

Chapter 6: Completed and Ongoing Water Quality Programs

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Introduction

Each Remedial Action Plan shall include:

“An evaluation of remedial measures in place...”

(Great Lakes Water Quality Agreement, as amended in 1987)

This Stage II chapter describes and briefly evaluates water quality programs that are ongoing in the Rochester Embayment Area of Concern. Many of the water quality programs directly impact more than one use impairment, and may indirectly impact others. In most cases, there is no single cause for a use impairment. Consequently, more than one program is required to address each use impairment. For this reason, an ad hoc Task Group of the Monroe County Water Quality Management Advisory Committee evaluated the relationships between water quality programs and use impairments and summarized the linkages in a table that is shown at the beginning of this chapter.

The description of each water quality program was written with the assistance of professional persons in the appropriate field. Each description received three levels of review by:

- Review team composed of persons knowledgeable in the appropriate field.
- Monroe County Water Quality Coordinating Committee.
- Monroe County Water Quality Management Advisory Committee.

Impairments Reference Table

Identification of Use Impairments Impacted by Chapter 6 Sections

Each section in Chapter 6 was written with one specific use impairment in mind. However, most of the sections are actually related to more than one use impairment. After the completion of Chapter 6, a three-person Task Group assisted with identifying all the use impairments associated with each section.

Identification of the use impairments is sometimes obvious, but more often it is subjective. Recognizing that the actions in some sections will have more impact on use impairments than others, the Task Group divided the impacts into two categories: major/direct and minor/indirect.

Major/direct (denoted on the use impairments table by a black square): The actions to address the use impairment are literally actions, rather than recommendations, promotions or educational programs. The impact on the use impairment is an improvement in an existing condition or the prevention of deterioration in an existing condition.

Minor/indirect (denoted on the use impairments table by a gray square): The actions to address the use impairment are:

- Dependent on the success of an educational program, a recommendation or a follow-up action; or
- Planned to address another use impairment, but has a secondary impact on the use impairment in question.

When the Task Group members identified the use impairments associated with each section, they recognized the impact of *preventing* impacts as well as *remediating* impacts.

**Table 6-1
Chapter 6: Summary of Completed and Ongoing Water Quality
Programs and the Use Impairments that They Address**

Water Quality Program	Use Impairments (see below)													
	1	3	5	6	7	8	9	10	11	12	13	14		
1-PCB ban and related activities														
2-Fish flesh monitoring and advisory														
3-Devel./distrib. of fish consumption adv.														
4-Great Lakes Water Quality Guidance														
5-Great Lakes Toxic Reduction Effort														
6-Lake Ontario Lakewide Mgmt. Plan														
7-Lake Ontario Toxics Management Plan														
8-Atmospheric deposition programs														
9-State Pollution Discharge Elim. System														
10-Environ. Benefit Permit Strategy														
11-Industrial pretreatment program														
12-Federal stormwater regulations														
13-EPA pollution prevention programs														
14-New York State pollution prevention														
15-Xerox Corp. Pollution prevention														
16-Pollution prevention at Kodak Park														
17-Mercury pollution prevention project														
18-Monroe Co. Waste Site Advis. Comm.														
19-Rapid response to spills														
20-Rapid response to spills on Lake Ont.														
21-Kodak wastewater treatment plant														
22-CSOAP construction, BMPs														
23-CSOAP modeling program														
24-GRIA Deicing Fluid Management														

Use Impairments Identified in the Rochester Embayment:

- | | |
|--|---|
| 1. Restrictions on fish and wildlife consumption | 9. Drinking water taste and odor problems |
| 3. Degradation of fish and wildlife populations | 10. Beach closings |
| 5. Bird or animal deformities or reproductive problems | 11. Degradation of aesthetics |
| 6. Degradation of benthos | 12. Added cost to agriculture or industry |
| 7. Restrictions on dredging activities | 13. Degradation of plankton populations |
| 8. Eutrophication or undesirable algae | 14. Loss of fish and wildlife habitat |

Water Quality Program	Use Impairments (see below)													
	1	3	5	6	7	8	9	10	11	12	13	14		
25-Inspection/monitoring of dredging														
26-Phosphate detergent ban														
27-Pure Waters programming														
28-Irondequoit basin stormwater program														
29-Irondequoit Bay alum treatment project														
30-Irondequoit Bay oxygen supplementation														
31-Irondequoit Bay Coordinating Comm.														
32-Stormwater Management Specialist														
33-Greece Ponds monitoring/study/plan.														
34-Dry basin conversions														
35-Streambank erosion control projects														
36-Erosion and sediment control														
37-Agricultural BMPs														
38-ID onsite sewage disposal syst. problems														
39-Ed. public on lawn care & pesticides														
40-NYS Coastal Nonpoint Pollution Contr.														
41-Efforts-drinking water taste/odor														
42-Beach monitoring/modeling program														
43-Aquatic harvester to remove algae														
44-Van Lare stormwater management														
45-Elimination of overflow dredging														
46-Fish cleaning stations														
47-Zebra mussel control systems														
48-Estab.-Braddock Fish & Wildlife Mgmt.														
49-NGO habitat protection & acquisition														
50-City of Rochester programming														

Use Impairments Identified in the Rochester Embayment:

- | | |
|--|---|
| 1. Restrictions on fish and wildlife consumption | 9. Drinking water taste and odor problems |
| 3. Degradation of fish and wildlife populations | 10. Beach closings |
| 5. Bird or animal deformities or reproductive problems | 11. Degradation of aesthetics |
| 6. Degradation of benthos | 12. Added cost to agriculture or industry |
| 7. Restrictions on dredging activities | 13. Degradation of plankton populations |
| 8. Eutrophication or undesirable algae | 14. Loss of fish and wildlife habitat |

Water Quality Program	Use Impairments (see below)													
	1	3	5	6	7	8	9	10	11	12	13	14		
51-Educate public officials on wetlands														
52-Education-stewardship of watershed														

Use Impairments Identified in the Rochester Embayment:

- | | |
|--|---|
| 1. Restrictions on fish and wildlife consumption | 9. Drinking water taste and odor problems |
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| 6. Degradation of benthos | 12. Added cost to agriculture or industry |
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| 8. Eutrophication or undesirable algae | 14. Loss of fish and wildlife habitat |

6.1. PCB ban and related activities

6.1.1. Background:

Use Impairments addressed: See Table 6-1.

The term "polychlorinated biphenyls" (PCBs) refers to a group of 209 chlorinated chemical compounds favored for their low conductivity, high boiling point, chemical stability, and flame-retardant properties. (Some commercial PCB mixtures are known in the United States by their industrial trade name, Aroclor™.) Since the 1920s, PCBs have been used for many diverse purposes, such as coolant, insulating material, and lubricant in electrical equipment. The majority were used in the production of dielectric fluids for transformers, capacitors, and other electrical components.

In the past PCBs entered the environment in wastewater discharged directly into surface waters from various industries or as treated wastewater from municipal or industrial treatment plants. PCB-containing wastes generated during manufacture and use were sometimes placed into inadequate waste sites. They also entered the environment from accidental spills and leaks, during transport, or from leaks or fires in products containing PCBs.

Potential health and environmental problems associated with PCBs were first recognized in the 1960s. PCBs are persistent in the environment and toxic to humans.

Persistence varies among the 209 PCBs, but usually mixtures include PCBs that are nonbiodegradable. The rate of breakdown decreases with increasing chlorine. Some PCBs are subject to breakdown by sunlight, but in the aerobic conditions that would allow it, other toxic chemicals may be formed. Released to the environment, PCBs adsorb strongly to soil and sediment. Adsorption of PCBs generally increases as chlorination of the compound and organic carbon content of the soil and sediment increase. PCBs in air can be present as solid and liquid aerosols or as vapor and can stay in the air for more than ten days. Once in the air, PCBs can be carried long distances before they return to the land and water by settling or in snow or rain. PCBs have a low water solubility, and in a water environment most PCBs adsorb to particles and sediments.

PCBs enter the bodies of fish from water, sediment, particulates in water, and from eating prey that have PCBs in their bodies. The bioconcentration factors from water to aquatic animals vary from 26,000 to 660,000, and may depend on the water zone in which the aquatic animal predominantly resides.

Humans may be exposed to PCBs by inhaling indoor air contaminated by electrical equipment that contains PCBs and by ingesting contaminated water and food. The detection of PCBs in blood, adipose tissue and breast milk samples from the general population indicates widespread human exposure to PCBs from environmental sources. Human studies on people with

occupational exposure to PCBs show that irritations, such as acne-like lesions and rashes can occur, and that PCBs may cause liver cancer. Reproductive and developmental effects may be related to occupational exposure and eating of contaminated fish. While the role of PCBs in producing cancer, reproductive and developmental effects in humans cannot be proven, the evidence provides a basis for concern about humans who are exposed to PCBs.

Affected water body: Lake Ontario, tributaries, groundwater

Date programs initiated: In 1977, Monsanto Chemical Company, producers of approximately 99% of the PCBs used by U.S. industry, voluntarily stopped production. Also in 1977, final regulations were issued by the U.S. Environmental Protection Agency (EPA) prohibiting manufacturers and producers of transformers and capacitors from discharging PCBs into waterways, and limiting the level of PCBs in ambient water to <.001 micrograms per liter. In 1978, the U.S. began to regulate the storage and disposal of PCBs. Section 6 of the Toxic Substances Control Act (TSCA) prohibited all manufacture and importation of PCBs as of January 1, 1979.

EPA promulgated the "Fires Rule" in 1985. The New York State Public Service Commission (PSC) law about inventory of equipment has been in effect since 1985.

Completed or ongoing? Ongoing

6.1.2. Program: Regulations are in effect for the manufacture and handling of PCB-containing equipment, and for emergency preparedness when PCB-containing equipment is involved.

6.1.2.1. Program descriptions

Toxic Substances Control Act (TSCA)

Since 1979 PCBs have been regulated primarily under TSCA, which dictates restrictions on the manufacture, sale, use, disposal, import and export of PCBs. The statute includes provisions for some allowable uses. PCB releases are also regulated to some extent under other major environmental statutes, and PCB releases are reported in the Toxic Chemical Release Inventory.

TSCA regulations specify:

- How PCBs may be used, processed, distributed, manufactured (for very limited scientific purposes), exported, and/or imported.
- Acceptable storage and disposal conditions.
- Spill clean-up requirements.
- Record keeping and reporting requirements.

PCBs are no longer produced (except under exemption: small quantities for research and

development and as a microscope mounting medium) in the U.S., and are no longer used in the manufacture of new products.

TSCA specifies increasing regulatory burdens with increasing levels of PCB concentration.

- Electrical equipment with <50 ppm PCBs ("non-PCB" items): Generally excluded from regulation, with the exception of a prohibition on using and burning waste oil. Disposal is regulated even if wastestreams are diluted to <50 ppm. Can be sold at the end of useful life.
- Electrical equipment with PCBs between 50-500 ppm ("PCB-contaminated"): Have some record keeping and disposal requirements, and specifications for storage, cleanup and notification. Servicing, rebuilding, or salvaging is authorized for owners, but may be restricted for third parties.
- Electrical equipment with PCBs >500 ppm ("PCB-transformers"): Have requirements for marking, record keeping, inspection, cleanup, registration, notification, location, and disposal. Servicing is restricted, and salvaging or rebuilding is prohibited without permits. Cannot be sold to third parties at the end of useful service life.

All PCB uses or activities are banned unless they fit into one of these "allowable use" categories:

- Totally enclosed: Ensures that exposure to PCBs will be insignificant.
- Authorized uses: Non-totally enclosed uses that must be specifically authorized by a TSCA rule [section 6(e)(2)(B)], and listed (40 CFR 761.30). EPA may modify this list as appropriate. For example, in 1994, EPA added analytical reference samples to the list of authorized uses. Authorized uses are based on a finding that the use will not pose an unreasonable risk of injury to health or the environment.
- Exemptions: Individuals may petition EPA to approve a one-year exemption for their specific use. EPA may grant an exemption if it determines that the activity will not pose an unreasonable risk of injury to health or the environment, and the applicant has made good faith efforts to develop a chemical substitute.

In several instances, EPA has rejected outright bans on a continued PCB use because the societal costs far outweigh the benefits of additional risk reduction. For example, in the mid-1980s, EPA imposed additional regulatory requirements (inspection, servicing, registration, labeling, location, etc.) on PCB transformers instead of immediately banning them because of the estimated multi-billion dollar costs associated with electrical service disruption.

EPA's Fires Rule (40 CFR 761,30)

When PCB-containing electrical equipment is involved in fire incidents, PCBs and other potentially carcinogenic by-products may be widely dispersed. To address this potential hazard, the Fires Rule applies to transformers containing 500 ppm or more PCBs (PCB transformers) and requires:

- Registering all PCB transformers with the local fire department.
- Providing exterior labeling of all PCB transformer locations.

- Removing all combustible materials within five meters of the transformer(s).

PCB transformers in or within 30 meters of commercial buildings or buildings with public access were to be either retrofilled (PCB fluid replaced with a non-PCB fluid) and reclassified to at least "PCB-contaminated" status, be replaced, or to have enhanced electrical protection before October 1, 1990.

Public Service Commission Law (Section 66, Subdivision 23)

Public Service Commission law requires each gas or electric corporation having equipment containing 500 ppm or greater of PCBs to submit an inventory of the equipment to the PSC twice a year. The law also requires distribution of the inventory to each county and city in which the PCB-containing equipment exists.

6.1.2.2. Costs and/or sources of funding: Industry, utilities, consumers

6.1.2.3. Current responsible entity: U.S. EPA

6.1.2.4. Effectiveness of regulations:

Phaseout of PCB equipment

Rochester Gas and Electric Corporation (RG&E) example (Other utilities in the Rochester Embayment watershed are undertaking similar projects to remove and handle PCBs.):

Over the past several years, RG&E has been actively removing PCBs from its system. All distribution capacitors have been replaced with non-PCB equipment. By the end of 1994, all PCB-containing transformers and capacitors were removed from service. RG&E is testing and replacing PCB-contaminated dielectric oil in substation mineral oil transformers. All PCB oils and waste PCB equipment are sent for disposal to EPA-approved facilities. All oil spills from electrical equipment are tested for PCB concentration and cleaned up appropriately so as to prevent oil from escaping to the environment.

In many cases PCB-contaminated oil is replaced with uncontaminated oil. However, residual amounts (<20 ppm) of PCB may remain within a piece of equipment. Pole top transformers are not on a specific schedule for oil replacement due to the difficulties in sampling these items.

RG&E has a program of continually eliminating contaminated oils beyond that required by existing regulations, and is studying various methods for decontaminating remaining equipment. (See Chapter 7 section on "Accelerate PCB removal".)

Continuing Use of PCB-containing equipment

Although most PCB-related activities have been banned or tightly restricted, PCBs still remain in industrial and commercial use in certain allowable circumstances. Existing regulations do not necessarily encourage accelerated phaseout of PCBs, and they do not require their total elimination. Items such as large appliances, transformers, fluorescent lamp ballasts, and many other products created before PCBs were banned have a long useful life, and many of these items remain in service. (The life expectancy of transformers containing PCBs is >30 years. The life expectancy of capacitors ranges from 10 to about 20 years.) In some cases, owners may not know that items in their possession contain PCBs.

Continuing health risk

PCB concentrations in indoor air are normally at least an order of magnitude higher than outdoor air, probably due to emissions from appliances, such as fluorescent lighting ballasts, that have PCB-containing components.

Groups with potentially higher exposure than the general population include:

- Individuals exposed in the workplace.
- Breastfed infants of mothers who consume large amounts of contaminated fish.
- Persons who consume sport fish from contaminated waters.
- People who live in the vicinity of incinerators or older PCB disposal facilities.

Environmental recycling

Over half of the PCBs manufactured were used and disposed of prior to federal restrictions, and PCBs have made their way to the air, water, landfills, and sediments. (For Rochester Embayment waste sites identified as containing PCBs, see Table 5-8 in the Stage I RAP.)

Explosions or overheating of transformers containing PCBs may release large amounts of PCBs into the air. Small amounts of fugitive emissions may be released into the atmosphere due to incomplete combustion during incineration, a much used means of disposal. (EPA requires that combustion efficiency for PCBs must be at least 99.9%.) Small amounts may also be released to the atmosphere from disposal sites and illegal disposal. Landfills are expected to be a continuous source of release into the atmosphere because methane and carbon dioxide are released from landfills and carry PCBs along with them. However, monitoring data indicate that the amount of PCBs released from landfills and incinerators is relatively small compared to the quantity of PCBs that is estimated to be released into the atmosphere by redistribution of compounds already present in soil and water.

The major source of PCB release to surface water is also the environmental cycling process, involving volatilization from terrestrial and aquatic surfaces into the atmosphere, and return to the surface. Smaller amounts of PCBs may enter surface water via wash water from accidental

spills of hydraulic fluids. Sediments containing PCBs at the bottom of a body of water generally act as a reservoir from which PCBs may be released in small amounts to the water over a long period of time. PCBs, especially the lower chlorinated ones, may enter groundwater through leaching of soils containing low organic matter or through soils from some hazardous waste sites.

PCBs remain a major cause of contamination in the Great Lakes. All five of the Great Lakes, as well as numerous inland lakes, have fish consumption advisories as a result of PCB contamination. (See Chapter 6 section on "Fish flesh monitoring and annual fish consumption advisory".) The actions described in this section have been very helpful in reducing the PCB problem, but do not eliminate the problem.

The preamble to the Great Lakes Water Quality Guidance states, "... while PCB concentrations are still declining through 1990, the rate of decline is slowing and may be leveling off, resulting in concentrations continuing well above water quality criteria...These substances appear to be approaching equilibrium in the Great Lakes System at unacceptably high levels due to continuing loading from a variety of sources, such as...historically contaminated sediments...tributary inputs...and atmospheric deposition..." (See also Chapter 6 section on "Great Lakes Water Quality Guidance".)

Author: Carole Beal

6.2. Fish flesh monitoring and annual advisory

6.2.1. Background:

Use impairments addressed: See Table 6-1

Affected water bodies: Lake Ontario; other freshwaters and marine waters of New York State. The Genesee River is not specifically listed, but the advisory also applies to any fish that migrate to or from Lake Ontario.

Target audience: Those who eat sportfish caught in Lake Ontario and/or other freshwaters or marine waters of New York State

Date program initiated: The first fish advisory was established in 1976 because of Mirex contamination.

Completed or ongoing? Ongoing

6.2.2. Program: Fish flesh monitoring and annual advisory

6.2.2.1. Program description:

The New York State Department of Environmental Conservation (NYSDEC) directs sampling programs for chemical contaminants in fish and shellfish. Samples are collected by NYSDEC Bureau of Fisheries staff and regional personnel. The New York State Department of Health (NYSDOH) generates recreational fishery health advisories in consultation with NYSDEC. The U.S. Environmental Protection Agency (EPA), the Food and Drug Administration (FDA) and NYSDOH data are also used by NYSDOH in the development of fish consumption advisories.

The selection of species to be sampled is based on knowledge of historical species contamination levels, fish tissue fat content, and popularity to anglers. Samples are collected for the range of age groups found in a species.

In the laboratory, collected fish are cleaned according to NYSDEC guidelines and analyses are performed on standard fillets, providing so-called "wet weight" analytical results. Generally fillets are prepared with skin intact, but with scales removed. For some fish, such as eels and bullheads, the skin is removed. These procedures are consistent with FDA methods and are conservative.

Recent NYSDEC fish tissue sampling programs include:

Table 6-2. New York State Fish Sampling Programs

Sampling Program	Date Begun	Fish Sampled	Chemicals Analyzed	Rochester Embayment Sampling Location
NY Statewide Toxic Substances Monitoring Program	1976	Am. eel; brown, rainbow & lake trouts; chinook & coho salmon; smallmouth bass; channel catfish; white perch	PCBs, mercury, organochlorine pesticides	Rochester
Lake Ontario Contaminant Trend Analysis Project	1977	Salmon, trout	Pesticides, PCBs, mercury	Rochester Embayment
Lake Ontario TCDD Bioaccumulation Project	1987	Lake & brown trout, smallmouth bass, yellow & white perch	2,3,7,8-TCDD dioxin and furan	Throughout Lake Ontario
Nearshore Contaminants in Young Fish from NY's Great Lakes Basin	1992	Spottail & emerald shiners	PCBs, mercury, arsenic, organochlorine pesticides	Mouth of Genesee River
Special Fish Collections from the Great Lakes Basin for Chemical Contaminant Analysis	1993	Alewife; Am. eel; black crappie; bluegill; brown bullhead; burbot; carp; channel catfish; freshwater drum; muskellunge; northern pike; pumpkinseed; rainbow smelt; rock, largemouth, smallmouth & white bass; walleye; white & yellow perch	PCBs, organochlorine pesticides, mercury	Rochester

Based on the results of the sampling programs and other sources for which quality assurance has been demonstrated to be acceptable, the NYSDOH annually generates a recreational fishery health advisory in consultation with NYSDEC. The advisory is divided into three sections:

- General advice on sportfish taken from New York State.
- Advice on sportfish from specific water bodies.
- Advice on wildlife.

An advisory is issued for a species if the average contaminant level exceeds FDA action levels/tolerance limits for fish tissue or the New York State DOH guideline for dioxin. Additive and/or synergistic health impacts are considered. In general the type of advisory is determined by the ratio of the fish flesh contaminant levels to the FDA limit:

<u>Ratio</u>	<u>Advisory</u>
<1 (less than the FDA limit)	Eat no more than one 8-oz meal per week.
1-3 (1-3 times the FDA limit)	Eat no more than 1 meal per month; women of childbearing age and children <15 years eat none.
3 or more (3 times the FDA limit)	Eat none.

The Council of Great Lakes State Governors is currently developing a fish consumption advisory process intended to provide uniform standards for the eight Great Lakes states. If adopted, these new standards may alter advisories for Lake Ontario fisheries. The unified fish advisory is currently undergoing a peer review by all involved health and environmental agencies.

Chemical contamination of commercial fisheries are evaluated using formal guidelines established by FDA, New York State Department of Agriculture and Markets or NYSDOH. The closure or reopening of a commercial fishery requires the certification of the NYSDOH Commissioner and Department of Agriculture and Markets that such actions are warranted.

Waterfowl and snapping turtles are included in the advisory. The 1994-1995 advisory gives the following advice:

Mergansers	Do not eat.
Other waterfowl	Should be skinned and all fat removed before cooking; limit to 2 meals/month
Snapping turtles	Trim away all fat & discard fat, liver & eggs prior to cooking; women of childbearing age and children <15 years should not eat.

When health advisories are established, the New York State DOH and NYSDEC jointly disseminate the information to the public. The health advice is communicated via a news release, as part of a booklet handed out to those purchasing a fishing license, "tip strips" and brochures.

6.2.2.2. Costs and/or sources of funding: NYSDEC; NYSDOH

6.2.2.3 .Current responsible entity: NYSDEC; NYSDOH

6.2.2.4. Effectiveness:

A 1990-1991 questionnaire filled out by Lake Ontario licensed anglers indicated that 87% were aware of Lake Ontario health advisories. However, some anglers that were aware of the advisories continued to consume Lake Ontario fish in amounts that exceed those recommended (U.S. EPA, NYSDEC; 1994).

In 1992 data was collected from Lake Ontario licensed anglers who recorded in a diary information about their fishing trips and fish consumption during the year. Most of the anglers

(>95%) said they were familiar with the fish consumption advisory. Of the total number of anglers in the survey:

- 36% consumed fish in excess of the species-specific limits recommended.
- 14% ate fish within the recommended limits.
- 50% did not consume any fish from Lake Ontario.

Only 2% of the anglers who consumed sport-caught fish ate more than the 52 meals per year recommended in the general advisory (Connelly, Kuehn: 1994).

Those who did not keep their consumption within the limits had two primary reasons for not doing so:

- They did not believe the health advisory.
- They felt their consumption was well within the limits.

Among the diary participants, 32% said they would eat more fish if health advisories did not exist.

