

Report to the
Great Lakes Water Quality Board

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**A Review of Pretreatment Programs
in the Great Lakes Basin**

by the
Municipal Pretreatment Task Force
of the
Point Source Coordinators

International Joint Commission
Great Lakes Regional Office
Windsor, Ontario
August, 1989

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A Review of Pretreatment Programs
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This report to the Water Quality Board was carried out as the principal activity of the Municipal Pretreatment Task Force of the Point Source Coordinators. While the Board supported this work, the specific conclusions and/or recommendations do not necessarily represent the views of the International Joint Commission, the Water Quality Board or its committees.

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GLOSSARY OF ACRONYMS

AO's	administrative orders
BATEA	Best Available Technology Economically Achievable
BSA	Buffalo Sewer Authority
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CWA	Clean Water Act
DEC	Department of Environmental Conservation
DNR	Department of Natural Resources
FOA	Final order of Abatement
FTE(s)	full-time employee(s)
GLWQ	Great Lakes Water Quality
IDEM	Indiana Department of Environmental Management
IPP	Industrial Pretreatment Program
MISA	Municipal Industrial Strategy for Abatement
MOE	Ministry of the Environment
MPCA	Minnesota Pollution Control Agency
NEORS	Northeast Ohio Regional Service District
NITEP	National Incinerator Testing and Evaluation Program
NPDES	National Pollution Discharge Elimination System
NPP	National Pretreatment Program
OWPCA	Ohio Water Pollution Control Association
PACT	Power Activated Carbon Treatment
PCI	Permit Compliance Inspections
PCME	Pretreatment Compliance Monitoring and Enforcement
PCS	Permit Compliance System
POTW(s)	publicly owned treatment works
PPETS	Pretreatment Permits Enforcement Tracking System
QNRC	Quarterly Noncompliance Report
RCRA	Resource Conservation and Recovery Act
SIU(s)	significant industrial user(s)
STP(s)	sewage treatment plant(s)
SWDA	Solid Waste Disposal Act
TOMP(s)	toxic organic management plan(s)
TTO(s)	total toxic organic(s)
UGLCCS	Upper Great Lakes Connecting Channels Study
WENDB	Water Enforcement National Data Base
WLSSD	Western Lake Superior Sanitary District
WPCA	Water Pollution Control Association
WPCC	Water Pollution Control Center
WWTP	Wastewater Treatment Plant

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I. EXECUTIVE SUMMARY

The Great Lakes support a population in excess of 40 million people, the majority of whom live in large urban centres. As of 1985, there were 1,199 municipal wastewater treatment plants with a total hydraulic design capacity of $19.5 \times 10^6 \text{ m}^3/\text{d}$ (5,130 USMGD) in the basin. Three hundred ninety of these facilities are considered major, having design capacities in excess of $3,800 \text{ m}^3/\text{d}$ (1 USMGD).

The Municipal Pretreatment Task Force of the Water Quality Board reviewed the significant features and objectives of current municipal pretreatment programs in the Great Lakes basin, in the light of Article VI of the amended Agreement which calls for the "establishment of pretreatment requirements for all industrial plants discharging waste into publicly owned treatment works [POTWs] where such industrial wastes are not amenable to adequate treatment or removal using conventional municipal treatment processes."

Under its Terms of Reference, The Municipal Pretreatment Task Force was charged to:

- Review and report on the significant features and objectives of current municipal pretreatment programs in the Great Lakes basin and determine and compare their contribution to the control of toxic substances discharges.
- Compile information on the plans and strategies to improve current pretreatment control programs.
- Analyze and report on compliance among those industrial sources subject to pretreatment provisions or requirements.
- Estimate the contribution of toxic substances (both metals and organic chemicals) released to the basin ecosystem from municipal wastewater facilities via atmospheric emissions, sludge disposal and effluent discharges.
- Assess the adequacy of present and proposed pretreatment programs to achieve both the jurisdictional goals and the reduction and virtual elimination of discharges of persistent toxic substances called for in the amended Agreement.

Estimation of Contribution of Selected Toxic Substances

To estimate the total contribution of toxic substances released to the Great Lakes basin from municipal wastewater facilities via atmospheric emissions, sludge disposal, and effluent discharges, detailed information on plant design, operating parameters and influent wastewater characteristics was assembled under contract by Canviro Ltd. for a selected population of approximately 20% of 1,199 municipal sewage treatment plants (STPs). These data were used in conjunction with a predictive model and estimates of contaminant removal efficiencies achievable in different treatment plant designs to estimate concentrations of selected contaminants in raw sewage, treated effluents and sludges from all municipal facilities. From these estimates, the total loadings of the selected contaminants to the Great Lakes basin from municipal STP effluents and releases associated with atmospheric

emissions and sludge disposal practices were calculated. The contaminants considered and the estimated total releases are presented in Table 1.1. These represent a first-order estimate of the releases from all sources related to the operation of municipal STPs in the Great Lakes basin.

For three of the organic compounds (2,3,7,8-TCDD, tetrachlorodibenzofuran and anthracene), due to the very limited data available, no credible estimate of the mass released from municipal STPs was possible.

In summary:

- Total releases of selected toxic contaminants from publicly owned treatment works (POTWs) in the Great Lakes basin ranged from approximately less than 1 tonne (one thousand kilograms) per annum (t/a) of hexachlorobenzene and total PCBs respectively to more than 500 t/a of chromium, lead and zinc for the year 1985. The PCB estimate of approximately 1 tonne/a is consistent with extrapolations from other available data.
- Because of a lack of an adequate database, no estimate of the quantities of 2,3,7,8-TCDD, tetrachlorodibenzofuran and anthracene could be made.
- These calculated releases are considered 'order-of-magnitude' estimates but are generally in reasonable agreement with quantities calculated based on literature values for effluent and sludge concentrations. However, the mass of benzene released appears to be underestimated, based on comparison to literature values and to releases of other similar compounds.

Suggested future activities include:

- The data files, model and treatment/removal efficiencies developed for the Task Force's report need to be routinely updated and expanded to improve the generated estimates and determine if any trends can be established.
- More comprehensive data on emissions from POTWs due to incineration and volatilization are needed.

Pretreatment Programs in the United States

In the U.S., pretreatment programs are designed to address four concerns within the sewage treatment system: interference with the effective operation of the POTWs; passthrough of toxic contaminants to receiving waters; contamination of municipal sludge by toxic substances; and exposure of treatment plant workers to chemical hazards. Generally, POTWs with flows greater than 5 million US gallons per day (USMGD) (18,925 cubic metres per day) are required to develop control programs under the National Pretreatment Program (NPP). Other POTWs may be required to meet NPP requirements because of treatment plant upsets, contaminated sludge, or violation of effluent permit limits.

Section 405 of the Clean Water Act (CWA), the Solid Waste Disposal Act (SWDA), including the Resource Conservation and Recovery Act (RCRA) and state sludge management regulations prepared pursuant to Subtitle D of the SWDA, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection,

Table 1.1
ESTIMATE OF TOTAL RELEASE AND ESTIMATED DISTRIBUTION OF CONTAMINANTS
FROM MUNICIPAL STPs WITHIN THE GREAT LAKES BASIN ECOSYSTEM FOR 1985

Contaminant	% of Total Release via			Total Release (tonnes/yr)
	Effluent	Atmosphere	Sludge* Disposal	
Arsenic	66	NS	34	19.
Cadmium	76	NS	24	26.
Chromium	49	NS	51	640.
Copper	43	NS	57	300.
Cyanide	73	NS	27	89.
Lead	59	NS	41	580.
Mercury	44	NS	56	3.
Nickel	79	NS	21	130.
Zinc	51	NS	49	1300.
Benzene	61	39	NS	2.
Toluene	45	55	NS	42.
Ethylbenzene	31	69	NS	55.
Chloroform	70	30	NS	34.
Tetrachloroethylene	36	64	NS	76.
Trichloroethylene	58	42	NS	26.
1,1,1-trichloroethane	49	51	NS	76.
Hexachlorobenzene	NS	25	75	<1.0
PCBs (Total)	50	NS	50	<1.0
Phenol (Total)	94	NS	6	85.
2,3,7,8-Tetrachlorodibenzo-p- dioxin (TCDD)	NE	NE	NE	NE
Tetrachlorodibenzofuran	NE	NE	NE	NE
Base-Neutral Extractable PAHs				
Anthracene	NE	NE	NE	NE
Naphthalene	53	20	28	28.

NE = No Estimate

NS = Assumed to be not significant

* via landfill or land application

Research and Sanctuaries Act, all can have some bearing on the operations of a POTW.

The U.S. industrial pretreatment standards consist of two broad initiatives: the control of prohibited discharges, which are discharges of substances that could threaten the operation of the sewage collection and treatment system, and control of particular industrial categories that discharge specific toxic contaminants.

Categorical pretreatment standards developed under the CWA currently affect 28 specific industrial sectors. Six of the categories (electroplating, metal finishing, electrical and electronic components, copper forming, aluminum forming, and coil coating (can-making subcategory only)) have a pretreatment standard established for total toxic organics (TTO). The TTO is defined as the sum of the masses or concentrations of specific toxic organic compounds found in the industrial user's process discharge at a concentration greater than 0.01 mg/L.

The focus of any pretreatment program is direct control by the municipality; the local pretreatment program is the legal, technical and administrative framework for achieving effective IU discharge control, with the state and U.S. EPA playing an oversight role.

The essential tasks of a pretreatment program are i) to develop and issue permits/agreements with industry; ii) to carry out inspection/monitoring activities on significant industrial users (SIUs), including direct sampling of their wastewater as necessary; iii) to maintain and update data on municipal effluents; iv) to enforce and remedy noncompliance; v) to report to the approval authority at least annually on the status of programs; and vi) to perform other special condition requirements.

Typical POTW permits contain specific conventional effluent limits and nonconventional pollutant effluent limits and, increasingly, water quality based limitations for toxics and nonconventionals, narrative toxicity limitations (e.g. no toxics in toxic amounts), and whole effluent toxicity limits. However, many National Pollution Discharge Elimination System (NPDES) permits do not incorporate any sludge criteria per se. Sludge requirements may be contained in state or federal regulations and/or state-issued sludge use and disposal limits. Where states have promulgated numerical water quality standards for specific toxic pollutants, POTWs are required to develop limits in their permits to meet these standards. Otherwise, NPDES permitting authorities are expected to use a combination of biological techniques and available toxic effect data to establish effluent toxicity limits or limits on specific contaminants. POTW local limits would then be developed to ensure these targets are met.

Anticipated Program Changes - U.S. Federal Program

No fundamental changes to the U.S. pretreatment program are planned. However, several initiatives will be undertaken in the coming years, including:

- Improvements in information management and trend data analyses through the Permit Compliance System (PCS), including establishment of a common definition of compliance, tracking of minimum data elements, and automated screenings for POTW non-compliance.

- Improved control of hazardous materials discharged to POTWs including those discharged with domestic waste under current RCRA exemption.
- Improved control of toxicants discharged from POTWs through toxic limitations in permits and improved control of sludge disposal through National Sludge Disposal regulations.
- Increased emphasis on enforcement as represented by the National Pretreatment Enforcement Initiative scheduled to occur in late 1989.

State Pretreatment Programs--Description and Assessment

Over 95% of the pretreatment programs at individual U.S. Great Lakes municipalities are now approved; only 8 programs in Michigan and 1 in Ohio remain unapproved. Indiana, New York and Pennsylvania have not been delegated primary oversight of pretreatment programs.

Three primary mechanisms (compliance inspections, program audits, and the solicitation and review of periodic POTW pretreatment reports) are or will be used by the states to ensure program compliance. The pretreatment compliance inspection should occur annually. A POTW program audit is a comprehensive review by the state of all elements of the POTW pretreatment program, especially the adequacy of local limits; the effectiveness of POTW-issued control mechanisms; and the suitability of POTW administrative procedures; these audits occur typically once every five years or as NPDES permits require. For both delegated and nondelegated states, specific program goals and activities are negotiated annually between EPA and the state.

Table 1.2 presents summary data on state pretreatment programs in the U.S. portion of the Great Lakes basin. Noncompliance of SIUs as presented in this table is based upon definitions of the terms "noncompliance" and "SIUs" largely developed by individual municipalities; thus the noncompliance data between individual treatment plants, as well as jurisdictions, should not be considered comparable. The States and the EPA are moving to introduce compatible definitions of these terms to the extent practical in the basin.

The table also notes that some of the compliance information is given for plants in the basin segment of the state only, while others are given on a statewide basis. No such distinction is necessary for Michigan, which is entirely within the basin.

An estimate of compliance of individual users, similar to that determined in other states, was not available for New York, as the data required to provide same was not assembled in a coordinated fashion at the Department of Environmental Conservation (DEC). However, using the results of overall PCI (Permit Compliance Inspections) ratings, including IU inspections, 23 of the 25 New York programs in the basin were deemed to be satisfactory.

In the case of Michigan, a majority of the noncompliant SIUs were located in the Detroit treatment system; both the state and the EPA are moving to address the obvious deficiencies in the Detroit pretreatment program.

Wisconsin operates under the most stringent definition of compliance in the basin, and thus the noncompliance level should not be considered as entirely indicative of the comparative merit of that state's program, which is among the best in the basin.

Table 1.2 SUMMARY OF PRETREATMENT PROGRAMS

GREAT LAKES STATES □

	Delegated Program	GL POTWS w Pretreatment Programs	EPA Approved Programs ¹	Pretreatment Compliance Inspections ¹	Pretreatment Audits	Estimated Industrial User Noncompliance ⁰
New York	No	31	25	32	24	N/A ³
Michigan	Yes	116	108	167*	44	161/945 (17%)
Ohio	Yes	41	40	112	23	117/820 (14%) ²
Indiana	No	9	9	0	7	33/283 (11%) ²
Minnesota	Yes	1	1	0	1	1/9 (11%)
Wisconsin	Yes	11	11	8	6	119/494 (24%) ²
Pennsylvania	No	1	1	1	1	N/A

□ Illinois has no POTWs with pretreatment programs discharging into the basin;
Pennsylvania plants were not considered significant

¹ Between 1986 - March 1988 in G.L. basin

* some facilities inspected twice

² statewide; other compliance data are for plants in basin

⁰ compliance based largely on individual POTW definition

³ In the case of New York, compliance is estimated by a different measure.
Using the results of overall PCI ratings, including industrial user inspections,
23 of 25 programs were deemed to be satisfactory.

This information, the knowledge and experience of the Task Force members, and information gleaned from the detailed audit of selected treatment plants indicated that, although the framework for an adequate pretreatment program was in place, the selective deployment of further resources at the municipal and state level was necessary to affect adequate tracking and enforcement of pretreatment programs. Development of common definitions of significant noncompliance and SIU, as well as computer based tracking systems at the local and state level and further training of municipal and industrial operators, should be part of this initiative. Also, the inability or unwillingness of some municipal governments to prosecute pretreatment program violators should be rectified and multijurisdictional variances in requirements and enforcement among municipalities should be resolved.

The Canadian Regulatory Framework

The Canadian federal government's main instrument for developing water quality controls is the Fisheries Act. Under that Act, in the mid 1970s Environment Canada promulgated regulations and guidelines on discharges from six industrial sectors, representing approximately 65% of the total industrial wastewater discharge in Canada. However, inasmuch as the federal government has delegated enforcement of these regulations to the provinces, compliance monitoring and enforcement have been within the provincial domain and have only been periodically reported by the federal government. Thus, implementation of the exemption clause has been inconsistent and unverified. The new Canadian Environmental Protection Act (CEPA), passed in 1988, is to provide for life cycle control of specific substances considered to be a significant threat to human health and the environment. The Act can be used to limit direct or indirect discharges, but will rely on provincial delivery systems to an extent being currently determined. Thus, the impact of CEPA on point source discharge control is not clear at this time.

Ontario Programs - Description and Assessment

The discharge of industrial, commercial and institutional wastes to STPs is regulated locally by municipalities through the use of an Industrial Waste Sewer Use Bylaw developed by the local level of government under the Ontario Municipal Act. Many of the municipal by-laws are based entirely or in part on a Model Sewer Use Bylaw of 1975. The most recent version was issued in late 1988 and many municipalities are reviewing their by-laws in light of this newer proposal. This by-law prescribes limits for conventional pollutants, most metals, hazardous wastes and a few organic contaminants.

All regional municipalities, district municipalities and most cities, which in total treat 4,120,000 m³/d (1,088 USMGD) of sewage, have implemented some form of sewer use control programs. However, by-law implementation and enforcement activities in most of the towns and villages vary markedly depending on the degree of industrialization. Many small municipalities have no effective enforcement program. At the moment, pretreatment at IUs is focused on neutralization, destruction of cyanide, and precipitation of metals; this level of treatment is the rule rather than the exception in the province and is consistent with the majority of treatment concerns experienced by Ontario municipalities.

A detailed assessment was made of a number of Ontario STPs, which revealed many of the same difficulties unearthed in the U.S. review, namely that the

selective deployment of further resources at the municipal level was necessary to affect adequate tracking and enforcement of local sewer use programs. Development of a common set of criteria within the framework of a comprehensive sewer use program at the provincial level, as well as computer based tracking systems and further training of municipal and industrial operators at the local level, is vital and should be encouraged. Also, the inability or unwillingness of some municipal governments to prosecute sewer use program violators should be rectified and multijurisdictional variances in requirements and enforcement among municipalities should be resolved.

In summary, although there is considerable effort, particularly at the larger municipalities, to deliver programs comparable to those at POTWs in the Great Lakes states, there is no comprehensive, coordinated pretreatment program at the provincial level at this time. The Ministry of the Environment (MOE) is committed to the delivery of such a program within the next several years.

Current Developments

Although large municipalities do have sewer use programs in place, a comprehensive and uniform coordinated pretreatment program at the provincial level is needed. In recognition of this, under the Ontario Municipal/Industrial Strategy for Abatement (MISA) emerging Sewer Use Control Program, a regulatory strategy is under development. This strategy will likely include the following:

- A pretreatment standard for industrial categories based on Best Available Technology Economically Achievable BATEA provincial regulations with an allowance for municipalities to set more stringent "local limits."
- Regulation enforcement by local or regional municipalities, with provincial auditing.
- All municipalities, regardless of size of STP, are to be included in the strategy.

Measures to address the discharge of toxics to sewers from domestic sources are being evaluated. Various options are under consideration, including public education programs, more accessible waste collection depots, and enforcement measures.

II. FINDINGS AND RECOMMENDATIONS

FINDINGS

- As part of a national initiative, jurisdictions in the U.S. portion of the Great Lakes basin have put in place programs that respond to the pretreatment requirements of Article VI of the 1987 Great Lakes Water Quality Agreement with Protocol and, if properly applied, are responsive to the requirements for virtual elimination of persistent toxic substances called for in the Agreement.
- Further effort is required on the part of the EPA and the states to adequately track and enforce pretreatment program requirements in the U.S. portion of the basin.
- The Canadian government has general provisions for the control of discharges from selected industries to POTWs, but their impact has not been verified. The federal and Ontario governments have continued to cooperate on the refinement of a model sewer use by-law for voluntary adoption by Ontario municipalities; however, notwithstanding a renewed interest in achieving this objective by the current provincial government, a comprehensive pretreatment program coordinated at the provincial and federal level does not currently exist. Such a program is being developed as part of the MISA initiative of the MOE. Monitoring of municipal systems receiving industrial discharges is expected to begin in 1990.
- Although there are pretreatment activities of merit at the 35 major municipalities/regions in Ontario, these programs are not uniform in substance or vigor and do not have any centrally administered review or audit to determine their effectiveness.
- The proposed Ontario MISA sewer use program appears to meet the intent of the GLWQ Agreement and should establish a uniform, coherent and effective provincial program containing provisions for the regular and detailed determination of compliance with established objectives by individual municipalities.
- To a great extent, programs at the municipal level in both countries remain focused on toxic metals and relatively few selected organic compounds. In the U.S., adequate identification of other toxic organic compounds, particularly those on the Priority Pollutant list, is now largely completed, and implementation of regulations necessary for their control is continuing. In Ontario, the MISA review of sewer use requirements will address control of a number of organic contaminants, using a list based, in part, on the EPA Priority Pollutant list.
- Certain U.S. categorical standards have not limited major toxic organic discharges of pollutants such as methylene chloride, 1,1,1-trichloroethane, toluene, and ethyl benzene. Major industrial sources of these unregulated pollutants include the Pharmaceuticals, Equipment Manufacturers, and Petroleum refining industries. EPA is considering revisions of these categorical standards or guidance documents and extension of the contaminant list among all categorical industries to include other toxic

organics. The impact of the discharge of hazardous materials to the sewer system under the RCRA domestic sewage exemption is also under continued review.

- U.S. NPDES Great Lakes permits establish water quality limits for toxic substances; however, current human health considerations are not incorporated into every state's water quality standards.
- In the United States portion of the basin, a comparable standard definition of significant noncompliance among IUs has not been entirely achieved at either the municipal or state level; thus, a precise comparison of program performance among the Great Lakes States is impossible.
- Resources are a key factor in the effectiveness of a pretreatment program at all levels regardless if they are allocated to operator training, inspection and monitoring, enforcement, data management or other aspects of the program. In selected instances, very specific resource concerns were identified in established programs at a number of levels.
- Most of the U.S. POTWs have sufficient legal authority to operate their programs effectively. Very few ordinances contained serious deficiencies, or were lacking authority to take immediate action to halt an industrial discharge in an emergency situation that threatens human health or welfare. Ontario municipal programs do not have the same depth of legal authority and this issue needs to be addressed.
- The willingness of local levels of government to pursue prosecutions for significant violations of current regulations and requirements is a matter of concern. Such actions are frequently hampered by the absence of an appropriate and established policy and specified procedures. Due to close working relationships with local industry, smaller communities often are reluctant to pursue enforcement actions. Many municipalities had never taken formal enforcement actions, even in the face of significant violations.
- The Task Force identified a need for a significant additional amount of education and assistance at the municipal level, including legal staffs, throughout the basin to make current and proposed programs completely understood and effective.
- Some training of government and industrial treatment operators exists, but it is limited and needs to be more widely implemented. Industrial management may not be fully aware of all the benefits obtainable through operator training and education.
- As further refinements occur in industrial pretreatment or sewer use, the volume of toxic materials in wastewater from domestic sources will take on more significance.
- Several programs face multijurisdictional enforcement issues. Lack of resolution in multijurisdictional situations could result in a failure to take enforcement actions against IUs outside the boundaries of the municipality in which the STP is located.

- Generally, in jurisdictions with major programs, data adequate to allow characterization of program delivery have been collected; however, an inordinate level of effort was frequently required to do so. The most common shortcoming encountered was decentralized files, making a review of relevant permit inspection and enforcement difficult. Development of electronic databases at the local level would simplify greatly tracking by all levels of government and subsequent review of enforcement activities.
- Local limits are a cornerstone of an effective program and are a necessary supplement to categorical standards and the prohibitions in the control of impacts of other hazardous wastes on a site-specific basis.
- Total estimated releases of selected toxic contaminants from POTWs in the Great Lakes basin ranged from approximately less than 1 tonne (one thousand kilograms) per annum (t/a) of hexachlorobenzene and total PCBs respectively to more than 500 t/a of chromium, lead and zinc for the year 1985. Because of a lack of an adequate database, no estimate of the quantities of 2,3,7,8-TCDD, tetrachlorodibenzofuran and anthracene could be made.

RECOMMENDATIONS

General

- Research should be undertaken to determine if domestic sources of toxic substances should be considered for additional control and to identify the methods for effecting suitable controls.
- Municipalities should have a centralized Electronic Data Processing system, with effective and efficient accessibility. Ontario and the states should ensure the timely, accurate, responsive, and continuous transfer of compliance data from municipalities to their respective databases or record systems in a manner to allow an accurate, responsive, comprehensive and ongoing determination of program status and compliance.
- Development of local limits to respond to contaminants in both effluent and sludge as well as process inhibition and worker health and safety concerns, should be done as a regulated requirement using a methodology approved by state or provincial authorities. The substances controlled and the extent of that control needs to be consistent throughout the basin.
- Expanded use of regulatory biomonitoring techniques to demonstrate nontoxicity should be encouraged as part of the permit development process, or whole effluent toxicity limitations and other biomonitoring requirements should be included in municipal point source permits.
- Jurisdictions should cooperate in the collection of more broadly-based data sets including loadings associated with air emissions and groundwater exfiltration from STPs and collection systems. The significance of such releases from plants should be explicitly considered in the development of local limits, as well as controls where these appear necessary.
- Further emphasis and resources should be dedicated to the provision, on a regular basis, of training of both municipal and industrial wastewater treatment plant operators as well as discharge permit inspectors. State

and provincial governments should develop, with federal support, training programs for such personnel by the end of calendar year 1992.

- Detailed, specific compliance and enforcement policies and practices should be provided as an element of the regulatory program at all levels of program administration, but particularly at the local level. These practices should include a mandatory permit system or equivalent for all direct municipal dischargers to the basin and associated SIUs.
- All jurisdictions should review the resource requirements of their programs and ensure that resources adequate for the effective functioning of these programs are provided.

Specific

- Ontario should put the current proposed MISA sewer use control program in place by the end of calendar year 1991.
- EPA and the Great Lakes states should actively address the need to introduce, in the short term, further commonality in their pretreatment programs, particularly in the definitions of SIUs and Significant Noncompliance, and in enforcement procedures and activities.
- To further develop the mass balance approach and evaluate program progress, the Parties and jurisdictions, in cooperation with the Commission, should undertake to continue the enhancement of the current estimates of toxic releases from the municipal sector through the collection of additional data on influent, effluent and sludge quality and relevant information on the operating characteristics of treatment plants in the Great Lakes basin.
- The U.S. EPA and Environment Canada should be encouraged to provide technical assistance to states and Ontario and take whatever additional steps are necessary to ensure adequate water quality and sludge standards are in place. In the process of developing such standards, critical pollutants, hazardous polluting substances and persistent toxic substances, as determined under the 1987 Great Lakes Water Quality Agreement with Protocol, should be considered for inclusion in the standard development exercise.
- The Parties (U.S. and Canada), as part of their reporting to the Commission, should provide a biennial update on the status of their pretreatment programs in the Basin to coincide with the Water Quality Board reporting cycle, with particular emphasis on compliance and enforcement activities.

III. INTRODUCTION

The Great Lakes support a population in excess of 40 million people, the majority of whom live in urban centres serviced largely by communal wastewater treatment facilities. As of 1985, there were 1,199 municipal wastewater treatment plants, with a total hydraulic design capacity of 19.5×10^6 cubic meters per day (m^3/d) (5,130 million U.S. gallons per day) in the basin. Three hundred and ninety of these facilities are considered major, having design capacities in excess of $3,800 m^3/d$ (1 USMGD) (Report of the Water Quality Board - 1985).

In accordance with its terms of reference, the Municipal Pretreatment Task Force of the Water Quality Board has prepared this report with the intention of reviewing the significant features and objectives of current municipal pretreatment programs in the various jurisdictions of the Great Lakes basin. The Task Force has considered these programs in the light of Article VI of the current Great Lakes Water Quality Agreement, which calls for the "establishment of pretreatment requirements for all industrial plants discharging waste into POTWs where such industrial wastes are not amenable to adequate treatment or removal using conventional municipal treatment processes." In performing this review, the Task Force was cognizant of and drew upon the work of the 1983 Municipal Abatement Task Force of the Water Quality Board.

In preparing this overview, the Task Force has reviewed information on the diverse pretreatment strategies in place in the basin and on ongoing developments to effect additional levels of pretreatment control, with a particular emphasis on control of toxic substances.

As the list of members (appended) indicates, national, state, provincial, and municipal agencies were represented on the Task Force in some capacity. The state of Illinois was not represented because none of its STPs discharges into the Great Lakes basin; nor was Pennsylvania, which has few POTWs discharging to the Basin.

Under the direction of the Water Quality Board, and with the participation of the federal, state, provincial and municipal governments, the Municipal Pretreatment Task Force was charged to:

- i) Review and report on the significant features and objectives of current municipal pretreatment programs in the various jurisdictions of the Great Lakes basin and, to the extent possible, determine and compare their impact on the adequacy of control of toxic substances discharged in the Basin.
- ii) Compile information on the plans and strategies under development in the jurisdictions to further improve current pretreatment control programs.
- iii) Analyze and report on the success of jurisdictions in obtaining compliance among those industrial sources subject to pretreatment provisions or requirements.
- iv) Estimate the contribution of toxic substances (both metals and organic chemicals) released to the basin ecosystem from municipal

wastewater facilities via atmospheric emissions, sludge disposal and effluent discharges as well as what portion of this total burden originates from industrial, commercial and domestic sources discharging to these facilities.

