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Region 5
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Illinois, Indiana,
Michigan, Minnesota, Ohio,
Wisconsin

POLLUTION SOLUTIONS II

Continuing to Promote Pollution Prevention in the Great Lakes Basin

A Report on the Pollution Prevention Grant Program in the Great Lakes Basin

Great Lakes National Program Office

Illinois • Indiana • Michigan • Minnesota • New York • Ohio • Pennsylvania • Wisconsin

AKNOWLEDGEMENTS

GLNPO would like to thank the grantees for their hard work and commitment to promoting pollution prevention around the Great Lakes basin, and for their reviews during this project. Acknowledgement is due to E.Marie Graziano,Yamille Cirino, Frank Anscombe, Joy Schnackenback and Ted Smith for their valuable comments and suggestions on this report.

DISCLAIMER

Information in this report is based on information supplied to U.S.EPA by the grantees. Any mention of products or trade names does not constitute recommendation for use by the U.S. EPA

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Executive Summary

Introduction

This report provides a summary of activities and accomplishments supported by U.S. EPA's Great Lakes National Program Office (GLNPO) pollution prevention and toxics reduction (P2TR) grant program over a ten-year time frame, from 1992 through 2001. The objective of this report is twofold: 1) to summarize the accomplishments of the P2TR grant program, and, 2) to provide a resource for environmental professionals that work on P2TR, with which to learn from these projects and build on the successes that have come from this program.

The P2TR program plays an important role in U.S. EPA's commitment to implement Article II(a) of the Great Lakes Water Quality Agreement (GLWQA), which states that "the discharge of any or all persistent toxic substances (into the Great Lakes System) be virtually eliminated", as well as the goals and objectives of the Great Lakes Binational Toxics Strategy (GLBTS). The GLBTS, developed jointly by Canada and the United States and signed April 7, 1997, provides a framework for actions to reduce or eliminate PTS, especially those which bioaccumulate, from the Great Lakes Basin Ecosystem. These grants have helped to fund P2TR outreach, education, collection and disposal, technical research, and program and policy development, all in an effort to reduce and mitigate the use and release of PTS that impact the Great Lakes Basin Ecosystem.

Between 1992 and 2001 the Great Lakes National Program Office (GLNPO) of the U.S. Environmental Protection Agency (U.S. EPA) awarded 71 P2TR demonstration grants totaling $4,855,459 to States, Tribes, academic institutions, non-profit organizations, county and municipal governments, technical assistance providers, and others. These grants have leveraged $2,156,584 in contributions from grantees and others. The details of each of these projects are found in Appendix A of this report.

Outcomes: quantitative and qualitative

One important feature of this report is the discussion of project "outcomes." Some outcomes are not conveniently discrete; a project may be one element within a larger effort that has collective outcomes, such that it can be hard to apportion credit among individual contributors. Alternatively, it can sometimes be difficult to express a numeric outcome, such as the collection of pounds of a substance, into ecological or human health benefits. Alternatively, too, an outcome may be a report, which could have a positive influence on others, but this can be hard to gauge.

Because of such factors, most projects deserve to be viewed on a case-by-case basis, seen within the unique contexts of an individual project. Where salient quantitative metrics are available, they can be meaningful indicators of outcomes. A well-rounded, thoughtful assessment of a project's outcomes generally includes non-numeric considerations, as well. In the context of environmental benefits and costs, former EPA Administrator Michael Leavitt has suggested "neither quantitative nor qualitative factors [should] dominate." Both perspectives have value.

With regard to measurable outcomes, these projects have resulted in:

- 8236 Lbs of mercury removed from use or uncontrolled storage;
- 5790 mercury thermometers collected from residents within the Great Lakes states and exchanged for alternative thermometers;
- 105275 Fluorescent lamps containing mercury collected and recycled.
- 500 mercury containing auto switches collected from autos (both end of life and in-use) and properly disposed of;
- 451 PCB Transformers removed, and the PCB materials properly disposed of, while the metal, etc. has been recycled;
- 262,073 Lbs of Pesticides properly disposed of.
- 7041 Lbs. Of household hazardous waste collected and properly disposed of.

In addition thousands of pounds of electronics and computer equipment containing lead solder, mercury, and other precious metals have been collected from residents within the Great Lakes states and properly recycled.

Project Examples

A few notable and innovative demonstration pilot projects funded through the P2TR program include:

- The Western Lake Superior Sanitary District in Duluth, Minnesota and the Bad River Band of Lake Superior Chippewa Indians working with the local community to develop and distribute outreach materials and community service announcements, about the human health and environmental dangers of open burning of waste and burn barrel alternatives.

- The New York Department of Environmental Conservation and Erie County Department of Environment training oil change facilities in New York to exchange switches in automobiles getting their oil changed upon vehicle owner approval.

- State and local governments in every Great Lakes State working with hospitals to eliminate mercury from the facility in partnership with the hospital associations and the “Healthcare Without Harm” program.

- The three major auto manufacturers within the United States modifying the design of switches installed in new vehicles to eliminate the use of mercury. In addition, these same auto manufacturers supplying replacement switches for vehicles already in use.

Conclusions

Since 1992, we have learned a great deal about the value of pollution prevention as a critical tool in environmental protection, both regionally and nationally. This became even more evident when the National Pollution Prevention Roundtable in cooperation with the state pollution prevention programs developed the 2003 report An Ounce of Pollution Prevention is Worth Over 167 Billion Pounds of Cure: A Decade of Pollution Prevention Results 1990-2000. Through the P2TR program, public awareness has grown significantly and the need for financial support to develop and maintain P2TR programs within the Great Lakes States that offer PTS collection and disposal, continuing education, and related program support has evolved. For example, since 1995 seven Great Lakes states, including Illinois, Indiana, Michigan, Minnesota, New York, Pennsylvania, and Wisconsin have adopted legislation to control the use, sale and/or disposal of mercury containing products with the state. Many county and municipal governments have established more strict ordinances in states where legislation banning its use or sale has not been passed. This legislative action is a result of increased public awareness about PTS, particularly mercury.

The successes of the P2TR grant program provide a strong foundation for further efforts in pollution prevention, regionally, nationally and internationally. Looking forward, USEPA's Great Lakes National Program Office is committed to continuing to foster new and innovative ways to conduct pollution prevention and toxics reduction activities for years to come.

Title: POLLUTION PREVENTION AND PUBLIC AWARENESS CAMPAIGN FOR LAKES SUPERIOR AND MICHIGAN BASIN (FY92 - X995881-01-0)

Organization: Minnesota Pollution Control Agency, in partnership with Illinois, Indiana Michigan and Wisconsin environmental agencies.

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Project Statistics:

Award Amount:	$160,000
Dollars Leveraged:	$8,421
Project Timetable:	10/1/92 - 9/30/94
Lake Basin(s):	Superior
Toxic Stressor:	HHW[1]
Project Type:	Education/Outreach, HHW Collection

Summary: This grant supported a pollution prevention awareness campaign for Lakes Michigan and Superior, household hazardous waste collection between Minnesota and Wisconsin, and a program for management and reduction of waste from very small quantity generators.

Environmental Results/Products:

Pollution Prevention Awareness Campaign

Illinois, Indiana, Michigan, Minnesota, and Wisconsin conducted a unified public awareness campaign that addressed pollution prevention and toxics of concern in the Lake Superior and Lake Michigan drainage basins. Partners in this project included U.S. EPA, State Remedial Action Plan coordinators, the Lake Superior Bi-National Work Group Communication Team, and the Lake Michigan Lakewide Management Plan team.

The partners produced two outreach pieces: Protecting Our Great Lakes, a pollution prevention public awareness campaign for individuals in the Lake Superior and Michigan basins, and a Disposal Guide to Household Hazardous Wastes, detailing responsible ways to dispose of various products commonly found in homes and garages. The disposal guide can be found at:
http://www.epa.gov/glnpo/p2/Lkwatchc.html on the Internet.

Minnesota- Wisconsin Household Hazardous Waste

Through funding under this grant, Wisconsin residents were able to deliver household hazardous waste to the permanent household hazardous waste education and collection center in Duluth, Minnesota. Very Small Quantity Generator Program Development There are approximately 2,000 conditionally exempt or very small quantity generators (VSQGs) of hazardous waste in the Minnesota portion of the Lake Superior basin. These generators have few options for properly disposing of their waste and need information and assistance to begin preventing pollution. With funds from this grant, the Western Lake Superior Sanitary District (WLSSD) developed a program for VSQGs in Minnesota and Wisconsin for management and reduction of waste. In addition to collecting already generated hazardous wastes,

[1]Household Hazardous Waste

Minnesota assisted participating VSQGs in identifying opportunities and resources for pollution prevention with an emphasis on toxics of concern for Lake Superior.

Project Partners:

U.S. EPA, State Remedial Action Plan coordinators
Michigan Department of Environmental Quality
Wisconsin Department of Natural Resources
Indiana Department of Environmental Management
Western Lake Superior Sanitary District
Lake Superior Bi-National Work Group Communication Team
Lake Michigan Lakewide Management Plan Team

Title: INDUSTRIAL WASTE WATER OPERATOR POLLUTION PREVENTION TRAINING (FY92 - X995882-01-0)

Organization: Michigan Department of Environmental Quality

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Project Statistics:

Award Amount:	$40,000
Dollars Leveraged:	$2,105
Project Timetable:	10/1/92 - 2/15/95
Lake Basin:	Superior
Toxic Stressor(s):	Industrial/Municipal Discharge to POTWs
Project Type:	Education/Outreach

Summary: Michigan has eight major dischargers to Lake Superior: four industrial, and four municipal. This project focused on pollution prevention training for the Wastewater Treatment Plants (WWTP) that treat the waste from these dischargers. Michigan developed pollution prevention training materials specific to the operation of a WWTP and to the pollutants of concern for Lake Superior.

Environmental Results/Products: Staff conducted training in Lansing and Marquette, Michigan in January 1995. Staff developed the Pollution Prevention Training Manual for Wastewater Treatment Plant Operators which is available on the Internet for downloading. The address is: http://www.deq.state.mi.us/ead/potw/.

Products:
Pollution Prevention Training Manual for Wastewater Treatment Plant Operators
http://www.deq.state.mi.us/ead/potw/.

Title: HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAM AND POLLUTION PREVENTION ASSESSMENTS (FY93 - GL995415-01)

Organization: Michigan Department of Environmental Quality

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Project Statistics:

Award Amount:	$139,839
Dollars Leveraged:	$8,660
Project Timetable:	10/1/93 - 9/30/96
Lake Basin(s):	Superior
Toxics Reduced:	455 lbs. mercury, 8,999 lbs. loose pack pesticide liquids, 1,017 lbs. of florescent bulbs
Toxic Stressor(s):	HHW, pesticides, mercury
Project Type:	HHW Collection, Ag Clean Sweep

Summary: This project focused on waste collection and technical assistance in the Michigan, Minnesota and Wisconsin portions of the Lake Superior Basin.

Collection: The purpose of this project was to provide Michigan, Minnesota, and Wisconsin Lake Superior basin homeowners and users of agricultural products a means to dispose of unwanted household hazardous waste and unusable agricultural pesticides. By providing this service at no cost to the participants, it assured that the materials collected would be recycled or disposed in an environmentally safe manner, thus avoiding the possible environmental consequences of improper disposal.

Environmental Results/Products: Local contact agencies put out educational information on the need for the project, and the times, locations and types of materials eligible for collection. This included newspaper articles or advertisements, radio and television spots, and informational bulletins distributed by local recycling or environmental groups. The publicity and information distribution added greatly to the success of this project.

Staff collected more than five semi-truck loads of hazardous wastes. The wastes collected at the five central collection/assembly areas (Duluth, Marquette, Houghton, Ironwood, and Escanaba) included 455 pounds (lbs.) of mercury (including lab pack solutions, lab pack solids and elemental), 8,999 lbs. loose pack pesticide liquids (dioxins <30%), and 1,017 lbs. of florescent bulbs.

Pollution Prevention Assessments: More than forty retired engineers, scientists, and other professionals were hired through the Retired Engineer Technical Assistance Program (RETAP) and trained to conduct on-site waste reduction assessments for local businesses and Publicly Owned Treatment Works (POTWs) whose discharges affect Lake Superior. RETAP staff provided specific guidance to industries and businesses to reduce the release of toxins. These retired professionals were located throughout the State and represented diverse industrial and occupational disciplines. Their extensive experience garnered respect and receptivity among Michigan businesses and institutions. All pollution prevention activities were closely coordinated with the local POTWs.

Environmental Results/Products: After detailed on-site assessments, RETAP staff identified problems and opportunities to reduce waste and achieve cost savings for the facilities. The assessments were free, voluntary, nonregulatory, and confidential. RETAP conducted 26 preassessments and 14 full assessments at 10 industries and 16 institutions. The types of industries assessed included wastewater treatment, metals/machinery fabrication, wood products, corrugated medium, solid waste management, automotive, and pulp and paper. The types of institutions assessed included hospitals and schools—elementary, high school, community college, and university. Industrial and institutional organizations continue to request additional assessments beyond the scope of the funded project. Potential annual cost savings from RETAP recommendations ranged from $10,000 to $1.5 million per company.

Partners:
Retired Engineer Technical Assistance Program (RETAP)

Title: ERIE COUNTY REGIONAL MUNICIPAL POLLUTION PREVENTION PROGRAM (FY93 - GL995373-01-0)

Organization: Western New York Economic Development Corporation/Erie County

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Project Statistics:

Award Amount:	$50,000
Dollars Leveraged:	$6,000
Project Timetable:	10/01/93 - 9/30/96
Lake Basin(s):	Erie
Project Type:	Municipal P2 Program, Development, Training, and Assessment

Summary: Erie County, New York established a pollution prevention partnership with the Regional Municipality of Hamilton-Wentworth, Ontario. The Erie County Office of Pollution Prevention also worked with other local governments within Erie County to adopt pollution prevention policies, practices, and procedures.

Environmental Results/Products

Bilateral Partnership with Hamilton-Wentworth*:* The Regional Municipality of Hamilton-Wentworth and Erie County signed a Memorandum of
Understanding on March 30, 1995, which formally launched training and information sharing networks linking the communities.

Erie County conducted two pollution prevention training sessions for Publicly Owned Treatment Works (POTW) employees. More than 100 POTW inspectors and managers from both New York and Ontario attended these sessions. The Regional Municipality of Hamilton-Wentworth hosted two pollution prevention symposiums for municipal officials throughout Canada and the United States, with more than 150 officials attending these workshops.

The bilateral partnership has enhanced information sharing, allowing both governments to avoid duplicating efforts. Erie County and the Regional Municipality of Hamilton-Wentworth continue to share information about pollution prevention processes, policies and training.

Erie County/Town of Amherst Pollution Prevention Alliance*:* The Erie County Office of Pollution Prevention (ECOPP) established a $20,000 grant program, soliciting proposals from the 44 municipalities within Erie County. Originally, ECOPP envisioned dividing the funds for local pollution prevention efforts between four municipalities. However, the Town of Amherst was the only municipality which demonstrated interest in carrying out the program. Thus the grant program focus shifted toward supporting incorporation of pollution prevention strategies into one local government's policies and procedures.

The Town of Amherst, with assistance from Erie County, developed a work plan to incorporate pollution prevention into its policies and procedures. A Town policy, adopted in April 1996, establishes pollution prevention as a priority in the use and management of hazardous materials. Key Town employees were trained and the project received a commitment from the Town's leadership before the

project progressed. Pollution prevention has been included in the pretreatment inspection process, routine fire and safety inspections, the site plan review process, and the building inspection process. The

Pretreatment Coordinator supplies pollution prevention information and assistance to Town of Amherst businesses*:* Pollution prevention assessments were conducted at a hospital, a university facility management
department, a university vehicle maintenance department, two large manufacturing companies, a restaurant, a hotel, two print shops, a research park, and a dental products manufacturer. The assessments were voluntary and confidential. Town and County staff identified opportunities for local businesses to both reduce the amount of waste they generate and to save money. The town and the county organized pollution prevention workshops for health care facilities; hotels and restaurants; and vehicle maintenance facilities. These industry sectors were chosen because they are ubiquitous throughout the Town of Amherst.

Project Partners:
The Regional Municipality of Hamilton-Wentworth, Ontario
Town of Amherst

Title: OHIO GREAT LAKES BASIN PRETREATMENT POLLUTION PREVENTION
(FY93 - GL995374-01-0)

Organization: Ohio Environmental Protection Agency

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Project Statistics:

Award Amount:	$80,000
Dollars Leveraged:	$4,210
Project Timetable:	9/01/93 - 9/30/96
Lake Basin:	Erie
Project Type:	Education/Outreach

Summary: This was an education project which introduced pollution prevention into Publicly Owned Treatment Works (POTW) and industrial user operations and into Ohio pretreatment programs in the Lake Erie basin.

Environmental Results/Products: Brochures with general pollution prevention information were distributed to approximately 20,000 industrial users of POTWs and 75,000 homeowners throughout the Ohio portion of the Lake Erie basin. A newsletter was distributed to the Lake Erie POTWs.

The Ohio Environmental Protection Agency (EPA) developed a Pollution Prevention Training Resource Guide for Publicly Owned Treatment Works.

In October 1994, Ohio EPA conducted training for POTWs in Archibald, Sandusky, and Akron, Ohio. Two hundred forty-seven individuals attended these training sessions. Approximately 50 copies of the training manuals were sent to representatives in each of the Great Lakes States and to several Indian Nations. Ninety-nine copies were distributed to Ohio Pretreatment Coordinators who did not attend the training and manuals were given to the Operator Training Committee of Ohio (OTCO) for the purpose of incorporating pollution prevention into OTCO training sessions.

As part 1994 pollution prevention training evaluation, several POTWs in the Lake Erie basin indicated that they were interested in additional pollution prevention assistance. Ohio EPA selected four of the facilities requesting additional pollution prevention assistance. The assistance included two waste reduction assessments for industrial users identified by the POTWs (ITT Automotive in Archibald POTW and Metokote in Lima POTW), POTW operations assessment and training for personnel at Archibald and Wauseon POTWs, workshops on pollution prevention for industrial users in Archibald and Freemont POTWs and working with Lima POTW on a public outreach campaign to reduce mercury discharges to the sewer. A final report was prepared summarizing this part of the project.

Project Partners:
City of Archbold, OH
City of Sandusky, OH POTW

City of Akron, OH POTW
City of Wauseon, OH POTW
City of Freemont, OH POTW
Lima Ohio POTW

Products:
Pollution Prevention Training Resource Guide for Publicly Owned Treatment Works.

Title: TOXICS POLLUTION PREVENTION MENTORING
(FY93 - GRANT # GL995412-01-0)

Organization: Western Lake Superior Sanitary District

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Project Statistics:

Award Amount:	$95,000
Dollars Leveraged:	$5,000
Project Timetable:	9/1/93 - 9/30/96
Lake Basin:	Superior
Project Type:	Education/Outreach

Summary: The purpose of this project was to help Lake Superior communities build pollution prevention capabilities. The Western Lake Superior Sanitary District (WLSSD) worked directly with Virginia, Minnesota; Marquette, Michigan; Ashland, Wisconsin; and Superior, Wisconsin to develop toxic reduction plans. Project activities included: pollution prevention awareness for wastewater treatment plant managers and operators; a toxic pollution prevention needs survey; facilitating local toxic reduction meetings; developing business-specific pollution prevention opportunities and waste management guidelines; and assisting local communities around Lake Superior to develop toxic reduction plans. The grant included funds for the pilot communities to develop and implement the plans.

Environmental Results/Products

Pollution Prevention Awareness: WLSSD developed a short presentation for wastewater treatment plant managers and operators on the regulatory need to reduce toxics in Publicly Owned Treatment Works (POTW) discharge, an overview of pollution prevention and its advantages, and examples of successful pollution prevention projects in industry. WLSSD presented this information at local State operator meetings in Marquette, Michigan; Ashland, Wisconsin; and Aurora, Minnesota.

Needs Survey: WLSSD surveyed Lake Superior POTWs to determine what they believed would be most effective in reducing toxics at their source. There is a need for communication about toxics with industrial, business and residential POTW customers. There appears to be a need for POTWs to learn what can and cannot go down the drain and which materials contain toxics of concern for Lake Superior.

Specific Business Opportunities
WLSSD distributed pollution prevention information to pretreatment operators, hospitals, and dentists.

Community Toxic Reduction Plans: Virginia, Minnesota; Marquette, Michigan; Ashland, Wisconsin; and Superior, Wisconsin all took different tacks when developing toxic reduction plans. In Virginia, Minnesota the project was run by the POTW operator, a private consulting firm. In Marquette, Michigan, city employees ran the program, with consultant support for the final reporting. In Ashland, Wisconsin a partnership was
formed between the city, Northland College, businesses, and environmental groups. All of the pilot cities developed public information campaigns.

In **Virginia, Minnesota** on-site assessments were completed at a number of large facilities and other places known to discharge chemicals of concern for Lake Superior. These included a small electric cooperative, a municipally owned steam electric utility, a manufacturer, and a dental practice. The municipality placed information on mercury in the local paper and developed a zero discharge workbook listing businesses and possible toxics that they could likely discharge.

The **Marquette, Michigan** plan included a public awareness campaign which emphasized what residents and businesses could do to eliminate discharge of Lake Superior chemicals of concern. Outreach to a hospital and local businesses centered on reduction of toxic discharges. Marquette developed 11 educational handouts and 12 newspaper ads and a public service announcement which addressed the pollutants of concern for Lake Superior. These materials stress the use of non-polluting alternatives, and provided techniques and instructions for the appropriate disposal of household hazardous waste. Pollutant-specific fact sheets on mercury, lead, copper, silver, formaldehyde, and PCBs were published in local newspapers.

Ashland, Wisconsin produced two reports: Zero Discharge Model Project, Ashland, Wisconsin and Zero Discharge Campus Project, Northland College. With a community-based focus group, the municipality evaluated commercial, industrial and residential sources of the nine chemicals of concern for Lake Superior.

In the **Superior, Wisconsin** toxic reduction plan, data on effluent was examined to determine whether any additional compounds should be focused on. Industry-specific pollution prevention information was sent to targeted industries: photographic industries, dentists, clinics, nursing homes, a university and a technical school. Pollution prevention information was also published in the local newspaper.

Lessons Learned: It is important to educate the local pollution prevention champion at the POTW. Support from management, the local governing body, and the community early in the process is crucial. Each community needed to go through the process of deciding which chemicals of concern were a problem for them and thus should be the focus for their pollution prevention efforts. A professional group or the general public, rather than a specific facility, may be the appropriate target for pollution prevention activities. It is important to develop a strategy with specific pollution prevention activities in cooperation with the targeted group or facility personnel.

Project Partners:
Ashland Water and Wastewater Utility and Department of Public Works
Northland College
University of Wisconsin-Extension Office

Title: MERCURY/PCB OUTREACH AND COLLECTION PROGRAM AND TECHNICAL ASSISTANCE (FY93 - GL995440-01-0)

Organization: Minnesota Pollution Control Agency

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Project Statistics:

Award Amount:	$115,000
Dollars Leveraged:	$5,750
Project Timetable:	10/01/93 - 9/30/95
Lake Basin:	Superior
Toxic Stressor(s):	mercury, PCBs
Project Type:	Education/Outreach

GL995440-01_cvrletter.pdf

GL995440-01.pdf

Summary: Minnesota conducted an outreach program for mercury and PCB-containing products and delivered pollution prevention technical assistance to small and medium-sized businesses in the Lake Superior basin.

Environmental Results/Products

Outreach: Staff identified mercury and PCB-containing wastes generated by service industries and conducted a series of meetings and interviews with stakeholders to discuss the needs of the affected community and suggestions for how to address the problem. Project stakeholders included contractors, businesses, trade associations, chambers of commerce, local and State governments, utilities, product manufacturers and suppliers, haulers, and recycling and disposal companies. Staff also participated in trade shows and monthly meetings of business organizations in order to educate attendees about mercury issues.

Slide Shows: Staff developed two slide presentations. The first slide show targets trade groups that generate mercury and PCB containing wastes and is designed for use with brochures (see below). It motivates contractors and service technicians to manage their wastes properly and to keep mercury and PCBs out of the waste stream. The second slide show, designed for the general public, is specifically about mercury. It encourages consumers to purchase alternative products, where appropriate, and informs consumers how to dispose of mercury-containing products.

Brochures: Staff developed brochures on mercury and PCBs. The mercury brochure contains fact card inserts describing common items which contain mercury. These brochures can be found at:

http://www.epa.gov/glnpo/p2/ on the Internet.

Display: Staff developed a display to show the types of products that contain mercury. The display titled, "WHO ME? Do I Contribute Mercury to the Environment?," has two components. There is a three-panel display board with pictures and text about mercury's effect on the environment. A collection of mercury-containing products assembled on the table in front of the display board shows items such as a thermostat, switches and fluorescent lights. This collection is accompanied by text about mercury contained in the products and non-mercury alternatives.

State specific copies of the display are housed at the Michigan and Wisconsin environmental regulatory agencies, and throughout Minnesota. Two generic copies are housed at the U.S. Environmental Protection Agency in Chicago.

Collection: Minnesota staff worked with the partners to identify collection needs, potential collection sponsors, regulatory and economic barriers to collection and proper management of mercury containing wastes. There is a need to develop waste collection systems which are convenient and economically feasible for service industries and businesses.

Staff obtained the rights to use a logo for florescent bulb recycling projects. This logo, modeled after the chasing arrows recycling symbol, is in the public domain and thus can be used as part of a unified campaign around Lake Superior (and beyond) for lamp collection programs.

***Technical Assistance*:** A team from the University of Minnesota-Duluth Department of Chemical Engineering generated a potential client list for pollution prevention assessments, cataloged and reviewed pollution prevention literature, and called potential clients. They used data from five Publicly Owned Treatment Works (POTWs) to scan for priority pollutants. They also conducted an information needs assessment and examined the way businesses used existing pollution prevention information.

Site Assessments: Nine pollution prevention assessment site visits were made to businesses (three oil distributors, two printing companies, a furniture refinisher, a laboratory, a veterinary hospital, a printed circuit board assembler, and a large forest products facility). Based on the site visits, team members drafted a report which included recommendations for pollution prevention opportunities. Each assessment took approximately 50 staff-hours to complete and included four team members visiting the businesses, gathering pollution prevention information, and writing the report.

Lessons Learned: Focusing on one or two business types for visits would reduce the amount of background pollution prevention information gathered and allow for development of generic reports which could be quickly modified for each business visited. Having two rather than four team members per assessment could increase the number of site visits possible. Soliciting clients via letters and phone calls yielded clients who were already practicing pollution prevention. These clients probably chose to participate to find out if there was any more they could do.

The project did not reach the businesses that could have benefitted the most because these businesses probably would not voluntarily allow an assessment to be conducted. Other methods to locate clients might include: referral by regulatory agencies or other agencies involved in pollution prevention/ hazardous waste minimization activities, referral by bank loan officers, or referral by POTW officials.

Pollution Prevention Database User Needs Assessment: A survey of businesses examined use of

pollution prevention data bases. Findings for Minnesota's Lake Superior basin showed that while 73% of the businesses responding to the survey did own a computer, 51% indicated that they did not know what an electronic data base was nor how to use one. A majority, 52%, indicated that they would use a pollution prevention technical assistance center.

Project Partners:
University of Minnesota-Duluth Department of Chemical Engineering

Title: POLLUTION PREVENTION ASSESSMENTS IN SUPPORT OF THE LAKE SUPERIOR BINATIONAL PROGRAM - TECHNICAL ASSISTANCE TO INDUSTRIES (FY93 - GL995466-01)

Organization: Wisconsin Department of Natural Resources

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Project Statistics:

Award Amount:	$57,000
Dollars Leveraged:	$3,000
Project Timetable:	10/01/93 - 09/30/95
Lake Basin:	Superior
Toxic Stressor(s):	Mercury, PCBs
Project Type:	Education/Outreach

Summary: The Solid and Hazardous Waste Education Center (SHWEC) provided pollution prevention information, education and technical assistance to waste generators in the four Wisconsin counties in the Lakes Superior basin. Building awareness among the waste generators about the resources available from SHWEC, the Wisconsin Department of Natural Resources and local resources, and building linkages with municipal operations, primarily Publicly Owned Treatment Works (POTWs) in the Lake Superior basin, were key project objectives. Although the project was designed to target reductions of specific bioaccumulating substances, primarily PCBs and mercury, facilities were approached with the opportunity to reduce all types of wastes.

Environmental Results/Products: SHWEC inventoried and identified companies discharging directly to the Lake Superior watershed and to the POTWs. SHWEC provided training to POTW pretreatment coordinators on basic pollution prevention concepts with special emphasis on discharges from dentists, photo developers and medical laboratories.

SHWEC completed 15 technical assistance assessments. Many of the targeted businesses were reluctant to invite SHWEC to their facilities. This may have been due to a distrust of government. Local partnerships (e.g., “Green Star” programs in Ashland and Superior, Wisconsin) can help establish the trust that is needed among waste generators, the community, regulators, and technical assistance programs.

SHWEC conducted five workshops for marinas and boat repair facilities, small quantity generators, and the wood finishing industry. Outreach materials included information on services offered by SHWEC and other resources (including county Community Resource Development Agents) for targeted businesses in the Lake Superior basin in Wisconsin.

Publications developed by SHWEC include:

GL995466-01.pdf

- Small Business Pollution Prevention Guide
- Conducting an Internal Mercury Audit for Manufacturing Facilities, a 6-page fact sheet;
- The Great Lakes Water Quality Initiative (GLWQI), a 2-page fact sheet;

- Pollution Prevention/Waste Minimization Options for Metal Finishing Processes, Implementing a "Closed Loop" Process, a 5-page fact sheet;
- Lake Superior Business and Industry Assistance Quick Reference List, a 1-page fact sheet;
- Pollution Prevention for Wood Finishing and Manufacturing, an 85-page guidebook; and
- Pollution Prevention for Marinas and Boat Yards, a 35-page guidebook.

Project Partners:

Products:

Small Business Pollution Prevention Guide
Conducting an Internal Mercury Audit for Manufacturing Facilities, a 6-page fact sheet;
The Great Lakes Water Quality Initiative (GLWQI), a 2-page fact sheet;
Pollution Prevention/Waste Minimization Options for Metal Finishing Processes, Implementing a "Closed Loop" Process, a 5-page fact sheet;
Lake Superior Business and Industry Assistance Quick Reference List, a 1-page fact sheet;
Pollution Prevention for Wood Finishing and Manufacturing, an 85-page guidebook; and
Pollution Prevention for Marinas and Boat Yards, a 35-page guidebook.