However, some people who eat fish may not have a license, may not read the advisory accompanying the license, or may not have caught the fish themselves. These people may not be as aware of fish contamination as those who were surveyed. (See also Chapter 6 section on "Development and distribution of fish consumption advisory pamphlet.")

Author: Carole Beal

6.3. Development and Distribution of Fish Consumption Information Pamphlet

6.3.1. Background:

Use impairments addressed: See Table 6-1

The idea for this project began when a former member of the WQMAC expressed concern that economically disadvantaged people were purchasing illegally-sold fish caught in Lake Ontario or local waters and eating them. The New York State Department of Health (NYSDOH) and the New York State Department of Environmental Conservation (NYSDEC) both publish fish consumption advisories but neither are in a concise, easily readable format. Also, neither of these advisories target those audiences which most likely consume the largest amounts of fish (see b. below). Therefore, the Public Outreach Subcommittee believed a more understandable pamphlet was needed which would reach out to a potentially "high risk" audience. The information in this pamphlet comes from the NYSDOH health advisory (which is updated every year) and studies on health effects conducted in the Great Lakes region.

Target audience: The purpose of this pamphlet is to provide information to people at high risk so that they can make an educated choice in protecting their health. The target audience is people, often of low socio-economic status, who consume locally caught fish as a regular part of their diet. The pamphlet is written in lay terms so that a broad audience finds it understandable. It is published in both the English and Spanish languages. The authors of the pamphlet understood that because of personal choice, ethnic tradition, or other reasons, some people may continue to choose to eat contaminated fish. For this reason, the pamphlet describes ways in which the fish can be prepared that may reduce some of the toxic chemicals in the fish. Alternative high-protein food sources are also cited.

Completed or ongoing? Ongoing

6.3.2. Program: Fish consumption advisory pamphlet

6.3.2.1. Program description:

The Fish Consumption Information pamphlet was prepared by the Public Outreach Subcommittee of the Water Quality Management Advisory Committee(WQMAC) to inform people of the bioaccumulation of toxic chemicals in fish in Lake Ontario and the Rochester Embayment watersheds, and the risk associated with eating these fish (See Appendix for pamphlet).

The pamphlet was finalized only after several drafts were written and reviewed by many agencies including, but not limited to, NYSDOH, NYSDEC, Sea Grant Extension, Cornell Cooperative Extension, U.S. Environmental Protection Agency, and several Monroe County Departments. In addition, the writers of the pamphlet worked with strong objections expressed by members of the

commercial sportfishing community concerning the possible economic impacts of informing people of the risks of eating contaminated fish. Much discussion and some compromises were made before the wording of the pamphlet was acceptable to both parties (see Appendix for responsiveness summary to concerns).

Before wide-spread distribution of the pamphlet began, it was first tested on a small sample population. Monroe County Community Health workers distributed the pamphlet and a brief one-page survey to clients to test the clarity and readability of the pamphlet. Approximately 50 surveys were completed and the results were favorable.

The pamphlet has been widely distributed in the local community with emphasis on reaching the "target population" whenever possible. The means of distribution has been to educate community leaders within a specific sector and have *them* get the word out to their community via the pamphlet. The project has received great encouragement from the local community. Often, community leaders have requested a staff person or author of the pamphlet speak to members of their organization and these requests have been met. Also, agencies and organizations outside this Area of Concern have shown an interest in using the format and philosophy behind this project for their communities.

Locations where the pamphlet has been distributed are: health clinics, churches, community centers, libraries, town halls, YWCA & YMCA's, Public Assistance Offices, via Monroe County Departments and existing health and social service programs, school groups, non-profit agencies, Neighborhood Associations, all area pediatricians and ob/gyn offices, day care centers, hospitals, American Red Cross, State Departments and Agencies, and many others. In addition, the pamphlet and the information contained therein has been announced on public radio talk shows, and has been sent to other area radio stations. Some volunteers are personally distributing the pamphlets to people as they fish on the docks and shores of Lake Ontario and other waterways. Also, efforts are ongoing to distribute the pamphlet via the City School System and possibly incorporating Lake Ontario/water quality issues in school curricula. As of July 1994, approximately 40,000 copies of the pamphlet have been distributed.

6.3.2.2. Costs and/or sources of funding:

The funding for the printing and publication of this pamphlet came from a grant provided by the U.S. Environmental Protection Agency. A total of \$5,000 was allocated for the project and spent as follows:

100,000 copies of the pamphlet in English	\$4100
professional Spanish translation services	\$ 375
approximately 11,000 copies of the pamphlet in Spanish	<u>\$ 525</u>
Total	\$5000

As implied in the above project description, the responsible parties for the publication of the

pamphlet were the Public Outreach Subcommittee of the WQMAC, as staffed by Monroe County. The pamphlet is being distributed by Monroe County staff and volunteers from various Remedial Action Plan citizen advisory committees and task groups. Many hours of in-kind services were provided by the staff, reviewers, and volunteers who wrote and distributed the pamphlet.

6.3.2.3. Current responsible entity: Monroe County Health Department

6.3.2.4. Effectiveness:

Restrictions on fish and wildlife consumption exist as a result of the bioaccumulation of persistent toxic chemicals in the food chain. Since many of these chemicals were dumped years ago and are retained in the sediments of Lake Ontario, little can be done to *eliminate* the chemicals. Therefore, we are left with two important options for action in the Area of Concern: 1) *prevent* any further contamination of the sediments and waters; and 2) *educate* citizens on how they can help protect water quality and how the existing pollution affects them. The pamphlet and the associated activities operate by educating citizens about health risks associated with pollution. The effectiveness of this project thus far is apparent by the many requests and supportive remarks we have gotten from people concerning the pamphlet. This program is not effective in eliminating this use impairment altogether but it is effective in educating people that such a use impairment exists.

Author: Margit Brazda

6.4. Great Lakes Water Quality Guidance

6.4.1. Background:

Use impairments addressed: See Table 6-1

Pollutants enter the Great Lakes from point sources, the air, bottom sediments, urban and agricultural stormwater runoff, hazardous waste sites, spills, and industrial and municipal wastewater. Many of the pollutants are a serious threat to humans and wildlife, even in small amounts, because they are persistent in the environment and they bioaccumulate, becoming more concentrated as they move through the food chain from plants to fish to people and wildlife. There are fish consumption advisories in all of the Great Lakes States and in the Province of Ontario. (See Chapter 6 section on "Fish flesh monitoring and annual advisory.")

Standards for Great Lakes water quality are inconsistent among jurisdictions. The Great Lakes are surrounded by eight states and the Province of Ontario. Each state and province has its own rules, regulations and programs for controlling water quality.

Affected water bodies: Great Lakes, tributaries in the U.S., connecting channels downstream to Massena

Date program initiated: In 1989 The Great Lakes Water Quality Initiative was introduced by the U.S. Environmental Protection Agency (EPA) Region V to provide a forum for the eight Great Lakes States and EPA to develop uniform water quality criteria and implementation (permit writing) procedures. In 1990, Congress passed the Great Lakes Critical Programs Act that required EPA to publish water quality guidance and procedures for the Great Lakes States and required the States to adopt the Guidance. The final Water Quality Guidance for the Great Lakes System was published in the Federal Register on March 23, 1995.

Completed or ongoing? The States will be required to adopt procedures and water quality standards consistent with the Guidance within two years of the publication of the final regulations (by March 1997).

6.4.2. Program: Great Lakes Water Quality Guidance

6.4.2.1. Program description:

The recently finalized Great Lakes Water Quality Guidance focuses on ambient water quality standards and point source discharges of bioaccumulative chemicals of concern (BCCs). (The nonpoint source component of the Great Lakes Initiative is the Great Lakes Toxic Reduction Effort. See Chapter 6 section on "Great Lakes Toxic Reduction Effort.")

The goal of the Guidance is the reduction of point sources of BCCs to the maximum extent

possible. The Guidance may require additional toxics reduction activities and stricter regulations in the States. In some cases, the only way that stricter effluent limits will be achieved will be through pollution prevention measures, such as finding alternatives for toxics that end up in the wastestream.

Bioaccumulation Factors

A major innovation in the Guidance is the incorporation of Bioaccumulation Factors (BAFs) into calculations of human health and wildlife criteria. BAFs are defined as the ratio of a substance's concentration in tissue of an aquatic organism to its concentration in the ambient water, in situations where both the organism and its food are exposed and the ratio does not change substantially over time.

Tier I and Tier II Water Quality Criteria and Values

"Tier I" criteria for human health, aquatic life and wildlife are based on extensive toxicity data. EPA will add Tier I criteria for additional substances when there is adequate data. When EPA adds a Tier I criteria, it will apply to all the Great Lakes States. The Guidance prescribes the methodologies to be used to add to the Tier I lists for human health, aquatic life and wildlife.

"Tier II" values are intended to provide a conservative (protective), interim level of protection in the establishment of a discharge permit limit for substances not included in the Tier I list. They are distinguished from the Tier I approach by the availability of a lesser amount of data and quality of data used for derivation. The Guidance does not provide lists of Tier II values. It will be up to the States and Tribes to develop Tier II values to protect human health and aquatic life, using the methodologies provided in the Guidance. The Guidance does not provide a Tier II methodology for wildlife, nor does it require that Tier II values for wildlife be developed.

NYSDEC currently has criteria or guidance values for about 250 substances or groups of substances for the protection of aquatic life and human health.

Criteria to Protect Human Health

The Guidance contains numeric Tier I human health criteria for 18 pollutants:

Benzene	Hexachloroethane
Chlordane	Lindane
Chlorobenzene	Mercury
Cyanides	Methylene chloride
DDT	PCBs
Dieldrin	2,3,7,8-TCDD
2,4-dimethylphenol	Toluene
2,4-dinitrophenol	Toxaphene
Hexachlorobenzene	Trichloroethylene

Tier I criteria are used to establish ambient concentrations of chemicals which, if not exceeded in the Great Lakes system, will protect humans from adverse health impacts from that chemical due to consumption of fish and water. For each chemical, criteria are derived to reflect long-term consumption of food and water from the Great Lakes System. The Guidance uses a Great Lakes-specific fish consumption rate of 15 grams per day, based on several fish consumption surveys. EPA believes that this number provides adequate protection for even highly exposed populations.

The Guidance describes Tier I and Tier II methodologies for States and Tribes to derive human health criteria for additional pollutants.

Criteria to Protect Aquatic Life

Aquatic life criteria are used to establish ambient concentrations of pollutants in water which, if not exceeded, will protect fish and other aquatic life from adverse effects. The Guidance contains numeric Tier I criteria to protect aquatic life from acute effects for 15 pollutants (the Roman numerals represent the oxidation state of elements that can have more than one oxidation state):

Arsenic (III)	Lindane
Cadmium	Mercury (II)
Chromium (III)	Nickel
Chromium (VI)	Parathion
Copper	Pentachlorophenol
Cyanide	Selenium
Dieldrin	Zinc
Endrin	

The Guidance contains numeric Tier I criteria to protect aquatic life from chronic effects for 14 pollutants:

Arsenic (III)	Endrin
Cadmium	Mercury (II)
Chromium (III)	Nickel
Chromium (VI)	Parathion
Copper	Pentachlorophenol
Cyanide	Selenium
Dieldrin	Zinc

The Guidance describes Tier I and Tier II methodologies for States and Tribes to derive aquatic life criteria for additional pollutants.

EPA Region V, in cooperation with Regions II and III and the States and Tribes, will establish a Great Lakes Initiative Clearinghouse to assist States and Tribes in developing numeric Tier I and Tier II water quality criteria and values. The Clearinghouse will prevent duplication of studies when developing data for Tier I criteria or Tier II values.

Criteria to Protect Wildlife

Wildlife criteria are used to establish ambient concentrations of chemicals in the water which, if not exceeded, will protect mammals and birds from adverse impacts due to consumption of contaminated food or water. The Guidance contains numeric criteria for four Tier I chemicals (PCBs, mercury, DDT, and dioxin) and provides a Tier I methodology for deriving criteria for other bioaccumulative chemicals. There are no Tier II methodologies provided or required for wildlife. In developing wildlife criteria, EPA used pollutant-specific hazard data and species-specific exposure parameters for mammals and birds that reside in the basin. For each chemical, only a chronic criterion is expressed. The methodology focuses on endpoints related to reproduction and population survival rather than the survival of individual members of a species.

If there is a conflict among the human health, aquatic life and wildlife criteria, the most strict criteria will apply.

Antidegradation

"Antidegradation" refers to the policy that a State or Tribe must follow when an action, such as construction of a new facility that will discharge into a water body or increased discharges from an existing facility, is proposed that may lower the quality of water in a river, stream or lake.

- If a State or Tribe has designated a water body as an Outstanding National Resource Water, then no permanent lowering of water quality is allowed under any circumstances.
- The Guidance provides procedures on how the States and Tribes are to determine when a proposed action involving BCCs will result in a significant lowering of water quality, and outlines procedures to follow in determining whether such lowering is necessary, and would be permitted.
- Water quality cannot be degraded below existing uses in any situation (any uses that a water body has supported since 1978).

The NYSDEC has had an antidegradation policy since 1985. It is expected that the Great Lakes Guidance will require some modification of the implementation procedures associated with the current policy.

Implementation

The Guidance sets forth a common set of methodologies for State regulators to use to achieve a more consistent method of calculating maximum allowable pollutant discharges in State water discharge permits. The methodologies address:

- How much mixing and dilution, if any, is to be allowed in calculating discharge permit limits.
- How discharge permit limits should be expressed, monitored, and evaluated when the amount that can be discharged is below analytical detection limits.
- How Total Maximum Daily Loads should be calculated for waters not expected to meet

- water quality standards after the implementation of technology-based controls.
- How adjustments to water quality criteria should account for the unique characteristics of particular locations.
- How background concentrations and pollutants in intake waters should be considered.
- How and when variances from water quality standards for individual dischargers should be granted.
- When water quality-based permit limits will be required for dischargers.
- How much time dischargers will be given to come into compliance with new controls.

Public Participation

The Guidance is the result of a collaborative effort that included State environmental agencies, industry, environmental and other public citizen groups, municipalities, academia and EPA. All of the pre-proposal discussions were open to the public. During the five-month comment period following the proposal of the Guidance, EPA received over 26,500 pages of comments from more than 6,000 commenters.

6.4.2.2. Costs and/or sources of funding:

EPA evaluated three sites in the Great Lakes Basin to estimate the costs and benefits of the Guidance. The sites were the Fox River in Wisconsin, the Saginaw River in Michigan, and the Black River in Ohio. EPA analyzed the data from every discharger in the study areas (over 300 facilities). The results of the analysis showed that the benefits of the Guidance will outweigh its costs.

EPA estimated the average value of benefits for the case study areas to be \$3.1 million per year per area for:

- Improved human health.
- Expanded commercial and recreational fishing.
- Improved quality of swimming and other water recreation.

The average cost of compliance for the case study areas was estimated to be \$2.8 million per year per area for:

- Improvements by industrial dischargers.
- Improvements by municipal treatment works.

New estimates by the EPA show that the Guidance will cost households in Michigan, for example, \$1 to \$10 per year. The cost to direct and indirect dischargers basin-wide was estimated by EPA to be between \$60 million and \$380 million per year.

The sources of funding are: U.S. EPA, States, point source dischargers to water

6.4.2.3. Current responsible entity: U.S. EPA, State environmental agencies

6.4.2.4. Effectiveness:

New York State and the other Great Lakes States are required to adopt procedures and water quality standards consistent with the Guidance by March 1997. In many cases, New York State's ambient water quality standards are already stricter than those in the Guidance. In the cases where the Guidance standards are stricter or where New York State did not have standards, New York State will be required to meet the Guidance standards. However, the methodologies for achieving the standards may differ from the Guidance. The following table, showing the chemicals on the lists of criteria to protect human health, aquatic life and wildlife, applies to surface waters with the "best use" of drinking water. A table for nondrinking water would appear somewhat different.

Table 6-3. Guidance Standard Compared with New York State Standards

<u>Guidance standards</u> <u>stricter</u>	<u>*Guidance applies standards</u> <u>where none existed previously</u>	<u>NYS standards</u> <u>stricter</u>
Arsenic	Chlordane	Benzene
Chromium III	Endrin	Cadmium
Copper	Hexachlorobenzene	Chlorobenzene
DDT	Hexachloroethane	Chromium VI
Dieldrin	Mercury	Cyanide
Nickel	Methylene chloride	2,4-Dimethylphenol
PCBs	Toluene	2,4-Dinitrophenol
2,3,7,8-TCDD	Toxaphene	Heptachlor
	Trichloroethylene	Lindane
		Parathion
		Pentachlorophenol
		Phenol
		Total selenium
		Zinc

*New York State has guidance values for these chemicals, except endrin and hexachloroethane.

All of these chemicals appear on the Rochester Embayment list of priority pollutants (see Stage I, page 5-39) except hexachloroethane, chlorobenzene, 2,4-dimethylphenol, 2,4-dinitrophenol, lindane and parathion.

There are also BCCs which will eventually have stricter point source discharge standards due to the Guidance as allowed "mixing zone" considerations are phased out.

There are widely varying viewpoints on the potential effectiveness of the Guidance. Issues involve:

- Methodologies for the choice of risk levels, total maximum daily loads, and assumptions

in developing human health criteria, among others. (However, all methodologies must meet the same goal and their effectiveness must be demonstrated to EPA.)

- Economics. EPA concludes that economic impact will be small because municipalities and industry can meet the objectives partly through pollution prevention. Municipalities and industry, on the other hand, say that the economic impact will be high for a small reduction in pollutants.
- Equity. Industry is concerned that the treatment requirements for facilities in the Great Lakes Basin will give unfair competitive advantage to facilities outside the basin.
- Sources. For many pollutants, point sources are not the most significant source category to the Great Lakes. Potentially significant costs borne by point source dischargers will not result in environmental improvement without significant reductions from nonpoint source categories.

Author: Carole Beal

6.5. Great Lakes Toxic Reduction Effort

6.5.1. Background:

Use impairments addressed: See Table 6-1

Toxic pollutants enter the Great Lakes from the air, accidental releases and spills, stirred-up bottom sediments, urban and agricultural stormwater runoff and hazardous waste sites. Some of the pollutants may be a serious health threat to humans and wildlife, even in small amounts, partly because they are persistent in the environment and they bioaccumulate, becoming more concentrated as they move through the food chain from plants to fish to humans and wildlife. There are fish consumption advisories in all of the Great Lakes States and in the Province of Ontario. (See Chapter 6 section on "Fish flesh monitoring and annual advisory.")

Affected water bodies All waters of the Great Lakes Basin

Date program initiated: The Great Lakes Initiative, of which the Great Lakes Toxic Reduction Effort is a part, was a requirement of the U.S. federal Great Lakes Critical Programs Act of 1990. (See also Chapter 6 section on "Great Lakes Water Quality Guidance.")

Completed or ongoing? Is being discontinued as an "official" program

In 1995 it was decided by the U.S. Environmental Protection Agency (EPA) that the pathways track and the virtual elimination track described below are duplicative. As a result, the organizational structure for these programs is changing. Efforts to reduce toxic chemicals will continue under the Virtual Elimination Project, described in this section, and the Lakewide Management Plans (see Chapter 6 section on "Lake Ontario Lakewide Management Plan").

Additional Information:

The Great Lakes Toxic Reduction Effort is the component of the Great Lakes Initiative that focuses on nonpoint sources. Unlike the Great Lakes Guidance component for point sources, the Effort is intended to coordinate existing programs, rather than create new ones.

The Effort has two multimedia (air, water, soil) tracks: the "pathways" track and the "virtual elimination" track. The purpose of the pathways track is to track sources of bioaccumulative chemicals of concern (BCCs), to analyze reduction and elimination opportunities, and to reduce loadings. The pathways track is to be applied by the Great Lakes States with federal guidance.

Pathways sources include:

- Air
- Sediments
- Storage, handling and transport (spills)
- Urban runoff, stormwater, combined sewer overflows

- Waste sites

The virtual elimination track focuses on detailed analyses of options for reducing or eliminating a small number of BCCs.

6.5.2. Program: Nonpoint Source Pathways

6.5.2.1. Program description:

Air deposition pathway

Modification of the Hazardous Waste Program for mercury-containing lamp management The Environmental Protection Agency (EPA) Administrator signed a rule in July 1994 to encourage maximum recycling of the lamps by small quantity commercial generators without unnecessary handling and paperwork. (The lamps are currently disposed according to hazardous waste disposal rules.) The rule addresses the concern that, after disposal, mercury in lamps can vaporize, escape from landfills, become air pollution and eventually be redeposited.

EPA gave two options for management. They were open for public comment before one was to be chosen:

1. Add the lamps to the list of "universal wastes" managed under a streamlined hazardous waste regulatory program. This option is preferred by the Region 5 office of the EPA because:

- Mercury is a Great Lakes critical pollutant.
- It sends the wrong message to the public for EPA to officially pronounce that mercury is not a hazardous waste.
- It is inconsistent to propose establishing maximum available control technologies for mercury sources and at the same time exempt the mercury-containing lamps from hazardous waste disposal rules.

2. Exempt the lamps from hazardous waste regulations, providing that they are disposed in permitted municipal solid waste landfills or recycled at qualified facilities. This option is preferred by the lamp manufacturers, who argue that the level of mercury in the lamps is decreasing as technology improves, and that the lamps can be disposed of in municipal waste landfills since mercury emissions from landfills are negligible.

The New York State Department of Environmental Conservation (NYSDEC) commented that option 2 would encourage disposal, not recycling, and would remove responsibility from the small quantity generator. NYSDEC prefers option 1 in which the small quantity generator is part of a formal program.

As of December 1996, the rule has not become final, and a decision has not been made about which option will be chosen.

Medical Waste Mercury Reduction Project EPA has prepared educational materials that target

professional hospital administrators.

- Make Your Facility a Leader in Mercury Pollution Prevention (poster and chart).
- The Case Against Mercury: Rx for Pollution Prevention (booklet).

The materials are available for distribution from the Terrene Institute, Washington, DC. The concern is that mercury could be incinerated, become part of the solid waste stream or be discharged to a sewage treatment plant. The materials point out the dangers of mercury, how it is cycled in the environment, and how to reduce its presence in waste streams. (In 1994 EPA published Mercury Usage and Alternatives in the Electrical and Electronics Industry. Other than that, EPA has not yet produced educational materials for any other business or industry that uses mercury.)

The effectiveness of the Medical Waste Reduction Project will depend on the extent to which local facilities are aware of, use and follow the recommendations.

Deposition of Air Pollutants to the Great Waters EPA released the report of this name in May 1994, as a requirement under the Clean Air Act Amendments (CAAA) of 1990. EPA formed the Great Lakes Air Team to facilitate the recommendations in the Great Waters Report, and to track state activities and available grants. (See Chapter 6 section on "Atmospheric deposition programs.")

Mercury Study Under the requirements of the CAAA, EPA has studied mercury emissions from steam generating units, municipal waste combustors and other emitters. The CAAA specified that the Study consider the rate and mass of the emissions, the health and environmental effects, technologies which are available to control emissions, and the cost of the technologies. The content of the seven-volume draft study, due to be sent to Congress by December 15, 1995, and the draft conclusions are summarized below:

Volume I	Executive Summary
Volume II	Inventory of Anthropogenic Mercury Emissions in the United States
Volume III	An Assessment of Exposure from Anthropogenic Mercury Emissions
Volume IV	Health Effects of Mercury and Mercury Compounds
Volume V	An Ecological Assessment for Anthropogenic Mercury Emissions in the United States
Volume VI	Characterization of Human Health and Wildlife Risks from Anthropogenic Mercury Emissions in the United States
Volume VII	An Evaluation of Mercury Control Technologies, Costs, and Regulatory Issues

The highest emitters of mercury include medical and municipal waste incinerators, coal-fired electric utilities, chlor-alkali plants using the mercury cell process, primary copper and primary lead smelters, cement manufacturers and secondary mercury production. Anthropogenic sources emit to the air about 230 metric tons annually, 85% from stationary combustion and industrial

sources. (A metric ton is equal to 1.102 U.S. tons.) Most mercury deposition from anthropogenic emissions takes place in the southern Great Lakes region, the northeast corridor from New York to Maine, and scattered areas in the South and in the West.