- v) Through an examination of programs at selected sewage treatment facilities in the Great Lakes basin, assess the adequacy of present and proposed pretreatment programs to achieve both the jurisdictional goals for which they were established and the reduction and virtual elimination of discharges of persistent toxic substances called for in the 1978 Agreement, and repeated in the revised 1987 Agreement with protocol.
- vi) Using the findings from the efforts listed above, develop appropriate recommendations for the consideration of the Water Quality Board.

IV. ESTIMATION OF THE RELEASE OF SELECTED TOXIC SUBSTANCES TO THE GREAT LAKES BASIN FROM MUNICIPAL SEWAGE TREATMENT PLANTS

In response to its charge under Item iv of its Terms of Reference - to estimate the total contribution of toxic substances (both metals and organic chemicals) released to the ecosystem of the Great Lakes basin from municipal wastewater facilities via atmospheric emissions, sludge disposal, and effluent discharges - the Task Force initiated a contract with Canviro Inc. Their report, 'An Estimation of Toxic Substance Release to the Great Lakes basin from Municipal Sewage Treatment Plants' has been filed at the Regional Office of the Commission and formed the basis for this chapter.

Under the provisions of the contract, a selected population of all municipal STPs in the basin was contacted to assemble detailed information on plant design, operating parameters and influent wastewater characteristics. These data were used in conjunction with a predictive model and estimates of contaminant removal efficiencies achievable in different types of treatment plants to estimate concentrations of selected contaminants in raw sewages, treated effluents and sludges from municipal facilities. From these estimates, the total loadings of the selected contaminants to the Great Lakes basin from municipal STP effluents and associated atmospheric emissions and sludge disposal practices were calculated by an extrapolation procedure.

Approach

Loading estimates for toxic substances, both metals and organic chemicals, were of interest to the Task Force. Most investigations have focused on the U.S. EPA 'priority pollutants' which includes 126 compounds, of which 13 are trace metals. In order to reduce the information base to a manageable level, it was agreed that a 'short list' of toxic contaminants or groups of contaminants would be included in the estimate, based on their known presence in POTW effluents and sludges, known environmental or human health significance, and public concern. The short list included inorganic contaminants, including cyanide, arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc, PCBs (total), 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), related dibenzofurans, phenols (total), volatile aromatic hydrocarbons, including benzene, toluene and ethylbenzene, chlorinated volatile and semi-volatile compounds including chloroform, tetrachloroethylene, hexachlorobenzene, 1,1,1-trichloroethane and trichloroethylene and base-neutral extractable polyaromatic hydrocarbons (PAHs), including naphthalene and anthracene.

It was recognized that less data would be available on dibenzofurans, which are not included in the U.S. EPA Priority Pollutant List, and on 2,3,7,8-TCDD, in particular, which was included in only a very few of the POTW investigations of toxic organic contaminants. It was further agreed that the estimate developed would reflect the toxic contaminants load for the entire Great Lakes basin and would not be further subdivided into component parts.

Plant Selection

There are approximately 1200 POTWs discharging to the Great Lakes basin, of which about 360 had flows in excess of 4,540 m³/d (1.2 USMGD). To meet the schedule and budget constraints, it was agreed to conduct the analysis on a select number of plants from this population and then extrapolate to estimate

the total loading of selected toxic contaminants to the basin. Approximately 20% of the plants in the basin were to be included in the detailed analysis, selected largely at random. The distribution of these POTWs would be skewed toward the larger plants, rather than equally distributed over all sizes, but would be representative of the distribution of plant types in the basin. The base year of estimation was chosen to be 1985.

A further search of various databases, including STORET and NEEDS, yielded 1,199 POTWs for which information was available regarding size and plant type. These were subdivided into two jurisdictions (United States and Ontario) and further categorized according to facility type and quantity of flow. This procedure produced 27 different categories or 'strata' shown in Table 4.1. The 'miscellaneous' stratum represented less than 1% of total flow and the lack of definition of these plants was not a source of significant relative error. Selection of the approximately 20% of the plants was random, subject to the following constraints:

1. Each stratum was to be represented by at least two POTWs.
2. At least one POTW was to be selected for each of the U.S. jurisdictions in the basin.
3. At least one of the five largest POTWs in U.S. and Canada would be selected for contact.
4. Approximately one-half of the number of plants selected to be contacted were to be selected to serve as replacement plants. The number of POTWs to be selected for contact was set at 240 (20% of the total).

With these constraints, the selection of specific plants to be contacted or to serve as replacements was done at random from the population of POTWs in the basin according to the following procedure:

1. Two POTWs were selected at random to represent each stratum ($27 \text{ strata} \times 2 \text{ POTWs} = 54 \text{ POTWs}$).
2. The remaining 186 POTWs to be selected ($240 \text{ minus } 54$) were distributed into the 27 strata according to the percent of total flow represented by POTWs in each stratum.

A brief questionnaire, dealing primarily with the following plant specific information: plant size (flow), plant type, type of aeration (if appropriate), type of grit removal process, sludge generation, sludge disposal method, and estimated industrial/commercial/domestic contributions to the plant influent, was developed. The selected plants were contacted by telephone. In total, data from 225 plants were used in the final data analysis.

Estimation of Pollutant Removal Efficiencies

Major sources of data for the estimation of pollutant removal efficiencies for the various plant designs were taken from available literature as well as several ongoing research programs, including the MOE MISA Municipal STP Pilot Monitoring Project and an associated activity being conducted by Environment

Table 4.1
DISTRIBUTION OF POTWs INCLUDED IN THE SURVEY

Jurisdiction	Plant Type	% of Total Flow	Total Number of Plants	Contact Plants	Replacement Plants	Total
Ontario	<u>Lagoon</u>					
	<0.3785	0.02	19	5	3	8
	0.3785-3.785	0.49	70	6	3	9
	>3.785	0.33	8	6	2	8
	<u>Primary</u>					
	<3.785	0.11	8	6	2	8
	3.785-37.85	0.37	5	5	0	5
	>3.785	3.09	7	7	0	7
	<u>Secondary</u>					
	<3.785	0.50	69	6	3	9
	3.785-37.85	3.28	49	12	6	18
	37.85-113.55	4.51	15	14	1	15
	>113.55	12.22	7	7	0	7
	<u>Tertiary</u>					
	<3.785	0.12	19	6	3	9
	3.985-18.925	0.43	7	6	1	7
	>18.925	0.62	3	3	0	3
United States	<u>Lagoon</u>					
	<0.3785	0.06	51	6	3	9
	0.3785-3.785	0.70	109	6	3	9
	>3.785	0.85	18	7	4	11
	<u>Primary</u>					
	<3.785	0.23	29	6	3	9
	3.785-37.85	0.38	9	6	3	9
	>3.785	0	-	-	-	-
	<u>Secondary</u>					
	<3.785	2.18	303	10	5	15
	3.785-37.85	8.54	150	21	11	32
	37.85-113.55	8.69	28	22	6	28
	>113.55	39.76	20	20	0	20
	<u>Tertiary</u>					
	<3.785	0.55	77	6	3	9
	3.985-18.925	2.06	48	9	5	14
	>18.925	9.86	21	21	0	21
	<u>Misc.</u>					
	<0.3785	0.02	45	6	3	9
	0.3785-3.785	0.02	5	5	0	5
TOTAL		100.00	1199	240	73	313

*All Flows in 1000 m³/d

Canada's Wastewater Technology Centre, aimed at determining emissions of selected toxic organics due to volatilization from aeration tanks and grit tanks, and sludge incinerators tested under Environment Canada's National Incinerator Testing and Evaluation Program (NITEP), as well as published literature sources.

Removal efficiencies for each type of treatment facility for specific toxic contaminants under consideration were determined from the available literature. For each type of facility, an average value representative of the overall removal of that specific contaminant was calculated and these values, as presented in Table 4.2, were incorporated into the toxics removal data file for calculation of average effluent concentrations from municipal POTWs.

For several contaminants, including 2,3,7,8-tetrachlorodibenzo-p-dioxin, dibenzofuran and anthracene, removal data are not reported in Table 4.2 for some plant types. However, these contaminants were not identified at detectable levels in influents to these types of facilities in the literature.

In Table 4.2, there are a few anomalies where the degree of removal achieved for a particular contaminant is higher in a lagoon, for example, than in a tertiary facility. Where these estimates were based on actual plant monitoring data, the values were retained in the data file.

The contribution of biodegradation, volatilization and adsorption to the total removal of each contaminant under consideration in each type of POTW was estimated and is summarized in Table 4.3. The primary source of these data was the U.S. EPA Domestic Sewage Study. The contribution of volatilization to the overall removal of organic contaminants from aeration tanks and grit tanks was based on data produced by the Wastewater Technology Centre, Environment Canada.

Land application of sludges, landfill disposal and airborne emissions from sludge incinerators were considered as sources of toxic loadings in the basin due to sludge disposal practices. Concentrations of toxic contaminants in POTW sludges were calculated based on the estimated degree of adsorption of each contaminant (Table 4.3).

Because analytical detection limits were such that accurate estimates of emissions of dioxin were difficult, the measured emissions of dibenzofurans at one of two plants sampled by Environment Canada were used as first order estimates of sludge incinerator dioxin emissions.

Influent Model

HAZPRED, an interactive microcomputer based model, was used to predict the concentration of each contaminant under consideration in an industrial, commercial and residential wastewater discharged to the POTW. Since limited information of questionable accuracy was available to define the types of industries discharging to the selected POTWs, a generic industrial wastewater, based on an A.D. Little study, was assumed. The waste water concentrations assumed by HAZPRED are given in Table 4.4.

Part of the "Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works" (1985) included an estimate of loadings of hazardous materials from domestic sources to POTWs. For hazardous metals and

Table 4.2

AVERAGE REMOVAL OF CONTAMINANTS THROUGH VARIOUS TYPES OF TREATMENT FACILITIES

Compound	Primary	Secondary	Tertiary	Lagoon
Arsenic	16.	54.3	58.3	35*
Cadmium	39.1	40.5	43.9	46.2
Chromium	46.7	67.1	76.4	80.
Copper	41.8	74.9	80.7	77.8
Cyanide	60.0	70.5	56.4	74.
Lead	50.3	59.6	67.1	54.
Mercury	68.0	73.7	74.1	80.7
Nickel	31.6	35.4	43.1	41.
Zinc	51.0	67.1	71.6	79.6
PCBs (total)	56.9	79.3	82*	60*
2,3,7,8-tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA
Dibenzofuran	NA	94.0	NA	NA
Phenols (total)	63.4	83.4	72.	57.
Benzene	50*	78.2	66.	99.
Toluene	46.5	77.2	91.	93.
Ethylbenzene	66.0	88.2	72.	79.7
Chloroform	46.7	52.2	61.6	79.7
Tetrachloroethylene	70.0	78.0	91.	86.
Hexachlorobenzene	76.3	81.2	80*	80*
Trichloroethylene	71.9	72.0	75.2	86.
1,1,1-trichloroethane	15.0	75.6	85.5	90.
Naphthalene	39.6	77.3	53.	75.5
Anthracene	58.	63.5	NA	NA

*Best professional judgment was used in the estimate.

NA - Concentrations were reported at less than measurement method detection limit in the literature. No estimate of removal available.

Table 4.3

ESTIMATE REMOVAL BY BIODEGRADATION, VOLATILIZATION, AND ADSORPTION

	Primary			Secondary			Tertiary			Lagoon		
	% B	% V	% A	% B	% V	% A	% B	% V	% A	% B	% V	% A
Arsenic	0	0	100	0	0	100	0	0	100	0	0	100
Cadmium	0	0	100	0	0	100	0	0	100	0	0	100
Chromium	0	0	100	0	0	100	0	0	100	0	0	100
Copper	0	0	100	0	0	100	0	0	100	0	0	100
Cyanide	0	0	100	0	0	100	0	0	100	0	0	100
Lead	0	0	100	0	0	100	0	0	100	0	0	100
Mercury	0	0	100	0	0	100	0	0	100	0	0	100
Nickel	0	0	100	0	0	100	0	0	100	0	0	100
Zinc	0	0	100	0	0	100	0	0	100	0	0	100
PCBs (total)	0	0	100	0	0	100	0	0	100	0	0	100
2,3,7,8-tetrachloro-dibenzo-p-dioxin	0	0	100	0	0	100	0	0	100	0	0	100
Dibenzofuran	0	0	100	0	0	100	0	0	100	0	0	100
Phenols (total)	0	0	100	100	0	0	100	0	0	100	0	0
Benzene	0	100	0	78	22	0	75	25	0	70	30	0
Toluene	0	100	0	69	31	0	66	34	0	60	40	0
Ethylbenzene	0	100	0	71	29	0	70	30	0	55	45	0
Chloroform	0	100	0	69	31	0	65	35	0	65	35	0
Tetrachloroethylene	0	100	0	58	42	0	57	43	0	52	48	0
Hexachlorobenzene	0	5	95	3	9	88	3	9	88	3	7	90
Trichloroethylene	0	100	0	80	20	0	79	21	0	74	26	0
1,1,1-trichloroethane	0	100	0	55	45	0	55	45	0	52	48	0
Naphthalene	0	10	90	38	10	52	38	11	51	30	8	60
Anthracene	0	5	95	35	5	60	35	5	60	29	2	69

% B = Percent of removal related to Biodegradation
 % V = Percent of removal related to Volatilization
 % A = Percent of removal related to Adsorption

Table 4.4
WASTEWATER CONCENTRATIONS USED BY HAZPRED

Contaminant	Concentrations (µg/L)		
	Industrial	Commercial	Domestic
Total Cyanide	90.7	0.2	1.1
As	3.2	2.6	4.8
Cd	20.7	0.6	1.8
Cr	713.2	56.8	16.3
Cu	124.8	54.5	72.1
Pb	323.7	49.8	97.3
Hg	1.9	0.4	0.4
Ni	108.7	12.4	4.2
Zn	860.0	138.1	214.0
Total Phenols	204.1	37.0	30.8
Benzene	1.2	2.7	0.2
Toluene	52.3	11.0	2.6
Ethylbenzene	100.4	5.0	0.4
Chloroform	12.0	6.7	3.0
Tetrachloroethylene	69.9	21.4	6.3
1,1,1-trichloroethane	85.1	2.9	2.3
Trichloroethylene	25.4	12.8	0.4
Naphthalene	50.7	2.6	2.1

cyanide, the nationwide estimate for the United States was 5,563 Metric Tons per annum (MT/A), or approximately 7% of estimated total metal loadings; hazardous organic discharges were estimated to be 2,633 MT/A, approximately 20% of total organic loadings. As full implementation of pretreatment programs occurs, the domestic contribution of hazardous metals is projected to increase to 60% of the total metals loadings.

HAZPRED does not have the capability to predict the concentration of 2,3,7,8-TCDD, dibenzofurans or anthracene, since these contaminants were not measured in the industrial wastewater characterization conducted by A.D. Little. Further, PCBs and hexachlorobenzene were not detected in industrial, commercial or domestic wastewaters at concentrations above the detection limit (1 µg/L and 10 µg/L, respectively). Therefore, no predicted concentrations for those compounds could be generated by HAZPRED.

Calculation Method

The step-by-step procedure (Figure 4.1) used to estimate the total contaminant loading into the Great Lakes involved the following steps:

Information obtained from the procedure outlined above and data from the POTW data file were used to estimate the quantities of toxic contaminants released by municipal POTWs in the Great Lakes basin by the following procedure:

1. The HAZPRED model was used to determine the concentrations of contaminants in the influent to surveyed POTWs based on the reported contributions of industrial, commercial and domestic operations to the influent.

2. The estimated influent concentrations were screened by comparison to available Ontario or Ohio data (Table 4.5 and 4.6). In cases where the predicted influent concentrations were outside the established $[1/3 \times (\text{minimum}) \text{ to } 3 \times (\text{maximum})]$ concentration range, or where HAZPRED did not contain an estimate of the contaminant, the average influent concentration from the Ontario or the Ohio POTW data was substituted.

Note that the Ohio data include sampling programs spanning early 1985 to mid 1988; thus some of these data may have been obtained prior to full implementation of a pretreatment program at the sampled plant.

Also, arithmetic averages are used as averages in the Ohio data, while geometric means are used as averages in the Ontario data. This difference is not considered significant, given the inaccuracies associated with the calculated first estimates of total toxic releases.

3. Effluent concentrations for each surveyed POTW were calculated based on the removal efficiency established for that contaminant in that type of plant.
4. The calculated effluent concentrations were checked against Ontario or Ohio data. Based on the screening criteria given under Step 2, these concentrations were accepted or replaced with the appropriate average.
5. Using percent volatilization and percent adsorption estimates for each plant type, the fraction of each selected compound emitted directly to atmosphere or accumulated in sludge was calculated.
6. Calculated concentrations of contaminants adsorbed to sludge were checked against those observed in POTW sludges in Ontario or Ohio. Outliers were identified and replaced by average concentrations.
7. From the very limited data available on sludge incineration emissions sampling, the quantity of each contaminant emitted to the atmosphere from POTWs practicing sludge incineration was estimated.
8. The mass loading of each contaminant resulting from effluents discharged by surveyed POTWs was calculated as the product of POTW flow and effluent concentration.
9. The mass loading of each contaminant emitted to atmosphere from aeration tanks and grit tanks at surveyed POTWs was estimated based on the influent load and the degree of volatilization estimated for that compound.
10. The mass loading of each contaminant resulting from sludge disposal practices at each surveyed POTW was calculated based on the estimated sludge concentrations, reported sludge generation rates and applicable sludge disposal methodology.
11. The quantity of each toxic compound released from surveyed POTWs in each jurisdiction/type/size stratum (Table 4.1) from all pathways (effluent, atmosphere, sludge) was summed.

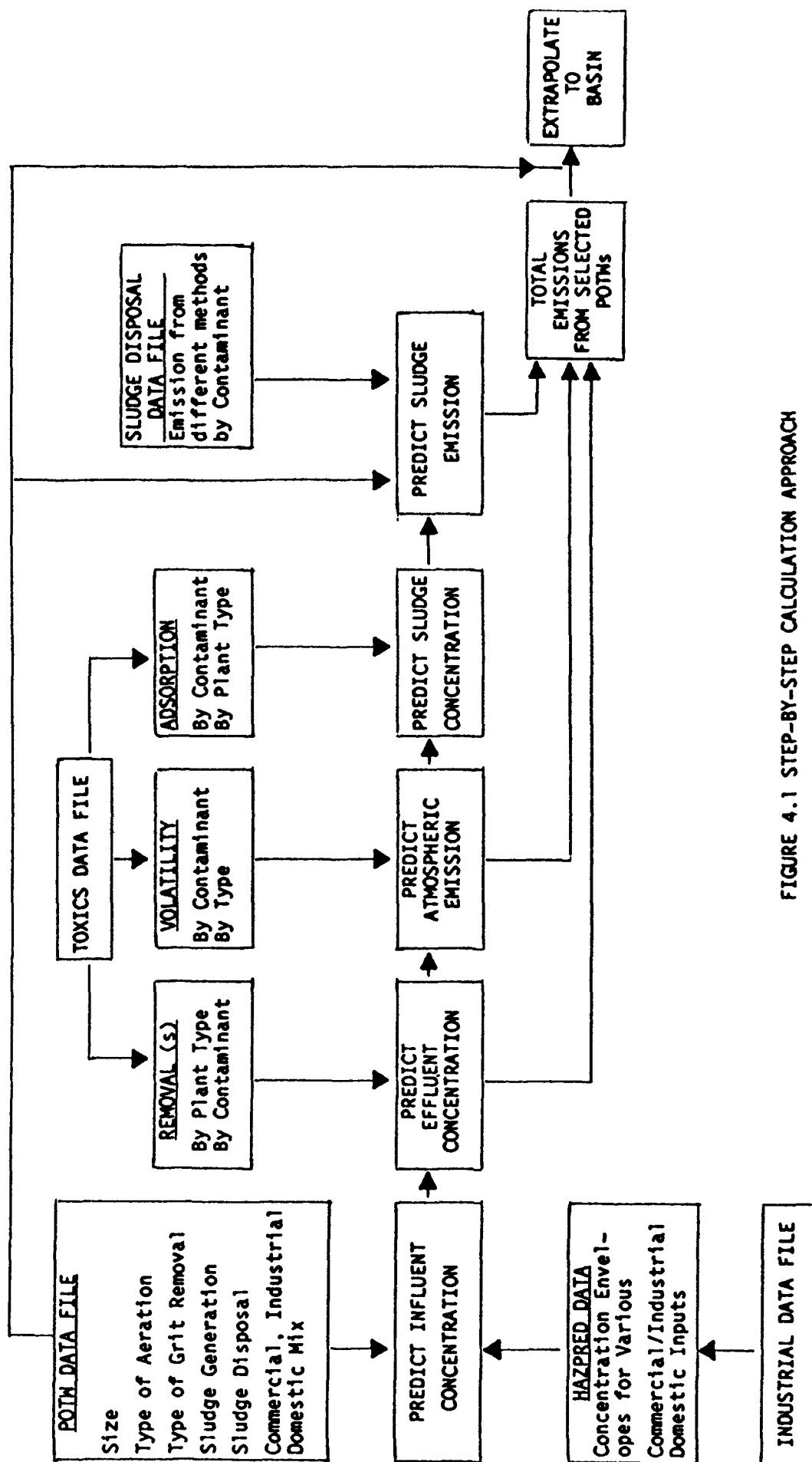


FIGURE 4.1 STEP-BY-STEP CALCULATION APPROACH

Table 4.5
CONCENTRATIONS OF TOXIC CONTAMINANTS IN ONTARIO STP INFLUENTS, EFFLUENTS AND SLUDGES
(1987)

Contaminant	Influents*			Primary Effluents*			Secondary/Tertiary/ Lagoon Effluents*			Sludges**		
	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
Arsenic	ID	ID	ID	NO	NO	NO	ID	ID	ID	0.25	14.6	6.4
Cadmium	<3.	34.7	6.6	<3.	3.7	2.3	<3.	7.2	1.9	<0.5	175.6	18.7
Chromium	<10.	555.0	91.1	<10.	26.1	12.9	<10.	68.8	9.5	5.5	7488.	608.9
Copper	<1.	590.0	143.0	10.	60.0	23.7	<10.	190.0	18.1	0.25	4962.	847.3
Cyanide	<1.	197.9	15.6	<1.	1.8	0.81	<1.	22.9	2.0	NO	NO	NO
Lead	<30.	1113.6	71.9	<30.	93.2	28.1	<30.	55.9	15.0	<0.5	4538.	313.0
Mercury	0.05	0.80	0.28	0.01	0.098	0.067	0.01	0.17	0.027	<0.01	33.7	4.1
Nickel	<10.	867.7	59.2	<10.	66.5	15.3	<10.	436.6	35.7	<3.	2393.	141.1
Zinc	20.4	3815.7	429.3	30.3	881.7	175.5	11.2	959.6	81.8	52.0	15126.	1464.
Benzene	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Toluene	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Ethylbenzene	<40.	139.3	28.0	<2.	5.9	1.7	<2.	1.3	0.8	0.1	28.6	15.3
Chloroform	<40.	54.4	24.9	<2.	4.9	2.2	<2.	8.4	1.3	<0.1	20.0	13.7
Tetrachloroethylene	<40.	54.5	22.7	<2.	101.1	17.4	<2.	29.8	1.7	ID	ID	ID
Trichloroethylene	<40.	282.5	30.4	<2.	17.7	3.5	<2.	4.5	1.0	ID	ID	ID
1,1,1-Trichloroethane	<40.	91.3	24.0	<2.	21.0	3.9	<2.	5.1	1.0	ID	ID	ID
Hexachlorobenzene	<0.02	0.031	0.011	NO	NO	NO	NO	NO	NO	<0.004	0.10	0.055
PCBs (total)	<0.08	0.38	0.068	<0.04	0.18	0.047	<0.04	0.046	0.018	0.029	4.18	0.39
Phenol (total)	<500.	660.	310.	<100.	110.	44.6	<100.	107.	52.	<1.0	1062.	79.2
2,3,7,8-tetrachlorodibenzo-p-dioxin	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Tetrachlorodibenzofuran	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Anthracene	NO	NO	NO	NO	NO	NO	NO	NO	NO	ID	ID	ID
Naphthalene	<10.	8.1	5.32	<2.	1.36	1.12	ID	ID	ID	<1.0	100.	87.8

* Influent and effluent concentrations reported in µg/L

** Concentrations in sludges reported in mg/kg DS

NO = Not Detected in any sample

ID = Insufficient Data on which to base a meaningful average

Note: Averages based on calculation of geometric means

Table 4.6
CONCENTRATIONS OF TOXIC CONTAMINANTS IN OHIO POTW INFLUENTS, EFFLUENTS AND SLUDGES
(1985-1986)

Contaminant	Influent*			Effluent**			Sludges**		
	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
Arsenic	<2.	40.	5.9	<2.	28.	6.0	0.03	37.	5.6
Cadmium	<1.	80.	10.3	<1.	20.	4.1	0.19	1341.	54.9
Chromium	2.	2510.	88.5	<2.	1260.	51.7	0.50	8330.	527.9
Copper	2.	997.	141.1	2.	3500.	84.0	1.2	13000.	905.1
Cyanide	<5.	930.	118.0	<5.	660.	80.6	0.6	1730.	119.0
Lead	<4.	198.	35.6	<4.	200.	21.0	1.4	6000.	221.7
Mercury	<0.2	100.	2.4	<0.2	17.	1.3	0.03	84.	3.2
Nickel	<2.	1550.	78.4	<2.	1560.	62.4	10.7	3883.	234.8
Zinc	<2.	15750.	557.3	<2.	6540.	218.8	2.4	39500.	2600.0
Benzene	<0.2	672.	18.7	<0.2	5.	2.0	No Data	No Data	No Data
Toluene	<0.2	400.	29.0	<0.2	23.	2.9	No Data	No Data	No Data
Ethylbenzene	<0.5	47.	4.8	<0.5	13.	2.6	No Data	No Data	No Data
Chloroform	<0.5	36.	7.1	<0.5	53.	5.2	No Data	No Data	No Data
Tetrachloroethylene	1.0	850.	30.9	<0.5	68.	6.4	No Data	No Data	No Data
Trichloroethylene	<0.5	447.	20.1	<0.5	70.	3.9	No Data	No Data	No Data
1,1,1-Trichloroethane	<0.5	140.	13.7	<0.5	21.	3.6	No Data	No Data	No Data
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ID	ID	ID
PCBs (total)	ND	ND	ND	ND	ND	ND	ID	ID	ID
Phenol (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-tetrachlorodibenzo-p-dioxin	ND	ND	ND	ND	ND	ND	NA	NA	NA
Tetrachlorodibenzofuran	NA	NA	NA	ND	ND	NA	NA	NA	NA
Anthracene	ND	ND	ND	ND	ND	ND	ID	ID	ID
Naphthalene	<1.0	149.	10.4	<1.0	12.	3.1	No Data	No Data	No Data

* Influent and effluent concentrations reported in µg/L

** Sludge concentrations reported in mg/kg D.S.

ND = Not Detected in any sample

ID = Insufficient Data on which to base a meaningful average

NA = Not Analyzed

12. The total quantity of each toxic compound emitted from all POTWs in each stratum was calculated by extrapolation based on the ratio of the total flow from POTWs in the stratum to the flow of surveyed POTWs in the stratum.
13. The total emissions of each toxic contaminant from municipal STPs in the Great Lakes basin was calculated as the sum of the total emissions from each stratum.

It should be noted that the reported total emissions do not represent the total quantity of these contaminants deposited in the Great Lakes since no assumptions were made with respect to the fate of the atmospheric volatile emissions from aeration and sludge disposal. These totals represent a first-order estimate of the emissions from all sources related to the operation of municipal STPs in the Great Lakes basin.

Estimation of Release of Toxics from Municipal STPs

Following the calculation method, the mass of selected contaminants released from municipal STPs in the Great Lakes basin via atmospheric emissions, sludge disposal practices and effluent discharges was estimated. The results of these calculations, including approximate pathway distribution, are presented in Table 4.7. These estimated first order emissions, as noted previously, are for the year 1985.