Title: LOCAL GOVERNMENT POLLUTION PREVENTION TARGETING PROJECT
(FY94 - GL995674-01-0)

Organization: Erie County Department of Environment and Planning

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Project Statistics:

Award Amount:	$50,000
Dollars Leveraged:	$6,000
Project Timetable:	1/1/95 - 3/31/97
Lake Basin(s):	Erie
Project Type:	Education/Outreach

Summary: Using regulatory databases (e.g., SARA Title III), Erie County, New York identified businesses discharging persistent, bioaccumulative toxic substances into the Buffalo River and Niagara River Areas of Concern. Companies were invited to participate in a nonregulatory pollution prevention review to develop site-specific pollution prevention plans. An advisory group for this project included representatives from: the Buffalo Sewer Authority, Erie County Sewer District, the Local Emergency Planning Committee (LEPC) and three different divisions of the New York State Department of Environmental Conservation.

Environmental Results/Products: Upon examination of the regulatory databases, regulators identified 25 companies, from a pool of 96, that could most benefit from pollution prevention assistance. These 25 facilities received a letter from Erie County describing the project and offering free, non-regulatory technical assistance. Ten companies participated in the project and received on-site technical assistance. The technical assistance resulted in source reduction successes such as: manufacturing process modifications, recycling industrial byproducts and other waste-streams, identifying lead-free raw materials, recirculating water, switching paint operations from solvent to water-based, replacing clay absorbents with a “waste free” alternative, and energy conservation recommendations. The Erie County Office of Pollution Prevention will continue to work with the facilities.

Project Partners:
Buffalo, NY Sewer Authority
Erie County Sewer District
Erie County Local Emergency Planning Committee (LEPC)
New York State Department of Environmental Conservation.

GL995674-01.pdf

Title: ERIE COUNTY CLEAN SWEEPS II
(FY94 - GL995675-01-0)

Organization: Erie County Department of Environment & Planning, Division of Environmental Compliance Services

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Project Statistics:

Award Amount:	$75,000
Dollars Leveraged:	$56,000
Project Timetable:	10/01/94 - 1/1/96
Lake Basin(s):	Erie
Toxics Reduced:	32,300 lbs Pesticides
Toxic Stressors:	Pesticides
Project Type:	Ag Clean Sweeps

Summary: This project built upon a very successful 1993 collection of 8000 pounds of pesticides including arsenic, DDT and chlordane. Implementing recommendations from the initial clean sweeps, Erie County regionalized the collection of agricultural waste pesticides. The Clean Sweeps II pesticide collection program provided disposal opportunities for farmers and agribusiness in Niagara, Erie, Cattaraugus and Chautauqua counties. In addition, Clean Sweep II offered an opportunity for nonagricultural Erie County conditionally-exempt small quantity generators, such as schools, to surrender waste pesticides.

Environmental Results/Products: In April 1995, Erie County staff collected 32,300 pounds of waste pesticides from 119 registrants at two events. The pesticides collected included banned products such as DDT and DDT mixtures, arsenic mixtures, dinoseb, chlordane and 700 pounds of dioxin-bearing pesticides.

Conditionally-exempt small quantity generators turned in 11,000 pounds of waste pesticides. Examples of these small quantity generators include school district building and grounds maintenance departments, nurseries, and county recreational facilities.

GL995675-01_coverletter.pdf

GL995675-01.pdf

Title: POLLUTION PREVENTION EDUCATION AND TECHNICAL ASSISTANCE FOR THE LAKE MICHIGAN AND LAKE SUPERIOR BASINS IN WISCONSIN
(FY94 - GL995676-01-0)

Organization: University of Wisconsin, Cooperative Extension, Solid and Hazardous Waste Education Center

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Project Statistics:

Award Amount:	$140,028
Dollars Leveraged:	$7,101
Project Timetable:	10/1/94 - 5/30/97
Lake Basin(s):	Michigan, Superior
Project Type:	Education/Outreach

Summary: The Solid and Hazardous Waste Education Center (SHWEC) provided broad-based pollution prevention information, education and technical assistance to Wisconsin businesses in the Lake Michigan and Lake Superior basins. SHWEC worked with a broad spectrum of industries and businesses including manufacturers, marinas, dry cleaners, vehicle maintenance and auto body repair and medical facilities to target reduction of specific bioaccumulating substances, most frequently mercury. When working with companies, SHWEC addressed air emissions, wastewater discharges and hazardous waste. SHWEC conducted surveys at the beginning and the end of the project to gather pollution prevention trend information and to measure the project's effectiveness. SHWEC also helped establish local coalitions which are continuing to work on pollution prevention and waste reduction activities beyond the grant project period.

Environmental Results/Products:

Outreach Activity
SHWEC conducted 55 major outreach activities providing pollution prevention information, education and guidance to more than 3,000 people. Attendees at outreach programs included many diverse industries that generate wastes and emissions of all types. Attendees also included consulting engineers, regulatory personnel, and local government employees. Numerous partners were involved in the outreach activities including the Wisconsin Department of Natural Resources, Wisconsin Department of Commerce, the Lake Michigan Federation, Citizens for a Better Environment, Publicly Owned Treatment Works and trade associations.

SHWEC used several methods to deliver pollution prevention information, such as; in-person training sessions, satellite downlinks, an education telecommunication network and video tape. In general, the most successful outreach programs were face-to-face workshops, as measured by the number of attendees. The Industrial Cleaning and Paints & Coatings expositions, held in the Milwaukee area, were effective because they provided instant connections with vendors of equipment and materials who could help implement pollution prevention actions.

The outreach programs, while extremely effective for delivering the pollution prevention message, also served as a nonthreatening method to supply regulatory compliance information. The highest rate of attendance for the programs occurred when there was an emphasis on regulatory compliance information, thus indicating that compliance issues motivate companies to investigate pollution prevention options.

Technical Assistance

SHWEC conducted 75 pollution prevention assessments for very large manufacturers with more than 200 employees to very small vehicle maintenance, machine shops and marinas with only two or three employees. In addition, SHWEC responded to approximately 200 requests for detailed information packages containing regulatory guidance fact sheets, new and existing manufacturing technology information, materials substitution information and vendor information.

The largest amount of mercury recovered was from recycling of fluorescent lamps. Specific mercury reductions occurred in medical facilities and veterinary facilities. The Children's Hospital of Milwaukee was a 1996 winner of the *Wisconsin Governors Award for Hazardous Waste Reduction*. Another hospital eliminated a mercury problem when SHWEC discovered that batteries containing mercury and containers with other toxics were being incinerated instead of separated from the waste streams. In addition, many companies assessed by SHWEC implemented pollution prevention projects.
Survey

SHWEC conducted surveys at the beginning and at the end of the project period to gather environmental trend information relating to pollution prevention. Over 78% of the companies responding to the surveys indicated that they have completed a project to eliminate a hazardous waste, air emission or wastewater discharge in the last two years. The companies surveyed represent a cross-section of hazardous waste-generating industries. The two main reasons cited in this survey as to why companies have implemented pollution projects are regulatory compliance and concern for the environment. Economics was not a significant motivator.

Partnerships

SHWEC introduced a "business to business" pollution prevention roundtable by establishing Partners for Business Environmental Quality in Waukesha County. This provides one-stop shopping for businesses looking for environmental information including pollution prevention, waste reduction and recycling. SHWEC also worked with coalitions such as the Southeast Wisconsin Waste Reduction Coalition and individual industrial groups in several Wisconsin counties.

Project Partners:
Wisconsin Department of Natural Resources
Wisconsin Department of Commerce
The Lake Michigan Federation
Citizens for a Better Environment
Publicly Owned Treatment Works
trade associations
Business Environmental Quality in Waukesha County
Southeast Wisconsin Waste Reduction Coalition

Title: CREATIVE POLLUTION SOLUTIONS FOR SOUTHEAST CHICAGO
(FY94 - GL995677-01-0)

Organization: Chicago Legal Clinic, Inc.

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Project Statistics:

Award Amount:	$60,000
Dollars Leveraged:	$5,571
Project Timetable:	10/1/94 - 9/30/97
Lake Basin(s):	Michigan
Project Type:	Education/Outreach

Summary: The goal of this project was to build knowledge, consensus and action regarding pollution prevention in Southeast Chicago by marketing pollution prevention resources to community residents and area businesses, on a person-to-person basis. Activities included the development of a pollution prevention newsletter, the development of a pollution prevention electronic repository marketed to local users, and conducting a series of meetings with local business and community leaders to introduce the concept of pollution prevention.

Environmental Results/Products: The Chicago Legal Clinic (Clinic) distributed pollution prevention information in a number of ways. The Clinic developed a partnership with Chicago law firm Gardner, Carton & Douglas and co-produced five issues of a pollution prevention newsletter distributed to over 500 readers, predominantly businesses, in Southeast Chicago.

The Clinic developed, in partnership with the Information Center at Chicago-Kent College of Law, a pollution prevention library consisting of over 500 pieces, including an annotated bibliography. These resources are available in Southeast Chicago. General pollution prevention information will be available on the Internet. The pollution prevention information gathered during this project will continue to be actively marketed to appropriate industries and businesses.

Clinic staff conducted a series of educational events to introduce basic pollution prevention concepts, including a February 1995 luncheon for key community leaders from business and community organizations. In April 1995, the Clinic co-sponsored a regional Toxic Release Inventory (TRI) workshop. The information presented included use of TRI data as a means to enable community industry dialogue, with specific attention paid to good neighbor agreements, citizen electronic access to and use of TRI data, and community assistance panels. Recently, the Clinic conducted individual meetings with more than 15 community and business leaders about pollution prevention and locally available pollution prevention resources.

Project Partners:
Gardner, Carton & Douglas
Chicago-Kent College of Law
EPA Region 5 TRI Program

Title: GREAT PRINTERS PROJECT
(FY94 - GL995679-01-0)

Organization: Council of Great Lakes Governors

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Project Statistics:
Award Amount: $61,205
Dollars Leveraged: $3,220
Project Timetable: 10/1/94 - 9/30/95
Lake Basin(s): All
Toxic Stressors: HW, Solvents
Project Type: Education/Outreach

Summary: The Council of Great Lakes Governors (Council), in partnership with the Environmental Defense Fund and the Printing Industries of America, Inc., successfully launched the Great Printers Project. Eighty percent of printing plants employ less than 20 people, and one-third of the national printing industry is concentrated in the eight Great Lakes States. The first phase of the project centered around developing precedent setting environmental policy recommendations for the printing industry in the Great Lakes basin. These recommendations were endorsed by the Administrator of the U.S. Environmental Protection Agency and the Governors from the eight Great Lakes States.

The goal of the Great Printers Project is to make pollution prevention the first choice of the lithographic printing industry in the Great Lakes States in meeting and exceeding its environmental and human health protection responsibilities. This was the first project in the nation to seek to create an entire business environment conducive to pollution prevention for an industry sector. The second phase of the Great Printers Project, partially supported through this grant, focused on implementation of the policy recommendations through State pilots in Illinois, Michigan, Minnesota, and Wisconsin. The Council served on the steering committee for the Regional Great Printers Team to ensure coordination between the various pilot efforts.

Environmental Results/Products: The Council of Great Lakes Governors worked with their project partners and with Illinois, Michigan, Minnesota and Wisconsin to establish the pilot projects and secure funding for them. The Council also conducted outreach to the non-pilot States. Indiana, Pennsylvania and Ohio were interested in working with printers in their States.

The Council worked with the environmental agencies in the pilot States to identify opportunities for the Great Printers Project to build upon existing State programs such as Illinois' "Clean Break" amnesty program and Minnesota's Beyond Compliance program. The Great Printers Project has continued beyond the GLNPO grant period. Information on the Great Printers Project can be found on the Internet at: *http://www.cglg.org* under the 'Projects' heading.

Project Partners:
Illinois Waste Management & Research Center
Illinois EPA
Michigan Department of Environmental Quality
Minnesota Pollution Control Agency
Minnesota Technical Assistance Program

Wisconsin Department of Natural Resources
University of Wisconsin - Solid & Hazardous Waste Education Center
Printing Industries of Illinois
Printing Industries of Michigan
Printing Industries of Minnesota
Citizens for a Better Environment
Center for Neighborhood Technology
Environmental Defense Fund

Title: AUTO INDUSTRY POLLUTION PREVENTION PROJECT: PHASE II
(FY94 - GL995696-01-0)

GL995696-01_status.pdf

GL995696-01.pdf

Organization: Michigan Department of Environmental Quality

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Project Statistics:

Award Amount:	$76,680
Dollars Leveraged:	$48,520
Project Timetable:	10/1/94 - 12/31/95
Lake Basin(s):	Michigan, Huron, Superior
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary: This project built upon previous voluntary efforts by Chrysler, Ford and General Motors (Auto Companies) to reduce the release of persistent toxic substances in the Great Lakes basin. Michigan staff focused the Auto Industry Pollution Prevention Project: Phase II efforts on establishing an Auto Project Advisory Group, enhancing coordination with the Canadian Auto Project, expanding outreach to suppliers, and evaluating the 1991 Auto Project agreement and list of targeted persistent toxics.

Environmental Results/Products: Since 1991, the year the Auto Project began, releases of the targeted 65 listed Great Lakes persistent toxic (GLPT) substances from auto company facilities (as reported under in the Toxic Release Inventory) have declined every year except one. These reductions, mainly accomplished through the use of specific pollution prevention actions, process improvements, and recycling, are explained in detail in the Auto Project pollution prevention reports and case studies.

The Michigan Department of Environmental Quality (MDEQ), AAMA, Chrysler, Ford and General Motors published the Automotive Pollution Prevention Project: Progress Report II. MDEQ also published a bound document containing 33 pollution prevention case studies and an addendum with 20 case studies submitted by the auto companies. The June 1997 US Automotive Pollution Prevention Project: Progress Report III details efforts beyond this grant period, including data on reportable releases of U.S. EPA Toxics Release Inventory (TRI) chemicals and pollution prevention activities and accomplishments for each of the three participating companies. It is available from MDEQ. Information on the Auto Project, including 60 pollution prevention case studies, is available at: *http://www.deq.state.mi.us/ead/p2sect/auto/* on the Internet.

The project partners formed an Auto Project Advisory Group composed of representatives from trade associations, higher education, technology centers, public interest groups, a foundation and government. During the grant period, they met twice a year to review progress on the Auto Project. The Canadian Auto Project and U.S. Auto Project representatives met on a semiannual basis to enhance binational pollution prevention efforts in the automotive industry and to exchange information regarding their respective projects.

The American Automobile Manufacturers Association (AAMA) trade association and the Auto Companies co-sponsored the Michigan Department of Environmental Quality (MDEQ) annual waste reduction conference in the Detroit metropolitan area in December 1994 and 1995. The U.S. and

Canada Auto Project partners jointly sponsored the "North American Supplier Environmental Workshop" in October 1995. More than half the participants at the North American conference were auto suppliers. All 5,000 tier-one auto suppliers for Chrysler, Ford and General Motors received project progress reports, which included pollution prevention case studies.

Project Progress Beyond the Grant Period

In 1996 the auto companies decided to broaden the project from an exclusive focus on the Great Lakes to one including operations in the entire United States. This expansion reflects the fact that pollution prevention activities are implemented on a corporate-wide basis. Current industry efforts target all materials of concern rather than being limited to the 65 persistent toxic chemicals focused on for the Great Lakes basin. It is important to note that 74% of the auto companies' U.S. facilities are located in the Great Lakes States. The Auto Project has matured from a government led and funded project to a nation-wide industry led project with support from State and Federal governments and the advisory group.

Combined pollution prevention achievements for Chrysler, Ford, and General Motors include a 56.9% reduction in U.S. EPA TRI reportable releases and a 63.9% reduction in U.S. EPA 33/50 Program releases since the 1988 base year. There has also been a 9.2% production normalized reduction in the Great Lakes Persistent Toxics, targeted since 1991 in the Great Lakes region. Excluding zinc releases, the Auto Project achieved a 54.5% production normalized reduction of Great Lakes Persistent Toxics since 1991.

Project Partners:
American Automobile Manufacturers Association (AAMA)

Products:
MI Auto Project Web Page
http://www.deq.state.mi.us/ead/p2sect/auto/

Title: CAMPAIGN FOR A SUSTAINABLE CALUMET REGION
(FY94 - GL995704-01-0)

GL975704-01.pdf

Organization: Center for Neighborhood Technology

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Project Statistics:

Award Amount:	$89,045
Dollars Leveraged:	$4,686
Project Timetable:	10/01/94 - 10/31/95
Lake Basin(s):	Michigan
Project Type:	Education/Outreach

Summary: The Center for Neighborhood Technology (CNT) developed a model community participation process for the cleanup and responsible reuse of brownfield sites in Southeast Chicago.

Environmental Results/Products: CNT developed a brownfield slide show, a "Bill of Rights" outlining general criteria for cleanup and reuse of brownfield sites in Southeast Chicago, and brownfield fact sheets: The Challenge of Brownfields: Recycling Old Industrial Property into Opportunities for Community Redevelopment and A Community Checklist for Identifying Potential Environmental Hazards at Old Commercial or Industrial Sites.

The report, "Recycling Contaminated Land: A Community Resource Guide" is available at: *http://www.cnt.org/sus_man/bf3.htm* on the Internet. There have been over 1200 visits to this site.

Through community group input, CNT identified priority brownfield sites in Southeast Chicago. These include USX South Works, Wisconsin Steel, Anderson/Schroud LTV property, West Pullman brownfields cluster near 119th/Halstead and a 25 acre parcel south of Altgeld Gardens.
A working group met periodically to discuss local brownfields issues. Regular participants included Community Workshop on Economic Development, Mexican Community Committee, Southeast Environmental Task Force, Chicago State Neighborhood Assistance Center, People for Community Recovery, Citizens for a Better Environment and the Chicago Legal Clinic. Priorities for the working group members included establishing a training program at a local educational institution to provide residents with the capacity to access environmental technician and cleanup jobs, identifying methods to influence brownfields redevelopment decisions at the larger sites, and promoting sustainable redevelopment of brownfield sites.

Partners:
Community Workshop on Economic Development
Mexican Community Committee
Southeast Environmental Task Force
Chicago State Neighborhood Assistance Center
People for Community Recovery
Citizens for a Better Environment and the Chicago Legal Clinic

Products:
Brownfields slide show, a "Bill of Rights"

The Challenge of Brownfields: Recycling Old Industrial Property into Opportunities for Community Redevelopment fact sheet
A Community Checklist for Identifying Potential Environmental Hazards at Old Commercial or Industrial Sites fact sheet
"Recycling Contaminated Land: A Community Resource Guide"
http://www.cnt.org/sus_man/bf3.htm

Title: GREAT LAKES ALTERNATIVE CLEANING EDUCATION PROGRAM
(FY94 - GL995723-01-0)

Organization: Center for Neighborhood Technology

GL995723-01.pdf

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Project Statistics:

Award Amount:	$76,407
Dollars Leveraged:	$229,304
Project Timetable:	10/1/94 - 10/31/95
Lake Basin(s):	Michigan
Toxic Stressors:	Perchloroethylene
Project Type:	Innovative Technology

Summary: The Center for Neighborhood Technology (CNT) demonstrated the commercial viability of a water-based cleaning technique as an alternative to traditional dry cleaning that relies on chlorinated solvents. CNT worked with The Greener Cleaner, a private wet cleaning shop, for one year. CNT promoted an industry-wide shift to cleaning techniques that do not use toxic solvents and focused outreach efforts on the dry cleaning industry in Buffalo, Cleveland, Detroit, Milwaukee and Northwest Indiana.

Environmental Results/Products Products: The Center for Neighborhood Technology created an Internet site at: *http://www.cnt.org/sus_man/wet_cln.html* and a Wet Cleaning Hotline: 773-278-4800 x299. Monitoring of the water discharges from the Greener Cleaner showed that no chemicals of concern were being released from the cleaning facility. As a result of information gained through the wet cleaning project, some dry cleaners reduced their use of chlorinated solvents by increasing wet cleaning. At the start of the project, three cleaners had wet cleaning equipment. At the end of the project more than 100 cleaners have this equipment. Specifically in the Great Lakes basin, CNT helped grow wet cleaning shops in Illinois (7), Wisconsin (3), Michigan (1), Ohio (3) and Buffalo (2).

The Greener Cleaner demonstration shop was the catalyst for the Professional Wet Cleaning Partnership between the Union of Needletrade, Industrial, Textile Employees (UNITE), Massachusetts Toxic Use Reduction Institute, Greenpeace, four major dry cleaning associations, and the Center for Neighborhood Technology. The partnership is working to get dry cleaners the resources they need to make wet cleaning an essential part of the garment care industry. More than 45 groups toured the Greener Cleaner demonstration shop. One-thousand-two-hundred (1,200) individuals requested information on wet cleaning and continue to receive regular updates. CNT developed the first wet cleaning newsletter, which attracted national interest. In addition, CNT targeted outreach to Korean dry cleaners including translating some materials into Korean and recruiting leadership from the Korean American Dry Cleaners Association to serve on the project's advisory committee.

CNT launched a week of intensive educational outreach activities, with local partners, in Buffalo, Cleveland, Milwaukee, Detroit, and Indianapolis. CNT developed profiles of the dry cleaning industry in Buffalo, Cleveland, Detroit, Milwaukee, and Northwest Indiana, and introduced dry cleaners in these areas to wet cleaning. CNT also crafted a report on various wet cleaning machines.
In Fall 1995, CNT held a wet cleaning conference in Chicago. Attendees included representatives from dry cleaners, trade association leaders, equipment manufacturers, suppliers, representatives from

environmental organizations, and regulators. All Great Lakes States, except Minnesota, were represented at this conference. This major symposium allowed an opportunity for stakeholders and industry to start merging ideas on wet cleaning. This project received extensive media coverage, including coverage in the three main dry cleaning trade publications.

Project Partners:

Union of Needletrade, Industrial, Textile Employees (UNITE)
Massachusetts Toxic Use Reduction Institute
Greenpeace
Korean American Dry Cleaners Association

Title: ZERO DISCHARGE PILOT PROJECT
(FY95 - GL985121-01-0)

GL985121-01.pdf

Organization: ***Western Lake Superior Sanitary District (in coordination with Monroe County, New York and the National Wildlife Federation)***

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Project Statistics:

Award Amount:	$100,000
Dollars Leveraged:	$519,000
Project Timetable:	9/01/95 - 8/31/98
Lake Basin(s):	Superior
Toxics Reduced:	17.26 lbs. Amalgam Scrap: 33.47 lbs, elemental mercury
Toxic Stressors:	Mercury
Project Type:	Education/Outreach/Collection

Summary: The Western Lake Superior Sanitary District (WLSSD) developed an integrated multimedia program to reduce the discharge of mercury using "front end" pollution prevention techniques with hospitals, clinics, educational institutions, laboratories, and dental practices.

Environmental Results/Products: The Western Lake Superior Sanitary District staff conducted site visits at hospitals, clinics, educational institutions, laboratories, and dental practices to evaluate prevention, recycling, or treatment opportunities to reduce or eliminate mercury discharges. WLSSD assisted each customer with developing pollution prevention strategies and promoted implementation of these plans. In addition, staff secured a commitment of zero discharge from WLSSD's own facilities. The WLSSD staff and local dentists have developed a process for recycling amalgam waste and strategies for recycling training. Staff have evaluated advanced treatment systems to reduce mercury discharges from dentists.

WLSSD staff identified many mercury-containing sources in hospitals from histopathology labs. Trap cleaning has demonstrated an abundance of historic mercury. An investigation of the University of Minnesota-Duluth, showed widespread use of mercury containing equipment and poor management of all potential mercury sources. An audit revealed mercury-free equipment replacement costs are approximately $10,000. The University is now replacing all equipment and will be line cleaning to remove historic sources of mercury. WLSSD developed the Blueprint for Mercury Elimination: a Guide for Wastewater Treatment Plants as part of the Zero Discharge Pilot Project. The blueprint, funded by the Great Lakes Protection Fund, is available from WLSSD.

Title: MERCURY REDUCTION THROUGH TREATMENT CHEMICAL SELECTION
(FY95 - GL985131-01-0)

Organization: Minnesota Pollution Control Agency

GL985131-01.pdf

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Project Statistics:

Award Amount:	$35,000
Dollars Leverages:	$1,750
Project Timetable:	10/1/95 - 6/30/98
Lake Basin(s):	Superior
Toxic Stressors:	Caustic Soda, Mercury
Project Type:	Substance Removal/Reduction

Summary: The purpose of this project is to reduce mercury that may be reaching Lake Superior through cooling water and effluents from power plants, boilers and other facilities. Cooling water is treated with pH altering chemicals, such as acid and caustic soda. Certain feedstock chemicals used to alter the pH have been found to contain high levels of mercury. For example, sulfuric acid produced as a by-product from a lead smelter was found to have significantly higher levels of mercury than sulfuric acid from a copper smelter. The project strategy is to promote the switch from high mercury to low mercury chemical feedstocks.

Environmental Results/Products: MPCA compiled a list of the boilers in the four Minnesota counties bordering Lake Superior. A survey for boiler operators was distributed at a State-sponsored boiler workshop. Only 10 operators filled out the survey, but those that did indicate that they would be willing to switch to non-mercury caustic if the price was the same. A few operators indicated they would be willing to pay more. MPCA collected information on mercury concentrations in various grades of caustic soda from, a chemical supplier and a chlor-alkali producer and the Western Lake Superior Sanitary District (WLSSD). Up-to-date cost information is needed.

MPCA will be working with boiler operators on solid waste management issues. Some boilers use high pressure steam gauges that contain large amounts of mercury. For example, one steam gauge collected during a WLSSD mercury amnesty project contained 30 pounds of mercury. Some boilers may also contain mercury switches.

Project Partners:
Western Lake Superior Sanitary District (WLSSD)

Title: MERCURY REDUCTION AND POLLUTION PREVENTION IN HOSPITALS
(FY95 - GL985135-01-0)

Organization: National Wildlife Federation (in coordination with Monroe County, New York and Western Lake Superior Sanitary District)

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Project Statistics:

Award Amount:	$41,350
Dollars Leveraged:	$22,016
Project Timetable:	9/25/95 - 6/30/97
Lake Basin(s):	All
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary: The National Wildlife Federation (NWF) conducted a conference in October 1996 to promote the reduction/elimination of mercury use in hospitals. They developed a source reduction plan for hospitals, Mercury Pollution Prevention in Health Care: A Prescription for Success.

Environmental Results/Products Products: The National Wildlife Federation, in cooperation with the Michigan Health and Hospital Association and other partners, developed a practical and economical plan for reduction of mercury use in the health care industry. This plan, as well as a summary of the proceedings from the October 1996 conference on reduction/elimination of mercury use in hospitals, is detailed in the report, Mercury Pollution Prevention in Health Care: A Prescription for Success. Among the NWF recommendations to eliminate mercury use, hospitals should adopt new procurement and training policies. This report is available at: *http://www.greatlakes.nwf.org/pp/hosprpt.htm* on the Internet, or from the NWF.

Project Partners:
Michigan Health and Hospital Association.

Products:
Mercury Pollution Prevention in Health Care: A Prescription for Success
http://www.greatlakes.nwf.org/pp/hosprpt.htm

Title: ROCHESTER EMBAYMENT WATERSHED MERCURY POLLUTION PREVENTION PROGRAM (FY95 - GL985142-01-0)

GL985142-01.pdf

Organization: ***Monroe County Department of Health (in coordination with the National Wildlife Federation and Western Lake Superior Sanitary District)***

Contact:
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Project Statistics:

Award Amount:	$61,000
Dollars Leveraged:	$34,100
Project Timetable:	9/01/95 - 9/30/98
Lake Basin(s):	Erie
Toxic Stressors:	Mercury
Project Type:	Program Development

Summary: The Monroe County Pollution Prevention Team, Strong Memorial Hospital, and Eastman Dental Center are targeting mercury reduction in the Rochester Embayment Area of Concern.

Environmental Results/Products: Monroe County staff documented findings on opportunities and barriers to implementing mercury pollution prevention activities in medical and dental settings. A Mercury Pollution Prevention Study for Medical and Dental Centers Findings Report was published in Spring 1997 and is available from Monroe County.

Monroe County staff is developing a hospital manual and a booklet and poster for dental offices to illustrate cost-effective practices to minimize or eliminate the release of mercury to the environment Strong Memorial Hospital in Rochester and Eastman Dental Center are planning and implementing mercury pollution prevention projects in their respective facilities. Monroe County will seek voluntary commitments with 12 hospitals and 50 dental offices located in the Rochester Embayment watershed to advance pollution prevention.

Project Partners:
Strong Memorial Hospital
Eastman Dental Center

Products:
Mercury Pollution Prevention Study for Medical and Dental Centers Findings Report, Spring 1997

Title: VIRTUAL ELIMINATION STRATEGY IMPLEMENTATION
(FY97 - GL985524-01)

GL985524-01.pdf

GL985524-01-2.pdf

Organization: Great Lakes United

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Project Statistics:

Award Amount:	$160,000
Dollars Leveraged:	$8,420
Project Timetable:	09/30/97 - 03/30/00
Lake Basin(s):	All
Toxic Stressors:	Dioxin, PCB, HCB, and Mercury
Project Type:	Education/Outreach

Summary: Great Lakes United (GLU)conducted outreach to grass roots environmental organizations to explain provisions of the Great Lakes Binational Toxics Strategy (GLBTS), developed a list of suggested actions to reduce persistent toxic substances (PTS), evaluated current regulatory and policy regimes to address gaps to eliminating production and use of PTS, and participated in relevant GLBTS stakeholder meetings.

Environmental Results/Products: GLU participated in all GLBTS workgroup meetings: Dioxin, HCB, PCB, Pesticides and Mercury, and all Integration workgroup meetings. In this forum, GLU presented a proposal for the work group to take an initiative on the crosscutting issues of incineration which was endorsed by industry and government representatives and resulted in a workshop on incineration held in May 2000. GLU coordinated with all work groups to help them move toward a source sector focus to allow some of the groups to combine for greater stakeholder coverage. GLU worked with the Pesticides workgroup to begin focusing on Level 2 pesticides.

GLU organized a three-hour panel discussion in September 1999 in Milwaukee, Wisconsin on "extended producer responsibility." Experts from Europe and Canada spoke on the panel and met with grassroots and labor groups afterward. A video of this panel was produced.

GLU organized five Health Care Without Harm workshops with healthcare professionals. The first workshop, funded under this agreement, was held on June 2, 1999 in Montreal Canada.

GLU disseminated information on the GLBTS and work group progress to its membership through the GLU web page, print and email newsletters, and mailings.

GLU worked with several other environmental non-governmental organizations, including the Lowell Institute, Clean Production Action, Toronto Environmental Alliance, the Ecology Center and Environmental Defense to develop a set of clean production principles for our work. Meetings with the Council of Great Lakes Industries were held to agree on a common set of principles. Using this criteria and the GLBTS framework, GLU consulted their basin-wide membership for possible clean production initiatives and came up with four possible sectors for pilot projects: agriculture, automobile, computer and health care.
Given the auto worker union membership and interest in incineration as a cross cutting issue, GLU worked

on two initiatives: a "Clean Car Campaign" and the "Health Care Without Harm Campaign."