Adverse health effects from mercury exposure have been noted in humans and in experimental animals. The type and severity of effects depend on the route of exposure and the form of mercury. In aquatic ecosystems mercury is known to bioaccumulate and bioconcentrate up the food chain. The highest levels of mercury in these ecosystems are found in fish. Fish-eating birds and non-human mammals have much higher exposures to mercury than humans due to differences in consumption of fish as a percentage of body weight. Wildlife criteria were calculated to be protective for five species considered to be highly sensitive to mercury: mink, otter, kingfisher, osprey, and bald eagle.

Control technologies designed only for particulate matter control have very low collection efficiencies for mercury. Acid gas scrubbers remove about 50% of mercury. Activated carbon injection and selenium filters are considered to be effective technologies for removal from stack gas. Costs of these technologies vary widely according to emission source type.

The Mercury Study is a good information base. Its effectiveness will depend upon whether or not it leads to actions.

Utility Study This Study, on all hazardous air pollutants from electric utilities, was required under the CAAA and is due to be submitted to Congress by November 1995. EPA concluded that mercury is the primary pollutant of concern from electric utilities. (There is mercury in coal. The coal that is lowest in sulfur tends to be the highest in mercury.)

The Utility Study will be effective if it leads to new limits on hazardous emissions from electric utilities.

Municipal Waste Combustors and Medical Waste Incinerators Under the requirements of the CAAA, EPA proposed a new rule in January 1995 that would limit emissions to air of mercury, dioxin, cadmium and lead from municipal waste combustors that burn 25 tons per day or more, and for all medical waste incinerators. As of June 1995, the rule had not been finalized.

Municipal waste combustors are responsible for about 63.5 metric tons per year of mercury and medical waste incinerators are responsible for about 60 metric tons per year. EPA estimates that the new rule will cut mercury emissions from each by about half, for a total reduction of about 60 metric tons per year.

Sediments pathway

EPA has developed the following strategies, documents, recommendations and criteria. Effectiveness will depend upon how they are used and whether or not they lead to actions.

EPA's Contaminated Sediment Management Strategy The Strategy was released in July 1994 by EPA. It describes specific actions that EPA will take to reduce environmental and human health risks associated with contaminated sediment. The Strategy does not propose new regulations. Its goals are:

1. To develop consistent methodologies for assessing contaminated sediments.
2. To prevent ongoing contamination of sediments that may cause unacceptable ecological or human health risks.
3. To clean up existing sediment contamination that causes significant effects on human health or the environment.
4. To ensure that sediment dredging and the disposal of dredged material continue to be managed in an environmentally sound manner.

Working Group A group with representatives from EPA, the States and the U.S. Army Corps of Engineers is working on cleanup goals, sediment criteria and data management. The Working Group has also completed a paper on analysis of the barriers to remediation.

Documents EPA and the Army Corps of Engineers have jointly released two documents:

- Inland Testing Manual for inland waters.
- Draft Great Lakes Dredged Material Testing and Evaluation Manual for Great Lakes waters.

Assessment and Remediation of Contaminated Sediments (ARCS) This EPA project to study sediments in the Great Lakes assessed the degree of contamination and a means to evaluate potential solutions. The Report on the study was released in August 1994. It is intended as guidance for Remedial Action Plans (RAPs).

Major findings and recommendations of the ARCS Program include the following:

- Use of an integrated sediment assessment approach, incorporating chemical analyses, toxicity testing, and benthic community surveys, is essential to define the magnitude and extent of sediment contamination at a site.
- Risk assessment and modeling activities are valuable techniques for evaluating the potential impacts associated with contaminated sediments.
- A number of treatment technologies are effective in removing or destroying sediment contaminants. However, no one treatment technology is able to adequately treat all contaminants. Pilot-scale demonstrations involved onsite field testing of treatment technologies in five Areas of Concern:

<u>Location</u>	<u>Treatment Technology</u>
Buffalo River	Low temperature thermal desorption
Saginaw Bay	Sediment washing
Grand Calumet River	BEST process, using the solvent triethylamine
Ashtabula River	Low temperature thermal desorption
Sheboygan River	Bioremediation

- Broad public involvement and education are critical in any sediment assessment and

remedy selection study in order to develop a common understanding of the problem and the environmental and economic impacts of alternative remedial actions.

Sediment Quality Criteria EPA will publish final criteria in January 1996 for:

Dieldrin
Endrin
Acenaphthene
Fluoranthene
Phenanthrene

Storage, handling and transport (spills) pathway

A workgroup (there is no representative from New York) formed by the EPA recommended future rulemaking to lower the reporting thresholds for the Toxics Release Inventory for bioaccumulative chemicals. EPA has not yet acted on the recommendation. The Toxic Reduction Effort for storage, handling and transport will not be effective unless EPA acts on the recommendation.

Urban runoff, stormwater, combined sewer overflows pathway

EPA is working on a project in the Saginaw Bay RAP area to inventory BCCs and on a wet weather demonstration project in the Rouge River RAP area. There is no project currently in New York. The Toxic Reduction Effort for this pathway will not be effective unless the demonstration projects lead to actions in other areas.

Waste sites pathway

EPA began development of an issue paper on reducing BCC loadings from waste storage sites. However, it may not be completed. The Toxic Reduction Effort for this pathway will not be effective unless the issue paper is completed and leads to subsequent actions.

6.5.2.2. Costs and/or sources of funding: U.S. Environmental Protection Agency

6.5.2.3. Current responsible entity: U.S. Environmental Protection Agency

6.5.2.4. Effectiveness: Noted above under Pathway name

6.5.3. Program: Virtual Elimination

6.5.3.1. Program description:

The U.S. EPA, working closely with states, local governments, industry and environmental groups, launched this project to promote the elimination of releases of chemicals of concern in

the Great Lakes basin. Objectives include:

- Identification and evaluation of regulatory, economic or other "signals" by which governments encourage reductions of the targeted chemicals.
- Discussion of options to eliminate the chemical by a focus group composed of representatives of industry, all levels of government in the U.S. and Canada, and environmental groups.
- Recommendations for additional signals that governments can send to encourage reductions at a faster pace and creative ideas for actions.

The Virtual Elimination Project is being led by the EPA Great Lakes National Program Office in Chicago and will build on existing information and programs, including the Lakewide Management Plans, the Lake Superior Pollution Prevention Strategy and recommendations of the International Joint Commission's Virtual Elimination Task Force. The Project will select a small group of BCCs and perform in-depth analyses of uses, sources, releases and opportunities for reduction.

6.5.3.2. Costs and/or sources of funding: U.S. Environmental Protection Agency

6.5.3.3. Current responsible entity: U.S. Environmental Protection Agency

6.5.3.4. Effectiveness:

The Project has identified the single biggest source of mercury in the U.S. as the U.S. Department of Defense. The Department stockpiled mercury until it was no longer needed for national defense. Then it started selling mercury on the open market, without knowledge of how it would be used. The Project has arranged a temporary suspension of sales.

Options papers on mercury and polychlorinated biphenyls (PCBs) were due to be complete by the end of 1995. The Draft Options Paper for Mercury was completed first and recommends the following actions:

- Create "Mercury Reduction Challenges" for the Great Lakes States to give them the opportunity to use federal funds to support State-specific projects.
- Develop voluntary, incentive-based reduction action plans to target leading emission sectors.
- Seek to eliminate or modify government policies, regulations and/or practices that serve as barriers to reducing mercury use or release.
- Target mercury reduction in binational and international arenas by developing a U.S./Canada Virtual Elimination Strategy, and through participation in international forums.
- Strengthen and streamline federal/state coordination by adding state representatives to the National Mercury Task Force, targeting funds to support innovative technology, and convening a Great Lakes symposium to exchange information on legislation.

The Virtual Elimination Project will be effective if federal funding is made available for state-specific projects and if recommendations are adopted.

Author: Carole Beal

6.6. Lake Ontario Lakewide Management Plan

6.6.1. Background:

Use impairments addressed: See Table 6-1.

Affected water bodies: Waters of the Lake Ontario basin

Date program initiated: The Great Lakes Water Quality Agreement (GLWQA), as amended in November 1987, and the Great Lakes Critical Programs Act require the development and implementation of lakewide management plans for the five Great Lakes. (Each of the five Great Lakes basins is undergoing a separate LaMP process.)

Completed or ongoing? Ongoing

Additional information:

Lakewide Management Plans (LaMPs) are designed to restore the beneficial uses of each of the Great Lakes, by reducing levels of critical pollutants that cause lakewide problems. "Critical Pollutants" is defined in the Great Lakes Water Quality Agreement 1987 Amendments as "substances that, singly or in synergistic or additive combination, are causing, or are likely to cause, impairment of beneficial uses despite past application of regulatory controls due to their:

- Presence in open lake waters;
- Ability to cause or contribute to a failure to meet Agreement Objectives through their recognized threat to human health and aquatic life; or
- Ability to bioaccumulate."

6.6.2. Program: Lake Ontario Lakewide Management Plan

6.6.2.1. Program description:

Environment Canada and the U.S. Environmental Protection Agency (EPA), in cooperation with the Ontario Ministry of Environment and Energy and the New York State Department of Environmental Conservation (the Four Parties) are developing the Lake Ontario LaMP. The primary goal of the LaMP is to reduce loadings of critical pollutants in order to restore beneficial uses in open lake waters. It will focus on pollutants that require control on a lakewide basis and coordinate actions for controlling them. The LaMP will utilize a systematic and ecosystem approach to restoring beneficial uses, and is intended to serve as an important step toward virtual elimination of persistent toxic substances. A LaMP addresses impairments encountered in the open waters of the lake, nearshore areas and embayments.

The Lake Ontario LaMP evaluation process uses the 14 beneficial use impairments provided in the GLWQA as a way to identify indicators of pollution problems. (These are the same

impairments described in Chapter 4 of the Stage I RAP.) These indicators include:

- Degraded populations of plankton, benthic organisms, fish, mammals and birds.
- Health and reproductive problems of Lake Ontario organisms.
- Restrictions on consumption of lake water and fish and wildlife.

Regulatory standards and guidelines for water, sediment, and fish tissue will also be used to help identify critical pollutants. Those critical pollutants determined to cause lakewide beneficial use impairments will be targeted as part of a basinwide pollutant reduction program.

The LaMP will be developed in four stages:

Stage I	Problem definition	Which ecosystem problems may be caused by pollutants? Which pollutants may be responsible?
Stage II	Strategy development for load reductions	Where do the pollutants come from? How can pollutant inputs be reduced or eliminated?
Stage III	Remedial measures selected	Evaluate current remedial measures and identify potential new measures.
Stage IV	Document success	Monitoring indicates that impairments have been eliminated.

Currently, a draft Stage I document is being developed. This serves as the problem definition document; however, additional information concerning subsequent Stages has been included wherever possible.

LaMPs, like RAPs, may address tributaries, air deposition, nonpoint sources or any other sources of pollutants that cause use impairments. The LaMP will recognize and provide linkages to other resource management initiatives such as fisheries management plans, lake level management, wetlands protection, and control strategies for undesirable exotic species. LaMPs also emphasize pollution prevention, and address pollutants that have the potential to impair waters that currently meet water quality standards and/or beneficial uses.

LaMP Structure

The management structure for the LaMP consists of:

- **LaMP Coordination Committee.** Includes one member from each of the Four Parties. Provides direction on LaMP development and implementation, makes decisions related to Lake Ontario issues, and ensures accountability to the public.
- **LaMP Management Committee.** Provides overall program management. Ensures progress in meeting the LaMP schedule, effective public involvement, and participation by other government agencies as necessary.
- **LaMP Workgroup.** Carries out day-to-day activities necessary to achieve LaMP goals.

- LaMP Issue Subcommittees. Will be formed as needed to provide scientific and technical advice.

Public Participation

The Four Parties adopted a three-tiered public involvement strategy, designed to ensure that all Lake Ontario stakeholders have an opportunity to become informed about and involved in the LaMP process:

- Partnerships. NYSDEC plans to create Basin Teams, networks of regional and local groups such as county Water Quality Coordinating Committees, regional planning councils, citizen-based watershed groups, municipalities, businesses and tribal governments that will work to conserve, improve and protect the Lake Ontario Basin. Other partnerships will involve Ontario and lakewide coordination.
- Information Network. The Network will consist of an extensive mailing list and Internet Websites.
- Lake Ontario Forums. At significant stages in the development of the LaMP, the Management Committee will convene a binational meeting of basin team representatives and other stakeholders to provide input on major decisions.

Relationship of the LaMP to the RAP

The LaMP process, resembles the RAP process:

- Evaluates the status of beneficial use impairments and identifies pollutants contributing to any impairments.
- Identifies sources and loadings of pollutants.
- Identifies ongoing prevention, control, and remediation actions, as well as additional efforts needed to reduce pollutant loadings and restore beneficial uses.
- Monitors activities to evaluate the effectiveness of program actions.

LaMPs and RAPs have other features in common:

- Mandated by the 1987 Amendments to the GLWQA.
- Coordinate efforts between federal, state, tribal and local governments.
- Have comprehensive public involvement programs.

There are also differences:

- Address water quality and related problems on two different levels, the LaMP on a lakewide basis, and the RAP on the basis of the Area of Concern (AOC).
- Have different decision makers. Decisions about LaMP activities are made by the governments of both U.S. and Canada. RAP activities are directed by either the state and the U.S. EPA, or by the Ontario Ministry of Environment and Energy and Environment Canada, in cooperation with local constituents including citizens, government agencies, industry and others.
- LaMPs shall include “a definition of the threat to human health...posed by Critical

- Pollutants, singly or in synergistic or additive combinations with another substance...” GLWQA Annex 2 notes that LaMPs shall include “a definition of the threat to human health...posed by Critical Pollutants, singly or in synergistic or additive combinations with another substance...” There is not a similar requirement for RAPs.

There are connections between the Lake Ontario LaMP and the NYS RAPs. RAP committee members and RAP strategy for remediation and prevention can provide information about each AOC that is fundamental to the development of the LaMP. In turn, policies and programs that may be developed under the LaMP will provide the RAPs with possible ways to address problems in the AOCs that cannot be addressed at the local level. Sharing information between the RAP committees and individuals working on the LaMP will benefit both programs.

Relationship of the LaMP to the Lake Ontario Toxics Management Plan

The Four Parties signed a Declaration of Intent in 1987 committing the agencies to develop the Lake Ontario Toxics Management Plan (LOTMP) for the Niagara River and Lake Ontario specifically to focus on discharges of toxic pollutants. In 1995 the Four Parties agreed that *one* program, the LaMP, should be developed which provides an overall framework that incorporates the commitments of the LOTMP. (See Chapter 6 section on “Lake Ontario Toxics Management Plan.”)

6.6.2.2. Costs and/or funding: The costs are for staff time at the agencies of the Four Parties. Sources of funding are the U.S. EPA, NYSDEC, Environment Canada, Ontario Ministry of Environment and Energy.

6.6.2.3. Current responsible entities: U.S. EPA, NYSDEC, Environment Canada, Ontario Ministry of the Environment and Energy

6.6.2.4. Effectiveness:

Effectiveness will be evaluated by the International Joint Commission (IJC) as required in the GLWQA. The LaMP will benefit the Rochester Embayment Area of Concern because it will identify and address pollutant sources from outside the Embayment that affect it. Effectiveness will be enhanced if citizens of the Rochester Embayment are active in the Lakewide Advisory Network.

Author: Carole Beal

6.7. Lake Ontario Toxics Management Plan

6.7.1. Background:

Use impairments addressed: See Table 6-1.

Although contaminant levels have decreased in the Lake Ontario food chain since the 1970s, the rate of decrease has slowed. Contaminant levels are being maintained by the recycling of persistent toxic chemicals from sediments, from atmospheric deposition, and other point and nonpoint sources.

Affected water body: Lake Ontario and tributaries

Date program initiated: In February 1987 the Four Parties (Environment Canada, the Ontario Ministry of Environment and Energy, the United States Environmental Protection Agency, and the New York State Department of Environmental Conservation) signed a Declaration of Intent that included a commitment to develop a Toxics Management Plan for Lake Ontario. The Plan was issued in 1989. In 1995 the Four Parties agreed that *one* program, the Lakewide Management Plan, should be developed which provides an overall framework that incorporates the commitments of the Lake Ontario Toxics Management Plan (LOTMP). (See Chapter 6 section on "Lake Ontario Lakewide Management Plan.")

Completed or ongoing? Activities are ongoing, although the name will change.

6.7.2. Program: Lake Ontario Toxic Management Plan

6.7.2.1. Program description:

The goal of the LOTMP is a Lake that "will provide drinking water and fish that are safe for unlimited human consumption, and that allows natural reproduction, within the ecosystem, of the most sensitive native species." The LOTMP addresses contaminant problems encountered in open waters, nearshore areas and embayments.

In order to achieve its goal, the existing LOTMP includes four objectives:

1. Reductions in toxic inputs, driven by existing and developing programs.
2. Further reductions in toxic inputs, driven by special efforts in geographic areas of concern.
3. Further reductions in toxic inputs, driven by lakewide analyses of pollutant fate.
4. Zero discharge.

Many of the activities carried out to fulfill these objectives are undertaken concurrently.

6.7.2.2. Costs and/or sources of funding: Environment Canada, U.S. Environmental Protection Agency (EPA), Ontario Ministry of Environment and Energy, New York State Department of

Environmental Conservation (NYSDEC)

6.7.2.3. Current responsible entity: Environment Canada, U.S. EPA, Ontario Ministry of Environment and Energy, NYSDEC

6.7.2.4. Effectiveness:

A benefit of the LOTMP has been the federal funding made available to the NYSDEC because a problem was identified as part of the LOTMP. The LOTMP will continue to be effective when it becomes part of the LaMP if its objectives are continued, as they are planned to be.

Effectiveness for the Rochester Embayment will be enhanced by local participation in the Lake Ontario Advisory Network.

Some accomplishments toward each objective since the release of the LOTMP in 1989 follow.

Objective 1: Reductions in Toxic Inputs (driven by existing and developing programs)

Some accomplishments of programs in the U.S. that contribute to Objective 1 are listed. (See also Chapter 6 sections on "New York State pollution prevention," "Federal stormwater regulations", and the "Great Lakes Water Quality Guidance.")

- EPA and NYSDEC reallocation of resources toward Great Lakes activities. EPA funding is influenced by how a proposed project fits into the LOTMP.
- EPA and NYSDEC multi-media inspections at industrial and municipal facilities to evaluate opportunities for pollution prevention. EPA's Region II conducted pollution prevention projects in New York State during 1993. EPA also assists NYSDEC with funding for such projects.
- NYSDEC State Pollution Discharge Elimination System permits for stormwater.
- The Great Lakes Guidance to set consistent water quality standards for the Great Lakes States and Indian Tribes.
- NYSDEC guidance and standards. NYSDEC developed new enforceable guidance values for several organic contaminants and metals in 1985, developed new human health based guidance values for 15 pesticides in 1985, and made revisions to a few water quality standards in 1991. These revisions bring the total number of substances for which New York has enforceable standards (via the permit system) to more than 200.
- EPA's Assessment and Remediation of Contaminated Sediments Program to demonstrate remedial treatment technologies. A demonstration project in the Buffalo River removed over 80% of the polycyclic aromatic hydrocarbons (PAHs) present in the sediment sample.
- Clean Sweep pilot project in Erie County to assist farmers in safely disposing of banned or unregistered pesticides. Approximately 7,500 pounds were collected.

Objective 2: Further Reductions in Toxic Inputs (driven by special efforts in geographical Areas of Concern)

Remedial Action Plans, called for in the Great Lakes Water Quality Agreement as amended in 1987, are under development in 42 Areas of Concern in the Great Lakes Basin, including eight in the Lake Ontario Basin. (See Chapter 1, Stage I RAP.)

Objective 3: Further Reductions in Toxic Inputs (driven by lakewide analyses of pollutant fate)

Accomplishments are:

- Development of a system for categorizing toxic chemicals by comparing ambient data to U.S. and Canadian standards. The system is used to determine either that a chemical warrants corrective action on a priority basis, or that it can be controlled more routinely by the implementation of existing and developing programs. A preliminary categorization of chemicals produced a list of nine "priority" toxic chemicals:

Chlordane	Mercury
Dieldrin	Mirex
Dioxin	Octachlorostyrene
DDT and metabolites	PCBs
Hexachlorobenzene	

In 1995, this list is undergoing revision to reflect new data and progress in standards and criteria.

- Development of mass balance models for Lake Ontario to relate toxic loadings to ecosystem responses. The models provide the technical basis necessary to determine load reduction targets and how long it will take to meet these targets.
- Development of a preliminary loadings matrix for the original nine priority chemicals listed above plus nine others:

Arsenic	Chrysene
Benz(a)anthracene	Lead
Benzo(a)pyrene	Tetrachloroethylene
Benzo(b)fluoranthene	Toxaphene
Benzo(k)fluoranthene	

- Monitoring the Lake and tributaries.
- Development of ecosystem objectives for Lake Ontario for wildlife, habitat, aquatic communities, human health and stewardship. The Ecosystems Objectives Workgroup is developing quantitative indicators for each objective. The Four Parties will consider these indicators as a means of monitoring the effectiveness of their remedial activities.

Objective 4: Zero Discharge

Pollution prevention activities toward the goal of virtual elimination that are taking place in the U.S. include (see also Chapter 6 sections on "New York State pollution prevention," and "EPA pollution prevention programs"):

- Establishment of NYSDEC's Pollution Prevention Unit.
- Pollution prevention and waste minimization inspections at facilities that discharge LOTMP priority toxics or toxics that have high bioaccumulation rates.
- EPA's 33/50 Program.
- Pilot program in Erie County to instruct municipal pretreatment inspectors in pollution prevention techniques.
- EPA's Virtual Elimination Pilot Project.

As the list of priority toxic chemicals is revised, the Four Parties will continue to promote the accelerated reduction of toxic chemical loadings to Lake Ontario, leading towards virtual elimination.

Relationship to the LaMP

As the LOTMP and LaMP were conceived, there was no plan for them to coordinate. Some differences between the two Plans are shown in the following table:

Table 6-4. Comparison of the LOTMP and the LaMP

	Lake Ontario Toxics Management Plan	Lake Ontario Lakewide Management Plan
Initiation of Plan	Declaration of Intent, Feb. 1987	Great Lakes Water Quality Agreement amendments, Nov. 1987
Parties in agreement	Four Party agreement	Two-party agreement; Four Parties work cooperatively
Approach	Identifies contaminants that are above criteria or guidelines	Ecosystem approach. Uses 14 beneficial use impairments
State/Province relationship	A firm agreement for NYSDEC and Ontario Ministry of Environment	NYSDEC and Ontario Ministry of Environment not part of formal agreement

There are many important similarities between the two Plans:

- Cooperation among the Four Parties.
- Focus directly on the Lake Ontario watershed (not including the contribution from the other four Great Lakes).
- Need to track loadings and sources of contaminants.
- Virtual elimination of toxic chemical discharges as a goal.
- Public involvement actively encouraged.

The similarities between the LOTMP and the LaMP were substantial enough that, in 1995, the

Four Parties agreed that there would be *one* program, known as the “Lakewide Management Plan,” which would incorporate the LOTMP.

Author: Carole Beal

6.8. Atmospheric deposition programs

6.8.1. Background:

Use impairments addressed: See Table 6-1

Affected water body: All waters of the Great Lakes Basin

Date program initiated: Great Lakes States Air Permitting Agreement - 1986; Clean Air Act Amendments (CAAA) - 1990; Great Lakes Air Team - 1992

Completed or ongoing? Ongoing

Additional information

Scientific studies show that atmospheric deposition is often an important factor in the degradation of water quality and associated adverse human health and ecological effects. Control of point sources of water pollution have greatly improved water quality conditions in the Great Lakes. However, as major reductions in point source discharges were achieved, the air contribution to water quality became more apparent. Of particular concern are pollutants that persist in the environment, accumulate in body tissues, and biomagnify in the food chain. Top consumers in the food chain, usually consumers of large fish, may accumulate chemical concentrations millions of times greater than the concentrations present in the water. (See also Chapter 6 section on "Fish flesh monitoring and annual advisory.")