For three of the organic compounds, 2,3,7,8-tetrachlorodibenzo-p-dioxin, tetrachlorodibenzofuran and anthracene, no credible estimate of the mass released from municipal STPs was possible. Concentration data for these compounds were not available in HAZPRED and no estimate of their concentrations in POTW influents was possible. 2,3,7,8-tetrachlorodibenzo-p-dioxin was not detected at a concentration above the detection limit in any sample (influent, effluent or sludge) from any treatment facility included in the Ontario or the Ohio analytical database. Tetrachlorodibenzofuran was not included in the analytical program in Ohio. In Ontario, tetrachlorodibenzofuran was detected in only one raw sewage sample (of 54 samples tested), two treated effluent samples (of 38 samples tested) and none of the treated sludges. Therefore, insufficient data were available to support an estimate of the mass released. Similarly, anthracene was not detected in the influent or effluent from any facility monitored in Ohio or Ontario at a concentration above the detection limit. One sludge sample from a POTW in Ohio and one sludge sample from a POTW in Ontario had a detectable concentration of anthracene.

For all other contaminants, a first-order estimate of the mass released from municipal STPs in the Great Lakes basin was generated. The mass emitted varied from less than 1 tonne/year for hexachlorobenzene and total PCBs respectively to more than 500 tonnes/year for chromium, lead and zinc. As mentioned, an estimation of the distribution/pathway of each contaminant is also included, based on limited data.

An annual total PCB release of 1 tonne/a is consistent with estimates derived from the extrapolation of STP effluent data generated by the Upper Great Lakes Connecting Channels Study (UGLCCS). In determining total release, it was assumed that the amount of PCB discharged in effluent was equivalent to that released in air. No such confirming estimates were made for hexachlorobenzene.

Table 4.7
ESTIMATE OF TOTAL RELEASE AND ESTIMATED DISTRIBUTION OF
CONTAMINANTS FROM MUNICIPAL STPs IN THE GREAT LAKES BASIN

Contaminant	% of Total Release Emitted via			Total Release (tonnes/yr)
	Effluent	Atmosphere	Sludge* Disposal	
Arsenic	66	NS	34	19.
Cadmium	76	NS	24	26.
Chromium	49	NS	51	640.
Copper	43	NS	57	300.
Cyanide	73	NS	27	89.
Lead	59	NS	41	580.
Mercury	44	NS	56	3.
Nickel	79	NS	21	130.
Zinc	51	NS	49	1300.
Benzene	61	39	NS	2.
Toluene	45	55	NS	42.
Ethylbenzene	31	69	NS	55.
Chloroform	70	30	NS	34.
Tetrachloroethylene	36	64	NS	76.
Trichloroethylene	58	42	NS	26.
1,1,1-trichloroethane	49	51	NS	76.
Hexachlorobenzene	0	25	75	<1.0
PCBs (Total)	50	0	50	<1.0
Phenol (Total)	94	0	6	85.
2,3,7,8- Tetrachlorodibenzo-p-dioxin	NE	NE	NE	NE
Tetrachlorodibenzofuran	NE	NE	NE	NE
Anthracene	NE	NE	NE	NE
Naphthalene	53	20	28	28.

NE = No Estimate

NS = Assumed to be not significant

* via landfill or land application

NOTE: These estimates are based on estimated removal of each contaminant by adsorption, biodegradation and volatilization in the sewage treatment process. These removal mechanisms are poorly defined for many of the contaminants in question; because of the limits on quality and quantity of data, these values should be considered as only roughly indicative of any actual distribution.

The estimated total release of selected toxics from municipal STPs in the Great Lakes basin is considered to be of 'order-of-magnitude' accuracy. Estimated releases of heavy metals are generally in agreement with values calculated based on average effluent and sludge concentrations from the literature. With the exception of benzene, similar agreement exists for organic contaminants, although a poorer quality database is available for comparison. In the case of benzene, the calculated emissions are low because of the low influent concentration estimate generated from HAZPRED as compared to literature values. However, because the HAZPRED estimate was within the acceptable range compared to the Ohio POTW data (benzene data were unavailable from the Ontario POTW data), the low HAZPRED estimate was carried through the calculation procedure; given the ubiquitous presence of benzene in the environment, this value should be taken as an anomaly.

Conclusions

Using the procedures outlined herein, estimates of the mass release of selected inorganic and organic toxic contaminants from municipal STPs in the Great Lakes basin were developed. These estimates were presented in Table 4.7. Specific conclusions related to these estimates follow:

- Total releases of selected toxic contaminants from municipal STPs in the Great Lakes basin ranged from approximately less than 1 tonne/year of hexachlorobenzene and total PCBs to more than 500 tonnes/year of chromium, lead and zinc for the year 1985.
- Because of a lack of an adequate database, no estimate of the quantities of 2,3,7,8-tetrachlorodibenzo-p-dioxin, tetrachlorodibenzofuran and anthracene could be made.
- These calculated releases are considered 'order-of-magnitude' estimates but are generally in reasonable agreement with quantities calculated based on literature values for effluent and sludge concentrations. However, the mass of benzene released, based on these calculations appears to be an underestimate based on comparison to literature values and to releases of other similar compounds (i.e. toluene and ethylbenzene).

4.5 Suggested Future Activity

Although an effective procedure has evolved for the estimation of toxic releases from POTWs, improved data in specific areas would increase confidence in the accuracy of these estimates. Specifically,

- The HAZPRED model needs to be updated to more accurately reflect present industrial wastewater discharge characteristics and applied analytical procedures. Additional data are also needed for specific

contaminants in industrial wastewater including 2,3,7,8-TCDD, anthracene, PCBs, dibenzofurans and hexachlorobenzene.

- More comprehensive data are needed to characterize the influent to POTWs with respect to industrial contributions and extraneous flow.
- More comprehensive data on emissions from POTWs due to incineration and volatilization are needed.
- The data files developed for this report need to be routinely updated and expanded to improve the estimates generated herein.

V. PRETREATMENT PROGRAM STRUCTURES

Pretreatment Programs in the United States

Federal

Legislative Framework

The five principal U.S. federal laws that govern waste and components of waste management in the United States include the:

Federal Water Pollution Control Act, Clean Water Act (CWA) is the core legislation for the regulation of discharges to municipal sewer systems.

Solid Waste Disposal Act including **Resource Conservation and Recovery Act (RCRA)** defines waste in its many forms and sets out the regulatory procedures to control the discharge of waste. It contains an exemption for discharges comingled with domestic waste water, which will be discussed in greater detail later in this report.

Clean Air Act addresses air quality in the United States; air emissions from U.S. POTWs are required to comply with the provisions of this Act.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or "Superfund" is designed to identify and remediate releases of hazardous wastes from abandoned waste sites, and thus would only bear on the operation of a small majority of POTWs receiving such discharges. The impact of CERCLA requirements on U.S. POTWs in the Great Lakes basin is considered insignificant for the purposes of this report.

Toxic Substances Control Act, through the identification and control of toxic chemicals, supports the above acts and many other U.S. laws.

The U.S. Federal Government's role in the development of National Pretreatment Standards began with the passage of the CWA in 1972. This act is concerned with wastewater and sludge, as compared to the more comprehensive mandate of RCRA, and calls for the U.S. Environmental Protection Agency to address control of certain pollutants from industrial sources to POTWs. An overall regulatory framework was developed in the General Pretreatment requirements, initially published in 1973, and since modified in 1978 and 1981.

The goal of the current CWA continues to be the restoration and maintenance of the quality of surface water. Three programs that have a bearing on the control of sewer uses have been established under the CWA.

The NPP, which requires industrial pretreatment of waste to a technologically based standard prior to discharge to municipal sewers;

The NPDES Program, which provides technology or water quality based effluent standards and an associated permitting system that dischargers to surface waters, including POTWs, must comply with;

Sludge disposal requirements under the CWA specify pollutant specific limits for exercising various sludge disposal options.

Pretreatment programs are designed to address four concerns within the sewage treatment system: control of substances which interfere with the effective operation of the POTWs; prevention of passthrough of significant quantities of toxic contaminants from the treatment system to receiving waters; limitations on the contamination of municipal sludge by toxic substances; and the control of exposure of treatment plant workers to chemical hazards. Generally, POTWs that have flows larger than 5 USMGD (18,900 m³/day) are required to develop control programs that meet the requirements of the NPP as a condition of their NPDES permits; all other POTWs may be required to meet NPP requirements if non-domestic wastes have caused treatment plant upsets, contaminated sludge, or violated effluent permit limits.

The four concerns noted above were addressed via two broad initiatives: the control of prohibited discharges, which are discharges of substances that could threaten the operation of the sewage collection and treatment system, and control of particular industrial categories that discharge specific toxic contaminants of concern both to POTWs and users of the ultimate receiving water.

Regulatory Requirements

Prohibited Discharge Standards

The Prohibited Discharge Standards contained in 40 CFR 403.5 list both general and specific prohibitions. Under the General Pretreatment Regulations, general and specific prohibitions are established and implemented through local limits. Under the General Prohibitions, a user may not introduce into a POTW any pollutants which cause passthrough of contaminants or interfere with the treatment process. The term 'passthrough' is defined as a discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement (emphasis added) of the POTW's NPDES permit, including an increase in the magnitude or duration of a violation.

Interference is further defined as a discharge which inhibits or disrupts the POTW operations and causes a violation of any requirement of the POTW's NPDES permit or the prevention of sewage sludge use or disposal in compliance with the statutory provisions and regulations.

Section 405 of the CWA, the Solid Waste Disposal Act (SWDA), including the RCRA, state sludge management regulations prepared pursuant to Subtitle D of the SWDA, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act, all can have some bearing on the operations of a POTW. (Guidance Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program, Dec. 1987, U.S. EPA). Specific prohibitions forbid the discharge of five categories of pollutants:

- Those that create a fire or explosion hazard in the collection system or the treatment plant.
- Those that are corrosive, including any discharge with a pH lower than 5.0, unless the POTW is specifically designed to treat such discharges.

- Solid or viscous pollutants in amounts that will obstruct the flow in the collection system or treatment plant, resulting in interference with operations.
- Any pollutant discharged in quantities sufficient to interfere with POTW operations.
- Discharges with temperatures above 104°F (40°C) on arrival at the treatment plant, or of a temperature which interferes with the biological treatment processes at the STP.

Local Limits

As noted in the immediately preceding discussion, Section 403-5 of the General Pretreatment Regulations requires the implementation of General & Specific Prohibitions through the local limits process under two specific circumstances:

1. POTWs with local pretreatment programs shall develop and enforce specific limits to implement the prohibitions under 403.5 a) and b) (General and Specific Prohibitions).
2. All other POTWs shall, in cases of Interference or Pass Through resulting in a violation, develop and enforce specific effluent limits for industrial and all other users to ensure renewed or continued compliance with the POTW's NPDES permit or sludge use or disposal practices.

Typical municipal effluent permits may contain both specific conventional and non-conventional pollutant effluent limitations and, increasingly, water quality based toxic pollutant limitations, narrative toxicity limitations (e.g. no toxics in toxic amounts) and whole effluent toxicity standards. Section 406 of the 1987 Water Quality Amendments also requires the imposition of "conditions in permits issued to POTWs ... to protect public health and the environment from any adverse effects which may occur from toxic pollutants in sewage sludge". The EPA has provided a guidance manual outlining in detail appropriate methodologies for development of discharge limitations on sewage collection system users (Guidance Manual - EPA, Dec. 1987).

Currently, some NPDES permits include criteria for sludge use or disposal; however, many permits do not. At this time, sludge technical criteria are under development by the Office of Water at EPA; in the interim, sludge requirements may be contained in State or Federal regulations and/or State issued sludge use or disposal limits. In order that POTWs meet such limits, it is frequently necessary to develop a further limit on the contents of wastewater discharges to the POTW from industrial sources.

As the NPDES permitting system continues to evolve, increasing numbers of POTW effluent permits will incorporate limits for specific toxic contaminants. Where states have promulgated numerical water quality standards for specific toxic pollutants, POTWs whose effluents contain such contaminants may be required to develop limits in their industrial permits to ensure that these standards are met. In the absence of such State criteria, NPDES permitting authorities are expected to use a combination of biological techniques and available toxic effect data to develop permit conditions that

establish whole effluent toxicity limits or limits on specific contaminants. POTW local limits would then be developed to ensure these targets are met.

Local limits may also be developed to prevent fume toxicity to sewage plant workers and for the reduction of toxic emissions to the airshed from the POTW. Additional state requirements in areas such as solid waste management and hazardous waste acceptance should also be considered in the development of local limits. It should be emphasized that the existence and application of a Federal categorical standard does not relieve a municipality of its obligation to develop a more stringent local limit where the need for same is demonstrated.

Methodology for Limit Development

A number of methods exist for the development of local limits, depending on the specific concerns being addressed e.g. passthrough, explosivity, control of volatile organic compounds, or control of sludge content. Selection of a particular technical approach is largely a local decision, providing that the resulting limits are enforceable and scientifically defensible. For further information, refer to: "Guidance Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program", December, 1987, U.S. Environmental Protection Agency, Office of Water, Office of Water Enforcement and Permits, 401 M Street, S.W., Washington, DC 20460.

Categorical Pretreatment Standards

As noted earlier, categorical pretreatment standards are aimed at controlling the content of discharges of toxic substances to the POTW from specific industrial sectors. Development of these standards began in 1978 and has continued to this day under 40 CFR parts 400-499. Each categorical standard covers one particular industrial sector.

In determining target industrial sectors, the categorical standard initiative made use of the EPA list of 126 toxic pollutants (often referred to as the Priority Pollutants) identified as having the greatest potential to harm human health or the environment (Table 5.1). Some of the standards also regulate industrial discharges of non-conventional pollutants which are not included among the 126 chemicals. Those 28 industrial sectors currently affected by categorical standards are listed in Table 5.2.

Six of the industrial categories have a pretreatment standard established for TTOs. The TTO is defined as the sum of the masses or concentrations of specific toxic organic compounds found in the industrial user's process discharge at a concentration greater than 0.01 mg/l. Each Categorical Standard lists the specific toxic organic compounds that are to be included in the summation to define TTO for that particular category. The categories affected by a TTO limit include electroplating, metal finishing, electrical and electronic components, copper forming, aluminum forming, and coil coating (can-making subcategory only). The TTO requirement for these industries resulted from industry studies which demonstrated significant potential for TTO discharges from them.

Industrial users in the electroplating, metal finishing, and electrical and electronic components categories, rather than perform routine TTO

TABLE 5.1
TOXIC POLLUTANTS REGULATED UNDER CATEGORICAL STANDARDS

1. acenaphthene	46. bromoform (tribromomethane)	87. dieldrin	
2. acrolein	47. dichlorobromomethane	88. chlordane	
3. acrylonitrile	48. chlorodibromomethane	(technical mixture & metabolites)	
4. benzene	49. hexachlorobutadiene	89. 4,4-DDT	
5. benzidine	50. hexachlorocyclopentadiene	90. 4,4-DDE (p,p-DDX)	
6. carbon tetrachloride	51. isophorone	91. 4,4-DDD (p,p-TDE)	
7. chlorobenzene	52. naphthalene	92. Alpha Endosulfan	
8. 1,2,4-trichlorobenzene	53. nitrobenzene	93. Beta Endosulfan	
9. hexachlorobenzene	54. 2-nitrophenol	94. endosulfan sulfate	
10. 1,2-dichloroethane	55. 4-nitrophenol	95. endrin	
11. 1,1,1-trichloroethane	56. 2,4-dinitrophenol	96. endrin aldehyde	
12. hexachloroethane	57. 4,6-dinitro-o-cresol	97. heptachlor	
13. 1,1-dichloroethane	58. N-nitrosodimethylamine	98. heptachlor epoxide	
14. 1,1,2-trichloroethane	59. N-nitrosodiphenylamine	(BHC-Hexachlorocyclohexane)	
15. 1,1,2,2-tetrachloroethane	60. N-nitrosodi-n-propylamine	99. Alpha-BHC	
16. chloroethane	61. pentachlorophenol	100. Beta-BHC	
17. bis(2-chloroethyl) ether	62. phenol	101. Gamma-BHC (lindane)	
18. 2-chloroethyl vinyl ether (mixed)	63. bis(2-ethylhexyl) phthalate	102. Delta-BHC	
19. 2-chloronaphthalene	64. butyl benzyl phthalate	(PCB-polychlorinated biphenyl)	
20. 2,4,6-trichlorophenol	65. di-n-butyl phthalate	103. PCB-1242 (Arochlor 1242)	
21. parachlorometa cresol	66. di-n-octyl phthalate	104. PCB-1254 (Arochlor 1254)	
22. chloroform (trichloromethane)	67. diethyl phthalate	105. PCB-1221 (Arochlor 1221)	
23. 2-chlorophenol	68. dimethyl phthalate	106. PCB-1232 (Arochlor 1232)	
24. 1,2-dichlorobenzene	69. benzo(a)anthracene	107. PCB-1248 (Arochlor 1248)	
25. 1,3-dichlorobenzene	(1,2-benzanthracene)	108. PCB-1260 (Arochlor 1260)	
26. 1,4-dichlorobenzene	70. benzo(a)pyrene (3,4-benzo-pyrene)	109. PCB-1016 (Arochlor 1016)	
27. 3,3-dichlorobenzidine	71. 3,4-benzofluoranthene	110. toxaphene	
28. 1,1-dichloroethylene	(benzo(k)fluoranthene)	111. antimony (total)	
29. 1,2-trans-dichloroethylene	72. benzo(k)fluoranthene	112. arsenic (total)	
30. 2,4-dichlorophenol	(1,12-benzofluoranthene)	113. asbestos (total)	
31. 1,2-dichloropropane	73. chrysene	114. beryllium (total)	
32. 1,2-dichloropropene	74. acenaphthylene	115. cadmium (total)	
(1,3-dichloropropene)	75. anthracene	116. chromium (total)	
33. 2,4-dimethylphenol	76. benzo(ghi)perylene (1,12-benzoperylene)	117. copper (total)	
34. 2,4-dinitrotoluene	77. fluorene	118. cyanide (total)	
35. 2,6-dinitrotoluene	78. phenanthrene	119. lead (total)	
36. 1,2-diphenylhydrazine	79. dibenzo(ah)anthracene	120. mercury (total)	
37. ethylbenzene	(1,2,5,6-dibenzanthracene)	121. nickel (total)	
38. fluoranthene	80. indeno (1,2,3-cd)pyrene	122. selenium (total)	
39. 4-chlorophenyl phenyl ether	(2,3-o-phenylene-pyrene)	123. silver (total)	
40. 4-bromophenyl phenyl ether	81. pyrene	124. thallium (total)	
41. bis(2-chloroisopropyl) ether	82. tetrachloroethylene	125. zinc (total)	
42. bis(2-chloroethoxy) methane	83. toluene	126. 2,3,7,8-tetrachlorodibenzo-o-dioxin	
43. methylene chloride (dichloromethane)	84. trichloroethylene	(TCDD)	
44. methyl chloride (chloromethane)	85. vinyl chloride (chloroethylene)		
45. methyl bromide (bromomethane)	86. aldrin		

TABLE 5.2 SUMMARY STATUS OF NATIONAL CATEGORICAL PRETREATMENT STANDARDS: MILESTONE DATES
FINAL REGULATIONS

Industry Category	40 CFR Part	Proposed New Source Rule Date ¹	Promulgation Date	Effective Date	BMR Due Date	PSES Compliance Date	90-Day Compliance Report Due Date
Aluminum Forming	467	11-22-82	10-24-83	12-07-83	06-04-84	10-24-86	01-22-87
Battery Manufacturing	461	11-10-82	03-09-84	04-23-84	10-20-84	03-09-87	06-07-87
Coil Coating (Phase I)	465	01-12-81	12-01-82	01-17-83	07-16-83	12-01-85	03-01-86
Coil Coating (Cannmaking))	465	02-10-83	11-17-83	01-02-84	06-30-84	11-17-86	02-15-87
Copper Forming	468	11-12-82	08-15-83	09-26-83	03-25-84	08-15-86	11-13-86
Electrical and Electronic Components (Phase I)	469	08-24-82	04-08-83	05-19-83	11-15-83	07-01-84 (TTO) ² 11-08-85 (As)	09-29-84 02-06-86
Electrical and Electronic Components (Phase II)	469	03-09-83	12-14-83	01-27-84	07-25-84	07-14-86	10-12-86
Electroplating	413	07-03-80 ³	01-28-81	03-30-81	09-26-81 (Non-integ.) 06-25-83 (Integrated) 02-25-84 (TTO)	04-27-84 (Non-integ.) 06-30-84 (Integrated) 07-15-86 (TTO)	07-26-84 09-28-84 10-13-86
Inorganic Chemicals (Interim, Phase I, and Phase II)	415	--	07-20-77 06-29-82 08-22-84	07-20-77 08-12-82 10-05-84	01-16-78 05-09-83 04-03-85	07-20-80 ⁴ 06-29-85 08-22-87	10-18-80 09-27-85 11-20-87
Iron and Steel	420	01-07-81	05-27-82	07-10-82	04-06-83	07-10-85	10-08-85
Leather Tanning and Finishing	425	07-02-79	11-23-82	01-06-83	07-05-83	11-25-85	02-23-86
Metal Finishing	433	08-31-82 ³	07-15-83	08-29-83	02-25-84	06-30-84 (Part 433, TTO) ⁵ 07-10-85 (Part 430, TTO) 02-15-86 (Final)	09-28-84 10-08-85 05-16-86
Metal Molding and Casting (Foundries)	464	11-15-82	10-30-85	12-13-85	06-11-86	10-31-88	01-29-89
Nonferrous Metals Forming and Metal Powders	471	03-05-84	08-23-84	10-07-85	04-05-86	08-23-88	11-21-88
Nonferrous Metals Manufacturing (Phase I)	421	02-17-83	03-08-84	04-23-84	10-20-84	03-09-87	06-07-87
Nonferrous Metals Manufacturing (Phase II)	421	06-27-84	09-20-85	11-04-85	05-03-86	09-20-88	12-19-88
Organic Chemicals, Plastics and Synthetic Fibers	414,416	03-21-83	11-05-87	12-21-87	06-20-88	11-05-90	02-04-91

TABLE 5.2 SUMMARY STATUS OF NATIONAL CATEGORICAL PRETREATMENT STANDARDS: MILESTONE DATES (continued)

Industry Category	40 CFR Part	FINAL REGULATIONS			MILESTONE DATES (continued)		
		Proposed New Source Rule Date ¹	Promulgation Date	Effective Date	BMR Due Date	PSES Compliance Date	90-Day Compliance Report Due Date
Pesticide Chemicals	455	11-30-82	10-04-85 ⁶	---	---	---	---
Petroleum Refining	419	12-21-79	10-18-82	12-01-82	05-30-83	12-01-85	03-01-85
Pharmaceuticals Manufacturing	439	11-26-82	10-27-83	12-12-83	06-09-84	10-27-86	01-25-87
Porcelain Enameling	466	02-27-81	11-24-82	01-07-83	07-06-83	11-25-85	02-23-86
Pulp, Paper, Paperboard	430, 431	01-06-81	11-18-82	01-03-83	07-02-83	07-01-84	09-29-84
Stream Electric Power Generation	423	10-14-80	11-19-82	01-02-83	07-01-83	07-01-84	09-29-84
Timber Products Processing	429	10-31-79	01-26-81	03-30-81	09-26-81	01-26-84	04-25-84
PROPOSED REGULATIONS							
Leather Tanning and Finishing - Amendments	425	01-21-87	(12-87)	---	---	---	---

Parentheses indicate expected milestone dates for categories that do not yet have final standards.

Footnotes:

¹The date of the proposed rule for each category is used to determine the new source status of an industrial facility. Industrial facilities that were in existence or that began construction of the regulated processes prior to that date are considered existing sources. New sources are facilities that began construction of the regulated processes after the date of the proposed rule.

²The compliance date for total toxic organics (TTO) for facilities subject to existing source Electrical and Electronic Components, Phase I regulations is July 1, 1984. The compliance date for arsenic under this category is November 8, 1985.

³The Electroplating proposed rule date is not used to determine the new source/existing source status of a facility. The Metal Finishing proposed rule date is used to make this determination for all electroplating and metal finishing facilities.

⁴The compliance date for Subparts A, B, L, AL, AR, BA, and BC of the Inorganic Chemicals category is July 20, 1980. The compliance date for Subparts AJ, AU, BL, BM, BN, and BO (except discharges from copper sulfate or nickel sulfate processes and for all Subparts of Part 415 not listed above is June 29, 1985.

⁵Existing sources that are subject to the Metal Finishing standards in 40 CFR Part 433 must comply only with the interim limit for Total Toxic Organics (TTO) by June 30, 1984. Plants also subject to the Iron and Steel Manufacturing standards in 40 CFR Part 430 must comply with the Interim TTO limit by July 10, 1985. The compliance date for metals, cyanide, and final TTO is February 15, 1986 for all sources.

⁶On July 25, 1986, the Eleventh Circuit Court of Appeals remanded to the EPA the final regulations originally promulgated on October 4, 1985 for the Pesticide Chemicals category. EPA removed the regulation from the Code of Federal Regulations on December 15, 1986 (40 FR 44911).

Note: The compliance date for any discharge that is subject to pretreatment standards for new source facilities (PSNS) is the same date as the commencement of the discharge.

monitoring, may prepare a toxic organic management plan (TOMP). Such a plan specifies the toxic organic compounds used in the process, the method of disposal used rather than discharge into wastestreams, and procedures for ensuring that toxic organics do not routinely spill or leak into wastewaters discharged to POTWs. In the Detailed Audit of Selected POTWs appended to this report, repeated reference will be made to both TTOs and TOMP. Both initiatives, TOMP in particular, are consistent with the goal of virtual elimination of persistent toxic substances called for in the Agreement, although contaminants addressed under them are not explicitly limited to that goal. (Reference: "Guidance Manual for Implementing Total Toxic Organic Pretreatment Standards", Permits Division, Office of Water Enforcement and Permits, Office of Water, U.S. Environmental Protection Agency, Sept. 1985.)

There are three circumstances under which categorical standards may be modified for an industry to which they do apply. If the service water to an industry contains a regulated pollutant, a **net/gross adjustment** may be made, which would allow the industry to discharge that particular pollutant in a quantity which would exceed the limit in the standard by the amount found in the service water.

The second adjustment is referred to as a **removal credit**. If the STP serving the industrial facility demonstrates effective removal of a pollutant of concern, the limit applicable to served industries discharging that pollutant may be adjusted. The use of such credits has been temporarily prohibited, in accordance with an April 1, 1986 court decision.

The third adjustment accounts for the existence of '**fundamentally different factor(s)**'. If a POTW, industry or interested party can demonstrate that a factor or factors exist that were not considered in the application of the standards, they may apply for a change in the standards. For example, firms which introduce process technology which was not considered in the development of the standards may be eligible for relief under this provision.

Hazardous Waste Discharges to Sewer System (RCRA)

The RCRA, which was passed by Congress in 1976, and followed by implementing regulations in 1980-1982, was designed to provide 'cradle to grave' management of hazardous waste, including its generation, transportation, storage and disposal. Hazardous wastes which are regulated by RCRA can be divided into two broad classes; 'characteristic' waste, i.e. those exhibiting one or more of the properties of ignitability, corrosivity, reactivity or toxicity, and 'listed' wastes, including 375 specific hazardous constituents identified in Appendix VIII of the Act. However, in the original RCRA legislation, an exemption was granted for mixtures of domestic sewage and other wastes (which could include hazardous wastes as defined by RCRA) that passthrough a sewer system to a POTWs. Thus, for example, discharges of such common solvents as xylenes and acetone, which are not among the 126 Priority Pollutants but are listed as part of the RCRA Appendix VIII, from a categorical industry, would not be regulated if discharged via the sewage collection system to a POTW, other than through the general provisions or a specific local limit. Also, priority pollutants from non-categorical industries discharging into the sewer collection system would not be subject to control other than by general provisions or a specific local limit.

In the Hazardous and Solid Waste amendments of 1984, the Congress directed the EPA to determine the types, size, and number of hazardous waste generators disposing of waste through domestic sewage treatment systems, the types and quantities of waste disposed of in this manner, and to determine if further regulation would be required to protect human health and the environment from such discharges. The findings of the subsequent Domestic Sewage Study were considered in this review and those relevant to the Great Lakes basin will be emphasized herein.

Implementation

The General Pretreatment regulation for Existing and New Sources of Pollution (40 CFR 403) requires that any POTW or combination of POTWs operated by the same authority with a design flow greater than 5 million U.S. gallons per day must establish a pretreatment program as a condition of its NPDES permit.

The focus of any pretreatment program is largely direct control by the municipality; the local pretreatment program is the legal, technical and administrative framework for achieving effective discharger control. In a great majority of cases, the municipality has the legal authority, procedures and funding to operate the pretreatment program, with the State and the EPA playing an oversight role.

