting facilities managed a little over 242 million pounds of toxic chemicals.
This amount represents a nine-percent decrease from the total amount of chemicals managed in 1995, when 454 reporting facilities managed almost 267 million pounds of chemicals.

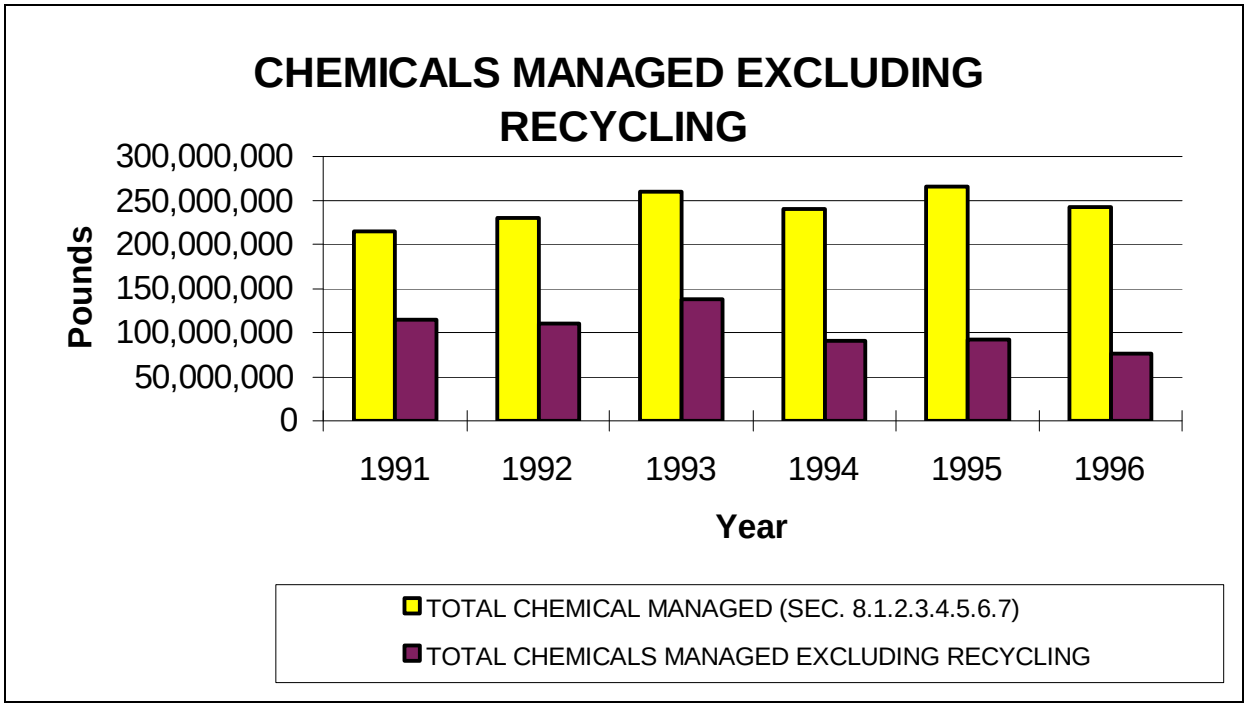
The pie chart below shows that recycling makes up 69 percent of chemical management by TRI-reporting facilities in Minnesota. Releases to the environment, treatment and burning for energy recovery make up the other 31 percent of chemical management. It is economically and environmentally beneficial to eliminate chemical wastes or recycle them for reuse. As detailed in Chapter One, the OEA proposes that facilities focus their efforts on reducing or shifting to recycling the 31 percent of waste chemicals currently being managed through less preferable methods.



Statewide chemical management, 1991 to 1996

The table below shows total quantities of TRI chemicals managed in Minnesota from 1991 to 1996, and also breaks out the totals managed through methods other than recycling. The last row indicates a positive trend, in that the amount of chemicals managed through recycling has increased over time while the amount of chemicals managed through burning, releasing or treating has decreased over time.

Total Chemicals Managed from 1991 to 1996 (in pounds)						
	1991	1992	1993	1994	1995	1996
NUMBER OF FACILITIES	583	564	550	531	454	418
ENVIRONMENTAL RELEASES (SEC. 8.1)	46,384,544	32,479,326	28,924,112	24,129,747	24,513,277	22,078,477
ON-SITE RECOVERY (SEC. 8.2)	6,104,097	8,274,143	13,388,944	10,938,561	25,578,864	10,742,139
ON-SITE RECYCLING (SEC. 8.4)	79,734,920	100,798,448	108,109,302	128,718,561	152,462,401	144,710,541
ON-SITE TREATMENT (SEC. 8.6)	55,123,275	56,688,230	79,275,941	43,817,270	29,990,749	31,503,542
OFF-SITE RECOVERY (SEC. 8.3)	3,650,191	5,005,719	5,454,441	2,706,447	2,980,622	2,413,970
OFF-SITE RECYCLING (SEC.8.5)	20,550,632	18,634,276	14,410,209	20,195,296	21,189,875	21,660,965
OFF-SITE TREATMENT (SEC. 8.7)	3,787,100	8,076,024	7,662,783	9,457,404	10,057,299	8,964,183
TOTAL CHEMICALS MANAGED (SEC. 8.1.2.3.4.5.6.7)	215,334,759	229,956,166	260,225,732	239,963,286	266,773,087	242,073,817
TOTAL CHEMICALS MANAGED EXCLUDING RECYCLING	115,049,207	110,523,442	137,706,221	91,049,429	93,120,811	75,702,311



Source: 1991 - 1996 TRI, Section 8

Top reducers of chemicals managed

In 1996, 58 percent of the TRI-reporting facilities reduced the quantities of chemicals they manage. One hundred fourteen companies reduced chemicals managed by more than 10,000 pounds; twenty-four reduced chemicals managed by more than 100,000 pounds; and five reduced chemicals managed by more than one million pounds. The following table shows the companies who achieved the greatest reductions in absolute quantities of chemicals managed.

TOP REDUCERS OF CHEMICALS MANAGED
(in pounds)

Facility Name	1995 Managed	1996 Managed	Change In Amt Managed
3M COTTAGE GROVE CENTER	26,378,531	14,290,087	-12,088,444
THERMO KING CORP.	11,309,924	109,340	-11,200,584
MINNESOTA MINING & MFG. - HUTCHINSON	36,403,071	32,420,324	-3,982,747
NORTHWEST AIRLINES, INC.	1,766,249	95,179	-1,671,070
MID-AMERICA DAIRYMEN, INC.	1,970,622	606,013	-1,364,609
FORD - TWIN CITIES ASSEMBLY PLANT	2,457,684	1,744,625	-713,059
NSP - SHERCO PLANT	432,760	23,660	-409,100
AMERICAN CRYSTAL SUGAR CO.	555,567	206,733	-348,834
AMERICAN CRYSTAL SUGAR CO. - MOORHEAD	585,500	247,920	-337,580
HONEYMEAD PRODUCTS CO.	1,121,800	789,900	-331,900

Source: 1995 - 1996 TRI, Section 8

Top increasers of chemicals managed

In the same year, 38 percent of TRI-reporting facilities increased the quantities of chemicals they manage. Sixty-two companies increased chemicals managed by more than 10,000 pounds; sixteen increased chemicals managed by more than 100,000 pounds; and three increased chemicals managed by more than one million pounds. The following table shows the companies reporting the largest increases in chemicals managed. The remainder of the facilities reported no change in chemicals managed.

TOP INCREASERS OF CHEMICALS MANAGED
(in pounds)

Facility Name	1995 Managed	1996 Managed	Change In Amt Managed
KOCH REFINING CO. (KRC)	892,169	2,616,764	1,724,595
ASHLAND PETROLEUM CO. - REFINERY	1,147,755	2,658,582	1,510,827
GREDE - ST. CLOUD	16,364	510,410	494,046
MIXON, INC.	1,500,112	1,960,112	460,000
SHELDAHL, INC. - EAST FACILITY	2,154,525	2,504,580	350,055
TWIN CITY DIE CASTING, INC.	95,392	444,819	349,427
POTLATCH CORP.	5,173,327	5,452,925	279,598
3M COMPANY	3,845,105	4,072,774	227,669
SILGAN CONTAINERS CORP. (St. Paul)*	19,100	214,770	195,670
ECO FINISHING COMPANY	17, 458	198,395	180,937

Source: 1995 - 1996 TRI, Section 8
*Silgan Containers Corporation started up in late 1995, so 1996 was the company's first full year of reporting.

Most commonly managed chemicals, 1996

Of the approximately 600 chemicals on the TRI list, these are the 15 chemicals managed in the greatest quantities in Minnesota. The management of these 15 chemicals represents 90 percent of the total chemical management reported in the state.

SUMMARY OF TOP 15 CHEMICALS MANAGED IN 1996
(in pounds)

Chemical Name	Amount of Chemicals Managed
LEAD AND COMPOUNDS	110,366,951
METHYL ETHYL KETONE	23,757,767
TOLUENE	22,675,424
METHANOL	18,314,047
XYLENE (MIXED ISOMERS)	7,020,051
NITRIC ACID	5,026,442
AMMONIA	5,021,945
COPPER AND COMPOUNDS	4,768,246
ZINC COMPOUNDS	3,984,516
LEAD COMPOUNDS	3,980,607
PHOSPHORIC ACID	2,994,865
N-HEXANE	2,960,732
COPPER COMPOUNDS	2,347,192
ANTIMONY AND COMPOUNDS	2,315,000
MANGANESE COMPOUNDS	2,289,637
TOTAL	217,823,422

Source: 1991 - 1996 TRI, Section 8

Chemicals added to the TRI list in 1995

The U.S. EPA added more than 250 chemicals to the TRI list in 1995. Thirteen of those additional chemicals are managed by reporting facilities in Minnesota. These additional 13 chemicals, especially N-Hexane and Nitrate compounds, had an impact on the quantities reported by some of the facilities ranked among the state's top chemical releasers and managers for 1996.

1995 TRI Expansion Chemicals Reported in Minnesota, 1995-1996

Chemical Name	1995	1996
DESMEDIPHAM	0	113
DICYCLOPENTADIENE	18,033	21,182
DIISOCYANATES	33,195	96,492
DIMETHYLAMINE	0	2,010
HCFC-124	0	144,290
N,N, DIMETHYLFORMAMIDE	824,135	987,040
N-HEXANE	3,723,404	2,960,732
N-METHYL-2-PYRROLIDONE	290,562	358,468
NITRATE COMPOUNDS	2,301,166	1,723,795
POLYCYCLIC AROMATIC COMPOUNDS	910	910
POTASSIUM N-METHYLDITHIOCARBAMATE	0	42,000
SODIUM DIMETHYLDITHIOCARBAMATE	30,600	0
SODIUM NITRITE	22,000	35,000
Grand Total	7,244,005	6,372,032

Source: 1995 - 1996 TRI, Section 8

Top 15 chemical managers, 1996

This section profiles the 15 companies that managed the largest quantities of TRI-listed chemicals in 1996. Seven of these fifteen facilities are among the state's top releasers of toxic chemicals.

These profiles highlight facilities that have made progress in reducing the amount of chemicals they release and manage, but also describe areas in which little progress has been made. The purpose of analyzing these facilities is to gain some understanding of the manufacturing processes that generate toxic chemicals, the best means of reducing or eliminating those chemicals, and barriers to reduction. The OEA will use these analyses to identify exemplary models of P2 and to determine opportunities for further reduction at specific facilities or across particular industry sectors.

The OEA has excluded three recycling businesses from its analysis of the state's top 15 chemical managers. These three facilities receive other companies' waste materials for recycling rather than generating those materials as wastes themselves. The excluded companies are Gopher Resource Corporation, U.S. Filter Recovery Services and North Star Recycling. These three companies managed approximately 116 million of the 242 million pounds of chemicals managed by all reporters in 1996.

- **Gopher Resource Corp.** is a secondary lead smelting facility that recovers lead from used batteries and other materials. In 1996, Gopher Resource Corp. alone was responsible for recycling more than 113 million pounds of reportable materials, accounting for 47 percent of the statewide total for all TRI reporters.

- **U.S. Filter** is a metal and chemical recovery facility which recycles waste received from metal finishing manufacturers. U.S. Filter recently began offering its customers a system that cleans contaminated water and returns it to a company for reuse in production processes. That project is highlighted in the Executive Summary.

- **North Star Recycling** recovers metals from old automobiles for use as raw materials at North Star Steel. The two North Star facilities are at the same location, but file separate TRI reports. Although excluded from the list of top chemical managers because of the nature of its business, North Star Recycling ranks among the state's top releasers of toxic chemicals, and is included in the section that discusses those facilities.

Excluding these three recycling businesses, the 15 top facilities profiled here (out of the 418 required to report) are responsible for managing approximately 70 percent of TRI-listed chemicals in Minnesota.

Recommendation

The same group of 15 companies is responsible each year for managing about 70 percent of the TRI-listed chemicals in the state. The OEA will work with these 15 companies to determine effective methods of making further progress in reducing the amount of chemicals that are managed and released in the state.

The OEA and company managers have already begun to identify possible topics for discussion. With its industry partners, the OEA also will establish forums for sharing information on these topics, which may include:

- "Best management practices" in the state and across the country.
- Corporate motivations for reducing the amount of waste chemicals generated.
- The true cost of waste.
- Working with suppliers to reduce waste and toxicity.

- Better means of assessing production's impact on waste generation.
- Models for incorporating Design for Environment into the production process.

Summary of top 15 chemical managers

The following table lists the amounts of chemicals managed by the top 15 reporters in 1996. These 15 facilities are responsible for managing approximately 70 percent of the reported total chemicals managed in the state for 1996, excluding quantities managed by Gopher Resources, U.S. Filter and North Star Recycling.

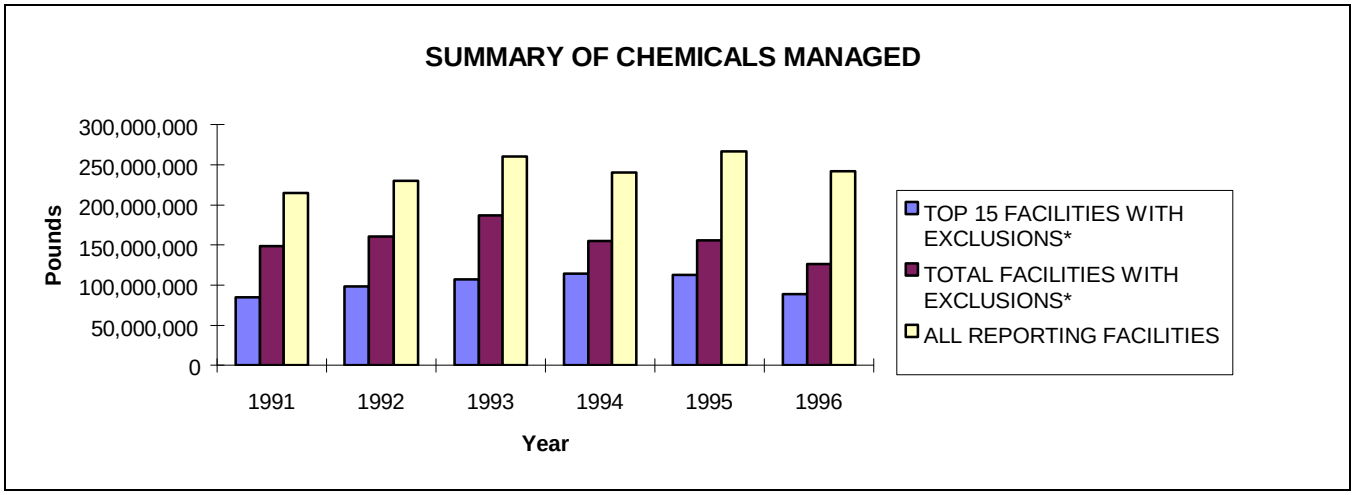
1996 SUMMARY OF CHEMICALS MANAGED (TOP 15 FACILITIES*)	
Facility Name	Quantity of Chemicals Managed (lbs)
3M - Hutchinson	32,420,324
3M - Cottage Grove	14,301,073
Boise Cascade	11,094,610
Potlatch Corporation	5,452,925
North Star Steel - Minnesota	4,298,852
3M Company	4,072,774
Ashland Petroleum Company	2,658,582
Koch Refining Company	2,616,764
Sheldahl, Inc.	2,504,580
Mixon, Inc.	1,960,112
Ford - Twin Cities Plant	1,744,625
Water Gremlin, Inc.	1,524,100
Kraft Foods, Inc.	1,475,040
Champion International Corporation	1,424,734
Filmtec Corporation	940,202
TOTAL	88,489,297

Source: 1996 TRI, Section 8

The following table and chart summarizes amounts of chemicals managed for 1) the top 15 facilities, 2) all TRI reporters in the state *excluding* Gopher Resources, U.S. Filter and North Star Recycling, and 3) all TRI reporters *including* Gopher, U.S. Filter and North Star from 1991 to 1996.

AMOUNT OF CHEMICALS MANAGED (in pounds)						
	1991	1992	1993	1994	1995	1996
TOP 15 FACILITIES WITH EXCLUSIONS*	84,706,343	98,267,728	107,076,814	114,370,335	112,553,928	88,489,297
TOTAL FACILITIES WITH EXCLUSIONS*	148,565,539	161,253,879	187,346,380	155,299,856	156,351,184	126,203,845
ALL REPORTING FACILITIES	215,365,539	229,988,376	260,335,030	240,555,373	266,773,087	242,073,817

*Excludes recyclers Gopher Resource Corp., U. S. Filter Recovery Services Inc. and North Star Recycling



Source: 1991 - 1996 TRI, Section 8
*Excludes Gopher Resource Corp., U. S. Filter Recovery Services Inc. and North Star Recycling - Minnesota

The following 15 facilities are responsible for 67 percent of the chemicals managed in 1996 through methods other than recycling. The quantity listed for each facility in the table below is the total amount of chemicals released to the environment, treated, or burned for energy recovery.

1996 SUMMARY OF CHEMICALS MANAGED MINUS RECYCLING
(TOP 15 FACILITIES)

Facility Name	Total Chemicals Managed Minus Recycling (lbs)
3M COTTAGE GROVE CENTER	13,568,148
BOISE CASCADE CORP.	11,094,610
POTLATCH CORP.	5,452,925
3M - HUTCHINSON	5,261,459
3M COMPANY	4,048,787
ASHLAND PETROLEUM CO. - REFINERY	1,964,123
KRAFT FOODS, INC.	1,475,040
CHAMPION INTERNATIONAL CORP.	1,424,734
SHELDAHL, INC. - EAST FACILITY	1,146,320
NORTH STAR RECYCLING-MINNESOTA	960,782
FILMTEC CORP.	940,202
FORD - TWIN CITIES ASSEMBLY PLANT	939,525
KOCH REFINING CO. (KRC)	885,306
CYTEC FIBERITE,INC.	845,280
HONEYMEAD PRODUCTS CO.	770,600
TOTAL	50,777,841

Source: 1996 TRI, Section 8

Evaluation of progress in P2 for Top 15, Chemicals Managed

This section provides an evaluation of progress in pollution prevention on a facility-specific basis, using two data sources:

- Progress Report Data.
- TRI Data.

Evaluation based on Progress Report data

Progress Reports include quantitative and qualitative information that the OEA uses to assess progress in P2 for individual facilities. In their progress reports, facilities may establish either numeric or non-numeric reduction goals for each chemical they report. In 1996, about half of the reporting facilities established numeric objectives. If facilities report that they have met their objective, then progress in reducing chemical releases or management is indicated. If facilities report that they did not meet their objectives, then either progress was made but fell short of the objective, or no progress was made.

Evaluation based on TRI data

Chemicals Managed and Production Ratio can be used as indicators of progress in P2 for individual facilities. Manufacturers commonly measure progress in P2 by documenting what goes into a process (inputs) and what comes out of it (outputs), and then contrasting it with the inputs and outputs after implementing P2. The ideal is when all the "input" results in "output" as marketable product, and there is no waste.

Establishing a link between waste generation and the production rate of a product helps determine changes in "waste generated per product" and document progress in P2. The OEA does not have access to the detailed data that manufacturers use to determine production rate and waste-per-product. The state must rely on data from Section 8 of the TRI Form R to evaluate changes in chemical waste generation relative to changes in production.

Chemicals Managed

The "output" data set supplied from TRI reporters consists of following information:

- Releases as a normal part of manufacturing process.
- Releases due to accident or remedial events.
- Burned for energy recovery on-site.
- Burned for energy recovery off-site.
- Recycled on-site.
- Recycled off-site.
- Treated on-site.
- Treated off-site.

The total gives the amount managed of each chemical for each facility.

Defining Production Ratio

A Production Ratio is also provided as a part of TRI Section 8 Form R. Reporters are required to base calculation of their ratio on the primary production variable that most directly affects the quantity of each listed chemical generated.

Production Ratio is defined as either:

- A ratio that reports the amount of product produced this year divided by the amount of product produced last year.

Example: At a factory, toluene is the chemical whose generation varies directly with the number of products produced. This year 12,000 products were painted, last year 10,000. (12,000/10,000 = 1.2) The production ratio is 1.2 for the use of toluene at this facility.

- A ratio based on a variable of production that more primarily influences the amount of chemical generated; (This may be appropriate for

such things as solvents when they are used to clean a factory process rather than a product.)

Example: A solvent containing glycol ether is used between color changes on a production line. The number of color changes required in a year is a more influential factor determining chemical use than the number of products produced. Two color changes over this year/four color changes last year (2/4 = .5) The activity ratio is .5 for the use of glycol ether at this facility.

Problem with Production Ratio

One method of assessing pollution prevention is by looking at changes in the amount of waste generated per "unit-of-product." However, government does not have access to data on the number of products a company produces, so the need for an accurate Production Ratio as supplied by the reporter takes on major significance. The main concern regarding use of the Production Ratio as supplied in TRI reports is the uncertainty with which the appropriate unit-of-product has been chosen by the reporter. Despite a high degree of uncertainty as to the basis of each reporting facility's chosen production ratios, these ratios remain the best indicators of changes in production available to the OEA.

Calculating progress using Chemicals Managed and Production Ratio

The following calculations are used to determine if there is progress towards pollution prevention (P2) for individual chemicals, and for a facility as a whole.

1. By taking the previous year's quantity of a particular chemical managed (CMp), and multiplying it by the current year's production ratio (PRc) for that chemical, an estimate of the amount of waste expected for that chemical in the current year can be determined (CMe).

$$(CMp) \bullet (PRc) = CMe$$

2. By dividing the estimated amount of chemicals managed (CMe), by the actual amount of chemical managed in the current year (CMc), an indication of progress in P2 is given (IP2).

$$\frac{CMe}{CMc} = IP2$$

3. If IP2 is greater than 1, progress is indicated for the chemical. If less than 1, it is not.

4. **Additional analysis:** When the total of all CMc is less than the total of all CMe, progress in P2 is indicated for the facility as a whole.

Top 15 Chemical Managers:

Facility Summaries

3M - Hutchinson 915 Highway 22 S Hutchinson, MN 55350

Progress Report data

Chemicals Reported: 16

Objectives: 3M Hutchinson indicates it met 9 of 16 numeric objectives for P2.

Reduction Methods: Solvent recovery, reduced number of process changeovers, modified design and product composition

Barriers to Reduction: Concern that product quality may decline; additional reduction not technically feasible; reduction not economically feasible

3M - Hutchinson is a tape manufacturing plant, and is the top releaser of toxic chemicals in the state, as well as a top manager of those chemicals. The company has reduced its chemical releases by 84 percent since 1991, with a slight increase from 1995 to 1996. In the same years, 3M increased the total amount of chemicals it manages by about 50 percent, although the company showed decreases in the total amount managed for the last two reporting years.