The Clean Car Campaign emphasis is cradle to grave, with the focus on "cradle," i.e., working with their union auto workers members on a toxic-free workplace; and the "grave" working with the industry and regulatory authorities on reducing substances such as mercury, PCBs and dioxin-producing PVC plastics in auto shredder waste.

Project Partners:
Lowell Institute
Clean Production Action
Toronto Environmental Alliance
The Ecology Center
Environmental Defense
Michigan Environmental Council
Union of Concerned Scientists
Improving Kids' Environment
Citizens for a Better Environment
Institute for Urban Ecology

Products:
Extended Producer Responsibility Panel Video
The Road to Zero

Title: MOBILIZING/COORDINATING INDUSTRY SUPPORT OF THE VIRTUAL ELIMINATION STRATEGY (FY97 - GL985546-01)

Organization: Council of Great Lakes Industries

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Project Statistics:

Amount:	$140,000
Dollars Leveraged:	$12,200
Project Timetable:	10/01/97-10/30/99
Lake Basin(s):	All
Toxic Stressors:	Mercury, PCBs, HCB, OCS
Project Type:	Education/Outreach

Summary: The Council of Great Lakes Industries (CGLI) promoted inustry awareness of the Great Lakes Binational Toxics Strategy (GLBTS) and voluntary opportunities to reduce persistent toxic substances (PTS); collected PTS reduction success stories from industry, and enumerated current industry commitments to reduce or eliminate PTS use and discharge.

Environmental Results/Products: CGLI expanded the list of industry stakeholders with whom they regularly communicate in order to increase awareness of the Great Lakes Binational Toxic Strategy and what the industry stakeholder can do to reduce emissions of toxic materials.

Industry participants revealed the existence of several voluntary PTS reduction programs. Some examples include the following:

- Niagara Mohwak replaced 37,000 mercury containing gas regulators in use by their customers, and their distribution facility focus efforts which retired 29,700 PCB capacitors;
- Dow Canada reported 95 percent reduction in release of dioxins and furans from vinyl chloride monomer production;
- Goodyear Tire and Rubber's efforts to phase-out PCB containing equipment resulting in 15 plants in the U.S. and two in Canada PCB now being free;
- The U.S. pulp and paper industry dioxin virtual elimination program. As a result of their voluntary efforts, dioxins if they exist at all, are no longer measurable in bleach plant effluents, wastewater treatment plant sludges, or bleached kraft mill products.

New commitments by industry made specifically as part of the GLBTS program, include the chlor-alkali industry mercury use reduction commitment, the steel industry mercury program, and the auto industry commitment on PCB equipment phase-out. Other significant commitments from industry to establish virtual elimination goals or make substantial commitments to further reduce Level 1 PBT substance release include:

- Eastman Kodak's commitment to virtually eliminate heavy metals cadmium, mercury, lead and chromium (VI) from their products;

- Dow's commitment to reduce hexachlorobenzene (HCB) and mercury compound releases by 75 percent by 2005;

- The Ontario Hydro program to destroy 81 percent of their PCB inventory by year 2006, and to be PCB free by year 2015.

Industry sector collective voluntary programs such as the American Forest & Paper Association environmental principles and goals program, Automotive Pollution Prevention Program, the Chemical Industry Responsible Care Program, Wisconsin Paper Council/Wisconsin DNR P5 program, and Michigan Pulp and Paper Environmental Council/Michigan DEQ P5 program all serve as examples of voluntary programs which include elements that call for and result in the reduction of releases of GLBTS level one and level two substances. These reductions are cataloged and included in the GLBTS program as a result of CGLI's contacts with sponsoring organizations.

CGLI also helped to determine and confirm the status of mercury use within the Great Lakes region, and to catalog the release of mercury from the manufacture and use of such products as household batteries, lighting lamps and equipment, thermostats, switches and relays. CGLI work with industry helped to identify potential sources of Octachlorostyrene in the Great Lakes Basin, as well.

Project Partners:
Niagara Mohawk Corporation
Ontario Hydro
Dow Chemical
Dow Canada
Eastman Kodak
Goodyear Tire and Rubber

Title HOUSEHOLD HAZARDOUS WASTE CLEAN SWEEP COLLECTION PROGRAM
(FY97 - GL985553-01-0)

Organization: Menominee Indian Tribe of Wisconsin

GL985553-01.pdf

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Project Statistics:

Award Amount:	$20,000
Dollars Leveraged:	$2,579
Project Timetable:	8/15/97 - 8/14/00
Lake Basin(s):	Michigan
Toxics Reduced:	18,830 lbs of HHW
Toxic Stressors:	Mercury, Lead
Project Type:	Clean Sweep Education/Outreach

Summary: The Menominee Tribe of Wisconsin hosted three one-day household hazardous waste collections at the Keshena Transfer facility and conducted education outreach as well. The purpose of this project was to reduce the amount of household hazardous waste (HHW) that would be disposed of in Wisconsin landfills and strengthen the tribes integrated waste management program promoting waste minimization.

Environmental Results/Products: The Menominee Tribe one-day collection events on June 13, 1998, December 22, 1998 and June 24, 2000 at the Keshena WI transfer facility site, which diverted more than 18,000 lbs of HHW from landfills within the Great Lakes basin. These collections included grease and oil, used batteries, formaldehyde, waste paint, waste mercury, waste aerosols, hydrochloric and sulfuric acid, sodium hydroxide, waste pesticides, chlorine tablets, mineral spirits, fluorescent lamps, and sealants.

The Household Hazardous Waste Project (HHWP) promoted the safe use, storage and disposal of hazardous materials by educating consumers to:

- identify and avoid potentially hazardous products;
- buy only what is needed, use it up completely or share leftovers with someone who can use it;
- recycle those materials that can be recycled; and
- dispose of leftover or unwanted products through hazardous waste collection facilities.

Project Partners:
Kenosha Volunteer Fire Department
Wisconsin Department of Natural Resources

Title **REDUCING MERCURY RELEASES THROUGH P2 IN HEALTHCARE FACILITIES**
(FY 97 - GL985597-01)

Organization: Illinois Environment Protection Agency

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Project Statistics:

Award Amount:	$137,750
Dollars Leveraged:	$7,247
Project Timetable:	10/01/97 - 12/30/99
Lake Basin(s):	Michigan
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary:
The goal of this project was to reduce the amount of mercury released in the Great Lakes Basin, by encouraging hospitals and other health care facilities in the Chicago metropolitan area to adopt comprehensive pollution prevention programs, with a particular emphasis on eliminating mercury-containing devices products and waste.

Environmental Results/Products:
Illinois Environmental Protection Agency (IEPA) Office of Pollution Prevention (OPP) staff conducted a training seminar to educate Illinois Environmental Protection Agency and Illinois Waste Management & Research Center (WMRC) staff on pollution prevention opportunities for mercury and other waste in health care facilities. IEPA OPP staff developed a pilot pollution prevention assessment for two hospital facilities. IEPA OPP staff established a working group to provide advice and mentoring assistance. IEPA OPP staff developed outreach materials for dissemination to hospitals, particularly to facilities utilizing on-site incinerators.

IEPA and WMRC conducted pollution prevention (P2) site visits at 22 hospitals in Illinois. Fifteen of the facilities were located in the Chicago area. A waste and mercury reduction checklist was developed to aid in evaluating hospital environmental activities.

A pre-assessment survey was provided to each of the 22 hospitals to collect background information about waste generation activities and priority areas for mercury and waste reduction. This information was used to focus discussions and tour specific areas during the P2 site visits. A typical P2 site visit included touring a patient care area, the clinical laboratories, pharmacy, central supply room and docking/receiving area. A representative from the surgical department was interviewed.

After each site visit a report to the hospital that listed existing waste and mercury reduction efforts, and outlined areas for improvement.

Waste and mercury reduction recommendations typically focused on:

- Alternatives to mercury-containing blood pressure devices, gastrointestinal equipment, thermometers, electrical equipment and laboratory chemicals.
- Recycling opportunities for waste lab solvents.
- Infectious waste segregation practices for patient care and surgical areas.
- Recycling opportunities for solid waste items.

- Waste management planning activities.

A second survey was developed and provided to the hospitals six to ten months after the site visit to identify recommendations that were adopted. During the site visits, a number of innovative waste reduction practices were bing implemented by the hospitals, including:

- Removing red bag containers from patient rooms.
- Posting signage on operating room doors to remind staff to segregate waste streams.
- Visually checking the contents of laboratory infectious waste containers to monitor waste segregation practices.
- Tracking wastes from different departments to help identify waste reduction priorities.
- Providing digital thermometers in newborn baby gift packs.
- Recycling waste alcohols, formalin, and xylene wastes on site.
- Placing recycling containers in convenient and accessible locations.

Ten of the 22 hospitals returned the post site visit survey. All of the reporting hospitals documented at least one improvement in their waste management efforts, while seven indicated they had implemented at least one mercury use reduction recommendation. Several hospitals reported that they were already implementing mercury reduction programs before the P2 site visit took place.

Hospital facility improvements included the following:

- 4 facilities increased staff training on waste segregation and reduction practices;
- 4 facilities formed an internal committee to identify additional waste and mercury reduction opportunities;
- 6 facilities conducted additional assessments of their waste generating activities;
- 4 facilities modified their procurement practices or guidelines to encourage purchasing less toxic or recycled products
- 7 facilities increased employee awareness about waste management;
- 678 mercury blood pressure meters (sphygmomanometers) eliminated;
- 251 mercury thermometers (105 from laboratories) eliminated;
- 3 facilities eliminated the use of mercury-containing lab chemicals;
- 1 facility prepared a mercury use inventory and protocol to eliminate mercury containing lab chemicals;
- 3 facilities instituted a formal program to replace mercury-containing electrical equipment during building renovation activities;
- 3 facilities adopted a policy to eliminate or phase-out mercury containing products and equipment;
- 3 facilities created an inventory of areas or places where mercury containing products are still being used;
- 3 facilities requested information from their vendors about the mercury content of selected products.
- 3 facilities established a program to check drain traps for historical mercury content;
- 4 facilities created programs to improve infectious waste segregation practices;
- 2 facilities expanded their recycling programs; and
- 3 facilities expanded their materials reuse programs.

Project Partners:

Illinois Waste Management Research Center (WMRC)

University of Wisconsin Extension

Products:
Training program materials
http://www.epa.gov/glnpo/bnsdocs/merchealth/

Hospital P2 Assessment
Pre-Assessment Survey
Post-Assessment Survey
http://www.epa.state.il.us/p2/fact-sheets/hospital-checklist.pdf

Title: NON-GOVERNMENTAL ORGANIZATION (NGO) INVOLVEMENT IN IMPLEMENTING VIRTUAL ELIMINATION (FY97 - GL985598-01)

GL985598-01_cvrletter.pdf

GL985598-01.pdf

Organization: National Wildlife Federation

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Project Statistics:

Award Amount:	$140,000
Dollars Leveraged:	$26,237
Project Timetable:	10/01/97 - 9/30/99
Lake Basin(s):	All
Toxic Stressors:	Mercury, Dioxin
Project Type:	Education/Outreach

Summary: The National Wildlife Federation (NWF) promoted the goals and objectives of the Great Lakes Binational Toxics Strategy (GLBTS) by working with the healthcare industry to eliminate PTS in hospitals, working with local government agencies to reduce PTS in wastewater, educating and mobilizing citizens to become involved with the GLBTS, and by providing leadership to the overall GLBTS Integration and Substance workgroups.

Environmental Results/Products: NWF partnered with other environmental non-governmental organizations (ENGOs) to plan a major public education initiative on deposition of airborne toxics. In September 1999, NWF published a report, Clean the Rain, Clean the Lakes: Mercury in Rain is Polluting the Great Lakes that documents the high concentrations of mercury in rainfall in the Great Lakes region. The report was designed to highlight the role that airborne PTS (particularly mercury) play in causing impairments to the Great Lakes basin.

NWF has worked with the Health Care Without Harm (HCWH) coalition to champion mercury pollution prevention in the healthcare industry. NWF and the international HCWH launched a campaign to persuade 100 hospitals to pledge to go mercury-free by National Hospital Week, May 1999. The campaign successfully recruited 127 hospitals and 361 clinics in the Great Lakes Basin.

In March 1999, NWF co-hosted a conference on mercury pollution prevention for healthcare professionals in Michigan. The conference, co-sponsored by the Ecology Center of Ann Arbor, the Michigan Health & Hospital Association, and Detroiters Working for Environmental Justice, was attended by more than 120 people.

On September 16, 1999, NWF and the Marquette Area Wastewater Treatment Facility co-hosted a one-day conference on the use of mercury in the healthcare industry. This conference served to introduce the Upper Peninsula of Michigan to the national trend of mercury pollution prevention in hospitals. Participants were educated about hospitals efforts to implement mercury pollution prevention and were encouraged to participate in the national Mercury Free Medicine campaign and the Health Care Without Harm coalition.

In November 1998, NWF organized a meeting in Chicago for ENGOs and EPA staff to discuss future directions of the mercury workgroup in the GLBTS process. In April 1999, NWF convened a meeting of other ENGOs to develop a consensus position on proposed changes to the GLBTS process, which were subsequently adopted at the GLBTS Stakeholder Forum in Toronto.

Dr. Michael Murray conducted an analysis of the multi-pollutant, multi-workgroup implications of different types of incinerators, which led to the development of an Incinerator Workshop.

NWF conducted a grassroots campaign to spark public involvement in the GLBTS. NWF mailed information to more than 4,000 activists and 200 organizations, devoted coverage on its web sites, and organized public participation at the hearings on the Great Lakes Binational Toxics Strategy in Washington, DC and Chicago. As a result of this effort, more than 400 citizens submitted letters and comments on the Strategy.

Project Partners:
Ecology Center of Ann Arbor
Michigan Health & Hospital Association
Detroiters Working for Environmental Justice
Marquette Area Wastewater Treatment Facility
Great Lakes United
Clean Air Network
Lake Michigan Federation
Sierra Club
Clean Water Action
Health Care Without Harm Coalition

Products:
An analysis of the multi-pollutant, multi-workgroup implications of different types of incinerators by Dr. Murray, NWF

Clean the Rain, Clean the Lakes: Mercury in Rain is Polluting the Great Lakes by NWF
http://www.nwf.org/cleantherain/ctrexec.html

March 1999 Conference Agenda
September 1999 Conference Agenda

Title **INDIANA LAKE MICHIGAN PESTICIDE CLEAN SWEEP**
(FY97 - GL985636-01)

GL985636-01.pdf

Organization: Purdue University

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Project Statistics:

Award Amount:	$23,456
Dollars Leveraged:	$1,579
Project Timetable:	09/30/97 - 09/29/98
Lake Basin(s):	Michigan
Toxics Reduced:	5,164 lbs pesticides
Toxic Stressors:	pesticides, DDT, cyano gas, lead arsenate, chlordane
Project Type:	Pesticide Clean Sweep Education/Outreach

Summary: The Office of Indiana State Chemist (OISC) conducted a one day pesticide collection in South Bend, Indiana. A hazardous waste contractor, Heritage Environmental, was selected to handle, transport and dispose of the pesticides. Heritage provided all the equipment needed and an emergency response plan.

Environmental Results/Products: OISC mailed 458 surveys to pest control business and golf courses within ST. Joseph County to guage the type and volume of materials that would be collected. OISC also issued news releases to local papers and provided information through its Extension Office newsletter.

The collection took place at the St. Joseph County Fairgrounds located in South Bend IN. Participants were directed to a designated area where personnel from Heritage took control of pesticides products brought to the site from target sources (e.g., golf courses & pest control industries). The participants were given a package of information pertaining to pesticide safety and pollution prevention.

The pesticides were sorted according to DOT hazardous material classification and disposal guidelines. A total of five thousand one hundred and sixty-four pounds (5,164) of waste pesticide was collected from 42 participants. Among the pesticides collected were DDT, Cyanogas, lead arsenate and chlordane.

The following informational brochures were provided:

- Agriculture Effect on Environment Quality: key management issues
- Conservation Tillage and Water Quality
- Wetlands and water Quality
- Pesticides and container management
- Pesticides and their proper storage

Project Partners:
Purdue University, Department of Agriculture
Heritage Environmental Corporation
St. Joseph County Indiana Extension Office

Products:
Survey

Informational Letter
Pesticides and Spill Management Fact Sheet
http://www.btny.purdue.edu/Pubs/PPP/PPP28.html

Conservation Tillage and Water Quality Fact Sheet
http://www.ces.purdue.edu/extmedia/WQ/WQ-20.html

Wetlands and Water Quality Fact Sheet
http://persephone.agcom.purdue.edu/AgCom/Pubs/WQ/WQ-10.html

Pesticides and Container Management Manual
http://www.btny.purdue.edu/Pubs/PPP/PPP21.html

Title MERCURY REDUCTION INITIATIVES - CATCH THE FEVER EXCHANGE PROGRAM (FY 97 - GL985648-01)

Organization: Michigan Department of Environmental Quality

GL985648-01.pdf

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Project Statistics:

Award Amount:	$108,100
Dollars Leveraged:	$5,700
Project Timetable:	10/01/97 - 9/30/00
Lake Basin(s):	Michigan, Huron, Superior, Erie
Toxics Reduced:	80 mercury manometers, 640 elemental mercury thermometers, 7 lbs mercury, 14 mercury lab thermometers and 3 mercury thermostats
Toxic Stressor(s):	Mercury
Project Type:	Education/Outreach

Summary: The Michigan Department of Environmental Quality (MDEQ) Environmental Assistance Division (EAD) staff conducted a state mercury pollution prevention outreach campaign targeting schools, universities, medical facilities, and industrial facilities. MDEQ provided information about the dangers of mercury, proper disposal techniques, best management practices, mercury substitutes, and lists of drop-off centers, companies accepting elemental mercury, and mercury-free substitutes.

Environmental Results/Products: The MDEQ,
MDEQ staff conducted a mass mailing of pollution prevention materials to all Michigan Intermediate School Districts. The Science Teachers and Mercury Concern brochures were featured, along with a new publication titled The P2 Education Tool Box.

EAD staff participated in six Mercury P2 in Schools workshops targeting science teachers and administrators. EAD staff also conducted an analysis of a State Senate bill to eliminate mercury in schools and provided testimony to the Michigan Legislature on the subject.

EAD staff developed a customized mercury resource manual was developed as a resource for state environmental staff. All EAD field staff and MDEQ district offices received copies of this manual.

The MDEQ-Air Quality Division and the EAD staff participated on a Multi-Cultural Mercury Task Force whose mission was to provide mercury education and outreach information to the Hispanic community. An investigation corroborated preliminary reports that elemental mercury was being sold in botanicas (Mexican gift shops) in southeast and southwest Michigan. As a result, a bilingual mercury brochure was developed and distributed to interest organizations. Staff also gave presentations on the dangers of mercury at workshops and special functions.

EAD trained 35 engineers to conduct mercury audits as part of their waste assessment training under the Retired Engineer Technical Assistance Program (RETAP). All the materials for the audits were provided to the Waste Reduction and Technology Transfer Foundation.

EAD expansion Michigan's pilot dairy farm mercury manometer trade-in program, which resulted in the elimination and recovery of 80 mercury dairy manometers. MDEQ conducted a pilot Catch the Fever mercury fever thermometer exchange for two departments in state government (the Michigan Department of Community Health and the MDEQ). As a result of this effort, a total of 640 mercury thermometers were recovered, as well as 7 pounds of elemental mercury, 14 mercury lab thermometers and 3 mercury thermostats. This effort served as a template for a statewide program expansion.

The following publications were updated and reprinted:

- Science Teachers and Mercury Concern Brochure
- Dairy Mercury Manometer Brochure
- Mercury Spill Contractors List
- Lists of Companies Accepting Mercury

Project Partners:
Waste Reduction and Technology Transfer Foundation
Michigan Department of Community Health
MDEQ-Air Quality Division

Products:
Science Teachers and Mercury Concern brochures
http://www.deq.state.mi.us/documents/deq-ead-p2-mercury-hgscience.pdf

The P2 Education Tool Box
http://www.epa.gov/reg5rcra/wptdiv/p2pages/toolbox.htm

Mercury P2 in Schools workshop materials
Mercury Resource Book for MI DEQ EAD Staff

Dairy Mercury Manometer Brochure
http://www.deq.state.mi.us/documents/deq-ead-p2-mercury-agmercbr.pdf

Mercury Spill Contractors List
http://www.deq.state.mi.us/documents/deq-ead-p2-mercury-cleanup.pdf

Lists of Companies Accepting Hg
http://www.michigan.gov/deq/0,1607,7-135-3307_29693_4175-11691--,00.html

Michigan Mercury Pollution Prevention (M2P2) Task Force Final Report
http://www.michigan.gov/deq/1,1607,7-135-3585-14172--,00.html

Title A PARTNERSHIP FOR PREVENTION
(FY97 - GL985665-01-0)

Organization: Pennsylvania Department of Environmental Protection

Contact:
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Project Statistics:

Award Amount:	$75,000
Dollars Leveraged:	$3,947
Project Timetable:	10/01/97 - 09/30/99
Lake Basin(s):	Erie
Toxics Reduced:	1,580 lbs elemental mercury, 200 lbs mercury devices, 350 lbs DDT, 500 lbs toxaphene, 275 lbs chlordane, 215 lbs aldrin/dieldrin.
Toxic Stressors:	Mercury, DDT, Aldrin/Dieldrin, Toxaphene
Project Type:	Education/Outreach

Summary: The Pennsylvania Department of Environmental Protection (PDEP) conducted a pollution prevention and toxics reduction education and outreach campaign to the greater Erie, PA area (i.e., the communities and businesses connected to the Erie Sewer Authority System). The project included the entire Pennsylvania Lake Erie watershed and all of Erie County. Communities such as North East, Girard and Lake City were included and welcomed to participate in various aspects of the projects.

The project included:

- Educating the community about the dangers of persistent toxic substances, with a special emphasis on mercury,
- Educating the community about the benefits of a pollution prevention (P2) to environmental protection,
- Educating the community about specific ways they can reduce or recycle mercury,
- Educating the community about the benefits of community-wide environmental partnerships,
- Educating businesses about specific P2 techniques and providing them with information needed to implement P2 practices,
- Collecting and recycling elemental mercury, and,
- Encouraging environmentally sophisticated companies to mentor other companies on how to reduce mercury.

Environmental Results/Products:
Pennsylvania Department of Environmental Protection (PA DEP) project staff established a committee for the partnership for prevention called Pollution Prevention Partnership in Erie (P3ERIE) to build support for P2 by developing and implementing a public education campaign and practical projects to reduce the presence and threat mercury and other toxic substances in the greater Erie area.

Several education and outreach activities are listed below:

- In February 1998, P3ERIE hosted a press conference to announce the Hamot Medical Center zero use of mercury goal. PA DEP mailed a letter to 300 hospitals, nursing homes and other healthcare facilities about the Hamot Medical Center's commitment and information about mercury free facilities.

- In April, 1998, PA DEP staff organized several pollution prevention workshops to more than 3,000 students a the City of Erie's celebration of Earth Day. P3ERIE also conducted a mercury collection in at the Erie Civic Center. Area residents were directed to the Erie Wastewater Treatment Plant to drop off mercury containing items. Approximately 1,240 pounds of elemental mercury were collected on April 17 and 18, 1998.

- P3ERIE and PA DEP's Emergency Response Team organized mercury collection programs within the greater Erie area. Approximately 140 pounds of elemental mercury and approximately 2,500 mercury-containing items from approximately 40 citizens, schools and institutions were collected.

- In September 1999, P3Erie partnered with the PA Department of Agriculture and International Paper Co. in Erie to conduct a mercury and pesticide collection. Approximately 200 pounds of elemental mercury, and 200 pounds of devices which contain mercury were collected from the public. Approximately 10, 000 pounds of pesticides were also collected and disposed of, including 350 pounds of DDT, 500 pounds of toxaphene, 275 pounds of chlordane, and 215 pounds of aldrin/dieldrin.

- P3ERIE developed and printed one-thousand copies of a brochure for the general public titled Mercury: toxic, persistent and preventable The brochure contains information on the dangers of mercury and mercury containing products, mercury recycling disposal information and alternatives to mercury products. A sticker puzzle that is completed by answering questions about mercury and P2 inquiries were developed for school children. Staff distributed 1,300 copies to area schools.

- A total of six P2 workshops were conducted, attracting over 280 people from businesses, healthcare facilities, local government and educational institutions in attendance. Examples included the, Pollution Prevention Strategies to Address Mercury and Other Great Lakes Initiative Pollutants, held in Chicago, and a P2 for School Laboratories Workshop at the General Electric Learning Center. Ten teachers attended this workshop.

- A packet was mailed to every school in Erie County asking school officials to inventory their laboratories to determine if there were any unwanted chemicals in the labs that are included on the SARA extremely hazardous substance list. Fifteen Erie County schools responded to the mailing.

PA DEP has continued to work with targeted industries to eliminate the use and discharge of mercury into the environment. Staff conducted several audits at the International Paper's Erie Mill. Water samples were taken within the production process and at the wastewater discharge. The laboratory analysis of the sample detected no mercury.

Project Partners:

Erie Wastewater Treatment Plant
General Electric Transportation Systems
Northeast Industrial Resource Center
Gannon University
Western Lake Superior Sanitary District
Air & Waste Management Association
Erie County Planning Department
City of Erie Public Works Department
International Paper Company

Products:

Blueprint for Mercury (Western Lake Superior Sanitary District)
http://www.wlssd.duluth.mn.us/publications/Blueprint%20for%20mercury/Revised%20Blueprint%20for%20Mercu.pdf

MercErie brochure - http://www.dep.state.pa.us/dep/deputate/pollprev/P3erie/mercbroch.htm
Mercury Brochure - http://www.dep.state.pa.us/dep/deputate/pollprev/P3erie/Mercbroch.pdf

Title: NORTHERN LAKE MICHIGAN AND LAKE SUPERIOR CLEAN SWEEP
(FY 97 - GL985714-01-0)

Organization: Michigan Department of Agriculture

GL985714-01.pdf

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Project Statistics:

Award Amount:	$60,000
Dollars Leveraged:	$3,158
Project Timetable:	09/30/97 - 12/30/98
Lake Basin(s):	Superior, Michigan, Huron
Toxics Reduced:	59,000 lbs pesticides
Toxic Stressors:	Pesticides
Project Type:	Program Development

Summary: The Michigan Department of Agriculture (MDA) administers a Statewide program to remove and properly dispose of unwanted or unusable pesticides in Michigan. The objective of this project was to establish two more permanent clean sweep collection sites in order to provide dedicated collection, storage, and disposal services in the Lake Michigan and Lake Superior watersheds, in both urban and rural areas. Disposer cClients included farmers, golf courses managers, municipalities, schools and private citizens.

Environmental Results/Products: Funds from this grant were used to install permanent Clean Sweep facilities in Escanaba and Traverse City, Michigan. These facilities now serve as a central pesticide collection and disposal site for Northern Michigan and Michigan's Upper Peninsula and serve the Lake Superior, Lake Michigan and Lake Huron watersheds. Each site has signed a ten-year agreement, which obligates them to collect and dispose of any pesticide presented to those facilities by Michigan residents.

Individual Michigan residents may dispose of unused and unwanted pesticides by taking them to one of these Clean Sweep sites where they will be collected, packaged for shipping, and disposed of properly. There is no charge to the end-users of pesticides for this service. Disposal costs are covered by the MDA's Michigan Groundwater Stewardship program, grants from the U.S. Environmental Protection Agency, and services provided by the local cooperators.

Pesticide dealers and individuals who sell and/or apply pesticides for hire may also, at the Clean Sweep site manager's discretion, dispose of unused or unwanted pesticides at cost. This cost is typically less than 20 percent of the normal cost of pesticide waste disposal because of economies of scale and competitive bidding of waste disposal costs.

The Clean Sweep program collected more than 59,000 pounds of pesticides from eight permanent sites in Michigan in operation at the time.

Project Partners:

Michigan Department of Agriculture

Title: NON-COMBUSTION EMISSIONS OF MERCURY IN THE GREAT LAKES AIRSHED
(FY 98 - DW89947904-01-0)

DW89947904-01.pdf

Organization: Department of Energy - Oak Ridge National Laboratory

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Oak Ridge National Laboratory
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Project Statistics:

Award Amount:	$100,000
Dollars Leveraged:	$7,271
Project Timetable:	12/01/98-11/30/00
Lake Basin(s):	All
Toxic Stressors:	Mercury
Project Type:	Emissions/Source Characterization

Summary: In conjunction with the U.S. EPA, the Chlorine Institute, and the University of Michigan, this project aimed to improve scientific understanding of the quantity and species of mercury vapor emitted to the atmosphere during operation of a chlor-alkali factory.

During the mid-1990s, U.S. factories that rely on mercury in the production of chlorine and sodium hydroxide consumed more than 10 tons of mercury per year per factory. However, these factories have not been able to account for much of the mercury that they consume. Because factory production equipment is hot and mercury is semi-volatile, the possibility of fugitive (non-stack) air emissions has long been recognized and regulated (though without continuous monitoring of non-stack emissions).

EPA's estimate of fugitive mercury vapor emissions from factories rests on short-duration measurements that were taken in 1972, using methods then available for measuring mercury in air. During the past decade, there have been large advances in equipments and methods for measuring mercury vapor. These advances include continuous values; near real-time values; and long-path optical instruments. In voluntary cooperation with the U.S. chlor-alkali sector, this study brought these advances to bear on vapor emissions from an operating factory.

Environmental Results/Products:
A non-stack emissions study was conducted at a factory during February 2000.

Oak Ridge National Laboratory reported its results in: G. R. Southworth, S. E. Lindberg, H. Zhang, and F. R. Anscombe. 2004. "Fugitive mercury emissions from a chlor-alkali factory: sources and fluxes to the atmosphere." *Atmospheric Environment*, 38, 597-611.

One finding was that fugitive air emissions from the cell-room roof vent are episodic and vary with factory operating conditions (maintenance and minor operational perturbations). Therefore, air emissions are likely to vary widely among factories on a worldwide basis, in accordance with the operating procedures practiced at each.

Properly positioned, real-time mercury vapor analyzers are potentially valuable tools to detect small-scale process vapor leaks.

A preliminary estimate of daily fugitive Mercury emissions during this period (~400-600 g per day) indicated that the bulk of the atmospheric loss was emitted from the roof vent of the main production building. This factory was unusual in having a single roof vent.

Sealed former waste ponds were not important sources, emitting mercury at rates comparable to background soils.