POTWs with design flows less than 5 USMGD (18,900 m³/day) may be required to develop a pretreatment program if non-domestic wastes cause upsets, sludge contamination or violations of NPDES permit conditions, or if their IUs are subject to national categorical pretreatment standards.

Under 40 CFR Part 403.10d3, a permittee's NPDES permit shall contain pretreatment conditions as enforceable items. An approved program is to contain a minimum requirement for a compliance monitoring/sampling procedure including a system for receiving, reviewing and maintaining records received by the POTWs from SIUs of the sewer system. A SIU is defined in the EPA Guidance Document as one meeting any of the following conditions: is subject to promulgated categorical standards; generates waste having an impact on the POTW; constitutes 5% (25,000 GPD) or greater of the flow to the POTW; or is otherwise considered significant by the control authority.

The essential elements of a pretreatment program, to be carried out for the most part by municipalities, were seen as: i) developing and issuing permits/agreements with industry; ii) carrying out inspection/monitoring activities on SIUs, including direct sampling of their wastewater as necessary; iii) maintenance and updating of data on municipal effluents; iv) enforcement and necessary remedy of non-compliance; v) reporting to the approval authority at least annually on the status of programs; and vi) performing other special condition requirements.

Categorical Industry Reporting Requirements

Categorical industries (those for whom regulations have been promulgated as listed in Table 5.2) discharging to a POTW, must report to the control authority (usually the POTW) in the following fashion:

- **Baseline Monitoring Report:** Within 180 days of the effective date of adoption of pretreatment standards for their industry, IUs of a POTW must submit information on their production, flow rates, nature and concentration of regulated substances, and either a schedule to achieve compliance with the pretreatment standards or a certification that this has been achieved.
- **Periodic Progress Report:** **Non-complying** industries are to submit, within 14 days of each milestone date in the compliance schedule shown in the Baseline Report, progress reports on achieving compliance.
- **90 Day Compliance Status Report:** Following submission of the 180 day Baseline Report requirement, a categorical industry has a maximum of three years after the effective date of the standard to achieve compliance. Within 90 days of this final compliance date, all facilities, regardless of compliance status, must file a report that certifies compliance or addresses steps being taken to achieve compliance.
- **Self-Monitoring (Semi-annual) Reports:** After the final compliance date, in June or December of each year, or more frequently, or at other dates if required by the Control Authority, categorical industries are to submit self-monitoring reports to the control authority to verify compliance.

As mentioned, compliance with the categorical standard is required as soon as possible, but no later than three years after the effective date contained in the appropriate standard.

Anticipated Program Changes

Oversight

No fundamental changes to the U.S. Pretreatment program are planned. However, several adjustments will be made over the course of the coming months and years. These adjustments can be grouped into three broad areas:

- improvements in information management.
- improved control of hazardous materials discharged to POTWs.
- improved control of toxicants discharged from POTWs.

Information Management

Nationwide, the pretreatment program controls more individual sources than the U.S. program for control of sources which directly discharge wastes to surface waters. It is also the most decentralized water pollution program, as primary responsibility for enforcement of national standards resides at the municipal level. Because of the large number of sources and decentralized nature of the program, transfer of program information from the local to national level to date has been poor.

Information management should be greatly improved by two simultaneous initiatives. By use of the Permits Compliance System (PCS), the national water program database, summary statistics of each approved POTW program, including its pretreatment elements, will be available on a national basis. At the same time, the compliance activities of state pretreatment programs will be monitored through the Quarterly Noncompliance Report (QNCR) system.

As of October 1987, PCS had the capability to track 54 national pretreatment data elements. In addition, several 'blank' fields will be available for EPA Regions and States to use in managing their programs more effectively. Fourteen data elements will be required to be entered by the states.

These 14 required elements form the pretreatment component of EPA's Water Enforcement National Data Base (WENDB). The WENDB elements provide POTWs specific information on the universe of regulated IUs, the quality of the POTW's control mechanism, and a summary of the POTW's compliance monitoring and enforcement program. The remaining 'optional' elements include data on the POTW's legal authority, general program deficiencies, program resources and other information.

States are presently required to report significant or 'reportable' noncompliance with NPDES permits to EPA on a quarterly basis. This report is called the Quarterly Noncompliance Report (QNCR). Presently, the regulations governing the QNCR (40 CFR Part 123) specify that failure to submit program reports and failure to implement approved pretreatment programs must be reported on the QNCR and addressed by state enforcement action.

Guidance to date has been very general as to what constitutes "failure to implement approved pretreatment programs". EPA is presently finalizing specific guidance on significant noncompliance with pretreatment implementation requirements. The guidance will center on failures of POTWs to issue Industrial User control mechanisms, conduct sampling and inspection activities and enforce pretreatment standards.

Having refined the guidance through demonstration applications during late calendar year 1987 and early 1988, the agency will propose any necessary modifications to Part 123 of 40 CFR shortly.

Control of Hazardous Materials

When the RCRA was amended in 1984, EPA was directed to review the nature and amount of hazardous wastes discharged to POTWs both through the user's normal sewer connection and transported to the POTW by truck, rail or dedicated pipeline. In this latter case, POTWs are subject to RCRA permit by rule. Hazardous wastes discharged into domestic waste streams are not regulated under RCRA, as it was assumed that they would be sufficiently controlled by the pretreatment program. Recognizing the considerable effect of the Domestic Sewage Exclusion on industry notification practices, in the 1984 RCRA amendments, Congress required that generators discharging hazardous wastes to POTWs comply with RCRA notification requirements.

A large percentage of these wastes were not 'priority' pollutants and, as such, were not targetted for coverage in the pretreatment program. Since the pretreatment program is not yet completely implemented, and in anticipation of

increased usage of this exemption by industry, the Agency is undertaking several activities to improve the control of hazardous wastes discharged to POTWs via this and other means. The impact of the domestic sewage exclusion should be the subject of continued review to determine if extension of the exemption is consistent with sound ecosystem management in the basin.

Both the categorical and prohibited discharge standards will be expanded. Twelve industrial categories are being investigated for new or broadened standards. These include: equipment manufacturers; pharmaceutical manufacturers; solvent and barrel reclaimers; hazardous waste treatment facilities; paint manufacturers; industrial laundries; waste oil reclaimers; motor vehicle services; transportation services; laboratories and hospitals; and timber and textile products. EPA expects to issue additional categorical standards and/or guidance for control of wastes from these industry sectors in the next five years.

The prohibited discharge standards will be broadened to include more detailed prohibitions on explosive/flammable compounds and wastes which could impact worker health and safety.

In addition to adjusting the pretreatment standards, EPA is considering modifying POTW program implementation requirements and the procedural requirements placed on IUs. These changes will center on spill prevention and the quality of POTW issued control documents and improvements to municipal enforcement programs. Appropriate regulations were proposed on November 23, 1988 and should be promulgated sometime in 1989.

Pretreatment Programs of the Great Lake States

Table 5.3 notes the number of pretreatment programs required and approved in the U.S. portion of the Great Lakes basin. Over 95% of the programs are now approved; only 8 programs in Michigan and 1 in Ohio remain unapproved. Indiana, New York and Pennsylvania, all of whom have POTWs discharging into the basin, have not been delegated primary oversight of pretreatment programs by the EPA. Current efforts in the balance of the states are focused on providing appropriate scrutiny and review.

As noted in the following state segments, the essential strategy used in implementing pretreatment programs is their integration into existing NPDES permitting and compliance programs. Priority activities for the states will remain the oversight of POTWs with approved programs and of industrial users (IUs) whose discharges to POTWs without approved programs require scrutiny.

POTWs with an approved program are charged with maintaining an inventory of IUs; applying pretreatment standards; securing and reviewing IU reports; inspection and monitoring of IUs; and enforcement as required.

Three primary mechanisms, the pretreatment compliance inspection, pretreatment program audit, and the solicitation and review of periodic POTW pretreatment reports, are or will be used by the states to ensure program compliance. The pretreatment compliance inspection, or PCI, is comprised of an onsite interview with responsible POTW officials and a review of POTW pretreatment files. These inspections are designed to occur annually in conjunction with other NPDES inspections. As is the case with other NPDES inspections, concerns identified in PCIs should be resolved within six months

by corrective action, an enforcement schedule or formal enforcement action. Table 5.4 summarizes PCI activity by state.

A POTW program audit is a comprehensive review by the state or EPA of all elements of a pretreatment program. Based on a review of initial audits, compliance inspections and annual reports, audit activities will likely focus on three areas; the adequacy of local limits; the effectiveness of POTW issued control mechanisms; and the suitability of POTW administrative procedures. Such audits should be scheduled a year prior to permit expiration, which occurs in routine cases approximately every five years. Data on audit activity in the Great Lakes basin are also presented in Table 5.4.

POTWs with pretreatment programs should also file reports on program activities at least on an annual basis. Information on industrial inventory updates, permitting, inspection, monitoring and enforcement, including a list of significant violators, should be provided in these reports.

The United States Environmental Protection Agency is responsible for review of state program activities. Within the basin, EPA conducts reviews of state pretreatment programs. For both delegated and non-delegated states, specific program goals and activities are negotiated annually. As noted in the discussion of future initiatives, the recently established PCS computerized database will be expanded to track pretreatment issues. Audit, PCI and POTW annual report results are being loaded into PCS so an assessment of implementation can be more easily made.

All pretreatment POTWs are encouraged to conduct a monitoring program. Typically, monthly monitoring for metals and cyanide in the influent, effluent and sludge and at least one annual GC/MS broadscan of these three streams for organic species should occur, with further follow-up as required. Significant changes in annual reporting requirements can be made based on the findings of such scans.

The need for an active monitoring program is apparent when the extent of the spill and illegal discharge problem at POTWs is considered. In 1985, the Association of Metropolitan Sewerage Agencies surveyed 107 of their member municipalities, representing 308 POTWs corresponding to 39% of the estimated total flow nationwide. This survey revealed that nearly all POTWs receive hazardous wastes, the most common being corrosives, solvents, electroplating baths and sludges. The most commonly reported sources of such wastes were spills, illegal discharges from industries, and routine discharges from industries.

Half the respondents noted discharges of explosive or flammable materials (gasoline, jet fuel, benzene, xylene) and nearly half reported corrosion of sewer lines due to acids and hydrogen sulfide gas. Approximately 30% of the respondents have experienced one or more biological treatment system upsets since 1980 as a result of significant quantities of hazardous materials contained in plant influent (Guidance Manual for Reporting Interference at POTWs, Sept. 1987, U.S. EPA).

TABLE 5.3

UNITED STATES PRETREATMENT PROGRAMS IN THE GREAT LAKES BASIN

S T A T E	TOTAL PROGRAMS REQUIRED IN THE GREAT LAKES BASIN	APPROVED PROGRAMS ¹
I N D I A N A	9	9
M I C H I G A N	116	108
M I N N E S O T A	1	1
O H I O	41	40
W I S C O N S I N	11	11
N E W Y O R K	25	25
P E N N S Y L V A N I A	1	1
I L L I N O I S	0	0
T O T A L	201	192

¹ Programs approved as of May 1, 1988

TABLE 5.4

CUMULATIVE PRETREATMENT FACILITY INSPECTIONS (1986 - March 1988^o)

IN GREAT LAKES BASIN

S T A T E	NUMBER OF PRETREATMENT COMPLIANCE INSPECTIONS	NUMBER OF AUDITS
I N D I A N A	0	7
*M I C H I G A N	167	44
M I N N E S O T A	0	1
O H I O	112	23
W I S C O N S I N	8	6
N E W Y O R K	32	24
*P E N N S Y L V A N I A	1	1

*Some facilities inspected twice.

^oRetrieval PCS database

New York State

i) Approach

A June 1988 application from the State of New York for delegation of its pretreatment program is currently under review by EPA. Delegation is anticipated in 1989, however, resource and legal authority issues are currently under review. Oversight of the implementation and enforcement of the 56 approved pretreatment programs in the entire state is carried out by the New York Dept. of Environmental Conservation under an extended Memorandum of Understanding with EPA Region II.

These 56 municipalities contain 91 POTWs with more than 1,500 SIUs. Approximately half of these SIUs are subject to some form of toxic consideration. Twenty-five of these municipalities, containing a total of 31 POTW treatment facilities, discharge into the Great Lakes basin, and all have state approved pretreatment programs.

The development phase of these 56 programs was conducted by the Department of Environmental Conservation's (DEC) Central Office and overseen and formally approved by EPA Region II. Program guidance and oversight remains a Central Office function; however, the inspection, report review, monitoring/sampling, and non-compliance follow-up activities are provided by DEC's nine regional offices.

In New York State, Water Quality regulations are based on receiving water classifications as defined by best usage of the waters. Quality standards with numerical limits are included for protection of human and aquatic health. These regulations were amended in 1985/86 to include ambient water quality standards. Some 96 hazardous or toxic substances are included in the ambient water quality standards which also have numerical limits based on human and aquatic considerations. These regulations and standards in effect "ban the discharge of toxic substances in toxic amounts". Point source direct discharge permits are developed on an individual basis and address these water quality regulations.

A municipality's POTW discharge permit includes, where applicable, requirements for the implementation of all pretreatment program elements, including the requirement to issue IU permits incorporating local discharge limits. Each approved pretreatment program originally provided the legal authority, procedures, and staffing to implement the program. During program development (1980-1985) at least one GC/MS scan was required to determine recommendations for local limits. Analysis and allocation of influent loading to STPs were used to determine local limits, and continue to be a periodic requirement; various data that document process inhibition also serve as input for local limits.

The strict water quality standards, as well as other toxic substances controls placed on the point source discharge, must now be reflected in local limit development as part of the ongoing oversight. DEC's policy guidance toward local limits is to ensure that all available data and regulations are included when setting local limits, local limits are set correctly, and limits are modified appropriately when conditions or requirements change. DEC uses EPA's "Guidance Manual on the Development and Implementation of Local

Discharge Limitations Under the Pretreatment Program" in establishing pretreatment programs.

POTW sludge disposal is regulated by a separate division within DEC based on the presence of hazardous or toxic substances. Sludge disposal options practised in the state include landfilling, composting, land application, and incineration. A permit system controls each one of these technical disposal options. All priority pollutants are considered when selecting a disposal option to be used by a municipality.

Technical assistance to municipalities on the implementation and enforcement aspects of the pretreatment program has been and continues to be a focus for EPA/DEC efforts. In 1988, a statewide local limits workshop was held and the guidance manual was distributed to all affected POTWs. Also, 3 regional PCME workshops were held. In addition, roundtable discussions co-sponsored by the Water Pollution Control Association (WPCA) occurred in 1988 and are planned for 1989.

Statewide pretreatment oversight consumes approximately six full-time employees (FTE), half of whom are provided by the Central Office.

ii) Implementation

Once a program has been approved, a municipality's point source discharge permit is modified to require pretreatment program implementation and reporting. Under these requirements, municipalities will: 1) enforce categorical pretreatment standards; 2) issue IU discharge permits that include local limits; 3) maintain program records; 4) carry out sampling, inspections and monitoring activities on IUs; 5) obtain/enforce remedies for non-compliance; 6) report to DEC on the implementation and non-compliance activities required, planned and taken; and 7) fulfill special conditions as required. The DEC emphasizes assuring complete implementation and identifying non-compliant program elements as determined through municipal program reports and DEC inspection/audits and the verification of definition and achievement of corrective actions.

In fulfilling its oversight role, the DEC monitoring and enforcement activities include, at a minimum, an annual pretreatment inspection/audit of approved pretreatment programs. In addition, the DEC conducts one annual compliance evaluation inspection and three reconnaissance inspections of all permitted municipal dischargers. These compliance evaluation inspections are enhanced to include pretreatment program inspection elements as appropriate to provide thorough point source and pretreatment program oversight without undue duplication. Sampling of POTW's or IUs depend on the priority and availability of Department resources given the inability of many of the individual municipalities to perform adequate self monitoring programs.

Michigan

i) Approach

The Michigan pretreatment program has had delegated status since June 1983. It is organized under the Michigan Department of Natural Resources (DNR); field responsibility is charged to nine District offices, with Central

office staff providing overall coordination. Approximately 7.5 FTEs are currently involved in the program.

The Michigan program operates under narrative water quality standards, with specific procedures for calculation of effluent limitations on a site specific basis. It is not confined to the EPA Priority Pollutant list; significant toxicity data are factored into effluent permit levels. Human health considerations (carcinogenicity) are also a factor in the determination of discharge levels.

The DNR took the lead in the development of local limits with the issuing of "Industrial Pretreatment Guidebook for POTWs" in 1982. This guidebook outlined a method of headworks analysis and mass balance techniques to determine local limits based on water quality criteria. Although there is not a broad requirement for updating limits, as new limits are introduced on pollutants such as silver, other established limits are then reviewed.

Sludge disposal is regulated under a PERM (Program for Effective Residuals Management) initiative, which is required by the POTW's NPDES permit. The PERM requires that the operator develop a preliminary and a contingency method for the disposal of sludge. The majority of Michigan municipalities has approved sludge management programs and several others are under review at this time. The residuals management program focuses on metallic pollutants and selected organic compounds, as well as nutrient content in the form of nitrogen, phosphorus and potassium.

The DNR provides technical support through monthly meetings of the Pretreatment Coordinating Committee. They also maintain contacts with the local arm of the Water Pollution Control Federation, the Michigan WPCA and its Industrial Pretreatment Committee. As of Oct. 1988, the DNR has resumed issuing Pretreatment bulletins on a quarterly basis.

In reviewing areas in which the program could have been improved, in retrospect, earlier training of the program staff would have been useful; annual staff and community training is the current objective.

The strength of the Michigan program is Rule 57, the Toxic Substances Rule, which permits only low passthrough values. Limits developed under Rule 57 are not restricted to any toxicant list, and provide protection for aquatic and terrestrial organisms, as well as human health.

Michigan initially identified 113 POTWs for which industrial pretreatment programs would be required. Three more communities have subsequently been identified, bringing the total to 116. Twenty nine (29) of these POTWs have a flow capacity of 5 million gallons per day (USMGD) (18,900 m³/d) or more. Seventy nine (79) POTWs are considered to be major facilities, with design flows of 1 USMGD (3,785 m³/day) or more. One hundred and eight (108) POTWs have received state approval to implement their pretreatment programs. All surface water dischargers in Michigan discharge to waters that flow to the Great Lakes.

ii) Implementation

Industries discharging to POTWs are subject to control and regulation by both Federal Pretreatment regulations and local sewer ordinances (local

limits). In Michigan, the focal point for pretreatment program implementation lies with the local unit of government. Sewer use ordinances are the local government's legal basis for exercising its control.

Michigan regulates and oversees local government implementation of the program through use of program audits, facility inspections, and review of annual reports. NPDES permits issued to pretreatment communities contain program requirements and discharge limits to prevent unacceptable levels of toxic pollutant discharge through the POTW. In order to assure compliance with these permit requirements, POTWs must monitor IUs and enforce industrial discharge controls as least as restrictive as Federal Pretreatment Discharge Standards. POTWs must submit annual pretreatment compliance reports that summarize the status of industrial compliance with discharge standards.

When toxic pollutants are identified in a municipal wastewater discharge, water quality based effluent limits are developed for these pollutants and incorporated into the municipal NPDES permit. The municipality then uses its pretreatment program authority to establish local discharge limits on non-domestic users to ensure compliance with NPDES permit limits. The state has chosen to require pretreatment programs of all POTWs (regardless of size) receiving wastewater from one or more categorical industries.

The Michigan Pretreatment Program is administered by the Surface Water Quality Division of DNR. Responsibility for program overview lies with the nine Surface Water Quality Division District Offices; the staff of these offices conduct all facility inspections and program audits, as well as review all submittals required under NPDES permit, including annual reports. Enforcement action, if warranted, will be initiated by the district staff. The State may take concurrent action against both the municipality and any particular industry contributing to a non-compliance situation.

Ohio

1) Approach

The pretreatment program was delegated to Ohio by the EPA in July of 1983. The program is managed from Ohio EPA headquarters, with five field offices performing sampling and other support functions. FTEs dedicated to the program total 12, with four in the Central offices and eight in the field. These personnel also respond for the state in enforcement situations.

Ohio water quality standards are numerically based, developed using the procedures contained within the EPA Gold Book, and are updated annually. With regard to Priority Pollutants, the state has developed and is implementing an approach similar to Michigan Rule 57; however, it is based only on the protection of aquatic life at this time. Human health considerations are currently being evaluated and will be incorporated into this legislation in some form within the next year.

The state requires that POTWs develop sludge management plans addressing all proposed methods of disposal. The general focus is on metallic contaminants; organic contaminants are considered on a case-by-case basis.

Local limits are developed through the review of three GC/MS scans of influent/effluent/sludge at each POTW. The limits are set on a case-by-case

basis through the application of the state water quality standards of 1978, generic inhibition data, sludge disposal options, and removal data, both site specific and values derived from the literature.

Renewal of each permit calls for a demonstration of the adequacy of local limits and, in addition, the state requests an annual review of limits.

One hundred POTWs have been required to develop pretreatment programs; of these, 98 now have approved programs. These 100 include all POTWs with design flows greater than 5 USMGD (18,900 m³/day) having contributing industries, and smaller POTWs with apparent problems associated with industrial discharges or receipt of a large industrial waste contribution. Forty-one (41) of the targeted POTWs discharge into the basin and 21 of those have a flow of greater than 5 USMGD (18,900 m³/day).

Industrial users not affiliated with targeted facilities (including some falling under federal and state categorical standards) are regulated directly by the Ohio EPA, Division of Water Pollution Control, under their permitting program. Approximately 50 SIUs are under state control in the basin. Compliance monitoring is conducted by the Division of Water Quality and Assessment.

The state provides technical support through workshops held statewide every 15 months and linkages with professional organizations such as the Ohio Water Pollution Control Association (OWPCA). Categorical pretreatment groups are also used for program review.

ii) Implementation

Following initiation by the State, ongoing development and implementation will be largely the responsibility of the local level of government through NPDES permits issued to the POTWs. Permits for POTWs with approved pretreatment programs require submission of program status reports and data on IU effluents.

Each municipal pretreatment program is inspected at least once per year to ensure that the POTW is complying with its approved program. Twenty percent of these inspections will be program audits, designed to assess program effectiveness and adequacy as well as compliance.

POTWs with approved pretreatment programs conduct at least annual on-site inspections at each categorical and SIU. POTWs monitor IUs regulated by federal and state categorical standards at least twice per year. Other SIUs are monitored at least once each year. Ohio EPA will inspect significant and categorical IUs not affiliated with targeted facilities annually and will continue to monitor these industries annually as resources allow.

The Ohio EPA has established a computer database to facilitate the receipt and analysis of baseline reports, self monitoring reports, compliance schedules and compliance reports, including information on influent, effluent, and sludge analysis from POTWs. Compliance inspection and audit procedures have been tied into those already in existence in the POTW direct discharge sampling program.

A definition of noncompliance will be adopted in the state rules during this year; it is anticipated that a one year transition period will be required for complete implementation.

Inadequate training in the application of the National Enforcement Protocol is a concern, as is the reluctance of a number of municipalities to proceed with legal action for enforcement. It is clear that the state and federal governments must provide more technical assistance and continuous training to all the municipal personnel, including the legal staff. There was also a need to simplify the language in a number of the training manuals, particularly those used at the municipal level.

Indiana

1) Approach

Indiana has applied for and is currently awaiting delegation of its pretreatment program from EPA Region V.

The state program is administered from one central office, using approximately 3 FTEs, rather than the 5 called for in the program design. These personnel issue and audit permits only; enforcement is under another branch using an additional 1 to 2 FTEs.

The Indiana Department of Environmental Management (IDEM) presently requires, through the NPDES permit program, 45 POTWs to operate federal and state approved pretreatment programs. All 45 programs have been approved. Of these POTWs, there are nine that discharge into the Great Lakes basin. Facilities in the Great Lakes basin include those at Gary, East Chicago, Michigan City, South Bend, Mishawaka, Elkhart, Goshen, Kendallville, and Fort Wayne.

The IDEM has direct control of a number of IUs that discharge process wastewater to POTWs not required to develop and operate a pretreatment program. There are presently 11 IUs under State control in the basin.

Presently, permits are written based on the EPA Gold Book criteria, which calls for no discharge of toxic substances in toxic amounts. EPA Priority Pollutant data are used to set water quality based effluent limits. Revised water quality standards, including narrative standards, are currently under development.

Sludge disposal is regulated under a separate Land Applications Section of the Indiana Department of Environmental Management. The focus of the program is on metals, phosphorus, nitrogen and PCBs.

Initially there was heavy technical assistance in the development of local limits, much of it based on the EPA program software. The limits were technology based and originally used default values derived from the old National Removal Rates; currently the "Prelim" values are used. (PRELIM USERS GUIDE, Version 3.0, USEPA, Office of Water Enforcement and Permits, 401 M Street, S.W., Washington, D.C. 20460).

NPDES permits contain heavy metal limits (Cu, Zn, Cr, Ni, Pb, Cd, Hg) as well as cyanide. Individual industrial surveys were used to determine permit

needs beyond these metals. In a few instances, monitoring for toxic organic substances is required on an annual or semi annual basis. Permits are updated as they are reissued; typically the updating takes approximately one year. To provide some technical assistance, the state met with the POTW community last year and will attempt to do so again this year.

ii) Implementation

a) Major Facilities

As stated above, pretreatment programs are made an enforceable part of the POTWs NPDES permit through the incorporation of effluent limits for IUs, and the administration of monitoring and inspection activities to determine compliance by the IUs. Also, POTWs are required by permit to enforce their ordinances against the IUs, operate compliance monitoring programs and report IU compliance status.

Compliance with pretreatment requirements is verified by computer tracking by the IDEM of analytical results contained in the monthly monitoring reports, and through audits or PCI on municipal programs.

The state also tracks, through quarterly IU compliance status reports from each POTW, the compliance status of each IU. These data are also stored on computer.

State pretreatment staff visit each POTW once per year, at minimum, to perform onsite and audits or PCIs of program operation.

b) Minor Facilities

The state has identified 11 IUs discharging to POTWs in the Great Lakes basin for continued scrutiny. Industrial Pretreatment Permits have been issued by the State to all 11 IUs. These permits require the IUs to meet effluent limits, analyze and report results to the State, etc. The permits have been issued in accordance with state and EPA guidelines for permit writing.

Minnesota

The EPA delegated the Minnesota pretreatment program to the state in July of 1979. Management of the program is under the Minnesota Pollution Control Agency (MPCA); the headquarters office is charged with overall coordination and 2 to 3 FTEs are dedicated to the program.

The state water quality standards are set on the basis of use classifications for fisheries, recreation, domestic consumption, and several other uses. Some numerical standards are used to define water and effluent quality, as well as a narrative omnibus clause banning discharge of "toxic substances in toxic amounts." The standards will be reviewed in 1990.

The MPCA provides sludge management through a permit system which controls metals, nutrients, and PCBs. Since the Western Lake Superior Sanitary District (WLSSD) plant incinerates its sludge, air quality limitations are also used to develop local limits. Human health concerns are reflected

through the application of water quality limits based on drinking water and fish consumption considerations.

Local limits are developed for metals, cyanides and other toxic contaminants on a case-by-case basis through a technical review. Site specific water and air quality criteria are used, coupled with generic data on inhibition of the treatment process.

The MPCA last held a pretreatment seminar more than a year ago; they respond now to individual queries.

One POTW with a federally delegated pretreatment program (WLSSD - Duluth and Cloquet) and one POTW with a limited local pretreatment program (Hibbing - two treatment plants) discharge into the Great Lakes basin. At the WLSSD POTW, water quality based effluent limits are determined by mass balance and other water quality criteria. Of the nine SIUs discharging to the WLSSD plant, one (11%) is not in compliance with reporting requirements.

In addition, five other POTWs (Eveleth, Kettle River, Silver Bay, Two Harbors, and Virginia) discharging to the Great Lakes basin were evaluated and found not to have IU inputs significant enough to warrant program development.

In all cases, the MPCA retains the authority and responsibility to administer the national program both in communities with limited local pretreatment programs and those with no approved program. The MPCA issues State Disposal System Permits to categorical industries in accordance with the National Categorical Standards and monitors compliance through IU self monitoring reports and state inspection and monitoring as required. All pretreatment programs are audited by the MPCA to assure compliance with the approved plan and conditions contained in the NPDES permits.

Wisconsin

The state was delegated the pretreatment program in 1982. The Department of Natural Resources (DNR) administers a pretreatment program under a Memorandum of Understanding with the EPA. The 24 major POTWs over 5 USMGD (18,900 m³/d) design capacity (11 in the Great Lakes basin) are administering pretreatment programs regulating their IUs. These POTWs have established local limits for toxics and issued permits with numerical limits to their IUs.