3M - Hutchinson provides a good example of capturing, recycling and reusing chemicals within a process. Eighty percent of the chemicals managed, principally solvents, at 3M are recovered and recycled on-site. The company also burns chemicals on-site for energy recovery through thermal oxidization. The chemicals 3M manages in the greatest quantities are methyl ethyl ketone, toluene and methanol.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

3M (HUTCHINSON) SARA 31 DATA SUMMARY
(in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	13,410,240	5,685,050	3,088,304	2,285,986	2,070,775	2,153,759	-84%
ON & OFF-SITE TREATMENT	2,429,574	2,473,690	2,794,920	3,463,105	2,480,006	2,845,900	17%
ON & OFF-SITE ENERGY RECOVERY	387,767	677,100	591,760	347,800	592,210	261,800	-32%
ON & OFF-SITE RECYCLING	5,035,159	22,738,580	28,754,000	29,759,700	31,260,080	27,158,865	439%
TOTAL CHEMICALS MANAGED	21,262,740	31,574,420	35,228,984	35,856,591	36,403,071	32,420,324	52%
TOTAL MINUS RECYCLING	16,227,581	8,835,840	6,474,984	6,096,891	5,142,991	5,261,459	-68%

Source: 1991 - 1996 TRI, Section 8

3M - Hutchinson 915 Highway 22 S Hutchinson, MN 55350

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 9 of 16 chemicals managed for 1996.
- Since the total of actual chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

3M - HUTCHINSON P2 TRENDS						
CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
ANTIMONY COMPOUNDS	1,400	1,400	1,498	1.07	1.07	Yes
CHROMIUM COMPOUNDS	1,500	1,300	1,320	0.88	1.02	Yes
CYCLOHEXANE	262,020	259,335	277,741	1.06	1.07	Yes
ETHYL BENZENE	10,900	17,100	13,080	1.2	0.76	No
LEAD COMPOUNDS	4,300	4,100	4,601	1.07	1.12	Yes
METHANOL	1,448,400	1,432,630	1,390,464	0.96	0.97	No
METHYL ETHYL KETONE	20,990,000	18,259,000	20,780,100	0.99	1.14	Yes
METHYL ISOBUTYL KETONE	23,300	17,700	24,698	1.06	1.40	Yes
TERT-BUTYL ALCOHOL	37,100	39,400	39,326	1.06	1.00	No
TOLUENE	13,375,000	12,040,000	13,508,750	1.01	1.12	Yes
XYLENE (MIXED ISOMERS)	48,216	73,900	53,038	1.1	0.72	No
ZINC COMPOUNDS	5	5	5	1.06	1.06	Yes
COBALT AND COMPOUNDS	19,000	13,000	16,530	0.87	1.27	Yes
DIISOCYANATES	3,500	3,804	3,080	0.88	0.81	No
ETHYLENE GLYCOL	11,770	10,650	10,358	0.88	0.97	No
N-HEXANE	163,760	247,000	175,223	1.07	0.71	No
METHYLENE BIS(PHENYLISOCYANATE)	2,900	(not reported)	(not reported)			
TOTALS	36,403,071	32,420,324	36,299,812		1.12	Yes

Source: 1995 - 1996 TRI, Section 8

3M - Cottage Grove 10746 Chemolite Road Cottage Grove, MN 55016

Progress Report data

Chemicals Reported: 32
Objectives: 3M - Cottage Grove indicates it met 16 of 32 non-numeric objectives for P2.
Reduction Methods: Changes in operating practices and process modifications
Barriers to Reduction: Further reduction not technically feasible; Further reduction not economically feasible.

3M - Cottage Grove has reduced its releases to the environment by 68 percent since 1991, although releases increased in the last reporting year. From 1995 to 1996, the company decreased the total amount of chemicals it manages, a continuation of decreases achieved in 1993 and 1994. 3M - Cottage Grove is also a top releaser of chemicals in the state, ranking tenth.

3M's Cottage Grove location is the site of the corporate hazardous waste incinerator. The chemicals that are shipped to and transferred from this site are counted in the total amount managed by 3M Cottage Grove, although these chemicals are processed, not produced, at this facility. Only 30 percent of the chemicals reported by 3M - Cottage Grove originate on-site; the other 70 percent come from other 3M facilities. Such transfers may account for the spike in the amount of chemicals managed at 3M - Cottage Grove in 1995.

3M has two pollution prevention goals to be met by the year 2000. One goal is to reduce releases by 90 percent from 1990 baseline amounts. 3M - Cottage Grove has already reduced releases by 77 percent since 1990. The second goal is to cut waste by 50 percent. Teams of process engineers and chemists will be examining all inputs to 3M's processes, and determining ways to produce more product using less materials, or identifying uses for by-products of a process. Increasing 3M's efficiency should mean cost savings and a reduction in chemicals managed.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

3M (COTTAGE GROVE) SARA 31 DATA SUMMARY
(in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	1,933,014	1,073,246	960,105	647,173	529,711	613,997	-68%
ON & OFF-SITE TREATMENT	1,709,760	4,303,107	5,582,451	7,158,643	4,129,954	6,834,556	300%
ON & OFF-SITE ENERGY RECOVERY	3,685,200	6,597,885	11,281,832	7,006,532	21,110,016	6,119,595	66%
ON & OFF-SITE RECYCLING	62,400	88,500	928,600	528,990	608,850	721,939	1057%
TOTAL CHEMICALS MANAGED	7,390,374	12,062,738	18,752,988	15,341,338	26,378,531	14,290,087	93%
TOTAL MINUS RECYCLING	7,327,974	11,974,238	17,824,388	14,812,348	25,769,681	13,568,148	85%

Source: 1991 - 1996 TRI, Section 8

3M - Cottage Grove 10746 Chemolite Road Cottage Grove, MN 55016

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical is derived.

- Progress in P2 is indicated for 17 of 32 chemicals for 1996.
- Since the total of actual chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

3M - COTTAGE GROVE P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
2-ETHOXYETHANOL	153,071	151,692	130,110	0.85	0.86	No
4,4'-ISOPROPYLIDENEDIPHENOL	270	4,522	446	1.65	0.10	No
ACRYLIC ACID	67,507	72,386	68,857	1.02	0.95	No
ALUMINUM (FUME OR DUST)	156	10	203	1.3	20.28	Yes
AMMONIA	27,570	24,170	18,472	0.67	0.76	No
COBALT COMPOUNDS	9,400	6,116	9,870	1.05	1.61	Yes
CYCLOHEXANE	386,184	297,940	401,631	1.04	1.35	Yes
DICHLOROMETHANE	57,530	40,244	53,503	0.93	1.33	Yes
ETHYL ACRYLATE	59,695	51,824	45,965	0.77	0.89	No
ETHYL BENZENE	779,953	768,052	670,760	0.86	0.87	No
ETHYLENE GLYCOL	55,109	119,690	73,295	1.33	0.61	No
FORMALDEHYDE	54,800	37,054	61,924	1.13	1.67	Yes
GLYCOL ETHERS	3,389,214	129,776	4,100,949	1.21	31.60	Yes
HYDROGEN FLUORIDE	154,840	117,931	345,293	2.23	2.93	Yes
MALEIC ANHYDRIDE	91	683	86	0.95	0.13	No
METHANOL	4,761,366	969,613	6,237,389	1.31	6.43	Yes
METHYL ACRYLATE	9,125	3,150	10,129	1.11	3.22	Yes
METHYL ETHYL KETONE	4,828,754	3,026,880	4,635,604	0.96	1.53	Yes
METHYL METHACRYLATE	6,018	18,735	5,657	0.94	0.30	No
NITRIC ACID	123,100	37,549	118,176	0.96	3.15	Yes
PHENOL	25,213	96,352	29,247	1.16	0.30	No
PHOSPHORIC ACID	32,000	32,156	32,000	1	1.00	No
PHTHALIC ANHYDRIDE	723	39,463	593	0.82	0.02	No
TOLUENE	6,444,616	4,919,430	6,315,724	0.98	1.28	Yes
TOLUENEDIISOCYANATE (MIXED ISOMERS)	472	36,336	599	1.27	0.02	No
XYLENE (MIXED ISOMERS)	3,085,020	2,744,141	2,776,518	0.9	1.01	Yes
ZINC COMPOUNDS	67,270	168,872	58,525	0.87	0.35	No
NICKEL COMPOUNDS	8200	9,018	18,286	2.23	2.03	Yes
DIISOCYANATES	24	44,114	38	1.57	0.00	No
2,2-DICHLORO-1,1,1-TRIFLUOROETHANE	304410	287,011	289,190	0.95	1.01	Yes
FORMIC ACID	8437	14,884	17,886	2.12	1.20	Yes
N,N DIMETHYLFORMAMIDE	18845	20,293	27,891	1.48	1.37	Yes
CHLOROFORM	124207	(not reported)				
N-BUTYL ALCOHOL	664128	(not reported)				
METHYL ISOBUTYL KETONE	461643	(not reported)				
N-HEXANE	208788	(not reported)				
ALLYL CHLORIDE	782	(not reported)				
ADJ. TOTAL	26,378,531	14,301,073	26,554,815		1.86	Yes

Source: 1995-1996 TRI, Section 8

Boise Cascade 2nd Street International Falls, MN 56649

Progress Report data

Chemicals Reported: 11; zero releases for 3 of the 11 chemicals

Objectives: Boise Cascade indicates it met its objectives, but hard to ascertain progress because the paper mill uses its own progress report format.

Reduction Methods: Spill and leak prevention; substituted raw materials; installed vapor recovery systems; process modifications

Barriers to Reduction: Lack of technical information on techniques applicable to the production process: this barrier applies only to ammonia emitted as a by-product of combustion.

Boise Cascade is a paper mill. The amounts of chemicals both released and managed at Boise Cascade have decreased slightly since 1991, although the mill posted much larger reductions in releases prior to 1991. (check) Boise Cascade implemented odor reduction projects in 1996 which reduced emissions of several reportable chemicals. Boise Cascade is the fifth largest releaser of toxic chemicals in the state.

The federal government is requiring that all paper mills switch from using elemental chlorine to chlorine dioxide in the bleaching process. Like most mills in the state and nationwide, Boise Cascade is already making this substitution. This change will greatly decrease the production of dioxins, which are suspected carcinogens. When the mill moves to 100 percent substitution, it will no longer need to report on chlorine and chloroform.

Boise Cascade is in the process of switching to using 100 percent chlorine dioxide in its bleaching process, and is already at a 70-80 percent substitution level. Boise Cascade is working with the MPCA to eliminate the production limits in its permit, allowing it to increase its operating rate and produce more pulp. The paper mill is simultaneously trying to increase its operating efficiency through upgrading equipment and finding uses for its solid wastes.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

BOISE CASCADE SARA 313 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	834,222	651,801	408,210	779,630	881,530	713,510	-14%
ON & OFF-SITE TREATMENT	9,763,900	7,273,880	8,197,270	5,014,870	7,704,885	7,781,100	-20%
ON & OFF-SITE ENERGY RECOVERY	770,000	910,000	2,740,000	2,500,000	2,400,000	2,600,000	238%
ON & OFF-SITE RECYCLING	0	0	0	0	0	0	
TOTAL CHEMICALS MANAGED	11,368,122	8,835,681	11,345,480	8,294,500	10,986,415	11,094,610	-2%
TOTAL MINUS RECYCLING	11,368,122	8,835,681	11,345,480	8,294,500	10,986,415	11,094,610	-2%

Source: 1991 - 1996 TRI, Section 8

Boise Cascade 2nd Street International Falls, MN 56649

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 2 of 11 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is greater than the total estimated for 1996, progress in P2 is not indicated for the facility as a whole.

BOISE CASCADE P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
AMMONIA	640000	710000	633600	0.99	0.89	No
CATECHOL	545	2,400	540	0.99	0.22	No
CHLORINE	27,400	27,390	27,126	0.99	0.99	No
CHLORINE DIOXIDE	413,300	413,300	409,167	0.99	0.99	No
CHLOROFORM	21,140	23,500	20,929	0.99	0.89	No
METHANOL	8,600,000	8,850,000	8,514,000	0.99	0.96	No
PHOSPHORIC ACID	960,000	960,000	960,000	1	1.00	No
PHENOL	8030	6,020	7,950	0.99	1.32	Yes
NITRATE COMPOUNDS	316000	38000	312,840	0.99	8.23	Yes
FORMIC ACID	(not reported)	0				
ACETALDEHYDE	(not reported)	64,000				
TOTAL	10,986,415	11,094,610	10,886,151		0.98	No

Source: 1995 - 1996 TRI, Section 8

Potlatch Corporation - Cloquet 2201 Avenue B Cloquet, MN 55720

Progress Report data

Chemicals Reported: 7
Objectives: Potlatch indicates it did not meet its one numeric objective for P2.
Reduction Methods: Spill and leak prevention; recirculation within a process
Barriers to Reduction: Problems with new stripper, which removes methanol from condensate

Potlatch, a paper manufacturer, continued to decrease its chemical releases in 1996, although the total quantity of chemicals managed increased slightly. Some of the releases reported for 1991 should have been reported as treated instead of released. Potlatch currently ranks thirteenth among the state's top chemical releasers.

As part of an ongoing modernization of its mill, Potlatch built a spill and non-condensable gas collection system that went on-line in December 1996. The collection system will capture high-volume, low-concentration gases, many of them odorous, which had previously been emitted to the atmosphere. Potlatch expects to document further reductions in releases in its 1997 TRI report.

Potlatch generates more methanol than any other chemical it reports, managing 4,572,195 pounds of methanol in 1996. Most of that is shipped off-site for treatment. Potlatch expects to decrease the amount of methanol released with its new collection system, and with new equipment to strip the chemical from condensate. Potlatch is using chlorine dioxide as a substitute for elemental chlorine in the bleaching process, which has resulted in slight increases in releases of chlorine dioxide. As explained in the previous facility profile, using chlorine dioxide instead of chlorine reduces the formation of dioxins. Some substitution of chlorine dioxide for elemental chlorine will soon be required by the federal government for all kraft mills that utilize elemental chlorine.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

POTLATCH CORPORATION SARA 313 DATA SUMMARY
(in pounds)

	1991	1992	1993	1994	1995	1996	**'91 - '96 Change**
ENVIRONMENTAL RELEASES	3,348,600	587,920	509,468	449,700	371,033	352,334	-89%
ON & OFF-SITE TREATMENT	0	2,771,200	2,693,238	4,877,113	4,059,071	4,429,679	
ON & OFF-SITE ENERGY RECOVERY	1,970,000	1,961,000	996,978	720,309	743,223	670,912	
ON & OFF-SITE RECYCLING	0	0	0	0	0	0	
TOTAL CHEMICALS MANAGED	5,318,600	5,320,120	4,199,684	6,047,122	5,173,327	5,452,925	3%
TOTAL MINUS RECYCLING	5,318,600	5,320,120	4,199,684	6,047,122	5,173,327	5,452,925	3%

Source: 1991 - 1996 TRI, Section 8

Potlatch Corporation - Cloquet 2201 Avenue B Cloquet, MN 55720

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 5 of 9 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is greater than the total estimated for 1996, progress in P2 is not indicated for the facility as a whole.

POTLATCH CORPORATION P2 TRENDS						
CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
CATECHOL	34,116	82,787	34,457	1.01	0.42	No
CHLORINE	4,584	4,627	4,630	1.01	1.00	Yes
CHLORINE DIOXIDE	17,145	17,275	17,316	1.01	1.00	Yes
HYDROCHLORIC ACID	145,006	136,702	146,456	1.01	1.07	Yes
FORMIC ACID	0	0	0	1.01		
METHANOL	4,792,116	5,161,943	4,840,037	1.01	0.94	No
ACETALDEHYDE	18,027	18,189	18,207	1.01	1.00	Yes
AMMONIA	35,124	31,402	35,475	1.01	1.13	Yes
PHOSPHORIC ACID	0	0	0	1.01		
PHENOL	127209	(not reported)	128,481	1.01		
TOTAL	5,173,327	5,452,925	5,225,060		0.96	No

Source: 1995 - 1996 TRI, Section 8

North Star Steel - Minnesota 1678 Red Rock Road St. Paul, MN 55165

Progress Report data

Chemicals Reported: 8
Objectives: North Star Steel indicates it met 6 of 8 numeric objectives.
Reduction Methods: Increased purity of raw materials, changes to operating practices
Barriers to Reduction: Further source reduction not economically feasible, technical limitations of the production process

North Star Steel, a steel manufacturer, manages and releases mostly zinc compounds. The apparent jump in releases at North Star is due to a change in EPA's 1996 reporting criteria. For the first time in 1996, the chemicals that North Star Steel ships off-site for solidification must be reported under Section 8.1 as a release. This change resulted in an addition of 92,722 pounds to the company's reported releases. Releases to the environment, as previously defined, totaled 28,625 pounds in 1996, a reduction of 54 percent since 1991, although a slight increase from 1995.

Melting steel scrap generates metals in the form of dust. More than 99 percent of the TRI chemicals in this dust is captured by air pollution control equipment and sent off-site for recycling. The remaining dust is emitted within permitted levels to the environment. Toxic chemicals are also present in the recycled steel scrap and alloys which are the company's raw materials. North Star Steel engages in ongoing efforts to improve the quality of its raw materials through scrap inspection, educating its suppliers and penalties to suppliers.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996. North Star Steel reports that the total amount of chemicals managed corresponds directly to the facility's annual production. Since 1991, production has increased by more than one-third.

NORTH STAR STEEL- MINNESOTA SARA 31 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	62,118	46,321	28,410	32,816	24,873	121,347	95%
ON & OFF-SITE TREATMENT	0	0	770	1,260	6,730	0	
ON & OFF-SITE ENERGY RECOVERY	0	0	0	0	0	0	
ON & OFF-SITE RECYCLING	3,453,900	1,877,400	1,487,800	1,899,700	4,088,100	4,177,505	21%
TOTAL CHEMICALS MANAGED	3,516,018	1,923,721	1,516,980	1,933,776	4,119,703	4,298,852	22%
TOTAL MINUS RECYCLING	62,118	46,321	29,180	34,076	31,603	121,347	95%

Source: 1991 - 1996 TRI, Section 8

North Star Steel - Minnesota 1678 Red Rock Road St. Paul, MN 55165

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 5 of 8 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

NORTH STAR STEEL P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
BARIUM COMPOUNDS	7,878	7,346	8,666	1.1	1.18	Yes
CHROMIUM COMPOUNDS	43,950	44,174	48,345	1.1	1.09	Yes
COPPER COMPOUNDS	48,470	77,822	53,317	1.1	0.69	No
LEAD COMPOUNDS	395,900	370,258	435,490	1.1	1.18	Yes
MANGANESE COMPOUNDS	595,900	698,625	673,367	1.13	0.96	No
NICKEL COMPOUNDS	6,745	8,156	7,420	1.1	0.91	No
ZINC COMPOUNDS	3,017,000	3,092,258	3,318,700	1.1	1.07	Yes
MOLYBDENUM TRIOXIDE	3,860	213	4,246	1.1	19.93	Yes
TOTAL	4,119,703	4,298,852	4,549,550		1.04	Yes

Source: 1995 - 1996 TRI, Section 8

3M Company 900 Bush Ave St. Paul, MN 55144

Progress Report data

Chemicals Reported: 17; no releases of 3 of the 17 chemicals.

Objectives: 3M Company-Bush Ave. indicates it met 13 of 15 numeric objectives.

Reduction Methods: Process modifications, raw material modifications, modified product design or composition

Barriers to Reduction: Concern that product quality may decline as a result.

3M continues to reduce its releases of TRI chemicals, mainly through on-site recycling and thermal oxidation (incineration) of chemicals. The company ranks ninth in the state in releases of toxic chemicals to the environment. To reduce one of its uses of n-hexane, 3M uses a supplier whose raw material contains no n-hexane. The amount of chemicals the facility manages increased drastically from 1994 to 1995 and again slightly from 1995 to 1996.

The company has a long-term policy to develop new products without use of solvents. 3M concentrates its research and resources on finding environmentally-preferable ways of making the products that have the largest market share, such as Post-Its ®, some of which are now produced using water-based instead of chemical-based solvents. Since the products produced at 3M Company in St. Paul have smaller shares of the market, they tend not to be the focus of research and development.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

3M SARA 31 DATA SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	1,625,970	1,657,120	630,308	597,675	668,297	620,632	-62%
ON & OFF-SITE TREATMENT	1,661,893	2,290,526	1,867,812	788,771	2,751,329	3,276,903	97%
ON & OFF-SITE ENERGY RECOVERY	294,988	420,130	693,034	431,721	385,712	151,252	-49%
ON & OFF-SITE RECYCLING	188,000	115,056	66,000	40,000	39,767	23,987	-87%
TOTAL CHEMICALS MANAGED	3,770,851	4,482,832	3,257,154	1,858,167	3,845,105	4,072,774	8%
TOTAL MINUS RECYCLING	3,582,851	4,367,776	3,191,154	1,818,167	3,805,338	4,048,787	13%

Source: 1991 - 1996 TRI, Section 8

3M Company 900 Bush Ave St. Paul, MN 55144

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 10 of 14 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is greater than the total estimated for 1996, progress in P2 is not indicated for the facility as a whole.

3M COMPANY P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
2-ETHOXYETHANOL	104,077	91,838	116,566	1.12	1.27	Yes
CYCLOHEXANE	695,300	709,573	716,159	1.03	1.01	Yes
ETHYL BENZENE	14,280	27,606	14,708	1.03	0.53	No
FORMALDEHYDE	36,340	38,032	40,701	1.12	1.07	Yes
METHANOL	20,058	13,430	20,660	1.03	1.54	Yes
METHYL ETHYL KETONE	441,900	391,289	455,157	1.03	1.16	Yes
METHYL ISOBUTYL KETONE	57,670	25,820	59,400	1.03	2.30	Yes
NICKEL AND COMPOUNDS	26,210	23,010	24,900	0.95	1.08	Yes
PHENOL	89,611	149,783	100,364	1.12	0.67	No
TOLUENE	2,100,018	2,340,580	2,205,019	1.05	0.94	No
XYLENE (MIXED ISOMERS)	128,520	123,771	134,946	1.05	1.09	Yes
N-HEXANE	64515	84955	66,450	1.03	0.78	No
DI(2-ETHYLHEXYL) PHTHALATE (DEHP)	0	0	0	1.03		
ZINC COMPOUNDS	2970	1649	3,119	1.05	1.89	Yes
LEAD COMPOUNDS	20	(not reported)				
1,2,4-TRIMETHYL BENZENE	48275	51,438	54,068	1.12		Yes
N-BUTYL ALCOHOL	6731	(not reported)				
COPPER AND COMPOUNDS	8610	(not reported)				
TOTAL	3,845,105	4,072,774	4,012,217		0.99	No

Source: 1995 - 1996 TRI, Section 8

Ashland Petroleum Company 100 West 3rd Avenue St. Paul Park, MN 55071

Progress Report data

Chemicals Reported: 23

Objectives: Ashland indicates it met 8 numeric and 2 non-numeric objectives for P2.

Reduction Methods: Improved loading, unloading and transfer procedures;
Installing a vapor recovery system.

Barriers to Reduction: Further reduction not technically feasible, further reduction not economically feasible

As this document went to print, Ashland, an oil refinery, identified errors in its reporting of 1,2,4-trimethylbenzene and sulfuric acid. For 1996, Ashland reported managing 473,372 pounds of 1,2,4-trimethylbenzene, but a typographical error in the quantity recycled on-site (442,130 pounds reported versus 44,213 pounds actual), resulted in over-reporting of nearly 398,000 pounds.

Ashland also reported an increase of 1,111,930 pounds in the quantity of sulfuric acid managed on-site in its wastewater treatment units during 1996. Only the aerosol form of sulfuric acid is reportable, not the aqueous form which Ashland reported. Ashland had no reportable quantities of sulfuric acid in an aerosol form. Ashland is in the process of officially changing its records with the Minnesota Emergency Response Commission. Due to time constraints, the tables in this document do not reflect the changes in reported numbers. Following these changes, the refinery should show an overall increase of 980 pounds in chemicals managed during 1996.

Ashland has decreased its releases since 1991, although it posted a slight increase in releases from 1995 to 1996. Overall, the company recycled approximately 275,000 pounds of materials on-site and 21,000 pounds off-site. In addition, Ashland completely eliminated its use of carbon tetrachloride at this facility during 1996.

During 1996, Ashland installed a light oil loading rack with a vapor recovery system. The company expects this system to reduce atmospheric emissions of reported chemicals by approximately 80,000 pounds each year. The refinery also continued its leak detection and repair program to reduce the quantity of fugitive air releases.