One uncertainty was that the study did not witness a full and representative range of maintenance activities and operating conditions typically conducted at a chlor-alkali factory. It is only reasonable to regard the average of 500 g per day witnessed during the study to be a best-case, lower bound estimate of the year around daily average. Only a long-term study that witnesses a full and typical range of maintenance and system malfunctions can provide a surer estimate of emissions.

On the other hand, the studied factory is known to have made equipment improvements that may have reduced air emissions from the rate that was observed during February 2000. U.S. factories have reduced their annual consumption of mercury by about 70 percent since undertaking a voluntary program to reduce replenishment mercury.

Project Partners:
The Chlorine Institute
USEPA
University of Michigan
Olin Corporation

Products:
Emission of Mercury from Chlor-alkali Factories, Atmospheric Environment 38 (2004) 597-611
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VH3-49XPG7T-7&_user=10&_handle=B-WA-A-W-AC-MsSAYZA-UUA-AAUBEUVWUD-AAUAVYCUUD-DZYECAWAV-AC-U&_fmt=summary&_coverDate=02%2F29%2F2004&_rdoc=8&_orig=browse&_srch=%23toc%236055%232004%23999619995%23473615!&_cdi=6055&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=b7e9e870ec083a4a53a9f3cab7397eae

Title **BAD RIVER CLEAN SWEEP**
(FY 98 - GL985154-01-0)

GL985154-01_cvrletter.pdf

Organization: ***Bad River Band of Lake Superior Chippewa***

GL985154-01.pdf

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Tribe of Chippewa Indians
Chief Blackbird CTR, Maple LN
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Project Statistics:

Award Amount:	$22,257
Dollars Leveraged:	$1,236
Project Timetable:	10/01/98 - 05/30/00
Lake Basin(s):	Superior
Toxics Reduced:	6,160 lbs Household Hazardous Waste
Toxic Stressors:	Corrosives, Ethylene Glycol, Solvents, Cleaners, Pesticides, Mercury, Gas/oil, Batteries, Aerosols, Contaminated Soil (special waste)
Project Type:	Clean Sweep

Summary: The Bad River Clean Sweep collected household hazardous waste at three pick-up locations on the Bad River Chippewa Indian Reservation. The Bad River Watershed Coordinator also conducted community outreach by writing articles for the community and regional papers, producing and distributing a pamphlet, and conducting a workshop at the Bad River Tribal School. The students at the Bad River School were encouraged to participate as volunteers during the collection day. This program increased citizens' knowledge and awareness of waste disposal issues and their connection to the quality of water resources on the reservation and in Lake Superior.

Environmental Results/Products:

A total of three separate on-site Bad River Reservation Household Hazardous Waste (HHW) Clean Sweep events were hosted at the Tribe's recycling/solid waste transfer station. Residents of the Bad River Reservation and surrounding communities in the watershed were invited to participate. The tribe added a personalized touch to its collection methods. It offered a free home pick-up service, allowing those that live on the reservation's most rural areas and communities to participate and contribute.
These events were made public by means of posters, flyers and advertisements. Notices were distributed and posted flyers throughout the tribal governmental and community building and agencies. Prior to each event ads were placed in tribal and the local newspapers. The Tribal Recycling/Solid Waste Department staff provided the public with information regarding HHW and Clean Sweep events. They began informing the public that it provides curbside service to pick up HHW materials on their scheduled recycling material pick-up days.

A total of 6,160 pounds of HHW materials were collected and disposed of from these three events. The following items were removed (collected) from the environment and managed properly through a contractor of hazardous waste: hazardous paint, corrosives, ethylene glycol, cleaners, pesticides, gas/oil, fluorescent bulbs, batteries, aerosols, contaminated soil (special waste).

Bad River Tribal School Student Pollution Prevention Education
The educational component of this grant consisted of the Tribe's Watershed Coordinator visiting the tribal school system and presenting an Environmental Protection curriculum to the students. The presentation covered several areas including HHW, Pollution Prevention, Recycling and the Landfill Closure Project.

A brochure/pamphlet was developed and circulated throughout the community. The Bad River Housing Authority distributed the pamphlets to 223 households under their jurisdiction.

Project Partners:
University of Wisconsin
Volunteer community group
The Bad River Housing Authority
Tribal Recycling/Solid Waste Department
Bad River Recycling and Solid Waste Department
The Nature Conservancy - Wisconsin Chapter
Town of Sanborn
University of Wisconsin - Extension

Products:
Household Hazardous Waste Brochure

Title: GREAT LAKES BINATIONAL TOXICS STRATEGY SUPPORT - POLLUTION PREVENTION SPECIALIST
(FY 98 - GL985779-01)

GL985779-01.pdf

Organization: Wisconsin Department of Natural Resources

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Al Shea
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Project Statistics:

Award Amount:	$18,400
Dollars Leveraged:	$970
Project Timetable:	03/14/98-12/31/99
Lake Basin(s):	Michigan
Toxics Reduced:	3,579 lbs mercury, 5,539 pounds of mercury containing devices, and 104,258 mercury containing lamps from state residents
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary: Wisconsin Department of Natural Resources (WDNR) developed Great Lakes Binational Toxics Strategy GLBTS outreach and educational materials for Wisconsin stakeholders and promoted GLBTS goals and strategies as part of their State-wide pollution prevention outreach strategy. WDNR personnel participated in (GLBTS) planning and stakeholders meetings as well.

Environmental Results/Products:

WDNR conducted/developed the following outreach/educational projects:

- Print and internet versions of a WDNR fact sheet to promote residential recycling of mercury-containing thermostats; (http://www.dnr.state.wi.us/org/caer/cea/publications/pubs/co110.htm)
- A pledge program within Wisconsin to recognize HVAC contractors and wholesalers who recycle mercury-containing thermostats and encourage use of non-mercury thermostats; (link to list of contractors & wholesalers http://www.dnr.state.wi.us/org/caer/cea/mercury/thermostat/businesses/index.htm)
- A multi-community Mercury Recycling Program which ran through December 2000. This program allowed for the collection of mercury and mercury-containing devices from very small quantity generators at reduced or no cost;
- A "Mercury Round Up" which collected 3,579 pounds of elemental mercury, 5,539 pounds of mercury containing devices, and 104,258 lamps from state residents;
- In conjunction with the City of Madison, A Madison mercury workgroup to promote mercury awareness in the Madison area;
- Internet content for the American Hospital Association - EPA Communications workgroup.

WDNR also participated in the following GLBTS and related activities:

- Presented information on Wisconsin's Mercury Air Strategy at the GLBTS Stakeholder Forum in Toronto, April 1999;
- Developed a program to reduce the purchase of, and encourage recycling of, mercury-containing thermostats, and

- Convened a mercury stakeholder group, consisting of representatives from utilities, a chlor-alkali plant, environmental groups, sportfishing groups, and Native American tribes, to focus on measures to reduce mercury emissions to the environment. A draft concept paper outlining a mercury cap and trade concept for air emissions was used for discussion.

Project Partners:
Wisconsin Department of Commerce
Small Business Clean Air Assistance Program
University of Wisconsin Extension - Solid and Hazardous Waste Education Center
Citizens for a Better Environment
City of Madison, Wisconsin

Products:

Household Thermostat Recycling an Environmental Fact Sheet
http://www.dnr.state.wi.us/org/caer/cea/publications/pubs/co110.htm

Thermostat Vendors Participating in the Thermostat Recycling Corporation Program
http://www.dnr.state.wi.us/org/caer/cea/mercury/thermostat/businesses/index.htm

Title **A COMMUNITY BASED MERCURY REDUCTION ON THE LAKE SUPERIOR BASIN**
(FY98 - GL-985855-01)

GL985855-01.pdf

Organization: ***Marquette Community Mercury Reduction Committee***

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Project Statistics:

Award Amount:	$36,000
Dollars Leveraged:	$10,800
Project Timetable:	10/01/98 - 10/01/00
Lake Basin(s):	Superior
Toxics Reduced:	700 thermometers
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary: The specific goals of the project were: 1) to quantify Marquette, Michigan area mercury emissions through sampling and a regional mercury source mass balance, 2) identify and target areas and business sectors with significant mercury emissions for assistance with mercury reduction, 3) organize specific community mercury reduction activities, such as thermometer exchanges, 4) coordinate mercury reduction efforts with key players and share successful strategies and useful information with other Upper Peninsula communities, 5) develop materials for and conduct public education and outreach to generally reduce mercury use and encourage appropriate handling and disposal of mercury-containing devices.
Environmental Results/Products: With the help of this grant, the National Wildlife Federation and interested community members, the Marquette Community Mercury Reduction Committee (MCMRC) has accomplished the following:

- MCMRC conducted low-level mercury sampling in 2000 and 2001. Based on sampling results, supplemented by a literature review and community inteviews, MCMRC identified local sources of mercury for pollution prevention actions. These included hospitals, veterinary facilities, coal-fired utilities, dental offices, schools, and the heating and plumbing industry;
- MCMRC designed educational materials to address industry-specific mercury topics, and focused mercury reduction efforts, such as workshops and thermometer exchanges, on these areas;
- MCMRC advocated for energy conservation among coal fired utilities;
- MCMRC held several Mercury Free Medicine Workshop and collected 700 thermometers for thermometer exchanges;
- MCMRC contacted a number of Upper Peninsula wastewater treatment plants, education institutions, and medical facilities to establish outlets to distribute mercury information; and
- MCMRC developed informational presentations and a brochure on local mercury disposal options;

Project Partners:
National Wildlife Federation
Michigan Department of Environmental Quality
Marquette County Health Department
Marquette County
Northern Michigan University

Products:
Educational materials to address industry-specific topics

local mercury disposal options brochure

Title ACHIEVING ZERO DISCHARGE IN HEALTH CARE
(FY 98 - GL-995860-01)

Organization: Western Lake Superior Sanitary District

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Project Statistics:

Award Amount:	$60,000
Dollars Leveraged	$8,000
Project Timetable:	10/01/98-9/30/01
Lake Basin(s):	Superior
Toxic Stressors:	PBTs/Mercury, dioxin
Project Type:	Education/Outreach

Summary: Western Lake Superior Sanitary District (WLSSD) worked directly with health care facilities to identify and purchase alternative products to help to minimize the discharge of persistent toxic substances (PTSs) in the health care waste stream. WLSSD helped to develop and implement a Preferred Purchasing Policy targeting potentially toxic substances (PTSs). WLSSD produced educational e materials for health care staff about the complete life cycle of products they use, including their environmental and health costs.

Environmental Results/Products: WLSSD assisted individual hospitals to draft letters to their state purchasing organization and general purchasing organizations, requesting products that would help them work toward the zero-discharge of PTS products. The Minnesota Office of Environmental Assistance (MOEA) accomplished a significant portion of this activity through their Health Care Environmental Purchasing Tool (HCEPT)

WLSSD held quarterly meetings with representatives of public and private hospitals, Healthcare Without Harm, the MOEA, a and manufacturer of medical products, to discuss environmentally preferable purchasing and the elimination of PTS.

In 2000, a video addressing the elimination of dioxins from the hospital waste stream was produced. The 20 minute program First Do No Harm: Polyvinyl Chloride and Medicine Responsibility targeted hospital staff and discussed sources of dioxins in medical waste with steps toward their elimination. A total of 2750 tapes were produced and distributed nationwide by WLSSD.

A Lumex Mercury Analyzer was purchased to assist Duluth, Minnesota regional hospitals and clinics with mercury detection and cleanup efforts, and to enhance WLSSD's zero-discharge project. The Lumex has been made available to the Duluth office of Minnesota Pollution Control Agency and others requiring mercury detection or involved in educational efforts.

WLSSD held two workshops to familiarize potential users and other interested parties with the Lumex Mercury Analyzer. The first workshop demonstrated the instrument and provided hands-on training to WLSSD safety and laboratory personnel and the staff of MPCA first responders. The second workshop demonstrated the capabilities of the instrument to educators, hospitals and industrial environmental and safety personnel.

Project Partners:

Minnesota Pollution Control Agency
Healthcare Without Harm
Hospitals for a Healthy Environment
Minnesota Office of Environmental Assistance
Healthcare Supply Manufacturer

Products:

First Do No Harm: Polyvinyl Chloride and Medicine's Responsibility - Hospital Purchasing Video
http://www.noharm.org/library/docs/First_Do_No_Harm_video_2.htm

Strategies and Roadblocks Towards the Elimination of PBT Through Contract Purchasing (report)
Strategies and Roadblocks Towards the Elimination of PBT Through State Healthcare Purchasing (report)
Health Care Environmental Purchasing Tool (HCEPT)
http://www.nihe.org/hcept_tool/home.html

Title ERIE COUNTY/TRIBE ENVIRONMENTAL PARTNERSHIP
(FY 98 - GL985904-01)

Organization: County of Erie, Department of Environment and Planning

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Project Statistics:

Award Amount:	$75,000
Dollars Leveraged	$25,000
Project Timetable:	10/01/98-10/01/01
Lake Basin(s):	Erie
Toxics Reduced:	270 lbs Pesticides
	881 lbs HHW
Toxic Stressors:	Pesticides and HHW
Project Type:	Clean Sweep

Summary: The Erie County/Tribe Environmental Partnership Project provided hazardous waste collection and disposal services to the Seneca, Tuscarora and Tonawanda Reservations in located in Western New York. The project focused on the collection and disposal of persistent toxic substances (PTS) such as PCBs, mercury, chlordane and DDT which are common in household hazardous waste (HHW).

Environmental Results/Products: Erie County successfully conducted five HHW collections over two years for the Seneca, Tuscarora and Tonawanda Indian Reservations. Most collected materials were standard HHW. In addition to the toxics in the summary above, other toxics included lead, chromium, endrin, heptachlor, diazinon, aldrin, malathion, arsenic, phenols, benzene, and carbon tetrachloride.

Combined totals for the five HHW collection events area as follows:

- consolidated paint (liquid) 220 gallons
- consolidated paint (sludge) 275 gallons
- waste paint recycled 176 gallons
- pesticides 270 pounds
- aerosols 65 gallons
- resins/adhesives 60 gallons
- acids 50 gallons
- alkaline 95 gallons
- lead acid batteries 143
- tires 1,686

(Includes a one time clean-up of 1,428 tires on the Seneca Reservation)

Erie County Department of Environment and Planning (ECDEP) initiated the County/ Tribe Environmental Partnership Project with an organizational meeting with the three above-mentioned Western New York Tribes. A consensus was reached among all parties to conduct a Household Hazardous Waste (HHW) collection program.

An environmental workshop was held at the Tuscarora Reservation on April 23, 1999 and about 75 residents attended. The workshop provided the opportunity to educate reservation residents on how to identify HHW materials, properly dispose of these materials in an environmentally responsible manner,

promote the use of less toxic products, and watershed and groundwater protection. Residents were provided with handouts on HHW and observed a slide presentation of the collection event procedures.

To minimize program expenses, other no-cost service providers that participate in Erie County programs were solicited to support this effort. A lead-acid battery recycler and a propane tank recycler agreed to support the event. A tire recycler also agreed to supported the event, which enabled the County and the Seneca Reservation to dispose of 1,428 tires from an illegal dump site on the reservation.

Project Partners:

New York State Department of Environmental Conservation
Safety Kleen Inc.
El-Don Battery Inc.
Irish Propane
Integrated Tire provided the disposal services
Modern Disposal Services
Waste Management
Seneca Indian Reservation
Tonawanda Reservation
Tuscarora Reservation
Cattaraugus County, New York

Title 1998 CLEAN SWEEP
(FY 98 - GL985913-01)

GL985913-01.pdf

Organization: Michigan Department of Agriculture

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Project Statistics:

Award Amount:	$40,000
Dollars Leveraged:	$2,106
Project Timetable:	10/01/98 - 9/30/99
Lake Area Affected:	Michigan, Superior, Erie, Hurons
Toxics Reduced:	59,000 lbs pesticides
Toxic Stressors:	Pesticides
Project Type:	Clean Sweep

Summary: The Michigan Department of Agriculture (MDA) collected 59,000 pounds of pesticides at eight permanent clean sweep storage facilities. The MDA Clean Sweep program helps to protect the State of Michigan's natural resources and prevent agriculture pollution by ensuring the safe and proper disposal of outdated, unused or unwanted pesticides in Michigan. The MDA's Michigan Groundwater Stewardship Program (MGSP), in cooperation with the U.S. Environmental Protection Agency (EPA), local units of government, and the Michigan Department of Environmental Quality (MDEQ), have established a totaal of sixteen (16) permanent Clean Sweep sites throughout the state.

Farmers and individual Michigan residents may drop off potentially harmful pesticides at a Clean Sweep site where they will be collected, packaged for shipping, and disposed of properly and safely. There is no charge for this service. Those interested in participating in the program may contact the site coordinator at the location nearest to them for more information, including collection dates. Pesticide dealers and individuals who sell and/or apply pesticides for hire may also, at the Clean Sweep site manager's discretion, dispose of unused or unwanted pesticides at cost. This cost is typically less than 20 percent of the normal cost of pesticide waste disposal because of economies of scale and competitive bidding of waste disposal accounts.

Clean Sweep sites cannot take non-pesticide or non-mercury items like Household Hazardous Wastes (leftover consumer products like certain paints, cleaners, car batteries and motor oil), they are run concurrently with local HHW programs to ensure convenience for customers. MDA, through the MGSP and fees paid by pesticide and fertilizer registration fees on specialty and agricultural products, provides funding to support the disposal of pesticides, while the local unit of government host site provides for staffing, scheduling, site maintenance, promotion, vendor selection, etc. The USEPA has historically provided funding for site construction, and will often provide additional funding to support pesticide disposal. MDEQ support covers the cost of allowing mercury disposal at the sites as well.

This Clean Sweep program collected more than 59,000 pounds of pesticides from eight permanent sites in Michigan.

Project Partners:
Pesticides & Plant Pesticides Management Division - Michigan Department of Agriculture
Michigan Department of Environmental Quality
Local units of government in Michigan

Title: MERCURY MANOMETER REPLACEMENT ON DAIRY EQUIPMENT
(FY 98 - GL-985917-01)

GL985917-01.pdf

Organization: Wisconsin Department of Natural Resources

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Project Statistics:

Award Amount:	$80,000
Dollars Leveraged:	$4,210
Project Timetable:	10/01/98-09/30/01
Lake Basin(s):	Superior, Michigan
Toxics Reduced:	312 lbs mercury
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction

Summary: The Wisconsin Department of Natural Resources removed 416 mercury containing manometers from dairy farms, 371 manometers from operating farms and several from farms that were no longer milking cows, for a total collection of 312 pounds of mercury.

The State of Wisconsin has approximately 20,000 operating dairy farms that milk cows two or three times each day. Each of these farms has a device, called a manometer, to accurately measure the negative pressure in their milking system. Manometers contain elemental mercury. The goal of this project was to remove the mercury manometers from milking systems and replace them with non-mercury gauges (digital read out, etc.), as part of the long-term strategy to replace mercury devices with a suitable non-mercury device when available. The challenge of this project was to provide a satisfactory incentive and then convince the dairy farmer to give up a device with an established satisfactory performance record.

Environmental Results/Products: The success of the project was due to the formation of partnerships with other state agencies and the private business sector that have more credibility with the farmer than a regulatory agency. Their cooperation was vital to convince the dairy farmer that the mercury manometer on their milking system could be replaced by an accurate and reliable non-mercury vacuum gauge.

A professor from the University of Wisconsin (UW) professor in the College of Agriculture, who is an expert on milking equipment and conducts experiments, promoted the program by evaluating suitable replacement gauges, setting up a meeting with dairy equipment service providers and using a mercury manometer from the milking lab to experiment with handling techniques.

Farmers often request advice from county agricultural agents. Knowing this, the UW Extension agriculture agents serving in each county were solicited for help with this program. Background information and a supply of program brochures to answer questions and publicize the project were provided to the agents.

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) have inspectors that check the sanitation on each dairy farm twice a year. This department was solicited for their help by leaving a brochure explaining the program on each farm where they noticed a mercury manometer.

Vendors agreed to provide the alternative manometers at a minimized equipment and installation cost. Based on the services provided by the equipment vendor, the dairy farmers were required to pay a minimal cost to replace their manometer.

The outcome of this project was 416 manometers were removed from dairy farms, 371 were removed from operating farms and the rest were removed from farms that are no longer milking cows. These manometers contained 312 pounds of mercury.

Project Partners:

University of Wisconsin-College of Agriculture
The Wisconsin Department of Agriculture, Trade and Consumer Protection
UW Extension

Title: HEALTH HAZARD OF RITUAL USE OF MERCURY
(FY 98 - GL985933-01)

GL985933-01.pdf

Organization: Illinois Department of Public Health

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Tayseer Rehan
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Project Statistics:

Award Amount:	$21,006
Dollars Leveraged:	$12,162
Project Timetable:	10/01/98 - 09/30/00
Lake Basin(s):	Michigan
Toxic Stressors:	Mercury
Project Type:	Education/Outreach/Research

Summary: The Illinois Department of Public Health undertook to identified ritual uses of mercury in the Chicago area, mercury levels in residential air as a result of ritual mercury use, which uses of mercury results in greatest exposures, and wether the ritual use of mercury is a public health hazard.

To determine health hazards associated with the different ritual uses, a study was designed that included recruiting individuals who use mercury for ritual purposes, sampling homes where mercury was used, administering household and exposure questionnaires, and sampling individuals for biomarkers of mercury exposure.

The ritual use of mercury has occurred in some Hispanic communities for many years. It is commonly encountered in certain religious rituals of Esperitismo, a spiritual belief system native to Puerto Rico and Santeria, a Cuban-based religion. Promoters of mercury use claim that because mercury "flows smoothly" it provides good luck and, as a result of its slippery nature, prevents evil from sticking to the person. Individuals are frequently instructed to carry mercury in a pouch, purse, or amulet to benefit from its perceived powers. The following ritual uses of mercury were discovered during a literature search:

- Sprinkled around baby cribs or beds
- Worn in amulets around a person's neck
- Carried in a purse or pouch
- Sprinkled in automobiles
- Burned in or on top of candles
- Added in cleaning solutions to cleanse dwellings
- Added to bath water
- Ingested (by infants)
- Added to perfume
- Added to folk medicines
- Added to open containers of wine or oil
- Added to cream lotion and rubbed into skin

Environmental Results/Products: .
Two focus groups with Hispanic community members where held in 1999 to discuss the ritual uses of mercury in the Hispanic communities. The focus group was attended by 28 individuals (1 male and 27 females). The ages of the participants ranged from 27 to 56 years old. Project staff identified that the reason why botanicas are so popular in these communities is because they are inexpensive (compared to traditional medical treatment) and accessible to the communities. The local clinics are not as accessible and are thought to be insensitive to the community needs. Botanica owners were viewed as more

approachable and sensitive to Hispanic culture and beliefs. Participants also indicated that botanicas promise fast results from treatments and owners speak their language (Spanish)

In 1997, the Chicago Department of Public Health (CDPH) conducted a survey in 16 botanicas in Hispanic communities in the Chicago area including: in the Lower West side, Logan Square, Humboldt Park, West Town, Near West Side, South Lawndale. All 16 botanicas sold mercury in plastic capsules that had average weights of 14.16 grams of mercury. Due to the language barrier that existed, employees from Illinois Department of Hispanic Community Affairs (DHCA) agreed to administer questionnaires to occupants of the study residential units.

The questionnaires were administered to approximately 724 individuals between November 1998 and March 1999. Fourteen (14) women admitted to using mercury for ritual purposes, but refused to participate in any further study. The primary reason these women refused was, "they didn't want their husbands finding out they were using it."

Air sampling for airborne metallic mercury was planned for each residential unit recruited for the study. Carbon dioxide sampling was also planned for the purpose of calculating an air exchange rate. At the time of the air sampling, a representative from DCHA was scheduled to administer a household questionnaire to obtain specific information about the ritual use of mercury including amounts used, frequency, purpose of use, and locations. In addition, to the air sampling, the study design included the collection of biological samples (urine) from each occupant in the household.

The project proposal anticipated that 20 - 25 residential units would be sampled. Out of the 724 individuals contacted, seven women were interested in having their homes sampled after they were informed about the potential health effects associated with mercury exposure. Ultimately the homes were not sampled because consent was required from all occupants and there were problems associated with not keeping all family members informed.

Later in the study, Chicago Department of Public Health lead inspectors, who are required to enter homes and conduct housing inspections for lead when an elevated blood lead level is reported for a child less than six years of age, were asked to review the mercury questionnaire during their inspections between February 1999 and May 2001. None of the respondents to the questionnaire admitted to using mercury for ritual purposes.

Informational brochures about the dangers of mercury were distributed to the homes visited. Residents provided direct feedback on the education materials developed for the study. The fact sheet and pamphlets that were distributed for review and the residents in the control homes informed personnel from DHCA that all the information was important and in a format that was concise and easy to read.

Future studies should include public service announcements and a monetary incentive for participants should be considered. Monetary incentives are routinely offered by DCHA personnel for other programs in Chicago. A strategy needs to be developed to involve local church organizations because they have such a great influence in the communities. Focus groups should be organized to discuss recruitment with the key individuals from these local churches. In addition, the local citizens from Hispanic communities should be hired to assist with recruitment. These individuals would be viewed as more trustworthy to other local residents.

Project Partners:
Department of Hispanic Community Affairs
The School of Public Health at the University of Illinois at Chicago
The Chicago Department of Public Health

Products:
Mercury informational brochures
Resident Survey

Title: AUTOMOTIVE MERCURY SWITCH COLLECTION RECYCLING PROJECT
(FY 98 - GL985951-01)

GL985951-01.pdf

Organization: New York State Department of Environmental Conservation

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Project Statistics:

Award Amount:	$55,000
Dollars Leveraged:	$5,000
Project Timetable:	10/01/98-9/30/00
Lake Basin(s):	Lake Erie
Toxics Reduced:	10.5 lbs mercury*
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction

Summary: New York State Department of Environmental Conservation (NYDEC), Division of Pollution Prevention conducted a pilot project to collect and recycle mercury switches from the hoods and trunks of automobiles. The goal of the project was to prevent mercury releases to the Great Lakes Basin from crushing and shredding operations at scrap and salvage yards. The automotive mercury switches (AMS) were voluntarily removed and collected from vehicles by scrap and salvage yards through participation at household hazardous waste collections and as a voluntary service provided by auto dealerships. NYDEC collected more than 5,000 automotive mercury switches from end-of-life vehicles at nearly 35 Automotive Recycling Yards. At 1 gram of mercury per switch, this equates to nearly 10.5 lbs of mercury collected. The mercury collected from the AMS end-of-life vehicles was sent to Mercury Waste Solutions for refining.

Environmental Results/Products: NYDEC developed a model AMS Replacement/Recycling program for on-the-road vehicles for use by automotive service establishments, used car dealerships, federal/state/local government fleets, and commercial fleets within the state of New York. *NYDEC also established an effective collection/recycling network for the continued removal of AMS from Automotive Recycling Yards. County governments (Erie and Monroe) continue to collect, store, and recycle AMS from the yards that participated in this pilot project.

Successful AMS replacement programs were implemented with one used car dealership, 30 automotive service establishments, two Regional NYSDEC office fleets, one county (Erie) fleet, and one commercial fleet (Chemical Waste Management). Replacement switches were also used at several demonstration events and nearly 300 AMS were collected from public participants. Twenty-five hundred (2,500) ball-bearing replacement switches have been distributed in these programs, resulting in the eventual collection and recycling of nearly 5.5 pounds of mercury from these switches. County governments (Erie and Monroe) will continue to collect, store, and recycle AMS from the established replacement programs.

NYSDEC provided direct technical assistance over a two-day period to the State of Connecticut by training their staff, local government fleet supervisors, and a used car dealership on the subjects of AMS switch identification, removal, and replacement for on-the road vehicles. A meeting with the Automotive Recyclers Association of Connecticut also produced a cooperative effort to begin collection and recycling of AMS in end-of life vehicles. This effort demonstrates that an effective AMS collection/replacement program is easy to duplicate, given the information, tools, and logistical support developed under the grant.

A list of 430 Automotive Recycling Yards in New York State were made aware of the need to remove AMS from end-of-life vehicles through distribution of the document "Getting Mercury Out of Cars." The document was drafted as a collaborative effort between NYSDEC and the Alliance of Automotive Manufacturers. In addition, NYSDEC assisted other states, including Connecticut and Wisconsin, with the distribution of the publication to yard owners under new programs for end-of-life vehicles that use the models developed by New York, Michigan, and Minnesota.

Convincing automotive recycling yard owners to collect AMS from end-of-life vehicles was not universally successful, even though a no-cost option for the transportation and recycling of the switches they collected was offered. There were shortcomings in the infrastructure to conduct recycling of AMS from automotive recycling yards and from switch replacement programs. It was also difficult to elicit public interest and participation in voluntary AMS replacement programs for on-the-road vehicles. Even news releases, radio announcements, and large poster displays at participating auto maintenance shops did not significantly increase public interest.

The NYDEC collected more than 5,000 automotive mercury switches from end-of-life vehicles at nearly 35 Automotive Recycling Yards. At 1 gram of mercury per switch, this equates to nearly 10.5 lbs of mercury collected. The mercury collected from the AMS end-of-life vehicles was sent to Mercury Waste Solutions for refining.

Project Partners:
Niagara Frontier Automotive Dismantler Association
Mercury refining Company
Mercury Waste Solutions Inc.
Monroe Muffler Shops
Mr. Oil Change
Valvoline Instant Oil Change
State of Connecticut
Automotive Recyclers Association of Connecticut
Alliance of Automotive Manufacturers

Products:
Model AMS Replacement/Recycling program for on-the-road vehicles
http://www.dec.state.ny.us/website/ppu/p2autosw.html

Getting Mercury Out of Cars- Fact sheet
http://www.epa.gov/ARD-R5/mercury/autoswitch.htm

Title: MERCURY EMISSION BANK PILOT PROJECT
(FY 98 - GL-985964-01-0)

Organization: The Center for Clean Air Policy

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Project Statistics:

Award Amount:	$50,000
Dollars Leveraged:	$110,000
Project Timetable:	10/01/98-9/30/99
Lake Basin(s):	Superior, Michigan
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction

Summary: The Center for Clean Air Policy (Center) developed a model mercury emissions banking program, designed to encourage early reductions in mercury emissions and to provide early benefits to the Great Lakes basin ecosystem. The Center consulted with stakeholders in Minnesota on the need to standardize measurement, monitoring and reporting protocols for mercury emissions, encouraged consideration of regional measurement and reporting standards, and initiating a project to demonstrate the viability of measuring and verifying reductions in mercury emissions. The Center also supported the Wisconsin Department of Natural Resources proposed a cap-trade-and-bank program.