There are approximately 450 IUs of POTWs in Wisconsin subject to categorical pretreatment standards. Two-thirds of these are located in municipalities with programs and the balance are directly regulated by the DNR.

The DNR requires these municipalities to provide annual pretreatment program reports and has audited or inspected each program on a yearly basis.

Pretreatment activity is centered in the Headquarters office among 4 FTEs, who centrally administer the program, carry out audits and program reviews, and assist with enforcement. Three to four FTEs assigned to the districts carry out field inspections, review reports from IUs and directly oversee approved pretreatment programs and IUs of POTWs located outside municipalities that have approved pretreatment programs.

On March 1, 1989, Wisconsin Administrative Codes NR105 and 106 were promulgated to establish comprehensive procedures for establishing Water Quality based limitations for protection of the aquatic environment, wildlife and human health. The Department uses comprehensive procedures associated with these codes, including a review of IUs, biomonitoring and chemical specific monitoring as necessary, to identify concerns and develop limits in the Wisconsin Pollutant Discharge Elimination System (WPDES) permits issued to municipalities.

POTWs operate with a Sludge Management Plan, which is part of the WPDES permit, regulating disposal methods and establishing sludge monitoring requirements. The focus is on metals and selected organic contaminants.

Local limits were developed using initial headworks analysis based on industrial removals, metals and cyanide monitoring, and GC/MS scans. Sludge data are required in the POTW's WPDES permit.

The state provides technical support through Pretreatment Program oversight activities which include annual pretreatment program audits and reviews.

Pretreatment in Canada

Federal

i) National Standards

In Canada, the federal government's main instrument for developing water quality controls is the Fisheries Act. Although the Act deals primarily with regulating fishing and managing fish stocks, it also contains provisions for protecting fish habitat. It is these provisions that support federal water quality controls in Canada.

Environment Canada promulgated federal regulations and guidelines on allowable wastewater discharges from six industrial sectors, including pulp and paper, petroleum refining, chlor-alkali, metal mining, metal finishing and food processing (i.e. potato processing, meat and poultry products, fish processing), in the mid-'70s. Together, these sectors represent approximately 65% of the total industrial wastewater discharge in Canada.

Where these industrial sectors discharge to municipal sewerage systems, all control documents, except pulp and paper and chlor-alkali regulations, contain a sewer use exemption clause. The Minister of Environment is to give approval for exemption from the control documents only where the off-site facility provides "equivalent" treatment. If the off-site facilities are not approved by the Minister, the effluents leaving the plant are subject to the legislative requirements.

ii) Implementation

Responsibility for implementation of the regulations under the Fisheries Act has been delegated to the provinces. Implementation of the exemption clause of federal control documents has been inconsistent among regulated industrial sectors and various regions of the country. For example, in the pulp and paper sector, there are 24 mills nationwide discharging to municipal sewers; they are not exempted from the controls nor from the monitoring

requirements. Although the effluents from the 24 non-integrated mills are believed to be in compliance, monitoring is not being conducted in accordance with the regulations and guidelines. Thus, Federal legislation has not provided any effective basis for a national sewer use control program.

A 1983 survey by Environment Canada found that, in Ontario, over 95% of the approximately 350 metal finishing companies were discharging wastewaters to municipal sewers. Two-thirds of the wastewater discharges were less than 5,000 m³/yr. (1.32 US MGY); about one-third was over 10,000 m³/yr (2.64 US MGY). Effluent pretreatment was being practised at less than 50% of these plants. Record keeping for waste disposal was generally inadequate. Monitoring activity (self or external) occurred at little better than half the companies surveyed.

iii) Recent Developments

In 1988, Canada passed a new Environmental Protection Act which permits a life cycle control of substances deemed to be a significant threat to human health and the environment. The legislation provides for control of specific substances and, through regulation, may limit direct or indirect discharges to the environment.

The Act provides for federal/provincial cooperation and, in fact, to a large degree will rely on provincial delivery mechanisms to ensure adequate control of priority substances. The degree to which indirect dischargers may be controlled or influenced by these measures is not clear at this time.

In summary, although the individual industrial regulations under the Fisheries Act address discharges to municipal sewers, compliance and enforcement have been accorded a low priority by Environment Canada, and the noted components cannot be considered as a national industrial sewer use control program.

Provincial Ontario Pretreatment Provisions

i) Provincial Standards

In Ontario, 407 municipal STPs process an average of 5,345,000 cubic metres per day (1,410 USMGD) of wastewater. These STPs accept waste from approximately 12,000 industries.

Sewage treatment plants fall under the Ontario Water Resources Act and the Environmental Protection Act. STP process design, operating criteria and discharge limits for conventional wastewater parameters and, in some cases, toxics are prescribed in a Certificate of Approval. Effluent discharge limits are usually specified on the basis of type of treatment, e.g. secondary treatment, lagoons, etc. However, more stringent discharge limits based on the local receiving water quality are required in some instances. These effluent discharge limits are derived from the policies and objectives listed in "Water Management - Goals, Policies, Objectives and Implementation Procedures of the Ontario Ministry of the Environment (1984)" and local field studies conducted by MOE staff.

The discharge of industrial, commercial and institutional wastes to STPs is regulated locally by municipalities through the use of an Industrial Waste

Sewer Use By-Law developed by the local level of government under the *Municipal Act*. A revised *Model By-Law* developed by the MOE, Environment Canada and representatives of the Municipal Engineers Association, was issued in late 1988. Many of the municipal by-laws remain based entirely or in part on the *Model Sewer Use By-Law* of 1975, but are currently under review.

The *Municipal Act* provides adequate authority under section 147, paragraph 210 to implement and enforce a local sewer use by-law. However, there are no provisions in the Act to allow the courts to terminate the use of the sewers or to issue effluent discharge permits to IUs. In June 1988, the Act was amended by increasing the maximum allowable fines to \$5,000 for the first offence and \$10,000 for subsequent offences for individuals and \$25,000 for the first offence and \$50,000 for subsequent offences for corporations.

The 1988 *Model By-law* prescribes limits for conventional pollutants, most metals and some organics, as well as addressing surface runoff, industrial waste surveys, compliance programs, spills control and general procedures for sampling, analysis, and enforcement. Discharge of hazardous waste is also banned. Effluent limits are developed to preclude worker health and safety problems and address concerns related to passthrough to the receiving water, sludge contamination, and interference with STP processes and equipment. Industrial discharges to the sewer system are also regulated by the *Ontario Water Resources Act* with respect to passthrough and interference.

Hazardous wastes are regulated under Regulation 309 of the *Environmental Protection Act*. Currently the discharge of landfill leachate to treatment plants requires approval under Regulation 309 and only receives approval based on the potential impact on the sludge quality, the operation of STP and effluent quality.

The majority of the STPs in Ontario use agricultural land application for sludge disposal. This disposal practice also falls under Regulation 309 of the *Environmental Protection Act* and the metals and conventional pollutant limits in the sludge are specified in "Ontario's Guidelines for Sewage Sludge Utilization on Agricultural Lands (1986)." The guidelines also have restrictions on spreading sites to prevent contamination of water courses or groundwater and to allow agricultural use of the land. Any land spreading site must be approved by the MOE.

ii) Implementation

The *Model by-Law* acts as a guideline that municipalities can adopt or adapt, on a voluntary basis. All regional municipalities, district municipalities and most cities, which in total treat 4,120,000 cubic metres per day (1,088 USMGD) of sewage, have implemented sewer use control programs. These 35 municipalities monitor industrial discharges from 2,500 industries using 95 municipal staff. In 1986, they collected and analyzed 11,800 samples and carried out enforcement actions against 246 industries. Administration of sewer surcharge programs for extra strength waste was a significant part of these activities.

In comparison, by-law implementation and enforcement activities in most of the towns and villages vary markedly. Many small municipalities have no effective enforcement programs.

At the moment, pretreatment at IUs is focused on neutralization, destruction of cyanide, and precipitation of metals; this level of treatment is the rule rather than the exception in the province.

Effluent sampling, plant inspections and enforcement activities are carried out by the local municipality and the MOE. In part, they can include the following:

- inspection and compliance sampling of significant industrial dischargers by the municipality;
- periodic audit of STP operational and effluent data by the MOE;
- audit of sludge quality for sludges applied on agricultural land;
- audit of sludge spreading sites, spreading practices and application rates;
- audit of Regulation 309 Waste Generator Reports and Manifests by the MOE;
- inspection and compliance sampling by the MOE of industries where complaints are received from the public, concerns are identified by the municipality, or problems are identified by STP or sludge application on land audits.

Although major facilities do have pretreatment programs in place, a comprehensive and uniform sewer use control program at the provincial level does not yet exist.

iii) Anticipated Program Changes

In September, 1988, under the MISA initiative, the MOE released a discussion paper that outlined a sewer use program to control industrial discharges.

The proposed program is based on five principles: control of indirect dischargers at source; setting of provincial discharge limits for twenty-two industrial sectors at levels that can be obtained using the BATEA; application of more stringent "local limits" on a site specific basis where necessary; requiring the implementation of a user-pay scheme to assist in meeting program costs; and providing for public participation in the development and implementation of these programs. Industrial dischargers will be required to self-monitor their effluents.

Municipalities will be required to develop and implement a "Municipal Enforcement Program". These programs will include: industrial waste surveys; sampling of the discharger, in the sewer system and at the treatment works; local limits development; a sewer use by-law; effluent discharge permits for dischargers; sampling and inspection programs; enforcement programs; an equitable user pay system; the opportunity to petition the courts to terminate the rights to discharge to a sewer; and a public participation program.

All municipalities with collection systems and STPs will be included in the proposed program. However, the implementation will be in a number of

phases. According to the proposal all regional municipalities, district municipalities, cities, and towns and townships with a population greater than 10,000 or with a total combined sewage flow greater than 4546 cubic metres per day (1.2 USMGD) will be required to develop and implement a "Municipal Enforcement Program" on regulation promulgation. All other municipalities will be required to develop and implement a "Municipal Enforcement Program" when specific concerns at the treatment plant or a sector industry or SIUs of the collection system have been identified by the MOE.

Under the MISA program, Municipalities will be required to report the results of all municipal enforcement activities on a quarterly basis including results of municipal monitoring and the status of all abatement and enforcement actions. The MOE audit program will include review of these reports, one detailed compliance audit per year and a minimum of one facility inspection per year.

Nine full time MOE staff are currently involved in the development of the MISA sewer use control program. By the summer of 1989, another thirteen FTEs will be added to the program.

VI. PRETREATMENT PROGRAM ADEQUACY

Approach to Evaluating Adequacy

This section offers an evaluation of the existing programs in the Great Lakes basin and provides comment on the Ontario program now under development. In its evaluation, the Task Force will be guided by the principles for pretreatment and persistent toxic substance control contained in the 1987 Agreement with Protocol.

Article VI, Section 1 (a) of the current Great Lakes Water Quality Agreement describes programs to be undertaken by the Great Lakes jurisdictions to control pollution from municipal discharges, including the "establishment of pretreatment requirements for all industrial plants discharging waste into POTWs where such industrial wastes are not amenable to adequate treatment or removal using conventional municipal treatment processes". In addition, Annex 12 of the Agreement advocates the establishment of programs and strategies for the control and virtual elimination of discharges of persistent toxic substances, including those listed under the specific objectives in Annex 1, in the Great Lakes basin. For the purposes of the Agreement, "persistent toxic substance" is defined as any toxic substance with a half life in water in excess of eight weeks and would refer to such contaminants as mercury, Mirex, lead, PCBs etc. From Annex 12 (2a), regulatory strategies for controlling or preventing the input of persistent toxic substances to the Great Lakes system are to be adopted in accordance with the following principles:

- i) The intent of programs specified in this Annex is to virtually eliminate the input of persistent toxic substances in order to protect human health and to ensure the continued health and productivity of living aquatic resources and human use thereof;
- ii) The philosophy adopted for control of inputs of persistent toxic substances shall be zero discharge; and
- iii) The reduction in the generation of contaminants, particularly persistent toxic substances, either through the reduction of the total volume or quantity of waste or through the reduction of the toxicity of waste, or both, shall, wherever possible, be encouraged.

In its assessment, the Task Force gave particular emphasis to the compatibility of the jurisdictional pretreatment program goals with those of the Agreement, and determined if the design and execution of the jurisdictional program are adequate to meet both the jurisdictional and Agreement requirements. Part of this assessment consisted of a review of pretreatment programs at a select number of individual facilities in the various jurisdictions of the Basin; this information is contained in Appendix 2.

U.S. Analysis

Regulatory Measures

As described earlier, the first U.S. federal pretreatment regulations were established in 1972 under Section 307 (b) of the CWA (PL 92-500). This

regulation set forth pretreatment standards largely for the protection of the publicly-owned treatment facility from nondomestic sources of substances which either interfere with the operation or performance of the treatment plant or passthrough such plants in significant quantities. For a more thorough description of the U.S. program, see Chap. V.

In 1978, the U.S. EPA developed the General Pretreatment Regulations, which established mechanisms for use by state and local programs to control largely conventional pollutants such as pH, oil and grease, BOD and suspended solids. At approximately the same time, the EPA shifted the focus of its pretreatment program to the control of toxic pollutants through the use of categorical standards which, based on available technology, limit the discharge of toxic pollutants to POTWs from particular selected industrial sectors or categories.

To evaluate the adequacy of the U.S. jurisdictions' pretreatment efforts, the Task Force gauged the ability of each jurisdiction to compel POTWs to perform satisfactorily in four areas: development of local limits, application of pretreatment standards, enforcement of pretreatment standards and securing overall IU compliance.

The CWA states as its goal that "discharge of toxic materials in toxic amounts" shall be forbidden. Sections 307(b) and 402(b)(8) of that act require the development of pretreatment standards and programs consistent with the goal. The Task Force has concluded that, if properly designed and applied, the U.S. program establishes a framework for the virtual elimination of persistent toxic substances from IUs of POTWs as that target is presently defined in practice in the basin.

Local Limits

The development of local limits for IUs by interpolation from the POTW effluent limit necessary to meet water quality standards in the receiving water body and sludge disposal requirements is an important element of any pretreatment program. These limits also provide compliance or non-compliance reference points for monitoring and enforcement. To the extent that POTW programs include local limits which are based on a detailed evaluation of all relevant environmental criteria (process, stream/water body water quality, sludge use), the jurisdictional program is adequate. Conversely, where POTW programs do not include local limits, where limits were established with incomplete or unscientific procedures, or where environmental criteria are not available, there is a potential for environmental degradation.

40 CFR Part 403.5(c)(1) requires all POTWs developing pretreatment programs to adopt specific local limits to prevent the discharge of pollutants by IUs which would passthrough the POTW causing interference with the operation of the POTW, causing a discharge permit violation or causing the POTW to violate sludge disposal requirements. The Task Force reviewed each jurisdiction's process for requiring and approving these local limits. The basis for local limits include the State's Water Quality Standards, sludge disposal requirements, sensitivity of the POTW to process upset, and any discharge permit limitations.

Local limits are the primary means that POTWs use to comply with environmentally driven requirements such as Water Quality Board effluent

limitations and sludge limits. Where local programs were approved without adequate limits, where states fail to have up-to-date water quality standards, or sludge disposal programs, where limits were established using incomplete or unscientific methods, or where limits do not keep pace with changing requirements, there is significant potential for deleterious impact on the environment.

Application of Standards

Application of standards is determined by a demonstration of successful calculation of IU effluent limits by the POTW. The application process includes: properly categorizing IUs, identifying sampling locations, adjusting categorical pretreatment standards for combined waste streams, and applying the more restrictive categorical or local limit.

Standards must be applied so that all categorical users have equal minimum treatment and any need to comply with more restrictive local limits is identified. Relevant factors considered in the review of standards application include the rate of adoption of categorical pretreatment standards, the adequacy of state and local expertise and the availability of suitable technical support by the state or EPA. 40 CFR Part 403.8(f)(2) requires that POTWs notify their IUs of applicable pretreatment standards.

The definition of a SIU currently varies slightly from state to state, as noted in the state program descriptions. Although the absence of a uniform definition is an inconvenience in assessment, of and by itself it does not constitute a significant problem.

There is considerable variation, from state to state, in the number of pretreatment programs under state control. For example, approximately one third or 150 of the IUs in Wisconsin are directly under that state's control, whereas in Michigan, all IUs operate under some sort of municipal framework. Such direct IU control and supervision by states has typically resulted in improved cooperative program developments with municipalities, as the state's personnel are better acquainted with the practicalities and challenges faced in directly administering a pretreatment program.

Enforcement Program Activities

Prior to any enforcement action, a definition of significant non-compliance is required to identify major violations. At this time a specific, generic definition of significant non-compliance is lacking. Without such a definition, all violations, no matter how small or meaningless their impact on the POTW influent, must be considered for prosecution. One result is that insignificant violations, such as a tardy submission of a report, could conceivably divert legal resources away from the prosecution of significant instances of receiving water contamination. The EPA is currently coordinating the development of a working definition of 'significant non-compliance' among the Great Lakes states. Such a common definition of significant non-compliance should allow a more adequate comparison and assessment of municipal and state programs.

Factors considered in a current assessment of compliance include the POTWs, municipality and state interpretation of significant non-compliance

among IUs, and the maintenance of records adequate to indicate the state of compliance at any given POTW.

In order to determine industry compliance (or non-compliance), a vigorous, high quality inspection and monitoring program is necessary. Adequate sampling, addressing all significant QA/QC questions, must be performed as part of any monitoring program. States applying for pretreatment program approval and subsequent delegation are required to demonstrate a monitoring program, both at the state and the municipal level.

Self monitoring by the industries is a widely applied approach to reduce municipal resource requirements. There are concerns regarding this option, because of the possibility of abuse by industries; however, perhaps the success of a self monitoring program is best secured by a strong, successful, and visible municipal pretreatment program. For example, Cleveland has made self monitoring an integral part of their pretreatment program since the mid-seventies. This self monitoring is used as an initial indicator of compliance or non-compliance, and is subsequently followed up by intensive municipal monitoring as necessary.

The following are key factors which should be considered in any assessment of a monitoring program: the visibility of the monitoring program; the frequency of regulatory and self monitoring and the protocols governing each; the adequate management of data; establishment of priorities for action; and the consistency of the monitoring program with the balance of the pretreatment program.

40 CFR Part 403.9(b)(2) requires that all POTW programs specifically state how IU noncompliance will be addressed through local enforcement. Such enforcement response procedures should address how IU compliance reports and POTW sampling data will be evaluated, how noncompliance is identified, determine instances of IU noncompliance that require formal response by the POTW, establish an escalating set of responses for continued noncompliance, identify typical responses to typical violations and establish time frames for the completion of the above activities. Such procedures must be specific processes, not a simple commitment to enforce requirements.

Where approved programs do not contain specific enforcement procedures, POTWs are not compelled to take specific actions in response to IU noncompliance, and inequities will arise among approved programs.

Factors to be considered include the degree to which approved programs include appropriate, detailed enforcement procedures, the adequacy of the jurisdictional process to establish, maintain and upgrade related information, the amount of formal enforcement by POTWs/municipalities in a given jurisdiction, and remedial action taken to address and correct defective or inadequate programs.

At this time, as the detailed program summaries contained in Appendix 2 indicate, enough significant violations are occurring to indicate that a greater effort at enforcement is required if pretreatment programs are to be entirely effective in the U.S. portion of the basin.

The ability of a state to translate environmental targets and minimum federal requirements to working pretreatment programs is tied directly to the

resources dedicated to review, approval, and oversight of approved pretreatment programs. Without adequate resources, state programs will find themselves continually reacting to problem facilities rather than preventing pollution through the operation of delegated POTW programs.

Detailed State Assessments

To facilitate review of the jurisdictions' programs, the Task Force identified a number of "typical" POTW programs for each jurisdiction in the basin and reviewed the operation of their pretreatment programs. Significant features of each POTW program are presented in Appendix 2. The Task Force also considered available data on IU compliance as one estimate of the success of various jurisdictions in achieving adequate control of industrial sources. From these data, and from other information presented to the Task Force, the following was revealed.

New York

The State of New York uses technically based standards developed in 1985 for the formulation of its local limits; as is the practice in other states, these local limits are currently being updated to reflect newer water quality standards.

The mechanism used for application of developed standards appears to be reasonable, although the detailed assessment database (Appendix 2) is far too narrow to serve as any comprehensive indicator of the quality of the program.

A determination of compliance of IUs was not done due to the absence of firm data at the state level on this issue; the four local programs noted as involved in correcting non-compliance in the state synopsis cannot be taken as a complete accounting of those that should be doing so. Twenty-three of the 25 pretreatment programs in the Great Lakes basin were judged satisfactory by detailed EPA audit; however, definition and assembly of IU compliance data will not be undertaken until further resources are dedicated to pretreatment at the local and state level.

The quality of the Buffalo Sewer Authority program outlined in Appendix 2 indicates that the ability of the local and state personnel to develop and implement an effective pretreatment exists.

Michigan

The State of Michigan program operates under guidelines and water quality standards promulgated in 1982. Water quality standards were revised in 1986 and are currently being reviewed. The state has yet to put in place a local limit review process incorporating these revised standards.

The Michigan program is decentralized, with nine district offices directing its program with some central office coordination. There is concern that a lack of resources and central direction is impeding the uniform application and enforcement of the program.

What data are available indicate a level of noncompliance of approximately 17%, among a total population of 945 SIUs (the greatest number of SIUs in any state in the Great Lakes portion of the basin); a majority of the noncompliant

users discharge to the Detroit STP. As recommended in the recently released Upper Lakes Connecting Channels Study, Detroit's pretreatment program should be reviewed and the compliance of specific contributors of industrial wastewaters should be determined. In mid 1988 the Federal government issued a formal notice of violation to the City of Detroit for failure to implement a pretreatment program.

A February 1988 review of the Kalamazoo program, described in the detailed audit, indicated that that program was not being implemented as approved. A lack of developed local limits at all IUs was a major shortcoming of the program; this was a result of the presence of conventional limits only in the POTW's NPDES permit. The city is currently dedicating a significant amount of resources to implement and enforce the program as a result of the audit findings; state and federal enforcement actions are also underway to address this situation.

Assessment of the four other Michigan programs indicates similar concerns about the levels of resources dedicated to pretreatment. Pinconning has not monitored all SIU's annually and thus the effectiveness of the program at sources other than the major one is difficult to gauge.

In Ludington, another smaller centre (population 9,000), the pretreatment program appears to more adequately address the needs and requirements of the POTW, but there was no record available of the resources actually dedicated to the program.

The Boyne City program description is characterized as "adequate", with two identified shortcomings being the lack of an enforcement response guide and a number of incidents of failure to report self-monitoring results.

The Flint POTW, embracing as it does a number of major industries and a relatively large urban population, has an approved program in place which limits discharges of selected metals and cyanide, as well as an established revenue collection mechanism. A recent review of PCS data indicates that all SIUs are adequately inspected and are in compliance with their permit requirements. The frequency of self monitoring programs could be more rigorous and reduce the level of municipal resources required.

A number of facilities in the audit were in a multijurisdictional situation, which had an impact on the development of an effective enforcement program. This factor is also apparent at a number of other Michigan POTWs.

In summary, while progress has been made through the efforts of committed staff, further resources are required to ensure delivery of an effective, quality assured and well documented state pretreatment program.

Ohio

The Ohio program required development of local limits under technically based 1978 water quality standards, which also considered POTW removals and sludge disposal requirements. These water quality standards have been updated in 1984 and are now under review. Individual POTWs are required to update local limits based on audit results or at the time of permit reissuance.

The application of standards under the Ohio program is good, with adequate staff support and significant transfer of knowledge from the state IU programs to those state staffers overseeing municipal programs.

Compliance with programs could be characterized as average; of a total of 820 SIUs, 117 (14.2%) are not in compliance, based on various local definitions of compliance. Ohio will adopt a definition of noncompliance sometime during this year.

Among the programs audited in Ohio, the Bryan program has established appropriate limits for the discharge of metals and cyanide, and has adequate legal authority for implementation and enforcement. However, the determination and application of appropriate standards has proved difficult on occasion; sampling locations have not been clearly delineated in the permits and some IUs have not been advised of RCRA requirements.

Compliance at the Bryan facility could not be accurately determined as the City did not routinely sample for all the parameters in the user's permit and IU inspection records were incomplete. Enforcement efforts are not adequately documented and the state of the records is such that effective enforcement may be precluded. In summary, the Bryan program does not appear to be deploying adequate resources to be effective.

A review of the Northeast Ohio Regional Sewer District, which includes five facilities in the Cleveland area, also raises similar issues. The District was very active in the development of pretreatment programs prior to federal delegation to the state of Ohio; however, it is the state's observation that legal authority in addition to the sewer use code is necessary, particularly a requirement for the issuance of permits to all SIUs. Concerns were raised as well regarding the sampling programs associated with the application of standards.

Notwithstanding these concerns, the District compliance monitoring program appears thorough, and ten percent of the IU population has been subjected to some form of enforcement action over a twelve month period. Data management is adequate and is being enhanced as part of office reallocation; the program resource level also appears adequate.

The third Ohio program reviewed in the detailed assessment, Willoughby Eastlake, appears to respond well to all the principal requirements of the pretreatment program with the exception of the lack of vigorous enforcement by the municipality to established noncompliance among some of the SIUs.

Elyria was the remaining Ohio facility assessed by the Task Force. The need for updating of the local ordinance to embrace categorical standards was identified. Notwithstanding this need, the application of standards at this facility was judged to be fair; both categorical and local standards are used in assessment. However, some revision to sampling programs is recommended to allow the city to make an independent assessment of compliance.

Compliance determinations have been focused on a few of the IUs; however, the overall compliance determination effort does not meet program commitments. Enforcement efforts are lacking, due to the absence of a strategy; five industries have been out of compliance for over two years. Record keeping is not adequate to determine continued compliance in some cases. The assessment

determined that resources appeared adequate, but more efficient deployment of same was required, and noted that the city was moving to meet this requirement.

Notwithstanding some of the deficiencies noted in the detailed assessment of individual programs, the state enforcement program is considered good and the state is making a concerted effort to improve enforcement at appropriate individual facilities.

Indiana

In developing and reviewing its pretreatment program, Indiana uses a combination of older water quality standards and literature values. While discussing program delegation with the EPA, the state is currently in the process of developing additional numerical standards.

The application of available standards was judged to be fair to good, with good staff support by the state.

Compliance determinations are hampered by the lack of a uniform state level definition of significant noncompliance. Notwithstanding this factor, recent estimates indicate that 11% of the 293 IUs were out of compliance with their requirements.

The detailed assessment of the Fort Wayne, Indiana facility indicated a fundamentally sound program was in place, with improvements suggested in the extension of TTO requirements, consideration of the need to increase monitoring at sources demonstrated to be out of compliance and the development of an enforcement response procedure.

Review of the pretreatment program at Elkhart again revealed a sound program, with one similar concern - the need to extend TTO requirements among the IU community. Legal authority, record-keeping and enforcement were judged to be adequate.

In considering the statewide enforcement program, it was judged to be fair, but a need for significant revision to the program was identified citing lack of enforcement procedures and concerns regarding adequacy of resources. These were identified in Indiana's most recent application (1988) for delegation of programs from EPA. A need for additional state resources to administer the program was also apparent. The state efforts to offer some technical assistance to the POTW community were noted, but further effort in this area would enhance the program.

Minnesota

Minnesota used guidelines and water quality standards largely developed circa 1980 to establish pretreatment local limits. The standards were revised in mid 80's and are to be reviewed in 1990. Where appropriate, such as at facilities which incinerate sewage sludge, air quality standards are also applied. Re-evaluation of local limits is required in audit findings and permit re-issuance, where needed.

Application of standards through the state program was judged to be good; at the one principal plant with a pretreatment program discharging to the

Great Lakes (Western Lake Superior Sanitary District), one of the thirteen SIUs was out of compliance (7.7%), a relatively good performance. However, the state has advised the District to improve inspection and monitoring of IUs and to resolve the noncompliant situation. Data management by the District could also be improved.

The state's efforts to enforce the program were considered good; a revision to the water quality standards and associated re-evaluation of local limits would fulfill all program structural requirements.

Wisconsin

As of 1989, Wisconsin uses comprehensive procedures to establish water quality and local limits. These procedures are not driven by numerical values for water quality per se, but are based on the protection of the aquatic environment, wildlife and human health. Wisconsin defines consistent compliance based on U.S. EPA's PCME Guidance Manual (Sept. '86). Failure to achieve consistent compliance can include minor to significant exceedences of categorical standards, local limits, or failure to report according to an established schedule.