Ashland Petroleum Company 100 West 3rd Avenue St. Paul Park, MN 55071

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

ASHLAND SARA 31 DATA SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	343,200	414,148	400,336	357,682	281,653	295,405	-14%
ON & OFF-SITE TREATMENT	1,429,462	580,623	630,489	7,111,284	647,629	1,645,513	15%
ON & OFF-SITE ENERGY RECOVERY	0	0	0	7,134	68,217	23,205	
ON & OFF-SITE RECYCLING	21,940	39,322	81,415	91,674	150,256	694,459	3065%
TOTAL CHEMICALS MANAGED	1,794,602	1,034,093	1,112,240	7,567,774	1,147,755	2,658,582	48%
TOTAL MINUS RECYCLING	1,772,662	994,771	1,030,825	7,476,100	997,499	1,964,123	11%

Source: 1991 - 1996 TRI, Section 8

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 7 of 21 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is greater than the total estimated for 1996, progress in P2 is not indicated for the facility as a whole.

ASHLAND PETROLEUM COMPANY P2 TRENDS						
CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
1,2,4-TRIMETHYL BENZENE	30,239	473,372	30,239	1	0.06	No
1,3-BUTADIENE	4,098	3,763	4,098	1	1.09	Yes
AMMONIA	156,375	4,781	156,375	1	32.71	Yes
BENZENE	63,387	87,379	63,387	1	0.73	No
CHLORINE	250	250	250	1	1.00	No
CYCLOHEXANE	20,260	21,342	20,260	1	0.95	No
ETHYL BENZENE	26,333	33,822	26,333	1	0.78	No
ETHYLENE	7,159	16,277	7,159	1	0.44	No
HYDROGEN FLUORIDE	374,596	325,045	374,596	1	1.15	Yes
NAPHTHALENE	8,535	17,507	8,535	1	0.49	No
PHOSPHORIC ACID	51,918	39,528	51,918	1	1.31	Yes
PROPYLENE (PROPENE)	23,291	27,549	23,291	1	0.85	No
STYRENE (MONOMER)	1,075	1,328	1,075	1	0.81	No
TOLUENE	136,038	188,540	136,038	1	0.72	No
XYLENE (MIXED ISOMERS)	184,582	219,016	184,582	1	0.84	No
ZINC COMPOUNDS	418	273	418	1	1.53	Yes
POLYCYCLIC AROMATIC COMPOUNDS	800	800	800	1	1.00	No
CARBONYL SULFIDE	3	2	3	1	1.50	Yes
SULFURIC ACID	(not reported)	1,111,930		1		
CARBON DISULFIDE	1	1	1	1	1.00	No
BIPHENYL	(not reported)	1,399		1		
N-HEXANE	57462	84678	57,462	1	0.68	No
CARBON TETRACHLORIDE	935	0		1		Yes
TOTALS	1,147,755	2,658,582	1,146,820		0.43	No

Source: 1995 - 1996 TRI, Section 8

Koch Refining Company 12555 Clayton Boulevard Rosemount, MN 55068

Progress Report data

Chemicals Reported: 42

Objectives: Koch indicates it met 2 numeric and 38 non-numeric objectives for P2.

Reduction Methods: Improved storage; recirculation within a process, substituted raw materials; inspection and monitoring

Barriers to Reduction: None listed.

As this document went to print, Koch identified a typographical mistake in its reporting of manganese compounds. As a result, the Minnesota Emergency Response Commission adjusted the quantity of manganese compounds Koch managed in 1996 from 1,400,500 pounds to 140,500 pounds. This change is reflected in the following two tables, but due to time constraints, other relevant tables in this document do not reflect the change in reported numbers.

Koch's chemical releases declined sharply from 1992 to 1995, but increased slightly from 1995 to 1996. The oil refinery is the third-largest releaser of TRI chemicals in the state.

The amount of chemicals the facility manages decreased in the mid-1990s, but showed an increase from 1995 to 1996. Koch attributes much of this increase to better reporting of its data. For instance, Koch sends waste catalyst to a reclaiming facility, where metals from the catalyst are recovered and sold back to Koch for reuse. Koch had a high number of catalyst changeovers in 1996, so more waste catalyst, containing reportable metals, was sent to the reclaiming facility and counted in Koch's total amount managed. The catalyst sent off-site for reclaiming was not reported in 1995.

Koch reduced its generation of hydrochloric acid by improving the catalyst regeneration procedure. The refinery also eliminated chromium from use in its cooling tower in 1996, and completely eliminated its use of dichlorodifluoromethane. Koch finished implementing its Leak Detection and Repair Program for the entire refinery at the end of 1996.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

KOCH REFINING SARA 31 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	1,393,843	1,464,282	1,408,919	1,070,482	793,595	876,889	-37%
ON & OFF-SITE TREATMENT	704,048	724,708	728,323	380	505	8,417	-99%
ON & OFF-SITE ENERGY RECOVERY	0	0	3,146	1,568	155	0	
ON & OFF-SITE RECYCLING	22,957	12,981	121,949	102,309	98,024	1,731,458	7442%
TOTAL CHEMICALS MANAGED	2,120,848	2,201,971	2,262,337	1,174,739	892,279	2,616,764	23%
TOTAL MINUS RECYCLING	2,097,891	2,188,990	2,140,388	1,072,430	794,255	885,306	-58%

Source: 1991 - 1996 TRI, Section 8

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 17 of 32 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is greater than the total estimated for 1996, progress in P2 is not indicated for the facility as a whole.

KOCH REFINING COMPANY P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
1,2,4-TRIMETHYL BENZENE	23,000	22,000	24,840	1.08	1.13	Yes
AMMONIA	54,000	210,000	74,520	1.38	0.35	No
ANTHRACENE	180	41	194	1.08	4.74	Yes
BARIUM COMPOUNDS	7,609	15,316	10,500	1.38	0.69	No
BENZENE	22,460	21,071	24,257	1.08	1.15	Yes
BIPHENYL	2,200	1,400	2,376	1.08	1.70	Yes
CHLORINE	1,200	1,000	1,260	1.05	1.26	Yes
CHROMIUM COMPOUNDS	17,002	41,000	18,362	1.08	0.45	No
COBALT COMPOUNDS	126	35,239	136	1.08	0.00	No
COPPER COMPOUNDS	9,027	83,028	9,749	1.08	0.12	No
CYCLOHEXANE	5,100	5,000	5,508	1.08	1.10	Yes
ETHYL BENZENE	34,000	23,000	36,720	1.08	1.60	Yes
ETHYLENE	2,100	1,400	2,268	1.08	1.62	Yes
LEAD COMPOUNDS	1,853	8,470	1,112	0.6	0.13	No
MANGANESE COMPOUNDS	62,500	140,500	86,250	1.38	0.61	No
METHANOL	3,400	12,000	3,672	1.08	0.31	No
NAPHTHALENE	16,000	14,000	17,280	1.08	1.23	Yes
NICKEL COMPOUNDS	2,630	108,200	2,840	1.08	0.03	No
PHENOL	3,200	3,430	3,456	1.08	1.01	Yes
PROPYLENE (PROPENE)	43,000	28,000	46,440	1.08	1.66	Yes
SELENIUM COMPOUNDS	5,030	8,200	6,941	1.38	0.85	No
TOLUENE	140,000	120,007	151,200	1.08	1.26	Yes
XYLENE (MIXED ISOMERS)	220,948	220,831	238,624	1.08	1.08	Yes
ZINC COMPOUNDS	57	40,200	62	1.08	0.00	No
ETHYLENE GLYCOL	23,000	23,000	24,840	1.08	1.08	Yes
N-HEXANE	167,000	120,000	180,360	1.08	1.50	Yes
TETRACHLOROETHYLENE	4,205	12,600	4,541	1.08	0.36	No
ASBESTOS (FRIABLE)	9,400	20,000	20,022	2.13	1.00	Yes
METHYL TERT-BUTYL ETHER	1	470	0	0	0.00	No
POLYCYCLIC AROMATIC CMPDS	110	110	117	1.08	1.06	Yes
N-BUTYL ALCOHOL	0	1	0	1.08	0.00	No
PHOSPHORIC ACID	(not reported)	17,000		1.08		
CUMENE	2	250	2	1.08	0.01	No
HYDROCHLORIC ACID	3800	(not reported)				
CRESOL (MIXED ISOMERS)	11	(not reported)				
2-METHOXYETHANOL	1	(not reported)				
METHYL ISOBUTYL KETONE	92	(not reported)				
PERACETIC ACID	12	(not reported)				
METHYL ETHYL KETONE	3050	(not reported)				
DICHLORODIFLUOROMETHANE	4000	(not reported)				
PROPYLENE OXIDE	72	(not reported)				
HYDROGEN CYANIDE	700	(not reported)				
CHLOROFORM	1	(not reported)				
FORMALDEHYDE	5	(not reported)				
BERYLLIUM COMPOUNDS	7	(not reported)				
ANTIMONY COMPOUNDS	1	(not reported)				
ARSENIC COMPOUNDS	69	(not reported)				
MERCURY COMPOUNDS	118	(not reported)				
TOTAL	892,279	1,356,764	998,451	0.74		No

Source: 1995 - 1996 TRI, Section 8

Sheldahl Inc. - East Facility 805 Highway 3 North Northfield, MN 55057

Progress Report data

Chemicals Reported: 9
Objectives: Sheldahl indicates it met 2 of 4 numeric objectives for P2.
Reduction Methods: Substituted raw materials, instituted recirculation, cleaning and degreasing modifications
Barriers to Reduction: Technical limitations of the production process

Sheldahl, which manufactures printed circuitry, electrical laminates and membrane switches, has drastically reduced its releases from 1991 levels, and shows a slight overall decrease in the amount of chemicals the facility manages as well. Sheldahl provides its laminations department employees with annual training in pollution prevention. The company is using tin plating instead of lead plating where feasible, and is considering waste water treatment upgrades to recover ammonia. Sheldahl tried to improve its operators' ability to clean equipment at their stations using lower amounts of solvents such as methyl ethyl ketone and toluene, but these efforts did not meet the company's expectations.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

SHELDAHL SARA 31 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	451,630	278,240	184,860	95,250	77,540	77,850	-83%
ON & OFF-SITE TREATMENT	1,014,647	1,751,056	2,074,890	2,045,185	874,705	971,370	-4%
ON & OFF-SITE ENERGY RECOVERY	25,680	59,200	73,800	44,500	64,880	97,100	278%
ON & OFF-SITE RECYCLING	1,266,830	1,457,600	1,373,000	1,695,000	1,137,400	1,358,260	7%
TOTAL CHEMICALS MANAGED	2,758,787	3,546,096	3,706,550	3,879,935	2,154,525	2,504,580	-9%
TOTAL MINUS RECYCLING	1,491,957	2,088,496	2,333,550	2,184,935	1,017,125	1,146,320	-23%

Source: 1991 - 1996 TRI, Section 8

Sheldahl Inc. - East Facility 805 Highway 3 North Northfield, MN 55057

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 6 of 9 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

SHELDAHL INC. P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
AMMONIA	92,660	108,820	124,164	1.34	1.14	Yes
COPPER COMPOUNDS	954,900	1,242,555	1,279,566	1.34	1.03	Yes
DECABROMODIPHENYL OXIDE	6,310	8,860	8,708	1.38	0.98	No
METHANOL	21,680	32,200	25,799	1.19	0.80	No
METHYL ETHYL KETONE	321,700	335,200	382,823	1.19	1.14	Yes
NITRIC ACID	84,180	131,180	109,434	1.3	0.83	No
TOLUENE	542,300	613,800	645,337	1.19	1.05	Yes
ANTIMONY COMPOUNDS	5,230	3,930	6,381	1.22	1.62	Yes
LEAD COMPOUNDS	31,520	28,035	46,650	1.48	1.66	Yes
DICHLOROMETHANE	94,045	(not reported)		1.22		
TOTAL	2,154,525	2,504,580	2,628,862		1.05	Yes

Source: 1995 - 1996 TRI, Section 8

Mixon, Inc. 2286 Capp Road St. Paul, MN 55114

Progress Report data

Chemicals Reported: 1
Objectives: Numeric objective, not met.
Reduction Methods: Modify equipment, layout or piping
Barriers to Reduction: Insufficient capital to install reduction equipment or implement reduction activities.

Mixon is a metal casting factory that produces batteries. The total amount of lead the facility manages has increased slightly overall since 1991. Mixon attributes the large increases in the quantities of chemicals it managed in 1995 and 1996 to increased production.

When it delivers new batteries to its customers, Mixon picks up their used batteries and delivers them to Gopher Resource Corp. for recycling. This transfer of the used batteries to Gopher for recycling is a reportable quantity of lead for Mixon. Except for a small amount of releases, all of Mixon's chemical management consists of off-site recycling.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

MIXON, INC. SARA 31 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	144	144	144	144	112	112	-22%
ON & OFF-SITE TREATMENT	22,000	22,000	10,000	40,000	0	0	-100%
ON & OFF-SITE ENERGY RECOVERY	0	0	0	0	0	0	
ON & OFF-SITE RECYCLING	1,880,000	1,420,000	682,000	870,000	1,500,000	1,960,000	4%
TOTAL CHEMICALS MANAGED	1,902,144	1,442,144	692,144	910,144	1,500,112	1,960,112	3%
TOTAL MINUS RECYCLING	22,144	22,144	10,144	40,144	112	112	-99%

Source: 1991 - 1996 TRI, Section 8

Mixon, Inc. 2286 Capp Road St. Paul, MN 55114

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 0 of 1 chemical managed for 1996.
- Since the total of chemicals managed in 1996 is greater than the total estimated for 1996, progress in P2 is not indicated for the facility as a whole.

MIXON INC. P2 TRENDS

CHEMICAL	CAS NO.	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
LEAD COMPOUNDS	12	1,500,112	1,960,112	1,395,104	0.93	0.71	No
TOTAL		1,500,112	1,960,112	1,395,104		0.71	No

Source: 1995 - 1996 TRI, Section 8

Ford - Twin Cities Plant 366 S Mississippi River Blvd St. Paul, MN 55116

Progress Report data

Chemicals Reported: 12

Objectives: Ford indicates it met 8 of 8 numeric objectives for P2.

Reduction Methods: Modified spray systems, substituted raw materials, improved maintenance scheduling, solvent audits

Barriers to Reduction: No acceptable alternatives to some chemicals used for coating.

Ford's Twin Cities Assembly Plant showed a cyclical pattern of alternating increases and decreases in chemical releases from 1991 to 1995. However, in 1996, the quantities of chemicals Ford manages and releases dropped to their lowest levels in six years.

Some of the reductions can be attributed to a decline in production. However, the Ford plant also has established innovative agreements with its suppliers which have resulted in pollution prevention. For instance, the Ford corporate office asked its paint vendor, DuPont, to reduce the TRI chemicals in its paints. DuPont has decreased some TRI chemicals in the paints by 50 percent.

Ford uses solvents to clean its coating equipment before each color change. The assembly plant pays its solvent supplier based on the number of trucks Ford builds, rather than on the volume of solvents used, which provides an incentive to the supplier to sell the least amount necessary for the job. As a result, the Twin Cities Plant uses the lowest amount of these solvents of any of the 17 Ford assembly plants nationwide.

The plant has a similar contract with its supplier of chemicals to treat wastewater generated from coating trucks with phosphate before painting them. This arrangement helps the plant generate only about 2.2 pounds of sludge per vehicle, compared with as much as six pounds generated at other plants. Ford's arrangements with its suppliers lead to increased efficiency and decreased chemical waste.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

FORD - TWIN CITIES PLANT SARA 31 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	833,390	764,861	841,209	749,815	861,790	636,825	-24%
ON & OFF-SITE TREATMENT	183,429	233,260	503,074	498,545	363,394	190,500	4%
ON & OFF-SITE ENERGY RECOVERY	433,030	483,690	588,920	173,987	169,000	112,200	-74%
ON & OFF-SITE RECYCLING	390,600	574,988	677,200	1,231,000	1,063,500	805,100	106%
TOTAL CHEMICALS MANAGED	1,840,449	2,056,799	2,610,403	2,653,347	2,457,684	1,744,625	-5%
TOTAL MINUS RECYCLING	1,449,849	1,481,811	1,933,203	1,422,347	1,394,184	939,525	-35%

Source: 1991 - 1996 TRI, Section 8

Ford - Twin Cities Plant 366 S Mississippi River Blvd St. Paul, MN 55116

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 12 of 13 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

FORD-TWIN CITIES ASSEMBLY PLANT P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
ETHYL BENZENE	237,200	185,200	208,736	0.88	1.13	Yes
ETHYLENE GLYCOL	2,620	2,225	2,306	0.88	1.04	Yes
GLYCOL ETHERS	175,400	93,400	154,352	0.88	1.65	Yes
METHANOL	62,100	27,500	54,648	0.88	1.99	Yes
METHYL ETHYL KETONE	54,800	37,100	48,224	0.88	1.30	Yes
METHYL ISOBUTYL KETONE	278,400	210,800	244,992	0.88	1.16	Yes
N-BUTYL ALCOHOL	176,000	81,000	154,880	0.88	1.91	Yes
PHOSPHORIC ACID	51,000	29,000	44,880	0.88	1.55	Yes
TOLUENE	199,000	144,600	175,120	0.88	1.21	Yes
XYLENE (MIXED ISOMERS)	1,187,000	904,000	1,044,560	0.88	1.16	Yes
ZINC COMPOUNDS	9,070	8,300	7,982	0.88	0.96	No
MANGANESE COMPOUNDS	2857	2,500	2,514	0.88	1.01	Yes
SODIUM NITRITE	22000	19,000	19,360	0.88	1.02	Yes
BENZENE	121					
N-HEXANE	107					
CYCLOHEXANE	4					
PROPYLENE (PROPENE)	5					
TOTAL	2,457,684	1,744,625	2,162,553		1.24	Yes

Source: 1995 - 1996 TRI, Section 8

Water Gremlin, Inc. 1610 Whitaker Avenue White Bear Lake, MN 55110

Progress Report data

Chemicals Reported:	2
Objectives:	Water Gremlin indicates it met 2 of 2 numeric objectives for P2.
Reduction Methods:	Modified spray systems, spill and leak prevention, instituted recirculation within a process, changed production schedule to maximize changeovers; improved storage
Barriers to Reduction:	Water Gremlin has not found an adequate substitute for TCE, although the company continues to explore replacement solvents.

Water Gremlin manufactures fishing sinkers and custom lead parts. Water Gremlin's releases of toxic chemicals to the environment increased from 1991 to 1994, but have since decreased. The company cut its releases by more than half from 1995 to 1996. Likewise, the total amount of chemicals managed by the company peaked in 1993, and since then has declined.

Water Gremlin reports on two materials: lead compounds and the solvent trichloroethylene (TCE). Despite increased production, the company decreased its total management of both these chemicals in 1996. Water Gremlin recycled and reused (91) 55-gallon drums of TCE on-site, incorporated atomizing sprayers into the coating process to minimize overspray and established an impervious coating for TCE areas.

The company designed a completely enclosed lead storage area, which will be built in 1998, and decreased lead by-product from die casting operations. Water Gremlin recycles all of its lead waste through Gopher Resources Corp.; in 1996, Water Gremlin sent over 1.4 million pounds of lead to be recycled.

Water Gremlin reports that its pollution prevention activities have resulted in both environmental and economic benefits, and that the company intends to pursue further pollution prevention measures.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

WATER GREMLIN SARA 31 DATA SUMMARY
(in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	69,300	79,090	154,220	200,100	97,460	45,900	-34%
ON & OFF-SITE TREATMENT	0	0	0	200	800	200	
ON & OFF-SITE ENERGY RECOVERY	0	0	0	0	0	0	
ON & OFF-SITE RECYCLING	1,225,113	1,531,454	1,633,789	77,000	1,593,000	1,478,000	21%
TOTAL CHEMICALS MANAGED	1,294,413	1,610,544	1,788,009	277,300	1,691,260	1,524,100	18%
TOTAL MINUS RECYCLING	69,300	79,090	154,220	200,300	98,260	46,100	-33%

Source: 1991 - 1996 TRI, Section 8

Water Gremlin, Inc. 1610 Whitaker Avenue White Bear Lake, MN 55110

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 2 of 2 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

WATER GREMLIN, INC. P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
LEAD COMPOUNDS	1,500,460	1,403,900	1,665,511	1.11	1.19	Yes
TRICHLOROETHYLENE	190800	120,200	211,788	1.11	1.76	Yes
TOTAL	1,691,260	1,524,100	1,877,299		1.23	Yes

Source: 1995 - 1996 TRI, Section 8

Kraft Foods, Inc. 1000 East Kraft Drive Melrose, MN 56352

Progress Report data

Chemicals Reported: 3

Objectives: Kraft indicates it met 3 of 3 non-numeric objectives for P2.

Reduction Methods: Improved storage procedures; modified equipment, layout or piping; improved monitoring; operator training

Barriers to Reduction: Pollution prevention not economically feasible

Kraft Foods produces various kinds of bulk cheese. Kraft's chemical releases to the environment remain higher than 1991 levels. The amount of chemicals the company manages has increased significantly since 1991, although there was a decline from 1995 to 1996.

Ethanol is a by-product of Kraft's production processes. Kraft uses gasoline as a denaturant for the ethanol and markets it to the fuel industry. The company has minimized its emissions of toluene, xylene and other compounds through improved gasoline and alcohol handling systems. Kraft is seeking markets for its products that would not require denaturing of the alcohol, which in turn would eliminate emissions of these chemicals.

Kraft also reports on ammonia, which results from food processing. The company recently upgraded its piping and installed leak detection instruments. Kraft decreased its releases of ammonia from 1995 to 1996, despite increased production. However, release levels remain above 1991 baseline levels.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

KRAFT FOODS, INC. SARA 31 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	4,824	13,188	7,273	7,164	5,249	5,346	11%
ON & OFF-SITE TREATMENT	502,080	807,555	836,169	870,277	1,527,530	1,469,694	193%
ON & OFF-SITE ENERGY RECOVERY	0	0	0	0	0	0	
ON & OFF-SITE RECYCLING	0	0	0	18,740	0	0	
TOTAL CHEMICALS MANAGED	506,904	820,743	843,442	896,181	1,532,779	1,475,040	191%
TOTAL MINUS RECYCLING	506,904	820,743	843,442	877,441	1,532,779	1,475,040	191%

Source: 1991 - 1996 TRI, Section 8

Kraft Foods, Inc. 1000 East Kraft Drive Melrose, MN 56352

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 6 of 6 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

KRAFT FOODS INC. P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
AMMONIA	5,840	6,001	6,366	1.09	1.06	Yes
NITRIC ACID	865,151	927,474	943,015	1.09	1.02	Yes
PHOSPHORIC ACID	28,970	23,880	31,577	1.09	1.32	Yes
TOLUENE	56	55	61	1.09	1.11	Yes
XYLENE (MIXED ISOMERS)	50	50	55	1.09	1.09	Yes
NITRATE COMPOUNDS	632670	517,580	689,610	1.09	1.33	Yes
METHYL TERT-BUTYL ETHER	42	(not reported)	0			
TOTALS	1,532,779	1,475,040	1,670,683		1.13	Yes

Source: 1995 - 1996 TRI, Section 8

Champion International Corp. 100 East Sartell Street Sartell, MN 56377

Progress Report data

Chemicals Reported: 6

Objectives: Champion indicates that it met 3 numeric and 3 non-numeric objectives.

Reduction Methods: Improved maintenance scheduling, implemented inspection and monitoring program; modified equipment.

Barriers to Reduction: None reported

Champion International's releases of TRI chemicals have increased in the last two years to levels above those reported in 1991. Champion attributes the increases, in part, to changes in EPA's reporting criteria and the mill's improvements in estimating release amounts. Champion's overall management of chemicals has increased slightly.

Champion produces paper for magazines using a thermomechanical pulping process that does not require bleaching chemicals such as chlorine or chlorine dioxide. In 1997, Champion discontinued its use of chlorine to purify intake, process and wastewater streams.

Champion has eliminated its use of two TRI chemicals by finding substitutes or changing production processes. Champion believes that the long-term gains of making these changes will outweigh the increase in short-term costs.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996.