Potential adverse effects on human health and/or wildlife include reproductive problems, developmental and neurological impacts on fetuses and children, immune system disease, and cancer. Other adverse ecological effects are caused by nitrogen and phosphorous compounds that contribute to eutrophication. The air pollution problem is compounded by the potential for long-distance transport of pollutants, demonstrated by the detection of pollutants in remote, formerly pristine environments such as the Arctic.

There are several federal and Great Lakes programs intended to reduce air deposition. These programs can be considered to be part of the response to Annex 15 of the Great Lakes Water Quality Agreement of 1978, as amended in 1987, which states the following purpose: "The Parties, in cooperation with State and Provincial Governments, shall conduct research, surveillance and monitoring and implement pollution control measures for the purpose of reducing atmospheric deposition of toxic substances, particularly persistent toxic substances, to the Great Lakes Basin Ecosystem."

6.8.2. Program: Great Lakes States Air Permitting Agreement

6.8.2.1. Program description:

This Agreement, of the environmental administrators of the eight Great Lakes States, commits the air regulatory program of each State to require the air emission sources of the following seven Great Lakes critical pollutants to use Best Available Control Technology for toxics to the maximum extent allowed under existing authority.

- Alkylated lead compounds
- Benzo-a-pyrene
- Hexachlorobenzene
- Mercury
- 2,3,7,8-Tetrachlorodibenzo-p-dioxin
- 2,3,7,8-Tetrachlorodibenzofuran
- Total polychlorinated biphenyl (PCB)

The Agreement also specifies that the States will enter pertinent information into a national permitting database, and that they will exchange permit applications for potentially significant sources of the seven pollutants and ask for comments. Exchange of information will be assisted by the RAPIDS project (Regional Air Pollutant Inventory Development System) which will allow exchange of information over Internet.

6.8.2.2. Costs and/or funding: Not available

6.8.2.3. Current responsible entity: Great Lakes States

6.8.2.4. Effectiveness:

New York implements the Agreement through 6NYCRR Part 212 which requires that a contaminant be assigned an environmental rating based on its potential health or environmental effects. The seven listed contaminants are given an environmental rating of "A". Any required Environmental Impact Statement must assess the potential adverse impact on the Great Lakes.

The Great Lakes States exchange information on permits, but because the Agreement pertains to only seven pollutants, there are not a lot of permits involved. Typically there are no comments, but there are exceptions to this. The effectiveness of the Agreement would be improved if it applied to more pollutants.

State-of-the-art inventory software, the Regional Air Pollutant Inventory Development System (RAPIDS) will allow each of the Great Lakes States to compile its share of the first Great Lakes regional inventory of toxic air contaminants. The inventory is scheduled for completion in January 1996. RAPIDS data will be accessible to the States and to federal and academic researchers via Internet.

6.8.3. Program: Federal Clean Air Act Amendments of 1990 (See also the Chapter 6 section on "Great Lakes Toxic Reduction Effort: Air deposition pathway."):

6.8.3.1. Program description:

New programs and improvements to existing programs that are the most important for the Great Lakes Basin ecosystem are the following (for a summary of historical federal programs that affect air pollution, see Table 6-5).

Clean Air Act Amendments of 1990 Title III

Programs to identify and control major point and area sources of 189 Hazardous Air Pollutants (HAPs). EPA was to list categories of sources of seven HAPs by November 15, 1995:

Alkylated lead compounds	2,3,7,8-TCDF
Polycyclic organic material	2,3,7,8-TCDD
Mercury	Hexachlorobenzene
Polychlorinated biphenyls (PCBs)	

The sources that account for at least 90% of the aggregate emissions of each pollutant are subject to technology-based standards by November 15, 2000. EPA has a schedule for further promulgation of regulations. (For the complete list of HAPs see Table 6-6.)

The Title III program will have the effect of extending the authority of the Great Lakes States Air Permitting Agreement to additional categories of sources, and to smaller sources in all categories.

Section 112(m) of Title III required EPA to establish the Great Lakes Integrated Atmospheric Deposition Network (IADN), in accordance with Annex 15 of the GLWQA. EPA will use the data provided by IADN to identify and track the movement of HAPs through the Great Lakes, to determine the portion of water pollution loadings attributable to atmospheric deposition of these pollutants, and to support development of Remedial Action Plans (RAPs) and Lakewide Management Plans (LaMPs). (See also Chapter 6 section on "Lake Ontario Lakewide Management Plan.") EPA must submit a biennial report to Congress which summarizes its findings regarding the contribution of atmospheric deposition to water pollution, the sources and rates of the deposition, and evaluation of any adverse effects to human health or the environment.

Clean Air Act Amendments of 1990 Title V

Requirement for comprehensive new operating permits for major sources of criteria pollutants and HAPs. (The definition of "major source" is different in different sections of the CAAA.) The permits will specify operating schedules, emission limits, control techniques, enhanced pollutant monitoring, and record keeping and reporting requirements. Major sources will also be required to develop risk management plans designed to identify and correct conditions which might release listed pollutants.

6.8.3.2. Costs and/or sources of funding: Not available

6.8.3.3. Current responsible entity: U.S. Environmental Protection Agency, dischargers of air pollutants

6.8.3.4. Effectiveness:

Emissions reductions under the Clean Air Act Amendments are being phased in from 1990 to well past 2000 in some cases. They will be effective, but it will be many years before the effectiveness of emissions reductions can be documented. Air quality benefits to the Rochester Embayment will come partly from emissions reductions upwind of the Embayment. Emissions reductions in the Embayment will be partly responsible for air quality benefits downwind of the Embayment.

Air deposition is one of the transport mechanisms for all of the pollutants on the Rochester Embayment preliminary list of high priority pollutants (see Stage I RAP, page 5-40) except mirex. The pollutants may be transported as stack emissions or adsorbed on dust particles from nonpoint sources. Most of the pollutants are on the Clean Air Act Amendments Title III list of Hazardous Air Pollutants (Table 6-6). The point sources that account for at least 90% of the aggregate emissions of the HAPs are subject to technology-based standards by November 15, 2000. High priority pollutants not on the Title III list are mirex, aldrin, dieldrin, phosphorus, silver, epoxide (a degradation by-product of heptachlor), and di-n-octyl phthalate. It should be noted that the Title III list is based on point-source emissions and may not necessarily include chemicals which could be airborne, but from nonpoint sources.

The Integrated Atmospheric Deposition Network (IADN), required by Title III Section 112(m) is a U.S.-Canada network with one monitoring station on each Great Lake. The Lake Ontario station is operated by the Canada Centre for Inland Waters, and is located at Point Petrie, Prince Edward County, Ontario. The station monitors monthly (formerly biweekly) for wetfall (rain and snow) and weekly for dryfall (particulates). The station has been in operation since 1991, monitoring for: organochlorine pesticides, all PCB congeners, chlorobenzenes, polycyclic aromatic hydrocarbons (PAHs), heavy metals (except for mercury due to technical problems).

The IADN monitoring results become part of the biennial report to Congress that is also required by Title III Section 112(m).

The first of the required reports, Deposition of Air Pollutants to the Great Waters [includes Great Lakes, Lake Champlain, Chesapeake Bay, coastal waters]: First Report to Congress, was published in 1994.

The Report evaluated 15 chemicals of concern:

Cadmium and compounds	Mercury and compounds
Chlordane	PCBs
DDT/DDE	Polycyclic organic matter (POM)*
Dieldrin	2,3,7,8-TCDF
Hexachlorobenzene	2,3,7,8-TCDD
a-Hexachlorocyclohexane	Toxaphene
Lindane	Nitrogen compounds
Lead and compounds	

*Polycyclic organic matter is a large class of chemicals consisting of organic compounds having multiple benzene rings and a boiling point greater than 100°C. Polycyclic aromatic hydrocarbons are a chemical class that is a subset of POM.

(Nitrogen compounds are on the list because of nutrient enrichment in coastal waters and Chesapeake Bay.)

This list of pollutants overlaps substantially with other lists of Great Lakes chemicals of concern selected by other scientific and regulatory groups, including Tier I lists for the Great Lakes Guidance. (See Chapter 6 section on "Great Lakes Water Quality Guidance.") It is generally consistent with the toxic air pollutants that ranked the highest in a 1991 EPA study to identify priority chemicals for the Great Waters Program. The pollutant list does not include all chemicals that may, now or in the future, be an important component of atmospheric deposition to the Great Lakes. Nor does it include phosphorus, which is considered to be an important pollutant in the Rochester Embayment and is transported by atmospheric deposition.

The Report is organized around answering four scientific questions, as follows.

What human health and environmental effects are associated with pollutants of concern in the Great Waters?

Human health effects are summarized in Table 6-7. Other ecological effects include:

- Changes in the function of the immune, nervous, reproductive and endocrine systems, and cancers in aquatic organisms and other wildlife.
- Changes in fish communities and population declines in fish species.
- Changes in the species diversity and populations of bottom-dwelling communities.

According to the Great Waters Report, atmospheric deposition is not thought to be a major factor in eutrophication of freshwater lakes. (However, it is a major factor in the Rochester Embayment. See the Stage I RAP, Table 5-4.)

Potential human health and environmental effects associated with the pollutants of concern are generally well documented. However, it is difficult to relate a specific effect to a single pollutant. Quantifying the contribution of atmospheric deposition of each pollutant of concern to

ecological and human health effects is not yet possible, and a given pollutant present in a waterbody generally is derived from many sources.

Conclusions Related to effects:

- Some ecological and human health effects are subtle, resulting from long-term exposures to low levels of pollutants, and may be delayed in onset and occurring over multiple generations.
- Noncancer effects are of great concern, particularly for animals higher up in the food web.
- The relationship between atmospheric deposition and the effects on humans and ecosystems is not clearly understood.
- Persistence in the environment, tendency to accumulate in animal tissue, and toxicity to humans and other organisms are important indicators of the hazard potential of air pollutants that are deposited to waterbodies.

What is the relative importance of atmospheric deposition in causing contamination in the Great Waters?

The Report lists four conclusions on loadings:

- Although uncertainties still exist, case studies demonstrate that atmospheric deposition may be an important and, in some cases, a primary contributor of toxic chemical contamination and nitrogen enrichment to the Great Waters.
- The relative importance of atmospheric loading for a specific chemical in a given waterbody depends on characteristics of the waterbody, properties of the chemical, and the location of sources. (Atmospheric deposition contributes 13% of the PCBs and 72% of the polycyclic organic matter to Lake Ontario. The number for PCBs is consistent with data reported in Chapter 5 of the Stage I RAP, which indicates an atmospheric loading between 7% and 19%.)
- Chemicals in the environment may cycle between soil, air, water and biota for many years.
- When possible, relative loadings to the Great Waters should be evaluated using a mass balance approach.

What sources are significant contributors to atmospheric loadings to the Great Waters?

The sources of the pollutants of concern are summarized in Table 6-8. Conclusions about sources are:

- It is difficult to identify and characterize the specific sources that emit the pollutants.
- The specific sources and source categories contributing to atmospheric deposition to the Great Waters are not well known.
- Atmospheric loadings to the Great Waters may be derived from local, regional and global sources.
- The relative contribution of local sources and distant sources to atmospheric deposition to

the Great Waters is uncertain.

- The environment may act as an important reservoir or source of persistent contaminants that have been released to air previously. Because of pollutant cycling in the environment, atmospheric concentrations of some pollutants may not correspond closely to current source emissions.

Is action warranted to reduce atmospheric deposition?

Most of the actions that EPA will undertake will utilize the regulatory mechanisms in the Clean Air Act that are intended to address the most hazardous chemicals. The recommendations in the Report involve three types of strategies:

Emissions EPA will continue efforts to implement section 112 and other sections of the Clean Air Act, and will use the results of the Report in the development of policy that will reduce emissions of pollutants of concern. EPA's actions will include:

- Publishing emission standards affecting important chemicals of concern ahead of schedule where possible.
- Evaluating the adequacy of control technologies for important pollutants.
- Proposing definition of smaller sources of certain pollutants to be regulated as major sources.
- Evaluating which area sources should be regulated with maximum achievable control technology.

Multimedia approach EPA will take actions that include using a Great Waters Core Project Management Group as a coordinating body to communicate with other federal, state and local agencies. The objectives will be to:

- Coordinate work and identify lead offices to implement recommendations.
- Support changes to the Clean Water Act that address nonwaterborne sources of water pollution.
- Address the exportation of banned pesticides.
- Emphasize pollution prevention efforts to reduce environmental loadings of pollutants of concern.
- Facilitate information sharing between EPA and other federal, state and local agencies.

Research EPA will continue to support research activities and will develop a strategy to define further necessary research. EPA actions will include:

- Focusing research planning on a mass-balance approach to determine relative loadings.
- Using an appropriate mix of monitoring, modeling, and emission inventories in conducting mass-balance work.
- Evaluating the need for development of tools for risk assessment for total exposure to pollutants of concern and for regulatory benefits assessment.
- Continuing to support ongoing research efforts, including monitoring.

In an August 1994 letter, organized by the National Wildlife Federation and Sierra Club, 82 environmental organizations criticized the Report in several areas:

- EPA did not recommend measures that would achieve virtual elimination of persistent toxic substances.
- The Report recommends pollution prevention efforts only in the form of voluntary programs.
- EPA was too timid in its recommendations to control mercury emissions.
- The report documents the concentration of polluting facilities in low-income communities and the disproportionate reliance of Native American and low-income people on contaminated Great Lakes fish as food. But EPA did not suggest measures to achieve air and water quality standards that would reduce emissions of facilities near residential areas, and that would permit the safe consumption of the kind and amount of Great Lakes fish desired by anglers and traditional communities.
- EPA should adopt new air emission controls to assure that the Great Lakes achieve the water quality criteria of the Great Lakes Water Quality Initiative. These measures should include the phaseout of new hazardous waste and municipal incinerators, quicker phase-ins of maximum achievable control technology standards for toxic chemicals, especially for mercury, and controls on air releases by sewage treatment facilities.
- EPA should push for modification of the Toxic Release Inventory to require reporting of all releases, not just releases that exceed large annual minimums, and to include information about toxic uses as well as emissions, since many air releases are the result of toxic materials contained in an end product, such as paint.

6.8.4. Program: U.S. EPA Great Lakes Air Team (GLAT):

6.8.4.1. Program description:

In June 1992, GLAT was formed upon request of the Deputy Administrator of EPA. GLAT had a hand in reviewing the EPA document Deposition of Air Pollutants to the Great Waters (see below). Upon publication of the document its main purpose has been to ensure implementation of the Report's recommendations. The group is chaired by a representative of EPA Region V and includes representatives of other EPA staffs, including the Great Lakes National Program Office (GLNPO), and air program offices of Regions II, III, and V. It also includes a member from each Great Lakes State. The GLAT has determined that a balance among emission inventory, atmospheric deposition monitoring and research, and atmospheric deposition modeling activities is appropriate for arriving at a basis for regulatory decision making.

6.8.4.2. Costs and/or sources of funding: Not available

6.8.4.3. Current responsible entity: U.S. Environmental Protection Agency

6.8.4.4. Effectiveness:

It is intended that GLAT promote the recommendations of the Great Water Report. The effectiveness of GLAT currently is in information exchange and coordination among federal and state programs.

6.8.5. Program: New York State implementation of federal programs

6.8.5.1. Program description:

New York State has had a stricter program for air toxics than the federal government. Control requirements for air toxics are found primarily in 6NYCRR Part 212. However, there are many other regulations which may be applicable to a given source.

The New York State Department of Environmental Conservation (NYSDEC) publication Air Guide-1 (see Resources) offers guidelines based on risk assessment for the control of toxic ambient air contaminants. Contaminants are first assigned a preliminary environmental rating according to tables which list contaminants in three categories:

- "A", high toxicity air contaminants (88 contaminants) - Discharge results or may result in serious adverse effects on receptors or the environment. These effects may be of a health, economic or aesthetic nature or any combination of these. Must apply Best Available Control Technology (BACT).
- "B", moderate toxicity air contaminants (296 contaminants) - Discharge results or may result in only moderate and essentially localized effects or where the multiplicity of sources of the contaminant in any given area would require an overall reduction of the atmospheric burden of that contaminant.
- "C", low toxicity air contaminants (83 contaminants) - Discharge may result in localized adverse effects of an aesthetic or nuisance nature.

Guidance is also provided for contaminants that are not listed in a table.

After the preliminary environmental rating is assigned, the next step in a review requires that annual and short-term air quality impact analyses be conducted. A contaminant may need to be re-rated after the impact analysis. Impacts are compared against NYS or federal standards or Air Guide-1 annual and short-term guideline concentrations. The degree of control required will depend on both the toxicity of the contaminant and the amount emitted. There are separate scales for A, B and C contaminants (see Table 6-9).

In addition to air toxics control requirements, NYSDEC operates an air monitoring network for air toxics, as well as one for acid deposition.

6.8.5.2. Costs and/or sources of funding: Not available

6.8.5.3. Current responsible entity: New York State Department of Environmental Conservation

6.8.5.4. Effectiveness: NYSDEC regulations will undergo major modifications to comply with the CAAA and its requirements for Maximum Achievable Control Technology. NYSDEC is conducting air toxics workshops to get feedback from the public while it is developing the new program.

Author: Carole Beal

Table 6-5

Historical EPA Regulations

Authority	Action	GW Pollutants Controlled	Notes
Clean Air Act (1970 - present) Stationary Sources	National Ambient Air Quality Standards for Criteria Pollutants	Lead, Particulate Matter, ^a Nitrogen Oxides	These "health-based" standards established safe concentration levels of six criteria pollutants, three of which are not currently of concern to the Great Waters. States are responsible for implementing regulations to keep the levels of air pollution below these concentrations and are provided guidance by the EPA. States must submit plans to EPA for how areas will meet these standards. Guidance to States includes an identification of alternative control techniques for sources in various industries including incinerators, smelters, electric utilities, cement plants, and wood stoves.
	National Emission Standards for Hazardous Air Pollutants	Mercury	These standards set emission limits for various hazardous air pollutants. Mercury emissions from ore processing facilities, mercury cell chlor-alkali plants, and sludge drying plants were regulated.
Clean Air Act (1970 - present) Mobile Sources	Emissions Controls	Nitrogen Oxides, Particulate Matter, Lead	The Clean Air Act required reductions in emissions from auto exhaust, set more stringent fuel economy standards, and required inspection and maintenance (I/M) programs to locate malfunctioning emission control systems. Since 1970, lead emissions from automobiles have been reduced by approximately 90%. The 1990 Amendments require lower tailpipe standards; more stringent emissions testing procedures; expanded I/M programs; new vehicle technologies; introduction of a range of clean fuels programs; clean transportation provisions; and possible regulation of emissions from nonroad vehicles.
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (1972 - present)		Mercury, Chlordane, DDT/DDE, Hexachlorobenzene, Lindane, Toxaphene	This Act provides the authority for banning and restricting the use of pesticides containing these chemicals in the U.S. according to how and where they are used. It requires registration of all pesticides and reporting of any exported pesticides.
Toxic Substances Control Act (1976 - present)		PCBs	In addition to other requirements, this Act bans the manufacture, processing, distribution in commerce, and use of PCBs except in totally closed systems and establishes rules for disposal of PCBs.
Superfund Amendments and Reauthorization Act (1976 - present)	Emergency Planning and Community Right-to-Know (EPCRA)	All except nitrogen compounds, dieldrin, DDT/DDE, 2,3,7,8-TCDD, 2,3,7,8-TCDF, and some POM. ^b	Establishes new authorities for emergency planning and preparedness, community right-to-know reporting, and toxic chemical release reporting.

^aParticulate matter includes airborne particles made up of a variety of substances that may include the following pollutants of concern: cadmium, POM, 2,3,7,8-TCDF, and 2,3,7,8-TCDD.

^bReporting of releases of these pollutants is not currently required, mainly due to their low emissions. EPA is taking comment on modifications to EPCRA 313 requirements, such as lowering the reporting thresholds to ensure that release and transfer information is obtained for certain persistent pollutants. (See proposed rule: 59 FR 1788, January 12, 1994.)

Note: This table documents EPA legislation that has reduced emissions of Great Waters pollutants directly into the air. It does not account for other legislation that may have reduced these pollutants from other sources that may eventually be emitted to the air. Other such sources may include effluent released to waterbodies and runoff from agriculture.

**Table 6-6: Hazardous Air Pollutants
as listed in Title III of the federal Clean Air Act Amendments of 1990**

acetaldehyde	cresols/cresylic acid
acetamide	o-cresol
acetonitrile	m-cresol
acetophenone	p-cresol
2-acetylaminofluorene	cumene
acrolein	2,4-D, salts and esters
acrylamide	DDE
acrylic acid	diazomethane
acrylonitrile	dibenzofurans
allyl chloride	1,2-dibromo-3-chloropropane
4-aminobiphenyl	dibutylphthalate
aniline	1,4-dichlorobenzene(p)
o-anisidine	3,3-dichlorobenzidine
asbestos	dichloroethyl ether
benzene (including from gasoline)	1,3-dichloropropene
benzidine	dichlorvos
benzotrichloride	diethanolamine
benzyl chloride	N,N-diethyl aniline
biphenyl	diethyl sulfate
bis(2-ethylhexyl)phthalate	3,3-dimethoxybenzidine
bis(chloroethyl)ether	dimethyl aminoazobenzene
bromoform	3,3'-dimethyl benzidine
1,3-butadiene	dimethyl carbamoyl chloride
calcium cyanamide	dimethyl formamide
caprolactam	1,1-dimethyl hydrazine
captan	dimethyl phthalate
carbaryl	dimethyl sulfate
carbon disulfide	4,6-dinitro-o-cresol and salts
carbon tetrachloride	2,4-dinitrophenol
carbonyl sulfide	2,4-dinitrotoluene
catechol	1,4-dioxane
chloramben	1,2-diphenylhydrazine
chlordan	epichlorohydrin
chlorine	1,2-epoxybutane
chloroacetic acid	ethyl acrylate
2-chloroacetophenone	ethyl benzene
chlorobenzene	ethyl carbamate
chlorobenzilate	ethyl chloride
chloroform	ethylene dibromide
chloromethyl methyl ether	ethylene dichloride
chloroprene	

**Table 6-6 (continued): Hazardous Air Pollutants
as listed in Title III of the federal Clean Air Act Amendments of 1990**

ethylene glycol	4-nitrobiphenyl
ethylene imine	4-nitrophenol
ethylene oxide	2-nitropropane
ethylene thiourea	N-nitroso-N-methylurea
ethylidene dichloride	N-nitrosodimethylamine
formaldehyde	N-nitrosomorpholine
heptachlor	parathion
hexachlorobenzene	pentachloronitrobenzene
hexachlorobutadiene	pentachlorophenol
hexachlorocyclopentadiene	phenol
hexachloroethane	p-phenylenediamine
hexamethylene-1,6-diisocyanate	phosgene
hexamethylphosphoramide	phosphine
hexane	phosphorus
hydrazine	phthalic anhydride
hydrochloric acid	polychlorinated biphenyls
hydrogen fluoride	1,3-propane sultone
hydrogen sulfide	beta-propiolactone
hydroquinone	propionaldehyde
isophorone	propoxur
lindane (all isomers)	propylene dichloride
maleic anhydride	propylene oxide
methanol	1,2-propylenimine
methoxychlor	quinoline
methoxybromide	quinone
methyl chloride	styrene
methyl chloroform	styrene oxide
methyl ethyl ketone	2,3,7,8-tetrachlorodibenzo-p-dioxin
methyl hydrazine	1,1,2,2-tetrachloroethane
methyl iodide	tetrachloroethylene
methyl isobutyl ketone	titanium tetrachloride
methyl isocyanate	toluene
methyl methacrylate	2,4-toluene diamine
methyl tert butyl ether	2,4-toluene diisocyanate
4,4-methylene bis(2-chloroaniline)	o-toluidine
methylene chloride	toxaphene
methylene diphenyl diisocyanate	1,2,4-trichlorobenzene
4,4-methylenedianiline	1,1,2-trichloroethane
naphthalene	trichloroethylene
nitrobenzene	2,4,5-trichlorophenol

**Table 6-6 (continued): Hazardous Air Pollutants
as listed in Title III of the federal Clean Air Act Amendments of 1990**

2,4,6-trichlorophenol
triethylamine
vinyl acetate
vinyl bromide
vinyl chloride
vinylidene chloride
o-xylenes
m-xylenes
p-xylenes
antimony compounds
arsenic compounds
beryllium compounds

cadmium compounds
coke oven emissions
cyanide compounds
glycol ethers
lead compounds
mercury compounds
fine mineral fibers
nickel compounds
polycyclic organic matter
radionuclides
selenium compounds

Table 6-7

Potential Human Health Effects^a Associated with Pollutants of Concern^b

Pollutant ^d	Potential Effects on Human Health ^c					
	Cancer ^e	Reproductive/ Restrictions ^f	Neurological/ Behavioral	Immuno- logical ^g	Endocrine	Other Noncancer ^h
Cadmium and compounds	Probable ^h	●	●	●		Respiratory and kidney toxicity
Chlordane	Probable ^h	● ^f	●	●	●	Liver toxicity ^h
DDT/DDE	Probable ^h	● ^h	● ^f	●		Liver toxicity ^h
Dieldrin	Probable ^h	● ^h	● ^f	●	●	Liver toxicity ^h
Hexachlorobenzene	Probable ^h	●	● ^h	●	●	Liver toxicity ^h
α-HCH ⁱ	Probable ^h					Kidney and liver toxicity
Lindane	Probable ^j	● (γ-HCH)	●	●		Kidney and liver toxicity ^h
Lead and compounds	Probable ^h	● ^k	● ^k	●	●	Kidney toxicity ^k
Mercury and compounds		●	●	●	●	Kidney toxicity
PCBs	Probable ^h	●	●	●	●	Liver toxicity
Polycyclic organic matter	Probable ^h	●		●		Blood cell toxicity
2,3,7,8-TCDF	Not classifiable ^h	●		●	●	Liver toxicity
2,3,7,8-TCDD	Probable ^j	● ^l	● ^l	● ^l	● ^l	Integument toxicity ^l
Toxaphene	Probable ^h	● ^f	● ^f	●	●	Cardiovascular effects; liver toxicity ^f

^aThese data are based on a compilation of results from both human and animal studies. Potential for effects will depend on the level and duration of exposure and the sensitivity of the exposed organism.