Most IUs have installed and are operating pretreatment systems and have made process changes to reduce the discharge of regulated pollutants. Compliance rates should improve as IUs enhance the consistency of their operation of their pretreatment systems and make additional process changes. Municipalities also revise local limits, which can be more restrictive than necessary to protect POTW operations and receiving waters. A review of the state application of standards indicates that, as a result of excellent state agency support, this is carried out in a good to excellent manner.

Under the state's rigorously applied criteria, 24% of the 494 SIUs tributary to POTWs with pretreatment programs are not in consistent compliance, considering both failure to report to an established schedule and major and minor exceedences of categorical standards or local limits. Levels of noncompliance are very comparable between the local administered programs and those administered by the state.

A review of the detailed audit of the pretreatment program operated by the City of Manitowoc noted that the City should update its local ordinance to reflect changes in the federal requirements. Revisions to the local limits may also be necessary to prevent violations of water quality based standards. Compliance monitoring was determined to be adequate, but the City appeared hesitant to take formal enforcement action against violators. The level of resources applied to the program appear to be appropriate for quality delivery; no comment was made on the conditions and procedures under which records are maintained.

The program at Green Bay was also reviewed and it was noted that the City ordinance also requires upgrading. Application of standards was also judged adequate, reinforced by a good compliance monitoring and inspection program. Data management was considered good and enforcement adequate. Resources levels were also judged adequate, with a total of 2 FTEs dedicated to the program.

The program at Fond Du Lac, one of the smaller capacity facilities which operates a pretreatment program in the state, was also reviewed. The current

program addresses conventional pollutants and metals, and will be reevaluating its local limits during 1989. Its local ordinance must also be upgraded to be consistent with the federal requirements. The need for a more detailed enforcement management system was noted and data management and application of standards were considered adequate. Resources levels, at 1 FTE, were also considered adequate.

The Task Force review of the state program indicated that the state level of effort in enforcement was good, but there was some reluctance in the POTW community to vigorously pursue violations. The state is aware of this and is working to improve the approach at the local level. In summary, a program which meets federal requirements is in place, but further effort on enforcement at the local level is required. The upgrade of ordinances and local limits is also necessary; this latter task is being pursued by the state and the POTWs.

Summary of Findings

In summary, although the framework for an adequate pretreatment program is in place in the Great Lakes states, the states and the U.S. EPA should move to address deficiencies in the implementation and enforcement of that program. The extension of the categorical industry requirements to embrace other significant industrial sectors, an initiative currently underway within the EPA, should be encouraged. The consequence of the differences among state criteria used to establish municipal requirements in the various jurisdictions must be further considered.

The agency is encouraged to continue its review of the impact of the domestic exclusion clause in RCRA (see pages 37-38); as loadings from other source sectors are reduced, further more accurate determinations of the toxic content of domestic wastewater should be made to allow for a consideration of the significance of contributions from this source.

The selective deployment of further resources at the municipal and state level is necessary to affect adequate tracking and enforcement of pretreatment programs. Development of common definitions of "significant noncompliance" and "significant industrial user" should be brought to fruition, and the implementation of computer based tracking systems at the local level should be encouraged.

Also, the inability or unwillingness of some municipal governments to prosecute pretreatment program violators should be rectified and multijurisdictional variances in requirements and enforcement among municipalities should be resolved. Further opportunities for training at the municipal and industrial treatment sites should be provided to ensure that the capabilities of these systems are fully realized.

Canadian Analysis

Ontario

Recent reviews done in preparation of the MISA pretreatment strategy indicated that by-law enforcement varied markedly across the province. Most enforcement actions were informal and municipalities were generally slow at initiating them. Seven hundred enforcement actions were carried out against

246 industries. Verbal warnings accounted for 38%, written warnings accounted for 52% and prosecutions accounted for 9% of these actions. Forty-three compliance programs were also issued. There is a reluctance in many municipalities to initiate legal actions against industrial sources violating by-law requirements. Most municipalities do not include compliance program procedures in their by-laws.

Eight municipalities accepted sewage from one or more adjacent municipalities. In most cases, the agreements between these municipalities, did not contain clauses identifying responsibility for sampling and enforcing a sewer use by-law in the adjacent municipality or mechanisms whereby a municipality accepting the sewage could ensure itself that such by-laws were enforced. In many multi-tiered municipalities, difficulties with jurisdictional responsibilities were also identified, even though most of the Regional Municipality Acts specified that the upper tier municipality was responsible for sewage treatment and collection.

Survey reports and data from the waste treatment systems of Ontario municipalities with flow less than 4500 m³/d (1.2 USMGD) indicated concerns regarding industrial discharges at 60 of the 200 municipalities in this group. Site visits to these respondents indicated that industrial discharges to the sewer systems were having a major impact at 17 municipalities and creating minor difficulties at 22. Although many of the municipalities in this group have a sewer use by-law, none of them routinely sampled industrial dischargers.

The results of the survey are significantly better in municipalities with total combined sewage flows greater than 4500 m³/d (1.2 USMGD). In this group, 35 municipalities monitored industrial discharges from 1,200 industries, including surcharged industries, using 120 municipal staff. In 1986, they carried out 916 enforcement actions against 246 industries including 376 verbal and 417 written requests for correction. Civil action was initiated in 71 of these incidents and 63 programs were approved. However, by-law implementation and enforcement activities also vary markedly among this population.

The functional responsibilities of the municipal staff employed in these programs were distributed as follows: management 9%; program development 6%; industrial waste surveys 8%; sampling 19%; inspection 14%; enforcement 3%; lab analysis 27%; legal 2%; and clerical 9%. Municipal staff collected and analyzed 15,500 samples of which 4,400 samplings were of surcharged industries. Generally, samples were analyzed for conventional parameters including BOD, suspended solids, oil and grease (animal and vegetable), oil and grease (mineral and synthetic), phosphorus, and metals. The metal group generally included chromium, lead, copper, nickel, and zinc. No IU's effluent samples were analyzed for specific toxic organics. The sampling programs in many municipalities must be improved by increasing both the sampling frequency and the list of parameters of interest. Most municipalities did not include a requirement for an industrial waste survey in their by-laws.

The province has initiated development of a training program for municipal staff employed in sewer use by-law enforcement. Six courses (environmental law enforcement; sampling, monitoring and inspection of industrial dischargers; control of spills; local limits development; unit processes (industrial and waste treatment); and control instruments) are in various

stages of development. The environmental law and sampling courses should be offered in the fall of 1989. Two data management packages will soon be available also.

Detailed audits were conducted on 6 facilities in the Ontario segment of the Great Lakes basin. The largest of these, the municipality of Metropolitan Toronto, operates four wastewater treatment facilities. The local by-law controls, revised in 1982, limit concentrations of conventional pollutants, metals and cyanide to the four plants; in 1986 the municipality collected 2,759 samples from 306 IUs and initiated 82 enforcement actions, the majority being prosecutions. Eighteen compliance programs were also implemented. Total resources dedicated to the local program in 1986 was \$732,000 CAN and 29.5 FTEs, including personnel required to administer surcharge agreements.

Within the current structure, Metropolitan Toronto has adequate authority under the Municipal Act to implement and enforce its by-law within its boundaries. However, it should alter its current agreement with the adjacent municipality to extend provisions for controlling industrial dischargers to the Metro sewer system.

Application of available standards was judged to be good. The Municipality should upgrade its by-law to provide for an industrial waste survey and consider a local limits development program.

Compliance monitoring was judged adequate, but requiring further documentation of procedures. Enforcement was also considered adequate; however, data management could be improved by the development of a computer based system to maintain data on sampling, inspection and enforcement programs.

The Regional Municipality of Waterloo passed its current by-law in 1987, which addresses influent to 11 waste treatment facilities with a combined capacity of 163,000 m³/d (43 USMGD). Local limits have been developed for conventional pollutants, metals, phenols and cyanide.

In 1986, the regional municipal collected 2,768 samples (some for surcharge agreement purposes) from 203 IUs. Sixty IUs were inspected and 131 enforcement actions were initiated against IUs, the majority being written warnings. There were two prosecutions and 13 compliance programs were established. Resource levels in 1986, including those required to oversee surcharge agreements, were \$412,000 CAN and 11.1 FTEs.

The municipality has adequate legal authority to implement and enforce a sewer use by-law. The current by-law should be revised to include provisions for industrial waste surveys and spills control. The program could also be improved through a local limits development program. The compliance and enforcement programs were judged to be adequate; the need for a computer based data management system was apparent.

The City of Windsor operates two treatment plants with a total combined flow of 156,000 m³/d (41 USMGD), under a sewer use by-law passed in 1985. Wastes are received from a number of adjacent towns and townships without the benefit of an operating agreement. Local limits based on the model by-law requirements and sludge disposal requirements were established for conventional pollutants, metals, phenols and cyanide.

In 1986, 242 samples were collected from 95 IUs. The City initiated 55 enforcement actions against IUs, the majority being verbal or written warnings. One compliance program was developed and one prosecution initiated. In 1986, the program consumed \$233,000 CAN and utilized 3.5 FTE's.

The municipality does not currently have adequate agreements with the adjacent municipalities discharging sewage to its facilities, including provisions for the control of industrial discharges in the adjacent municipalities. The by-law should also be upgraded to include industrial waste surveys, spills control and compliance programs.

Application of standards was judged to be adequate. A review of local limits is recommended. Compliance monitoring and enforcement were judged to be adequate and data management and resource levels were judged to be good.

The pretreatment program in the City of Barrie was established under a by-law passed in 1970 and is part of the operation of a 28,600 m³/d (7.6 USMGD) treatment plant operation. Local limits have been developed for conventional pollutants, metals, phenols and cyanide. In 1986, 239 samples were collected from 21 IUs and 35 users were inspected. One enforcement action was taken. In 1986 the City spent \$105,000 CAN and utilized 2.8 FTE's.

The current by-law should be upgraded to include industrial waste surveys, spills control and compliance programs. Application of standards and compliance monitoring were judged adequate. Enforcement and data management were considered adequate, while the resource level was judged appropriate.

The City of Brantford sewer use by-law dates from 1982; the two treatment facilities in the community have a combined flow of 52,000 m³/d (13.7 USMGD). Local limits have been established for conventional pollutants, metals, phenols and cyanide. In 1986, 250 samples were collected from 30 IUs with surcharge agreements with the City, and 50 industrial inspections were carried out. Eighteen enforcement actions were initiated, the majority being verbal or written warnings. Six compliance programs were also issued. Resource levels for 1986 were \$136,000 CAN and 2.4 FTEs.

A need to update the by-law to include industrial waste surveys and spills control was identified. Application of standards was judged to be inadequate, with too many uncatalogued industries; an industrial survey and local limits review would be appropriate. Compliance sampling was also inadequate, as only the surcharged population was sampled. There is an apparent reluctance to sample under and enforce the by-law requirements. Both data management and resources were judged adequate.

Brockville operates a treatment facility with a total flow of 17,000 m³/d (4.5 USMGD), with a pretreatment program organized under a 1983 by-law. Conventional pollutants, metals, phenols and cyanide are subject to local limits. In 1986, 52 samples were collected from five IUs and two users were inspected. \$17,000 CAN and 0.4 FTEs were dedicated to the program in 1986.

The city should reach agreement with the outlying township and upgrade its current law to include provisions for industrial waste surveys, spills control and compliance programs. Standards have been properly applied; however, compliance monitoring and enforcement were judged to be inadequate; an

enforcement strategy should be developed to commit the municipality to an established course of action.

Management of the data currently available was judged adequate but resource levels were not; further staff appear to be required to make the program fully functional.

Two waste treatment facilities with a combined total of 13,000 m³/d (3.43 USMGD) are operated in Cobourg. The sewer use by-law was passed in 1969, containing local limits for conventional pollutants, metals, phenols and cyanide. In 1986, 1,360 samples were collected from 10 IUs. Twenty industries were inspected, including execution of an industrial waste survey. Twenty nine enforcement actions (a majority being verbal warnings) were taken and three program approvals were issued. The city spent \$32,000 CAN and 0.85 FTEs on their sewer use program.

The municipality should upgrade its by-law to include provisions for industrial waste surveys, spills control and compliance programs. Application of standards was judged to be adequate, but the limits in the by-law should be reviewed to determine if they remain adequate. Compliance monitoring was judged to be good, with enforcement and data management considered adequate. It was determined that further resources must be made available if the program is to continue to be of acceptable quality.

Summary of Findings - Canada/Ontario

Although there are a number of well administered independent sewer use programs at the municipal level in the Canadian segment of the Great Lakes basin, the Province of Ontario has recognized, under MISA, the need for a comprehensive and centrally administered pretreatment program for that province. Such a program should introduce formal monitoring and data collection requirements which will allow a comprehensive overview of compliance data for IUs of sewage treatment systems. Further it should eliminate, or reduce to insignificance, the variances among the current municipal pretreatment programs.

Some municipalities should also be encouraged to take a more aggressive approach to the prosecution of violators of their current sewer use by-laws and to undertake adequate industrial surveys and address deficiencies with respect to spills control. Resources necessary to operate an effective program at both the municipal and provincial level should be further enhanced from current levels.

APPENDIX I

PPETS DATA ELEMENTS (REVISED 2/10/87)

Pretreatment Permits Enforcement Tracking System Water Enforcement National Data Base

WENDB
DATA
ELEMENT
#

Universe

1. Number of Significant Industrial Users (SIUs)
2. Number of Categorical industrial users

Control Mechanism

3. Number of SIUs where the required control mechanism has not been issued
- 4a. Did the Control Authority technically evaluate the need for local limits for all of the following pollutants:
cadmium, chromium, copper, lead, nickel, zinc, and any others
required by the Approval Authority?
- 4b. If the technical evaluation indicated that local limits for these pollutants were needed, did the Control Authority adopt such local limits?

Compliance Information

5. Number of SIUs in significant noncompliance with applicable pretreatment standards, or reporting requirements
6. Number of SIUs in significant noncompliance with compliance schedules to meet pretreatment standards
7. Number of SIUs not inspected and/or sampled by the Control Authority in the past year
8. Number of SIUs in significant noncompliance with self-monitoring requirements
9. Number of SIUs which are in significant non-compliance with self-monitoring requirements and have not been inspected or sampled by the Control Authority in the past year

Enforcement Actions

10. Number of civil or criminal judicial actions filed against SIUs
11. Number of formal enforcement actions (other than judicial actions) initiated against SIUs
12. Number of IUs assessed penalties
13. Number of SIUs with significant violations listed in the local newspaper.

Other

14. Has the Control Authority's permit been modified to include language requiring implementation of an approved pretreatment program?

LIST OF OPTIONAL PPETS DATA ELEMENTS

CONTROL MECHANISM AND LEGAL AUTHORITY

- 1 Which of the following components are not sufficient or are not contained in the POTW's control mechanisms:
 - effective dates and expiration dates
 - reference to local ordinance or other legal authorities
 - applicable discharge limits
 - sampling location
 - sample type
 - IU self-monitoring requirements
 - IU reporting requirements
 - standard conditions?
- 2 Number of jurisdictions covered by the Control Authority's pretreatment program
- 3 Which of the following deficiencies exist in the multijurisdictional agreements:
 - lack of oversight authority
 - lack of inspection authority
 - lack of remedies for noncompliance
 - lack of clean delineation of responsibilities for program implementation?
- 4 In which of the following areas do problems/deficiencies exist in the POTW's legal authority:
 - denying or conditioning new or increased contributions
 - applying and enforcing pretreatment standards
 - controlling each IU through permit, contract, etc.
 - requiring development of IU compliance schedules
 - requiring submission of IU reports
 - allowing IU inspections and sampling
 - obtaining remedies for noncompliance
 - halting or preventing discharges
 - complying with confidentiality requirements?
- 5 Has the Control Authority technically evaluated the need for, and adopted as necessary, local limits to address toxicity concerns, sludge criteria, and pollutants specifically designated by the Approval Authority?

COMPLIANCE INFORMATION

- 6 Number of SIUs not sampled or inspected by the Control Authority at a frequency in accordance with the approved pretreatment program or permit.
- 7 Percent of all SIUs which have not installed treatment although required to do so.
- 8 Number of SIUs in significant noncompliance with pretreatment standards.

LIST OF OPTIONAL PPETS DATA ELEMENTS (continued)

CONTROL MECHANISM AND LEGAL AUTHORITY (continued)

- 9 Number of SIUs in significant noncompliance with reporting requirements
- 10 Are there any indications of passthrough or interference incidents in the past year?
- 11 Which of the following deficiencies exist in the POTW's sampling of IUs:
 - improper sample types
 - inadequate sampling frequency
 - improper sampling protocols
 - improper or inadequate parameters sampled
 - inadequate chain of custody procedures?
- 12 Number of SIUs currently on compliance schedules
- 13 Number of categorical IUs in significant noncompliance in the past year
- 14 In the audit report, which of the following deficiencies were noted by the inspector in the Control Authority's interpretation and application of pretreatment standards to IUs:
 - failure to identify all categorical industrial users
 - incorrect categorization of industrial users
 - failure to apply more stringent standard (local vs. categorical)
 - improper application of production-based standards
 - application of inappropriate long-term average
 - failure to apply appropriate TTO limitations
 - improper use of the combined wastestream formula
 - inadequate sample type and/or sample frequency
 - improper designation of sampling location
 - failure to use effective control mechanism?
- 15 In the PCI/audit report, did the inspector report that the POTW performs (in combination with IU self-monitoring) adequate inspections and sampling of its IUs to:
 - identify the character and volume of pollutants from all IUs
 - receive and review industrial user reports
 - assess industrial user compliance
 - investigate instances of noncompliance
 - produce admissible evidence in an enforcement action?

LIST OF OPTIONAL PPETS DATA ELEMENTS (continued)

ENFORCEMENT ACTIONS

- 16 Number of SIUs subject to any kind of enforcement action.
- 17 Does the Control Authority have an enforcement response guide?
- 18 What is the maximum civil penalty provided by law?
- 19 Number of violation notices issued to SIUs.
- 20 Number of administrative orders issued to SIUs.
- 21 Number of civil suits filed against SIUs.
- 22 Number of criminal suits filed against SIUs.
- 23 Amount of penalties collected.

OTHER

- 24 Which of the following program elements have been changed since the last PCI/audit without approval:
 - legal authority
 - control mechanism implementation
 - local limits
 - inspection and monitoring program
 - enforcement program
 - resources?
- 25 In the PCI/audit report, in which of the following broad areas were deficiencies noted during the inspector's review of IU files:
 - file contents
 - control mechanisms
 - POTW compliance monitoring
 - IU self-monitoring
 - POTW enforcement initiative
 - spills / slug loading?
- 26 If applicable, has the Control Authority violated any schedule for implementation of needed remedial measures identified as a result of audits or inspections? If so, has the Approval Authority responded by initiating judicial enforcement action?
- 27 Did the PCI generally support statements made by the Control Authority in the most recent pretreatment report?
- 28 Does the POTW have removal credits?
- 29 Date of removal credits approval.
- 30 Has the Control Authority's original pretreatment program been modified, with accompanying permit modifications, to address the domestic sewage study follow-up requirements: Has the Control Authority's original pretreatment program been modified, with accompanying permit modifications, to address the recent "PIRT amendments" to the General Pretreatment Regulations*?
- 31 Does the POTW accept hazardous waste (as defined by 40 CFR 261) by truck, rail, or dedicated pipe?

*After these amendments are issued in final form and associated guidance is prepared, this question may be modified to include specific modifications that should be made to the program and to the permit.

LIST OF OPTIONAL PPETS DATA ELEMENTS (continued)

- 32 Which of the following types of wastes other than domestic sewage and industrial wastes does the POTW receive by any means:
- none
 - hauled septage
 - landfill leachate
 - RCRA/CERCLA site wastes or leachate
 - other?
- 33 Which of the following methods of sludge disposal are utilized by the Control Authority:
- land application
 - landfill
 - incineration
 - public distribution
 - ocean disposal
 - other?
- 34 What is the frequency of the POTW's toxicant sampling of its influent (times/year)?
- 35 What is the frequency of the POTW's toxicant sampling of its effluent (times/year)?
- 36 What is the frequency of the POTW's toxicant sampling of its sludge (times/year)?
- 37 Which of the following deficiencies exist in the POTW's data management and public participation efforts:
- failure to annually publish a list of significant violators
 - failure to provide notice to interested parties when local limits are developed
 - failure to provide adequate procedures for handling confidential information
 - failure to provide to the public, upon request, unrestricted access to effluent data
 - failure to maintain records for at least three years
 - poor documentation of activities in IU files?
- 38 Which of the following inadequacies are there in the POTW's pretreatment resources:
- inadequate numbers of personnel
 - insufficient training of personnel
 - inadequate sampling equipment
 - inadequate safety equipment
 - inadequate numbers of vehicles
 - inadequate access to analytical equipment
 - inadequate funding?
- 39 Approximate annual pretreatment budget
- 40 Name of the pretreatment coordinator

APPENDIX II

NEW YORK

WASTEWATER TREATMENT PLANTS IN THE GREAT LAKES BASIN

BUFFALO SEWER AUTHORITY

PROGRAM DESCRIPTION AND IMPLEMENTATION

The Industrial Pretreatment Program (IPP) for the Buffalo Sewer Authority (BSA) was approved in September of 1984. The State point source discharge permit has been modified to require implementation of the approved pretreatment program. For all 56 programs in New York State such a permit modification typically requires the approved pretreatment program Control Authority (now BSA) to 1) issue industrial user discharge permits; 2) define local limits with details such as sampling, reporting, and special conditions; 3) develop compliance schedules as needed; 4) enforce local limits and categorical pretreatment standards; 5) maintain program records; 6) carry out sampling, inspections and monitoring activities on industrial users; 7) report on implementation and non-compliance activities; 8) obtain/enforce remedies for non-compliance; 9) conduct other special conditions.

BFA submits a quarterly report to the State describing its pretreatment program implementation. This report contains an updated SIU survey listing with local permit status, a current listing of SIU inspections, noting deficiencies, a listing of SIU violations with causes and corrective actions, relevant plant operating and sampling data, and related follow-up correspondence.

The BFA has developed a computer tracking system to manage its pretreatment program data. They also have developed various reporting, guideline, and inspection forms to facilitate program administration. These forms include an SIU inspection form, a trucker's discharge permit, a spill control (solvent management) guideline, a spill control permit, and an SIU permit.

The most recent quarterly report showed all SIUs inspected (36 out of 164 total) as in compliance. These SIUs are identified as to whether they are categorical, non-categorical, surchargeable, trucker permit, or spill control permitted. BSA's pretreatment program is fully implemented.

Trend data documented by BSA between 1983 and 1986 demonstrate the effectiveness of its pretreatment program. Mass loading data were collected to insure that no metal was exceeding the treatment plant's daily critical influent mass loading. Levels are not only below the required pretreatment program's influent limits but show a dramatic reduction over the years. Some correlation in this reduction of metals loadings can be made with the implementation of the National Categorical Pretreatment Standard for electroplaters and metal finishers in June of 1984.

In another study conducted by DEC, a comprehensive sampling and analysis was performed on municipal and industrial wastewaters discharging to the Niagara River during 1981-1982 and again in 1985-1986. The results showed a

dramatic (typically over 50%) reduction in total priority pollutant loadings, both metallic and organic, to the river contributed by both industrial and municipal users. These reductions can be attributed to several factors: 1) completion and operation of some large wastewater treatment plants, BSA included, 2) stabilization of operations of some other newer wastewater treatment plants, 3) chemical corporation plant closings (estimated to account for 20%), 4) operational changes required by renewed (more strict) point source discharge permit limits that now include toxic parameters, and 5) implementation of pretreatment programs and associated best management practice programs.

PROGRAM EFFECTIVENESS

Legal Authority: Adequate local legal authority exists for the enforcement of approved pretreatment program. Much as the State would enter into an Order of Consent with a point source discharger, the municipality (BSA) can pursue a similar course of action to achieve compliance with an industrial user.

Application of Standards: Pretreatment standards are adequately applied to both categorical and non-categorical industries. The state's requirement for industrial user permits insures the development and enforcement of local discharge limits.

Compliance Monitoring: BSA has an excellent compliance inspection and sampling program. The status is updated quarterly in their report to the Approval Authority.

Enforcement: BSA has an excellent enforcement program with responses that range from verbal non-formal requirements to consent decrees with penalties. The National Enforcement Response Guide provided by EPA has been embraced as a management tool.

Data Management: Excellent: BSA has taken a lead in utilizing databases to maintain records and report on the implementation of its approved pretreatment program.

Resources: BSA has adequate resources to deliver an effective pretreatment program. An expertise has been developed over the years that provides efficient use of resources.

CITY OF KALAMAZOO

PROGRAM DESCRIPTION AND IMPLEMENTATION

The IPP for the City of Kalamazoo (City) was approved on October 1, 1985. The IPP requirements were included in the NPDES permit on July 18, 1988 by permit modification. The City is not operating under any consent decree, administrative order or other document containing pretreatment program requirements. However, on February 17-18, 1988 the U.S. EPA conducted an IPP audit at the City. The audit exit interview indicated that the IPP was not being implemented as approved. Based on that information, the Michigan Department of Natural Resources prepared a Final Order of Abatement (FOA) to correct the indicated shortcomings in the IPP as well as to address operational problems at the POTW. This FOA was signed by the City and approved for public notice by the Michigan Water Resources Commission during its September 1988 meeting.

The FOA specifically demands that the City:

1. Establish local limits.
2. Develop and implement an enforcement program.
3. Verify that sufficient resources are designated to implement the IPP.
4. Implement procedures to enforce industrial self-monitoring and reporting.
5. Submit data to verify removal rates and provide calculated allowable influent loading for each parameter of concern.
6. Issue individual control documents to all significant nondomestic users.
7. Verify that all nondomestic users are in compliance with the IPP requirements.

Items 2, 3, and 5 were submitted to the Michigan DNR by September 30, 1988, the date designated in the FOA.

The collection system to the Kalamazoo POTW reaches out to sixteen (16) surrounding communities. The IPP is enforced by the sewer use ordinance of the City and by contracts with the surrounding communities. In addition the City has direct contracts with three (3) major industries in the area. The contracts enable the City to establish limits and to administer and implement the IPP. Administrative orders (AO's), including discharge limits for each industry, are issued to individual industries. Enforcement of the IPP is by the local units of government as advised by the City.

The City has identified nearly two-hundred and fifty (250) non-domestic users. Of these, twenty-two (22) are categorical Industrial Users (IUs), 38 are significant noncategorical IUs, and nineteen (19) are other regulated noncategorical IUs. The rest are not specifically regulated. Significant noncategorical IUs have been defined as those IUs that discharge more than 25,000 U.S. gallons of wastewater per day or discharge toxics or have a significant impact on the POTW. Other regulated noncategorical IUs are the

ones that are determined to possibly have a significant impact on the collection system.

The City continually updates the industrial waste survey as inspections of IUs are completed.

The City based its IPP on the availability of removal credits and as yet has not developed local limits that apply to all IUs. The FOA includes a requirement to develop local limits by December 31, 1988. The original IPP submittals listed only 1,2-Dichloroethane as passing through the POTW. The new Powder Activated Carbon Treatment (PACT™) system removes this chemical. For that reason no local limit was established for 1,2-Dichloroethane. At the time of IPP approval the NPDES permit set numeric limits only for conventional parameters. Categorical standards have been used as local limits.

The NPDES permit for the City will contain a biomonitoring requirement as well as limits or monitoring for cadmium, lead, mercury, silver, cyanide, 1,2-dichloroethane and polychlorinated biphenyls. Limits for these parameters will be included in AO's, issued by the City, as warranted.

The City has issued AO's that include limits to specific industries. Three (3) industries are subject to production-based categorical limits. Two (2) industries have limits for TTOs. Seventy-nine (79) industries have solvent management plans. The combined wastestream formula is applied to sixty (60) industries. Spill Prevention Plans to address toxic discharges are in place. The City does not accept hazardous waste by truck, rail, or dedicated pipeline. The City's IPP is deficient in that it does not include procedures for notifying IUs of RCRA requirements.

The City regularly inspects and monitors the IUs. Enforcement options include Notice of Violation, Establishment of IU Compliance Schedule, Revocation of Permit, Injunctive Relief, Fines, and Termination of Service.

The City has dedicated the equivalent of ten (10) FTEs to the implementation of its IPP and has budgeted \$600,000 per year to fund the implementation of the IPP.