CHAMPION INTERNATIONAL CORPORATION SARA 313 SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	57,401	37,671	35,921	40,721	97,801	96,701	68%
ON & OFF-SITE TREATMENT	1,255,840	1,232,900	1,203,800	1,216,000	1,251,000	1,328,000	6%
ON & OFF-SITE ENERGY RECOVERY	0	0	0	0	0	0	
ON & OFF-SITE RECYCLING	0	0	0	0	0	0	
TOTAL CHEMICALS MANAGED	1,313,241	1,270,571	1,239,721	1,256,721	1,348,801	1,424,701	8%
TOTAL MINUS RECYCLING	1,313,241	1,270,571	1,239,721	1,256,721	1,348,801	1,424,701	8%

Source: 1991 - 1996 TRI, Section 8

Champion International Corp. 100 East Sartell Street Sartell, MN 56377

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 4 of 7 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is greater than the total estimated for 1996, progress in P2 is not indicated for the facility as a whole.

CHAMPION INTERNATIONAL CORPORATION P2 TRENDS

CHEMICAL	1995 Chemicals Managed (in lbs)	1996 Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
AMMONIA	659,100	507,200	665,691	1.01	1.31	Yes
CHLORINE	150,001	140,001	151,501	1.01	1.08	Yes
ETHYLENE GLYCOL	38,400	52,633	38,784	1.01	0.74	No
HYDROCHLORIC ACID	131,300	393,900	132,613	1.01	0.34	No
PHOSPHORIC ACID	280,000	230,000	282,800	1.01	1.23	Yes
SULFURIC ACID	42,000	42,000	42,420	1.01	1.01	Yes
METHANOL	48000	59,000	48,480	1.01	0.82	No
TOTAL	1,348,801	1,424,734	1,362,289		0.96	No

Source: 1995 - 1996 TRI, Section 8

Filmtec Corporation 7200 Ohms Lane Edina, MN 55439

Progress Report data

Chemicals Reported: 1
Objectives: Filmtec indicates it met one of one non-numeric objective for P2.
Reduction Methods: Increased bulk deliveries, eliminating storage and handling of 55-gallon drums
Barriers to Reduction: None listed.

From 1991 to 1995, Filmtec reported on only one chemical — freon. In 1996, Filmtec eliminated freon use by substituting a non-TRI chemical. However, in 1995, the EPA listed N,N-Dimethylformamide (DMF) as a TRI chemical. Filmtec now reports only on DMF, which is used as a solvent in the manufacturing of membranes. The company is investigating means of recycling and reusing DMF.

TRI Report data

The following table identifies reported chemicals 1) Released 2) Managed 3) Totaled and 4) the percentage of change for 1991 through 1996. In the table below, the quantities reported for 1991 through 1995 are all for freon; the quantities reported for 1996 are for DMF.

FILMTEC CORPORATION SARA 31 DATA SUMMARY (in pounds)

	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	140,500	88,600	23,300	22,000	2,845	3,290	-98%
ON & OFF-SITE TREATMENT	31,700	20,700	11,600	2,700	778,315	936,912	2856%
ON & OFF-SITE ENERGY RECOVERY	0	0	0	0	0	0	
ON & OFF-SITE RECYCLING	1,200,000	1,100,000	1,900,000	2,200,000	0	0	-100%
TOTAL CHEMICALS MANAGED	1,372,200	1,209,300	1,934,900	2,224,700	781,160	940,202	-31%
TOTAL MINUS RECYCLING	172,200	109,300	34,900	24,700	781,160	940,202	446%

Source: 1991 - 1996 TRI, Section 8

The following table lists the amount of each reported chemical managed for 1995 and 1996. By using the Production Ratio and formula described on page 28, an indication of P2 for the use of each chemical and for total chemicals managed is derived.

- Progress in P2 is indicated for 1 of 1 chemicals managed for 1996.
- Since the total of chemicals managed in 1996 is less than the total estimated for 1996, progress in P2 is indicated for the facility as a whole.

FILMTEC CORPORATION P2 TRENDS

CHEMICAL	Chemicals Managed (in lbs)	Chemicals Managed (in lbs)	1996 Estimated Managed Chemicals (in lbs)	1996 Production Ratio	1996 Est/Actual Greater Than 1.00 Indicates P2	P2 INDICATED
N,N DIMETHYLFORMAMIDE	781,160	940,202	1,015,508	1.3	1.08	Yes
TOTALS	781,160	940,202	1,015,508		1.08	Yes

Source: 1995 - 1996 TRI, Section 8

Evaluating progress in P2 for TRI reporters within SIC codes

The following chart indicates whether or not P2 is indicated for the reporting facilities within a Standard Industrial Classification Code (SIC code) for 1996. To determine this:

- The total of all Chemicals Managed for 1996 (CMc) was divided by the total of all Estimated Chemicals Managed for 1996 (CMe), using the formula described on page 28 for each reporting facility.
- All 418 reporters were then sorted by two-digit SIC code; their totals were added to determine if P2 was indicated for that code.

The analysis assumes that reporters have met requirements to base calculation of their production ratios on the primary production variable that most directly affects the quantify of chemical waste generated.

Indication of P2 for SIC Codes by Production Ratio (PR) 1995 - 1996

SIC code	Lbs. Chemicals Managed 1995	Lbs. Chemicals Managed 1996	Lbs. Chemicals Estimated 1996	> 1.00 Indcates P2	P2 Indicated by PR
20 Food and Kindred Products	10,253,263	8,279,144	10,202,451	1.23	yes
24 Lumber and Wood Products	2,653,799	2,481,881	2,597,833	1.05	yes
25 Furniture and Fixtures	308,121	264,890	293,692	1.11	yes
26 Paper and Allied Products	58,824,624	55,530,591	58,873,121	1.06	yes
27 Printing and Publishing	272,893	305,323	340,642	1.12	yes
28 Chemicals and Allied Products	25,954,490	15,380,767	27,636,771	1.80	yes
29 Petroleum Refining	2,030,639	4,152,437	2,149,353	0.52	no
30 Rubber and Misc. Plastics	2,708,730	2,779,363	2,967,773	1.07	yes
31 Leather and Leather Products	399,344	426,683	404,250	0.95	no
32 Stone, Clay and Glass Products	160,013	192,040	181,796	0.95	no
33 Primary Metal Industries	116,991,168	121,793,611	136,116,644	1.12	yes
34 Fabricated Metal Parts	7,973,284	7,634,000	8,234,149	1.08	yes
35 Industrial and Commercial Machinery Mfgs.	14,855,160	3,725,540	9,473,421	2.54	yes
36 Electronic and Electrical Eqpt Mfgs	6,850,495	7,877,597	7,748,183	0.98	no
37 Transportation Equipment	3,776,155	2,986,889	3,512,139	1.18	yes
38 Instruments and Related Products	1,010,119	1,021,273	1,163,526	1.14	yes
39 Misc Manufacturing Industries	262,247	230,811	252,762	1.10	yes
45 Transportation by Air	147,581	185,811	155,368	0.84	no
49 Electric, Gas & Sanitary Services	1,484,424	1,634,450	1,573,258	0.96	no
51 Wholesale Trade, Non-durable Goods	231,605	162,501	169,433	1.04	yes

Source: 1995 -1996 TRI, Section 8

Evaluating progress in pollution prevention (P2) by SIC Code using TRI and Census of Manufacturers data

The OEA is searching for additional factors, besides TRI production ratios, that effectively link waste generation to units-of-production. "Value Added" is one such link under analysis.

TRI data gives information on amounts of chemicals managed and released from reporting Standard Industrial Classification code (SIC codes) as defined by the U.S. Department. of Commerce.

The Minnesota Department of Trade and Economic Development (DTED) receives SIC data through the Census of Manufacturers, as collected annually by the U.S. Department of Commerce. This data contains a Value Added measure of manufacturing activity for entire SIC codes; this Value Added figure, if used in conjunction with TRI data, might a useful indicator of P2.

Value Added is a measure of manufacturing activity; it represents the difference between the value of shipments (sales) and the values of inputs, including materials, supplies, fuels, contracts etc. Essentially, Value Added is the measure of the increased value added through the manufacturing process by a company.

Value Added is considered to be the best measure available for comparing the relative economic importance of manufacturing industries and is also used as a measure of productivity. (*Compare Minnesota: An Economic and Statistical Fact Book 1996/97,* DTED.)

By comparing the percentage change in chemicals managed by reporting SICs over time (CMpc), with the percentage change in Value Added for the same SICs over time (VApc), an indication of P2 (IP2) can be derived.

$$\frac{VApc}{CMpc} = IP2$$

If IP2 is greater than 1, progress is indicated.

If IP2 is less than 1, no progress is indicated..

This method of evaluating progress assumes that the percentage change in Value Added for an entire SIC is comparable to the percentage change in Value Added for the TRI-reporting facilities within that SIC.

The following table shows trends for chemicals released and managed, and for Manufacturing Value Added for the top 15 chemical managers (1991 to 1995). If Value Added increased at a rate faster than chemicals managed then progress in P2 is indicated for that SIC code, under column "P2 Indicated by VA." The most recent year for which complete data is available is 1995.

MANUFACTURING VALUE ADDED INDICATOR OF P2

(chemical amounts in pounds - value added amount in thousands of current dollars)

SIC CODE - INDUSTRY	Category	1991 Amounts	1992 Amounts	1993 Amounts	1994 Amounts	1995 Amounts	'91-'95 Change	P2 Occur	5 yr. Total
	Releases	20,146,057	9,437,070	5,327,299	4,909,155	4,759,937	-76%		44,579,518
26 PAPER AND ALLIED	Managed	42,566,493	50,826,923	53,878,550	53,597,750	58,034,970	36%	Yes	258,904,686
PRODUCTS	Value Added	2,427,700	2,821,100	2,901,700	3,356,000	4,179,800	72%		
	Releases	3,878,074	2,858,963	2,598,619	2,873,653	2,631,754	-32%		14,841,063
34 FABRICATED METAL	Managed	5,373,712	5,687,862	5,409,047	6,249,833	5,990,274	11%	Yes	28,710,728
PRODUCTS	Value Added	3,105,700	3,498,100	3,461,300	4,050,400	4,310,600	39%		
	Releases	2,333,431	2,222,627	2,786,048	2,175,193	1,834,268	-21%		11,351,567
33 PRIMARY METAL	Managed	73,544,140	74,106,713	73,503,836	85,406,108	116,501,001	58%	Yes	423,061,798
INDUSTRIES	Value Added	610,000	761,200	704,100	956,200	1,052,700	73%		
	Releases	2,791,199	2,360,314	1,922,689	2,207,866	2,013,237	-28%		11,295,305
24 LUMBER AND WOOD	Managed	2,722,114	2,913,797	2,597,521	2,574,474	1,767,208	-35%	Yes	12,575,114
PRODUCTS	Value Added	1,998,900	2,578,600	2,742,300	3,231,000	2,975,700	49%		
	Releases	2,943,271	2,529,087	2,071,956	1,101,114	1,131,879	-62%		9,777,307
30 RUBBER AND MISC.	Managed	811,518	732,130	748,950	794,065	735,531	-9%	Yes	3,822,194
PLASTICS	Value Added	1,700,900	1,953,900	2,168,600	2,295,600	2,581,700	52%		
	Releases	795,496	1,100,403	1,446,156	1,558,093	4,365,518	449%		9,265,666
20 FOOD AND KINDRED	Managed	4,371,364	5,565,216	5,135,715	5,512,762	5,826,636	33%	No	26,411,693
PRODUCTS	Value Added	6,574,200	6,574,202	6,574,204	6,574,206	6,574,208	0%		
	Releases	1,785,405	1,729,239	1,895,679	1,912,658	1,850,671	4%		9,173,652
37 TRANSPORTATION	Managed	2,235,843	2,567,826	3,120,804	3,466,216	3,229,814	44%	Yes	14,620,503
EQUIPMENT	Value Added	1,450,700	1,810,500	2,475,100	2,989,100	2,940,700	103%		
	Releases	2,773,448	1,981,168	1,780,370	1,341,745	847,234	-69%		8,723,965
28 CHEMICALS AND ALLIED	Managed	18,824,890	23,779,825	30,856,356	15,680,466	26,106,461	39%	Yes	115,247,998
PRODUCTS	Value Added	1,445,400	1,948,200	1,701,600	2,136,200	2,060,200	43%		
	Releases	1,986,992	1,848,625	1,673,739	1,497,697	1,481,041	-25%		8,488,094
35 INDUSTRIAL, COMM.	Managed	1,197,617	1,186,310	1,234,116	1,153,569	1,015,415	-15%	Yes	5,787,027
MACH. AND COMPUTER	Value Added	3,525,600	4,310,400	5,110,700	4,969,300	5,264,700	49%		
	Releases	1,754,062	1,902,415	1,835,476	1,437,254	1,077,479	-39%		8,006,686
29 PETROLEUM REFINING	Managed	2,675,761	2,755,395	2,836,531	151,009	1,774,409	-34%	Yes	10,193,105
	Value Added	-	888,300	466,300	831,500	718,600	-19%		
	Releases	2,122,871	1,867,872	743,641	540,559	407,288	-81%		5,682,231
36 ELECTRONIC EQUIPMENT	Managed	6,626,462	6,585,281	5,795,911	7,070,831	7,183,102	8%	Yes	33,261,587
AND COMPONENTS	Value Added	3,464,000	4,761,500	4,580,800	5,401,700	6,009,400	73%		
	Releases	1,204,016	1,079,996	903,811	636,023	541,944	-55%		4,365,790
38 INSTRUMENTS AND	Managed	1,197,617	1,186,310	1,234,116	1,153,569	1,015,415	-15%	Yes	5,787,027
RELATED PRODUCTS	Value Added	3,525,600	4,310,400	5,110,700	4,969,300	5,264,700	49%		
	Releases	484,519	347,669	327,079	262,412	221,002	-54%		1,642,681
27 PRINTING AND PUBLISHING	Managed	351,506	470,506	385,057	428,760	382,077	9%	Yes	2,017,906
	Value Added	5,465,900	6,137,700	6,456,400	7,134,000	7,819,500	43%		
	Releases	466,714	487,307	244,058	216,230	192,993	-59%		1,607,302
25 FURNITURE AND FIXTURES	Managed	378,104	389,802	362,051	333,932	304,537	-19%	Yes	1,768,426
	Value Added	527,900	622,500	604,300	612,500	681,800	29%		
	Releases	295,200	161,700	169,000	227,050	191,000	-35%		1,043,950
31 LEATHER AND LEATHER	Managed	621,660	704,080	718,740	472,840	401,512	-35%	Yes	2,918,832
PRODUCTS	Value Added	-	-	-	272,300	279,900	3%		
	Releases	45,760,755	31,914,455	25,725,620	22,896,702	23,547,245	-49%		149,844,777
TOTALS	Managed	163,498,801	179,457,976	187,817,301	184,046,184	230,268,362	41%	Yes	945,088,624
	Value Added	35,822,500	42,976,602	45,058,104	49,507,006	52,434,308	46%		

Sources: 1991 - 1996 TRI, Section 8.
1995 Value Added data — Minnesota Department of Trade and Economic Development

Statewide environmental releases – 1996

In 1996, 418 reporting facilities in Minnesota released 22 million pounds of toxic chemicals into the state's air, water and soil. This is a ten-percent decrease from 1995, when 454 reporting facilities released about 24.5 million pounds of toxic chemicals to the environment.

Top reducers of chemical releases

In 1996, 47.7 percent of TRI-reporting facilities reduced their chemical releases from 1995 levels. Sixty-six facilities reduced releases by more than 10,000 pounds; ten of those facilities reduced releases by more than 100,000 pounds. The following table shows the facilities who achieved the greatest reductions in absolute quantities of chemicals.

TOP REDUCERS OF ENVIRONMENTAL RELEASES
(in pounds)

Facility Name	1995 Releases	1996 Releases	Change in Releases
HONEYMEAD PRODUCTS CO.	1,100,000	770,000	-330,000
NORTH STAR RECYCLING-MINNESOTA	1,273,400	960,782	-312,618
NORTHWEST AIRLINES, INC.	393,341	82,200	-311,141
FORD - TWIN CITIES ASSEMBLY PLANT	861,790	636,825	-224,965
THERMO KING CORP.	269,000	52,900	-216,100
BOISE CASCADE CORP.	881,530	713,510	-168,020
SOUTHERN MN BEET SUGAR COOPERATIVE	780,071	634,472	-145,599
ARCHER DANIELS MIDLAND CO.	539,685	409,251	-130,434
CRYSTAL CABINET WORKS, INC.	341,303	218,438	-122,865
ANDERSON WINDOWS CORPORATION	198,588	116,860	-81,728

Source: 1995 - 1996 TRI, Section 8

Top increasers in chemical releases

In the same year, 35.8 percent of TRI-reporting facilities *increased* their chemical releases from 1995 levels. Thirty-nine facilities increased releases by at least 10,000 pounds; only one facility increased its releases by more than 100,000 pounds. (Silgan Container Corporation started production in the middle of 1995, so 1996 was its first full reporting year.) The following table shows the facilities reporting the largest increases in absolute pounds of chemicals released. The remainder of the facilities reported no change in quantities released.

TOP INCREASERS OF ENVIRONMENTAL RELEASES
(in pounds)

Facility Name	1995 Releases	1996 Releases	Change in Releases
SILGAN CONTAINERS CORP. (St. Paul)*	17,500	214,000	196,500
NORTH STAR STEEL-MINNESOTA	24,873	121,347	96,474
GOPHER RESOURCE CORP.	178,900	268,400	89,500
3M COTTAGE GROVE CENTER	529,711	613,997	84,286
KOCH REFINING CO. (KRC)	793,485	876,889	83,404
MINNESOTA MINING & MFG. - HUTCHINSON	2,070,775	2,153,759	82,984
LARSON GLASTRON BOATS, INC.	191,420	255,225	63,805
TWIN CITY TANNING COMPANY	3,000	61,781	58,781
AMERICAN NATIONAL CAN CO.	270,095	320,120	50,025
SILGAN CONTAINERS CORP. (City of Savage)	92,800	134,800	42,000

Source: 1995 - 1996 TRI, Section 8

* Silgan Containers Corporation started up in late 1995, so 1996 was the company's first full year of reporting.

SUMMARY OF TOP 15 CHEMICALS RELEASED IN 1996
(in pounds)

Chemical Name	Amount of Release
TOLUENE	3,020,400
N-HEXANE	2,671,415
METHANOL	2,059,924
XYLENE (MIXED ISOMERS)	1,969,190
AMMONIA	1,836,043
METHYL ETHYL KETONE	1,543,388
STYRENE (MONOMER)	1,162,931
GLYCOL ETHERS	866,780
N-BUTYL ALCOHOL	668,600
ZINC COMPOUNDS	635,210
FORMALDEHYDE	536,434
TRICHLOROETHYLENE	428,925
DICHLOROMETHANE	388,013
COPPER COMPOUNDS	332,607
CARBONYL SULFIDE	279,275
TOTAL	18,399,135

Source: 1995 - 1996 TRI, Section 8

Top 15 chemical releasers, 1996

Each year, the same 15 facilities are responsible for about 50 percent of the TRI-reported chemical releases in Minnesota. The following tables summarize chemical releases and chemical management at those facilities. The remaining 50 percent of total chemical releases come from many diffuse sources emitting smaller quantities of chemicals.

SUMMARY OF ENVIRONMENTAL RELEASES (TOP 15 FACILITIES)	
Facility Name	Quantity Released (lbs)
Minnesota Mining & Mfg. - Hutchinson	2,153,759
North Star Recycling	960,782
Koch Refining	876,889
Honeymead Products	770,000
Boise Cascade Corporation	713,510
Archer Daniels Midland Co.	660,000
Ford - Twin Cities Assembly Plant	636,825
Southern Minnesota Sugar Beet Cooperative	634,472
3M Company	620,632
3M Cottage Grove Center	618,616
Archer Daniels Midland	409,251
Potlatch Corp. - OSB	363,820
Potlatch Corp.	352,334
American National Can Co.	320,120
Crown Cork & Seal Co., Inc. (Owatonna)	310,000
TOTAL	10,401,010

Source: 1996 TRI, Section 8

Top releasers by individual facility, 1991 - 1996

Note: The other seven top releasers are also top chemical managers, and are profiled in previous pages.

HONEYMEAD PRODUCTS SARA 313 DATA SUMMARY * (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	0	0	0	0	1,100,000	770,000	-30%
OFF-SITE MANAGEMENT	23,500	22,500	23,200	20,600	0	19,900	-15%
ON-SITE MANAGEMENT	1,760,000	1,940,000	2,345,000	2,456,000	21,800	0	-100%
TOTAL CHEMICALS MANAGED	1,783,500	1,962,500	2,368,200	2,476,600	1,121,800	789,900	-56%

* The increase in releases and total chemicals managed in 1995 is due entirely to a change in federal reporting requirements that added N-Hexane to the TRI list. Prior to 1995, Honeymead was not required to report on N-Hexane.

ARCHER DANIELS MIDLAND CO. SARA 313 DATA SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 -'96 Change
ENVIRONMENTAL RELEASES	4	4	1	1	740,000	660,000	-11%
OFF-SITE MANAGEMENT	-	-	-	-	-	-	
ON-SITE MANAGEMENT	921,120	961,440	150,000	50,000	500	550	10%
TOTAL CHEMICALS MANAGED	921,124	961,444	150,001	50,001	740,500	660,550	-11%

SOUTHERN MN BEET SUGAR COOPERATIVE SARA 313 DATA SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	-	-	619,400	555,825	780,071	634,472	2%
OFF-SITE MANAGEMENT	-	-	-	-	-	-	
ON-SITE MANAGEMENT	-	-	-	-	-	-	
TOTAL CHEMICALS MANAGED	-	-	619,400	555,825	780,071	634,472	2%

ARCHER DANIELS MIDLAND (RED WING) SARA 313 DATA SUMMARY* (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	1,008	1,008	509	-	539,685	409,251	40500%
OFF-SITE MANAGEMENT	-	5	-	-	329	325	
ON-SITE MANAGEMENT	-	-	-	-	-	-	
TOTAL CHEMICALS MANAGED	1,008	1,013	509	-	540,014	409,576	40533%

***** The increase in releases and total chemicals managed in 1995 is due entirely to a change in federal reporting requirements that added N-Hexane to the TRI list. Prior to 1995, Archer Daniels Midland was not required to report on N-Hexane.