^bWhere footnoted, data for this table are taken both from EPA sources⁴⁸⁻⁵⁴ and the applicable Agency for Toxic Substances Disease Registry (ATSDR) Toxicological Profile^{14-22, 24-26, 55}, otherwise, all data are taken from the applicable ATSDR Toxicological Profile alone.

^cFor this table, a chemical was considered to induce an effect if human or laboratory mammal data indicating a positive result were available. Blanks mean that no data indicating a positive result were found in the references cited (not necessarily that the chemical does not cause the effect).

^dNitrogen compounds are not included in this table because they are considered a pollutant of concern only for eutrophication.

^eA chemical is classified as a "probable human carcinogen" when there is limited or no evidence of human carcinogenicity from epidemiologic studies but sufficient evidence of carcinogenicity in animals (corresponds to EPA weight-of-evidence category B). A chemical is classified as "not classifiable as to human carcinogenicity" when there is inadequate human and animal evidence of carcinogenicity or when no data are available (corresponds to EPA weight-of-evidence category D).

^fData from the applicable EPA Health Effects Assessment (HEA) document.⁵⁰⁻⁵³

^gThis is only a sample of other noncancer effects that may occur as a result of chronic exposure to the pollutant. Additional adverse human health effects may be associated with each chemical.

^hData from EPA's Integrated Risk Information System.⁴⁹

ⁱToxicity data are available primarily for γ-HCH and technical-HCH (a mixture of several HCH isomers), with limited data available for α-HCH.

^jData from EPA's Health Effects Assessment Summary Tables (HEAST).⁴⁸ HEAST classifies these chemicals as probable human carcinogens; however, these carcinogenic evaluations are currently under review by EPA.

^kData from EPA's Reportable Quantity (RQ) Document for lead.⁵⁴

^lData from *Biological Basis for Risk Assessment of Dioxins and Related Compounds*.⁵⁶

Table 6-8

U.S. Sources of Air Pollutants of Concern^a

Pollutant	Sources of Air Emissions
Cadmium and compounds	Fossil fuel combustion; aluminum production; cadmium, copper, lead, and zinc smelting; iron and steel production; battery manufacturing; hazardous waste and sewage sludge incineration; municipal waste combustion; petroleum refining; lime manufacturing; cement manufacturing; pulp and paper production; combustion of waste oil; pigment manufacturing; soil-derived dust; volcanoes.
Chlordane	Insecticide application ^b ; volatilization from soils, water, and treated building foundations due to past insecticide application; suspension of eroded soil particles.
DDT/DDE	Insecticide application ^b ; volatilization from soils and water due to past insecticide application.
Dieldrin	Insecticide application ^b ; volatilization from soils and water due to past insecticide application.
Hexachlorobenzene	Manufacture of chlorine and related compounds; combustion of materials containing chlorine; pesticide manufacturing; municipal waste combustion; fungicide application ^b ; volatilization from soils and water due to past fungicide application.
α -HCH	Insecticide application ^b ; volatilization from soils and water due to past insecticide application.
Lindane	Insecticide application ^b ; volatilization from soils and water due to past insecticide application.
Lead and compounds	Fossil fuel combustion; aluminum production; lead smelting; ferroalloys production; iron and steel production; battery manufacturing; hazardous waste and sewage sludge incineration; municipal waste combustion; petroleum refining; lime manufacturing; cement manufacturing; asphalt and concrete manufacturing; pulp and paper production; combustion of waste oil; paint application ^b ; motor vehicles ^b ; forest fires; suspension of eroded soil particles; volcanoes.
Mercury and compounds	Fossil fuel combustion; copper and lead smelting; hazardous waste, municipal waste, medical waste, and sewage sludge incineration; lime manufacturing; cement manufacturing; chlorine and caustic soda manufacturing; paint application ^b ; suspension of eroded soil particles; evasion from soils and water; volcanoes.
PCBs	Incineration and improper disposal of PCB-contaminated waste; disposal of waste oil; malfunction of PCB-containing transformers and capacitors; electrical equipment manufacturing; pulp and paper production; volatilization from soils and water; municipal solid waste incineration and unregulated combustion.
Polycyclic organic matter	Combustion of plant and animal biomass and fossil fuels; municipal waste combustion; petroleum refining; steel production; coke byproduct recovery; aluminum production; plywood and particle board manufacturing; surface coating of auto and light duty trucks; asphalt processing; dry cleaning (petroleum solvent); fabric printing, coating, and dyeing; forest fires.
2,3,7,8-TCDF	Hazardous, industrial, and medical waste and sewage sludge incineration; municipal waste combustion; combustion of fossil fuels and organic materials containing chlorine; byproduct of various metals recovery processes, such as copper smelting; accidental fires of treated wood products and PCB-containing transformers and capacitors; improper disposal of certain chlorinated wastes; pesticide production, application, and spills; pulp and paper production; volatilization from, and erosion of, dust from landfill sites; forest fires.
2,3,7,8-TCDD	Hazardous, industrial, and medical waste and sewage sludge incineration; municipal waste combustion; combustion of fossil fuels and organic materials containing chlorine; byproduct of various metals recovery processes, such as copper smelting; accidental fires of treated wood products and PCB-containing transformers and capacitors; improper disposal of certain chlorinated wastes; pesticide production, application, and spills; pulp and paper production; volatilization from, and erosion of, dust from landfill sites; forest fires.
Toxaphene	Insecticide application ^b ; volatilization from soils and water due to past insecticide application.
Nitrogen compounds	Fossil fuel combustion and other types of combustion; fertilizer application; animal waste.

^aData for this table are taken from References 5, 13 through 27, 71, and 72.

^bNot currently a significant source in the United States due to manufacturing restrictions.

Table 6-9
Degree of Air Cleaning Required
for
Gases and Liquid Particulate Emissions (Environmental Rating A, B, C or D)
and
Solid Particulate Emissions (Environmental Rating A or D)
but excluding
Volatile Organic Compound Emissions in the New York City Metropolitan Area*

Environmental rating	EMISSION RATE POTENTIAL (LB/HR)										
	Less than 1.0	1 to 10	10 to 20	20 to 100	100 to 500	500 to 1,000	1,000 to 1,500	1,500 to 4,000	4,000 to 10,000	10,000 and greater	
A	**	99% OR GREATER OR BEST AVAILABLE CONTROL TECHNOLOGY									
B	**	90%	91%	94%	96%	97%	97%	98%	98% or greater		
C	**	70%	75%	85%	90%	93%	95%	95%	96% or greater		
D		NO AIR CLEANING REQUIRED									

* See Table 3 of this Part for degree of air cleaning required for volatile organic compound emissions in the New York City Metropolitan Area.
 ** Degree of air cleaning required shall be specified by the commissioner.

6.9. State Pollution Discharge Elimination System

6.9.1. Background:

Use impairments addressed: See Table 6-1.

Affected water bodies: Lake Ontario, the Genesee River, and other surface and groundwaters that receive point discharges.

Date program initiated: In 1973, New York passed the State Pollutant Discharge Elimination System Act (SPDES) which provides for state permits for point source discharges, in conformance with the 1972 federal Water Pollution Control Act.

Completed or ongoing? Ongoing

Additional information:

Before the enactment of federal and state water quality legislation, the functions of rivers, streams, lakes, wetlands and groundwater were threatened by their use as dumping places for human and industrial wastes. Since legislation was enacted, progress has been made in protecting water quality for drinking, aquatic habitat, and recreation.

6.9.2. Program: State Pollution Discharge Elimination System (SPDES)

6.9.2.1. Program description:

The New York State Department of Environmental Conservation (NYSDEC) Division of Water regulates point source discharges to surface waters and groundwater through the SPDES permit program. SPDES permits limit the amounts and concentrations of pollutants in wastewater and are written to assure that New York State water quality standards are met. Limits are based upon achieving minimum waste treatment technology, further treatment to meet the water quality standard of the receiving water for the contaminant, other known sources of the contaminant up- and downstream, and the analytical methods' detection limits for the substances. To control pollutant concentrations, some industrial source owners are required to pretreat wastewater before discharging it to a sewer system (see Chapter 6 section on "Industrial pretreatment program"). Another component of the SPDES program is wastewater treatment plant and collection system operations.

6.9.2.2. Cost and/or sources of funding: The cost is for staff time for NYSDEC regional and Albany offices, and for the applicant. Sources of funding are NYSDEC and those regulated.

6.9.2.3. Current responsible entity: NYSDEC

6.9.2.4. Effectiveness:

Several NYSDEC programs, collectively, have been effective in reducing point source discharges. The SPDES program is the core program for the NYSDEC Division of Water. SPDES is New York State's implementation of the National Pollution Discharge Elimination System under the federal Clean Water Act. The upgrading of wastewater treatment plants from primary to secondary and tertiary treatment technology, mandated by the Clean Water Act, has contributed very significantly to point source discharge reductions in New York. Other NYSDEC programs that contribute to reductions are:

- Industrial pretreatment program (see Chapter 6 section on "Industrial Pretreatment Program")
- Environmental Benefit Permit Strategy (see Chapter 6 section on "Environmental Benefit Permit Strategy for renewing SPDES permits")
- Pollution prevention (see Chapter 6 section on "New York State pollution prevention")

Loading data

Phosphorus, lead, cadmium, silver, cyanide and methylene chloride are chemicals of concern in the Rochester Embayment that have shown significant *reductions* in point source discharge loadings within the last six years. Mercury and bis (2-ethylhexyl) phthalate are examples of chemicals of concern in the Embayment that have shown *increased* loadings within the last six years. Increases may have one or more of the following causes:

- New companies and new products.
- Increased use of chemicals due to increased production or use of new chemicals.
- Increased use of municipal systems by industrial dischargers.
- Population growth resulting in increased discharge to wastewater treatment plants.
- Improved capture and treatment of stormwater and reduction of combined sewer overflows.

Parameters, as reported to the NYSDEC, may show increases due to:

- Increased numbers of parameters in permits required to be analyzed and reported.
- Improved reporting.
- Improved analytical methods and lower detection limits.
- Difficulties in computing loadings.

Because of the many variables affecting the reporting of point source discharge loadings, it is important to look at long-term (periods of 10-20 years) rather than short-term trends.

Macroinvertebrate Data

Since 1972 the NYSDEC Stream Biomonitoring Unit has been using benthic macroinvertebrate communities to monitor and assess water quality in New York streams. In 1993 NYSDEC published 20 Year Trends in Water Quality of Rivers and Streams in New York State Based on

Macroinvertebrate Data 1972-1992. Its purpose was to provide a summary of findings on rivers and streams, and to examine temporal trends in water quality.

One indicator of water ecosystem health is the abundance and diversity of macroinvertebrates. Segments of the Genesee River drainage basin for which there is macroinvertebrate data for both the 1970s and the 1990s show either improvement in water quality or no change. None of the testing sites showed a decrease in water quality. Probable reasons for improvement in water quality are given below, if available. In some cases, improvement in water quality cannot be attributed to a single source, but may result from several factors working simultaneously.

Improved

- Barge Canal, west of Genesee River (sampled 1975, 1981): Improvements in industrial discharges and airport storm sewer.
- Canaseraga Creek, Mt. Morris (sampled 1973, 1989, 1990): The Dansville Sewage Treatment Plant upgrade in 1978.
- Genesee River, Wellsville (sampled 1973, 1984): The Wellsville Wastewater Treatment Plant upgrade in 1977.
- Genesee River, Scio (sampled 1973, 1989, 1990): The Wellsville Wastewater Treatment Plant upgrade in 1977.
- Genesee River, Avon (sampled 1974, 1980, 1989, 1990): Not correlated with any improvements in upstream discharges.
- Genesee River, Rochester, above canal (sampled 1974, 1980, 1989, 1990, 1992): Improvement from 1974 to 1990. Samples in 1992 showed a return to near-1974 levels. Changes in discharge from Gates-Chili-Ogden Sewage Treatment Plant.
- Genesee River, Rochester, below canal (sampled 1974, 1980, 1992).
- Genesee River, Rochester, near mouth (1974, 1980, 1989, 1990, 1992).
- Knight Creek, Allentown (sampled 1977, 1991): Decrease in production levels and discharge from crude oil production.
- Knight Creek, Scio (sampled 1977, 1991): Decrease in production levels and discharge from crude oil production.

No change

- Barge Canal, east of Genesee River (sampled 1974, 1975, 1980).
- Oatka Creek, Garbutt (sampled 1973, 1989, 1990).

Water Chemistry Data

A Routine Network monitoring site (now part of the Rotating Intensive Basin Studies program) was established in 1968 on the Genesee River near its mouth in Rochester. The sampling site is at milepoint 2.6 at the Genesee Dock off Boxart Street. The 1995 monitoring report compares current data with that for the past 20 or 25 years:

Ammonia: A significant downward trend over the past 25 years. Over the most recent 10-year

period, the downward trend is reduced, but still significant.

Nitrate + Nitrite: An upward trend over the past 25 years. Data from the most recent ten years reveals no trend.

Total phosphate: No clear trend over either the past 25 years or the most recent 10 years.

Dissolved Oxygen (% saturation): An upward trend for over the past 25 years. A lesser downward trend over the most recent 10 years.

Metals: Trends not given. Gives the % of samples over the assessment criteria and median to criteria ratio from 1987 to 1993 for metals of concern. The RIBS assessment criteria are parameter-specific threshold values that are loosely based on numerical water quality standards or guidance values adopted by the New York State Department of Environmental Conservation (NYSDEC).

	<u>Percent over criteria</u>	<u>criteria</u>
Aluminum	34.3%	1000 $\mu\text{g/l}$
Cadmium	17.1%	1.8 $\mu\text{g/l}$
Iron	90.5%	300 $\mu\text{g/l}$
Lead	16.7%	7 $\mu\text{g/l}$
Zinc	31.7%	30 $\mu\text{g/l}$

Volatile Halogenated Organics: Trends not given. The % of samples over the assessment criteria of 1 $\mu\text{g/l}$ over the period 1987-1993 for methylene chloride is 32.4%. Chloroform, trichloroethene, bromodichloromethane, and dibromochloromethane have been detected at or above the minimum reporting limits more than 10% of the time.

Phenolic Compounds: From 1987 to 1993, 23.1% of samples reveal concentrations over the assessment criteria.

Author: Carole Beal

6.10. Environmental Benefit Permit Strategy for renewing SPDES permits

6.10.1. Background:

Use impairments addressed: See Table 6-1

Affected water bodies: Lake Ontario, Genesee River, and other surface waters that receive point discharges

Date program initiated: The New York State Department of Environmental Conservation (NYSDEC) Division of Water initiated the Environmental Benefit Permit Strategy (EBPS) in 1992. A new New York State law, Chapter 701 of the laws of 1994, requires NYSDEC to hold hearings to take comments on the Priority Ranking System.

Completed or ongoing? Ongoing

Additional information:

The New York State Division of Water, which reviews State Pollution Discharge Elimination System (SPDES) permits, has been faced with more numerous and more complex permits, at a time when staffing levels have decreased. The backlog of permits needing review has been as high as 450 permits. Some permits that needed modification might be at the bottom of the chronological pile. Other permits that needed only renewal were subjected to the same rigorous technical review as those requiring major modifications. It became necessary to find a more efficient way to address environmental concerns and to use staff time.

6.10.2. Program: Environmental Benefit Permit Strategy

6.10.2.1. Program description:

Point source discharge permits are now given priority for modification based on their water quality benefits. If a permit needs modification for any reason, such as a change in regulations, a change in the operation of the industry, or a compliance problem, it will be reviewed in priority order, based on the environmental benefits of the modification.

The permits receive "points" for Priority Ranking Factors, such as:

- Needs to conform to state combined sewer overflow strategy;
- Needs to add industrial pretreatment requirements or industrial best management practices;
- A water quality standards violation or a water use impairment exists;
- Need for antidegradation.

(See also Figure 6-1: Priority Ranking Factors for SPDES Permit Modifications form.)

Each Priority Ranking Factor is multiplied by a "water quality enhancement multiplier" that indicates how likely the SPDES permit is to improve water quality or to eliminate a use impairment, as follows:

- 10 points - Likely to cause a major improvement to water quality; will eliminate a water quality standards violation or a use impairment; will correct other important environmental problems.
- 5 points - Will result in some significant reduction of contribution to a waterbody with a standard violation, use impairment or serious environmental problem. Violation or impairment will not be eliminated by the modification.
- 2 points - Will have little or no effect on a standards violation, use impairment or serious environmental problem.

More points are then added to the score for each year that has elapsed since the facility conducted comprehensive effluent sampling. The total score reflects the facility's priority for review.

There is no Permit Ranking Factor that specifically considers whether or not the discharge is to a tributary to an Area of Concern. However, item #5a on the Priority Ranking Factors form (Figure 6-1) is designed to include RAP considerations under the bioaccumulative/persistent toxics factor. This factor value is among the highest in determining a priority score.

The Permit Priority Ranking System is maintained on a computer in the Bureau of Wastewater Facilities Design (BWFD) in the Division of Water at NYSDEC in Albany, and permits are prioritized only at the Albany office. The database is accessible to NYSDEC staff and, within the constraints of the Freedom of Information Act, accessible to the public. By filling out portions of a SPDES Priority Ranking Work Sheet (see copy at end of section) and sending it to BWFD, any Division of Water staff person can influence the relative priority of any major or significant minor SPDES permit. BWFD will initiate the systematic process to prioritize permits, and will formally solicit the involvement of other bureaus and the regional staff.

Permit renewals are carried out by a simple one-page administrative procedure whenever it is time to renew, whether or not the EBPS process is being used for modification.

The NYSDEC held workshops at three locations in the State in March-April 1995. NYSDEC was seeking comments on the effectiveness of the ranking system and whether or not the right permits are being put at the top of the priority list. The workshops will not be repeated unless there is a substantive change in the EBPS process.

Information about the ranking of a facility and permit renewal will be made available in several ways:

- A list of the top facilities (about 400) on the list will be published annually in the Environmental Notice Bulletin. The first listing was expected to be May 1995.
- Permit renewals are required by law to be published on an ongoing basis in the Environmental Notice Bulletin.

- When it is time for a facility's permit renewal, a fact sheet on the facility will be available and it will include the facility's ranking.
- Any substantive comment of a problem at a facility can be made in the form of a letter. The comment may change a facility's total score.
- Other information can be obtained from NYSDEC Division of Water in Albany through the Freedom of Information Act.

6.10.2.2. Costs and/or sources of funding: NYSDEC

6.10.2.3. Current responsible entity: NYSDEC

6.10.2.4. Effectiveness:

The NYSDEC considers the EBPS to be effective because it focuses NYSDEC Division of Water staff time on permits with the greatest potential water quality benefits. It should eventually help to ease the backlog of permit renewals, and decrease the time, paperwork and cost of permit renewals. Private citizens, as well as professionals, can participate in determining the priority rank of a permit.

Eastman Kodak Company is the only example in the Genesee River basin that was handled earlier because of its EBPS scoring. The permit was dealt with five to seven years sooner under the EBPS system than it would have been otherwise. (The exact number of years is unknown, because the length of time it would have taken to renew the permit under the old system is unknown. Permit renewal can take several years.)

Below are comments that the EBPS has received and, in some cases, responses from NYSDEC to those comments:

- It is designed to automatically renew permits.
- Permits get high priority for review based on issues that NYSDEC wants to address. (NYSDEC response: They are issues that NYSDEC *needs* to address.)
- The priority selection process has the effect of setting policy. (NYSDEC response: The reverse is true. Policy established the priority selection process.)
- The public does not have enough input into the priority ranking process. (NYSDEC response: NYSDEC disagrees. Notification and comment aspects haven't changed. The priority ranking process involved public participation.)
- Due to the complexity of major discharge permits, many medium- to small-size discharge permits will not be evaluated for long periods of time. (NYSDEC response: True if the following phrase is added - "...if no changes occur in the raw wastewater, stream classification, and standards.")

Author: Carole Beal

Figure 6 - 1
PRIORITY RANKING FACTORS FOR SPDES PERMIT MODIFICATIONS

Factor No.	PERMIT PRIORITY FACTORS	FACTOR VALUE
1.	Permit needs to be Modified to conform to the State CSO Strategy.	Primary 10 Secondary 5
2.	Permit needs to be Modified to Incorporate Multi-Media Waste Reduction Requirements. (permit for a listed facility)	10
3.	Permit needs to be Modified to add Industrial Pretreatment requirements.	Primary 10 Secondary 5
4.	Permit needs to be Modified to add Industrial Best Management Practice(BMP) or Storm water requirements.	Primary 5 Secondary 2
5.	Permit needs to be Modified for one effluent limit parameter. (Rate separately for each parameter; both surface and groundwater)	
	a. Bio Accumulative/Persistent Toxic(PCB, Dioxin, etc.)	10
	b. Parameter Change for completed Stream Reclass, new W.Q. Standard or Important Substance relative to water quality.	5
	c. Other minor parameter (e.g. Water Treatment Chemicals, pH, temperature, suspended solids, action level, etc. not associated with water quality)	2
6.	Permit needs to be adjusted for a new wastewater treatment technology requirement for a parameter not identified in #5 above:	
	a. New EPA Technology Regulation; BAT, BCT or New Source	5
	b. Change in BPJ evaluation	2
7.	Permit Needs to be adjusted due to Consent Order or Permit Non-Compliance Issue.	10
8.	Permit Change is Associated with Economic Development. (e.g. facility expansion will be significant local economic stimulation)	10
9.	Permit is for an existing facility which Triggers Antidegradation.	5
10.	Permit appears on a USEPA 304(l) Toxic list and requires an Individual Control Strategy (ICS).	5
11.	Permit is a municipal STP project on the State Revolving Fund loan list.	5
12.	Permittee has requested modification to relax monitoring frequency, change monitoring location or other minor change.	2
13.	Permit Needs Toxicity Testing	5
14.	Permit generated substantial public concern	10
15.	Permit is a power plant needing modification for fish impingement or other F&W studies	10

PERMIT PRIORITY LONGEVITY SCORE

Five points will be added to the priority ranking score of a particular permit for each year that has elapsed since the last time the permitted facility was required to submit a Long Form SPDES permit Application together with comprehensive sampling of the effluent.