Environmental Results/Products: The Center staff worked with the stakeholders on Minnesota's Mercury Contamination Reduction Initiative Advisory Council (AC) to develop a program that would reduce mercury emissions in the state in a cost effective manner and includes emissions banking as a way to encourage voluntary, early reduction.

The Center educated stakeholders on the topics of emissions banking and other incentives, encouraged the use of efficiency and effectiveness as primary criteria for evaluating policy options, introduced information on viable mercury control options for the utility sector, and advocated for a shorter and more productive decision-making process.

The Center worked with Northern Indiana Public Service Company (NIPSCO) to verify reductions in mercury emissions resulting from their Biomass Initiative, which involved replacing a portion of their coal with biomass and petroleum coke, in order to demonstrate the viability of banking mercury emissions reductions. In the absence of standardized rules for how to register early reductions in mercury emissions, the Center worked with NIPSCO, in consultation with the Indiana Department of Environmental Protection (IDEM) to develop a good estimate of the reductions from their program.

The Center supported Wisconsin Department of Natural Resources (WDNR) proposed a cap-trade and bank program as a way to reduce mercury emissions in advance of any future federal requirements and at a lower cost than more traditional regulatory programs. The Center provided recommendations on how their proposed cap-trade and bank program could be improved in order to account for equity issues, ensure the desired effectiveness, encourage reductions in multiple pollutants simultaneously, and enable participants to consider the economic impact of proposed trading restrictions.

The Center promoted emissions banking and other market-based policy options at the regional level in the upper Midwest, New England, and Canada. They introduced the idea of mercury emissions banking along with a variety of other voluntary and mandatory incentive programs at the November 1998 Great Lakes

Binational Toxics Strategy (GLBTS) mini-conference on Mercury and Utilities. The Center presented the mercury emission reduction measurement methods at the Mercury in the Environment Specialty Conference hosted by the Air & Waste Management Association in September 1999.

The following are some of the Center's work products:

- Draft policy options and strategies authored by the Center for Clean Air Policy for publication in the forthcoming Surfers report;
- Air and Waste Management Association's Mercury in the Environment Specialty Conference paper entitled Verifying Mercury Reductions from Co-Firing with Biomass,
- Comments on the Electric Utility Steam Generating Unit Mercury Emissions Information Collection Effort

Project Partners:
Minnesota's Mercury Contamination Reduction Initiative Advisory Council
Northern Indiana Public Service Company (NIPSCO)
Indiana Department of Environmental Management
Minnesota Pollution Control Agency
Wisconsin Department of Natural Resources

Products:
Model Mercury Emissions Bank
http://www.epa.gov/air/mercuryrule/factsheetsup.pdf

Mercury Emission Reduction Measurement Methods

Verifying Mercury Reductions from Co-Firing with Biomass
http://www.ccap.org/pdf/hgverification.pdf

Title: EMISSION OF MERCURY FROM CHLOR-ALKALI PLANTS
(FY 98 - GL995136-01)

Organization: The University of Michigan

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Project Statistics:

Award Amount:	$100,000
Dollars Leveraged:	$7271
Project Timetable:	12/01/98-11/30/01
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction

Summary: The mercury-cell chlor-alkali (MCCA) industry in the U.S. requires about 160 tons of replacement mercury per year. Nobody currently knows the environmental fate of mercury. If most of the missing mercury were lost in the atmosphere, the MCCA would become the leading source of mercury in the country and the Great Lakes Basin.

The objectives of this project were to:

- Ascertain how and where mercury is lost from MCCA plants.
- The forms and fate of mercury from this industrial sector.

The focus was to develop a measurement scheme to quantify both direct and indirect atmospheric losses of mercury during routine chlor-alkali operations, and apply this scheme to an operating plant. Airborne losses were measured from individual cells, as well as the cell building, from locally stored waste deposits and estimated from the overall chlor-alkali plant itself.

Environmental Results/Products:
Measurements were performed over a period of time sufficient to capture the mercury emission signals from both routine and non-routine operations. The measurement approach involved a combination of methods including multipoint continuous airborne measurements within the cell rooms, spot measurements near individual cells, point source measurements, and direct flux measurements over waste deposits.

A typical MCCA factory contains 24 to more than 100 cells, which together hold 100 to more than 500 tons of mercury. The cells are located either in a closed building or carport type structure which are heavily ventilated to minimize the risk to workers.

The study conducted the following processes:

- Measure Mercury concentrations in gas stream being vented outside from the cell room as well as the ventilation rate.
- Real time monitoring of ambient mercury levels in various parts of the cell room to map out of the "hot-spots." Mercury concentrations were also determined as a function of distance outside the cell room.
- Flux chamber measurements of Mercury release from factory floors where a significant amount of mercury is handled.
- Flux chamber measurements of Mercury release over water covering mercury in a cell under different temperature conditions and as a function of time.

- Flux chamber measurements over retention ponds, landfills and waste handling facilities.
- Collected samples of water; wastewater and solid wastes at points of flux chamber measurements and analyzed them for total Mercury, elemental Mercury and reactive Mercury.
- Obtained samples of the cell lid and rubber linings for laboratory testing of their capacity to absorb and release mercury.

Samples were collected at the plant during the summer and winter. In addition, sampling was performed intermittently during the year at selected plant interior locations. Because of the potential importance of passive emissions of Mercury vapor from contaminated soils and wastes near the plant, direct sampling of fluxes over soil surfaces near the plant buildings and at known sites of waste storage were collected.

The estimates of overall Mercury losses based on a mass balance of material flows, sources and sinks, measured Mercury levels in and measurements of air flows and exchange rates to calculate Mercury fluxes. Similar measurements were made outside of the plant, both immediately adjacent to major points of air emissions, as well as in a selected region downwind.

These data were used with general and specific flow and wind data to calculate local and area-wide fluxes.

Project Partners:
Chlorine Institute
Oak Ridge National Laboratory

Title: DEFUSING THE CHLOR-ALKALI MERCURY TIME BOMB
(FY 99 - GL99154-01)

Organization: Institute of European Environmental Policy

Contact:
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London, England

Project Statistics:

Award Amount:	$45,000
Dollars Leveraged	$5,000
Project Timetable:	04/01/99 - 09/30/02
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction

Summary: This project undertook to study the environmental and economic impacts of mercury stockpiles associated with decommissioned chlor-alkali facilities in Western Europe. At the time this study was conducted, more than 60 factories in Western Europe hold 12,000 to 14,000 tons of mercury. When factories close, their mercury stocks have traditionally been sold to commodity dealers.

Environmental Results/Products: This project contributed to two reports. In September 2000, Institute of European Environmental Policy (IEEP) authored Decommissioning Chlor-alkali facilities in Western Europe: Mercury Options. In addition, IEEP provided the United Nations Environmental Program (UNEP), which after the onset of this grant undertook a technical review of mercury environmental issues. The grantee was able to provide salient information regarding the chlor-alkali industry to the UNEP review. The UNEP report became a useful forum by which chlor-alkali issues could be brought to the attention of environmental policymakers. This assessment report was forwarded to the UNEP Governing Council for its meeting during February 2003. This contributed to increased understanding worldwide of major issues related to mercury, thereby facilitating discussion and actions.

The IEEP project collaborated with the European chlor-alkali industry association, located in Brussels, obtaining information on its procedures for management of mercury and methods for measuring mercury vapor emissions. IEEP also shared information on the chlor-alkali industry with the United Nations Environmental Program mercury review. This in turn helped elicit information on the industry from other nations, including India.

With regard to mercury consumption in the chlor-alkalai industry, the Indian association has reduced mercury losses by about 40 percent during the past three years; the U.S. industry has reduced losses by 80 percent during the past six years; and European factories have made progress, though the extent of progress has not been comparably reported. This is contextual progress by the industry during recent years. It cannot be attributed to the efforts of IEEP, but rather to voluntary actions by factories. Nevertheless, IEEP's project contributed valuably to bolstering world understanding of chlor-alkali mercury issues.

Project Partners:
EuroChlor (the association of European chlor-alkali producers)
United Nations Environmental Program
European Commission

Products:
Decommissioning Chlor-alkali facilities in Western Europe: Mercury Options.

Title: MERCURY REMOVAL FROM THE DENTAL-UNIT WASTEWATER SYSTEM
(DW-17947929-01-0)

Organization: Naval Institute for Dental and Biomedical Research

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Project Statistics:

Award Amount:	$130,000
Project Timetable:	09/01/99 - 09/30/03
Toxic Stressors:	Mercury
Project Type:	Education and Outreach, Characterization & Evaluation

Summary:
The Great Lakes Naval Institute conducted research to evaluate and characterize mercury in dental-unit waste water, and education and outreach to dentists on mercury reduction practices.

Environmental Results/Products:
Speciation studies on dental unit waste water identified different forms of mercury present in dental-unit waste water. This data helped design a dental amalgam separator that can remove particulate bound mercury as well as dissolved mercury species. These characterization studies were the first to demonstrate the presence of organic mercury in this waste stream.

Residual mercury in amalgam capsules was also characterized and found to be a substantial source of mercury (up to 29.5 mg Mercury per capsule). Based on this finding, it is recommended that used amalgam capsules be recycled or sent to hazardous waste landfills. The disposal of municipal solid waste facilities may result in incineration of the capsules which could result in volatilization to the atmosphere of the residual mercury.

Outreach included the design and publication of a web site that presents commercially available amalgam separator technologies, publications on separators, wastewater characterization, EPA methods, links to environmental web sites, speakers' bureau information, course work and dental amalgam best management practices.

Twenty-three presentations were made to dentists, dental staff members, researchers and the general public about the removal of mercury from dental amalgam. A booth was set up at dental society meetings to distribute information on the environmental aspects of the dental practice and amalgam separators to prevent mercury from entering the wastewater.

Project Partners:
U.S. Air Force Dental Investigation Service

Products:

Dental Mercury www.dentalmercury.com
Amalgam Recycling www.amalgamrecycling.com

Mark E Stone. 2004. "The Effect of Amalgam Separators on Mercury Loading to Wastewater Treatment Plants." *Journal of the California Dental Association*, 32, 7, pp. 593 - 600.

Mark E Stone, Mark E Cohen, Lian Liang, Patrick Pang. 2003. "Determination of Methyl Mercury in Dental-Unit Wastewater." *Dental Materials*, 19, 7, pp. 677-681.

Ernest D Pederson, Mark E Stone, James C Ragain, John W Simecek. March - April, 2002. Waterline Biofilm and the Dental Treatment Facility: A Review. *General Dentistry*, 50, 2, pp. 190-195.

Mark E Stone, Ernest D Pederson, Mark E Cohen, James C Ragain, Ronald S Karaway, Richard A Auxer, Abel R Saluta. 2002. "Residual Mercury Content and Leaching of Mercury and Silver From Used Amalgam Capsules." *Dental Materials* Volume 18 (4) pp 289 - 294.

Mark E Stone, Ernest D Pederson, Mark E Cohen, James C Ragain, Jr., CAPT, DC, USN, Gordon K Jones, CAPT, DC, USN, Ronald S Karaway, John W Simecek, Kim E Diefenderfer, CDR, DC, USN, Howard Roberts, Lt. Col, DC, USAF. "Solid Waste Disposal Issues and Dental Amalgam." *Scientific Review of Issues Impacting Dentistry*, 2, 2. December 2000 (Navy Dental Corps Electronic Publication).

Mark E Stone, Ernest D Pederson, Gordon K Jones, James C Ragain, Ronald S Karaway, Richard A Auxer, and Sidney L Davis. Proceedings of a Specialty Conference: Mercury in the Environment. "Mercury Removal from the Dental-Unit Wastewater Stream." Air and Waste Management Association in Association with U.S. EPA. September 15-17th, 1999, Minneapolis, MN. PP. 413 - 424. VIP-91. ISBN: 0-923204-28-8

Ernest D Pederson, Mark E Stone, James C Ragain, and J Robert Kelly. "Biofilms in Dental-Unit Waterlines." *Scientific Review of Issues Impacting Dentistry*, 1, 1. December 1999. (Naval Dental Corp Electronic Publication)

Ernest D Pederson, Mark E Stone, and Victor G Ovsey. 1999. Mercury Removal from Dental Operatory Waste Water by Polymer Treatment. *Environmental Health Perspective*, 107, 1.

Title: MICHIGAN MERCURY MANOMETER DISPOSAL
(FY99 - GL995659-01)

Organization: Michigan Department of Agriculture

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Project Statistics:

Award Amount:	$40,000
Dollars Leveraged:	$127,000
Project Timetable:	10/01/99-09/30/00
Lake Basin(s):	Michigan
Toxics Reduced:	86 lbs mercury
Toxic Stressors:	Mercury
Project Type:	Manometer/gauges Clean Sweep

Summary: The Michigan Department of Agriculture developed a program to replace mercury manometer gauges used on dairy farms with non-mercury gauges. This helps reduce potential for spilling mercury into the environment. Mercury gauges will also be collected from active and inactive dairy farms for proper disposal. This work will be done at little or no cost to the farmer.

Environmental Results/Products: Dairy producers that participated in the program were paid up to $250 towards replacing the mercury manometers on each dairy farm. Eighty-six dairy farms participated in the statewide program. Most dairy producers chose to replace their mercury manometers, which contain approximately 1 pound of mercury each, with electronic digital vacuum gauges, the rest opting to use glycerin-filled vacuum gauges.

Project Partners:
Michigan Department of Environmental Quality

Title: MICHIGAN CLEAN SWEEP
(FY 99 - GL005667-01)

Organization: Michigan Department of Agriculture

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Project Statistics:

Award Amount:	$40,000
Dollars Leveraged:	$127,000
Project Timetable:	10/01/99-09/30/00
Lake Basin(s):	Michigan, Superior, Huron, and Erie
Toxics Reduced:	96,000 lbs. pesticides
Toxic Stressors:	Pesticides
Project Type:	Pesticide Clean Sweep

Summary:
The Michigan Department of Agriculture collected more than 96,000 pounds of pesticides from twelve permanent sites in operation in the State of Michigan. The Clean Sweep program collects pesticides from end users in order to prevent illegal disposal or use of the toxic pesticide in question. Michigan has an established Clean Sweep program which includes twelve permanent Clean Sweep storage facilities that allow end users (homeowners, farmers, golf courses, etc.) to drop of pesticides to a regional storage facility. The pesticides are then collected, packaged for shipping, and disposed of properly and safely. There is no charge for this service to residents.

Pesticide dealers and individuals who sell and/or apply pesticides for hire may also, at the Clean Sweep site manager's discretion, dispose of unused or unwanted pesticides at cost. This cost is typically less than 20 percent of the normal cost of pesticide waste disposal because of economies of scale and competitive bidding of waste disposal accounts.

Environmental Results/Products: Education and outreach as conducted to the communities serviced by each Clean Sweep site. Using the permanent Michigan Clean Sweep facilities and site coordinator resources, MDA maintained an ongoing program to collect pesticides from end-users at no charge. Commercial pesticide applicators were able to participate in the program, but were responsible for covering the cost of chemical disposal, which is well below the normal cost for contracting disposal independently.

This program collected more than 96,000 pounds of pesticides from twelve permanent sites in operation at the time in Michigan.

Project Partners:
Michigan County Health Department
Michigan Department of Environmental Quality
Michigan Farm Bureau
Michigan State University-Extension

Title: MERCURY EDUCATION PROGRAM FOR SCHOOLS
(FY 99 - GL005702-01)

Organization: Board of Reagents of the University of Wisconsin

Contact:
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Solid and Hazardous Waste Education Center (SHWEC)
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Project Statistics:

Award Amount:	$40,000
Dollars Leveraged:	$3,023
Project Timetable:	10/01/99-09/30/01
Lake Basin(s):	Michigan
Toxics Reduced:	520 pounds mercury
Toxic Stressors:	Mercury
Project Type:	Education/Outreach in Schools

Summary:
The University of Wisconsin Extension Solid and Hazardous Waste Education Center (SHWEC) worked with schools in seventeen Wisconsin communities to:1) reduce mercury use, 2) promote mercury recycling, and 3) reduce mercury spills in schools. Mercury is found in schools mainly in the science labs, but also in common items like fluorescent light, thermostats, and thermometers. A set of teaching activities were developed for teachers in order to educate the students about mercury.

Environmental Results/Products:

(SHWEC) developed a 2-3 hour workshop to help train teachers about mercury and remove mercury from their schools. The Mercury in Schools project recruited teachers, science coordinators, and key people from state departments of public instruction, and state environmental personnel, to attend these workshops. SHWEC staff conducted workshops in Detroit, Michigan; Chicago, Illinois; Milwaukee, Wisconsin; Indianapolis, Indiana; and Duluth, Minnesota. A total of 254 teachers participated in the training program. SHWEC staff presented and overview of this project at the US-Canada Great Lakes Binational Toxics Strategy meeting in Toronto on May 17, 2001.

A clearinghouse of information, documents and programs relating to reducing mercury usage and increasing Mercury recycling in schools was established and maintained and available for use by individuals basin-wide. This clearinghouse is accessible from the web site that was also developed through this program. A Mercury in Schools listserv was established to allow project and others easily exchange information and ideas on eliminating mercury from schools.

Project Partners:
Mercury in Schools Elimination Program Leaders in:
- Detroit, Michigan
- Chicago, Illinois
- Milwaukee, Wisconsin
- Indianapolis, Indiana
- Duluth, Minnesota

Products:
Mercury - Teacher Activities

http://www.mercuryinschools.uwex.edu/tools/index.htm
Mercury In Schools Clearinghouse
www.mercuryinschools.org

Title: LOCAL AND SECTOR-BASED POLLUTION PREVENTION IN THE BTS
(FY 99 - GL005831-01)

Organization: National Wildlife Federation

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Project Statistics:

Award Amount:	$75,000
Dollars Leveraged:	$3,023
Project Timetable:	10/01/99-09/30/01
Lake Basin(s):	Huron, Michigan
Toxics Reduced:	520 pounds mercury
Toxic Stressors:	Mercury
Project Type:	Education/Outreach in Schools

Summary:
The National Wildlife Federation (NWF) continued to promote mercury reduction practices in support of the Great Lakes Binational Toxics Strategy (GLBTS) in:

1) the health care sector
2) consumer products
3) by advocating Total Maximum Daily Loads (TMDLs) to mercury air emissions.

Environmental Results/Products:

- NWF obtained significant mercury reductions and pledges for further mercury reductions in the health care industry and in mercury products, and gained commitments for voluntary pollution prevention from many sectors through use of the Total Maximum Daily Load (TMDL) process.

- NWF participated extensively in setting the agendas of and in the meetings of the GLBTS Integration Group and the Mercury Group, and promoted participation to other organizations and individuals involved with the GLBTS.

NWF conducted a mailing to the CEO's of more than 180 members of the Michigan Health & Hospital Association, explaining the importance of eliminating the use and release of mercury and dioxin from health care facilities. The January/February 2001 issue of Michigan Heal & Hospitals Magazine featured an article highlighting the MHA's Hospitals for a Healthy Environment task force and it's support of mercury thermometer exchanges, and elimination of toxics, including mercury.

NWF, with the Health Care Without Harm coalition, initiated the Mercury Free Medicine campaign. Forty-four (44) hospitals and 100 health care clinics in Michigan signed the Mercury Free Medicine Pledge presented by the MHA.

NWF worked with community organizations in Detroit to gain a commitment from the Henry Ford Healthcare System to close the incinerator on its main campus in central Detroit. The incinerator was shut down in June 2001.

NWF played a supporting role in facilitating new mercury initiatives including municipal bans on mercury products, voluntary clean sweeps and mercury thermometer collection programs. NWF continued to work

with state agencies, including Ohio EPA and Minnesota Pollution Control Agency to draft TMDLs for mercury air emissions.

Project Partners:
Michigan Health & Hospital Association (MHA)
Minnesota Pollution Control Agency

Products:
MHA's Hospitals for a Healthy Environment Task Force Article

Title: MERCURY POLLUTION PREVENTION IN HEALTHCARE INITIATIVE
(FY 99 - GL00583801-0)

Organization: County of Erie-Department of Environment and Planning

Contact:
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Department of Environment and Planning
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Project Statistics:

Award Amount:	$70,000
Dollars Leveraged:	$25,200
Project Timetable:	10/01/99-09/30/01
Lake Area Affected:	Erie
Toxics Reduced:	369 lbs mercury
	4436 mercury thermometers
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction
	Education/Outreach

Summary: Erie County Department of Environment and Planning conducted hospital surveys/audits with the objective to eliminate the use of mercury-containing products in healthcare facilities and replace them with suitable mercury-free alternatives. The principle objectives of this project were to: 1) implement in-house mercury awareness and education campaigns, 2) identify and quantify current use of mercury in each hospital, 3) identify and quantify mercury product storage, 4) promote mercury-free purchasing policies, and 5) identify opportunities for solid waste reduction.

Environmental Results/Products: The Erie County Program Manager met with representatives from Erie County Medical Center (county facility), Buffalo General Hospital (Kaleida Health System), and St. Joseph Hospital (Catholic Health System). The Program Manager extended the program to include a Visiting Nurses Association for mercury pollution prevention efforts.

Following the completion of facility surveys, the Program Manager and staff from the Erie County Office of Solid Waste scheduled two-day pollution prevention and solid waste management audits of each hospital. The audits included mercury use and storage; current waste handling practices; polyvinyl chloride use; recycling practices; and waste reduction. Follow-up reports, specific to pollution prevention and solid waste management were prepared for each hospital. Each report summarized major findings from the audits, proposed recommendations and best management practices and contained supporting documentation.

The pollution prevention and solid waste reduction accomplishments realized by the hospitals participating in the pilot study included:

- eliminating use and distribution of mercury fever thermometers by the hospital,
- eliminating use of tungsten-weighted feeding tubes,
- continuous phase out of mercury sphygmomanometers,
- implementing dental amalgam recycling,
- implementing lead foil recycling, and,
- implementing in-house programs to increase solid waste recycling participation

The hospital staff continued to work with Erie County DEP to investigate reuse opportunities for products such as unused durable equipment, surgical supplies, and surgical packaging.

As noted previously, a local chapter Visiting Nurses Association (VNA) was included in the program. The baseline surveys that identified mercury use and storage in healthcare facilities indicated a substantial number of thermometers were used by the VNA, which is an affiliate of Kaleida Health Systems. At the time, the VNA provided home care patients with mercury thermometers. The Program Manager provided the VNA with samples of mercury-free thermometers, which they found to be a cost-effective and suitable alternative. The VNA now offers patients mercury-free thermometers as well as information on proper disposal of mercury-containing products. Through participation in the program, the VNA eliminated their existing stock of mercury thermometers, totaling 1,687 as well as future purchases.

The following resulted from this project:

- A total of 679 thermometers from project partner hospital employees' households were exchanged for mercury-free thermometers,
- 270 mercury thermometers were collected at exchanges at other Erie County, New York area hospitals,
- Overall, 1800 mercury thermometers would no longer be purchased annually by 3 Erie County, New York area hospitals and the Visiting Nurses Association,
- 364 lbs of mercury were no longer used through sphygmomanometer replacements by 3 Erie County, New York area hospitals.
- 931 mercury-weighted feeding tubes would no longer be purchased by 3 Erie County, New York area hospitals.
- 5 lbs of mercury amalgam are recycled per year by 3 Erie County, New York area hospitals.

Project Partners:
Buffalo Sewer Authority
Western New York Healthcare Association
Erie County Medical Center (county facility)
Buffalo General Hospital (Kaleida Health System)
St. Joseph Hospital (Catholic Health System)
Visiting Nurses Association
Healthcare Without Harm

Title: CLEAN PRODUCTION PROJECT FOR BASIN COMMUNITIES
(FY 99 - GL975034-01-0)

Organization: Great Lakes United

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Project Statistics:

Award Amount:	$125,000
Dollars Leveraged:	$6,579
Project Timetable:	10/01/99 - 09/30/02
Toxics Reduced:	5000 mercury auto switches
Toxic Stressors:	Mercury, Dioxin
Project Type:	Education/Outreach

Summary: Great Lakes United (GLU) worked with coalition members to support and develop a Great Lakes regional Clean Car Campaign, and promote dioxin and mercury reduction from medical facilities.

Environmental Results/Products:

Clean Car Campaign
As evidenced by a Ford Corporate Citizen report published in August 2001, the report Great Lakes United's Toxics in Vehicles: Mercury provided encouragement to the big three automakers; Ford Motor Company, General Motors and Daimler Chrysler commit to eliminating mercury switches from new models as of the end of 2002.

With the help of the New York State Department of Environmental Conservation (NYDEC), GLU's membership across the Great Lakes basin and significant media coverage, approximately 5,000 mercury switches were removed from vehicles on the road. GLU completed six mercury switch-outs with vehicle fleets in western New York including: City of Buffalo Police Department, Adelphia Cable Company, Erie County, Lockport Police, Cheektowaga Police and City of Kenmore Police Department. Through GLU members and partners we completed change outs at dealerships in Detroit, Grand Rapids, Grand Traverse Bay, and Ann Arbor, Michigan, and Duluth, Minnesota.

GLU, along with the Automotive Recyclers Association, Clean Production Network, Ecology Center, Environmental Defense, Institute of Scrap Recycling Industries, Steel Manufactures Association, and the Steel Recycling Institute created a Mercury Partnership to develop effective strategies for eliminating mercury from vehicles. The Partnership designed a Mercury Action Plan for recovering mercury switches currently in commerce, as well as a model *extended producer responsibility law* for mercury switches. An article from the industry trade journal Scrap, October 2001 cites the achievements of the Partnership.

Extended Producer Responsibility Conference
Great Lakes United organized an Extended Producer Responsibility (EPR) and Automobiles conference with presentations from clean production experts from the U.S., Canada and Sweden, including end-of-life industry representatives addressing the problems of contaminated auto scrap materials and the need to design out PBT-added parts used in vehicles. More than 100 people from the auto unions, the environmental community, U.S. and Canadian governments and the auto companies participated in the workshops held in Windsor, Toronto and Montreal, Canada.

Great Lakes Binational Toxics Strategy GLBTS) Integration Group
GLU participated the GLBTS Integration Group to represent the concerns of its membership.

Health Care Without Harm Activities
Tribal Health Care Workshop
Indigenous Environmental Network (IEN) partnered with the Tribal Health Care Association to host a one day workshop in September 2000 in Duluth, Minnesota. The workshop addressed the toxic impacts of tribal health care facilities and ways in which they can phase-out practices that release mercury and dioxin into the environment.

Reducing Waste Volumes and Toxicity and Saving Money Workshop
Citizens Environmental Coalition (CEC) and the City of Buffalo hosted a one day workshop in conjunction with Strong Memorial Hospital in September 2000 in Rochester, NY to present success stories of hospitals that have eliminated the use of any substances containing mercury and PVC. The presentation was based on the Environmentally Safe Hospitals, Reducing Waste Volumes and Toxicity and Saving Money resource guide written by CEC.

Canadian Association of Physicians for Environment (CAPE) Annual Meeting
A presentation was given at this conference, held in October 2000, about Health Care Without Harm's (HCWH) initiatives.

Toronto Environmental Alliance (TEA) Workshop
The workshop was hosted in order to launch the HCWH campaign in Canada. The program was hosted in September 2000.

Project Partners:
Automotive Recyclers Association
Clean Production Network
Ecology Center
Environmental Defense
Institute of Scrap Recycling Industries
Steel Manufacturers Association
The Steel Recycling Institute
Great Lakes Research Consortium
City of Buffalo Police Department
Adelphia Cable Company
Erie County
City of Lockport Police Department
City of Cheektowaga Police Department
City of Kenmore Police Department
Citizens Environmental Coalition
Canadian Association of Physicians for Environment (CAPE)
Toronto Environmental Alliance (TEA)

Products:
(Article) Scrap, October 2001
Toxics in Vehicles: Mercury (link to electronic document.)
Www.cleancarcampaign.org

Title: REGIONAL BURN BARREL CAMPAIGN
(FY 99 - GL975112-01)

Organization: Western Lake Superior Sanitary District

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Project Statistics:

Award Amount:	$75,000
Dollars Leveraged:	$28,000
Project Timetable:	10/1/99-12/31/01
Lake Basin(s):	Superior
Toxic Stressors:	Dioxin
Project Type:	Education/Outreach
	Substance Removal/Reduction

Summary: Western Lake Superior Sanitary District (WLSSD) conducted a burn barrel outreach campaign to educate the public about the hazards surrounding backyard burning and to reduce garbage burning in the region.

Environmental Results/Products: A committee consisting of 22 members from various governmental bodies from Wisconsin and Minnesota was formed to set forth objectives for the campaign. WLSSD staff developed and produced educational and outreach materials for the burn barrel campaign and distributed to 27 regional advertising agencies, including three fact sheets. Two posters were developed to provide further awareness about the hazards of burning; 500 copies of each of these posters were printed. The posters were displayed at eleven rural recycling facilities within the WLSSD. An informational television segment was developed, which was aired on local television, to introduce the program's mascot "Burnie the Burn Barrel" and explain the hazards of backyard burning. Other outreach activities included distributing 50 VHS copies of the TV spot, and articles were written and submitted to townships to publish in their newsletter in order to reach rural residents with the burn barrel message.

WLSSD attempted to make it easy for burners to dispose of their burn barrels by providing a coupon along with three burn-barrel fact sheets. The coupon was good for the free drop off of a burn barrel at the WLSSD Rice Lake Landfill.

Project Partners:
Minnesota Pollution Control Agency

Products:
Strategy/Implementation Plan for Reducing the Prevalence of Household Garbage Burning (Barrel Burning) in Rural Areas of the Great Lakes
http://www.c2p2online.com/documents/BurnBarrelStrategy-finalFeb04f.pdf

3 Burn Barrel Fact Sheets
Bernie the Burn Barrel Brochure (No. 1)
http://www.c2p2online.com/documents/bernie.pdf

Bernie the Burn Barrel Brochure (No. 2)
http://www.c2p2online.com/documents/bernie2.pdf

Bernie the Burn Barrel Poster
http://www.c2p2online.com/documents/bernieposter.pdf

Video of TV Segment (Burnie the Burn Barrel)

Title: TOXIC REDUCTIONS THROUGH ENERGY EFFICIENCY AND CONSERVATION AMONG INDUSTRIAL BOILERS (FY 00 -GL97514402-0)

Organization: Delta Institute

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Project Statistics:

Award Amount:	$75,000
Dollars Leveraged:	$3,947
Project Timetable:	09/01/99 - 09/30/02
Lake Basin(s):	All
Toxic Stressors:	Mercury, dioxins, furans, cadmium
Project Type:	Substance Removal/Reduction

Summary: The Delta Institute conducted a study to evaluate the potential for industrial boiler toxic emission reductions through energy conservation and efficiency measures. Delta engaged with selected industries which own and operate industrial boilers, sought to determine appropriate incentives for and barriers to investment in energy efficiency technologies and conservation practices, and developed a method to quantify reduction of persistent toxic substances (PTS) through energy efficiency and conservation technologies and practices that result in more efficient industrial boilers.