POTLATCH CORP. - OSB SARA 313 DATA SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	211,700	167,739	171,045	170,840	367,194	363,820	72%
OFF-SITE MANAGEMENT	-	-	-	-	-	-	
ON-SITE MANAGEMENT	-	-	-	-	-	-	
TOTAL CHEMICALS MANAGED	211,700	167,739	171,045	170,840	367,194	363,820	72%

AMERICAN NATIONAL CAN CO. SARA 313 DATA SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	280,216	259,085	280,068	280,069	270,095	320,120	14%
OFF-SITE MANAGEMENT	3,500	1,000	3,440	2,150	1,730	5,620	61%
ON-SITE MANAGEMENT	337,000	697,000	667,000	49,000	38,000	38,000	-89%
TOTAL CHEMICALS MANAGED	620,716	957,085	950,508	331,219	309,825	363,740	-41%

CROWN CORK & SEAL CO., INC. (OWATONNA) SARA 313 DATA SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'94 - '96 Change
ENVIRONMENTAL RELEASES	-	-	-	31,000	280,000	300,270	869%
OFF-SITE MANAGEMENT	-	-	-	-	-	-	
ON-SITE MANAGEMENT	-	-	-	30,000	-	23,000	-23%
TOTAL CHEMICALS MANAGED	-	-	-	61,000	280,000	323,270	430%

NORTH STAR RECYCLING - MINNESOTA SARA 313 SUMMARY (in pounds)							
	1991	1992	1993	1994	1995	1996	'91 - '96 Change
ENVIRONMENTAL RELEASES	1,333,400	1,293,100	1,955,000	1,449,000	1,273,400	960,782	-28%
OFF-SITE MANAGEMENT	-	-	-	-	-	-	
ON-SITE MANAGEMENT	-	-	-	-	-	-	
TOTAL CHEMICALS MANAGED	1,333,400	1,293,100	1,955,000	1,449,000	1,273,400	960,782	0%

SUMMARY OF TOP 15 SIC CODES BY AMOUNT OF CHEMICALS RELEASED (in pounds)	
SIC CODES	Amt of Releases
20 FOOD AND KINDRED PRODUCTS	17,050,177
28 CHEMICALS AND ALLIED PRODUCTS	1,261,468
26 PAPER AND ALLIED PRODUCTS	792,823
25 FURNITURE AND FIXTURES	680,769
24 LUMBER AND WOOD PRODUCTS	661,136
27 PRINTING AND PUBLISHING	390,918
30 RUBBER AND MISC. PLASTICS	319,004
34 FABRICATED METAL PARTS	259,815
33 PRIMARY METAL INDUSTRIES	235,502
29 PETROLEUM REFINING	125,320
35 INDUSTRIAL & COMMERCIAL MACHINARY MFRS	114,428
32 STONE, CLAY, GLASS &CONCRETE PRODUCTS MFRS	110,206
31 LEATHER AND LEATHER PRODUCTS	61,375
36 ELECTRONIC & OTHER ELECTRICAL EQUIP MFRS	9,983
37 TRANSPORTATION EQUIPMENT	884
38 INSTRUMENTS AND RELATED PRODUCTS	50
TOTAL	22,073,858

Source: 1996 TRI, Section 8

Chapter 3: Pollution Prevention Incentives and Financial Assistance

Governor's Awards for Excellence in Waste and Pollution Prevention

The Governor's Awards for Excellence in Waste and Pollution Prevention honor private and public organizations that have demonstrated exceptional accomplishments in pollution and waste prevention, reduction and reuse. Organizations are recognized for going beyond traditional treatment, control and disposal techniques, focusing instead on preventing, reducing and reusing wastes. Since its inception in 1991, the annual program has recognized over 35 organizations for their pollution prevention accomplishments. Some recipients have acknowledged the awards as a motivating factor in their subsequent decisions to make further environmental improvements — an "unintended," yet highly beneficial outcome of the program.

To evaluate nominees for the awards, the OEA selects a panel of judges from industry, government, and environmental and community organizations. Applications are evaluated on environmental and economic benefits, innovation, and commitment and leadership in accomplishing pollution and waste prevention. Organizations that can serve as models for others are especially preferred.

Eligible applicants include manufacturing, commercial/service or retail businesses; public organizations; educational institutions; community or civic organizations; and trade associations and other business groups.

1996-1997 Governor's Awards

In 1996, the OEA received 50 nominations for the Governor's Awards. Governor Carlson presented seven awards and one honorable mention during a special reception at the State Capitol in May 1996. Award recipients were also recognized in a lunch-time ceremony at the Minnesota Conference on Pollution Prevention in June 1996, and promoted through press releases.

In 1997, the Governor's Awards ceremony was a key feature of Minnesota's Pollution Prevention Week activities. A ceremony at the Minnesota History Center highlighted award winners; past accomplishments in pollution prevention were also touted.

Total annual savings reported by award recipients exceeded $588,000 in 1996 and $2 million in 1997, proving that pollution prevention has economic advantages as well as environmental ones.

New promotional strategies

In 1997, the OEA instituted a new strategy to publicize the Governor's Award program. The OEA featured all winners, past and present, in large advertisements placed in the *Star Tribune*, *Pioneer Press* and *City Business* newspapers, to provide greater visibility for these winners to their business peers and the general public. Advertising is another level of acknowledgment to those businesses and organizations that have led the way in establishing pollution prevention within their cultures and operations.

The next phase of promoting the leaders in pollution prevention is to write articles, fact sheets and case studies on individual winners, and expand the distribution of these pieces. OEA staff plan to mail articles to a particular industry or sector, and to the trade organizations related to the industry or business being featured. This year-round effort will further educate and inform interested readers about the success of waste and pollution prevention efforts, and showcase methods or processes that they can relate to or apply.

1996 Governor's Award winners

Larson/Glastron Boats, Little Falls, is a manufacturer of small fiberglass runabout boats and small to mid-size fiberglass cabin cruisers, and has been in business since 1913. The company initiated a program in 1990 to significantly reduce emissions from its plants and improve the safety of the work environment for its employees. Since then, the company has successfully replaced acetone, its primary VOC-producing compound, with water-based emulsifiers and a nonhazardous cleaner. The company also eliminated 90 percent of its 1,1,1 trichloroethane emissions by switching to water-based adhesives. This change has saved the company $103,000 and reduced emissions by 51 tons per year.

In 1995, Larson/Glastron switched to a low-styrene-based resin and new application equipment that the company anticipates will reduce styrene emissions by more than 13 percent. Other state-of-the-art technologies include the use of water-blown foam for seat cushions, and electrostatic spray-up of gel-coat.

Marvin Windows and Doors, Warroad, created a focused pollution prevention program several years ago, consolidating efforts throughout its environmental, engineering, production, purchasing, personnel and quality control departments. Between 1988 and 1994, this leading manufacturer of wood windows and doors reduces nearly 75 percent of five targeted EPA 33/50 chemicals.

VOC emissions from painting operations were reduced by 80 percent by replacing the original topcoat with a higher solids topcoat. Additional improvements in equipment, operator training and quality checks resulted in increased paint transfer efficiency.

Other environmental improvements include the elimination of all VOC emissions and releases of SARA 313 TRI chemicals from the strippable coating process, the replacement of a solvent-based lacquer with a water-based one, the elimination of a silicone sealer containing nearly 35 percent toluene, and the elimination of waste wood putty as a hazardous waste stream.

In 1994, the **More 4 Store** in Farmington, was designed and built with an environmental focus. The store, owned by Erickson's Diversified Corporation, installed a refrigeration system that contains no CFCs. Unlike conventional grocery store flooring, the highly-polished concrete flooring installed in the store never needs stripping or waxing, thus eliminating hazardous by-products from these processes. The store's lighting, T8 fluorescent bulbs, are the most efficient on the market today, using 50 percent less energy than the older T12 bulbs.

More 4 has also significantly reduced its solid waste generation by using re-inked cash register ribbons, implementing an inventory tracking system that reduces spoilage, and reusing containers and envelopes. The store's food waste is collected by a local farmer and fed to hogs. The store recycles cardboard, paper, glass, tin, aluminum, plastics, fluorescent tubes and stretch wrap. On-going efforts to educate customers includes a display of cleaning product alternatives and organically grown produce, and a five-cent-per-bag rebate for each bag a customer reuses.

Network Systems Corporation, Brooklyn Park, is a supplier of high-performance networking equipment. Recognizing several years ago that its solid wastes were increasing, the company initiated an aggressive waste reduction, reuse and recycling program that has resulted in a 77-percent decrease in its disposal of compacted trash.

The company began working with vendors to implement reusable shipping systems and bulk parts stocking based on the paperless Japanese reordering method. The company also uses pass-through packaging techniques wherever possible, which encourage the reuse of packaging.

Other company initiatives include: new product designs that require less packaging, new packaging systems designed to fit multiple products, a program to reuse and recycle customer-retired products, and the use of an electronic vendor document exchange system that eliminates more than 1,428 pounds of waste annually.

Onan Corporation, Fridley, Minnesota , is a manufacturer of gasoline and diesel powered electrical generator sets, gasoline and diesel engines, and electrical components. In the early 1990s, the company identified metal finishing as the single largest source of air, water and hazardous waste emissions at its Fridley facility. In 1993, the company formed teams to determine and evaluate alternatives for its existing spray painting and vapor degreasing activities. By May 1993, all vapor degreasing was eliminated from the facility; by October 1994, installation was completed on the major component of the project: the Electrodeposition Painting and Pre-Treatment system —the "E-Coat"system. One of the first of its kind in the world, this state-of-the-art, water-based, two-coat system provides a very durable coating at half the cost of conventional coatings. This highly efficient process, along with the incorporated conservation technologies, has saved Onan over $100,000 while reducing its annual VOC emissions by 55 percent, lowering wastewater discharges by 83 percent, and preventing the generation of 70 tons of hazardous paint waste annually.

Wabasha County is located in southeastern Minnesota. In 1994, Dairyland Equipment Services, Inc. (Plainview) contacted the county's solid waste administrator, looking for proper disposal methods for highly-toxic liquid mercury. This led to a significant effort to study the use of mercury on dairy farms. Tom Mosher, the county's solid waste officer, with assistance from the Minnesota Technical Assistance Program (MnTAP), found over 84 pounds of mercury in Wabasha County, either on dealers' shelves or on dairy farms; over 2,000 pounds of dairy-related mercury exists statewide.

Mercury manometers, used to monitor pressure in milking machines, were a major source of the mercury. Research turned up two acceptable, non-mercury alternatives.

Wabasha County disseminated fact sheets to all dairy equipment dealerships in as well as to dairy equipment manufacturers that participated in the project. The county now hopes to play an integral role in resolving this mercury problem through the replacement of mercury manometers in Minnesota's dairy industry.

The **Ramsey County Business Waste Assistance Program** is one of the first large-scale efforts by a local government in Minnesota to address business waste management issues. Since 1991, each of the 15,000 businesses in the county has been contacted at least four times about waste management issues. More than 560 businesses have received consultation on pollution prevention and recycling, and 750 businesses have requested printed materials. The county has also sent mailings to approximately 4,000 businesses, and conducted a door-to-door campaign reaching another 560 businesses, to raise awareness of waste and pollution prevention and recycling.

Partnerships with business associations, municipalities, peer programs and other service providers are an integral part of Ramsey County's program. These partnerships have enhanced the impact of limited resources, founded relationships in the community, and given partners an opportunity to be of greater service to members or constituents. Ramsey County also actively participates in Counties and Cities Involved in Source Reduction and Recycling (CISRR), a public forum to distribute and coordinate assistance materials to all Minnesota counties.

Honorable Mention: Citizens for a Better Environment (CBE) is an environmental organization located in Minneapolis. CBE's **Good Neighbor Project** fosters pollution prevention by bringing local citizens together with management at industrial facilities to set common goals for reductions in toxics use. Since 1991, the Good Neighbor Project has worked with citizens, labor unions, state and local officials, and business managers in 21 Minnesota communities. To date, two of the nine plants that have participated in Good Neighbor dialogues have signed Good Neighbor agreements demonstrating their commitment to pollution prevention. Through its Good Neighbor project, CBE has worked to build community awareness of pollution prevention, while encouraging non-adversarial communication and cooperation between businesses and local residents.

1997 Governor's Award winners

Automated Building Components (ABC), Millwork Division, Chanhassen, is a supplier of millwork products and services to professional builders. From 1994 to 1996, ABC succeeded in reducing its toluene use by 16,990 pounds and VOCs by 48,200 pounds. Hazardous waste generation was eliminated altogether in 1996 by switching from standard coatings to non-hazardous, water-based alternatives. Such a conversion is not an easy one in the wood finishing business. Operational changes and finish quality concerns had to be addressed, a process that took experimentation, patience and persistence on the company's part.

ABC is one of the few wood finishers in Minnesota that have converted finishing operations to water-based alternatives. The company worked closely with its coating supplier to find a coating that would work in its finishing processes. ABC also worked closely with MnTAP and with the MPCA's Small Business Assistance Program to document their efforts, so that other wood finishers in the state could benefit from their experiences.

Crown Cork & Seal, Plant #23, Faribault, is a manufacturer of aerosol cans. They successfully replaced a Heptane and tab lube combination with a water-soluble material,. eliminating annual use of 8,500 gallons of Heptane, and creating a healthier work environment for employees. The company also eliminated the use of Isopropanol on the litho printing presses. This change is especially significant, as Isopropanol is classified as 100-percent VOC and is a reportable chemical. This change eliminated a yearly usage rate of 6,700 gallons and 43,550 pounds of Volatile Organic Compounds.

Other environmental initiatives at Crown:

- An internal, employee-led team to identify recycling and waste reduction opportunities.
- Replacement of inefficient lighting fixtures with much more energy-efficient ones.
- Recycling over 60 percent of the company's solvent.
- A pallet return and repair program.
- Solidifying a "Good Neighbor" agreement with the local community of Faribault.

Andersen Corporation, Bayport, is a manufacturer of windows and patio doors. From 1986 to 1996, the company reduced annual TRI

emissions by 85 percent, VOC emissions by 50 percent, hazardous waste by nearly 38 percent, and solid waste by over 90 percent. In 1993 Andersen established an Environmental Management System that covers all aspects of the company's environmental operations.

The company has implemented numerous pollution prevention projects that include: converting its wood preservative operations from solvent-based to water-borne preservative solutions; installing four automated meter-mix painting systems to reduce the generation of hazardous paint waste; improving packaging efficiency by developing a reusable glass transport system; and developing a unique structural composite material, Fibrex™, made of reclaimed wood from internal operations and a special thermoplastic polymer. Fibrex™ is manufactured into parts that are assembled into Andersen window and patio door products.

Dana Corporation, Spicer Clark-Hurth Off-Highway Components Division, Plymouth, is a manufacturer of off-highway axles. Since 1993, Dana has focused its environmental policy and programs on air and water pollution prevention, reduction of manufacturing waste, and energy efficiency. Dana has conducted over 30 pollution prevention and waste reduction projects, including the elimination of several maintenance chemicals and hazardous organic degreasing solvents, and reducing toxicity of paint and other wastes.

Dana Corporation has achieved:

- A 98-percent reduction in hazardous waste.
- 65 percent fewer carbon monoxide emissions.
- A 55-percent reduction of water consumption,
- 60-percent reduction of particulate emissions.
- Reuse of 99.5 percent of machine oil and coolant.
- Zero-waste water discharge.

Annual savings total $280,000 in reduced energy consumption, chemical purchases and hazardous waste disposal costs.

West Group, Eagan, set out in 1995 to develop a process to replace developers containing hydroquinone (a SARA Extremely Hazardous Substance) in their PrePress Department. Working with Fuji Hunt, one of their primary suppliers, West Group officials successfully eliminated, through product substitution, six hydroquinone-based products. Between 1994 and 1996, this substitution reduced the company's inventory of hydroquinone by 60 percent and its usage by 91 percent. Annual savings include $4,250 in reduced labor, handling, maintenance, floor space, order processing and inventory costs.

Other pollution prevention initiatives at West Group include: testing of a non-hazardous press wash that could make waste ink and press towels non-hazardous; reducing water usage by 36,000 gallons a day by using water misers on film and plant processors in PrePress; and incorporating extensive, facility-wide recycling efforts.

Stowe Environmental School, Duluth, is the Duluth Public School District's flagship environmental school, serving students from pre-school through fifth grade. Since September 1994, Stowe school has emphasized a curriculum that integrates environmental themes in every discipline and serves as a model for environmental education.

Students are involved in all aspects of waste reduction and recycling at the school including: conducting a waste audit of solid waste in the school's classrooms, offices and cafeteria; replacing disposable napkins with cloth napkins and using reusable dishware and trays; cutting food waste by calculating more accurate food orders; composting excess food using red worms in bins (vermiculture); separating paper, plastic, glass and metal for recycling;

formalizing a pollution prevention plan; and establishing a sustainable community program through projects with community organizations and agencies.

Stowe has reduced its annual solid waste by 84 tons, saving the school district over $6,800. In addition, the Food Services Department of the Duluth public school district has expressed an interest in a district-wide cafeteria waste reduction program based on Stowe's success. Information on Stowe's successes has been shared with other schools.

Aveda Corporation, Blaine, is a manufacturer of cosmetics and personal care products. Throughout its almost 20-year history, the Aveda Corporation has based its business practices on environmental sensitivity and sustainability principles. Emphasizing waste reduction and recycling throughout its production facility and retail stores, Aveda's principles influence every discussion and decision.

In 1995, Aveda began taking a life-cycle analysis approach in selecting packaging materials. Through this analysis, cradle-to-grave environmental impacts are evaluated and ranked. For example, Aveda looks beyond the ability to recycle an item to determine its environmental impact on transportation, energy use and the manufacturing process.

Aveda's estimates of its annual reductions:

- 570,000 kilowatt hours of electricity.
- Over 3,000 pounds of nitrogen and sulfur oxides
- 850,000 pounds of carbon dioxide
- 427,000 gallons of water
- 100 gallons of hazardous solvent waste.

Annual savings are estimated to be more than $36,000. More than 90 percent of Aveda's raw materials for its product lines come from renewable plants rather than petrochemicals. Due to Aveda's strong corporate commitment to a sustainable environment, some actions are implemented even though they are not cost-effective.

The **John Roberts Company** is a commercial printer based in Coon Rapids. Internal pollution prevention initiatives have reduced solvent use by 65 percent, conserved 402,000 gallons of water annually, and eliminated the need for 368,000 pounds of isopropyl alcohol. Savings include $28,000 in annual hazardous waste disposal and $129,000 saved through alcohol substitution. As a participant in the EPA's Environmental Leadership Pilot Program, the John Roberts Company was instrumental in providing environmental stewardship to small companies that do not have the resources to develop their own comprehensive program. This included demonstrating how better management practices could reduce environmental impacts, how to increase bottom-line savings and how to assure their future environmental health, regardless the size of the business.

Employees of John Roberts are actively involved in several areas to accomplish pollution prevention and waste reduction. A 14-member safety and environmental committee meets every two weeks, an internal newsletter has an environmental issues column, and annual company gain sharing is linked with environmental performance.

Honorable Mention: The Metropolitan Materials Exchange Program (MAX) is a free materials exchange service designed to assist in the reduction of commercially-generated solid and hazardous waste in the Twin Cities. The materials exchange is primarily supported by the Solid Waste Management Coordinating Board (SWMCB), which is comprised of 15 elected officials from the seven county metropolitan area. The MAX operates in partnership with the Minnesota Technical Assistance Program and the Minnesota Office of Environmental Assistance. The program works with businesses

that have unwanted materials that are useful to other businesses. If a material cannot be exchanged quickly, the material is listed in a catalog that is distributed to other businesses.

Since 1996, it is estimated that MAX has helped businesses save over $442,000 in avoided purchase and disposal costs for hazardous and non-hazardous materials. MAX is considering use of the Internet to promote the program to a wider audience.

Honorable Mention: The Minnesota Asphalt Pavement Association (MAPA) represents the majority of hot mix asphalt producers in Minnesota. In 1995, the organization developed a pollution prevention program to educate the industry on the opportunities for pollution prevention and environmentally sound management. MAPA's mission is to increase awareness and expertise of company owners and plant operators, so they can minimize the environmental impact of construction projects and production sites. Through MAPA's leadership, the training program became a cooperative effort between government agencies, industry representatives and environmental consultants.

The training program is updated annually and promoted through MAPA's newsletter. It is the first ongoing environmental training program of its kind in the construction industry in the United States. Feedback from participants has been very positive – numerous companies have commented about learning new management practices that lower operating costs while conserving energy and reducing pollution. The program has proven that pollution prevention can be a "win-win" for companies, government entities and the environment.

Waste and pollution prevention grants

To streamline its financial assistance delivery and improve service to its clients, the OEA conducted two consolidated grant cycles in the spring and fall of 1996 that encompassed the majority of its competitive financial assistance activities. These programs included waste education, pollution prevention and source reduction, market development and waste separation.

The consolidated grant rounds were intended to:

- Provide grant applicants with a single due date for proposals for all applicable grant programs.
- Merge and apply common eligibility and review criteria within the various grant programs.

In addition, the combined program enabled applicants to address problems in a holistic manner. Proposals could blend elements of the different grant programs, thus furthering the pollution prevention and waste management goals of the state.

Comprehensive new grant program

Statutory changes in 1996 authorized the OEA to develop a new, comprehensive grant and loan program which was broader in scope than earlier programs, yet encompassed most activities previously administered under separate grant programs. Rules for the Environmental Assistance Grant and Loan Program were enacted in 1997, and encompass all of the OEA's grant-making activities, including:

- Pollution prevention.
- Solid waste source reduction.
- Environmental education.

- Market development of recyclables or compost.
- Recycling and reuse.
- Resource conservation.
- Resource recovery.

The new rules eliminate the complexity and redundancy that existed among the OEA's financial assistance programs, while allowing for more project options. Potential applicants have an incentive to address multiple areas of eligible environmental activities in an integrated fashion, as opposed to a piecemeal approach.

Spring 1996

The pollution prevention component of the spring 1996 grant round targeted projects that addressed the prevention, reduction or reuse of:

- High-volume chemical releases
- Construction or demolition wastes
- Wastes generated through government, education, manufacturing or other business operations.

Outreach programs on pollution prevention for the retail, commercial and service industries were also eligible for pollution prevention funding, as were public-private partnerships and local or regional training related to sustainable communities. The maximum grant available was $100,000.

Fall 1996

The fall 1996 grant cycle targeted several industries, sectors and materials for pollution prevention/solid waste source reduction assistance:

- Construction and demolition
- Hospitality
- Office buildings
- Mercury-containing products
- Transport packaging.

Also eligible were projects that promote "sustainable communities" by emphasizing the environmental, economic and social needs and priorities of local communities. The maximum grant available was $100,000.

Funded grant projects

In Fiscal Year (FY) 1996 – spring 1996 – the OEA received 42 pollution prevention and sustainable communities grant applications. Sustainable community projects were primarily funded under the pollution prevention grant program because of their primary emphasis on pollution prevention. A total of $1,963,218 in funding was requested with total project costs of $4,551,275. The OEA funded fifteen projects for $441,075 with total project costs of $1,375,327.

In FY 1997 – fall 1996 – the OEA received 46 pollution prevention and sustainable communities applications, requesting $2,259,539, to conduct projects with total costs of $8,669,311. The OEA funded 17 projects for $775,961 with total project costs of $2,607,887.

A summary of funded projects follows.

Organization	Date Awarded	Current Status	Amount Awarded	Project Cost	Project Description
Hennepin County Environmental Services Division	7/18/96	In Progress	$30,000	$131,960	Asses the existing pollution prevention activities of hazardous waste generators and examines methods for promoting further efforts, particularly direct company contact.
Institute for Local Self-Reliance	7/18/96	In Progress	$30,000	$63,850	Demonstrates the “Carbohydrate Economy” concept, encouraging the use of plant matter as a feedstock for biochemicals, biofuels, biomass energy, construction materials, and as a source of fibers (for textiles, paper, etc.).
Land Stewardship Project, Western Minnesota Office	7/18/96	In Progress	$50,000	$287,960	Public-private partnership to transform the lower Chippewa River Basin into a "model sustainable watershed” through planning, implementing and monitoring sustainable land-use activities.
Lyndale Neighborhood Association	7/18/96	In Progress	$10,000	$24,000	Empowers inner city residents to reduce solid & toxic waste, improve safety and build community through: 1) Eco-Teams 2) Environmental Contacts, 3) Neighborhood-wide education efforts and actions.
Lyon County Environmental Office	7/18/96	In Progress	$17,000	$68,000	Promotes and implements source reduction, reuse, recycling and appropriate disposal of solid and hazardous waste among southwest Minnesota businesses.
Minnesota Waste Wise	7/18/96	In Progress	$40,965	$83,016	Program to encourage businesses to implement a comprehensive waste reduction program through workshops, information packets, organization of inter-association waste reduction challenges, a quarterly newsletter and individualized assistance.
Ronald R. Rich & Associates	7/18/96	In Progress	$41,750	$230,250	Project will assess levels of unnecessary toxic metals in many process and maintenance chemicals used by industrial and commercial companies and will work with companies and their vendors to reduce the use of toxic metal products and their metals content.
Solid Waste Management Coordinating Board	7/18/96	In Progress	$41,083	$82,166	Project will advance the Metro Area eXchange (MAX), a materials exchange for metro businesses initiated by the Solid Waste Management Coordinating Board in April, 1995, from start-up to an on-going operational state.
Stowe Elementary School	7/18/96	In Progress	$18,060	$36,120	A partnership of schools and agencies creating a model of environmental service learning in the Stowe enrollment area.