6.11. Industrial Pretreatment Program

6.11.1. Background:

Use impairments addressed: See Table 6-1

Affected water body: Monroe County's industrial pretreatment program affects Lake Ontario, Genesee River, tributaries downstream of wastewater treatment plants. (Monroe County's wastewater treatment plants discharge to Lake Ontario beyond the Rochester Embayment or to the Genesee River.)

Date program initiated: The federal Clean Water Act was passed in 1977. However, the City of Rochester initiated a preliminary industrial waste control program in the middle 1960s. Monroe County assumed responsibility for the program in 1971. The County used the upgrading of the Frank E. Van Lare Treatment Plant from primary to secondary treatment in 1976, as a basis for requiring more control and industrial treatment prior to discharge to a County treatment plant. In 1984, the U.S. Environmental Protection Agency (EPA) approved Monroe County's Pretreatment Program. Monroe County became the first control authority for implementing and enforcing federal regulations in the State of New York, and enforces the Local Monroe County Sewer Use Law as well.

Completed or ongoing? Ongoing

Additional information:

The purpose of the Industrial Pretreatment Program is to protect municipal wastewater treatment plants, known as Publicly Owned Treatment Works (POTWs), from pollutants in wastewater discharges which may pass through or interfere with treatment processes or which may contaminate sewage sludge. The pretreatment program protects employees at POTWs and facilities from the potential danger of flammable and explosive chemicals or chemicals generating toxic or harmful vapors or gases. The program also helps to protect surface waters.

Under the federal Clean Water Act, any POTW, or combination of POTWs operated by the same authority, will be required to establish a pretreatment program if:

- It has a total design flow greater than five million gallons per day, and
- It receives pollutants from industrial users that may interfere with the operation of the POTW or are otherwise subject to pretreatment standards.

Federal regulations for pretreatment, under the Clean Water Act, apply to "significant industrial users":

- All industrial users subject to Categorical Pretreatment Standards (categories defined by type of industry).
- Any other industrial user that: (1) discharges an average of 25,000 gallons per day or

more of process wastewater, (2) contributes a process wastewater stream which makes up 5% or more of the average dry weather capacity of the POTW, or (3) is designated as such by a defined authority because the user has a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard.

Each industrial user operates under a permit that establishes specific discharge limits, prohibitions and requirements for use of the public sewer system to ensure that its wastewater can be effectively treated at the POTW and to protect POTW employees and facilities. Industrial users are required to comply with permit limitations by eliminating or removing pollutants to acceptable permitted levels. The pretreatment program (officially overseen by the U.S. Environmental Protection Agency in the State of New York) enables POTWs to comply with their New York State Pollution Discharge Elimination System (SPDES) permits and federal sludge regulations.

New York State Department of Environmental Conservation (NYSDEC) Region 8 POTWs in the Rochester Embayment watershed that have industrial pretreatment programs are the following:

Webster, Monroe County

Monroe County Department of Pure Waters (includes Gates-Ogden-Chili, Frank E. Van Lare, and Northwest Quadrant Treatment Plants)

Other POTWs, that do not have formal approved pretreatment programs, have partial pretreatment program requirements called "mini-pretreatment programs" contained in their SPDES discharge permits. The following POTWs have mini-pretreatment programs:

Holley, Orleans County

Avon, Livingston County

Honeoye Falls, Monroe County, has a working mini-pretreatment program. All industrial users are in compliance. The permit will be modified to include a formal mini-pretreatment program at the next renewal.

6.11.2. Program: Monroe County's Industrial Pretreatment Program

6.11.2.1. Program description:

Monroe County's program can be used as an example of how an industrial pretreatment program works. Monroe County's Industrial Pretreatment Program is designed primarily to regulate the quantity and quality of industrial wastewater discharges. The program protects facilities, their employees, and surface water resources. Monroe County's Sewer Use Law and Rules and Regulations, as well as the federal pretreatment program, give the County the legal authority to implement the program.

The County grants industries a permit with specific discharge limitations and prohibitions,

inspects them annually, and samples and tests their discharges for a period of up to four days per year for compliance. Industrial users also must self-monitor their discharge quality. The industrial users have made large financial investments in the design, construction and operation of physical/chemical treatment plants that pretreat their process discharges before entering the County sewer system.

The program requires that industrial users develop and implement spill prevention plans to protect the system from the potential damages that could be caused by spills of toxic chemicals or those which cannot be treated at the municipal plants. The users are required to sample and test their discharges for a variety of pollutants and report these findings to the County on a regular basis. They are subject to enforcement actions if found in noncompliance.

6.11.2.2. Costs and/or funding: The Monroe County budget for industrial pretreatment activity is approximately \$470,000 per year. The source of funding is user fees.

6.11.2.3. Current responsible entity: Monroe County Department of Environmental Services, Division of Pure Waters.

6.11.2.4. Effectiveness:

Currently there are 160 permitted industrial users in the program. Monroe County's three wastewater treatment plants consistently comply with the SPDES permit requirements. There have not been any adverse conditions resultant from industrial discharge activity, either reported by the sewer maintenance section of the Department or by wastewater treatment plant operators. Industrial users are generally in compliance with the program. Those industrial users defined as being in significant noncompliance are published annually in the local newspaper. The pretreatment section of the Department works closely with those users in noncompliance to rectify and remedy any problems in a timely manner.

An example of the effectiveness of the Industrial Pretreatment Program in Monroe County is McAlpin Industries, Monroe Plating Division, which was motivated by the Program to make process changes. From 1989 through 1992 the Company was producing only ten hours per day. Increased production was not possible because the pretreatment system was operating at maximum rates of 24 hours per day to meet the pretreatment discharge limits of 1.47 ppm zinc and 1.71 ppm chromium. In 1994 the Company integrated two new waste treatment technologies into its pretreatment system:

- Ion exchange to treat rinse water with low total dissolved solids and send it back into production. The recycling of water saves 40% of water usage compared with 1992.
- A membrane filtration system to remove metal from rinse water with high total dissolved solids and discharge the treated water to the sewer system. The unit can remove the metals to as low as 0.1 ppm.

As a result of the two new technologies, the Company was able to increase production to 24 hours per day and still meet pretreatment discharge limits. There have also been economic

benefits to the company. The total savings for waste disposal costs, purchase of chemicals, and water usage is \$42,000 per year, based on an eight-hour per day production schedule. The payback period for the project on this basis is 5.7 years.

A comparison of the company's discharges before and after the new technologies were installed is shown in the table:

Table 6-10. McAlpin Industries Discharges Before and After New Technologies

	Former Technologies		New Technologies	
	1992	1993	1994	1995
Average daily production hours	10	10	24	24
Average concentration zinc in effluent discharge, ppm	0.90	0.46	0.50	0.26
Average concentration chromium in effluent discharge, ppm	0.46	0.34	0.19	0.07
Average monthly water consumption, gallons	1,500,000	1,500,000	1,200,000	900,000

For its achievement, McAlpin Industries received an Industry Award for Pollution Prevention and Waste Minimization from the Genesee Valley Chapter of the New York Water Environment Association.

An Association of Metropolitan Sewerage Agencies Bulletin states that, while measures of environmental quality are useful to assess the aggregate performance of all water quality programs, few can be linked unambiguously to the pretreatment program alone. Other factors that contribute to improving water quality are itemized in the Chapter 6 section on "State Pollution Discharge Elimination System." (See also Chapter 6 sections on "New York State pollution prevention," and "Kodak wastewater treatment plant.")

Authors: Michael Schifano, Carole Beal

6.12. Federal Stormwater Regulations

6.12.1. Background:

Use impairments addressed: See Table 6-1

Affected water body: All waterbodies in the Rochester Embayment watershed downstream from a construction or industrial site, groundwater

Date program initiated: August 1, 1993

Completed or ongoing? Ongoing

Additional information:

Stormwater runoff from developing areas can lead to offsite problems including flooding, erosion, and water quality degradation. By changing land cover on developing sites, there can be reduced infiltration into the soil, decreased interception of precipitation by vegetation, and changes in the timing of runoff.

Additionally, pollutants, such as sediment, oil, grease, metals and nutrients, can be washed off impervious areas during storm events and be transported to the waters of the Rochester Embayment. If the impervious surface is within an industrial site, a wider variety of chemicals in trace amounts may be transported to waterways.

Regulations, published in the Federal Register on November 16, 1990, list eleven industrial activities (including construction) that are required to have permits for stormwater runoff. In New York State, the Department of Environmental Conservation (NYSDEC) developed a program that was approved by the U.S. Environmental Protection Agency for issuing these permits in accordance with the federal stormwater regulations.

The program includes two general permits for stormwater discharges:

- Discharges associated with construction activities (General Permit GP-93-06).
- Discharges associated with ten industrial categories, except construction (General Permit No. GP-93-05).

The permits were initiated on August 1, 1993, and will expire on August 1, 1998, after which NYSDEC expects to re-issue new general permits, with or without changes.

To be subject to the stormwater regulations, the following are necessary:

- The activity must be one of those identified in federal regulation 40 CFR Section 122.26(b)(14), which lists the 11 categories (see Table 6-11).
- There must be some sort of conveyance system, man-made or otherwise, which collects

- and conveys stormwater from the property and enables sampling of the runoff.
- There must be a point source discharge to waters of the United States.

6.12.2. Program: General Permit for Stormwater Discharges Associated with Construction Activity

6.12.2.1. Program description:

Only construction projects which result in clearing, grading and excavation of five or more acres of land are required to obtain coverage under the permit. To comply with the permit, the applicant must:

- Pay the annual regulatory fee.
- File a Notice of Intent (NOI) at least two days in advance of any clearing or earth moving activity.
- Prepare a Stormwater Pollution Prevention Plan (SP3).
- File a Notice of Termination (NOT) when the construction project is completed.

The SP3 is a comprehensive document with a set of drawings that identifies potential sources of pollution expected to affect water quality and that details methods to reduce these pollutants.

The plan has two components:

- Construction-phase erosion and sediment control.
- Long-term stormwater management.

The plan must be retained on site and a copy must be sent to the local governing body. (In Monroe County a copy must also be sent to the Department of Health.)

6.12.2.2. Costs and/or sources of funding:

Costs to applicant: annual fee of \$50, staff time of developer's engineer to develop plans, costs of implementation. It may take the developer's engineer substantial time to set up the process the first time a plan is prepared. If the town already has erosion and sediment control regulations, the new permit requires minimal additional time after that.

Costs to local governing body: staff time to review plans.

Sources of funding: Currently, educational programs to inform target audiences about SPDES permit compliance are being funded by the NYSDEC.

6.12.2.3. Current responsible entity: The enforcement of SPDES is the responsibility of the NYSDEC which has held a series of workshops explaining permit requirements to civic engineers, land developers, contractors, and municipalities. (In Monroe County, compliance is checked by the Monroe County Stormwater Management Specialist of the Soil and Water Conservation District, Monroe County Department of Health, and municipal staff. See also Chapter 6 section on "Stormwater Management Specialist.")

6.12.2.4. Effectiveness:

The permit addresses water quality and nonpoint source pollution problems created by construction and subsequent development by requiring that post-development stormwater runoff, and stormwater pollutant loads do not exceed pre-existing conditions. The permit also has the objective of protecting and maintaining existing stream corridors. The general permit enables NYSDEC to provide coverage of activities which would not otherwise be covered by an individual SPDES permit.

There are three factors that limit the effectiveness of the stormwater permit:

Lack of awareness Across the state, many municipalities and many developers are unaware of the new permit requirement. There is a need for more information to be distributed on the subject. In Monroe County the Development Review Committee (see Chapter 6 section on "Erosion and sediment control") increases awareness among developers by including the information in development reviews for projects of at least five acres.

Lack of review Even if a plan is prepared, NYSDEC does not have the resources to review it, unless it is for a major project. In some counties, it may not be reviewed by the municipality.

Lack of monitoring NYSDEC does not have the resources to routinely field-check the construction sites.

The new permit may be somewhat duplicative of erosion and sediment control regulations in municipalities. (However, no town in Monroe County currently has regulations that are stricter than the nonpoint SPDES permit.)

6.12.3. Program: General Permit for Stormwater Discharges Associated with Industrial Activity

6.12.3.1. Program description:

The industrial activities that are subject to stormwater permitting are defined in terms of either a facility's primary Standard Industrial Classification (SIC) code, or by a general description of the activity, as listed in the federal regulations (see Table 6-11). Any stormwater discharge to a publicly owned treatment works or to a sanitary sewer is exempt from stormwater permit application requirements. A stormwater discharge permit has been required for some of these categories for many years.

To obtain coverage under the general permit, a discharger must:

- Pay the annual regulatory fee.
- Submit a Notice of Intent.
- Develop and implement a stormwater pollution prevention plan, which is not submitted to NYSDEC, but is kept onsite and continually updated.
- Submit a Notice of Termination when the activity either changes ownership or is no longer subject to the federal regulations.

6.12.3.2. Costs and/or sources of funding:

Cost to applicant: Annual regulatory fee of \$50 plus site-specific costs.

Monroe County's Van Lare Wastewater Treatment Plant is being used as an example of cost to a municipality. It cost the County \$3,000 to pay a consultant to develop the pollution prevention plan, plus over 100 hours of county staff time to assist, and review and revise the plan. More time will be required in the future to keep the plan current.

Sources of funding: NYSDEC (for enforcement); industry (for compliance)

6.12.3.3. Current responsible entity: NYSDEC; industry; municipalities

6.12.3.4. Effectiveness:

The general permit will enable NYSDEC to provide oversight for activities whose stormwater discharges are not covered by an individual site-specific SPDES permit.

In the case of industrial activities, the amount of detail required in the stormwater pollution prevention plan would make it effective if a facility is in compliance. The plan must include:

- A facility pollution prevention team or individual.
- Description of potential pollutant sources.
- Drainage plan.
- Inventory of exposed materials.
- List of significant spills and leaks that have occurred.
- Sampling data.
- Preventive maintenance measures.
- Spill and response procedures.
- Requirement for inspection by facility personnel.
- Employee training.
- Sediment and erosion control plan.
- Plan for management of runoff.

However, overall lack of monitoring by government agencies may make the effectiveness of the general permit depend on the conscientiousness of facility personnel. NYSDEC spot-checks facilities for the existence of a pollution prevention plan, and reacts to complaints. If NYSDEC checks a facility and finds that no plan has been developed, the facility will be given 90 days to develop a plan.

According to NYSDEC, most problems involving industrial activities can be detected, and the agency will respond to the problems. NYSDEC does not expect many problems with industrial facilities under the general permit, because facilities often have another discharge permit that covers stormwater.

Authors: Paula Smith, Carole Beal

Table 6-11
"Discharges Associated With Industrial Activity (Phase 1)"

40 CFR 122.26(a)(4) Subpart	Description																		
(i)	Facilities subject to storm water effluent limitations guidelines, new performance standards, or toxic pollutants effluent standards under 40 CFR, Subchapter N (except facilities which are exempt under category (d)).																		
(ii)	<p>Facilities classified as:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">SIC 24 (except 2434)</td> <td>Lumber and Wood Products</td> </tr> <tr> <td>SIC 26 (except 265 and 267) .</td> <td>Paper and Allied Products</td> </tr> <tr> <td>SIC 28 (except 283 and 285) .</td> <td>Chemicals and Allied Products</td> </tr> <tr> <td>SIC 29</td> <td>Petroleum and Coal Products</td> </tr> <tr> <td>SIC 311</td> <td>Leather Tanning and Finishing</td> </tr> <tr> <td>SIC 32 (except 323)</td> <td>Stone, Clay and Glass Products</td> </tr> <tr> <td>SIC 33</td> <td>Primary Metals Industries</td> </tr> <tr> <td>SIC 3441</td> <td>Fabricated Structural Metal</td> </tr> <tr> <td>SIC 373</td> <td>Ship and Boat Building and Repairing</td> </tr> </table>	SIC 24 (except 2434)	Lumber and Wood Products	SIC 26 (except 265 and 267) .	Paper and Allied Products	SIC 28 (except 283 and 285) .	Chemicals and Allied Products	SIC 29	Petroleum and Coal Products	SIC 311	Leather Tanning and Finishing	SIC 32 (except 323)	Stone, Clay and Glass Products	SIC 33	Primary Metals Industries	SIC 3441	Fabricated Structural Metal	SIC 373	Ship and Boat Building and Repairing
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SIC 33	Primary Metals Industries																		
SIC 3441	Fabricated Structural Metal																		
SIC 373	Ship and Boat Building and Repairing																		
(iii)	<p>Facilities classified as SIC 10 through 14, including active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with, or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts, or waste products located on the site of such operations.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">SIC 10</td> <td>Metal Mining</td> </tr> <tr> <td>SIC 11</td> <td>Anthracite Mining</td> </tr> <tr> <td>SIC 12</td> <td>Coal Mining</td> </tr> <tr> <td>SIC 13</td> <td>Oil and Gas Extraction</td> </tr> <tr> <td>SIC 14</td> <td>Nonmetallic Minerals, except Fuels</td> </tr> </table>	SIC 10	Metal Mining	SIC 11	Anthracite Mining	SIC 12	Coal Mining	SIC 13	Oil and Gas Extraction	SIC 14	Nonmetallic Minerals, except Fuels								
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SIC 13	Oil and Gas Extraction																		
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(iv)	Hazardous waste treatment, storage or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of the Resource Conservation and Recovery Act (RCRA).																		
(v)	Landfills, land application sites, and open dumps that receive or have received any industrial wastes including those that are subject to regulation under subtitle D or RCRA																		
(vi)	<p>Facilities involved in the recycling of material, including metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but not limited to those classified as:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">SIC 5015</td> <td>Motor Vehicle Parts, Used</td> </tr> <tr> <td>SIC 5093</td> <td>Scrap and Waste Materials</td> </tr> </table>	SIC 5015	Motor Vehicle Parts, Used	SIC 5093	Scrap and Waste Materials														
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SIC 5093	Scrap and Waste Materials																		
(vii)	Steam electric power generating facilities, including coal handling sites.																		
(viii)	<p>Transportation facilities which have vehicle maintenance shops, equipment cleaning operations, or airport de-icing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or airport de-icing operations, or which are otherwise listed in another category, are included.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">SIC 40</td> <td>Railroad Transportation</td> </tr> <tr> <td>SIC 41</td> <td>Local and Suburban Transit</td> </tr> <tr> <td>SIC 42 (except 4221-4225) ...</td> <td>Motor Freight and Warehousing</td> </tr> <tr> <td>SIC 43</td> <td>U.S. Postal Service</td> </tr> <tr> <td>SIC 44</td> <td>Water Transportation</td> </tr> <tr> <td>SIC 45</td> <td>Air Transportation</td> </tr> <tr> <td>SIC 5171</td> <td>Petroleum Bulk Storage and Terminals</td> </tr> </table>	SIC 40	Railroad Transportation	SIC 41	Local and Suburban Transit	SIC 42 (except 4221-4225) ...	Motor Freight and Warehousing	SIC 43	U.S. Postal Service	SIC 44	Water Transportation	SIC 45	Air Transportation	SIC 5171	Petroleum Bulk Storage and Terminals				
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(ix)	Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including lands dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 million gallons per day or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens, or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with Section 405 of the Clean Water Act.																																														
(x)	Construction activity including clearing, grading, and excavation activities except operations that result in the disturbance of less than five (5) acres of total land area and those that are not part of a larger common plan of development or sale.																																														
(xi)	<p>Facilities under the following SICs [which are not otherwise included in categories (ii) through (x)], including only storm water discharges where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, byproducts, or industrial machinery are exposed to storm water.</p> <table data-bbox="298 562 1182 1224"> <tr><td>SIC 20</td><td>Food and Kindred Products</td></tr> <tr><td>SIC 21</td><td>Tobacco Products</td></tr> <tr><td>SIC 22</td><td>Textile Mill Products</td></tr> <tr><td>SIC 23</td><td>Apparel and Other Textile Products</td></tr> <tr><td>SIC 2434</td><td>Wood Kitchen Cabinets</td></tr> <tr><td>SIC 25</td><td>Furniture and Fixtures</td></tr> <tr><td>SIC 265</td><td>Paperboard Containers and Boxes</td></tr> <tr><td>SIC 267</td><td>Converted Paper and Paper Board Products (except containers and boxes)</td></tr> <tr><td>SIC 27</td><td>Printing and Publishing</td></tr> <tr><td>SIC 283</td><td>Drugs</td></tr> <tr><td>SIC 285</td><td>Paints, Varnishes, Lacquer, Enamels</td></tr> <tr><td>SIC 30</td><td>Rubber and Miscellaneous Plastics Products</td></tr> <tr><td>SIC 31 (except 311)</td><td>Leather and Leather Products</td></tr> <tr><td>SIC 323</td><td>Products of Purchased Glass</td></tr> <tr><td>SIC 34 (except 3441)</td><td>Fabricated Metal Products</td></tr> <tr><td>SIC 35</td><td>Industrial Machinery and Equipment, except Electrical</td></tr> <tr><td>SIC 36</td><td>Electronic and Other Electric Equipment</td></tr> <tr><td>SIC 37 (except 373)</td><td>Transportation Equipment</td></tr> <tr><td>SIC 38</td><td>Instruments and Related Products</td></tr> <tr><td>SIC 39</td><td>Miscellaneous Manufacturing Industries</td></tr> <tr><td>SIC 4221</td><td>Farm Products Warehousing and Storage</td></tr> <tr><td>SIC 4222</td><td>Refrigerated Warehousing and Storage</td></tr> <tr><td>SIC 4225</td><td>General Warehousing and Storage</td></tr> </table>	SIC 20	Food and Kindred Products	SIC 21	Tobacco Products	SIC 22	Textile Mill Products	SIC 23	Apparel and Other Textile Products	SIC 2434	Wood Kitchen Cabinets	SIC 25	Furniture and Fixtures	SIC 265	Paperboard Containers and Boxes	SIC 267	Converted Paper and Paper Board Products (except containers and boxes)	SIC 27	Printing and Publishing	SIC 283	Drugs	SIC 285	Paints, Varnishes, Lacquer, Enamels	SIC 30	Rubber and Miscellaneous Plastics Products	SIC 31 (except 311)	Leather and Leather Products	SIC 323	Products of Purchased Glass	SIC 34 (except 3441)	Fabricated Metal Products	SIC 35	Industrial Machinery and Equipment, except Electrical	SIC 36	Electronic and Other Electric Equipment	SIC 37 (except 373)	Transportation Equipment	SIC 38	Instruments and Related Products	SIC 39	Miscellaneous Manufacturing Industries	SIC 4221	Farm Products Warehousing and Storage	SIC 4222	Refrigerated Warehousing and Storage	SIC 4225	General Warehousing and Storage
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Source: Federal Register, Vol. 55, No. 222, p. 48065, November 16, 1990

Note: On June 4, 1992, the U.S. Court of Appeals for the Ninth Circuit remanded the exemption for construction sites of less than 5 acres and for manufacturing facilities in category (xi) which do not have materials or activities exposed to storm water to EPA for further rulemaking (Nos. 90-70671 & 91-70200). In response to the remands, the Agency intends to conduct further rulemakings on both the light manufacturing and the construction activities. In the December 18, 1992 Federal Register, EPA stated that it is not requiring permit applications from construction activity under five acres or light industry without exposure until this further rulemaking is completed.