Emissions from industrial boilers are a function of the type and quantity of primary fuel burned in the boiler unit, the type of boiler, and emissions controls. Boilers emit a variety of pollutants including those pollutants associated with combustion processes, such as nitrogen oxides (NOx), sulfur dioxide (SO2), particulate matter (PM), and carbon monoxide (CO), as well as air toxics. The primary air toxics include formaldehyde, polynuclear aromatic hydrocarbons (PAHs), lead, hydrogen chloride, cadmium, mercury, and dioxin/furans (US EPA 1998). Several of the air toxics emitted by industrial boiler units, such as mercury, dioxin/furans, cadmium, PAHs, and 1,4-dichlorobenzene are considered to be Level I and II pollutants of concern under the GLBTS program which was the primary focus of this project.

Environmental Results/Products: The Delta Institute found that optimizing energy efficiencies reduces fuel consumption which reduces emissions of PTS, and lowers greenhouse gas emissions, as well. An aggregation analysis showed that industrial boilers are a substantial source of toxic compounds. Although emissions of PTS from industrial boilers are significant, they are not well inventoried, because they are often grouped together with the total facility emissions.

An aggregation analysis showed that more than 20,000 industrial boilers are located at facilities in Great Lakes region. This analysis also showed that 12% of the industrial boilers located in the Great Lakes region that use coal and residual fuel oil as the primary fuel emit the majority of PTS emissions. Because of the significance of industrial boilers as a source of air toxics and the potential for reductions through energy efficiency measures, an outreach program was established to encourage industrial facilities to upgrade their existing equipment. The effort focused on coal and residual oil boilers in energy intensive industries in order to take advantage of the reduction potential from this sector. Focusing on coal and residual fired units reduced the target pool of industrial boilers from more than 20,000 to 2,900 located in approximately 1,100 facilities in the Great Lakes region.

The Delta Institute, working with the Council of Industrial Boiler Owners and the Wisconsin Department of Natural Resources performed energy efficiency assessments at nine Wisconsin facilities, with a total of 34 industrial boilers. Plant-specific energy efficiency recommendations were developed based on the site visit. Primary operations at the participating facilities included:

- Four pulp and paper producers (designated in this report as PVT-1 through 4)
- One manufacturing facility (designated PVT-5); and,
- Four institutional facilities (designated PUB-1 through 4).

Through these assessments, they found that optimizing energy needs can result in reductions of toxic and greenhouse gas emissions because of reduced fuel use. This correlation was also confirmed through the aggregation analysis of emissions from more than 20,000 industrial boilers located at facilities in eight Great Lakes states.

Project Partners:
U.S. Department of Energy
Council of Industrial Boilers Owners
American Council for an Energy Efficiency Economy
Council of Industrial Boiler Owners
Wisconsin Department of Natural Resources

Title: PCBs AND ELECTRICAL CONTRACTORS WORKSHOP
(FY 00 - GL975148-01)

Organization: City of Superior, Public Works Department

Contact:
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Project Statistics:

Award Amount:	$30,000
Dollars Leveraged	$10,000
Project Timetable:	10/01/99 - 09/30/01
Lake Basin(s):	Superior
Toxic Stressors:	PCBs, Mercury, Asbestos
Project Type:	Education/Outreach Workshop for Contractors

Summary: The City of Superior, Wisconsin conducted two workshops for electrical contractors in Wisconsin and Minnesota to present information about state and federal regulations relating to PCBs, including identification, removal and disposal requirements, and also discussed health and environmental impacts associated with PCBs. The City of Superior designed this workshop in consultation with Minnesota Power, Northern States Power and Western Lake Superior Sanitary District (WLSSD). Thirty-one (31) people attended the workshop held in Ashland, Wisconsin and 53 people attended the workshop held in Duluth, Minnesota.

Project Partners:
University of Wisconsin Superior
Allete (Minnesota Power)
Xcel (Northern States Power)
Western Lakes Superior Sanitary District (WLSSD)
Health Care without Harm
Minnesota Pollution Control Agency
Wisconsin Department of Natural Resources (WDNR)

Products:
PCB survey for businesses
Workshop Brochure
Clean Sweep Rebate Certificate
Workshop Agenda

Title: MOBILIZING/COORDINATING INDUSTRY BNTS PARTICIPATION
(FY 00 - GL-975044-01)

Organization: Council of Great Lakes Industries

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Project Statistics:

Award Amount:	$105,000
Dollars Leveraged	$ 10,500
Project Timetable:	01/24/00 - 09/30/02
Lake Basin(s):	Great Lakes Basin
Project Type:	Education/Outreach

Summary: The Council of Great Lakes Industries (CGLI) has worked in partnership with the USEPA since 1997 to facilitate implementation of the Great Lakes Binational Toxics Strategy (GLBTS). CGLI has conducted awareness efforts, recruited workgroup participants, gathered data for release inventories helped implement a decision tree process for sector significance determinations, researched incentives which attract industry to the GLBTS, served as a liaison between USEPA and industry stakeholders, and sought substance release commitments from industry stakeholders. The highlights of this continuing work effort through the fiscal year 2002 include:

- Continue substance workgroup support activities and awareness efforts to nurture current participants, and seek additional participants from industry sectors, which have not yet become involved in the strategy. These include the primary and secondary aluminum and cooper smelters, pesticide manufacturers and small industries.
- Increase strategy awareness and participation among industry suppliers and;
- Chart a course for future efforts once current strategy goals have been met, this effort will include a study of existing pollution prevention programs to determine how/if EPA EPCRA Tier II substances have been included.

Environmental Results/Products: CGLI's outreach efforts have resulted in enhanced industry participation in GLBTS activities. Increasing this participation further and gaining additional commitments required additional contact within industries already active in the program and those sectors yet to join the effort.

CGLIs industry stakeholder list continues to grow, 150 individuals representing many different sectors, individual industries are now registered and receive regular briefings regarding strategic activities and challenge goals.

The chlor-alkali industry mercury use reduction commitment on PCB equipment, the steel industry mercury program, the auto industry commitments on PCB equipment phase out are examples of new commitments made specifically as part of the GLBTS program.

Other individual company efforts have resulted in GLBTS substances use and release reductions examples include:

- Niagara Mohawk's effort, which replaced 37,000 mercury containing gas regulators in use by consumers and their distribution facility focus efforts, which retired 29,700 PCB capacitors.

- Ontario Hydro's program, will result in the destruction of 81 percent (81%) of their PCB inventory by the year 2006. This facility seeks to be PCB free by year 2015.
- Dow Canada's 95% reduction in release of dioxins and furans from vinyl chloride monomer production
- Industry sector collective voluntary programs such as the American Forest & Paper Association environmental principles and goals program, Automotive Pollution Prevention Program, the Chemical Industry responsible Care Program, Wisconsin Paper Council/Wisconsin Department of Natural Resources (WI DNR) P5 program and Michigan Pulp and Paper Environmental Council/ Michigan DEQ P5 program all serve as examples of voluntary programs which include elements that call for and result in the reduction of releases of GLBTS Level I and Level II substances. '
- Eastman Kodak's commitment to virtually eliminate heavy metals, cadmium, mercury, lead and chromium (VI) from their products.
- Dow's commitment to reduce HBC and mercury compounds release by 75% by 2005.
- Goodyear Tire and Rubber's efforts, which have made 15 plants in the U.S. and two in Canada PCB free.

Project Partners:

Wisconsin Department of Natural Resources
Michigan Department of Environmental Quality
Michigan Pulp and Paper Environmental Council

Title: REGIONAL LAWNMOWER BUY-BACK PROGRAM
(FY 00 - GL975352-01)

Organization: City of Chicago

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Project Statistics:

Award Amount:	$32,400
Dollars Leveraged	$32,298
Project Timetable:	09/15/00 - 06/14/02
Lake Basin(s):	Michigan
Project Type:	Substance Removal/Reduction

Summary:
The Chicago Department of Environment (CDOE) addressed lawn equipment as a major source of air pollution by encouraging residents of the Chicago region to trade in their gas-powered lawnmowers for new electric push mowers. CDOE coordinated eight lawnmower equipment buyback programs where citizens received a rebate of $60 towards the purchase of a non-motorized mower regardless of the brand or place of purchase.

Environmental Results/Products:
CDOE has successfully retired more than 800 mowers during its events, sparing the region over 7 tons per year of ozone-causing pollution. During the summer of 2000, six buy back events were held in suburban locations and two were held in the City of Chicago. A total of 556 mowers were collected during these events, resulting in approximately 3.3 tons of VOC reductions for the mowing season.

The seasonal emission estimates assume a 20-week mowing season beginning May 15th and ending October 15th. Emission reduction estimates assume that an average lawn mower emits approximate 12 pounds of emissions during the mowing season.

In 2001, one event was held in the City of Chicago in conjunction with the CDOE's household hazardous waste collection event. A total of 242 mowers were collected which resulted in 2.55 tons of VOC's reduced per season. On June 8, 2002, CDOE collected 193 mowers, resulting in 1.20 tons of VOC reduced per season. Six lawnmower buy back events were held in various suburbs surrounding the City of Chicago.

Title: CATCH THE FEVER - MICHIGAN MERCURY THERMOMETER EXCHANGE PROGRAM (MMTE) (FY 00 - GL975372-01)

Organization: Michigan Department of Environmental Quality

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Project Statistics:

Award Amount:	$68,159
Dollars Leveraged	$3,408
Project Timetable:	01/24/00 - 09/30/04
Lake Basin(s):	Michigan, Huron, Superior, Erie
Toxics Reduced:	1061.20 lbs. mercury
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary:
The Michigan Department of Environmental Quality (MDEQ) offered digital thermometers as an incentive for the public to turn in their mercury fever thermometers. MDEQ provided educational materials describing the dangers of mercury when spilled in the household, and its subsequent adverse impacts on the environment.

This project also provided for the proper disposal of reclaimed mercury thermometers, liquid elemental mercury and a large list of other mercury-containing devices that were turned in during the thermometer exchange events.

Representatives from Michigan Health and Hospital Association (MHA)and Michigan Association for Local Public Health (MALPH) helped administer this program.

Environmental Results/Products:
Over 31,000 digital thermometers were purchased and distributed during this program. Sixty-six different groups and organizations hosted thermometer exchanges throughout the State of Michigan.

As a result of this program in Michigan a member of the Michigan Senate helped pass through a bill in Michigan's state legislature that would ban the sale of mercury thermometers in Michigan. The senator specifically mentioned the 'free' thermometer exchange opportunities for the public (throughout the state). The provisions of Public Act 578 of 2002 took effect on January 1, 2003, which prohibits the sale of mercury thermometers of any type in Michigan.

Project Partners:
Michigan Health and Hospital Association (MHA)
Michigan Association for Local Public Health (MALPH)
Michigan Ground Water Stewardship Clean Sweep Program

Title: DENTIST RECYCLING AND AWARENESS TRAINING MODULE
(FY 00 - GL975370-01)

Organization: The Board of Trustees of the University of Illinois

Contact:
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Project Statistics:

Award Amount:	$50,000
Dollars Leveraged	$40,600
Project Timetable:	10/1/00 - 11/30/02
Lake Basin(s):	All
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction

Summary: The University of Illinois School of Public Health conducted a study to quantify the total amount of amalgam used in dental offices in the state of Illinois and to estimate the fractions of amalgam waste material generated during dental filling procedures. A collection system of containers was placed in six dental offices and clinics to collect the material from the in-line trap, and the excess dental amalgam not placed into the oral cavity. The study also estimates the fractions of non-contact, contact, and tooth retained amalgam through an in vitro study.

The basic ingredients of dental amalgam, by weight, are silver (20 - 34%), tin (8 - 15%), copper (1-15%), other metals (0-5%), and mercury (42-52%). The disposal of dental wastewater streams into sewage system from dental offices and clinics are suspected to contribute from 10 to 40 percent of the mercury loading to wastewater facilities. Given stricter mercury discharge standards, the mercury loading from this and other small sources may influence the ability of treatment facilities to meet NPDES permit requirements. Stricter discharges standards reflect the recognition of the serious impacts of mercury discharges on the ecosystem.

Environmental Results/Products:
This study, along with previous research, resulted in an estimate of the amount of amalgam being used, and the solid waste amount, which can be discarded and eventually reach the environment.

Mercury data for this study was collected by installing amalgam separators at six dental offices within Illinois. The collection system consisted of three containers placed in the participating dental offices in order to collect:

- Material from the in-line trap, contact amalgam
- Excess dental amalgam that is not placed into the oral cavity, the non-contact amalgam
- Amalgam capsules

Dentists in Illinois (6,455) have the potential to generate 947 kg of non-contact mercury per year, which is recyclable; and 144 kg of contact mercury which has the potential to be discarded or discharged into the environment. Applied to dentists throughout the U.S. (123,641), then 18,159 kg of recyclable, non-contact mercury may be generated per year and 2,763 kg of mercury may enter the environment. These measurements are based on survey data from the ADA concerning the number of working days per year,

the number of practicing dentists, a 50%, by weight, mercury content in amalgam and the generation estimates from this project

A major finding of this project was the quantification of the amalgam generation rate for non-contact amalgam. The non-contact amalgam waste stream is easily recyclable. It contains a significant amount of uncontaminated amalgam, which has the potential to generate 211 mg of mercury/day/chair and 126 mg of silver /day/chair. These calculations are based a 50% mercury and 30% silver, by weight, amalgam composition.

The uncontaminated amalgam has the potential to generate 211 mg of mercury/day/chair, and 126 mg of silver/day/chair. These calculations are based a 50% mercury and 30% silver, by weight, amalgam composition.

The other fraction of the dental waste stream, contact amalgam, contains all the waste particles that are large than 700 micrometers. This waste stream generates 32mg of mercury/day/chair and 19 of silver/day/chair. A comparison can be made between this study and staff previous work, by accounting for the 7 to 1.5, difference in the median estimates of capsules used per day per chair.

Staff developed a continuing education module at the University of Illinois at Chicago School of Dentistry on best recycling practices and awareness of the effect of mercury on the environment.

Project Partners:
National Institute of Craniofacial Dental Research

Products:
Continuing education module on best recycling practices and awareness of the effect of mercury on the environment for dentists

J. Drummond. "Mercury generation potential from dental waste amalgam." *Journal of Dentistry*, 31, 7, Page 493, also:
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12927461&dopt=Abstract

Title: THE GREAT WOOD STOVE AND FIREPLACE CHANGE OUT
(FY 00 - GL975376-01)

Organization: Hearth Products Association

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Project Statistics:

Award Amount:	$60,000
Dollars Leveraged:	$71,000
Project Timetable:	10/01/00 - 09/30/01
Lake Basin(s):	All
Toxics Reduced:	particulate matter, dioxin
Project Type:	Substance Removal/Reduction Education/Outreach

Summary: The Hearth Products Association conducted a wood stove and fireplace change-out program in the Great Lakes and surrounding region, in February, March and April 2001. Participating retail stores offered consumers a discount on newer, clean, EPA-certified wood stoves and appliances when exchanging an old stove or appliance.

Consumers in certain counties in Wisconsin were also eligible for a rebate, provided they met certain criteria. This program was designed to address emissions of benzo(a)pyrene and other polyaromatic hydrocarbons in the Great Lakes region, from the operation of old, non-EPA-certified wood stoves and fireplace inserts. Each change out earned the consumer $200 credit toward the purchase of a new stove. The Hearth industry had over 10 years of experience conducting similar stove change out programs in parts of the western United States prior to this effort in the Great Lakes region.

Environmental Results/Products: The change-out program involved the exchanging of an old wood stove for a new, EPA-certified stove, or the converting of wood inserts in open hearths to cleaner inserts or gas logs. This incentive-based program was specifically designed to encourage consumers to trade in their old polluters for a discount on new EPA-certified appliances.

As of January 24, 2001, 33 manufacturers officially pledged participation in the change-out program. HPA solicited the participation of retail stores in the change-out program with targeted mailings, postcards and newsletters about the program and its benefits. More than 150 retail stores signed up to participate in the change-out program in 2001. Of these, 79 retailers were from Wisconsin, Minnesota and the Upper Peninsula of Michigan.

Each participating retailer received program materials such as Retailer Kits. Retailer Kits included advertising slicks, masters for handouts at home shows, hang tags, lists of participants, and banners. A website (www.woodstovechangeout.org) and a toll-free information telephone number was established for consumers to contact for more information.

The program began on February 1, 2001 in St. Paul Minnesota and ended April 30, 2001. A total of 1,221 change outs occurred. Overall 846 old wood stoves were exchanged. Of those 846, 646 (76%) changed to an EPA-certified wood stove, 164 changed to a gas appliance and 36 changed to a pellet stove.

- Wisconsin 611 change-outs
- Minnesota 384 change-outs

- Ohio 44 change-outs
- Illinois and Indiana together 28 change outs.

At the conclusion of the program the 1,200 conventional wood stoves exchanged for cleaner appliances, could realize a 95% emission reduction per unit and a fuel wage reduction of 48% in the Great Lakes Region.

Project Partners:
Michigan State University
Hearth Products Association (HPA)
North Central HPA
Middle States HPA
Midwest HPA
Northeast HPA
HPA Canada
Wisconsin Department of Natural Resources
Michigan Department of Environmental Quality
National Steel Recycling Council
Minnesota Department of Natural Resources
Minnesota Pollution Control Agency

Products:
Wood Stove Change Out Promotional Materials
http://woodstovechangeout.org/WhyChangeout.htm

Related Articles for Newsletters

Web Site
http://woodstovechangeout.org/

Title: MERCURY-FREE ZONE PROGRAM
(FY 00 - GL975377-01-1)

Organization: Minnesota Pollution Control Agency

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Project Statistics:

Award Amount:	$60,000
Dollars Leveraged	$3,158
Project Timetable:	10/01/00 - 9/30/03
Lake Basin(s):	Superior
Toxics Reduced:	650 lbs. mercury
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction Education/Outreach

Summary:
The Minnesota Pollution Control Agency (MPCA) launched the Mercury Free Zone program, a very comprehensive statewide mercury reduction initiative in 2001, building on the results of a successful pilot program conducted from November 2000 to February 2001.

The Mercury-Free Zone program promotes the removal of mercury from schools and other facilities in Minnesota, and a demonstration to school classes of how a dog, Clancy, can detect mercury vapor and how students can help solve the mercury pollution problem.

The comprehensive program requires participating schools to sign a mercury-free pledge, inventory their school for mercury, remove and replace "high" risk mercury items (e.g., thermometers, barometers, bulk mercury, blood pressure cuffs) educate their students and facility about the dangers of mercury, and as schedules permit, allow the assessment team (MPCA staff, Clancy the mercury detecting dog, and the Lumex unit) to come in and assess the school for mercury contamination. In addition to on-site assistance, the Mercury-Free Zone program provides each participating school with about $300 worth of replacement equipment and helps coordinate the disposal of mercury waste.

The objectives of this project were to:

- Permanently remove mercury from Minnesota schools;
- Assess Minnesota schools for mercury contamination and remediate; and
- Educate students, school staff and the general public about the mercury pollution problem and offer some solutions.

Environmental Results/Products:

- 650 pounds of mercury have been permanently removed from 250 participating Minnesota schools at a cost of $500 per pound.
- 104 schools were assessed for mercury contamination.
- Assessment team members located mercury spills in 35 schools
- Presentations about mercury were made to 10,000 Minnesota students and school staff.
- 9,418 students and others were educated about the hazards of mercury and the olfactory prowess of dogs to detect mercury.

- Information about the program and the dangers associated with mercury was distributed through media sources which reached approximately 60 million people.
  - 60 articles appeared in Minnesota newspapers.
  - 5 announcements on radio stations
  - National Geographic reported on the program twice.

Project Partners:

Institute for a Sustainable Future
Minnesota Pollution Control Agency
Minnesota Office of Environmental Assistance
Minnesota Science Teacher's Association
Minnesota County Governments
- Washington County, Minnesota
- Ramsey County, Minnesota
- Hennepin County, Minnesota
- McLeod County, Minnesota

City of St. Paul Police Department - Canine Unit
Western Lake Superior Sanitary District
Xcel Energy
250 Minnesota Schools

Title: LOCAL AND SECTOR BASED POLLUTION PREVENTION
(FY 00 - GL-97540101-0)

Organization: National Wildlife Federation

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Project Statistics:

Award Amount:	$80,000
Dollars Leveraged	$35,277
Project Timetable:	10/01/00-9/30/01
Lake Basin(s):	All
Project Type:	Substance Removal/Reduction Education/Outreach

Summary:
The National Wildlife Federation continued to implement local and industrial-based projects for reducing the priority pollutants targeted by the GLBTS, with a focus on:

- Expanding National Wildlife Federation's (NWF) successful mercury pollution prevention work in the healthcare industry within the Great Lakes basin;
- Integrating the Southeast Michigan mercury pollution prevention activities with the Detroit River Remedial Action Plan (RAP) Pollution Prevention Action Team's program;
- Initiating a multi-stakeholder mercury pollution prevention task force in Ohio; and
- Continuing a leadership role among environmental non-governmental organizations (ENGO's) in the GLBTS).

Environmental Results/Products:
Fifteen new hospitals in Region 5 have signed the *Mercury Free Medicine* pledge and will begin to convert to a mercury free facility. Eleven of the fifteen hospitals are located in Michigan. Nationally a total of over 650 hospitals and clinics have signed the *Mercury Free Medicine* pledge**.** Another 78 health care facilities in the Saginaw Bay watershed support mercury elimination at their facilities. This equates to as much as 2,656 pounds of mercury use being eliminated.

The Michigan Hospital Association (MHA) also launched a web site for member hospitals to make the *Mercury Free Medicine* pledge on-line. The project also distributed educational and technical materials to health care facilities in each of the 22 counties in the Saginaw Bay watershed.

NWF worked with the Great Lakes states and USEPA to develop the Total Maximum Daily Loads (a watershed cleanup plan**)** plan. The TMDL plan is intended to clean up waterways, including the Great Lakes, impaired by mercury and other pollutants. NWF has participated in the GLBTS meetings and has been an active participant in the workgroups.

Project Partners:
Michigan Hospital Association

Products:

Mercury Free Medicine Pledge
http://www.h2e-online.org/pubs/mercfree.pdf

Title: PBT-FREE PURCHASING IN THE GREAT LAKES STATES
(FY 00 - GL975432-01)

Organization: INFORM, Inc.

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Project Statistics:

Award Amount:	$33,541
Dollars Leveraged	$5,700
Project Timetable:	9/15/00 - 9/14/02
Lake Basin(s):	All
Toxics Reduced:	200 lbs mercury, 2000 lbs benzene compound,
Toxic Stressors:	Benzene compound, Mercury
Project Type:	Information/Outreach

Summary: The purpose of INFORM's project, PBT-free Purchasing in the Great Lakes States, was to help government agencies and public institutions in the Great Lakes region minimize the purchase of products that contain (or generate) mercury, lead, dioxin or other persistent, bioaccumulative and toxic (PBT) chemicals.

Research conducted by INFORM for its "Toxic Watch 1995" report demonstrated that in many cases, toxic chemicals contained in consumer products have played a much more significant role in environmental contamination and human health damage than those found in the waste streams of manufacturing facilities. Inform released a report on the industrial use of bioaccumulative toxins which documents that more than 90% of these chemicals are leaving factories in products, not in waste. PBTs, a more narrow group of bioaccumulative toxins, are found in a wide range of consumer and industrial products including paints (used on boats, bridges, roads and automobiles), pesticides, chlorinated solvents, inks, dyes, solder, etc. Toxic chemicals in consumer products can present risks both when products are used and after they are discarded into landfills and incinerators.

While many states, localities and federal agencies have altered their purchasing practices to favor products that are recycled or energy efficient, far fewer have looked extensively for ways to reduce the toxicity of the goods and services they procure. Government procurement has the potential to be a major catalyst for innovative technologies because the public sector has substantial purchasing power.

Environmental Results/Products:
One of the primary goals of INFORM's PBT-free Purchasing Project was to catalyze businesses to manufacture and distribute safer alternatives to PBT-containing products. Perhaps the greatest impact has been the stimulation of PBT-free product redesign in the auto industry. At INFORM's suggestion, Minnesota's 2002 vehicle bid put vendors on notice that vehicles purchased, used, and sold by the state will be completely mercury-free within three years. In response to this bid (and in concert with efforts by other environmentalists), General Motors (GM) announced that all mercury convenience lighting switches would be discontinued by January 15, 2002, nearly a year ahead of its previous schedule.

It has been estimated that this decision resulted in the elimination of mercury switches in 97,0001 vehicles, preventing the use of about 200 pounds of mercury. Moreover, Erie County, New York's elimination of para-dichlorobenzene urinal blocks prevented about 200 pounds of para-blocks from going into the sewer system.

As a result of this grant, more than a dozen state and local governments in the Great Lakes region are now evaluating a broad range of products for PBTs and specifying safer alternatives. With EP's support, it has been demonstrated that government purchasing can effectively spur pollution prevention and corporate innovation.

INFORM has produced numerous fact sheets that provide answers to frequently asked questions, lists of product vendors, price and performance comparisons, model specification language, and procurement success stories by other governments:

- Mercury-free vehicles (http://www.informinc.org/p3_09.php)
- Mercury-free medical equipment (http://www.informinc.org/p3_10.php)
- Safer alternatives to para-dichlorobenzene restroom deodorizers (www.informinc.org/fserie.pdf)
- Mercury-free products and alternatives (www.informinc.org/fsmercalts.pdf)
- Commonly (and some uncommonly) found PBT-containing products used by specific types of agencies and/or institutions.
- Environmentally preferable janitorial cleaning chemicals http://www.ecoiq.com/onlineresources/anthologies/prevention/index.html.

Project Partners:

Center for a New American Dream
Great Lakes Regional Pollution Prevention Roundtable (GLRPPR)
Great Lakes United (GLU)
Hospitals for a Healthy Environment (H2E) and Health Care Without Harm (HCWH)
International Alliance for Sustainability
The International Council for Local Environmental Initiatives (ICLEI)
National Association of Educational Buyers (NAEB)
National Wildlife Federation (NWF)
Erie County Environmental Management Council

Products:

- Mercury-free vehicles (http://www.informinc.org/p3_09.php)
- Mercury-free medical equipment (http://www.informinc.org/p3_10.php)
- Safer alternatives to para-dichlorobenzene restroom deodorizers (www.informinc.org/fserie.pdf)
- Mercury-free products and alternatives (www.informinc.org/fsmercalts.pdf)
- Commonly (and some uncommonly) found PBT-containing products used by specific types of agencies and/or institutions.
- Environmentally preferable janitorial cleaning chemicals http://www.ecoiq.com/onlineresources/anthologies/prevention/index.html.

Title: ERIE COUNTY PILOT COMPUTER RECYCLING PROJECT
(FY 01 - GL975389-01-2)

Organization: Erie County (NY) Department of Environment and Planning

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Project Statistics:

Award Amount:	$30,000
Dollars Leveraged:	$19,220
Project Timetable:	10/01/01- 12/31/03
Lake Basin(s):	Erie, Niagara River
Toxic Stressors:	Mercury, Lead, Phosphorus, Cadmium
Project Type:	Substance Removal/Reduction

Summary:
Erie County (NY) Department of Environment and Planning hosted two computer collection events in conjunction with several household hazardous waste collection events. Proper dismantling and recycling of the computers reduces environmental loadings of lead, which is categorized by U.S. EPA as a persistent bioaccumulative toxic pollutant (PBT). Other pollutants of concern related to the disposal of computers include mercury, cadmium and phosphorus.

Erie County Department of Environmental Planning (DEP) has historically provided outreach and education assistance to the New York State Department of Environmental Conservation (NYSDEC) Automotive Mercury Switch Project, and has established relationships with a number of the automotive salvage yards. Through this grant, Erie County continued to build on this partnership, coordinating with NYSDEC to collect and dispose of automotive mercury switches from vehicles prior to crushing and shredding operations within Erie County.

Environmental Results/Products:
Erie County DEP hosted eleven collection events. Erie county paid two electronic recycling companies to collect and recycle the materials collected at the eleven community collection events. Costs for recycling computer monitors ranged from $4.70 to $7.50 per monitor and $0.00 to $2.00 per central processing unit (CPU), printer and other small electronics.

A live television segment was broadcast from the first collection event held at the University of Buffalo. Many people who saw the television spot came to the event. Overall, advertising in the local Pennysavers and Buffalo News newspaper was the most effective method of promotion of the events, followed by television, then radio.

Electronics Collected:

Monitors:	5348
CPU's:	4310
Scanner:	47
Mice:	255
Printers:	7079
Keyboards:	488
Laptops:	13

Faxes: 5
Peripherals: 17357

Attendees: 4251

Each automotive mercury switch in a vehicle contains ~1 gram of mercury; each switch removed represents the equivalent of nearly 25 times the quantity of mercury contained in a 4-foot fluorescent light tube. The switches are easily removed, typically in about one minute per switch.

NYSDEC partnered with Valvoline Instant Oil Change Center, Monro Muffler, and Mr. Oil Change and Erie County DEC to support collection and recycling of the automotive mercury switches. The participating automotive service providers offered customers the option of replacing the automotive mercury switch in their trunk and/or hood lighting mechanism with a mercury-free ball bearing type switch. The automotive service centers supplied in-kind service to the public. The replacement option was voluntary by the customer at the point of delivery.

Erie County Mercury Program staff visited 58 automobile recycling facilities in Erie and Niagara Counties to collect 1891 mercury switches the recyclers had removed from vehicles. Each recycler received an educational package at the Spring 2001 site visit. The information included instructions for proper removal of the switches from vehicles. It also included details on how to replace the mercury switch with a mercury free switch should they wish to do so for resale purposes and an updated list of vehicles that contain mercury switch lighting mechanisms.

At the fall collections, each recycling facility received a labeled, DOT approved plastic container and shipping box for mercury switches. The container holds 450 switches, a quantity in compliance with conditionally exempt small quantity hazardous waste generator rules. The recyclers can ship the switches for recover via UPS for $4000. The Automobile Recyclers Association offset the recycling cost.

Project Partners:
New York State Department of Environmental Conservation
Valvoline Instant Oil Change
Monro Muffler
Mr. Oil Change

Products:
Promotional Flyers
Vehicle recycler educational package
Web Page - http://www.erie.gov/environment/compliance/computer_recyling.asp

Title: MERCURY REDUCTION THROUGH STEEL COMPANY SUPPLY CHAIN
(FY 01 - GL-975503-01-0)

Organization: Delta Institute

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Project Statistics:

Award Amount:	$40,000
Dollars Leveraged	$7,368
Project Timetable:	6/01/01-09/30/03
Lake Basin(s):	Michigan
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary: The Delta Institute worked with various companies in the Great Lakes region to identify pollution prevention opportunities to reduce GLBTS level 1 and 2 pollutants to the Great Lakes. These included Wisconsin Energy and 16th Street Community Health Center in Milwaukee, Wisconsin and NiSource, a large energy company, in Merrillville, Indiana.