Organization	Date Awarded	Current Status	Amount Awarded	Project Cost	Project Description
The Water Foundation	7/18/96	In Progress	$32,500	$89,874	Pilot project will select hardware retailers in Minnesota to research, identify and document cost/benefits of "best management practices and products" leading to waste reduction and pollution prevention in the hardware retail sector and ultimately by their customers.
University of Minnesota Conservation Biology	7/18/96	In Progress	$26,463	$52,955	Project will create an Advisory Committee consisting of local participants, agency representatives, and concerned organizations to design and implement plans to achieve the pollution prevention, waste reduction, and waste education goals outlined in both the City of Savage's Alternative Urban Areawide Review and the DNR's Aquatic Management Area Plan.
Vision-Ease Lens	7/18/96	In Progress	$16,754	$67,251	Project will implement the use of mechanical blocking fixtures, in place of wax, to hold glass button parts during their generating process, thereby eliminating the use of wax and 12,000 to 15,000 pounds. of trichloroethylene (used for wax removal) annually.
Washington County Extension Service	7/18/96	In Progress	$60,000	$122,000	Project will put in place a targeted public education plan designed to eliminate and reduce the quantity of pollutants generated by small acreage landowners in Washington County.
Woodbury/Cottage Grove League of Women Voters	7/18/96	In Progress	$6,000	$12,925	Promote public education and civic involvement supporting community environmental sustainability planning and implementation in the city of Woodbury, Minnesota.
The Yellow Bike Coalition	8/22/96	In Progress	$20,500	$43,000	Coordinate the labor and expertise of "at risk" youth, volunteers and organizations to develop a bicycle reuse and recycling program.
Cities Management Inc.	1/27/97	In Progress	$34,862	$69,724	Development of a resource directory of current information related to waste reduction techniques and sources, and a training curriculum that helps office building managers, owners, and tenants and member associations implement a waste recycling, source reduction and pollution prevention program.
Lincoln County	1/27/97	In Progress	$75,000	$188,683	Implementation of a planning initiative focusing on practical and sustainable approaches to the future. The project will result in a model rural planning and development process featuring unprecedented public involvement in all aspects of the process.

Organization	Date Awarded	Current Status	Amount Awarded	Project Cost	Project Description
Stearns County Environmental Services	1/27/97	In Progress	$50,000	$156,368	Expands Comprehensive Planning activities in order to improve Stearns County's ability to coordinate land use planning with other services, including water planning and solid waste management.
The Minnesota Project	1/27/97	In Progress	$35,000	$96,200	18-month partnership with St. John's University. Project will combine visioning work with direct pollution prevention efforts in four central Minnesota communities.
Urban Ecology Coalition	1/27/97	In Progress	$26,465	$59,040	Assist neighborhoods and the City of Minneapolis in developing livability indicators, an indicator project model, and to convene a Working Team and roundtables to build collaboration between neighborhoods, businesses, government and other stakeholders.
5R Research	3/3/97	In Progress	$30,000	$300,000	Goal is the eventual elimination of approximately 1700 tons of organic chemicals (amine reagents) used annually on the Minnesota Iron Range through the development of a novel patented process using high intensity sound (ultrasonic energy) in-lieu-of chemicals.
American Indian Housing Corporation	3/3/97	In Progress	$47,085	$94,169	Develop a series of three American Indian Housing Design conferences to serve all of the tribes in Minnesota and the urban Indian community. The LCO Ojibwa Community College will then host a semester-long 3-credit course.
Citizens for a Better Environment	3/3/97	In Progress	$20,452	$41,112	Project provides pollution prevention assistance in the Swede Hollow area of Phalen Creek, expanding multi-stakeholder participation in the planning process, providing technical engineering resources, and increasing educational outreach.
Hennepin County Property Services	3/3/97	In Progress	$54,610	$152,850	Hennepin County will develop an environmental building rating system for medical, institutional, and office buildings constructed in Hennepin County. System will encourage good environmental design practices .
Hometown Minnesota Inc.	3/3/97	In Progress	$24,000	$48,200	Plan introduces the concepts of sustainability into the realm of town planning and rural town redevelopment. Project develops a Model downtown plan for rural communities and will implement the plan in three communities.
Minnesota Petroleum Marketers Association	3/3/97	In Progress	$30,000	$100,000	Development of comprehensive environmental management, compliance and pollution prevention plan for Minnesota Petroleum Marketers Association.

Organization	Date Awarded	Current Status	Amount Awarded	Project Cost	Project Description
Saint Paul Neighborhood Energy Consortium	3/3/97	In Progress	$52,487	$176,189	Project brings together many sectors in two neighborhoods and nonprofit organizations in Saint Paul to increase knowledge, understanding and activities related to pollution prevention and sustainable development.
The Green Institute and The ReUse Center	3/3/97	In Progress	$50,000	$173,762	Project will develop a deconstruction salvage business that will reduce the solid waste stream while creating jobs and continuing to promote and expand the reuse of salvaged building materials.
The Institute for Agricultural and Trade Policy	3/3/97	In Progress	$30,000	$100,000	Project to help Minnesota farmers assess the adverse environmental impacts of their pesticide use and guide them in making use reductions.
Timmerman Finishing Inc.	3/3/97	In Progress	$70,000	$408,000	Project to further develop and expand the use of an environmentally-preferable paint & powder coating removal formulation.
University of Minnesota	3/3/97	In Progress	$80,350	$266,550	Habitat for Humanity will develop and construct homes using a combination of volunteer and paid labor, a portion of which will be union workers and apprentices provided through the Minneapolis Building and Construction Trades Council. Building and site design concepts that minimize material needs, use recycled materials, and reduce waste will be developed by the University of Minnesota's College of Architecture and Landscape Architecture.

A few completed grant projects, awarded in 1995, are highlighted below.

Northeast Business Association (NEBA)

NEBA received a $21,000 pollution prevention grant to develop an education, outreach and business development effort for northeast Minneapolis businesses. By focusing on pollution prevention, reuse, recycling and energy conservation, the program was to show businesses how preventing waste and pollution could positively impact their bottom line. The "Environmentors" program utilized, as volunteers, business people with success in pollution prevention and environmentally-sound practices. In addition to meeting with businesses, these volunteer mentors and NEBA staff met to develop ways of publicizing their availability, and to determine best ways to promote pollution prevention, waste reduction and recycling as cost-saving measures.

In cooperation with the OEA, a booklet, *EnvironMentors Advisor: Help Businesses Prevent Waste, Produce Profit*, was developed and distributed to business associations and chambers of commerce throughout Minnesota. The publication guides associations and other organizations through the mentoring process – from helping businesses one-on-one, to conducting waste prevention seminars.

Mentors provided 18 on-site visits to local businesses. The majority of the participating business representatives reported a heightened sense of awareness through the visits; several

made changes in their operations, reducing solid and/or hazardous wastes.

The EnvironMentors committee also hosted roundtables with bankers and insurance agents. These were opportunities to introduce business professionals to the project and to discuss issues involving lending, issuing insurance and pollution prevention. Most bankers expressed interest in having information on the EnvironMentors program shared at their regularly scheduled meetings. Many also requested brochures to distribute to their business customers. The project demonstrated the effectiveness of cooperating with local business associations as a means to motivate businesses to reduce waste.

Minnesota Asphalt Pavement Association (MAPA)

The Minnesota Asphalt Pavement Association (MAPA) represents the majority of hot mix asphalt producers in Minnesota. They received an $18,000 grant to educate asphalt mixture production contractors and their personnel on the proper use and operation of hot mix asphalt (HMA) equipment to minimize environmental effects and prevent pollution. MAPA's mission was to raise the level of awareness and expertise on the part of company owners and plant operators in order to reduce the environmental impacts on air and water quality at production sites and on construction projects. With MAPA's lead, the training program became a cooperative effort between government agencies, industry representatives and environmental consultants.

The training program has been designed to be updated annually. The program is promoted through MAPA's newsletter. It is the first ongoing environmental training program of its kind in the U.S. construction industry. Feedback from participants has been very positive — numerous companies commented about learning new management practices that lower operating costs while conserving energy and reducing pollution. The project demonstrated the effectiveness of cooperating with a trade group to educate its members on ways to reduce waste and pollution.

Crystal Cabinet Works

Crystal Cabinet Works received a $16,000 pollution prevention grant to:

- Increase the capacity of plant personnel to plan and implement an ongoing, comprehensive pollution prevention program for integration into the principle-oriented leadership culture being developed at the plant.
- Explore alternatives to solvent-based wood coatings and processes, as well as suitable alternatives for curing laminating adhesives.
- Implement pollution prevention strategies where feasible
- Participate with other Princeton community members and Citizens for a Better Environment (CBE) in collaborative pollution prevention planning activities.

A number of pollution measures were implemented, successfully reducing waste and pollution. These included: maximizing materials productivity, reformulating coatings to reduce VOC and HAP content, implementing high-transfer efficiency spray equipment, and replacing solvent-based spray contact adhesive with water-based alternatives.

Maximizing materials productivity became a major focus of the project. Materials productivity – a link between environmental management and quality assurance – recognizes that *process* improvements yield *environmental* improvements. It examines resource inputs as well as wastes and emissions to determine opportunities for cost savings and environmental improvements. Implementing this concept reduced the reject rate of finished product.

A switch to air-assisted airless spray guns increased the transfer efficiency of the finishing operations by 15 to 35 percent. Finishing materials use was reduced by 16,757 gallons annually, with annual cost savings of $203,914.

Crystal Cabinets worked closely with suppliers to reduce the amount of hazardous air pollutants (HAP) and volatile organic compounds (VOCs) in its coatings. The switch to low-VOC and low-HAP coatings has reduced toxic releases by 32 percent and VOC emissions by 48 percent. By switching to a water-based contact adhesive, Crystal eliminated the annual use and release of 32,000 pounds of the carcinogen methylene chloride.

Though the level of community involvement in the project was lower than anticipated – due, in part, to staff changes at CBE and a shift in that organization's programmatic focus – Crystal remains committed to communicating its pollution prevention efforts and accomplishments to the Princeton community and to consult with the local Good Neighbor Committee when revising the company's pollution prevention plan.

Chapter 4: Technical Assistance and Outreach

Minnesota Technical Assistance Program (MnTAP)

Enabling legislation

The Minnesota Technical Assistance Program (MnTAP) implements the technical assistance provisions of the Waste Management Act (Minn. Stat. §§ 15A.152, 115A.52 and 115A.55) and the Toxic Pollution Prevention Act (TPPA; Minn. Stat. § 115D.04). The Minnesota Legislature amended the Waste Management Act in 1984 to "provide for the establishment of technical and research assistance for generators of hazardous and industrial waste in the state." The TPPA, enacted by the Legislature in 1990, directs the OEA director to "establish a pollution prevention assistance program" for all persons in the state using, generating, or releasing toxic pollutants, hazardous substances or hazardous wastes.

Funding, mission and staffing

The OEA supports technical assistance activities through a variety of business assistance providers including counties, Minnesota Extension, trade associations and MnTAP, primarily through pass-through funding to counties and grants to others. In support of MnTAP activities, the OEA provides an annual $875,000 grant to the University of Minnesota, School of Public Health, Division of Environmental and Occupational Health. MnTAP uses University resources to research technical solutions to the environmental issues businesses face.

The mission of MnTAP is to provide assistance to Minnesota businesses to protect the environment and stay competitive by providing practical alternatives for properly managing industrial and solid waste, and preventing pollution of our land, air and water. Fourteen full-time and two part-time professionals work at MnTAP in three teams: manufacturing industries, service industries and communications. Cumulative technical staff expertise includes more than 35 years of industrial experience, with education in chemical engineering, environmental engineering and chemistry.

MnTAP assistance

This section describes the types of assistance offered by MnTAP to Minnesota companies who request help with their solid waste, hazardous and nonhazardous industrial wastes, wastewater discharges and air emissions. Technical assistance is one of several tools used in Minnesota to further the implementation of pollution prevention, materials exchange, and proper waste management by businesses and others as a primary means of environmental protection.

Over the years, MnTAP has developed a set of quantitative and qualitative measures for each of its services. These measures include a customer service survey, materials exchange database, case studies, intern project results, and others. Results through 1997 are presented in this report.

Telephone Assistance

Telephone calls are often a company's first contact with MnTAP staff. A number of other contacts are "regular customers" working through a series of environmental issues such as waste management or regulatory compliance. Emphasis is placed on responsiveness and completeness in getting information to the company. Pollution prevention is offered as part of the solution wherever it applies.

Over the two-year period from 1996 through 1997, MnTAP received a total of 1714 calls. The environmental benefits of providing timely and complete information to companies is difficult to quantify but assumed to accrue. A spring 1997 survey indicated that, of the businesses contacting MnTAP by phone, 81 percent said that the technical assistance received by phone for pollution prevention and waste management information was useful to them and met their needs.

Site Visits

Site visits provide companies with technical assistance that is specific to their needs, and combine pollution prevention, waste management, and regulatory compliance information. This one-on-one interaction ideally serves to develop relationships and results in an increased level of follow-through on the part of the company. Site visits may range from a one-time "snapshot" in which opportunities for change are pointed out, to biweekly meetings with company teams, to intensive, hands-on staff intervention with testing and demonstrating alternative products, procedures, or equipment. Site visits constitute a significant investment of staff time.

MnTAP staff conducted approximately 252 site visits in 1996-1997, providing pollution prevention and waste management information to companies on-site and specific to their process or waste needs. In a spring 1997 survey, 100% of businesses said that MnTAP provided useful information during the site visit. The one-on-one nature of site visits often results in significant reduction of waste and emissions, and cost savings.

Site Visits, 1996 - 1997

Business type	Share
Chemical Manufacturer	2%
Dry Cleaner	3%
Electronics	5%
Food	8%
Medical/Labs	2%
Metal Fabrication/Finishing	42%
Plastics/Fiberglass	10%
Primary Metal (foundry)	4%
Printing	7%
Vehicle Maintenance	4%
Wood Products (demonstration project selection)	13%
Other (miscellaneous service and manufacturing)	14%

New follow-up procedures

For a six-month period — from the end of 1996 through the first quarter of 1997 — MnTAP piloted a follow-up procedure for site visits.. A total of 35 site visits with 128 recommendations were followed up to determine whether recommendations had been implemented (implementation rate), and identify barriers to implementation. Of the 128 recommendations, 36 percent were implemented, 28 percent were planned for implementation, and another 36 percent not implemented. By far, the biggest reason given for not implementing a recommendation was lack of time or low priority. Less-frequently cited barriers were staff/company changes, regulatory barriers, and economic feasibility.

MnTAP will continue to work on two aspects of site visits: outreach to generate more requests,

and follow-up to document effectiveness and improve customer service. The Communications Team is devising specific outreach strategies for 1998 to generate a greater demand for site visits. MnTAP will work to find ways to institutionalize follow-up; staff agree the pilot demonstrated its value.

All staff will be receiving sales training. This training will help MnTAP find ways to help customers implement our recommendations more consistently. While this follow-up procedure may not provide immediate waste reduction documentation, it will identify an implementation rate — how often the companies are taking action based on MnTAP's suggestions. In addition, staff can work to build relationships with companies and address identified barriers to implementation.

Student intern program

The student intern program provides companies with a more detailed level of assistance than even site visits can provide. Interns work full-time at their assigned facility over a three-month period to assess the problem, compile information, identify pollution prevention options (technical and financial analysis), and move to implementation. Unlike telephone assistance and site visits, the intern program focuses primarily on pollution prevention projects. Project results are disseminated to companies with similar operations to promote pollution prevention and encourage use of MnTAP services.

During 1996 and 1997, MnTAP placed 15 interns in a variety of companies and projects. The program is working efficiently as a summer-only program because it is much easier to find and place qualified students during that time. In addition, administration (recruiting, hiring and reporting) is more efficient because it is confined to only one time of the year.

Intern projects from 1996 and 1997 are summarized in the following section.

Summary of results from 1996 MnTAP Intern Projects

Company	Waste/Emission	Pollution Prevention Method	Projected Annual Waste or Emission Reduction	Projected Annual Savings ($)	Current Annual Waste or Emission Reduction	Current Annual Savings ($)
Anagram International	Ink and solvent waste	Improved operating procedures	61,000 lbs	$68,600	61,000 lbs	$68,600
Diamond Brand*	Wood waste	Procedure and equipment changes resulted in more efficient wood use.	3.8 million lbs (increase wood recovery from 15.3% to 22.6%)	$400,000 - 970,000 (revenue increase)	----	----
Hoffman Engineering*	Wastewater	Decreased water use in parts washing system.	5.8 million gallons	$54,700	----	----
Jostens**	Hydrochloric and nitric acid	Increase the efficiency of acid usage and identify options to reclaim acid.	136,500 lbs	$15,900	----	----
Sparta Foods	Wastewater	Cut back on water use in food processing and housekeeping.	1.5 million gallons	$23,600	1.5 million gallons	$23,600
Viking Industries*	VOCs	Evaluated low VOC/waterborne finishes	3000 lbs	$ 5,000	----	----
Xcel/VisionEase	Trichloroethylene (TCE)	Redesigned lens holding part to eliminate wax that needed to be cleaned with TCE	16,000 lbs	$14,400	10,000 lbs	$ 4,100
TOTAL			3.8 million lbs wood waste; 216,000 lbs toxic waste/emissions; 7.3 million gallons water	$582,200 - $1,152,200	71,000 lbs waste/ emissions; 1.5 million gallons water	$96,300

*Some suggestions have been implemented, but it is difficult to quantify results
**Company continuing research

Summary of results from 1997 MnTAP Intern Projects

Company	Waste/Emission	Pollution Prevention Method	Projected Annual Waste or Emission Reduction	Projected Annual Savings ($)	Current Annual Waste or Emission Reduction	Current Annual Savings ($)
American Converters	Methylene chloride	Switched to water-based adhesives	8,000 lbs as hazardous waste; 31,580 lbs as air emission	$40,000 (compliance costs)	8,000 lbs hazardous waste; 31,580 lbs air emissions	$40,000
Bouquet Enterprises	Selenium acid	Outsourced inefficient process step.	6,000 lbs	$ 5,520	6,000 lbs	$ 5,520
Foldcraft	Paint waste	Improved transfer efficiency and changed coatings.	44,500 lbs	$28,300	---	---
Hood Flexible Packaging	Plastic film waste	Improved system for use of flexographic printing start-up scrap.	195,827 lbs	$196,099	--	$20,307
Kurt Manufacturing Company	Wastewater and chemicals (acid and alkaline cleaning rinsewaters)	Water conservation through cascading rinses and optimizing processes.	7.3 million gallons of water; 10,178 lbs of chemicals	$44,444 in chemical savings; $36,100 in SAC liability	264,000 gallons water	$ 1,637
Nico Products and North Star Finishing	Wastewater and chemicals (acids and metal-bearing solutions)	Water conservation using counterflow rinsing, spray rinsing, and rinse reuse.	NS: 281,000 gal. water & 17,000 lbs of chemicals; NICO: 187,400 gal. water 19,000 lbs chemicals	$196,099	--	---
Southern Minnesota Sugarbeet	Lime waste	Reduced use of lime in processing beets into sugar.	150,600 lbs	$582,405	---	---
Tennant Company	Packaging waste	Set up reusable shipping containers with suppliers.	84,000 lbs cardboard; 118,000 lbs wood	$88,400	64,000 lbs cardboard; 105,600 lbs wood	$54,200
TOTAL			684,685 lbs waste/ emissions; 7.7 million gallons water	$1,090,772	215,180 lbs waste; 264,000 gallons water	$121,664

The intern program has always had a relatively high success rate for documenting reductions and cost savings due to the intensive and long-term nature of the intern work. Intern projects from 1996 and 1997 achieved projected reductions of:

- 900,685 pounds of waste and emissions
- 3.8 million pounds of wood waste
- 15 million gallons of water.

The companies implementing these projects have saved, to date, $217,964 by implementing MnTAP intern suggestions; additional implementation is planned. Outreach plans to disseminate results will be developed for each successful project.

The cost of the student interns is $40,000 each year. As shown above, implemented recommendations for the 1996 and 1997 projects have already covered this cost. If all recommendations were implemented by the companies, in one year they would realize a cost savings of over $2 million — more than the total operational cost of MnTAP's $875,000 annual budget!

Company implementation is tracked for at least a year to determine actual reductions and savings. A signed agreement between MnTAP and the company was a positive step toward implementation of interns' recommendations in 1997, and will be continued in 1998.

These intensive, three-month projects utilize MnTAP and company staff to train college students to consider pollution prevention (P2) first when problem-solving in an industrial facility. By hands-on implementation of P2, students learn concepts and practices to carry with them into the workplace.

Process targeting and outreach

Targeting of companies with similar processes and waste streams has been an efficient method of focusing technical assistance activities and developing longer-term relationships with particular companies. Targeting activities may include mailings, article series in the *SOURCE* (the MnTAP newsletter), workshops, site visits and intern projects. All of these efforts are aimed at getting specific information to companies, raising awareness or achieving reductions.

Past targeting efforts have helped contribute to reductions in CFCs, VOCs, TCA, TCE, PCE and other waste materials. Completed targeting campaigns include: dry cleaning, wood finishing, and vapor degreasing. Many targeting campaigns carried over from 1996 were completed in 1997. Auto team, food processing, and Great Printers activities will continue into 1998. Four of these targeting campaigns and their results are described in more detail below.

Great Printers Project

In 1994, recommendations for making pollution prevention a standard business practice for printers were published. The Great Printers Project began in 1992 to address lithographic (offset) printer needs related to waste prevention, cost savings and environmental compliance. The project recognizes companies for their commitment to the Great Printers principles:

- Comply with applicable environmental and worker health and safety laws.
- Go beyond compliance by employing environmentally sound practices, including pollution prevention, reusing and recycling waste, and energy efficiency.
- Seek continuous environmental improvement through periodic assessments.

Project activities in Minnesota began in 1995 with four partners: Printing Industry of Minnesota (PIM), Minnesota Technical Assistance Program (MnTAP), Minnesota Pollution Control Agency (MPCA), and

Citizens for a Better Environment (CBE). MnTAP sent approximately 200 registration packets to Minnesota printers. Today, close to 40 Minnesota printers are recognized as Great Printers.

The Great Printers Project is already encouraging print buyers to seek out Great Printers for their purchases of graphic arts products and services. Great Printers will also be listed in a regional Great Printers Buyers Guide available for distribution.

Outreach to wood finishers

MnTAP targets assistance to the roughly 700 wood finishers in Minnesota to reduce emissions of VOCs, including toluene, xylene, methyl ethyl ketone, and methyl isobutyl ketone. Wood finishers are an important target for a number of reasons:

- Clean Air Act NESHAP for wood furniture.
- Minnesota's air permitting program.
- the Twin Cities as a marginal attainment area for ozone (with VOCs as a precursor)
- The large number of shops in Minnesota.
- New available technologies and waterborne products.

In 1996 and 1997, MnTAP joined the SBCAP to provide outreach, workshops, technical assistance, and development of new publications. A large component of the outreach effort was a demonstration project at PineTique Furniture conducted with support from an EPA leadership grant that MPCA was awarded. PineTique is planning an expansion and full facility conversion to waterborne coatings. Over the last 12 months, PineTique has tested coatings and tried them out in their showroom and with customers. The full conversion is scheduled to be completed by the end of 1997. Once the full conversion takes place, 4500 pounds of VOCs will be reduced at PineTique. MnTAP is writing a case study to disseminate to other wood furniture shops.

Outreach to users of halogenated solvent cleaning equipment

In 1989, Minnesota TRI data indicated that over 6 million pounds of CFCs and TCA was being released, much of this due to cleaning metal parts in hundreds of manufacturing operations. This presented opportunities to offer information on ways to not only reduce use of these cleaning solvents, but also find substitutes (usually aqueous) to their use. Over the years, MnTAP has provided direct technical assistance to halogenated solvent users, conducted workshops, partnered with SBCAP, placed interns, and developed resources — all aimed at helping businesses move toward alternative cleaning systems.

In 1997, MnTAP worked with an OEA grantee, the Minnesota Association of Metal Finishers, to develop and disseminate a series of fact sheets for metal fabricators and their platers on the topic of keeping parts clean so that contaminants do not have to be cleaned off using solvents or other cleaners. These "Get It Plated Right" fact sheets were distributed to over 1500 metal fabricators in three mailings.