CITY OF PINCONNING
INDUSTRIAL PRETREATMENT PROGRAM IMPLEMENTATION EFFORT

PROGRAM DESCRIPTION AND IMPLEMENTATION

The City of Pinconning is a small community of approximately 1,000 citizens located near the west shore of Saginaw Bay, 20 miles north of Bay City. A cheese production facility is located in town. This facility generates high strength wastewaters that historically biologically overloaded the City's wastewater treatment plant (WWTP) resulting in the City's failure to comply with effluent limitations contained in the NPDES permit, MI0020711. Because of this situation, the DNR required the City to develop and implement an IPP. The IPP was approved for implementation August 23, 1985. Requirements for implementing the IPP are contained in Part I.B.1. of the permit. No other judicial or administrative document presently exists containing IPP requirements.

All IUs regulated by the City are located within the City limits. The City has identified four (4) "Significant" users to the system. No categorical industries are located in the City.

The City has no formal definition for a "Significant" IU. This judgment is left to the WWTP superintendent based on the actual or potential operational interference presented by the IU. The control mechanism used to regulate significant IUs is the permit. All significant IUs have been issued a permit. In addition, one non-significant IU has been issued a permit. Only a cheese producer has been given discharge limits different from the general discharge limitations specified in the City's sewer use ordinance. No toxic/priority pollutant monitoring requirements are contained in the City's NPDES permit. Likewise, no specific discharge limits for these compounds have been issued to IUs by the City other than the general discharge prohibitions contained in the ordinance. Also no IUs are presently subject to the combined wastestreams formula, production based standards, TTO limits or solvent management plans.

The City inspects all significant users yearly. The cheese production facility is monitored daily. The City attempts to monitor all other significant IUs annually. No self-monitoring or reporting is required of any significant IU. Should noncompliance with discharge limitations occur, the City has all enforcement options available from verbal warning to termination of service.

No special resources have been allocated by the City to implement the IPP. The duties are being handled by existing WWTP staff with existing resources. It is estimated by the superintendent that approximately one hour per day is devoted to IPP (less than one-half FTE). Financial resources devoted annually to the program have been approximated to be in the vicinity of \$8,000.

Program Effectiveness:

Legal Authority: Pinconning's ordinance is unchanged from the date the IPP was approved by the Department. The City has issued all necessary discharge permits as stipulated in the ordinance.

Application of Standards: Pinconning is properly applying IPP discharge standards. Wastes generated by the cheese factory in excess of discharge limitations have been pumped and hauled to another nearby treatment facility (also with an approved and satisfactorily implemented IPP). A land application program to assist in properly disposing of wastes beyond the treatment capabilities of the Pinconning WWTP has also been undertaken. Pinconning has properly categorized users and uses city generated data to evaluate compliance with local limits.

Compliance Monitoring: The City has invested the majority of its monitoring efforts towards wastewater discharge from the cheese factory. The City is working to expand its monitoring efforts to the rest of the significant IUs. The City has not always monitored all other significant IUs annually as identified in the approved programs.

Enforcement: The City's enforcement efforts have been sufficient to ensure that discharges from the principal source comply with local limits. All other significant IUs have complied with local limits and have not required enforcement efforts by the City.

Data Management: The City's files are adequate to meet the needs of the program.

Resources: Sufficient at the present time.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Final Effluent Limitations

a. During the period beginning on the date of issuance and lasting until the expiration date, the permittee is authorized to discharge treated municipal wastewaters from the Pinconning wastewater treatment plant through outfalls 001 and 002 to Pinconning River, in Section 23, T17, R4E. Such discharges shall be limited and monitored by the permittee as follows:

<u>Effluent Characteristic</u>	<u>Dates In Effect</u>	<u>Discharge Limitations</u>			
		<u>Daily Minimum</u>	<u>Daily Maximum</u>	<u>30-Day Average</u>	<u>7-Day Average</u>
Flow (in MGD)	All Year	-	-	-	-
Carbonaceous Biochemical Oxygen Demand (CBOD5)	May 1-Oct 31	-	10.0 mg/l 42.0 lb/d	4.0 mg/l 17.0 lb/d	-
	Nov 1-Mar 31	-	9.0 mg/l 38.0 lb/d	6.0 mg/l 25.0 lb/d	-
	Apr 1-Apr 30	-	-	25.0 mg/l 104 lb/d	40.0 mg/l 167. lb/d
Total Suspended Solids	All Year	-	-	20.0 mg/l 83 lb/d	30.0 mg/l 125. lb/d
Ammonia Nitrogen (as N)	May 1-Oct 31	-	2.0 mg/l	0.5 mg/l	-
	Nov 1-Mar 31	-	10.0 mg/l	-	-
	Apr 1-Apr 30	-	-	Monitoring Only	
Total Phosphorus (as P)	All Year	-	-	1.0 mg/l	-
Dissolved Oxygen	May 1-Mar 31	7.0 mg/l	-	-	-
	Apr 1-Apr 30	3.0 mg/l	-	-	-
Fecal Coliform Bacteria	All Year	-	-	200/100ml	400/100ml
Total Residual Chlorine	All Year	-	0.036	-	-
pH (S.U.)	All Year	-	-	6.5	9.0

The following design flows were used in determining the above limitations, but are not to be considered limitations or actual capacities themselves: 0.5 MGD.

ATTACHMENT C

3.02.5 Supplementary Limitations

No discharger shall discharge wastewater containing concentrations (or mass limitations) greater than the following enumerated materials, except under permit from the Authority. For industrial users with discharges that do not meet the following standards or permit provisions, pretreatment of the wastewater shall be required to meet the appropriate concentrations or mass limitations.

<u>Material</u>	<u>Concentration</u> <u>(mg/l)</u>	<u>Mass Limitation</u> <u>(lbs/day)</u>
Cadmium	0.5	2.1
Copper	0.5	2.1
Cyanide	0.2	0.8
Lead	0.3	1.25
Nickel	1.0	4.2
Total Chromium	1.0	4.2
Zinc	1.0	4.2
BOD	300	75
Suspended Solids	300	75
Phosphorus	8	2

The Authority may impose mass limitations on dischargers using dilution to meet the pretreatment standards or requirements of this Ordinance, or in other cases where the imposition of mass limitations is deemed appropriate by the Authority.

3.03 SPECIAL AGREEMENTS

No statement contained in this article shall be construed as preventing any special agreement or arrangement between the Authority and any industrial concern whereby an industrial waste with unusual strength or character may be accepted by the Authority for treatment, subject to payment therefore, by the industrial concern, unless prohibited by State or Federal Regulations.

1/30/85

CITY OF LUDINGTON

PROGRAM DESCRIPTION AND IMPLEMENTATION

The City of Ludington, with a population of 9000, is located on the shore of Lake Michigan in Mason County, Michigan. The City discharges approximately two million gallons per day of treated sewage to the Pere Marquette River under authority of NPDES Permit # MI0021334. In addition to effluent limitations, the permit requires the development and implementation of an IPP. IPP requirements were met by the City and the program was approved on March 29, 1985.

Ludington's NPDES Permit does not contain effluent limitations for non-conventional pollutants, but the Permit has been modified to include specific IPP language. The modification requires the City to:

1. Maintain records related to IPP for a minimum of three years.
2. Submit annual reports to the state.
3. Issue discharge permits in accordance with the approved program plan.
4. Protect the quality of sludge.
5. Protect the quality of treated effluent.
6. Prevent operational upsets due to industrial discharges.
7. Ensure local limits are met.
8. Ensure federal limits are met.

The current permit expires October 1, 1991. The City is not operating under any consent decrees, administrative orders, or other documents that contain pretreatment program requirements.

The City identified 308 non-domestic users connected to the wastewater treatment facility. Of that number, 16 were located outside the City boundaries in Pere Marquette Township. Non-domestic users in the Township are required to meet IPP requirements by Township ordinance and by an interjurisdictional agreement between the City and Township.

Of all the non-domestic users, one has been identified as a categorical industrial user, two have been identified as significant, and four have been identified as regulated non-categorical industrial users. The City defines significant to mean more than 10,000 gallons per day of flow, the discharge of toxic pollutants, or a non-domestic discharge which creates a significant impact at the treatment facility or receiving stream. The two significant dischargers at Ludington are listed due to flow greater than 10,000 gallons per day. The four regulated non-categorical industries include Harrington Tool Company, House of Flavors, NSI Cleaners, and Great Lakes Castings.

The categorical discharger has been issued a discharge Permit. Ordinance authority and permits form the basis of City regulation of non-domestic users.

Since the construction of the treatment facility, there have been no historical problems due to industrial dischargers. Local limits were developed based on influent data, effluent data, sludge analysis, DNR guidance, plant records, literature review, and categorical pretreatment standards.

Based on this information, the following limits were adopted in the city's sewer use ordinance.

Arsenic	0.92 mg/l
Cadmium	0.07 mg/l
Chromium (Total)	1.71 mg/l
Copper	2.07 mg/l
Cyanide	0.65 mg/l
Lead	0.43 mg/l
Mercury	No detectable discharge
Nickel	2.38 mg/l
Silver	0.24 mg/l
Zinc	1.48 mg/l
Total Toxic Organics	2.13 mg/l
Phenols	0.30 mg/l

In addition, the city's ordinance limits conventional pollutants. Within ranges established by the ordinance, the City may collect surcharges for these pollutants. However, the ordinance sets an upper limit for the discharge of these pollutants.

The approved program provided that categorical users would be monitored monthly and provided that a semi-annual report must be submitted by the user. Significant Users will be monitored four times per year.

The City ordinance provides the following enforcement options. The City can impose fines of up to \$500 per day, can terminate service, can revoke permits, can seek injunctive relief, can issue letters of violation, and require plans, specifications, and construction schedules. Current level of effort expended by the City is approximately \$5000 per year and 250 person hours.

PROGRAM EFFECTIVENESS

Legal Authority: The extension of sewer services into other areas is underway at the present time. A county ordinance is being adopted. Along with this ordinance, interjurisdictional agreements between the County and City must be negotiated.

Application of Standards: Local standards and categorical standards are being applied in both the City and Pere Marquette Township. However, one industry is subject to the combined wastestream requirement and federal limits have not been adjusted yet to reflect this.

Compliance Monitoring: The City has met the monitoring requirement of the approved program, and in some cases exceed their program commitment.

Enforcement: Ludington presented an enforcement procedure as part of its approved program. One permit has been issued to the categorical discharger.

Compliance tracking is by hard copy files. Individual files are maintained for all significant, categorical, and other regulated dischargers.

Resource Commitment: The approved program indicated that 250 hours per year would be devoted to pretreatment. However, a line item account has not been established to accurately gauge such expenditures.

BOYNE CITY

PROGRAM DESCRIPTION AND IMPLEMENTATION

The Boyne City pretreatment program was approved by the Michigan DNR on May 1, 1985. Pretreatment program requirements were incorporated into the City's NPDES permit issued September 19, 1985. The City is not operating under any consent decree, administrative order, or other document containing pretreatment program requirements.

All IUs are located within the jurisdictional boundaries of the POTW.

Boyne City has a total of 60 IUs on their system. There is only one categorical IU and one significant non-categorical IU. The remaining 58 are other nondomestic users. The POTW has defined significant IU as any industry which discharges greater than ten percent of the design flow or design loading of the wastewater treatment plant.

There are no IUs subject to the combined wastestream formula or production-based categorical standards. One IU is subject to TTO requirements.

Boyne City has issued permits to its two significant IUs. These permits are effective for one year.

The City's NPDES permit contains the following toxic pollutant monitoring requirements. All samples are to be 24-hour composites.

<u>Parameter</u>	<u>Effluent Monitoring Frequency</u>
Chromium, total	Quarterly
Nickel	Quarterly
Silver	Quarterly
Tetrachloroethylene	Quarterly

Boyne City initially evaluated local limits without using site-specific information (i.e. background pollutant concentrations, removal rates, etc.). Maximum headworks loadings were calculated using EPA guidance. The POTW is currently in the process of re-evaluating its local limits using site-specific data.

Boyne City's monitoring program established compliance sampling and inspection frequencies as follows:

	<u>Categorical</u>	<u>Significant Non-categorical</u>
IU Inspections by POTW	1/year	1/year
POTW monitoring of IU	4/year	4/year
Self-monitoring by IU	1/month	4/year
Reporting by IU	2/year	4/year

Program Effectiveness

Legal Authority: Boyne City's pretreatment ordinance provides adequate legal authority for regulating its IUs.

Application of Standards: Boyne City has done an adequate job of applying pretreatment standards. The two significant IUs have been properly categorized. The City's compliance sampling of the categorical IU is done at the end of the process.

Compliance Monitoring: The City has conducted compliance sampling in accordance with the approved program frequency.

Enforcement: Very little enforcement action has been needed to date due to the City's close working relationship with its two significant IUs. Both SIUs have documented consistent compliance with pretreatment standards. The City has recently had to issue notice letters concerning failure to report self-monitoring results. The City does need to develop an enforcement response guide.

Data Management: The small number of SIUs simplifies data management by program personnel. Files are well documented with monitoring data, inspections, and compliance activities. The status of each SIUs compliance is easily determined.

Resources: The City has committed approximately 0.1 FTEs to the pretreatment program and appears to have adequate resources for implementation.

CITY OF FLINT

The City of Flint operates an advanced water treatment facility which treats the municipal and industrial discharges of the City of Flint and the Beecher Metropolitan District. The wastewater treatment plant currently processes an average flow of 35 USMGD (132,475 m³/d)(dry weather) with an activated sludge system followed by micro screens. Approximately 38% of this flow is industrial or non-domestic in nature. Sludge is treated with the zimpro process, belt filter pressed and incinerated.

The City of Flint IPP program was approved on May 29, 1985. The ordinance adopted by the City on February 25, 1985, contains provisions for issuance of permits to significant IUs. The City's NPDES permit was modified on August 22, 1985, to incorporate the approved program. The NPDES permit requires that the City submit annual reports on the status of the program, including effluent limits for cadmium, copper, lead, silver, and amenable cyanide (see Table 1).

At this time, the City of Flint has issued twenty-seven (27) discharge permits broken down as follows: categorical users - seven; significant non-categorical users - seven; and regulated non-categorical users - thirteen. Of the twenty-seven permitted dischargers, there are two using the combined wastestream formula, nine subject to total toxic organic limits, and nine subject to solvent management plans. There is also one significant discharger located in the Beecher Metropolitan District. The Beecher Metropolitan District is handled via a multi-jurisdictional agreement.

A SIU is defined as having any of the following; a flow of 25,000 gallons per day or greater; a flow of greater than 5% of the influent flow; a discharge which contains a toxic pollutant or has a IPP significant impact on the POTW either singly or in combination with other industries.

The following parameters appear in the Flint POTW's NPDES permit. All samples are required to be 24 hour composites.

TABLE 1

Parameter	Frequency Effluent Monitoring	Effluent Limits	
		Daily Maximum	30-Day Average
Amenable Cyanide	Weekly	30 µg/l*	5 µg/l*
Total Lead	Weekly	449 µg/l*	19 µg/l*
Total Silver	Weekly	2 µg/l*	0.1 µg/l*
Total Cadmium	Weekly	46 µg/l*	1.0 µg/l*
Total Copper	Weekly	121 µg/l*	65 µg/l*

*Effluent Limits take effect 10-1-90

Permit limits and ordinance limits are based upon a review of available information and calculations based on treatability and passthrough criteria. There is no history of difficulties caused by industrial dischargers and the plant is in consistent compliance with their effluent limits.

TABLE 2

1. Discharge Limitations – User Total Discharge Volume to POTW
Less than 10,000 gpd

<u>Parameter</u>	<u>Discharge Limitation (mg/l)</u> <u>(Daily Average)</u>
Arsenic	0.5
Cadmium	2.0
Chromium (Total)	5.0
Copper	3.0
Lead	0.5
Mercury	0.02
Nickel	3.5
Silver	0.5
Zinc	5.0
Cyanide	2.0

2. Discharge Limitations – User total discharge volume to POTW
Greater than 10,000 gpd

<u>Parameter</u>	<u>Discharge Limitation (mg/l)</u> <u>(Daily Average)</u>
Arsenic	0.10
Cadmium	0.70
Chromium (Total)	2.6
Copper	1.2
Lead	0.4
Mercury	0.005
Nickel	1.3
Silver	0.2
Zinc	1.1
Cyanide	0.60

The approved program contains recommended monitoring (both self and POTW) frequencies as a guideline for operating staff which allows them the flexibility of increasing or decreasing monitoring based on user compliance with their permit.

TABLE 3

MONITORING SCHEDULE

User Characteristics	Self-Monitoring Requirements	POTW Scheduled	Monitoring Unscheduled
User Regulated by Federal Categorical Discharge Regulations	Review Applicable Federal Categorical Discharge Regulation of Self-Monitoring Requirements.	Monthly	Quarterly
User with High Potential to Impact on POTW Process	Quarterly	Semi-Annually	Semi-Annually
User with Low Potential to Impact to POTW Process	Annually	Annually	None

NOTE: The above Monitoring Schedule is meant to serve as a guideline only. The actual monitoring requirements for a particular User should be based upon User performance. If a User has consistently met or violated the requirement of a User Permit, the monitoring requirements should be modified appropriately.

The adopted ordinance allows the City several enforcement tools dependent upon the severity of the violation. Options range from verbal or written notices up to the termination of service; to date, there have been no major enforcement actions by the City, due to significant compliance by IUs with program requirements.

The current program is operated with a staff of 2.3 FTE's and an annual budget of approximately \$110,000.

CITY OF BRYAN

PROGRAM DESCRIPTION AND IMPLEMENTATION

The City of Bryan's pretreatment program was approved on January 18, 1985 and pretreatment requirements were subsequently incorporated in its NPDES permit. Bryan is not operating under an enforcement order, consent decree, or other document containing pretreatment program requirements.

All IUs tributary to the Bryan POTW are located within its jurisdictional boundaries.

Bryan has six IUs in their system. Of these six, three are subject to categorical standards and three are considered significant non-categorical users. Bryan issues wastewater discharge permits for a duration of two years to SIUs. SIUs are either subject to categorical standards or are discharging industrial waste that has the potential to upset plant operations. Bryan has issued the six IU permits required by their approved program.

The combined wastestream formula is applied to two of the IUs. Two are also subject to TTO requirements. None of the IUs in Bryan are subject to production based standards.

The following parameters appear in the Bryan POTW's NPDES permit. All samples are required to be composites unless otherwise noted.

PARAMETER	MONITORING FREQUENCY		
	influent monitoring	effluent monitoring	sludge monitoring
Cadmium	1/month	1/month	1/month
Chromium, hex	1/month	1/month	--
Chromium, total	1/month	1/month	1/month
Copper	1/month	1/month	1/month
Lead	1/month	1/month	1/month
Nickel	1/month	1/month	1/month
Zinc	1/month	1/month	1/month
Mercury	1/month	1/month	1/month
Phenols	1/month	1/month ⁺	--
Cyanide, total	1/month [*]	1/month ⁺⁺	--

*grab samples

+ monitoring only

Local limits calculations for the program submission were based on three sampling periods of the influent, effluent and sludge in 1983. Removal rates were calculated based on these data. Maximum plant headworks loadings were then back-calculated using the most limiting factors among activated sludge biological processes, anaerobic sludge digestion, and land application of sludge. Sampled background headworks loadings were subtracted from the calculated allowable influent loadings and then allocated uniformly to industrial contributors.

In 1985 Bryan revised their local limits to reflect new water quality standards using the same procedures but new data collected over three months of daily 24 hour composite sampling. Bryan's local limits are as follows:

<u>Parameter</u>	<u>Limit (mg/l)</u>
Cadmium	0.69
Chromium	3.32
Copper	0.09
Lead	3.91
Nickel	0.69
Zinc	3.59
Phenols	2.74
Cyanide, total	0.16

Bryan's approved program establishes inspection and monitoring frequencies as follows:

	<u>Categorical</u>	<u>SIU</u>
IU inspections by POTW	1/year	1/year
POTW monitoring of IU	1/year	1/year
Self-monitoring by IU	4/year	4/year
Reporting by IU	2/year	2/year

Bryan has not developed a definite enforcement strategy to be applied uniformly to situations of noncompliance. Any enforcement that has been initiated in the past has consisted mainly of verbal warnings and informal letters that have been poorly documented.

The funding for Bryan's pretreatment program is borne completely by the POTW's general operating fund. One tenth of a FTE has been committed to the program.

PROGRAM EFFECTIVENESS

Legal Authority: Bryan is considered to have adequate legal authority to implement and enforce its pretreatment program. The only shortcoming in Bryan's sewer use ordinance is the absence of the recently revised federal definitions of passthrough and interference.

Application of Standards: Program staff have had periodic problems determining the correct limits to put in permits as well as the proper application of the combined wastestream formula. Sampling locations have not been identified in the permits. Bryan has also failed to notify its IUs of RCRA requirements.

Compliance Monitoring: The City has failed to document IU inspections, making it difficult to establish if these inspections have been conducted. The City's compliance monitoring events did not routinely sample for all parameters limited in the user's permit. In addition, chain of custody forms for samples are not used.

Enforcement: Out of six SIUs, one has been consistently out of compliance with local limits. The city has not placed this user on a compliance schedule, but the industry is installing pretreatment facilities to meet permit limitations.

There is no clear record that all IU violations have been acted upon. The City has not consistently issued notices of violation. Presently any type of enforcement against an industrial contributor would be difficult, if not impossible, due to the lack of inspection, monitoring and documentation done by the POTW.

Data Management: Bryan's program files do not contain adequate documentation. In addition, baseline monitoring reports are missing for several categorical industries.

Resources: Bryan is not providing sufficient resources to adequately implement the pretreatment program. Additional manpower is required to correct the deficiencies noted herein.

NORTHEAST OHIO REGIONAL SEWER DISTRICT

PROGRAM DESCRIPTION AND IMPLEMENTATION

Northeast Ohio Regional Sewer District's (NEORS) pretreatment program was approved on September 6, 1985; however, much progress was made in pretreatment prior to that time. Pretreatment requirements have been incorporated into three of the four affected NPDES permits. Presently, the District oversees program requirements for four separate wastewater treatment facilities and their service areas and has procedurally incorporated a fifth facility. The Southerly, Easterly, Westerly and Strongsville "A" treatment plants are covered under the pretreatment program and the Berea STP is being incorporated. All IUs are within the jurisdictional boundaries of the District. NEORS is not presently under any consent decree or enforcement order for pretreatment regulations.

There are approximately 29,000 IUs in the District's system. 160 users are subject to categorical standards, five are considered significant non-categorical users and 774 are other regulated non-categorical users. NEORS defines a SIU as a user (categorical or non-categorical) in violation of the local sewer use code.

The combined wastestream formula is applied to five IUs. 150 users are subject to TTO requirements. 15 users are subject to production-based categorical standards.

NEORS's program does not include a control mechanism other than their sewer use code.

At the time local limits were being developed for pretreatment program approval, several of the District's treatment facilities were still under construction. This made determining representative removal rates from sampling results marginal at best. Also, background concentrations from sampling showed relatively high levels of cadmium, copper and zinc. Therefore, NEORS decided to retain their existing heavy metals pretreatment limits. These limits were initially selected after an extensive review of similar programs. NEORS's local limits are as follows:

<u>Parameter</u>	<u>Limit (mg/l)</u>
Cadmium	2
Chromium, hex	10
Chromium, total	25
Copper	2
Nickel	10
Iron	50
Zinc	15
Lead	2
Cyanide, free	2
Cyanide, total	10

NEORSRD's approved program establishes inspection and monitoring frequencies as follows:

	Categorical	SIU
IU inspections by POTW	1/year - min	1/year - min
POTW monitoring of IU	1/year - min	1/year - min
Self-monitoring of IU	2/year	varies
Reporting by IU	as necessary	varies

NEORSRD's enforcement plan responds to first-time violators by sending a notice of violation describing the violation and requesting a response within a specified period of time. If an industry repeatedly discharges pollutants in excess of the limits contained in the Sewer Use Code, NEORSRD typically follows up with either administrative orders or show cause hearings. Overall, the enforcement strategies of the District have been effective in limiting violations.

Operating expenses for NEORSRD's Pretreatment Program are set at approximately \$131,500 for program implementation and another \$119,000 estimated for lab expenses. The total funding is borne by the general operating fund. Only lab expenses for TTO testing is billed directly to the industry. Approximately 5.5 to 6.5 man years are committed to the pretreatment program.

PROGRAM EFFECTIVENESS

Legal Authority: NEORSRD has adequate legal authority to implement and enforce pretreatment standards and requirements. However, the District currently does not have a control mechanism other than the sewer use code. Although the code is of and by itself enforceable, 40 CFR 403 is interpreted by the approval authority to require additional control. Given that USEPA intends to modify 40 CFR 403 to clearly require issuance of permits (or equivalent) to all SIUs, NEORSRD should modify their program to implement such a system.

Application of Standards: It appears that NEORSRD may not be applying standards appropriately. The District compliance sampling, whenever possible, is conducted end-of-process; this method does not allow assessment of compliance with local limits. The District must identify and quantify wastestreams introduced downstream of their sampling location. Where necessary, the combined wastestream formula should be used. NEORSRD also needs to identify representative sampling locations for IU self-monitoring.

Compliance Monitoring: NEORSRD's compliance monitoring program appears to be one of the program's strengths. The District implements a four-day sampling event for their scheduled compliance monitoring. These sampling events include a detailed inspection on the first day. Subsequent days are used to follow-up with questions generated by the first day's inspection, pick up samples and reset the sampler.

The District has also developed adhesive labels citing the IUs requirement to notify the District in the event of a slug discharge or treatment equipment failure. These stickers are being distributed to IUs throughout the District and are to be placed on treatment control equipment.

Enforcement: Of the 165 SIUs that discharge to NEORSD's facilities, approximately ten percent have been subject to some form of enforcement action during the last twelve months. Five SIUs are considered to be in noncompliance with categorical standards and three are in noncompliance with local limits. Eleven users are currently on compliance schedules, with eight having been returned to compliance.

Data Management: NEORSD's current filing system is by no means ideal, but its difficulties should be resolved after a move to new offices and establishment of centralized filing area.

Resources: Program resources appear to be at a reasonable level.

TABLE 1: NPDES Permit Parameters and Monitoring Requirements
(All samples are composites unless otherwise noted)

FACILITY: Easterly WWTP

PARAMETER	FREQUENCY		
	influent monitoring	effluent monitoring	sludge monitoring
Cadmium	1/week	1/week	---
Chromium, tri	---	1/week	---
Chromium, hex	---	1/week	---
Chromium, total	1/week	---	---
Copper	1/week	1/week	---
Lead	1/week	1/week	---
Nickel	1/week	1/week	---
Zinc	1/week	1/week	---
Mercury	1/week	1/week	---
Phenols	---	1/week	---
Cyanide, free	1/week*	1/week*	---

*grab samples

TABLE 1: Con't.

FACILITY: Southerly WWTP

PARAMETER	FREQUENCY		
	influent monitoring	effluent monitoring	sludge monitoring
Cadmium	1/month	1/week	1/week
Chromium, hex	1/month	1/week	---
Chromium, total	1/month	1/week	1/week
Copper	1/month	1/week	1/week
Lead	1/month	1/week	1/week
Nickel	1/month	1/week	1/week
Zinc	1/month	1/week	1/week
Mercury	1/month	1/week	1/week
Phenols	1/month*	1/week*	---
Cyanide, total	1/month*	1/week	1/week
PCBs	---	---	4/year*

*grab samples

FACILITY: Westerly WWTP

PARAMETER	FREQUENCY		
	influent monitoring	effluent monitoring	sludge monitoring
Cadmium	1/week	1/week	1/week*
Chromium, hex	---	1/week	---
Chromium, total	1/week	1/week	1/week*
Copper	1/week	1/week	1/week*
Lead	1/week	1/week	---
Nickel	1/week	1/week	1/week*
Zinc	1/week	1/week	1/week*
Mercury	1/week	1/week	---
Phenols	---	1/week*	---
Cyanide, total	1/week*	1/week*	---
PCBs	---	---	4/year*

*grab samples

TABLE 1: Con't.

FACILITY: Strongsville "A" WWTP

PARAMETER	FREQUENCY		
	influent monitoring	effluent monitoring	sludge monitoring
Cadmium	1/month*	+	4/year
Chromium, total	1/month*	+	4/year
Copper	1/month*	+	4/year
Lead	1/month*	+	---
Nickel	1/month*	+	4/year
Zinc	1/month*	+	4/year*
Mercury	1/month*	+	---
PCBs	---	+	1/year*

*grab samples

+facility is under orders to tie into Southwest
interceptor and abandon plant

CITIES OF WILLOUGHBY - EASTLAKE

PROGRAM DESCRIPTION AND IMPLEMENTATION

The City of Willoughby and neighboring Eastlake together form the Willoughby-Eastlake Water Pollution Control Center (WPCC). Pretreatment program approval was granted on September 26, 1985 and pretreatment requirements were subsequently incorporated into their NPDES permit. The WPCC is not operating under an enforcement order, consent decree, or other document containing pretreatment program requirements.