Environmental Results/Products:

NiSource, Merrillville, Indiana
The Delta Institute in cooperation with NiSource, developed a list of chemicals associated with NiSource operations, that are of concern to the Great Lakes basin ecosystem, as well as and other regions where NiSource companies operate.

An inventory of chemical usage was conducted at three NiSource facilities. High VOC chemicals were selected as a priority for reduction and replacement. The volume of VOC reduced was measured through Equity, Ecology, and Economy Analysis (3E analysis).

The Delta Institute developed the concept of including pollution prevention and toxics reduction as criterion within sustainable indices and socially responsible investment reports, which was promoted to investment managers from Calvert, Sustainable Asset Management and the Dow Jones Sustainability World Index, Innovest Strategic Value Advisors.

Wisconsin Energy Corporation
The Delta Institute worked with Wisconsin Energy Corporation in 2001 to 2002 to integrate an evaluation of Great Lakes pollutants into their current environmental management system (EMS).

16th Street Community Health Center
The Delta Institute successfully worked with Wisconsin Energy Corporation, the Policy Academy on Environmental Management Tools and 16th Street Community Health Clinic to develop a community based Environmental Management System (EMS) in the Menomonee River/Milwaukee Estuary Area of Concern. This community based EMS program that targets Great Lakes toxics is also being piloted in:

- Mona Lake Watershed. Delta Institute worked with Webb Chemical on an ecosystem-based EMS in Mona Lake Watershed region in western Michigan;

- Macatawa Watershed. Delta is developing an ecosystem impact analysis of the Macatawa watershed in western Michigan for Herman Miller Corporation;

- Milwaukee River. Delta Institute is developing a profile and matrix of ecosystem impairment of the Milwaukee River for Cook Composites and Polymers associated with their plant in Saukville, Wisconsin

Project Partners:
NiSource
Wisconsin Energies (WE Energies)
Policy Academy on Environmental Management Tools
16th Street Community Health Center
Webb Chemical Corporation
Herman Miller Corporation
Cook Composites and Polymers Corporation

Products:
Menomonee Valley Ecosystem Impairment Matrix
Related presentation
http://www.tnrcc.state.tx.us/exec/sbea/ems/MSWG/1.9_B_Brown_Ecosystem.pdf

Title: MERCURY POLLUTION PREVENTION FOR MUNICIPALITIES AND SMALL BUSINESS (FY 01- GL 975560-01)

Organization: Western Lake Superior Sanitary District

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Project Statistics:

Award Amount:	$12,000
Dollars Leveraged	$45,000
Project Timetable:	10/01/01-09/30/03
Lake Basin(s):	Superior
Toxic Stressors:	Mercury
Project Type:	Substance Removal/Reduction

Summary:
The objective of this project was to evaluate the effectiveness of existing programs within the St. Louis River watershed to reduce mercury, identify program and resource gaps and make recommendations, with an emphasis to expedite implementation.. Many waters within the Lake Superior watershed including the St. Louis River are listed with fish consumption advisories due to mercury. A number of projects to reduce mercury use and release in the St. Louis River (Douglas County) and Lake Superior Basins have been implemented or are currently underway. Although many of these have been highly effective at reducing mercury releases, additional efforts are needed to get the mercury reduction message to more residents and industries in these areas.

The Western Lake Superior Sanitary District (WLSSD) serves as the main coordinator for the St. Louis River Total Maximum Daily Loads (TMDL) Partnership. The Partnership is a diverse set of stakeholders representing environmental organizations, industries, academia, the public, and municipalities within the Lake Superior Basin.

Environmental Results/Products:

A comprehensive survey to identify existing mercury reduction efforts was conducted and a gap analysis was performed.

The existing program evaluation was completed in three steps. First, a list of known mercury reduction programs in the project area was created. The list includes local, state, regional and national efforts that are currently in use or well along in planning the stage. The list identifies 25 programs.

-Inventory, assessment, classification

Some of those programs offered throughout Douglas County:
> Fluorescent light recycling
> HHW and Clean Sweep collections
> Auto switch the switch program
> Mercury free school programs, which covers 10 counties in northern Wisconsin
> Camp thermometer Replacement Program, also called “On the Trail for Mercury”- a program aimed at youth camps in the 10 counties that comprise the Lake Superior watershed.
> Thermometer exchanges
> Thermostat Recycling Program

> Dental amalgam BMP project
-Scientific study

Twelve of the existing mercury reduction programs were selected for in-depth review. This effort included taking inventory of mercury sources that existing programs address and their geographic coverage, as well as collecting information regarding the effectiveness of each program and what could be done to improve that effectiveness.

PUBLIC STEWARDSHIP

-Outreach, information exchange
Staff conducted outreach activities for a diverse audience such as: dental, WWTP industries, households, and business, schools, construction and demolition contractors, dairy farms, and general public.

Project Partners:
Minnesota Pollution Control Agency
Minnesota Office of Environmental Assistance
Minnesota Technical Assistance Program
Douglas County Minnesota
Carlton County Minnesota

Products:
Survey of Existing Mercury Reduction Programs & Gap Analysis, September 12, 2002
http://www.ci.superior.wi.us/publicwks/wastewater/Survey%20of%20Hg%20Reduction%20programs.pdf

Title: PBT REDUCTION THROUGH ENVIRONMENTALLY PREFFRABLE PURCHASING (FY 01 - GL-975687-01-0)

Organization: Erie County (NY) Department of Environment and Planning

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Project Statistics:

Award Amount:	$45,000
Dollars Leveraged:	$14,913
Project Timetable:	10/01/01- 09/30/03
Lake Basin(s):	Erie
Toxics Stressors:	Napthalene Mothballs & Flakes

Summary: Erie County, New York established an Environmentally Preferable Purchasing (EPP) Program, to reduce the use and release of persistent bioaccumulative, toxic (PBT) chemicals. The project was based on the U. S. EPA's EPP program. Local government agencies, like Erie County, often unknowingly purchase products that contain PBT chemicals.

Environmental Results/Products:
Erie County staff identified and resolved a number of barriers to environmentally preferable purchasing and created a database of PBT-free environmentally preferable products, now available on the County intranet site for all county employees to utilize. A position for an environmental purchasing expert was created in Erie County's Bureau of Purchase to evaluate procurement opportunities, revise procedures in cooperation with the County Bureau of Purchase, and create a database of PBT-free replacement products.

The language within bid specifications for products and services was changed to insure that products are sustainable. Erie County employees received training regarding the revised product purchasing specifications and resources for selecting alternative products.

Local governments in the areas (44 cities, towns and villages within Erie County) expressed an interested in utilizing/duplicated the database of environmentally preferable products posted on the Erie County intranet site. An effort to share this information is underway.

Some Specific Outcomes of the EPP Policy include:

- Erie Community College City Campus - Arts Department replaced the use of naphthalene moth balls and flakes with cedar boards on the shelves that house yarn. This replacement will reduce inhalation risk for students and faculty that enter the unventilated room for project preparation.

- Biobased lubricants - Erie County Department of Parks and Recreation - Biobased lubricants were pilot tested on their mowers. A fact sheet was developed to outline the benefits of using bio-based lubricants.

- A table top display highlighting the County's EPP efforts has been developed and displayed at the Fleet Waterfest, Erie County Fair, and at the Erie County Department of Environment & Planning Pollution Prevention Week Open House.

Project Partners:
INFORM, Inc.

Products:
Bio-Based Lubricants fact sheet

Title: PROMOTING POLLUTION PREVENTION WITH KEY CONSTITUENCIES
(FY 01 - GL-975700-01-0)

Organization: National Wildlife Federation

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Project Statistics:

Award Amount:	$60,000
Dollars Leveraged	$40,576
Project Timetable:	10/01/01-09/30/02
Lake Basin(s):	All
Toxic Stressors:	Mercury
Project Type:	Program Development

Summary:
The National Wildlife Federation (NWF) continued to work to eliminate the introduction of mercury into the environment from the Region 5 states. NWF assisted state-level pollution prevention programs by promoting new incentives for industries to adopt P2 measures, and by working with selected source sectors on ambitious pollution prevention projects.

NWFs focused on channeling state mercury reduction and pollution prevention activities by defining statewide targets and mercury reduction plans, working closely with state agency personnel and other stakeholders, and putting particular emphasis on sectors where there is strong pollution prevention potential. This ongoing project aims to link strong state level programs with larger regional initiatives such as the Great Lakes Binational Toxics Strategy (GLBTS), to achieve the broad mercury reductions necessary to decisively reduce mercury and other toxic pollutants in the Great Lakes basin.

Environmental Results/Products:

Enhance state-level pollution prevention (P2) work by providing new incentives for industries to adopt P2 measures.

The NWF - Great Lakes Natural Resource Center (NWF) developed the mercury phase out proposal and briefed states on a mercury reduction initiative that would lead to virtual elimination of mercury pollution in the Great Lakes region. The mercury phase out proposal is designed to reward states for undertaking aggressive and effective mercury pollution prevention measures.

The proposal provides states with the option of meeting their extensive mercury-related watershed cleanup obligations under the Clean Water Act by entering into a memorandum of agreement with the U.S. Environmental Protection Agency (USEPA), to phase out mercury over a discrete period of time. USEPA and NWF's collaborative work on a regional phase out plan provided an effective context for NWF to approach agencies at the state level that work on mercury reduction.

NWF worked intensively with the Michigan Department of Environmental Quality (MDEQ) and state leaders to conceptualize, develop and cost out the mercury phase out plan that would virtually eliminate mercury releases in Michigan by 2020 and cut them by 90% by 2010.

NWF and MDEQ drafted mercury reduction plans to set forth a prospective timeline of how and when Michigan could achieve specific mercury reduction targets. A report was drafted to explore the feasibility of various reduction strategies in mercury emitting sectors in Michigan, and the comparative cost advantages associated with those strategies. The report reviews mercury reduction options for all know industries and sectors in Michigan which generate any substantial mercury emissions, including:

- coal-fired power generation, as well as commercial, industrial and domestic boilers
- hospital waste, municipal waste and sewage sludge incineration
- foundries and cement manufacturing
- automotive switches, dental amalgam, and fluorescent lamp manufacturing and use.

This study revealed that mercury emissions from medical waste incinerators, which were thought to have declined from 3400 pounds to 10 pounds or less, actually may still amount to up to 1,000 pounds. This finding reinforces that product substitution and pollution prevention should remain a high priority in the medical sector.

Work intensively in a single source sector to increase P2 for mercury and other PBTs

NWF partnered with the Detroit Water and Sewerage Department (DWSD), a publicly owned treatment works (POTW) in Detroit Michigan. Together they designed and implemented a pollution prevention strategy that focused on reducing PBT discharges from significant industrial users (SIUs) of water. A survey on mercury related concerns was distributed to approximately 400 SIUs in the DWSD system. Findings of the survey will be forthcoming.

Project Partners:

Delta Institute
Michigan DEQ
Michigan United Conservation Clubs
Izaak Walton League
Great Lakes United
League of Ohio Sportsmen
Minnesota Conservation Federation
Hoosier Environmental Council
Michigan Environmental Council
Lake Michigan Federation
Indiana Wildlife Federation
Wisconsin Wildlife Federation
Citizens for a Better Environment
Save Lake Superior Association
Wisconsin Environmental Decade
Mississippi River Revival
Environmental Law & Policy Center
Ohio Environmental Council

Products:

Significant Industrial User Survey
Sources of Mercury fact sheet
Mercury in Products Guide
http://www.nwf.org/nwfWebAdmin/binaryVault/mercuryproducts.pdf

Title: EVEN LESS MERCURY IN SCHOOLS
(FY 01 - GL-975704-01-0)

Organization: University of Wisconsin Extension - Solid & Hazardous Waste Education Center

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Project Statistics:

Award Amount:	$ 96,000
Dollars Leveraged:	$5,053
Project Timetable:	10/01/01-12/30/03
Toxic Stressors:	mercury
Project Type:	Outreach/Education

Summary: The University of Wisconsin Extension - Solid & Hazardous Waste Education Center (SHWEC) developed a national EPA mercury in schools outreach program, based on Wisconsin and Region 5 models. Website and workshop materials were updated to include the latest information on mercury sources, spills, health advisories and reduction programs; educator workshop was held in each EPA Region, and an online teacher training course was developed.

Environmental Results/Products:
SHWEC Staff organized and presented a total of fourteen workshops (a minimum of one in each of the 10 EPA regions). New features and information were added to the Mercury in Schools web site http://www.mercuryinschools.uwex.edu/, and curriculum materials, originally developed for the State of Wisconsin, were revised and expanded to provide a national focus to the background materials and teaching activities. Two online courses, *Mercury in Schools, Your Community and the Environment* and *Mercury Reduction for Educators: Taking Action in Your Community*, were developed to educate teachers on how to address the mercury issue. The courses are available through the University of Wisconsin - Stevens Point and offer college credit for completion. Information sharing on this topic was facilitated by the project partners listserv. The web site and listserv have been promoted in newsletters, and on other listservs.

A videoconference of the *Enhancing Pollution Prevention in School and Laboratory Facilities: Lessons Learned from Mercury Reduction Programs* was broadcast nationally on November 17, 2003.

Based on workshop experiences, the Mercury in Schools project staff recommended the following preferred workshop approach.

- Target a specific school district, rather than a region or state,
- Involve the science or curriculum coordinator in early planning efforts,
- Arrange for some kind of release or payment for teachers and/or other staff to attend the workshop,.
- Enlist one or more partners at the local, regional or state level that have the contacts, contracts and/or funding to handle replacement and proper disposal of mercury and mercury containing equipment,
- Help the school district create a mercury action plan,
- Follow-up with participants to make sure that mercury reduction efforts stay on track,
- Work with school janitorial/maintenance/engineering/purchasing staff,
- Develop a CD or video to support local mercury training efforts,

- Train the trainers on integrating mercury reduction into state specific curriculum or general lesson planning,
- Work with state education departments on waste minimization and toxics reduction,
- Develop a national mercury free pledge program and present awards to participating schools,
- Produce a how-to manual on conducting a mercury collection in the school,and,
- Partner with community service programs such as 4-H to develop a community based mercury reduction service.

Project Partners:
EPA Regional Office (Regions 1 - 10)
Children's Hospital in Detroit
North Dakota Science Teachers association
Kansas Environmental Educators Association
Missouri Department of Conservation

Products:
Mercury in Your School and the Community: A National Issue
http://www.mercuryinschools.uwex.edu/curriculum/national-curriculum.htm

Mercury in Schools, Your Community and the Environment

Mercury Reduction for Educators: Taking Action in Your Community
http://www.mercuryinschools.uwex.edu/project/onlinecourse.htm

Summary of the teachers issues and concerns
Summary of the teachers obstacles

Title: END-OF-LIFE VEHICLE PROGRAM
(FY 01 - GL975743-01-0)

Organization: Great Lakes United

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Project Statistics:

Award Amount:	$44,200
Dollars Leveraged	$2,326
Project Timetable:	10/01/2001 - 9/30/2003
Lake Basin(s):	All
Toxic Stressors:	Mercury
Project Type:	Education/Outreach

Summary:
Great Lakes United developed and presented a web conference called Getting the Mercury Out. The conference was a five-part series which laid out the background to the mercury in vehicles issue, overviewed mercury legislation and existing switch capture programs, and discussed the Michigan mercury switch study that was previously conducted.

Environmental Results/Products:
Get the Mercury Out web conference
The web conference brought together leading mercury experts to discuss the current status of automotive mercury switches in North America and help develop the next steps to reducing this source of mercury pollution. Conference presenters included individuals from the Partnership for Mercury Free Vehicles, US and Canadian governments, local switch removal programs, and the Auto Manufacturers Alliance. Over forty (40) participants took part in the five part series.

Next Steps**:**
The overwhelming feedback from the web conference was that the current level of information on the use of automotive mercury switches and methods for removal and disposal is sufficient to the development of widespread automotive switch collection programs. Participants suggested more time and resources should be put towards setting up and running these programs, with more limited resources placed in research areas.

Addition Research Recommendations:
- Developm a performance standard, which would set out a numerical target for switch collection from capture programs. The Northeast Recycling Council is doing work in this area. This was highlighted as the number one need at this time by many of the web conference participants,
- Gather further information on the use of mercury in anti-lock brakes, headlamps, and after market applications and the process for removal in these applications, and
- Develop retirement options for recovered mercury.

Additionally**,** The Michigan Department of Environmental Quality is studying the value of switch replacement in "live" vehicles. This information may be useful for other agencies planning similar programs.

Project Partners:

Partnership for Mercury Free Vehicles
U.S. EPA
Environment Canada
Alliance of Automobile Manufacturers
Michigan Department of Environmental Quality
Environmental Defense
Ecology Center
New York State Attorney General's Office
Institute of Scrap Recycling Industries
Maine Department of Environmental Protection
Clean Air Foundation
Minnesota Office of Environmental Assistance
New York Department of Environmental Conservation
Northeast Waste Managers Officials Association
Sustainable Research Group

Products:
MDEQ Study of Mercury Switch Replacement in "Live" Vehicles
http://www.deq.state.mi.us/documents/deq-ess-p2-mercury-michiganswitchstudy.pdf

Get . . . the Mercury Out: A Web Conference on Mercury in Automobiles
Contact Bailey Mylleville at 716-886-0142 or bailey@glu.org

Title: SOURCES OF PCB'S TO THE ATMOSPHERE IN CHICAGO
(FY 01 - GL975717-01-0)

Organization: Clarkson University

Contact:
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Project Statistics:

Award Amount:	$91,180
Dollars Leveraged	$19,320
Project Timetable:	10/01/2001 - 9/30/2004
Lake Basin(s):	Michigan
Toxic Stressors:	PCB's
Project Type:	Research

Summary:
The objective of this study was to determine if municipal sludge drying operations are releasing PCB's into the air near the Lake Calumet municipal sludge drying facility, operated by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), and assess their importance to the Chicago air shed. Sludge is generated at the municipal waste water treatment plants during the process of treating the combined storm water, sanitary, and industrial waste waters.

This study found that sludge drying beds lose a good fraction of PCBs to volatilization; however, the PCB emissions from the sludge drying beds are not very significant when compared to the total PCBs inputs needed in the Chicago area to sustain ambient concentrations. The PCB emission rates from the sludge drying beds accounted for between < 1 percent - 10 percent of total Chicago inputs on any given day.

Environmental Results/Products:
Upwind and downwind air samples, sludge samples and flux chamber samples from the Lake Calumet municipal sludge drying facility were obtained in order to measure PCB emissions from this facility. Six upwind and downwind samples were collected from the Calumet East sludge drying facility between April and October 2002 to measure their contribution to PCBs to the atmosphere in the Chicago air shed. These analytical results suggest that sludge drying at this location is a source of PCB's to the atmosphere, accounting for < 1 to 10 percent of total Chicago inputs to the atmosphere, on any given day.

Analysis of sludge samples confirmed these conclusions. Wet and dry sludge samples were analyzed for PCB concentrations. It was found that there is a significant loss of PCB's during the drying process, possibly due to volatilization. Wet concentrations of PCBs in sludge samples averaged 1.99 mg/kg versus dry concentrations of PCBs in sludge samples averaged 0.6 - 1.0 mg/kg.

In order to reduce these PCB emissions sources of the toxic chemicals to the MWRDGC wastewater sludge need to be identified. Other toxic pollutants (e.g. mercury, PAHs and other pesticides) may also be volatilized into the air through the process of drying waste water sludge. It is recommended that additional studies be conducted on these toxic pollutants in order to develop a reduction plan.

Project Partners:
Metropolitan Water Reclamation District of Greater Chicago (MWRDGC)

Products:

PCB Concentration in Lake Calumet Waste Water Treatment Sludge Analysis Reports
PCB Concentration from Lake Calumet Waste Water Treatment Downwind and Upwind Air Sampling Reports

Title: PHASE-OUT OF DISTRIBUTION TRANSFORMERS SUSPECTED TO CONTAIN PCB'S AT THREE UTILITIES IN THE MINNESOTA PORTION OF THE LAKE SUPERIOR BASIN
(FY 01 - GL975647-01)

Organization: Minnesota Pollution Control Agency

Contact:
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Project Statistics:

Award Amount:	$50,000
Dollars Leveraged	$140,000
Project Timetable:	10/01/2001 - 9/30/2004
Lake Basin(s):	Superior
Toxic Stressors:	PCB's
Toxics Reduced:	451 Power Transformers Containing PCB's
Project Type:	Research

Summary:
The Minnesota Pollution Control Agency (MPCA) assisted four small utility companies located within the Lake Superior watershed remove and properly dispose of power distribution transformers contaminated with Polychlorinated biphenyls (PCB's). This project was funded through a combination of sources, including the Great Lakes National Program Office (GLNPO), the Legislative Commission on Minnesota Resources (LCMR) and the Minnesota Pollution Control Agency (MPCA). MPCA focused their outreach efforts on smaller utilities in Lake Superior basin since Minnesota Power, the largest utility in the region, has a PCB phase-out plan.

Lake Country Power volunteered to remove all of their 292 suspect transformers (2.8% of their transformers in service) even though the program funds could not cover the entire cost. Cooperative Light and Power replaced 145 transformers that were suspected to contain PCBs. They selected the transformers to be removed based on their proximity to Lake Superior. The City of Grand Marais contracted to replace 14 suspect transformers and to test others.

Environmental Results/Products:

MPCA contacted transformer manufacturers in order to obtain a list of transformer serial numbers which contain PCB's or are likely to contain PCB's. A list of serial numbers was compiled and used to query the MPCA registered transformer database.

A survey of smaller utilities within the Lake Superior basin was conducted in 1997 to identify the number of "suspect" transformers in service. A suspect transformer is one that may contain PCB's based on its manufacturer, date and service history. MPCA contacted nine utility companies that were respondents to the 1997 survey, to invite them to work with MPCA to remove the transformers from service without being subject to Minnesota hazardous waste fees.

The nine utilities contacted reported that seventy-one percent (71%) of the transformers identified as "suspects" in 1997 project were either already replaced or in the process of being replaced. This high rate was only possible because of the proactive approach taken by the participating utilities.

Ultimately, MPCA partnered with four utility companies within the Lake Superior basin to identify and remove PCB containing transformers from service. Through database inquiries MPCA determined that between 3.6 to 9.2% of the transformers owned by the four utilities may contain PCB's. (overall 3.7 of the registered transformers in the Lake Superior Basin are considered "suspect" transformers.

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Project Partners:
Legislative Commission on Minnesota Resources (LCMR)
Lake Country Power
Cooperative Light and Power
City of Grand Morais
Arrowhead Electric Power
Elizabethton Electric Systems
City of Biwabik

Products:
Distribution Transformer Manufacturers and Available Polychlorinated Biphenyl (PCB) Information - Contact MPCA for list.

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Legislative Commission on Minnesota Resources (LCMR)
Lake Country Power
Cooperative Light and Power
City of Grand Morais
Arrowhead Electric Power
Elizabethton Electric Systems
City of Biwabik

Products:
Distribution Transformer Manufacturers and Available Polychlorinated Biphenyl (PCB) Information - Contact MPCA for list.

Title: WISCONSIN AUTOMOBILE/APPLIANCE MERCURY SWITCH COLLECTION AND MERCURY FLOW MODEL (MASS BALANCE) FOR DISTRIBUTION OF MERCURY
(FY 01 - GL97571001-4)

GL97571001

Organization: Wisconsin Department of Natural Resources

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Project Statistics:

Award Amount:	$100,000
Dollars Leveraged	$5,263
Project Timetable:	9/26/2001 - 6/30/2005
Lake Basin(s):	Michigan, Superior
Toxic Stressors:	Mercury
Toxics Reduced:	796 pounds of Mercury product collected from 54,000 automotive mercury switches and some bulk mercury turned in to collection stations
Project Type:	Research and Demonstration

Summary:
The Wisconsin Department of Natural Resources (WDNR) set up a program to collect automotive mercury and appliance switches from auto and scrap recyclers. The project was a result of a successful partnership between WDNR, the Concerned Auto Recyclers of Wisconsin, the Wisconsin Institute of Scrap Recycling Industries and members of the Wisconsin Storm Water Cooperative Compliance Programs. Over 50 counties were served by five main collection sites and 8 satellites sites that covered the immediate Great Lakes area. Each main site was provided the necessary collection equipment, record-keeping forms, and spill cleanup kits. Auto and scrap recyclers were informed of the program through the industry trade groups as well as other State of Wisconsin agency mailing lists (Department of Transportation and other WDNR Bureaus). Each auto and scrap recycler participating in the program was provided with collection containers and cleanup kits.

Auto and scrap recyclers were provided an annual mailing which included an update on the Project, annual pickup dates at collection sites, spill cleanup information, a list of autos with mercury switches available at that time, information on the requirements for storage, handling and proper labeling of storage containers, and information on obtaining free spill kits and storage containers. The focus of the program was on hood and trunk switches (available information indicated 90% of mercury was in hood and trunk switches). Participating auto recyclers provided in-kind service by removing mercury switches from the vehicles. Participants are being recognized with a framed certificate signed by either a WDNR official or the Governor, depending upon the number of switches turned in. In addition to the recognition they received, the program helped the participants comply with best management practices requirements of their stormwater permits.

The grant helped WDNR create a self-sustaining program for continued collection of automotive mercury switches.

Working under contract to WDNR, Barr Engineering Company created a set of flow diagrams for mercury for nine product lines for the state of Wisconsin. Such a model was developed and run previously for the Minnesota Pollution Control Agency. The model predicts the release of mercury to air, water, and waste streams from the most common mercury-containing products. The model results will be used to improve the management of mercury-containing wastes, inform decisions on mercury product legislation, and help focus efforts on effective mercury reduction efforts. These flow diagrams estimated the use and flow of mercury in the year 2000. Subsequently, Barr created flow diagrams to represent use of mercury in nine selected products or product groups on a national scale for the United States. Diagrams have been created for three years: 1990, 2000 and 2005 (a future year), allowing the user to predict changes over time.

Environmental Results/Products:

The Mercury Switch Collection Project:

- Established a collection program that is on-going,
- Furthered the development of positive relationships between the industry group and the WDNR,
- Resulted in keeping 796 pounds of mercury waste from entering the environment during the processing, smelting, shredding of scrap material,
- Collected over 50,000 mercury switches from scrapped automobiles,
- Was accomplished at minimal cost ($65,000 for the 4 years),
- Assisted the automotive recyclers in helping to meet their Best Management Practice required in their Storm Water Permit,
- Was able to provide recognition to those participants by the highest level of state government (Governor and Secretary of WDNR) and
- Provided a basis for further discussions/involvement with other responsible industry groups in future efforts.

The Mercury Flow Model provides an environmental management tool that can be used to improve the management of mercury-containing wastes, inform decisions on mercury product legislation, and help focus efforts on effective mercury reduction efforts.

Project Partners:

Concerned Auto Recyclers of Wisconsin
Wisconsin Institute of Scrap Recycling Industries
Auto and Scrap Recyclers of Wisconsin
Wisconsin Office of Occupation Safety and Health Administration
Onyx Corporation
Wisconsin Department of Transportation
Wisconsin Department of Motor Vehicles Section
Wisconsin Storm Water Cooperative Compliance Program
Dane County Recycling
Sacred Heart Hospital of Eau Claire, Wisconsin
Northwest Regional Planning Commission

Products:

Outreach products on recycling automotive mercury switches
(http://dnr.wi.gov/org/caer/cea/assistance/scrap/switches/index.htm)
Flow Model and Users Manual for Mercury in Wisconsin and Nationwide

Title: PCB & MERCURY MANAGEMENT IN THE MAUMEE RIVER AOC AND WESTERN LAKE ERIE BASIN
(FY 01 – GL9756701-2)

GL9756701.pdf

Organization: EISC, Inc.

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Project Statistics:

Award Amount:	$50,000
Dollars Leveraged	$2,631
Project Timetable:	10/01/2001 - 03/31/2005
Lake Basin(s):	Erie
Toxic Stressors:	Mercury, PCB
Toxics Reduced:	Not known
Project Type:	Education/Outreach

Summary:

EISC worked with small and medium-sized manufacturers to aid in the identification of potential sources of PCB release and mercury contamination, in addition to helping these companies develop environmental management programs that eliminates or reduces risk of release of PCBs. The project manager worked personally and directly with more than 35 different companies. And, although only an estimate, the project manager worked with more than 100 individuals and increased their knowledge about proper management of mercury (Hg) industrial wastes. The services EISC staff provided through this grant encouraged client companies and other companies in NW Ohio to reduce their PCB and mercury (Hg) industrial-related pollution. EISC accomplished this by incorporating PCB and Hg pollution prevention training in special workshops and routine meeting with client companies. EISC also assisted companies in performing PCB and Hg assessments at their facilities. Depending on the resulting of the assessment, EISC assisted manufacturing companies in establishing or updating management plans to prevent PCB and Hg pollution from occurring. EISC also participated in information sessions sponsored by the local chamber of commerce and presented materials on Hg and PCB to the participants.

The project team determined that it would be beneficial to solicit assistance from Chambers of Commerce, Economic Development Agencies, and the like, in northwest Ohio. A list of "network partners" was developed from the EISC Computer Information System database in conjunction with research from the internet. The list resulted in 72 Chambers of Commerce and 34 Economic Development Agencies. Introductory letters soliciting assistance were developed and mailed. EISC received letters/faxes from 2 economic development agencies along with mailing lists of companies in their areas. The mailing lists were for 19 companies from Van Wert County and 37 companies from Paulding County. These 56 companies were contacted via mail and follow-up phone calls to offer assistance. EISC also received phone contact from the Toledo Metropolitan Area Council of Government (TMACOG) offering suggestions for identifying industrial participants.

A new mailing list of 353 target companies was compiled from the Harris Directory, EISC/Lake Erie MEP Computer Information Systems, and other pertinent data sources. The size and age of these new target companies were the main criteria for selection. The criteria were companies established between 1880-1975 (thinking that they might still be located in older facilities) with 19-51 employees (smaller companies tend to have insufficient resources for updating electrical transformers and lighting equipment), and doing business within the Maumee River Valley area which drains to Lake Erie. A cover letter and information packet were mailed to this second target market.

Information Packets were made up and distributed to the Sales Team at EISC. Each member of the Sales Team was contacted to follow up on the information distributed. They were made aware of our project with the EPA and objectives for assisting companies with PCBs and Hg. Each member of the sales team was asked to help inform the manufacturing community about our project and solicit participation. The Sales Team recommended that we offer the PCB and Hg assessment to EISC member companies. 51 EISC members were subsequently contacted in July via telephone. From those members contacted, we received 4 requests for the on-site review and assessment. We also received a request from one company that was referred from the Paulding County Economic Development organization.