A number of motivational factors have played a role in the significant reductions of CFCs and other halogenated solvents that are ozone depleting compounds. The most significant factor was the manufacturing ban of CFCs after January 1, 1996 as a result of the Montreal Protocol. But other motivators such as increased taxes on CFCs, labeling requirements, CAA Amendments, success with aqueous cleaners, and availability of technical information through programs like MnTAP and vendors all played a key role in the conversion from CFCs to aqueous cleaners.

CFC and TCA use is down from 1989 levels of 6 million pounds to 1995 levels of 600,000

pounds, a 90-percent reduction in release due to the above factors. At $10/gallon for purchase, the metal fabricating/finishing industry could claim a savings of $60 million in avoided purchase of CFCs.

Outreach to Minnesota dry cleaners

With the passage of the Clean Air Act Amendments in 1990, EPA laid out a promulgation schedule for categories of sources of 189 hazardous air pollutants (HAPs). These standards, known as Maximum Achievable Control Technology Standards (MACT), are technology-based standards. In September 1993, the EPA issued national regulations to control air emissions of perchloroethylene (perc) from dry cleaners, including major sources, and large and small area sources. In 1995, due to concerns that these technology-based standards do not consider health effects of perc from dry cleaners, the Minnesota Pollution Control Agency undertook a study to conduct a health-based review of the standard using interviews and modeling. The study indicated that of the 272 dry cleaners in Minnesota, a possible 103 dry cleaners release perc at levels that exceeded the tolerable cancer risk in humans.

As a result of this study, the MPCA-SBCAP, Minnesota Technical Assistance Program (MnTAP), and Minnesota Fabricare decided to work together in 1995 and 1996 on an outreach effort to reduce perc use and thus reduce potential health hazards. The joint outreach effort involved a series of 5 workshops around the state, seminars at regional and state Fabricare meetings and spotting seminars, development and distribution of new resources, on-site technical assistance, and direct phone contact.

The outreach efforts covered a one-year period, with over half of the dry cleaners reached directly by seminar or site visit. Phone calls were placed directly to 25 of the highest perc users (over 700 gallons/year) in the state and information provided on more efficient equipment and wet cleaning, all with the intent to reduce perc purchase and use.

In 1994, Minnesota dry cleaners reported purchasing 91,326 gallons of perc. In 1996, they reported purchasing 76,620 gallons of perc. Between 1994 and 1996 perc purchases and use were reduced by 14,706 gallons or 16 percent. With perc costs at $10/gallon, this reduction saved the industry $147,000. Changes were driven by perc cost and regulation, but helped along by education and assistance. Dry cleaners continue to purchase more efficient equipment and reduce perc use.

New targeting for 1998

MnTAP formed a workgroup in 1997 to examine targeting for the next 2-3 years. New targets for 1998 include adhesives, paint stripping and publicly owned treatment works (POTWs). In addition, more general outreach and promotion activities are planned in 1998 with two primary messages:

- Pollution prevention is the most cost-effective environmental protection strategy.
- MnTAP can help companies implement pollution prevention.

Events

Presentations, seminars, workshops, conferences, and expos effectively reach a large group of businesses with general MnTAP information or specific pollution prevention information. Partnering with OEA, MPCA, MTI, NSP, and associations has produced a number of successful events this past year in which MnTAP has served as a planner, participant, speaker, and/or exhibitor. The major events in 1996 and 1997 included: Duluth Small Business Environmental Fair, Paint and Powder Coating Expo, Pollution Prevention Planning Workshop, Great Lakes Regional Pollution

Prevention Roundtable, and MPCA Conferences (Solid Waste, Hazardous Waste, Air Quality). The majority of invited presentations were associated with trade/industry associations or business organizations.

MnTAP conducted 163 presentations in 1996 and 1997, reaching nearly 3000 attendees. Trade and industry associations, OEA grantees, and business assistance organizations were the sponsors of many of the events where MnTAP staff presented. Customer service survey responses in 1997 indicated that 90 percent of the attendees were able to apply the information provided by speakers. Major partnered events for 1998 may include a Solvent Cleaning Expo based on the successful format used for the annual paint expo.

Information resources

Library resources, the MnTAP newsletter, the MnTAP website and printed materials (case studies, fact sheets, and reference lists) are all useful tools in educating and informing businesses about waste management and pollution prevention options. The *SOURCE* newsletter is mailed quarterly, and printed resources are updated annually.

MnTAP received more than 800 requests for information through the resource checklist form. From the 1997 customer service survey, 95 percent of businesses indicated the printed materials sent to them were useful. In 1998, MnTAP will place a greater emphasis on case study development and will increase its efforts to get new company-specific information resources into customer's hands.

Finally, the MnTAP homepage has been updated and improved to make it more user-friendly. More than 65 information resources are available online.

Materials exchange

MnTAP's role in operating the Metropolitan Area's Materials Exchange (MAX) program is described in the following section on the state's materials exchange programs.

Regulatory integration of pollution prevention

MnTAP is a resource and partner to the MPCA and the Metropolitan Council Environmental Services (MCES). Both of these agencies have worked to use pollution prevention as a tool to achieve compliance, protect the environment, and reduce regulatory requirements. MnTAP staff have served on various teams in the areas of rule development, enforcement activities, and permit conditions. An example is participation on the MPCA Auto Team working with the Auto Service Association to conduct outreach and assistance. In addition, MnTAP has been active with MPCA in training development and coordinated compliance/pollution prevention assistance to businesses under the MPCA Small Business Compliance Assistance Program (SBCAP).

In 1996 and 1997, MnTAP activities in regulatory integration fell into three main categories:

- Developing pollution prevention training for RCRA staff.
- Joint outreach to POTWs.
- Pollution prevention technical support for SBCAP.

Considerable time has been invested in the development of pollution prevention training to be delivered to RCRA compliance and assistance staff in early 1998. The modules will briefly cover P2 concepts and resources. However, the primary focus will be on specific pollution prevention integration opportunities for staff working with program development, inspections and permits.

MnTAP's partnership with MPCA and MCES to target outreach to POTWs in 1997 involved compiling current information on load reduction programs from other states, developing new resources, and sending an outreach letter. In 1998, work will primarily involve follow-up through technical assistance.

Work with SBCAP in 1996 and 1997 focused on halogenated solvents, dry cleaners, wood finishers, and the vehicle maintenance industry, including presentations and assistance, and was coordinated with trade associations.

MPCA and MCES recognize the benefits of incorporating pollution prevention into their regulatory programs:

- To the company, for cost savings and improved community relations.
- To the agency, to reduce workload.
- To the environment, to minimize releases and conserve resources.

Both agencies have taken steps to incorporate pollution prevention into their regulatory systems and provide incentives for doing pollution prevention in the following areas:

- **Rule development**
  Pollution prevention practices as part of compliance
  Best management practices for difficult to manage waste streams
- **Permitting**
  Pollution prevention as a permit condition
  Incentives such as expedited permit processing
- **Enforcement**
  Allowing partial penalty waivers if the company conducts a pollution prevention project
  Preparation of pollution prevention plans

MnTAP will continue to serve as a resource to MPCA, as the Agency moves toward a new structure that is more multimedia and ecoregion-based. MnTAP staff will serve on needed teams, participate in training, and be a referral point for companies needing pollution prevention options. Pollution prevention training will be delivered to RCRA staff in early 1998. MnTAP will continue to coordinate with MPCA and MCES staff on POTW outreach and assistance.

Integration of pollution prevention into higher education

MnTAP's location at the University of Minnesota presents a unique opportunity to introduce pollution prevention topics into the classroom and research areas in a variety of academic disciplines.

MnTAP staff and selected university faculty coordinate on research and funding opportunities. Faculty use MnTAP staff for proposal review, and MnTAP staff call upon faculty to assist in various technical assistance endeavors.

The primary objective for 1996 and 1997 was to develop contacts, courses, and research opportunities with interested faculty. This past year, MnTAP staff gave lectures on P2 to classes in chemistry, industrial hygiene, management, chemical engineering, civil engineering, and soil science, in addition to lectures at Pine Technical and St. Cloud Technical Colleges. In all, MnTAP staff gave lectures in eight classes, reaching approximately 400 students.

MnTAP provided significant input and resources into development, marketing and delivery of an OEA-funded pollution prevention course at the University of Minnesota, *Preventing Pollution: Innovative Approaches to Environmental Management*, during spring 1997. This interdisciplinary course attracted nearly 70 students, and evaluations indicated the course was a success. The class will be offered again in 1998.

MnTAP also participates on the University of Minnesota Waste Abatement Committee, and has provided assistance in the areas of transportation, food services, purchasing and printing. Finally, MnTAP has collaborated with University of Wisconsin faculty on the DfE Toolkit project, the sugarbeet processing intern project, and other potential research funding solicitations.

Summary

The goal of the MnTAP program is to provide assistance to industrial service and manufacturing businesses to prevent pollution and manage waste properly. MnTAP's experienced staff of engineers and other science-related professionals provides this assistance through a variety of services: telephone assistance, site visits, student interns, educational, and informational resources, and seminars and workshops. Through these services, MnTAP ultimately wants to show both environmental and economic benefits to offset its budget of $875,000 each year. More specifically, since industry pays for these services through toxic pollution prevention fees, MnTAP feels an obligation to deliver service back to the fee-payer and user (industry), and to show cost reductions for users that at least equal the cost of the MnTAP program.

MnTAP services result in both qualitative and quantitative results that provide environmental benefits. Information and education provided to broader audiences through phone assistance, information resources, and presentations was found (though survey) to provide between 80-95 percent of the businesses and organizations on the receiving end with information that allowed them to apply, utilize, and take action on either waste management or pollution prevention needs.

At the next level of assistance for one-on-one site visits with businesses, follow-up calls indicated 36 percent of the suggestions from staff were implemented and another 28 percent planned for implementation. This type of implementation rate had a significant impact on managing waste materials properly or keeping materials out of the environment.

Detailed assistance through the student intern program has been shown to be very effective for a smaller number of companies. Of the 15 companies who had interns during the summer of 1996 and 1997, 900,685 lbs of waste, 3.8 million pounds of wood waste, and emissions and 15 million gallons of water are projected to be reduced if all project suggestions are implemented. If all projects suggested under the student intern program are implemented, over $2 million will be saved by the fifteen companies. A number of last years projects have already been implemented with actual documented savings of $217,964. Actual savings more than cover the $40,000 intern cost, and projected savings cover the cost of the entire MnTAP program each year.

Targeting efforts have also paid off and resulted in environmental benefits. Contact has been made with over 700 wood finishers and 1,000 smaller shops with vapor degreasers. The use of ozone-depleting compounds (CFC and TCA) has gone down in Minnesota driven by many factors over the last eight years, with CFC use in 1996 at only 10 percent of 1989 levels. This is due in large part to process changes to aqueous cleaners, with obvious implications for the environment and the protection of the ozone layer. Perc use from dry cleaners has gone down 16 percent (14,000 gallons) over 3 years, saving dry cleaners $140,000. Finally, through the efforts of the Great Printers Project, forty Minnesota companies became Great Printers, benefiting the environment by working better with suppliers and using environmentally-friendly products and processes.

Materials exchange programs

Materials exchange is an activity in which organizations with reusable materials are linked with organizations that can use them. There are multiple benefits of reusing an otherwise wasted material. Materials exchange can:

- Provide low or no-cost materials.
- Save money on disposal costs.
- Help find markets for surplus materials.
- Maximize storage and warehouse space.
- Demonstrate environmental responsibility by conserving raw materials and natural resources.
- Aid communities by finding free or inexpensive materials for community service projects.

Materials exchange activities fill an important gap in the integrated waste management system to address the "reuse" portion of the waste management hierarchy. Many waste streams that cannot easily be reduced – scrap, construction and demolition waste, paint – have potential for reuse in new applications. The challenge lies in developing markets for reusing these materials. A fundamental role of materials exchange in Minnesota is to actively facilitate exchanges. This means linking organizations with reusable materials that they can no longer use to those organizations who can use them. A catalog of material listings is published twice a year and is a key tool, but most exchanges are facilitated by staff.

Minnesota has taken a unique approach in establishing its materials exchange network, which is in its third full year of operation. There are three major components in the Minnesota Materials Exchange Alliance (Alliance) – the coordinating agency (OEA), the technical coordinator (MnTAP) and the local programs (five have been established in several regions throughout the state.)

Key features of the Alliance are efficiency and flexibility. The OEA provides those services that are best facilitated centrally, such as Alliance coordination and consensus building. MnTAP serves two roles as the technical coordinator and the local program for the seven county metro area (MAX). MnTAP assumes the technical duties of computer coordination and catalog development and dissemination. The local programs tailor their services to the needs of businesses in their area and to their own solid and hazardous waste management priorities. Duplication of efforts is avoided by coordinating some services centrally. Flexibility is achieved by identifying needs and delivering services locally.

The Alliance focuses on developing an infrastructure in Minnesota that allows for and supports the reuse of materials. Efforts to build this infrastructure include fostering coordination and greater utilization of the state's local materials exchange programs, expanding existing service areas, strengthening links with regional and national materials exchanges, as well as increasing the volume of materials exchanged.

In 1997, the Alliance focused on:

- Gathering statewide exchange information for evaluation.
- Evaluating future funding options.
- Working toward getting the statewide materials exchange database on-line.
- Coordinating outreach and promotional efforts.

Currently there are five local programs located in Minnesota.

- **Metro Area eXchange (MAX)**
  Operated by MnTAP and funded by the Solid Waste Management Coordinating Board through the Metropolitan Landfill Abatement Account.

- **Northeast Minnesota Materials Exchange**
  Operated and funded by Western Lake Superior Sanitary District.
- **Olmsted County Materials Exchange**
  Operated and funded by Olmsted County.
- **Southeast Minnesota Recyclers Exchange (SEMREX)**
  Operated by SEMREX and funded by the SEMREX member counties.
- **Southwest Minnesota Materials Exchange**
  Operated and funded by Nobles County.

The local programs operate as separate entities, in that they individually document their exchange activity, cost savings and amount of materials diverted from the waste stream. The following information represents exchange activity for Greater Minnesota and for the Metropolitan Area. Activity for MAX is summarized below for 1995, 1996 and 1997:

Metro Area eXchange (MAX)

Activity	MAX (Metro) Goal	Actual 1995	Actual 1996	Actual 1997 (9 months)
Calls	N/A	807	885	512
Average Listings	500	928	1023(*)	709
Exchanges	N/A	55	257	235
TonsExchanged	5,000 tons	37.4	1225	505
Success Rate	33%	7.2%	27.3%	36.6%
Cost Savings	NA	$92,169	$592,690	$535,504

*This number was artificially high because it included old listings that were updated in 1997.
N/A = not applicable

MnTAP also responds to inquiries from businesses in Greater Minnesota that do not have a local materials exchange. In 1996, MnTAP facilitated 23 exchanges for businesses outside the Metropolitan Area; in 1997, 25 exchanges were made. In 1996, Greater Minnesota businesses working with MnTAP saved $118,567 in avoided purchase and disposal costs; in 1997, they saved $100,583.

During 1996 and 1997, MAX received nearly 1400 calls on 1730 catalog listings. A total of 540 exchanges took place, abating 1843 tons of waste and saving clients over $1.3 million in avoided purchase and disposal costs. Clear benefits include waste abated from landfills, conserving landfill space, saving money, and reusing valuable materials. For each dollar that the state invests in materials exchange, businesses realize a twelve-dollar savings in avoided purchase and disposal costs.

The materials exchanges in Greater Minnesota are faced with a lack of consistent funding and staffing for their programs. They are doing a good job of documenting exchanges, cost savings and success rate. Consistent funding is needed to keep their services operating.

For January - August 1997, Greater Minnesota programs facilitated over100 exchanges, diverting 140 tons of materials from landfills and incinerators. Combined, clients saved $173,026. Overall, the Alliance has a success rate of 32 percent, much higher than other programs in the U.S.

Materials exchange is most cost-effective when it takes place through a local exchange program. The OEA encourages businesses to use the materials exchange in their area. County governments have the option to use their SCORE dollars to fund materials exchange activities.

Flood Exchange

The OEA provided grant funds to SEMREX to support the development of the Flood Exchange, an on-line matching service to link needs of flood-stricken communities with goods and services. It can be viewed at **www.floodexchange.com.** The Flood Exchange is an information tool designed to help businesses in Minnesota and North Dakota's flooded communities access the goods and services they need to reopen their businesses and get back on their feet. The Flood Exchange successfully provided useful goods and services to the flood-affected communities. Building on the success of the Flood Exchange, the Department of Emergency Management is interested in using Flood Exchange technology as a tool to deal with other natural disasters.

Community assistance — Sustainable Communities

Overview and background

The OEA seeks to encourage greater cooperation and coordination among all stakeholders, the public and private sectors, carrying out pollution prevention activities. Citizens working together, and working with government and business, are key players in promoting pollution prevention.

The OEA's Community Assistance Program was formed in 1992 as a result of an amendment to the Minnesota Toxic Pollution Prevention Act (TPPA). This amendment to the TPPA was passed to support the public's role in promoting pollution prevention by expanding outreach and assistance to citizen groups and community organizations. Over the past five years, the OEA's community assistance program has worked with many citizens as well as a wide range of organizations, including:

- Local governments.
- Schools and religious institutions.
- Community development organizations.
- Twin Cities neighborhood groups.
- Businesses.
- Local and state-wide environmental organizations.

In 1996, the focus of the Community Assistance Program broadened to include promotion of community sustainability. Additional staff resources were devoted to this area, and designated as the OEA's Sustainable Communities Team. The evolution of the community assistance program came in response to the increasing realization that effective pollution prevention activities at the community level need to include consideration of economic and social factors as well as environmental concerns. Also, it became clear that effective, community-wide pollution prevention efforts must consider long-term opportunities, and utilize a preventive approach for all types of challenges.

Staff continue to answer information and assistance requests, provide presentations, and work with citizens and community groups. However, the Sustainable Communities Team has also developed several new initiatives:

- Minnesota Sustainable Communities Network.(MnSCN).
- Sustainable Communities Grants.
- Sustainable Communities Partnership.
- Conferences.
- Policy initiatives.

Minnesota Sustainable Communities Network (MnSCN)

The OEA created the Minnesota Sustainable Communities Network (MnSCN) in January 1997 to promote exchange of information, networking, and better access to assistance on the topic of sustainable communities. The network now consists of over 1,200 individuals, non-profit organizations, businesses, local government, educational institutions, and other organizations in Minnesota and bordering areas. MnSCN is open to anyone with an interest in sustainability; there are no membership charges or membership obligations.

Network members receive practical information on sustainability through printed resources, e-mail updates, regional gatherings, internships, grant programs, and training and networking opportunities. Timely information about sustainability is distributed through bi-weekly e-mail postings and occasional mailings; e-mail updates have been particularly well received, with approximately 800 subscribers. Local success stories, guides, manuals, videos and other materials are also available.

MnSCN also provides members with an opportunity to meet others in their communities and regions with similar interests in sustainability, which can lead to broader local partnerships and new working relationships. A directory of MnSCN members is distributed annually, and special gatherings are held. Members can also participate in the OEA's sustainable communities intern program, which helps match interested individuals with organizations that are working towards sustainability.

At the MnSCN regional meetings in June 1998, the OEA plans to distribute "Sustainable Communities Now!" a portfolio of implementation ideas. This 100-page notebook will lay out opportunities, principles, resources and indicators in several areas including the built environment, land use, business, agriculture and transportation.

Grants

The OEA offers grants for sustainable community activities focusing on resource conservation and pollution prevention. As a sign of increasingly strong interest, 30 out of 75 proposals in response to the OEA's fall 1997 Request for Proposals were in the sustainability category. To date, 17 grant projects have been funded in the sustainable communities area. These grants are helping businesses, farmers, residents and other groups in the community to achieve environmental, economic and social benefits through reduced waste and pollution.

Grant projects in the sustainable communities area typically have a strong focus on pollution prevention activities. Examples include neighborhood-level pollution prevention activities by the Lyndale Neighborhood Association, Steele County's Green Source 2020, and sustainable development planning efforts by Lincoln County and Stearns County.

Conferences

The OEA sponsored two conferences on sustainability in 1996: the two-day *Minnesota Conference on Sustainable Development* in Minneapolis, with attendance of over 750, and a one-day *Northland Conference on Developing Sustainable Communities* in Duluth, attended by over 200.

In June 1997, six regional meetings of members of the MnSCN were held in Blaine, Cohasset, Lanesboro, Little Falls, Marshall and St. Paul. Over 250 participated in these meetings, which included speakers on sustainable communities topics, small group discussions and networking opportunities.

Sustainable Communities Partnership

The Sustainable Communities Team is taking an active role in the development of a new initiative, the Sustainable Communities Partnership. The Partnership will be made up of public and private professionals from a range of disciplines, who intend to supply more proactive assistance to sustainable community initiatives. Assistance being considered includes community assessments, comprehensive planning and design, business and technical assistance, and project development.

The Partnership's mission is to leverage resources to help Minnesota's diverse communities and regions maintain their unique character and protect their long-term economic, environmental and social well-being by providing multi-disciplinary expertise to locally-driven initiatives. The Partnership is committed to, and guided by, Minnesota's statutory definition of sustainable development – the Environmental Policy Act – and the 11 sustainable development goals for the Community-Based Planning Act of 1997 (Minnesota Laws, Chapter 4A. 07-08).

Policy initiatives

The Sustainable Communities Team is actively working on a number of policy initiatives, including collaborating with the Governor's Sustainable Development Roundtable, the Advisory Council on Community-Based Planning, and federal initiatives such as the President's Council on Sustainable Development. In addition, Team members are active in the OEA's internal Policy Team which is exploring state policy initiatives, including environmental procurement, changes in the Waste Management Act, and market-based incentives to advance sustainable practices.

Evaluation

Several evaluation efforts have been undertaken by the Sustainable Communities Team. These include an e-mail survey of recipients of the bi-weekly e-mail update of the Minnesota Sustainable Communities Network, and an evaluation completed by individuals who attended the MnSCN regional workshops in 1997. Respondents were very positive about the MnSCN and the information and assistance provided by this new program.

Conferences and workshops

Minnesota Conference on Pollution Prevention

The OEA has hosted six annual conferences on pollution prevention. The conference has been a tool for teaching Minnesota businesses and other stakeholders more about pollution prevention, as well as network with other businesspersons, service providers and local government leaders interested in advancing pollution prevention.

The conference has also been the traditional forum for presenting the annual *Governor's Awards for Excellence in Waste and Pollution Prevention.* These awards honor the accomplishments of businesses, institutions and organizations that have demonstrated significant waste and pollution prevention in their operations. The conferences celebrated and showcased award recipients during a luncheon and slide presentation.

The theme for the June 1996 conference was "Are You Running a Green Business?" More than 400 people from public and private sectors attended.

Sessions at the *Sixth Annual Conference on Pollution Prevention* focused on internalizing

pollution prevention within business operations, including:

- Identifying incentives for pollution prevention.
- Developing a business management plan that incorporates pollution prevention activities.
- How preventing waste and pollution can foster a more efficient use of money, resources and time.
- A hands-on workshop for pollution prevention planning.

Outreach strategy for 1997

Customer feedback indicated the need for more information that related specifically to individual industries. In response, the OEA worked to bring P2 information to targeted audiences by introducing the subject into existing conferences and workshops sponsored by individual trade groups. The OEA participated in planning several of these events to create opportunities for staff to educate and inform the business and institutional communities about pollution prevention within their own forums.

- The OEA conducted a waste reduction forum for the hospitality sector. The forum specifically highlighted the highly effective and innovative waste reduction and resource conservation practices of a hotel chain in Sweden.

- Over the past two years, the OEA, MPCA and representatives of the health care industry cooperated in a wide-reaching outreach campaign to encourage mercury reduction in the health care industry. OEA staff have helped to develop presentations, displays, brochures and a video on mercury reduction specifically targeting the health care industry.

- In cooperation with the Minnesota Grocers Association, the OEA hosted a seminar with managers of grocery corporations to address issues particular to their industry.