The above table is taken from the draft EPA Report To Congress (October, 1993) entitled "Storm Water Discharges Potentially Addressed by Phase II of the National Pollutant Discharge Elimination System Storm Water Program" (Tables 2-4 and 4-2).

6.13. EPA pollution prevention programs

6.13.1. Background:

Use impairments addressed: See Table 6-1

Affected water bodies: Lake Ontario and tributaries; Genesee River and tributaries

Date program initiated: The federal Pollution Prevention Act and federal Clean Air Act Amendments were passed in 1990. The Environmental Protection Agency's (EPA's) Pollution Prevention Strategy and Great Lakes Pollution Prevention Action Plan were initiated in 1991.

Completed or ongoing? Ongoing

Additional information:

The federal Pollution Prevention Act established a hierarchy (ranking) of preferred waste reduction strategies to minimize waste generation and disposal:

- Prevention or reduction of pollution at the source wherever feasible (includes process changes, equipment changes, chemical substitution and reduction strategies).
- Recovery, reuse and recycling in an environmentally safe manner (onsite practices first and then offsite).
- Treatment in an environmentally safe manner where feasible and where prevention or recycling cannot be achieved.
- Disposal or other release/discharge as a last resort, conducted in an environmentally safe manner; disposal (other than treated and with safe residual) is to be phased out.

Under the Pollution Prevention Act generators are required, as part of their annual Toxic Releases Inventory (TRI) reports, to provide information regarding toxic chemical source reduction and recycling.

The EPA Pollution Prevention Strategy helps to implement the Pollution Prevention Act of 1990. The EPA Great Lakes Pollution Prevention Action Plan includes the EPA Strategy programs and others, such as Lakewide Management Plans and the Great Lakes Water Quality Initiative, that help to achieve the goals of the Great Lakes Water Quality Agreement. Pollution prevention strategies are taking place at both the federal and state levels to achieve the objectives of the Pollution Prevention Act. (See Chapter 6 sections on "Lake Ontario Lakewide Management Plan," "Great Lakes Water Quality Guidance," and "New York State pollution prevention.")

EPA strategies emphasize pollution prevention at the source, networking and information sharing among states and local governments, multimedia (air, water and land) pollution prevention, and development of voluntary partnerships among government, industry and the private sector.

Voluntary programs allow environmental results to take place more rapidly and cost-effectively than by regulation alone. The following voluntary programs focus specifically on pollution prevention for toxics.

6.13.2. Program: 33/50 Program (nationwide program)

6.13.2.1. Program description:

The 33/50 Program has been EPA's major voluntary effort for achieving pollution prevention through source reduction (the Program encouraged but did not require pollution prevention). The goal was to reduce releases and transfers of 17 high-priority toxic chemicals that are reported in the TRI:

Benzene	Methyl ethyl ketone
Carbon tetrachloride	Nickel & compounds
Chloroform	Tetrachloroethylene
Chromium & compounds	Toluene
Cyanides	1,1,1-Trichloroethane
Dichloromethane (methylene chloride)	Trichloroethylene
Lead & compounds	Xylenes
Mercury & compounds	

The Program sought a national reduction of 33% by the end of 1992 and 50% by the end of 1995. The 17 chemicals were selected according to risk to human health and the environment, and opportunity for prevention. EPA used the 1988 TRI as baseline because, at the time the program was established, the data for 1988 were the most accurate and current data available.

6.13.2.2. Costs and/or sources of funding: Sources of funding are the U.S. Environmental Protection Agency and industry.

6.13.2.3. Current responsible entity: U.S. Environmental Protection Agency, industry

6.13.2.4. Effectiveness:

According to EPA, which reports on the 33/50 Program as part of its annual report on the TRI, the program exceeded its interim goal of a 33% reduction in 1992, and achieved a 40% reduction. It is expected to exceed its goal of a 50% reduction in 1995. EPA included reductions achieved before the 33/50 Program was established (40% of the total) because it wanted to recognize accomplishments that companies made on their own before the Program's inception. Also many of the reductions reported by the Program were achieved by firms not formally participating in it. Of the reductions in releases reported from 1988 to 1992, 26% were achieved by firms not participating in the program. Although the 1,200 firms participating in the Program represent most of the largest facilities, over 6,800 firms chose not to join. Therefore, reductions in releases of the 17 chemicals cannot be attributed solely to the Program. However, EPA

believes the Program's presence influenced some of the firms not formally in it to reduce toxic releases.

Eastman Kodak Company is a company in the Rochester Embayment watershed that has participated in the 33/50 Program. In May 1991 Eastman Kodak set a corporate goal of reducing total releases and transfers of 33/50 Program chemicals by 55% by 1995 from the 1988 TRI baseline. The goal translates to a reduction of over 8.2 million pounds per year. Between 1988 and 1992 Eastman Kodak had reduced releases and transfers of 33/50 chemicals by 54% or over 8 million pounds, of which dichloromethane process changes at Kodak Park accounted for 4.7 million pounds. The Company expects to exceed its goal for 1995. Although part of Eastman Kodak's 33/50 Program goals were created from company projections and permit requirements already in place at the time of the Program's inception, the Program accelerated the rate of reduction by providing a framework for it to implement its pollution prevention program in concert with a common, recognized national goal and timetable.

6.13.3. Program: Early Reductions Program (nationwide program)

6.13.3.1. Program description:

Under the Clean Air Act Amendments of 1990, Congress gave the Environmental Protection Agency (EPA) ten years to prepare Maximum Achievable Control Technology (MACT) standards that specify the allowable emission levels for 189 toxic pollutants for all source categories. After a MACT standard is promulgated, companies will generally have up to three years to bring their facilities into compliance with the standard. Recognizing that EPA would need ten years to complete development of the standards, Congress established the Early Reductions Program to achieve reductions more quickly. According to EPA, the objective of this program is to reduce the toxic air emissions that will ultimately be regulated by the MACT standards sooner. Facilities that voluntarily reduce their hazardous air emissions by 90-95% from 1987 levels before the MACT standard is proposed may be granted an additional six years to comply with the standards once they are established.

6.13.3.2. Costs and/or sources of funding: Sources of funding are the U.S. Environmental Protection Agency and industry.

6.13.3.3. Current responsible entity: U.S. Environmental Protection Agency, industry

6.13.3.4. Effectiveness:

Participation has been limited. As of September 1994, EPA had only 40 active applications from facilities, and had approved 12 for the six-year extension. The number of facilities eligible to participate in the program is unknown, but runs into the thousands. Taking into account that the Program may have no practical application for some major sources, EPA officials estimate that fewer than 10% of the eligible facilities are participating. Factors that limit participation are:

- The difficulty of compiling base-year data.
- Uncertainty about how the States' standards will relate to the federal MACT standards. Some States may require controls that go beyond the requirements in the federal MACT standards.
- Delays in the promulgation of the MACT standards.
- The cost of pollution control equipment, given the uncertainty of control requirements.

6.13.4. Program: Design for the Environment (DfE) Program (nationwide program)

6.13.4.1. Program description:

EPA's Office of Pollution Prevention and Toxics works with businesses to facilitate information exchange and research on pollution prevention techniques. The program involves voluntary partnerships with industry, trade groups, professional organizations, state and local governments, other federal agencies, environmental groups, and the public in projects to identify and incorporate alternative products and processes. A business "designs for the environment" by:

- Implementing pollution prevention, energy efficiency, and other resource conservation measures.
- Producing and using less toxic and nontoxic materials.
- Making products that can be refurbished, disassembled, and recycled.
- Keeping track of the environmental costs associated with each product or process.

EPA's DfE projects include broad institutional projects aimed at changing general business practices, as well as more targeted joint projects with trade associations and businesses in specific industry segments.

Current institutional projects include:

- Working with the private sector to develop new and modified accounting tools that will incorporate environmental costs and benefits into accounting and capital budgeting practices.
- Research into alternative methods for producing chemicals that minimize or eliminate hazardous substances (in cooperation with the National Science Foundation).
- Establishment of a National Pollution Prevention Center at the University of Michigan, which is developing curricula which incorporate pollution prevention, life cycle analysis and DfE principles.
- Incorporation of pollution prevention into the curriculum of the American Institute of Chartered Property Casualty Underwriters certification program for Associates in Risk Management.
- Outreach to teach financial institutions how to estimate the returns on pollution prevention investments.

Current cooperative industry projects include:

- The dry cleaning project.

- The printing project.
- The cleaning products project.

6.13.4.2. Costs and/or sources of funding: Sources of funding are the U.S. Environmental Protection Agency, industry, trade groups, professional organizations, state and local governments, other federal agencies, environmental groups, and the public

6.13.4.3. Current responsible entity: U.S. Environmental Protection Agency

6.13.4.4. Effectiveness:

The Cooperative Industry Project that is furthest along is the Printing Project, aimed at small- and medium-sized screen printers. The EPA/industry partnership developed a technical evaluation of 16 chemical and technological options: 14 "substitute" options, and two "baseline" options (traditional options with which to compare). The technical report, the Screen Reclamation Cleaner Technologies Substitutes Assessment, is being distributed throughout the industry and will be used as a model for assessment of pollution prevention opportunities in other industries. In April 1995, EPA conducted the first pollution prevention conference for screen printers, which was attended by more than 100 printers.

In the screen printing industry, the main concern with water quality is due to rags that go to the laundry. The technical evaluation found that water quality is a concern only for one baseline option. The other options do not present a concern, assuming that laundry wastewater goes to a publicly owned treatment works.

Other projects currently underway are a project for dry cleaners, and one for the manufacture of printed wiring boards, which requires the use of a lot of water and some toxic chemicals.

The DfE program is not a sign-up program, and EPA does not maintain a list of companies that are benefitting from the program. Companies in the Rochester Embayment watershed have the opportunity to learn about the program through trade associations, the trade press, and state technical assistance providers.

Author: Carole Beal

6.14. New York State pollution prevention

6.14.1. Background:

Use impairments addressed: See Table 6-1

Affected water bodies: Lake Ontario and tributaries; Genesee River and tributaries

Date program initiated: New York State hazardous waste reduction planning requirements are provided for under Chapter 831 of the Laws of 1990 and ECL 27-0908. The New York State Department of Environmental Conservation (NYSDEC) Pollution Prevention Unit was established in 1992.

Completed or ongoing? Ongoing

Additional information:

New York State pollution prevention programs are consistent with the hierarchy (order of preference) established by the federal Pollution Prevention Act for addressing waste management. The hierarchy has also been adopted by New York State and is listed below:

- Source reduction.
- Reuse, recycling and recovery.
- Treatment, detoxification and other destruction methods.
- Discharges, emissions and disposal.

Therefore, pollution prevention programs in New York State should stress source reduction as much as possible.

6.14.2. Program: Multi-Media Pollution Prevention (M2P2)

6.14.2.1. Program description:

Pollution prevention and control can be achieved more efficiently if all types of pollution from a facility, and all management programs, are considered together, rather than independently. The M2P2 initiative integrates the regulatory programs of air, land and water to achieve more effective reductions in pollutant release (multi-media, M2). The program's target is the 400 facilities that generate and release 95% of the toxic chemicals to the air and waters of New York State, as identified from the federal Toxic Release Inventory (TRI). (See Table 6-12.) Along with the TRI data, NYSDEC uses permits and data for State Pollution Discharge Elimination System (SPDES), air, hazardous substances, and any other relevant information, to determine appropriate targets for reduction.

A NYSDEC team, including individuals from all programs that interact with a facility, are assigned to inspect and evaluate it. The focus is on compliance, but the team also considers

pollution prevention (P2) opportunities.

NYSDEC's Pollution Prevention Unit is responsible for M2P2 planning, coordination, information management and technical assistance. Each of the major program areas in NYSDEC (Water, Air Resources, Solid Waste, Hazardous Substances Regulation, Hazardous Waste Remediation, Spills Management, Natural Resources, Environmental Enforcement, and Regulatory Affairs) has a liaison to work with the BPP on M2P2 activities.

6.14.2.2. Costs and/or sources of funding:

M2P2 and technical assistance programs together cost \$4 million per year. Due to recent reorganization of the BPP, it may be difficult to use this number in comparison with future years.

Sources of funding: NYSDEC, industrial facilities, U.S. Environmental Protection Agency (EPA) grants

6.14.2.3. Current responsible entity: NYSDEC

6.14.2.4. Effectiveness:

According to NYSDEC, businesses are finding that, by applying M2P2 techniques, their compliance records are better, business costs are reduced, and their public image is improved. New York recognizes outstanding pollution prevention efforts by facilities through the Governor's Awards for Pollution Prevention. In 1994 one of the six winners of the award was Xerox Corporation. In 1995 Eastman Kodak Company was one of the winners. (See Chapter 6 sections on "Xerox Corporation Pollution Prevention" and "Pollution Prevention at Kodak Park".)

The M2P2 inspections have been multi-media (M2) in focus so far, and pollution prevention (P2) is not always included. In fiscal year 1993-1994 the BPP carried out mandated inspections at 45 facilities. Twenty-two of these facilities had Hazardous Waste Reduction Plans in place. Ten facilities were carrying out pollution prevention planning at their own initiative. Twenty-six facilities signed or were negotiating consent orders (agreements with facilities where problems are discovered) with NYSDEC. Of the 26, 11 facilities had pollution prevention plans included in the consent order.

The Weber-Knapp Company of Jamestown (outside the Rochester Embayment watershed), producers of metal hardware, is an example of M2P2. In 1992 an M2P2 inspection was carried out by NYSDEC staff to examine the entire facility, ensure no significant environmental problems, and understand the effects and relationships of pollutant discharges to air, water and land. The team also looked for areas where the generation and release of pollutants could be reduced. The multi-media inspection revealed only minor problems with air and bulk storage requirements, which the facility corrected. The pollution prevention inspection showed that the

facility could reduce the yearly generation of hazardous waste by segregating and separately treating electroplating and vibratory finishing wastes. After the segregation of wastes, a portion of the wastes could be classified as nonhazardous. Chautauqua Hardware, a sister facility, anticipates reducing its hazardous waste generation by 90% using the same segregation techniques suggested for Weber-Knapp. Chautauqua Hardware is now using its new equipment. It's working well and is saving \$35,000 per year. When process modifications are completed at both facilities, hazardous waste generation from wastewater treatment operations will drop from 227 to less than 50 tons per year, with a resultant savings in disposal costs.

Many feel that using waste segregation to reduce the amount of waste that is classified as hazardous is not pollution prevention. It does not reduce the amount of toxics produced at the source. The intent is to recategorize already existing wastes from hazardous to nonhazardous, thereby saving the industry money in disposal costs.

NYSDEC also investigated methods to reduce the use of trichloroethylene (TCE) at Weber-Knapp in anticipation of more stringent air emission standards under the Clean Air Act. Weber-Knapp eliminated the use of TCE entirely by installing new systems:

- New paint system that doesn't require solvents (a powder that bakes on).
- Preparatory washing system that uses water with detergents and alkali, rather than solvents, and uses a deionized water rinse.

Part of the multi-media approach is addressing contamination of groundwater and soils. As a result of an M2P2 inspection, NYSDEC, New York State Department of Health (DOH) and Diaz Chemical Corporation of Holley, Orleans County (within the Rochester Embayment watershed), entered into an agreement in 1994 to conduct a remedial investigation/feasibility study (RI/FS) on contaminated groundwater and soil at the Diaz Site. The RI/FS is a multi-phased, multi-year project to characterize and select a remedial alternative for cleanup. Diaz and NYSDEC will cooperatively develop the scope of each phase of the project. Following the completion of the RI/FS, the NYSDEC, with assistance from the New York State DOH will prepare a proposed plan for remediation, which will outline the state's preferred alternative for remediation of the site. The proposed plan for remediation will be released to the public for comment.

In addition to Diaz in Orleans County, other inspections have been completed in the Rochester Embayment watershed (see list below). With the exception of Eastman Kodak Company, NYSDEC is preparing reports on the inspections. (Because Eastman Kodak has an ongoing program, it is handled differently. NYSDEC has routine inspection reports for Eastman Kodak, but not a final summary report.) As part of each inspection, NYSDEC assisted the companies in finding pertinent references in the Pollution Prevention Clearinghouse database.

Livingston County: Elf Atochem

Monroe County: Bausch and Lomb Frame Center, Bausch and Lomb Optics Center, ITT Automotive, Eastman Kodak Company

Ontario County: Crosman Corporation

Steuben County: Gunlocke

During fiscal year 1995 (April - March 1996) NYSDEC Region 8 was to begin conducting M2P2 inspections at additional facilities. There is no guarantee that all could be completed in the fiscal year. All are in Monroe County and they will be inspected in the following order: 3M, ITT Automotive (Delco Products), Owens-Brockway Glass, Brainerd Manufacturing Company, Xerox Corporation. The inspections will focus on compliance. However, the NYSDEC team members will point out pollution prevention opportunities when they see something obvious. (Note: 3M announced on April 24, 1996, that it would close its Rochester facility.)

6.14.3. Program: Technical Assistance

6.14.3.1. Program description:

Various types of assistance are available in New York State. (Information about the following programs can be obtained from the NYSDEC Pollution Prevention Unit.)

- Annual pollution prevention conference.
- Workshops for the regulated community and for local government.
- New York State Pollution Prevention Information Clearinghouse - A free service. Consists of a library, a database of abstracted references and a computerized directory of manufacturing and consulting companies. Also obtains information from the Great Lakes Technical Resource Library and other sources.
- Pollution Prevention Guidance for Small Business and Local Government - Summarizes information on regulations and techniques.
- Environmental Self-Audit for Small Businesses - A resource guide to evaluate compliance.
- Fact Sheets - Pollution prevention success stories at specific facilities.
- Pollution Prevention Bulletin published in the spring and fall.

6.14.3.2. Costs and/or sources of funding:

M2P2 and technical assistance programs together cost \$4 million per year. Due to recent reorganization of the BPP, it may be difficult to use this number in comparison with future years.

Sources of funding: NYSDEC, industrial facilities, U.S. Environmental Protection Agency (EPA) grants

6.14.3.3. Current responsible entity: NYSDEC

6.14.3.4. Effectiveness:

During 1993 and 1994 BPP activities included:

- Conducted two annual conferences, co-sponsored by the New York State Business

Council, Inc. Provided information on pollution prevention policy, procedures, technologies and economics.

- Conducted workshops in August 1993 for town and county environmental officials and planning board members in Jefferson, Monroe, and Niagara Counties. Input from the workshops was the basis for Pollution Prevention Guidance for Local Governments.
- Conducted air emission workshops for small businesses.
- Co-sponsored a teleconference in June 1994 on new technologies in spray painting that can lead to reductions in toxic and hazardous waste generation and release.
- Received a grant from EPA to initiate a program in the Great Lakes region of the State to assist industries in identifying pollution prevention options.
- Distributed over 12,000 Environmental Self-Audit for Small Businesses manuals to all types of small businesses.
- Distributed Pollution Prevention Bulletin to over 10,000 recipients.

The NYSDEC does not keep statistics on requests for or use of the information it provides.

The BPP will be working with industry, other states, the federal government and environmental groups to develop an efficient procedure for measuring progress in pollution prevention. Procedures that factor in effects of increased waste treatment and reduced production rates will be considered. Methods that incorporate measures of reduction in the toxicity as well as the quantity of releases will be preferred.

Author: Carole Beal

Table 6-12. List of "400/95" Facilities in the Rochester Embayment Watershed

Allegany County

none

Cattaraugus County

none

Genesee County

none

Livingston County

Atochem North America

General Foods Frozen Products

Monroe County

3M Photo Products (Div. Of 3M Co.)

American Packaging Corporation

Bausch and Lomb Frame Center

Bausch and Lomb Optics Center

Brainerd Manufacturing Co.

DuPont Rochester, Driving Park

DuPont Rochester, Seneca Ave.

Eastman Kodak Co., Elmgrove Plant

Eastman Kodak Co., Kodak Park

Genesee Scrap and Tin Baling Corp.

Gleason Works

GMC-AC Rochester, Henrietta

ITT Automotive

Luster-Coate Metallizing Corp.

Metalade Inc.

Metalade Inc., Finishing Div.

Olin Corp.

Ragu Foods Inc., Packaged Foods Div.

Rochester Form Machine Inc.

Rochester Gas and Electric Corp.

Roehlen Engraving

Schlegel Corp.

Xerox Corp. (Joseph C. Wilson Center)

Xerox Corp.

Ontario County

Crosman Products Inc.

Orleans County

Diaz Chemical Corp.

Steuben County

Gunlocke Co.

Wyoming County

Champion Products Inc.

6.15. Xerox Corporation Pollution Prevention

6.15.1. Background:

Use impairments addressed: See Table 6-1

Affected water bodies: Tributaries of Mill Creek and Four Mile Creek and downstream of them, groundwater

Date program initiated: Xerox began pollution prevention activities in the 1960s.

Completed or ongoing? Ongoing

6.15.2. Program: Xerox Corporation Pollution Prevention

6.15.2.1. Program description:

In 1994 Xerox was awarded the first annual New York State Governor's Award for pollution prevention. Described below are some recent Xerox pollution prevention activities.

SARA

Xerox has reduced releases of Superfund Amendments and Reauthorization Act (SARA) reportable chemicals to publicly owned treatment works and waterways by 99% between 1988 and 1994. This was accomplished by installing chemical pretreatment equipment and restricting the discharge of chemicals to sewer systems.

Selenium

In the summer of 1994, Xerox installed a process that recovers selenium from wastewater, eliminating the need for offsite treatment. Xerox estimates that the process will reduce the volume of hazardous waste shipped offsite from North American operations by 400 tons in 1995.

Xerox has also developed a proprietary process to remove the selenium coating from nickel-based photo-receptor belts. The selenium alloy can be reused to produce new photo-receptor belts. The nickel belts can be sold to commercial recyclers for salvage. Recycling has reduced the need for raw selenium by 75%, at an annual savings of \$1 million. Annual sales of \$2 million are achieved by recycling 800,000 pounds of nickel. In addition, there is a decrease in toxic wastes and associated disposal costs.

Paints

Xerox completed the conversion from solvent-based paints used on its products to water-based

paints in 1994.

1,1,1-Trichloroethane

Xerox eliminated the use of 1,1,1-trichloroethane in its cleaning operations for photocopying equipment and supplies. The company incorporated a process adapted from a jet engine cleaning technology that uses carbon dioxide (CO₂) ice pellets to clean used electronic equipment. The pellets are blasted onto the dirty equipment by compressed air. Upon impacting the dirt layer, the pellets sublime into their next stable state which is a gas. The CO₂ gas travels under the broken layer of dirt, lifting away the dirt which is disposed of as an industrial waste. The new cleaning process eliminated the use of 1,1,1-trichloroethane and resulted in an increased overall process efficiency of 40%. This cleaning system also allows Xerox to reuse old copiers that were scrapped under the former process.

33/50 Program

(See Chapter 6 section on "EPA pollution prevention programs".) Xerox reduced emissions under the U.S. Environmental Protection Agency 33/50 Program by more than 59% since the baseline year of 1988, despite increases in plant capacity and production. Xerox is two years ahead of schedule in meeting its 33/50 target.

Design for the Environment (DfE)

(See Chapter 6 section on "EPA pollution prevention programs".) In 1993 Xerox began training design engineers in DfE principles of optimizing reuse and recycling. DfE at Xerox requires product designers to develop an environmental plan for each product that focuses on environmental impacts and product life cycle costs. To start, Xerox limits production materials to recyclable and recycled thermoplastics and metals. In 1994 Xerox was awarded the National Wildlife Federation Corporate Conservation Council Environmental Achievement Award for its DfE program.

6.15.12.2. Costs and/or sources of funding: Source of funding is Xerox Corporation.

6.15.12.3. Current responsible entity: Xerox Corporation

6.15.12.4. Effectiveness: See "Program description".

Author: Carole Beal

6.16. Pollution Prevention at Kodak Park

6.16.1. Background:

Use impairments addressed: See Table 6-1

Commercial and industrial facilities can have an effect on groundwater and receiving waters. The federal Pollution Prevention Act of 1990 stresses the importance of reducing or preventing pollution at the source through cost-effective changes in production, operation and raw materials use.