A letter was drafted to inform the new target companies about the existence and potential hazards of PCBs and Mercury (Hg) in the workplace. The letter included an offer by EISC to perform an on-site review of each company's status in relation to the subject materials. Sample information from EPA websites was downloaded and included with the mailing to the target companies (similar to enclosures with earlier letters to our first target group). The letters and literature were mailed on June 12, 2002. No unsolicited inquiry/response has been received as a result of the second targeted mailing.

In addition to the direct mailings and phone calls, the EISC project team developed an article for our quarterly newsletter, ***Synergy***. The article was published in our Spring 2002 edition. The ***Synergy*** is distributed to approximately 4,500 individuals representing more than 3,000 companies, economic development agencies, government offices, financial institutions and service providers in Ohio, primarily in the northwest quadrant.

To further communicate to manufacturers in northwest Ohio, our project team developed and coordinated a Mercury Reduction workshop for presentation in October. We recruited participation from Dave Heinlen, Safety and Health Coordinator for Bowling Green State University (BGSU), who oversees the Elemental Mercury Collection Program for northwest Ohio. Mr. Heinlen agreed to be a presenter at our workshop and include his video tape showing how easily elemental mercury vaporizes at room temperature. Announcements of the workshop were posted on the EISC website and were mailed to 470 companies in the region.

EISC conducted more Hg assessments and developed more Hg related management plans than PCB related work. Hg is generally more common in industry, especially in lighting equipment and control switches. We did not encounter much Hg in the form or thermostats, manometers,

leveling indicator tubes or laboratory equipment. PCB was also used in lighting equipment but is appears to us that lighting ballasts containing PCB are not widely in use any longer. Inspections indicated that the lighting ballasts in use today are typically PCB free. All of the replacement ballasts for lighting systems in stockrooms no longer contain PCBs and are labeled as free of PCB.

Environmental Results/Products:

The work EISC and their partners performed under this grant were successful in increasing the manufacturing community's awareness of the need to prevent PCB and Hg pollution. EISC was also successful in the development of the initiatives necessary to prevent pollution and implementation of effective management plans at manufacturing facilities. EISC also increased the awareness of the community at large to prevent PCB and Hg pollution through out workshops and communications with Chamber of Commerce and local community Manufacturing Industry and Commercial Associations in NW Ohio.

During the life of the grant, EISC performed an on-site review of PCB/Hg status for 5 companies in northwest Ohio, using their expertise and checklist tool. PCB / Hg awareness and management programs have also been incorporated into 7 on-going ISO 14001 implementation projects with clients. Other tools are available as part of EISC's Environmental Services, and are integrated into projects with individual companies where appropriate.

Low Hg fluorescent lighting tubes are widely available and widely used in the industry. Several manufacturing companies we worked with converted to low mercury fluorescent lighting as a result of our work with them.

As part of environmental energy efficiency work performed by EISC, several manufacturing companies converted portions of the lighting in their plants from high intensity discharge metal halide, HID, to fluorescent lighting. The fluorescent lighting selected is of the T12 or newer T5 design, both available with low mercury bulbs. Conversion from conventional HID lighting to low mercury fluorescent can significantly decrease the quantity of mercury at a manufacturing company and will likely result in decrease mercury pollution due to accidents, routine disposal, etc.

Project Partners:

Paulding County Economic Development Office
Lake Erie MEP Computer Information Systems
Chamber of Commerce (local)
Manufacturing Industry and Commercial Associations in NW Ohio
U.S. Department of Commerce NIST Manufacturing Extension Partnership

Products:

Outreach products for listing Hg & PCB as Environmental Aspect and Impact, including worksheets for assessing Mercury and PCBs.
An information packet with materials downloaded from USEPA's website for Mercury and PCBs.

Table 1: Summary of projects funded

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Non-Combustion Emissions of Mercury in the Great Lakes Air shed	Dept. of Energy Oak Ridge National Laboratory	ALL	$100,000.00	$7,271.00	ALL		Mercury	Emissions/Source Characterization
Mercury Emission Bank Pilot Project	The center for Clean Air Policy	ALL	$50,000.00	$110,000.00	Superior, Michigan		Mercury	Substance Removal/Reduction
Defusing the Chlor-Alkali mercury Time Bomb	Institute of European Environmental Policy	ALL	$45,000.00	$5,000.00	ALL		Mercury	Substance Removal/Reduction

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
The Great Wood Stove and Fireplace Change out	Hearth Products Association	ALL	$60,000.00	$71,000.00	ALL		Particulate Matter, Dioxin	Substance Removal/Reduction, Education/Outreach
TOTAL for all states			**$255,000.00**	**$193,271.00**				
Creative Solutions for Southeast Chicago	Chicago Legal Clinic	IL	$60,000.00	$5,571.00	Michigan			Education/Outreach
Great Printers Project	Council of Great Lakes Governors	IL	$61,205.00	$3,220.00	ALL		HW, Solvents	Education/Outreach
Campaign for a Sustainable Calumet Region	Center for Neighborhood Technology	IL	$89,045.00	$4,686.00	Michigan			Education/Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Great Lakes Alternative Cleaning Education Program	Center for Neighborhood Technology	IL	$76,407.00	$229,304.00	Michigan		Perchloroethylene	Innovative Technology
Reducing Mercury Releases Through P2 in Healthcare Facilities	Illinois EPA	IL	$137,750.00	$7,247.00	Michigan		Mercury	Education/Outreach
Health hazard of Ritual Use of Mercury	Illinois Dept. of Public Health	IL	$21,006.00	$12,126.00	Michigan		Mercury	Education/Outreach/Research
Mercury Removal From the Dental-Unit Wastewater System	Naval Institute for Dental and Biomedical Research	IL	$130,000.00		ALL		Mercury	Education and Outreach, Characterization & Evaluation

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Toxic Reductions through Energy Efficiency and Conservation Among Industrial Boilers	Delta Institute	IL	$75,000.00	$3,947.00	ALL		Mercury, Dioxins, Furans, Cadmium	Substance Removal/Reduction
Regional Lawnmower Buy-Back Program	City of Chicago	IL	$32,400.00	$32,298.00	Michigan			Substance Removal/Reduction
Dentist Recycling and Awareness Training Module	The Board of Trustees of the University of Illinois	IL	$50,000.00	$40,600.00	ALL		Mercury	Substance Removal/Reduction
Mercury Reduction Through Steel Company Supply Chain	Delta Institute	IL	$40,000.00	$7,368.00	Michigan		Mercury	Education/Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Indiana Lake Michigan Pesticide Clean Sweep	Purdue University	IN	$23,456.00	$1,579.00	Michigan	5,165 lbs pesticides	Pesticides, DDT, Cyano gas, Lead arsenate, chlordane	Pesticide Clean Sweep, Education/Outreach
Industrial Waste Water Operator Pollution Prevention Training	MDEQ	MI	$40,000.00	$2,105.00	Superior		Industrial/Municipal Discharge to POTWs	Education/outreach
Household Hazardous Waste Collection Program and Pollution Prevention Assessments	MDEQ	MI	$139,839.00	$8,660.00	Superior	455 Lbs. Mercury, 8,999 lbs. loose pack pesticide liquids, 1,1017 lbs. of florescent bulbs	HHW, pesticides, mercury	HHW collection Ag clean sweep
Auto Industry P2 Project Phase 2	MDEQ	MI	$76,680.00	$48,520.00	Michigan, Huron, Superior		Mercury	Education/Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Mercury Reduction and Pollution Prevention in Hospitals	National Wildlife Federation	MI	$41,350.00	$22,016.00	ALL		Mercury	Education/Outreach
Mobilizing/Coordinating Industry Support of the Virtual Elimination Strategy	Council of Great Lakes Industries	MI	$140,000.00	$12,200.00	All		Mercury, PCBs, HCB, OCS	Education/Outreach
NGO Involvement in Implementing Virtual Elimination	National Wildlife Federation	MI	$140,000.00	$26,237.00	ALL		Mercury, Dioxin	Education/Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Mercury Reduction Initiatives-Catch the Fever Exchange Program	MDEQ	MI	$108,100.00	$5,700.00	Michigan, Huron, Superior, Erie	80 Mercury Manometers, 640 elemental Mercury Thermometers, 7 lbs mercury, 14 mercury lab thermometers and 3 mercury thermostats	Mercury	Education/Outreach
Northern Lake Michigan and Lake Superior clean Sweep	MI Dept. of Agriculture	MI	$60,000.00	$3,158.00	Superior, Michigan, Huron	59,000 lobs. Pesticides	Pesticides	Program Development

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
A Community Basted Mercury Reduction on the Lake Superior Basin	Marquette County Mercury Reduction Committee	MI	$36,000.00	$10,800.00	Superior	700 Thermometers	Mercury	Education Outreach
1998 Clean Sweep	MI Dept. of Agriculture	MI	$40,000.00	$2,106.00	Michigan, Erie, Huron	59,000 lbs pesticides	pesticides	Clean Sweep
Emission of Mercury from Chlor-Alkali Plants	The University of Michigan	MI	$100,000.00	$7,271.00	Michigan		Mercury	Substance Removal/Reduction
Michigan Mercury Manometer Disposal	MI Dept. of Agriculture	MI	$40,000.00	$127,000.00	Michigan	86 lbs Mercury	Mercury	Manometer/gauges Clean Sweep
Michigan Clean Sweep	MI Dept. of Agriculture	MI	$40,000.00	$127,000.00	Michigan, Superior, Huron and Erie	96,000 lbs. Pesticides	Pesticides	Pesticide Clean Sweep

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Local and Sector-Based Pollution Prevention in the BTS	National Wildlife Federation	MI	$75,000.00	$3,023.00	Huron, Michigan	520 lbs mercury	Mercury	Education/outreach
Mobilizing/Coordinating Industry BNTS Participation	Council of Great Lakes Industries	MI	$105,000.00	$10,500.00	ALL			Education/Outreach
Catch the Fever-Michigan Mercury Thermometer Exchange Program	MDEQ	MI	$68,159.00	$3,408.00	Michigan, Huron, Superior, Erie	1061.20 lbs. Mercury	Mercury	Education/Outreach
Local and Sector Based Pollution Prevention	National Wildlife Federation	MI	$80,000.00	$35,277.00	ALL			Substance Removal/Reduction, Education/Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Promoting Pollution Prevention with Key Constituencies	National Wildlife Federation	MI	$60,000.00	$40,576.00	ALL		Mercury	Program Development
Pollution Prevention and Public Awareness Campaign for Lakes Superior and Michigan Basin	Minnesota Pollution Control Agency	MN	$160,000.00	$8,421.00	Superior		HHW	Education/outreach, HHW Collection
Toxics Pollution Prevention Mentoring	Western Lake Superior Sanitary district	MN	$95,000.00	$5,000.00	Superior			Education/outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Mercury/PCB outreach and Collection Program and Technical Assistance	Minnesota Pollution Control Agency	MN	$115,000.00	$5,750.00	Superior		mercury, PCBs	Education/outreach
Zero Discharge Pilot Project	Western Lake Superior Sanitary District	MN	$100,000.00	$519,000.00	Superior	17.26 Lbs. Amalgam Scrap, 33.47 lbs. Elemental Mercury	Mercury	Education/Outreach/Collection
Mercury Reduction Through Treatment Chemical selection	Minnesota Pollution Control Agency	MN	$35,000.00	$1,750.00	Superior		Caustic Soda, Mercury	Substance Removal/Reduction
Achieving Zero Discharge in Health Care	Western Lake Superior Sanitary district	MN	$60,000.00	$8,000.00	Superior		PBTs/Mercury/Dioxin	Education Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Regional Burn Barrel Campaign	Western Lake Superior Sanitary district	MN	$75,000.00	$28,000.00	Superior		Dioxin	Education/outreach, Substance Removal/Reduction
Mercury-Free Zone Program	Minnesota Pollution Control Agency	MN	$60,000.00	$3,158.00	Superior	650 lbs. Mercury	Mercury	Substance Removal/Reduction, Education/Outreach
Mercury Pollution Prevention For Municipalities and Small Business	Western Lake Superior Sanitary district	MN	$12,000.00	$45,000	Superior		Mercury	Substance Removal/Reduction

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Phase-Out of Distribution Transformers Suspected to Contain PCB's at Three Utilities in the Minnesota Portion of the Lake Superior Brain	Minnesota Pollution Control Agency	MN	$50,000.00	$140,000.00	Superior	451 Power Transformers Containing PCBs	PCBs	Research
Erie County Regional Municipal Pollution Prevention Program	Western NY Economic Development corporation/Erie county	NY	$50,000.00	$6,000.00	Erie			Municipal P2 Program Development, Training and Assessment

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Local Government Pollution Prevention Targeting Project	Erie County Department of Environment and planning	NY	$50,000.00	$6,000.00	Erie			Education/Outreach
Erie County Clean Sweeps II	Erie County Department of Environment and planning	NY	$75,000.00	$56,000.00	Erie	32,300 lbs. pesticides	Pesticides	Ag Clean sweeps
Rochester Embayment Watershed Mercury Pollution Prevention Program	Monroe County Dept. of Health	NY	$61,000.00	$34,100.00	Erie		Mercury	Program Development

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Virtual Elimination Strategy Implementation	Great Lakes United	NY	$160,000.00	$8,420.00	ALL		Dioxin, PCB, HCB and Mercury	Education/Outreach
Erie County/Tribe Environmental Partnership	County of Erie, Dept. of Environment and Planning	NY	$75,000.00	$25,000.00	Erie	270 Lbs pesticides 881 lbs HHW	Pesticides and HHW	Clean Sweep
Automotive Mercury Switch Collection Recycling Project	NY State Department of Environmental Conservation	NY	$55,000.00	$5,000.00	Erie	10.5 lbs Mercury	Mercury	Substance Removal/Reduction
Mercury Pollution Prevention in Health Care Initiative	County of Erie, Dept. of Environment and Planning	NY	$70,000.00	$25,200.00	Erie	369 Lbs mercury, 4436 mercury thermometers	Mercury	Substance Removal/Reduction, Education/Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Clean Production Projected for Basin Communities	Great Lakes United	NY	$125,000.00	$5,679.00	Erie	5000 mercury auto switches	Mercury, Dioxin	Education/Outreach
PBT-Free Purchasing in the Great Lakes State	INFORM, INC.	NY	$33,541.00	$5,700.00	ALL	200 lbs. mercury, 2000 lbs. benzene compound	Benzene compound, Mercury	Information Outreach
Erie County Pilot Computer Recycling Project	Erie County Department of Environment and planning	NY	$30,000.00	$19,220.00	Erie		Mercury, Lead, Phosphorus, Cadmium	Substance Removal/Reduction
PBT Reduction through Environmentally Preferable Purchasing	Erie County Department of Environment and planning	NY	$45,000.00	$14,913.00	Erie		Naphthalene Mothballs & Flakes & PBTs	

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
End-Of-Life Vehicle Program	Great Lakes United	NY	$44,200.00	$2,326.00	ALL		Mercury	Education/Outreach
Sources of PCB's to the Atmosphere in Chicago	Clarkson University	NY	$91,180.00	$19,320.00	Michigan		PCBs	Research
Ohio Great Lakes Basin Pretreatment Pollution Prevention	Ohio EPA	OH	$80,000.00	$4,210.00	Erie			Education/outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
A partnership for Prevention	PA Dept. of Env. Protection	PA	$75,000.00	$3,947.00	Erie	1,580 lbs. elemental mercury, 200 lbs mercury devices, 350 lbs DDT, 500 lbs toxaphene, 275 lbs. chlordane, 215 lbs aldrin/dieldrin	Mercury, DDDT, Aldrin/Dieldrin, Toxaphene	Education/Outreach
Pollution Prevention Assessments in Support of the Lake Superior Bi-national Program -Technical Assistance to Industries	Wisconsin department of natural resources	WI	$57,000.00	$3,000.00	Superior		mercury, PCBs	Education/outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Pollution Prevention Education and Technical Assistance for the Lake Michigan and Lake Superior Basins in Wisconsin	UW, Cooperative Extension, Solid and Hazardous Waste Education Center	WI	$140,028.00	$7,101.00	Michigan, Superior			Education/Outreach
Household Hazardous Waste Clean Sweep Collection Program	Menominee Indian tribe of WI	WI	$20,000.00	$2,579.00	Michigan		Mercury, Lead	Clean Sweep, Education/Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Bad River Clean Sweep	Bad River Band of Lake Superior Chippewa	WI	$22,257.00	$1,236.00	Superior	6,160 lbs Household Hazardous Waste	Corrosives, Ethylene Glycol, Solvents, Cleaners, Pesticides, Mercury, Gas/oil, Batteries, Aerosols, Contaminated Soil (special Waste)	Clean Sweep
Great Lakes Bi-national Toxics strategy support P2 Specialist	WDNR	WI	$18,400.00	$970.00	Michigan	3,579 lbs mercury, 5,539 pounds of mercury containing devices and 104,258 mercury containing lamps	Mercury	Education Outreach

Title	Organization	State	Award Amount	Dollars Leveraged	Lake Basin	Toxic Reduced	Toxic Stressor	Project Type
Mercury Manometer Replacement on Dairy Equipment	WI Dept. of Natural Resources	WI	$80,000.00	$4,210.00	Superior, Michigan	312 lbs. Mercury	Mercury	Substance Removal/Reduction
Mercury Education Program for Schools	Board of Reagents of the University of Wisconsin	WI	$40,000.00	$3,023.00	Michigan	520 lbs mercury	Mercury	Education/Outreach in Schools
PCBs and Electrical Contractors Workshop	City of Superior, Public Works Department	WI	$30,000.00	$10,000.00	Superior		PCBs, Mercury, Asbestos	Education/Outreach Workshop for Contractors
Even Less Mercury in Schools	UW extension - Solids & Hazardous Waste Education Center	WI	$96,000.00	$5,053.00	ALL		Mercury	Education/Outreach

Table 2: *Number of New Projects, Total Dollar Amounts and Dollars Leveraged for GLNPO Pollution Prevention and Toxics Reduction Grant Assistance, Fiscal Years 1992-2001*

Fiscal Year	Number of Grants	GLNPO Dollars	Dollars Leveraged
1992	2	$200,000	$10,526
1993	6	$536,839	$32,620
1994	8	$628,365	$360,042
1995	4	$237,350	$576,866
1997	9	$864,306	$71,067
1998	12	$657,663	$193,990
1999	9	$640,000	$323,925
2000	10	$594, 100	$215,888
2001	10	$518,380	$59,868

Table 3: *GLNPO Funded Pollution Prevention and Toxics Reduction Grant Dollars by Great Lakes Basin During Fiscal Years 1992-20012*

Basin	Number of Projects	GLNPO Dollars	Dollars Leveraged
Erie	29	$1,142,656	$299,866
Huron	24	$434,716	$113,333
Michigan	38	$1,359,375	$634,333
Ontario	18	$284,259	$59,869
Superior	43	$1,655,993	$1,202,217

2 Note that some projects funded during this period impacted more than one lake basin and are counted multiple times. These multiple basin projects are represented in the Dollar columns by the estimated proportion of funds spent in each basin.

Table 4: *GLNPO Funded Pollution Prevention and Toxics Reduction Grant Dollars by Great Lakes State During Fiscal Years 1992-2001*

State	Number of Projects	GLNPO Dollars	Dollars Leveraged
All	71	$4,855,459	$193,271
IL	11	$772,813	$346,367
IN	1	$23,456	$1,579
MI	19	$1,413,584	$497,136
MN	11	$762,000	$764,079
OH	1	$80,000	$4,210
NY	14	$964,921	$232,878
PA	1	$80,000	$80,000
WI	9	$503,685	$37,172

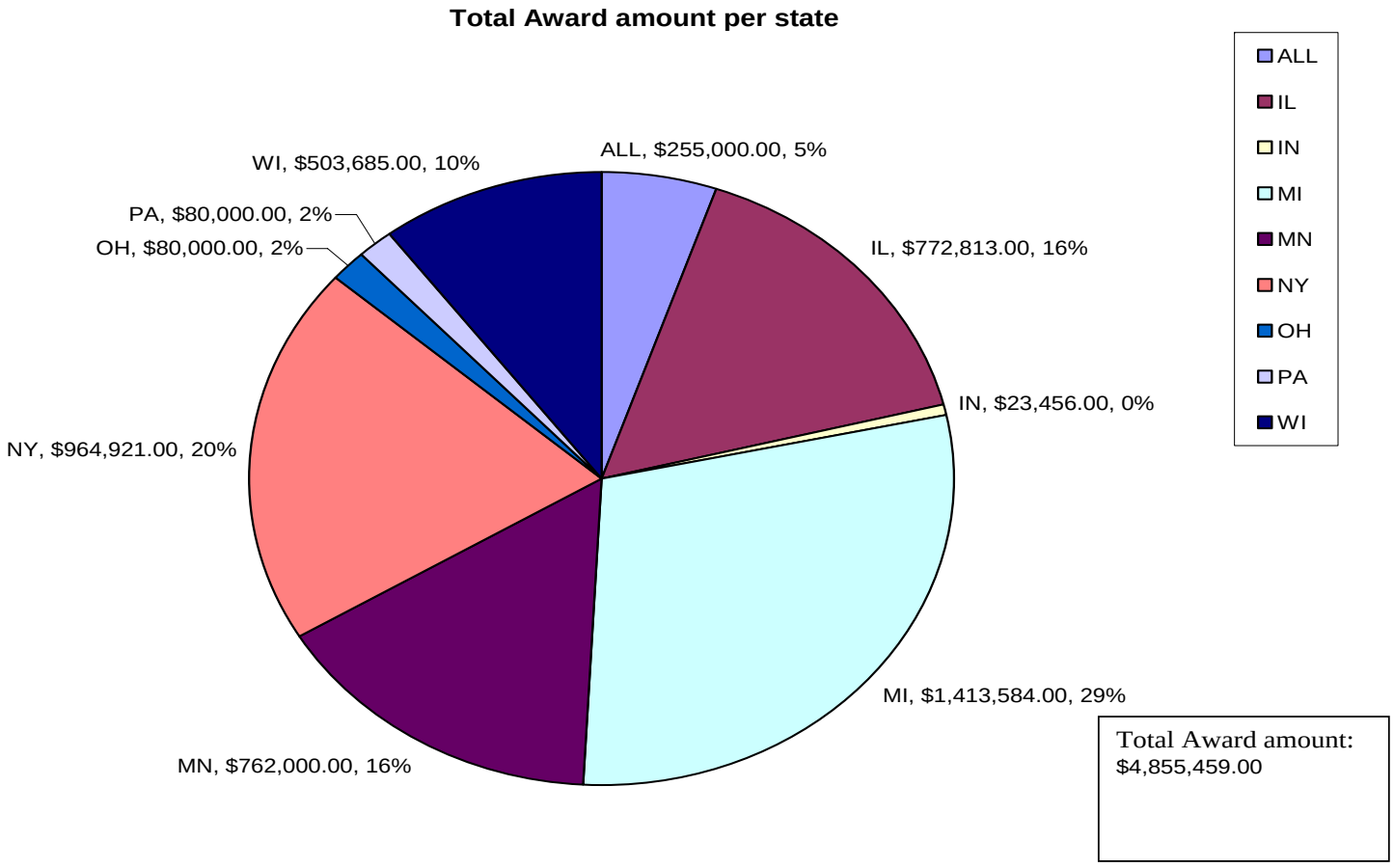

Figure 1: Total Award amount per State FY 1992-FY 2001

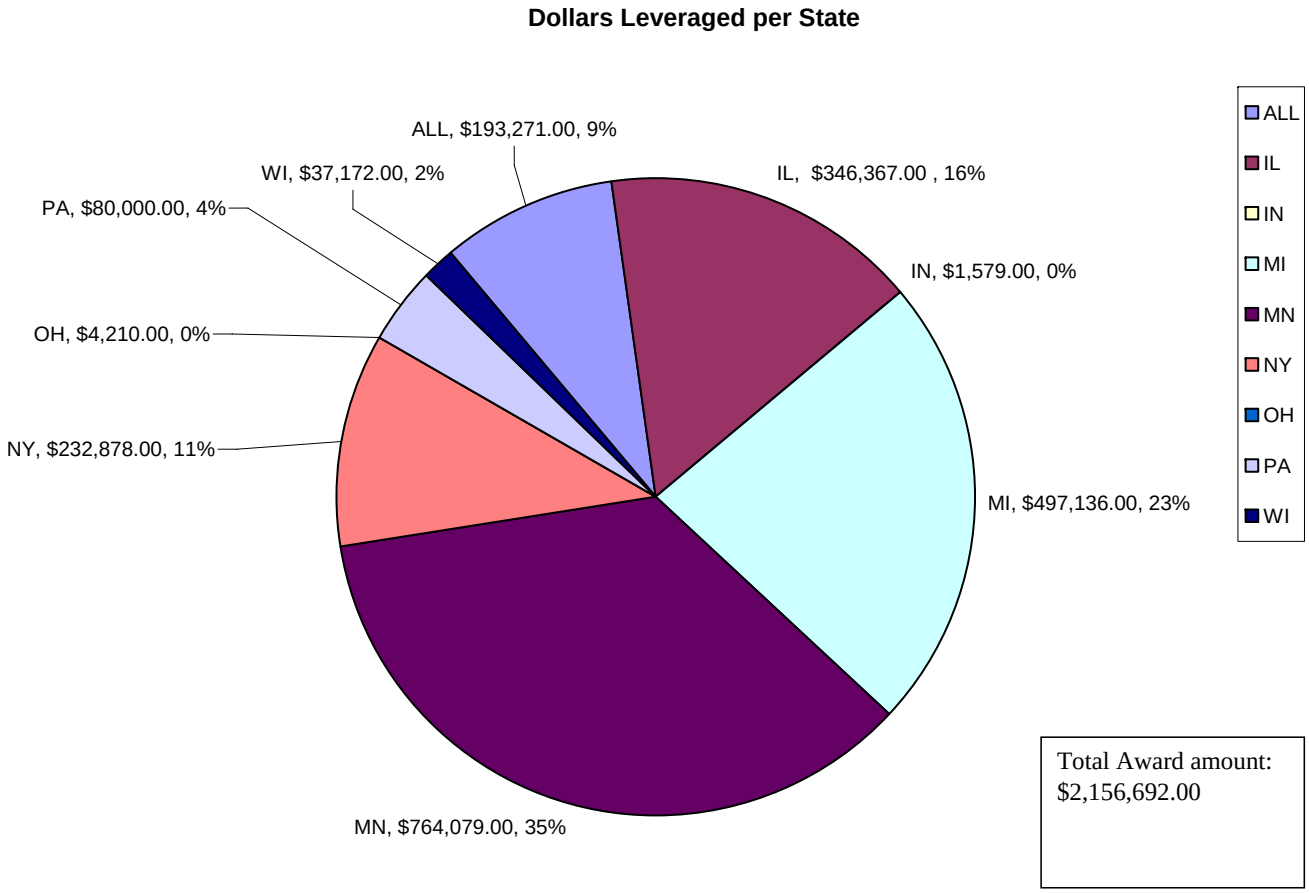

Figure 2: Dollars Leveraged per Stat FY 1992-2001

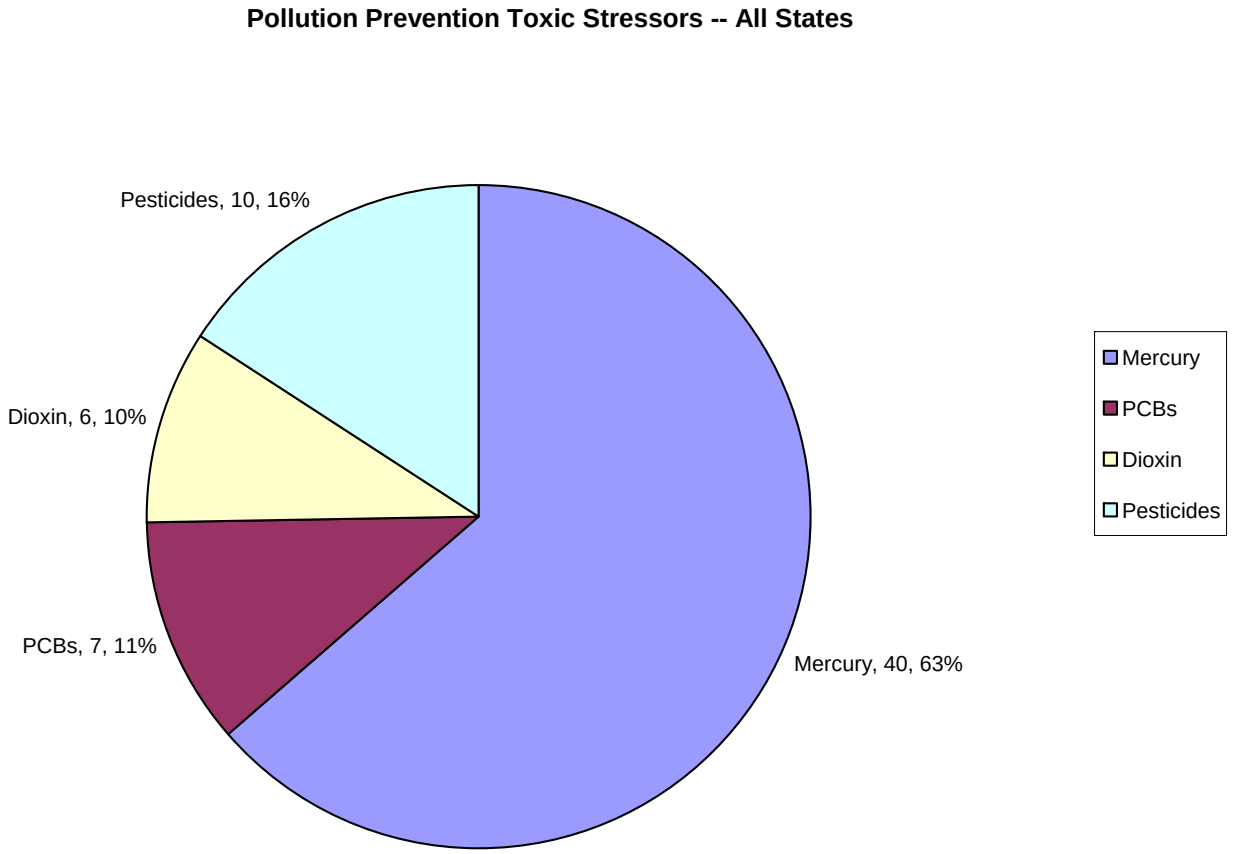

Figure 3: Pollution Prevention Toxic Stressors – all states FY 1992-FY 2001