Other events on pollution prevention (P2)

In 1997, OEA staff assisted with planning of the MPCA's annual Hazardous Waste Conference in February and the Air Quality Conference held in October. In addition, MnTAP, MPCA and OEA staff co-hosted the summer conference of the Great Lakes Regional Pollution Prevention Roundtable. Pollution prevention was a common thread.

In particular, the Roundtable involved presenters from among the previous winners of the Governor's Awards, including Dana Corporation, Frost Paint and Crown Cork & Seal. A special session was held on Design for the Environment. The conference was attended by Minnesota businesses, non-profit organizations, state agency and local government staff, as well as roundtable members from Illinois, Ohio, Michigan, Wisconsin and parts of Canada.

Finally, in conjunction with the Great Lakes Roundtable, an in-house orientation training was held for MPCA and OEA staff. The training provided a foundation of P2 knowledge for conference attendees, and sessions on pollution prevention. Approximately sixty staff attended the three-hour orientation, which covered the basic definitions and concepts of pollution prevention, along with sample outcomes of several case studies in Minnesota.

1997 "National Pollution Prevention Week" in Minnesota

Minnesota joined other states in celebrating its first Pollution Prevention Week (P2 Week) in 1997. P2 Week began in California in 1992, and each year, more states and localities join the effort during the third week of September to inform business sectors and the general public about pollution prevention. The OEA coordinated efforts among state agencies, principally with the MPCA and MnTAP, to

develop material and events, and to inform and recruit local government to participate. The Governor declared September 15-21, 1997, to be Minnesota Pollution Prevention Week, and the Governor's Awards for Pollution Prevention were also celebrated during the week.

In Minnesota, each day of the week was assigned a theme, and specific messages were developed around the theme to demonstrate practical steps businesses, institutions and individuals could do prevent pollution. The themes, beginning with Monday, were: Food Day, Packaging Day, Paper, Mercury, Energy, Community Action, and Stewardship. The OEA, MPCA and MnTAP are each committed to continuing and expanding on the success of this effort.

In 1998 the OEA will seek greater participation from the Interagency Pollution Prevention Advisory Team, and greater involvement from local government by working with them more closely and earlier during the planning process. The OEA also will work more closely with trade associations to host more pollution prevention tours for members during the week. (This past year, members of the Society of Manufacturing Engineers toured Crown Cork and Seal in Faribault.)

Evaluation

Evaluations by participants of annual pollution prevention conferences have been consistently positive. Participants say that the information they receive is useful; they plan to participate in next year's conference; and they look forward to the networking opportunities.

The OEA will evaluate and compare whether cooperating with other service providers and utilizing pre-existing conferences accomplished as much as the annual *Pollution Prevention Conference* has over the years. The OEA will then determine if a stand-alone conference is the most effective way to provide the business and institutions audience with waste and pollution prevention information and motivation needed for today's business environment. A combination of outreach methods is also being considered.

Advisory groups

Prevention Reduction and Recycling Advisory Council (PRRAC)

To promote greater synergy, reduce duplication and better serve the needs of its customers, the OEA has merged the former Market Development Coordinating Council (MDCC) with the Hazardous Waste Management Planning Council (HWMPC), forming the new, inclusive Prevention, Reduction and Recycling Advisory Council (PRRAC). PRRAC is established under Minn. Stat. § 115A.12, with expiration scheduled for June 30, 2001.

PRRAC is composed of 24 members — 8 citizen representatives, 8 representatives of government, and 8 representatives from business and industry. The first Council, appointed in August 1997, also includes four ex-officio members from other environmental and business assistance providers in the state.

This new, seamless advisory group will focus on a variety of issues across all OEA goal areas, including pollution prevention, recycling market development, and solid and hazardous waste source reduction. In addition, PRRAC will be working on projects related to sustainable development and resource conservation. Current Council members will serve a two-year term, ending June 1999.

Former councils

The Pollution Prevention Task Force (PPTF) was created to help facilitate effective

implementation of the Minnesota Toxic Pollution Prevention Act, which passed in May 1990. The PPTF consisted of 15 members, with representatives from industry, government and environmental/community organizations.

The PPTF advised OEA from 1990 to June 1996, at which time it was combined with the Hazardous Waste Management Planning Council (HWMPC).

The Hazardous Waste Management Planning Council (HWMPC) was created in conjunction with the passage of the 1980 Waste Management Act (Minn. Stat. § 115A.12 subd. 1). It consisted of 18 members — six representing citizens, six representing local government units, and six representing hazardous waste generators and private hazardous waste management firms.

The HWMPC functioned until June 30, 1997, when it was combined with the Pollution Prevention Task Force (PPTF) to become the Prevention, Reduction & Recycling Advisory Council (PRRAC).

Minnesota Waste Wise

Minnesota Waste Wise is a voluntary challenge program to increase waste prevention and recycling among Minnesota organizations. Since the partnership was formalized by the Governor and the Minnesota Chamber in February 1994, nearly 800 businesses have joined. Technical assistance providers, coordinated by the OEA, have contacted all participating companies. While focused primarily on solid waste, Waste Wise offers referrals in other areas, including toxic pollution prevention.

In 1997, Waste Wise focused on several efforts.

- Develop and conduct industry-specific workshops
- Promotion of the program/recruitment of new members
- Member assistance.

Waste Wise partnered with the Builders Association of Minnesota (BAM) to host two waste reduction workshops – one in Greater Minnesota and one in St. Paul – during BAM's regional continuing education seminars. Members received credit for their participation in the waste reduction portion of the seminar; over 70 businesses were represented at these workshops. Initially, Waste Wise targeted two other industries to partner with in hosting similar workshops, but the industry partners did not see the need for waste reduction workshops. New methods for promoting waste reduction in these industries are being explored.

In 1997, Waste Wise staff felt that a new method of promoting their program was needed, due to the lack of businesses signing up for the program in 1995 and 1996. They contracted with a telemarketing firm to promote waste reduction and Minnesota Waste Wise. The firm contacted 2,250 businesses; to date, 176 have signed up for the program. Waste Wise will continue to work with the telemarketing firm to identify new ways to promote the program and gain new members.

Waste Wise provides their members with many forms of technical assistance. All members receive a Minnesota Waste Wise guidebook, a quarterly newsletter, telephone assistance and site visits (if requested). Requests for site visits increased during the last quarter of 1997.

In the last two years, Waste Wise produced 20 success stories of member companies that have reduced waste and saved money, and published these stories in the Waste Wise newsletter. Businesses repeatedly stress that they find case

studies and success stories to be the most useful written information provided by the program.

To gauge the progress of respective members' waste reduction programs, each participating business is contacted twice a year by Waste Wise staff. At that time, members can ask questions and offer comments, order fact sheets, and provide updates on waste prevention and recycling activities. Waste Wise also staffs a hotline for their members to answer questions on waste reduction, recycling or reuse.

Through this cooperative project, the Minnesota Chamber of Commerce is providing promotion, outreach, administration and technical assistance. Public technical assistance providers are helping Minnesota businesses implement their Minnesota Waste Wise waste reduction policies. The program is successfully demonstrating that public/private partnerships can work, and that less waste is smart business for a better environment.

Chapter 5: Pollution Prevention within Government

Regulatory integration of P2

The state of Minnesota considers pollution prevention — eliminating or reducing pollutants at the source — to be an essential component of its environmental programs. During 1996 and 1997, managers and staff of the Minnesota Pollution Control Agency (MPCA), aided by input from customers, conducted a strategic planning process. This process is intended to assist the MPCA in reorganizing to better address the environmental challenges of the 21st century. Pollution prevention has figured prominently throughout this process, and is considered a high-level strategy for providing environmental protection.

The U.S. EPA's Pollution Prevention Incentives to States program funds the MPCA's pollution prevention regulatory integration team. This team has been working with MnTAP and the OEA to include pollution prevention as an essential component of environmental regulatory programs.

Regulatory integration projects will continue in 1998 and 1999. Results will be reported and shared, on an ongoing basis, with other MPCA programs for future integration. These projects and other regulatory integration efforts are summarized below.

Pollution prevention assistance

The MPCA surveyed 100 companies in Minnesota to determine the type and level of pollution prevention assistance they want from the MPCA. Based on survey results, the MPCA worked with MnTAP to develop and implement training for staff in the Air Quality program, to enable them to identify pollution prevention opportunities for companies during normal regulatory activities. Additional training is being developed for the MPCA and Twin Cities Metropolitan Area County Hazardous Waste staff, which is scheduled for delivery in 1998.

Revising environmental assessment tools

The MPCA is meeting with the Minnesota's Environmental Quality Board (EQB) to revise the state's environmental assessment worksheet to include questions on pollution prevention.

Project XL

The MPCA's pollution prevention program seeks to integrate pollution prevention promotion, information or outreach through innovations in permitting and licensing. The agency's pollution prevention staff have joined the Project XL team headed by Air Quality Division personnel. The Project XL team will be working with three to five partners, including U. S. Filter Recovery Services, Inc., Andersen Corporation, and the City of Owatonna and Steele County. Pollution prevention staff will be examining the flexible permit process for its utility in promoting pollution prevention. Project XL partners must commit to capping each of their facility's regulated emission or discharges at levels significantly lower than currently allowed. In return, the agency offers a single, multimedia operating document that allows product or process changes without the usual

permit modifications. Monitoring is maintained, while reporting is streamlined.

The Project XL team is currently working with various stakeholders to develop agreements and legislation to protect the projects from legal or regulatory entanglements while they have a chance to work. In addition, the team is developing criteria for measuring the projects' ability to promote superior environmental performance, encourage source reduction strategies, reduce costs, aid market responsiveness and innovation, increase local stakeholder involvement, and avoid risk shifting, as well as determining how well the flexible permit process transfers to other companies.

Review and use of pollution prevention progress reports

The MPCA turned over the review of pollution prevention progress reports to the Minnesota Department of Public Safety's Emergency Response Commission (ERC), and the OEA in 1996. The information contained in the 1996 and 1995 reports, as well as that from the reports submitted in previous years, is being used to assist the MPCA in integrating pollution prevention strategies into its regulatory activities. Reports continue to be used to identify possible candidates for special projects, such as Project XL, for facilities that may be interested in including pollution prevention provisions into their permit applications or compliance documents. Inclusion of pollution prevention in regulatory activities would be subject to bilateral agreement between the regulated client and the MPCA.

Multimedia coordination

The MPCA's pollution prevention team will incorporate pollution prevention goals and activities into new agency workplans. Broader goals encourage exploration of multimedia approaches through documents (such as multimedia permits or operating documents, multimedia inspections, etc.), to promote regulatory streamlining (such as single-form data reporting and collection models), and to look for other opportunities to promote pollution prevention in existing or new MPCA programs.

Promoting pollution prevention through procurement

The Toxic Pollution Prevention Act does not address the toxic materials that are contained in products, which can be sources of pollution during use and disposal stages. Through its procurement policies and projects, the OEA helps to evaluate and promote less toxic and recycled content products, and assists consumers of those products in making informed purchasing decisions.

Increasing the procurement of recycled and less toxic products helps reduce impacts on human health and the environment. During the past year, the OEA has been working with the Department of Administration to ensure that proposed procurement reform legislation satisfactorily addresses environmental issues.

Targeting less toxic cleaning products

In spring 1997, the City of Saint Paul and the Neighborhood Energy Consortium (NEC) completed a successful four-month pilot project in the St. Paul City Hall Annex to test the performance of non-toxic cleaning products. Funded by a grant from the Minnesota Office of Environmental Assistance (OEA), the project was aimed at reducing the use of hazardous chemicals found in many cleaning products.

The 65-year old downtown St. Paul building served as an ideal location for the pilot. The building has 17 floors with approximately 350 workers and is linked to a busy public skyway system. Under these conditions, cleaning products must perform well on sinks, toilets,

windows, mirrors, walls, floors and furniture. A comparison with the previously used products revealed that overall, the alternative products were safer for building occupants, price competitive, and better for the environment. Mark Galloway, building superintendent of the City Hall Annex, said he was especially impressed with the performance of the new degreaser in removing deep stains and the furniture cleaner's effectiveness in repelling fingerprints and smudges. Moreover, custodial staff specifically noticed a reduction in the fumes which caused staff to experience lightheaded sensations and tightening of the chest.

Brown and Company, the supplier of the non-toxic cleaners, avoided products containing hazardous chemical ingredients, chlorinated substances, phosphates, VOCs or petroleum solvents. Products were also provided in refillable, reusable containers. The custodial staff found that six of the ten alternative products worked as well or better than the products they replaced. The floor care products did not perform as favorably on the building's terrazzo flooring.

As a result of this project's success, steps have been taken to help promote better indoor air quality and protect the health of building occupants and maintenance workers throughout Minnesota.

- St. Paul approved Brown and Company (formerly known as Restore the Earth), to its list of vendors so that any city department can order non-toxic cleaning products.
- K-12 schools and other units of government are beginning to explore the use of less toxic cleaning products in their facilities.
- Through an OEA grant, Cities Management, Inc., is developing a fact sheet to educate building owners and managers about the performance and availability of less toxic cleaning products.

The state of Minnesota built upon the groundwork laid by the NEC pilot project. This past biennium, state agencies and local political subdivisions bought nearly $2 million of cleaning products through Minnesota's state contract. In the fall 1997, the State's five-year contract for cleaning supplies expired, allowing the Department of Administration to select new vendors and new cleaning products. The state's purchasing department used this opportunity to set higher standards and to purchase cleaners that better safeguard the health of custodial workers, building occupants and the environment, while also maintaining cost and performance standards.

In March 1997, a workgroup was formed to develop environmental criteria for evaluating cleaners. In addition to members from OEA, MPCA and MnTAP, there were representatives from:

- Institute for Local Self-Reliance
- Neighborhood Energy Consortium
- Cities Management, Inc.

In late May, the criteria were developed into an environmental certification form and sent out in a bid packet for vendors to complete. Each question on the form was assigned a point value and scored to determine if it was an acceptable product.

Since building maintenance crews are frequently exposed to chemicals in cleaning products, preference was given to products that minimize risks to human safety. Vendors received higher points for products containing ingredients that are not highly toxic, cancer-causing, flammable, or prone to cause skin irritation or allergic reactions.

Because the chemicals in cleaning products end up in local wastewater systems, and eventually in Minnesota's rivers and lakes, preference was also given to products that minimize the impact on our environment. Products received higher

points for avoiding ingredients derived from petroleum in favor of using renewable resources. Also avoided were phosphates and substances that contribute to the depletion of the ozone layer. Lastly, higher consideration was given to products sold in reusable and/or recycled content packaging.

At the same time products were being evaluated for their environmental performance, other state agencies were testing each product to determine their effectiveness in cleaning. The Department of Administration will compile a list of the products that passed the cleaning tests and the environmental screening, and vendors will be asked to bid on pricing and service. The new state contract is expected to be released in early 1998.

Targeting recycled content products

Recycled materials often use less water, energy and/or toxic chemicals in the manufacturing process. In 1996, the OEA updated and revised its *Minnesota Recycled Product Directory* and distributed 2,000 copies of the revised edition in 1997.

The OEA also provided grant funding for the Build-It-Recycled-Trailer (BIRT), which was completed by Lake Superior College, WLSSD, Lake, Cook, and St. Louis Counties in 1997. BIRT has begun touring the state to demonstrate the quality of recycled materials available for building construction. The OEA also co-sponsored a Buy Recycled Training Institute workshop in July 1997, providing the latest recycled product information to 30 public entity purchasers.

The Interagency Pollution Prevention Advisory Team (IPPAT)

The Interagency Pollution Prevention Advisory Team was established in 1991 by Governor's Executive Order 91-17, which provides for the implementation of pollution prevention by state government. The order directs all departments and agencies to:

- Give priority consideration to pollution prevention
- Develop policy statements and to undertake pollution prevention activities.
- Prepare annual summary reports on their activities and progress in pollution prevention;
- Investigate opportunities to encourage pollution prevention through their purchasing policies and specifications.

The order also established an Interagency Pollution Prevention Advisory Team (IPPAT).

The Office of Environmental Assistance (OEA) coordinates the IPPAT, which meets quarterly to share information and offer case studies on pollution prevention, waste reduction and resource conservation within state departments and agencies. IPPAT sponsors the MN GREAT! awards — Minnesota Government Reaching Environmental Achievements Together. This is the second year the awards were presented.

In 1997, IPPAT recognized five teams of agency staff for their work to reduce waste, conserve resources and save energy in their state workplaces. Winners had implemented a variety of projects that went beyond their regular job duties. Many of the projects will not only benefit the environment, but will also reduce costs and resource use.

Award winners included the following teams and projects:

- Kurt Schroeder, hydrologist at the MPCA, was recognized for his work as coordinator of the Lafayette Park Transportation Committee. The committee encourages cycling, walking and transit use by employees of five state agencies near downtown St. Paul. Schroeder has initiated over a dozen projects to encourage state employees to walk, bike or bus to work and during the work day. He organized the "Tour de Lafayette" – lunch-time bike rides to familiarize staff with bike routes into downtown. He produces e-mail messages called "Bus Line" on commuting options for agency staff.

- Todd Stugelmayer, Kim Anderson, Brian Oxton, Gordy Bergman, Duane Money and Alan Breuer, staff of the Physical Plant at Moorhead State University, were given an award for an energy and water conservation project at the campus.

Moorhead State installed: low-flow shower heads throughout campus; an energy management control system in 19 campus buildings; a pool environmental unit; heating plant boiler economizers; and a blow down recovery system. The energy retrofit was sponsored by a state program and Northern States Power Company. The estimated payback period is 4 years, with estimated savings thereafter of $236,100 annually.

- Bob Baker, Cari Hatcher, Art Kistler, Victoria Nelson, Mike Ramolae and Linda Rogers, staff from the Department of Parking and Transportation Services at the University of Minnesota, were given an award for a project that reduces auto idle time at parking garages at the U of M. Installation of new computer equipment at University parking ramps has reduced vehicle waiting time by about 1.5 seconds per car. Since 1993, 8,460 pounds of gasoline (nearly 1,000 gallons) have been saved, and CO2 emissions reduced by 28, 172 pounds.

- Duane Faber, Berry Conway, Sharon Sigmon, Jeff Rehbein, Tom Weireke and Gary Thrift, staff from the Printing, Communications & Media Division of the Department of Administration, were given an award for the printing of a class manual using digital printing and alternative fiber paper.

- New technology at the Department of Administration allows customers to submit projects electronically and allows the Department to print jobs on an as-needed basis. This minimizes the printing of extra copies. This class manual was printed on paper made from tropical grass sold by Fox River Papers Co. The paper is responsibly planted and harvested, and is both chlorine and acid free.

- Dann Adair and Michael Pumroy, staff from the Department of Plant Pathology and Facilities Management at the University of Minnesota, received an award for a lighting retrofit project at University Greenhouses. After enrolling in a NSP-sponsored conversion rebate program for lighting systems, the U of M converted its campus greenhouses to energy-efficient plant lighting. Many of the replaced fixtures had PCB-laden transformers. The new bulbs are more energy-efficient and longer lasting. This project has an estimated payback of 1.6 years with estimated savings thereafter of $60,897 annually.

Counties and Cities Involved in Source Reduction and Recycling (CISRR)

Created in 1990, CISRR is a group of public sector individuals who meet regularly to exchange and evaluate program ideas and coordinate waste prevention activities so that their customers receive optimum assistance to prevent waste. Membership to the group is open.

CISSR-sponsored discussions for 1995-1997 include:

- What sewage treatment plants can do to prevent pollution.
- Governor's Sustainable Development Initiative.
- Packaging and the environment.
- MPCA Landfill Cleanup Program.
- Olmsted County educational campaign results.
- Ramsey County business survey.
- Minnesota Department of Public Service Energy Information Center.
- Mercury in the environment.
- Environmental purchasing.
- Quarterly Materials Exchange Alliance and Minnesota Waste Wise updates.
- Steele County Green Source 2020 project.
- America Recycles Day.
- Purchasing materials with recycled content.
- Waste Management Act Examination process.

In 1995-1997, CISRR undertook the following work tasks related to source reduction:

- Conducted a presentation on how local government solid waste professionals have been integrating solid waste source reduction into their activities at the 1995 Annual Solid Waste Conference.
- Provided feedback on the three-percent credit questionnaire and the SCORE Form.
- Participated in the development of the *Source Reduction Tool Kit* for local governments. This tool provides source reduction materials that can be tailored to any county.
- Reviewed an commented on an OEA fact sheet on recycled copy paper.
- Published a quarterly newsletter, *CISRR News*.

CISRR plans to continue to act as forum to exchange and evaluate program ideas and coordinate waste reduction activities. Future issues for discussion include: alternatives to toxic cleaning products, green buildings, packaging reduction, and working with businesses to reduce waste.

In 1998, CISRR plans to publish four quarterly newsletters and start a "bulletin board" site on the Internet, which will be maintained by the OEA. The site will serve as a central point to exchange ideas about source reduction and recycling throughout the year.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ **Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.**

Energy Recovery Methods [enter 3-character code (s)]

1 ____ 2 ____ 3 ____ 4 ____

SECTION 7C. ON-SITE RECYCLING PROCESSES

☐ **Not applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.**

Recycling Methods [enter 3-character code(s)]

1 ____ 2 ____ 3 ____ 4 ____ 5 ____

6 ____ 7 ____ 8 ____ 9 ____ 10 ____

SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

	All quantity estimates can be reported using up to two significant figures.	**Column A** Prior Year (pounds/year)	**Column B** Current Reporting Year (pounds/year)	**Column C** Following Year (pounds/year)	**Column D** Second Following Year (pounds/year)
8.1	**Quantity released***				
8.2	**Quantity used for energy recovery on-site**				
8.3	**Quantity used for energy recovery off-site**				
8.4	**Quantity recycled on-site**				
8.5	**Quantity recycled off-site**				
8.6	**Quantity treated on-site**				
8.7	**Quantity treated off-site**				
8.8	**Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes** (pounds/year)				
8.9	**Production ratio or activity index**				

8.10 Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.

	Source Reduction Activities [enter code(s)]	**Methods to Identify Activity (enter codes)**		
8.10.1		a.	b.	c.
8.10.2		a.	b.	c.
8.10.3		a.	b.	c.
8.10.4		a.	b.	c.

8.11 Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box) YES ☐ NO ☐

* Report releases pursuant to EPCRA Section 329(8) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment." Do not include any quantity treated on-site or off-site.

Appendix B: Progress Report, See Blocks G and H

PART IV. SUMMARY OF OBJECTIVE (CHEMICAL-SPECIFIC) BASED ON POLLUTION PREVENTION PLAN

(Photocopy and complete PART IV & V for each objective set for EACH EPA FORM R (chemical) reported.)

A. Facility Name	B. Chemical Name	C. CAS Number

D. Describe the process(es) which generates the releases and/or transfers of the chemical entered in Block B. (Use "A" codes from page 7 of instructions.)

A	A	A

If the "A" Code does not adequately represent the process, please describe below:

E. Baseline Year of Objective:	F. Baseline Release Quantity of Objective in pounds: (See page 4 of instructions)	G. Did this facility have a numeric objective (s) for reduction of releases and/or transfers of this chemical?
1994	LB.	YES ☐ NO ☐ (If YES, continue to Block H) If NO, skip Block H and continue to Block I)

H. What is the estimated amount of releases and/or transfers associated with this chemical in pounds as stated in your Pollution Prevention Plan?:

1995	1996	1997	1998	1999
LB.	LB.	LB.	LB.	LB.

I. Describe the **non-numeric objective** for reduction of releases and transfers associated with the chemical; (Pursuant to **Minn. Stat. § 115D.07**, the objectives for eliminating or reducing the generation or release of each toxic pollutant at this facility must be expressed in numeric terms wherever technically and economically practicable).

J. For each process entered in Block D above, identify the source reduction activities you intend(ed) to utilize in meeting the objective for this chemical:

Process(es) Impacted, entered in Block D (Use "A" codes from page 7 of instructions)	**A**			**A**			**A**		
Source Reduction Techniques (Use "W" codes from page 8 of instructions)	**W**	**W**	**W**	**W**	**W**	**W**	**W**	**W**	**W**
Estimated Date of Implementation (Month/Year)	/	/	/	/	/	/	/	/	/

If the "W" code (s) does not clearly describe your intended methods, please explain:

Duplicate this form as needed.