Completed or ongoing? Ongoing

6.16.2. Program: Pollution Prevention at Kodak Park

6.16.2.1. Program description:

Over the last decade, Kodak has had an extremely active program for waste minimization/pollution prevention which has included source reduction as an important component. Kodak Park has achieved increasing success in designing waste-free or low-waste processes, but today's technologies do not make it possible to eliminate all waste.

Below are several examples of waste minimization/pollution prevention projects, with the focus on those which could result in improved water quality.

Reduced water discharges from polyester recycling

Kodak has a very unique facility to recycle polyester scrap (used x-ray film, PET bottles) into new polyester film base. One of the chemicals discharged by the polyester recycling operation (diethylene dioxide) cannot be treated as effectively as most others at the industrial wastewater treatment plant. Through operating changes and capital expansion of the polyester recycling plant, the discharge of this chemical to the Genesee River from Kodak's industrial wastewater treatment plant has been significantly reduced.

Reformulated film base coatings

Several film base coatings were reformulated to replace a toxic chemical with a less toxic material. This resulted in the elimination of the discharge of that toxic chemical from several divisions to the industrial wastewater treatment plant and the associated ultimate discharge of a small amount of that chemical to the Genesee River.

Reformulated consumer films

Consumer & Motion Picture Film Manufacturing began the production of several reformulated consumer films that require less silver content. This results in less silver required in manufacturing for these products and lower silver discharges from photo finishers who process these new films.

Reduced chromium usage

Chrome-plated materials are used in many industrial applications for their hardness which results in longer useful life of certain machine components. The Motion Picture Film Finishing Department developed perforators for film that do not require a chromium finish, eliminating the discharge of 100 pounds per year to Kodak's waste treatment facility.

Onsite recovery of machining coolant

Many machining operations use a liquid coolant. As this coolant is used, periodically the material is removed from the system, disposed of, and the system replenished with new coolant. Several alternatives were identified to treat the waste:

- Send the material to an external organization for treatment.
- Provide onsite recovery equipment.
- Treat and discharge to the local publicly owned treatment works.

A coolant management program that included onsite recovery and ultra-filtration was instituted. Waste generation was reduced by 14,500 gallons per year and savings of \$15,000 per year were realized.

Replaced transformers

A \$25 million program was complete to phase out all electrical transformers filled with polychlorinated biphenyl (PCB) coolant. This type of transformer had been widely used by electric companies, and commercial and industrial firms. The PCB coolant is a type that could pose an environmental hazard if leaked or spilled. The electrical transformers were rinsed and cleaned of PCBs. The cleaning/rinse material was sent to a special facility in Ohio for destruction, and the metal from the cleaned transformers was recycled. (See Chapter 6 section on "PCB Ban and related activities.")

Cooling system change

A \$500,000 project to drain and replace 400,000 gallons of brine coolant from a major cooling system was completed. The brine (salt solution) coolant contained the rust-inhibiting metal chromium, a potential environmental hazard if released to the environment. The cooling system was refilled with water and an environmentally safer rust-inhibiting additive. The old coolant was shipped via railcars to a recovery/disposal firm in Ohio where the material was treated and

made nonhazardous. The resulting sludge was disposed of in a landfill.

Chemical hardener process redesign

Chemical hardeners are used in the manufacture of photographic films and papers. In the manufacturing procedure for one of these hardeners, the product purification step resulted in air emissions of toluene and high hazardous waste volumes. A new procedure was developed over several years which eliminated one of the major purification steps and resulted in the increase in yield of the process, a lower manufacturing cost and significant reduction of hazardous wastes and air emissions. This project was a recipient of the 1995 New York State Governor's Award for Pollution Prevention.

6.16.2.2. Costs and/or sources of funding: Not available

6.16.2.3. Current responsible entity: Eastman Kodak Company

6.16.2.4. Effectiveness: See 6.16.2.1

Author: Jeffrey Mathews

6.17. Mercury pollution prevention project

6.17.1. Background:

Use Impairments addressed: See Table 6-1

Affected water body: Waters of the Lake Ontario watershed downstream of mercury discharges

Date program initiated: The effort to prioritize pollutants for the Rochester Embayment watershed began in 1993. A grant to fund a portion of the Mercury Pollution Prevention Project was obtained from the U.S. Environmental Protection Agency in July 1995.

Completed or ongoing? Ongoing

Additional Information:

The RAP Priority Pollutants Task Force, made up of representatives of the Monroe County Water Quality Management Advisory Committee, the Monroe County Water Quality Coordinating Committee, and others with special expertise, chose mercury as one of the 20 chemicals found in the Rochester Embayment watershed that warrant the highest priority for remediation (see RAP Stage I, Chapter 5). A private consultant, Waste Reduction Institute for Training and Applications (WRITAR) and the Great Lakes Commission received a grant from the Great Lakes Protection Fund to determine if the RAP process can foster a pollution prevention effort. The Rochester Embayment AOC was chosen as the site for a project and WRITAR assisted the Task Force in choosing mercury as the pollutant around which to design a pilot pollution prevention program. Mercury was chosen for several reasons:

- It ranked high on the list of priority pollutants.
- It has many sources.
- There is little controversy about the need to keep this pollutant out of the environment.
- It exists in products used in the home, in business and in medical and dental settings.
- There appeared to be good potential for the design and execution of a pollution prevention program.

After mercury was chosen as a top chemical of concern, the Priority Pollutants Task Force was continued with the name "Pollution Prevention Task Group" to begin design of a specific pilot pollution prevention program. The Task Group consists of local academia, government, and industry representatives.

6.17.2. Program: Mercury pollution prevention project

6.17.2.1. Program description:

Because the University of Rochester's Medical Center and Eastman Dental Center use a wide

range of mercury-containing devices, the Pollution Prevention Task Group suggested that a pollution prevention pilot project might begin there.

The University of Rochester Medical Center and Eastman Dental Center agreed to participate in a cooperative pilot study with the Pollution Prevention Task Group to investigate and reduce detectable sources of mercury entering the environment from medical and dental activities. The Task Group added representatives from the University of Rochester Medical Center and a University of Rochester graduate student.

The following actions will be taken:

- Identify current practices and equipment in the medical and dental facilities that may result in discharges of mercury to the environment.
- Identify alternative practices and equipment to minimize or eliminate the release of mercury to the environment and resulting risks to human health, aquatic life and wildlife.
- Implement one or more alternative practices to minimize or eliminate the release of mercury to the environment.
- Evaluate the opportunities and constraints to implementing alternative practices to minimize or eliminate the release of mercury to the environment.
- Provide a model to use with other medical and dental facilities in the Rochester Embayment watershed.

Specific activities to be completed as part of the pilot study will occur in two phases.

Phase I activities:

- Conduct a literature search to identify potential sources of mercury usage in hospital and dental settings, activities ongoing in other areas to minimize mercury usage and discharge to the environment, and educational materials.
- Characterize and quantify medical and dental equipment operations which generate or potentially generate mercury.
- Identify current and potential practices and equipment that minimize mercury discharge to the environment from the Medical Center and Dental Center.
- Identify alternative cost-effective practices and equipment to minimize or eliminate the release of mercury to the environment from medical and dental facilities.
- Implement one or more cost-effective practices or equipment usage to minimize or eliminate the release of mercury to the environment from medical and dental facilities.
- Monitoring of changes in mercury discharge.
- Written documentation of findings on opportunities and constraints to implementing mercury pollution prevention activities in medical and dental settings.

Phase II activities:

- Prepare a manual for hospitals to use in implementing mercury pollution prevention. Manual content will be based upon the literature search to be done during Phase I.
- Prepare a manual for dental offices to use in implementing mercury pollution prevention. Manual content will be based upon the literature search, as noted above.

- Hold workshops with representatives of hospitals and dental facilities to advance mercury pollution prevention.
- Seek voluntary agreements with 12 hospitals and 50 dental offices located in the Rochester Embayment watershed to promote mercury pollution prevention.
- Publicize efforts in reducing the release of mercury to the environment.

6.17.2.2. Costs and/or sources of funding:

Costs: \$61,000	grant
<u>\$34,100</u>	in-kind services.
\$95,100	total

Sources of funding: U.S. Environmental Protection Agency (grant), Monroe County (in-kind services), University of Rochester (in-kind services)

6.17.2.3. Current responsible entity: Monroe County Departments of Health and Environmental Services, University of Rochester Medical Center, Eastman Dental Center

6.17.2.4. Effectiveness:

The following activities were undertaken in 1994/1995:

- WRITAR conducted a thorough study of the sources of mercury in the environment and the opportunities for pollution prevention.
- The New York State Department of Environmental Conservation had an ongoing monitoring project to test a new method of measuring mercury, and agreed to conduct some mercury monitoring in the Rochester Embayment watershed. The Mercury Pollution Prevention Task Group made arrangements for preliminary sampling of mercury at several sites in the public combined sewer system, including locations in the vicinity of the University of Rochester Medical Center and the Eastman Dental Center.
- Two reports on Phase I activities, one for the Medical Center and one for the Dental Center, were scheduled to be completed in December 1995.
- A database of documents is being created to augment the information in the upcoming manuals. The manuals, one for hospitals and one for dental offices are to be completed by May 1996. The 12 hospitals in the Rochester Embayment watershed and 50 dental offices will be educated on planning and implementing a mercury pollution prevention program within their facilities.

The Mercury Pollution Prevention Task Group envisions planning and implementing, at a later date, community pollution prevention activities that target other sources of mercury, such as household consumers.

Author: Carole Beal

6.18. Monroe County Waste Site Advisory Committee and proper closure of waste sites

6.18.1. Background:

Use impairments addressed: See Table 6-1

Affected water body: Groundwater and surface water in the Monroe County portion of the Rochester Embayment watershed

Date Program Initiated: The original Monroe County Landfill Review Committee (now called the Waste Site Advisory Committee) was created in 1978.

Complete or ongoing? Ongoing

Additional information:

Waste sites existed before there were regulations to ensure their appropriate design, operation and closure. What is now known to be hazardous waste was deposited at many sites and is now gradually leaching out and contaminating groundwater, surface water, soil or sediment nearby. Investigating, prioritizing and remediating these sites is very costly. The New York State Department of Environmental Conservation (NYSDEC) is responsible for overseeing these activities, and it has developed a Registry that lists inactive hazardous waste sites (Superfund sites). As of its October 1994 Quarterly Status Report of Inactive Hazardous Waste Disposal Sites, there were 911 sites throughout the State listed. The number of sites in Rochester Embayment watershed counties are:

Allegany (13)	Ontario (8)
Cattaraugus (11)	Orleans (8)
Genesee (7)	Steuben (10)
Livingston (7)	Wyoming (4)
Monroe (51)	

Most of these sites are in some stage of investigation, enforcement or remediation. Other sites had previously been cleaned up and/or remediated, or did not meet the definition of hazardous waste and therefore were delisted from the Registry. Only sites that have documentation for the disposal of "hazardous waste", as defined in the law, are included in this Registry.

NYS Environmental Conservation Law requires counties to notify NYSDEC on an annual basis if a waste site is causing pollution problems. The Monroe County Department of Health (DOH) and the Monroe County Environmental Management Council (EMC) have identified inactive waste sites within Monroe County that are not on the State's Registry. Remediation at these sites occasionally requires State money, but at this time the State's program lacks sufficient money and staff. Since 1986, Monroe County and the NYSDEC have had a Letter of Agreement (LOA) in effect that allows effective communication and sharing of data. (There is no similar agreement

between NYSDEC and other Region 8 counties in the Rochester Embayment watershed: Genesee, Livingston, Ontario, Orleans and Steuben.)

6.18.2. Program: Monroe County Waste Site Advisory Committee and Proper Closure of Waste Sites

6.18.2.1. Program Description:

The Monroe County Waste Site Advisory (WSAC) Committee currently has representatives from:

- Monroe County Department of Health:
 - Environmental Health Laboratory (1)
 - Geological Consultant (1)*
 - Division of Environmental Health (3)*
- Monroe County Environmental Management Council (1)*
- Monroe County Department of Planning and Development(1)
- Monroe County Pure Waters (1)
- New York State Department of Environmental Conservation (3)
- New York State Department of Health (1)
- City of Rochester Department of Environmental Services (1)

* member of Technical Advisory Group

The Technical Advisory Group of the WSAC reviews the technical aspects of developments near waste sites as well as work plans and reports for Registry sites, and reports its finding to WSAC. Technical review letters to developers, consultants, and State and local officials are generated by the Technical Advisory Group.

WSAC functions are:

Information base. Solid and hazardous waste sites in Monroe County were identified by DOH, EMC, city and town records, interviews with municipal personnel, information from citizens, and aerial photographs dating back to 1930. A total of approximately 350 confirmed sites and 200 suspected sites have been identified. The WSAC maintains and revises the information base as needed.

Municipal reports. Each Monroe County municipality has been given information about its waste sites and, in many cases, assisted in field checking or adding to the information. Reports have been published for seven towns in Monroe County. Other reports are in draft form.

Oversight for NYSDEC's hazardous waste site activities. The WSAC is the County's representative in the partnership between the County and NYSDEC Region 8, outlined in the Letter of Agreement, which is renewable every two years. The County's role in the partnership

is advisory. Its purpose is "to coordinate the efforts of the NYSDEC and the County in implementing the New York State Superfund program for inactive hazardous waste disposal sites located within Monroe County in a manner to more effectively utilize the resources of both parties, by taking full advantage of existing data, knowledge, and expertise available in state and local offices." NYSDEC provides the County with:

- Its annual program work plan for Monroe County;
- Information necessary for the County to participate in the review and comment process;
- The opportunity to review and comment on draft and final Superfund reports involving sites in Monroe County.
- Copies of Consent Orders between NYSDEC and responsible parties.

The NYSDEC has drafted a list of hazardous substance waste disposal sites as part of a Hazardous Substance Waste Disposal Site Study in order to identify waste sites not meeting Superfund criteria that need remediation. The WSAC recommended sites for this study.

Development review. The Technical Advisory Group of the WSAC reviews development proposals referred by the County Planning and Development Department, towns, villages, City of Rochester, and the Monroe County DOH plan review staff. If a proposed development is within 2000 feet of a waste disposal site, recommendations in the Monroe County Department of Health Development Review Guidelines for Properties within 2000 Feet of Waste Disposal Sites, prepared by the WSAC, are followed. Criteria for various scenarios of developments involving waste sites are given. The Guidelines recommend the process to follow for the criteria listed. If the presence of hazardous waste is confirmed, remediation can become part of the development proposal. The Technical Advisory Group uses the State Environmental Quality Review Act or 6 NYCRR Part 74, Approval of Realty Subdivisions, to achieve results from developers.

Corporate information. WSAC representatives sit in at meetings between corporations and NYSDEC and at corporate public information meetings to gather information for DOH.

Community resource. The WSAC can and has responded to neighborhood concerns.

6.18.2.2. Costs and/or sources of funding:

Ten hours/month staff time for the Technical Advisory Group, primarily in the Monroe County Departments of Health and the Monroe County Environmental Management Council.
\$5,000 per year for geological consultant.

Sources of funding: Monroe County, NYSDEC, NYS Department of Health

6.18.2.3. Current responsible entity: Monroe County Health Department

6.18.2.4. Effectiveness:

Advice. The WSAC is effective in advising NYSDEC because it offers detailed, in-depth

reviews of work plans. It also provides a direct conduit to NYSDEC; communication is both effective and timely. The NYSDEC prime contact for the Letter of Agreement calls the two-way communication a "good mutual service." Many of the County sites on NYSDEC's preliminary list of hazardous substance sites were named by the WSAC; 17 out of 22 recommended sites were listed.

Review. The WSAC Technical Advisory Group reviews approximately 300 development proposals each year and recommends investigations at about 50. It has been an effective means of investigating sites.

Awareness. The WSAC raises awareness in the County of the existence of inactive waste sites and the potential for problems arising from them.

Facilitation. The WSAC improves water quality by facilitating remedial activities at sites that would have no remediation otherwise and by identifying areas that should be evaluated by NYSDEC. This facilitation helps to reduce and prevent the leaching of hazardous waste into groundwater and surface water.

(See also Chapter 7 section on "Promote proper closure/remediation of landfills and hazardous waste sites.")

Author: Carole Beal

6.19. Rapid response to spills

6.19.1. Background:

Use impairments addressed: See Table 6-1

Affected water bodies: Lake Ontario and Rochester Embayment tributaries, groundwater

Date program initiated: The federal Emergency Planning and Community Right-to-Know Act (also known as SARA Title III), enacted by the federal government in 1986, required the formation of Local Emergency Response Committees (LEPCs) in counties, and the preparation of county hazardous materials response plans. New York State appointed a Disaster Prevention Commission in April 1987 who, in turn, appointed all the members of all the LEPCs during summer 1987. All the LEPCs succeeded in having plans developed by October 1988 as required. The plans were approved by the Commission.

Completed or ongoing? Ongoing

Additional information:

A sudden, uncontrolled or potential release of hazardous materials, such as petroleum products or chemicals, in liquid, solid or gaseous form, is a potential danger to the environment and/or public health and welfare. Spills can enter waterways directly or via runoff or storm sewers.

6.19.2. Program: Rapid response to spills

6.19.2.1. Program description:

Local Emergency Planning Committees

As part of New York State's implementation of SARA Title III, all counties in the State have Local Emergency Planning Committees and emergency response plans. All county committees and plans are structured similarly because they have the same requirements and must receive the same approvals from the State. (Every department within each county, for example, Department of Health, Department of Transportation, is also required to have an emergency response plan.)

The principal duty of the LEPC is to develop the Hazardous Materials Response Plan for the county, and to review it annually. Other activities include conducting community right-to-know programs, training and education.

LEPC membership includes representatives from fire services, law enforcement, HazMat teams, emergency management, Civil Defense, health department, emergency medical services, elected

officials, industry, media, environmental groups, community groups and others. LEPC meetings provide a forum for its members to cooperatively establish procedures and mechanisms for emergency response to hazardous materials incidents.

In addition to the SARA Title III requirements, LEPCs have other requirements as a result of other environmental regulations. Those that have an impact on water quality include the following:

- The Hazardous Materials Transportation Safety Act of 1990 requires the LEPC to prepare for transportation incidents.
- The Oil Pollution Act of 1990 requires the LEPC to improve planning and response for oil and hazardous materials discharges to water, and to coordinate the community plan with facility plans.
- The Pollution Prevention Act of 1990 requires the LEPC to reduce risk by promoting source reduction and pollution prevention measures.

The Monroe County Hazardous Materials Response Plan

Monroe County is being used as an example of what a Hazardous Materials Response Plan includes. Other counties in the Rochester Embayment watershed have similar plans.

In Monroe County the planning concept was developed before SARA Title III. The County had already developed the Monroe County Comprehensive Plan and the Monroe County Radiological Emergency Preparedness Plan (to deal with emergencies or incidents at Rochester Gas and Electric Corporation's Ginna Nuclear Power Station). In response to SARA Title III, these plans were used by the Monroe County LEPC (established in 1987) as a basis to prepare the Monroe County Hazardous Materials Response Plan.

The Plan provides basic guidelines and establishes responsibilities for response to hazardous materials incidents in the County. It is intended for response to a transportation accident or the release of hazardous materials beyond the boundary of facilities using, storing or producing hazardous materials. However, any release of hazardous materials that has the potential to injure or harm the population or the environment must be reported, controlled and investigated. Municipalities and industrial facilities within the County should establish and maintain their own internal plans and procedures that are compatible with and consistent with this plan. The objectives of the Plan are to:

- Minimize the adverse impact of the release upon life, health, property and the environment.
- Establish procedures for coordination among the County, municipalities and industry when responding to an incident.
- Identify emergency response organizations, equipment and other resources which can be employed for a response.
- Ensure that municipal and facility response procedures are integrated into the Monroe County Comprehensive Emergency Plan (which addresses emergencies of all types).

The Hazardous Materials Response Plan includes requirements for:

- Reporting: A facility must immediately report a release of a hazardous substance to both the County Community Emergency Coordinator (through 911) and the New York State Department of Environmental Conservation.
- Determination of levels of magnitude of impact to life, health, property or the environment:

<u>Level</u>	<u>Impact</u>	<u>Scope</u>	<u>Capacity to Control</u>
0	Not significant	N/A	N/A
1	Significant	Within immediate area	Within capabilities of County resources
2	Significant	Beyond immediate area	Within capabilities of County resources
3	Significant	Beyond immediate area	Additional resources are required to supplement those locally available

- Notification and dispatch requirements for each level of magnitude.
- Incident command system and responsibilities for each level of magnitude.
- Operations: identification of materials involved, mitigation, cleanup and disposal, etc.).
- Emergency medical care and public health.
- Hazard analysis.

The Plan’s provisions for mitigation include suggested containment and control actions. Mitigation measures that may affect waterways are closing valves, plugging or patching holes, transferring material from one container to another, damming, diking, booming, absorbing, neutralizing, and diluting. Containment is the top priority. The method chosen depends on the type and quantity of material involved. For example, a spill into a waterway will require a different response if the material is heavier than water than if it is lighter than water. The most frequent cases encountered are incidents involving petroleum products, which are lighter than water and stay on the surface.

When contamination of a water-supply system occurs, the County Department of Health (DOH) and the water supplier are informed, so that they can evaluate the situation and take appropriate action. In the case of contamination of a sewer system, Monroe County Pure Waters or other appropriate sewer agency is informed. A spill of less than 25 gallons can be flushed into a combined sewer (the City of Rochester has combined sewers). A spill of 25 gallons or more must be contained. Before flushing, approval must be obtained first from Pure Waters or other sewer agency.

Office of Emergency Preparedness

The Monroe County Office of Emergency Preparedness has permanent staff support within the County Department of Public Safety. In an emergency, the facilities of the Office of Emergency

Preparedness become the County's Emergency Operation Center. The administrator of the Office of Emergency Preparedness is also the County Community Emergency Coordinator, as contacted through the 911 system.

Incident Commander

The Incident Commander is a qualified on-scene member (chief, deputy or captain) of the fire department serving the district where the incident occurs.

Hazardous Materials (HazMat) Response Teams

There are five on-call ("over-the-road") HazMat Teams: three from industry (one each from Kodak, Xerox and Delphi Automotive Systems), one from the City of Rochester (paid firefighters), and one from the County (volunteer firefighters). Each team is a group of individuals who train and work together. A team responds if called by the Incident Commander. The HazMat Team identifies the hazard and its potential implications, and provides this information to the Incident Commander. The HazMat Team also provides overall technical assistance, in the absence of qualified industrial representatives.

The Monroe County Spill Response Team

The Spill Response Team consists of approximately eighteen persons from the Monroe County DOH who act in an advisory capacity when dispatched through the Office of Emergency Communications/911 Center.

Chemical Hazard Information Team

The Chemical Hazard Information Team consists of chemists and industry and HazMat team representatives who meet to discuss issues, and training, and share information.

6.19.2.2. Costs and/or sources of funding:

The portion of the Monroe County budget allotted to the single County HazMat team is about \$10,000 annually for training and maintenance of equipment. (The members of the County's HazMat team are volunteers.) Money allotted for the City of Rochester HazMat team of paid firefighters falls under the City budget. The three industries with HazMat teams each support their own teams. Each of the other counties in the Rochester Embayment watershed also incur costs, but there has been no attempt to obtain these numbers.

Sources of funding: County, local municipalities, industrial facilities,

6.19.2.3. Current responsible entity: County

6.19.2.4. Effectiveness:

All counties in the Rochester Embayment watershed have highly effective spill response plans. The program is highly effective in keeping spills out of waterways, and in addressing spill incident concerns, and proper clean-up and disposal of waste materials.

Number of responses are not a good indicator of effectiveness, because it relies on numbers of incidents. But using 1991 as an example, Monroe County DOH representatives on the LEPC processed 392 reports of hazardous materials and petroleum spills and leaks in Monroe County and responded to 185 incidents.

(See also Chapter 6 section on "Rapid Response to Spills on Lake Ontario.")

Author: Carole Beal