The WPCC has jurisdictional authority over all wastewater contributors tributary to the treatment plant in the cities of Willoughby and Eastlake to monitor and inspect contributors and to require compliance with the sewer use ordinance adopted by the WPCC. However, the burden of enforcement falls on the legal department of the respective cities.

Willoughby-Eastlake has 348 IUs in their system. Of these, 10 are subject to categorical standards, 75 are significant non-categorical users, and 263 are considered other non-categorical users. Willoughby-Eastlake defines a SIU as any user discharging process waste or possessing the potential to discharge other than "normal sewage", a phrase contained in their by-law.

Ten of the users are subject to TTO requirements. One user is regulated by a production-based categorical standard.

IU permits expire one year after their issuance date and require the submission of an updated industrial waste survey when the IU applies for a permit renewal.

The following parameters appear in the Willoughby-Eastlake WPCC NPDES permit. All samples are required to be composites unless otherwise noted.

PARAMETER	FREQUENCY		
	influent monitoring	effluent monitoring	sludge monitoring
Cadmium	1/week	1/week	1/month*
Chromium, hex	---	1/week+	---
Chromium, total	1/week	1/week+	1/month*
Copper	1/week	1/week	---
Lead	1/week	1/week	1/month*
Nickel	1/week	1/week	1/month*
Zinc	1/week	1/week	1/month*
Mercury	1/week	1/week	1/month*
Phenols	1/week*	1/week**	---
Cyanide, total	1/week*	1/week**	---
PCBs	---		1/year*

* grab samples + monitoring only

Willoughby-Eastlake's sewer use ordinance contained limitations on some heavy metals and toxics prior to their pretreatment program submission. Removal rates were calculated from the preceding 12 months of monthly composite effluent sampling. An allowable industrial loading in pounds of pollutant at the treatment plant headworks was then back calculated from removal rates and NPDES permit limits. This was used as a comparison with actual headworks loadings from industry with the present local limits to qualify any necessary changes. Willoughby-Eastlake's local limits are as follows:

<u>Parameter</u>	<u>Limit (mg/l)</u>
Arsenic	0.04
Cadmium	0.4
Chromium, hex	1.0
Chromium, tri	3.0
Copper	0.9
Cyanide, total	0.1
Iron	15.0
Lead	2.0
Mercury	0.3
Nickel	3.0
Phenols	0.5
Silver	1.0
Zinc	4.0

Willoughby-Eastlake has defined three different categories of IUs that have different monitoring and reporting requirements. Users classified as major significant users are those industries with substantial process waste or who have a reasonable potential, in the opinion of the POTW, to adversely affect the treatment system. Those industries that are verified as categorical industries will be included as major significant users. Minor significant users are those industries that have a potential to discharge process wastes or have a potential for a spill, but at the same time discharge only sanitary waste, or whose individual discharges do not significantly impact the system. If any minor significant user becomes a problem for the system, the classification will change to major significant. Willoughby-Eastlake's approved program establishes inspection and monitoring frequencies as follows:

	<u>major</u>	<u>minor</u>	<u>insignificant</u>
	<u>significant</u>	<u>significant</u>	<u>insignificant</u>
IU inspections by POTW	4/year	2/year	1/year
POTW monitoring of IUs	1/month	4/year	1/year
Self-monitoring by IUs	2/year	2/year	none
Reporting by IUs	2/year	2/year	none

Willoughby-Eastlake's enforcement plan responds to first time violators by sending a notice of violation, stating the nature of the violation, and requesting a response on corrective actions and the date by which compliance will be achieved. If no positive corrective action is taken and if a second violation occurs within a one year period, the violator is sent a notice to abate and is ordered to return to compliance within a specified period of time, usually 30 days. The user is given the opportunity to appeal the order.

If the violations continue, the user is discussed at a monthly administrative meeting. A prosecutor's meeting may ensue. If the violations continue, the user is referred to the Law Department of the appropriate city for enforcement action. According to the sewer use ordinance, a violating IU will be referred to either Willoughby or Eastlake depending on the IUs location and which city has jurisdiction in that area.

Annual pretreatment program funding for 1988 is \$196,845 with 4.0 full time equivalents allocated to the program.

PROGRAM EFFECTIVENESS

Legal Authority: Willoughby Eastlake's legal authority is sufficient.

Application of Standards: Program staff appear to be applying standards correctly and appropriately.

Compliance Monitoring: The compliance monitoring program is sufficient.

Enforcement: Sixty-six Percent of all categorical and SIUs have been subject to some level of enforcement action during the past twelve months. Of fourteen IUs that were in significant noncompliance with permit limits, nine have been returned to compliance by use of orders or compliance schedules. Judicial action against one user in Eastlake has been initiated.

Willoughby-Eastlake's lack of enforcement is the major concern with an otherwise good pretreatment program. Program staff issue notices of violation, but the Willoughby legal department has failed to initiate further action.

Data Management: All files appear to be adequately documented and are in good order.

Resources: Program resources appear to be at a reasonable level.

CITY OF ELYRIA

PROGRAM DESCRIPTION AND IMPLEMENTATION

The City of Elyria's pretreatment program was approved by the Ohio EPA on March 29, 1985. Pretreatment program requirements were incorporated into the City's NPDES permit issued December 18, 1985. The City is not operating under any consent decree, administrative order, or other document containing pretreatment program requirements.

All IUs are geographically located within the jurisdictional boundaries of the POTW.

Elyria has 134 IUs in their system. Four are subject to categorical standards, 11 are significant non-categorical users, 27 are other non-categorical users and 92 are other non-domestic users. The city defines SIU as a facility which discharges pollutants that may be incompatible with the Elyria Wastewater Pollution Control Plant.

The combined wastestream formula is applied to two of the IUs. Seven users are subject to T10 requirements. One user is subject to a production-based categorical standard.

To date Elyria has issued 9 of the required 15 industrial discharge permits with an effective term of 3 years. However, permits are issued to IUs only after they have demonstrated compliance with the City's pretreatment program regulations. Until compliance is demonstrated, IUs are put on a compliance schedule for any improvements that are necessary to achieve that compliance.

The following parameters appear in the Elyria POTW's NPDES permit. All samples are required to be composites unless otherwise noted.

PARAMETER	FREQUENCY		
	influent monitoring	effluent monitoring	sludge monitoring
Cadmium	1/week	1/week	1/month
Chromium, hex	1/week	1/week	---
Chromium, tri	1/week	1/week	---
Chromium, total	---	---	1/month
Copper	1/week	1/week	1/month
Lead	1/week	1/week	1/month
Nickel	1/week	1/week	1/month
Zinc	1/week	1/week	1/month
Mercury	1/week	1/week	1/month
Cyanide, free	---	1/week	---
PCBs	---	---	1/year*

* grab sample

Elyria's local limits were developed to protect against 1) inhibiting biological processes, 2) violating sludge disposal requirements, and 3) violating NPDES permit limits. Removal rates for 8 heavy metals and cyanide were determined from previous POTW sampling data and information published by the U.S. EPA. These numbers were used to calculate allowable influent loadings for all parameters. The background pollutant value was then subtracted from the allowable headworks loading to determine the allowable industrial contribution. This value was divided by the total flow of industries known to contribute that pollutant to determine a local limitation. Elyria's local limits are as follows:

<u>Parameter</u>	<u>Limit (mg/l)</u>
Cadmium	0.54
Chromium	4.0
Copper	2.1
Lead	0.70
Mercury	0.002
Nickel	5.0
Zinc	3.4
Cyanide, total	1.3
Silver	1.2

Elyria has also established limits for industrial discharges of conventional pollutants but selectively grants variances on these limits up to a specified ceiling. Any concentration above a ceiling level is considered a violation of the sewer use ordinance, but within this range the POTW levies a surcharge on that parameter.

Elyria's monitoring program establishes compliance sampling frequencies for IUs according to the volume of wastewater that is discharged to the POTW. The frequencies are as follows:

	<u>>10,000 GPD</u>	<u><10,000 GPD</u>
IU inspections by POTW	1/year	1/year
POTW monitoring of IU	2/month	1/month
Self monitoring by IU	2/month	2/month
Reporting by IU	4/year	4/year

Elyria's approved program calls for a written notice of violation to be served on a violator requiring compliance within 10 days. An uncorrected violation would be subject to a citation followed by a hearing with the Superintendent, who retains the authority to order appropriate relief, including dismissal of the citation or termination of service. However, in actual practice, notices of violation have been followed by meetings and correspondence which have not always been effective in resolving noncompliance.

Elyria has an estimated annual pretreatment program budget of \$155,000 and has allocated 3.2 FTEs to the program.

PROGRAM EFFECTIVENESS

Legal Authority: Elyria's existing ordinance requires the city to codify categorical standards, which has not yet been done. This is a significant problem since enforcement of standards depends on the city requiring compliance with their effective code.

Application of Standards: Elyria has done a fair job of applying pretreatment standards. Program staff have appropriately categorized most of the IUs and indicate that compliance is assessed against both categorical and local standards. The city uses their own data to evaluate compliance with local limits and self-monitoring data to evaluate compliance with categorical standards. The city must be able to assess compliance status independent of IU data; therefore, the city must either sample at two locations or sample only end-of-pipe using the combined wastestream formula to adjust limits. Also, Elyria has not notified all IUs of requirements under RCRA.

Compliance Monitoring: Although Elyria has conducted extensive compliance monitoring at a few of their IUs, the overall compliance monitoring effort does not meet commitments in their approved program.

Enforcement: Elyria has identified eight IUs as being in significant noncompliance with discharge limitations. None is presently on a compliance schedule, although three have been in the past. Five of these industries have been out of compliance more than two years.

Elyria has not yet fully developed an enforcement strategy. Program personnel are knowledgeable regarding IU compliance status, but individual IU files do not document POTW or IU self-monitoring in some cases. Files do not document where violations have occurred or what enforcement actions have been taken. The city tends to give more attention to the larger industries and the files reflect this.

Elyria's program is in the process of being modified to require discharge permits for all SIUs regardless of their compliance status. If they are determined to be in violation of their permit they could then be put on a compliance schedule to bring them into compliance. This should make legal enforcement of pretreatment standards on noncomplying IUs much easier for the City.

Data Management: The files show monitoring data to be missing in some cases, and determining compliance status via the files is difficult.

Resources: Program resources appear to be at a reasonable level.

FORT WAYNE

PROGRAM DESCRIPTION AND IMPLEMENTATION

The Fort Wayne Municipal Code was amended to provide local authority for the pretreatment program in August of 1985. The Fort Wayne POTW serves 34 categorical industries, and 38 "significant, non-categorical industries", defined as those facilities having in their effluents pollutants other than oil and grease and pH. In addition, there are 46 other regulated noncategorical industries; these are industries that the POTW surcharges, inspects, controls through a permit, or otherwise regulates, but which are not considered significant for purposes of the pretreatment program. They include restaurants, hotels, and motels. Not all these sources are within the boundaries of the city; however, pretreatment standards are enforced through interjurisdictional agreement.

Of 20 categorical industries required to meet TTO regulations, 10 have met all TTO requirements; the balance are developing TOMP's required to meet TTO requirements. In response to survey questionnaires, five other industries have met TTO requirements.

The city performs industrial compliance monitoring once per quarter on all of the industries that are permitted and inspections of these facilities once or twice per year. IUs are required to perform self monitoring between two and six times per month.

The recent survey of 185 industries indicated that 24 were out of compliance (2 issued notices of violation, 22 non-significant violations mostly of pH); five of these have developed compliance schedules. Pollutants for which limits were exceeded included copper, lead, fats, oil and greases, pH, cyanide, zinc and manganese.

Program Effectiveness

Legal Authority: Adequate local legal authority exists for the enforcement of pretreatment standards under the Municipal Code.

Application of Standards: Pretreatment standards are adequately applied to both categorical and noncategorical industries. The city is making significant progress in determination of TTO for both types of industries; however, the state has been encouraging them to expand this effort to embrace other sources among the industrial population.

Compliance Monitoring: The city has conducted compliance sampling in accordance with approved program frequency. It was not clear at this time if the city has increased the frequency of monitoring at sources demonstrated to be out of compliance in response to a suggestion from the state.

Enforcement: Generally, enforcement action appears to be adequate, but the state noted a need for an Enforcement Response Procedure to ensure uniform and timely response to violations.

Fort Wayne, Indiana - cont'd.

Data Management: Record keeping was judged adequate.

Resource Evaluation: The program staff consists of two field personnel, one secretary, one lab staff and a program supervisor. Total funding is in the vicinity of \$130,000 per year. This level is considered adequate for a sound pretreatment program.

Summary: The city has been determined to be operating a sound pretreatment program.

CITY OF ELKHART

PROGRAM DESCRIPTION AND IMPLEMENTATION

The Elkhart pretreatment program was approved on August 30, 1984. The POTW serves and permits (every five years) 26 categorical industries, and eleven "significant, noncategorical industries", defined as those facilities having a discharge of over 10,000 U.S. GPD (37.85 m³/d) and/or toxic contaminants.

In the second quarter of 1988, five of the categorical industries were not in compliance. Two of these IUs were only marginally out of compliance and of the balance, two were on compliance schedules and the third was referred to the City Attorney for possible legal action. At the end of 1988 all IUs were in compliance.

The state expressed concerns regarding the demonstration of the achievement of TTO requirements at 10 categorical industries. Some of the industries have performed a TTO analysis and submitted the analytical data to the city.

The city performs industrial compliance monitoring twice per year on all of the industries that are permitted and inspects these facilities at least twice per year. IUs are required to perform self-monitoring between two times per year and once a month, depending on the type and size of the operation. Monitoring frequencies do increase when an IU is determined to be out of compliance.

Program Effectiveness

Legal Authority: Adequate local legal authority exists for the enforcement of pretreatment standards.

Application of Standards: Pretreatment standards are adequately applied to both categorical and noncategorical industries. The city is making significant progress in determination of TTO for both types of industries; however, the state has been encouraging them to expand this effort to embrace other sources among the industrial population.

Compliance Monitoring: The city has conducted compliance sampling in accordance with approved program frequency.

Enforcement: Generally, enforcement action appears to be adequate; an Enforcement Response Procedure to ensure uniform and timely response to violations has now been developed and approved by state.

Data Management: Record keeping was judged excellent.

Resource Evaluation: The program staff consists of one full time person and one half time supervisor and one half time program assistant. Total funding is in the vicinity of \$50,000 per year. This level is considered adequate.

Summary: The city has been determined to be operating a sound pretreatment program.

Western Lake Superior Sanitary District (WLSSD)
serving Duluth and Cloquet and surrounding areas in Minnesota

DESCRIPTION

The WLSSD pretreatment program was approved on June 24, 1985, pretreatment program requirements were placed in the WLSSD permit on September 18, 1985, and the program was implemented in August of 1986, after issuance of a Notice of Violation for non-implementation of their program.

WLSSD has adopted an Industrial Pretreatment Ordinance which regulates IUs of their system, in addition to a Model Sewer Use Ordinance which has been adopted by each of the political jurisdictions within their service area. Together these ordinances comprise the legal authority for the WLSSD pretreatment program.

The NPDES permit for WLSSD contains monitoring requirements for effluent chloroform, hexachlorobenzene, methylene chloride and pentachlorophenol twice a month, plus twice annual monitoring of influent, effluent and sludge for nickel, copper, cadmium, zinc, chromium, cyanide, phenols and pentachlorophenol. Priority pollutant scans were also required during the first year of the permit. WLSSD evaluated the need for local limitations to prevent interference and passthrough and adopted local limits for six metals.

Industrial flow is about 17 million gallons per day out of a total of about 35 million gallons per day. All IUs are located in the service area of WLSSD and are regulated directly by WLSSD. WLSSD has 13 SIUs, two of which are categorical IUs with relevant limitations.

WLSSD has issued permits to all SIUs as their control mechanism. WLSSD is now issuing permits, under the pretreatment program, to laboratories, universities, and hospitals. The local limits from the Industrial Pretreatment Ordinance or, if they are more restrictive, the limits in National Categorical Pretreatment Standards are placed in all permits issued by WLSSD. Permits issued by WLSSD also include limitations on conventional parameters when the IU contributes a significant portion of the treatment plant loading.

WLSSD receives and reviews reports for their permitted IUs and conducts inspections and monitoring of their IUs regularly. Enforcement actions have been taken for violations of the ordinances and permits. Implementation of the pretreatment program is guided by an IPP Procedures Manual.

EVALUATION

Legal Authority: The only problem which has been identified in the WLSSD Industrial Pretreatment Ordinance is in the temperature limitation in the general prohibitions. High temperature has caused operational problems at the treatment plant. This has been identified by WLSSD and they have indicated that they may be requesting an ordinance change.

Application of Standards: WLSSD has correctly applied pretreatment standards and have properly categorized IUs.

Compliance Monitoring: WLSSD has met program commitments for monitoring and inspecting IUs. However, the effort has not been well organized in some respects. This has been noted in inspections and WLSSD has committed to improved planning of inspections and monitoring of IUs.

Enforcement: As of the last pretreatment inspection, one categorical IU was noted to be in non-compliance with reporting requirements. WLSSD has been slow to take action against this IU. Monitoring by WLSSD shows that they are in compliance with limitations. WLSSD was directed to take enforcement action and resolve this situation. All other IUs were in compliance.

Data Management: With some effort any needed data could be found in the WLSSD pretreatment files. Some recommendations have been made to improve file organization. Because of significant potential for public interest in the pretreatment files, WLSSD is considering developing specific procedures for public access to the files.

Resources: Program resources appear to be adequate.

CITY OF MANITOWOC

PROGRAM DESCRIPTION

The City of Manitowoc received approval of its local pretreatment program in June of 1984. The City's WPDES permit was subsequently modified to include requirements to operate the approved program.

The City's treatment plant receives approximately 10.0 million gallons (US) (37,850 m³/d) of wastewater each day. Some 4.5 million gallons (17,437 m³/d) of that waste are from industrial sources.

Manitowoc receives wastewater from an estimated 50 IUs. Twenty-two (eleven categorical, eleven noncategorical) have been issued IU permits. Two additional users presently require permits.

All IUs are located within the jurisdictional boundaries of the City. Landfill leachate also is hauled to the plant for treatment.

The City used historical treatment plant monitoring to estimate pollutant removal rates to establish local limits. Maximum allowable headworks loads were determined based on the susceptibility of the biological treatment process to upset or inhibition, and to maintain current sludge disposal options. Since no water quality based limits for toxic materials were included in the WPDES permit, this factor was not used to establish the headworks targets. The City was able to demonstrate that the daily maximum limits for the electroplating category would protect against process upset and sludge contamination. The City will be required to reevaluate its local limits to contain limits for toxics when its WPDES permit is reissued in the coming months.

The City conducts compliance monitoring at its IUs at least twice a year using a contract lab. Inspections are to be performed on an annual basis.

The approved program contains an enforcement management system that describes how violations will receive an escalating response if not corrected in a timely fashion.

Manitowoc devotes 1.25 full time equivalents to its pretreatment program efforts.

PROGRAM EFFECTIVENESS

Legal Authority: The City has not experienced any practical problems in enforcing pretreatment requirements. However, the local ordinance must be upgraded to reflect changes in federal requirements.

Application of Standards: Revisions to local limits may be necessary to prevent violations of water quality based limits.

Compliance Monitoring: Adequate.

Enforcement: The City must follow the procedures in its approved program. To date, it has been hesitant to take formal enforcement actions against violators.

GREEN BAY METROPOLITAN SANITARY DISTRICT

PROGRAM DESCRIPTION

The Green Bay Metropolitan Sanitary District's (GBMSD) pretreatment program was approved in September, 1985. Requirements to operate the approved program were subsequently incorporated into GBMSD's WPDES permit. GBMSD is not presently subject to any State or Federal enforcement orders that affect the pretreatment program.

GBMSD's treatment plant receives approximately 28 million gallons (US) (105,000 m³/d) of wastewaters each day. Sixteen million gallons (60,600 m³/d) are from industrial sources.

All IUs of GBMSD's treatment works are located within its jurisdictional boundaries.

GBMSD serves 75 IUs. Ten of these IUs are subject to National Categorical Pretreatment Standards. Thirty-four noncategorical IUs discharge wastes which have the potential to upset or interfere with the treatment processes or otherwise require monitoring. Also, eight waste haulers have been issued on-site discharge permits. Generally, these are domestic septage and holding tank wastes. All of the above IUs have been issued a pretreatment order (which identifies pretreatment requirements) or a waste hauler permit. These documents serve as the program's control documents.

GBMSD developed local limits as part of its pretreatment program. The District used historical plant monitoring data to determine the fate of pollutants within the treatment system. Acceptable industrial loadings were then back calculated in consultation with Wisconsin DNR based on literature values established to prevent inhibition of biological processes (activated sludge with nitrification, anaerobic sludge digestion) and on instream water quality criteria. Since GBMSD incinerates its sludges, no sludge disposal criteria were factored into these calculations. GBMSD's WPDES permit has been reissued with a requirement for re-evaluation of local limits.

Generally, each IU which has been issued an order is to be inspected and sampled by GBMSD twice a year. A specific monitoring plan is established each year by GBMSD based on a case-by-case evaluation of the discharge status of each user. The compliance monitoring frequency is subject to Department review and approval.

GBMSD's program contains a detailed enforcement management system which ensures that similar violations are addressed in a similar fashion and that significant violations receive highest priority attention.

Green Bay devotes 2 FTEs to pretreatment program activities.

PROGRAM EFFECTIVENESS

Legal Authority: GBMSD has not encountered any practical difficulties in enforcing pretreatment requirements. However, the existing ordinance will have to be upgraded to capture changes in the federal requirements.

Application of Standards: Pretreatment standards have been properly applied.

Compliance Monitoring: GBMSD operates a high quality compliance monitoring and inspection program.

Enforcement: Adequate.

Data Management: GBMSD provides ample documentation of program activities and understands the status of all IUs.

Resources: Adequate.

CITY OF FOND DU LAC

PROGRAM DESCRIPTION

The City of Fond du Lac received approval of its pretreatment program in June 1984. Requirements to operate the approved program were subsequently incorporated into the City's WPDES permit. The City is not presently affected by any state or federal enforcement order concerning pretreatment.

The City's treatment plant treats approximately 7.2 million gallons (US) of wastewater each day (27,252 m³/d). Some 1.8 million gallons (6,810 m³/d) are discharged by IUs.

Fond du Lac receives wastes from industry outside of its jurisdictional boundaries but has assumed the responsibility for applying and enforcing pretreatment standards on such industries.

The City receives wastes from six IUs regulated by National Categorical Pretreatment Standards, three significant noncategorical users, two other users which are potentially subject to categorical standards, and five waste haulers. The City is finalizing IU permits for two of the categorical industries and the two IUs potentially subject to categorical standards. All remaining categorical and SIUs have been issued permits. The waste haulers are controlled by a manifest system and do not require permits.

The City used historical monitoring data to establish local limits at the time of program approvals. Maximum headworks loadings were developed to protect biological processes (activated sludge, anaerobic digestion) and sludge disposal (land application and landfill). Because no effluent limits for toxics were included in the WPDES permit, no headworks loadings were established to prevent the passthrough of toxics. The City demonstrated that the daily maximum limits for the electroplating category would be sufficient to protect the plant operations and sludges. These local limits will be reevaluated as a condition of a new WPDES permit to be reissued in 1989.

At a minimum, the City conducts one formal IU inspection and two compliance monitoring events at each permitted user.

In addition to the local sewer use ordinance authorities, the City uses a stepped enforcement procedure. They have been successful in working with IUs to achieve compliance prior to the need for formal enforcement action.

Fond du Lac presently devotes 1 FTE to pretreatment program activities.

PROGRAM ASSESSMENT

Legal Authority: The City has not experienced any practical problems in enforcing pretreatment requirements. However, the local ordinance must be upgraded to reflect changes in federal requirements.

Application of Standards: two metal molding and casting permits are in draft stages. Local limits will be upgraded to address water quality concerns when Sheboygan's permit is reissued to include revised effluent limits.

Enforcement: The city should consider a more detailed enforcement management system.

Data Management: Adequate.

Resources: Adequate.

CITY: CITY OF METROPOLITAN TORONTOProgram Description and Implementation

The City of Metropolitan Toronto passed their local municipal sewer use by-law in 1982 and operates four waste treatment facilities with a total combined flow of 1,375,900 cubic metres per day (m^3/d) (364 USMGD). The treatment facilities have Certificates of Approval without limits. The effluents from the facilities complied with MOE Policy 08-01, except for one plant which did not meet the total phosphorus requirements. Sludge disposal is by incineration. The municipality is not operating under any control order pertaining to its treatment plant operations.

Most IUs discharging to the collection system are located within the jurisdictional boundaries of the municipality. The municipality receives a small amount of waste from an adjacent municipality. The agreement with this municipality does not contain any provisions for controlling the industrial discharges to these sewers. The city has 5,870 potential dischargers to the system according to water use records. Based on EPA data, and using the population of the municipality for estimation, 347 SIUs would be expected. The total water use in the municipality was 1,245,000 cubic metres per day (329 USMGD) in 1986. The water use was 33% residential, 27% industrial and 21% commercial.

The local limits in the appropriate municipal by-law for discharge to the treatment plants are as follows:

<u>Parameter</u>	<u>Limit (mg/L)</u>
BOD	500
TSS	600
Oil & Grease (A&V)	150
Cadmium (T)	2
Chromium (T)	5
Copper (T)	5
Nickel (T)	5
Zinc (T)	5
Mercury (T)	0.1
Phenols (T)	1
Cyanide (T)	2

The sewer use by-law also contains the following provisions: surcharge agreements for conventional parameters; compliance programs for noncomplying users; sampling and analysis specifications; the reporting of spills; sampling manhole specifications; and offences. The municipality was also developed and implemented a sampling and enforcement strategy.

In 1986, the municipality collected 2,759 samples from 306 IUs. The users have been grouped by the municipality into a number of classes according to the potential impact of the waste to the treatment system. These classes include: 126 high potential industries; 188 medium potential industries; 252 low potential industries and 88 surcharged industries. The city initiated 82 enforcement actions against IUs, the majority being prosecutions. There were 18 specific compliance programs implemented.

The municipality spent \$732,200 in 1986 on their sewer use control program and utilized 29.5 person years. The industrial effluent samples were analyzed for conventionals and metals in the municipality's labs.

Program Effectiveness

Legal Authority: The municipality has adequate authority under Section 147 Paragraph 210 of the Municipal Act to implement and enforce a sewer use by-law. The city should alter its agreement with the adjacent municipality to include provisions for controlling the industrial dischargers to the sewers.

Application of Standards: Good. The municipality should upgrade its sewer use by-law to include provisions for an industrial waste survey. The program possibly could be improved by carrying out a local limits development program.

Compliance Monitoring: The municipality has a well established compliance sampling program.

Enforcement: The municipality has an excellent enforcement program, with written procedures, and effectively utilizes compliance programs and prosecutions to bring about compliance.

Data Management: Adequate. The municipality should develop a computer based system to maintain the data generated by the industrial waste survey and sampling, inspection and enforcement programs.

Resources: Resources adequate to meet the objectives of the program have been provided.

CITY: REGIONAL MUNICIPALITY OF WATERLOO

Program Description and Implementation

The Regional Municipality of Waterloo passed their local municipal sewer use by-law in 1987. The OMOE operates the 11 waste treatment facilities under an operating agreement for the municipality. The total combined flow of 11 treatment facilities is 163,000 cubic metres per day (43 USMGD). All treatment facilities have Certificates of Approval with limits for BOD, total suspended solids and total phosphorus. Two treatment facilities also have requirements for ammonia and one also has a requirement for phenolics. The effluents from the facilities complied with all ministry requirements. All facilities utilized application on agricultural land for sludge disposal. The municipality is not operating under any control order pertaining to its treatment plant operations.

All IUs discharging to the collection system are located within the jurisdictional boundaries of the regional municipality. The municipality has 677 potential dischargers to the system according to water use records. Based on EPA data, and using the population of the municipality for estimation, 109 SIUs would be expected. The total water use in the municipality was 129,700 cubic metres per day in 1986. The water use was 36% residential, 31% industrial and 18% commercial.

The local limits in the by-law are as follows:

<u>Parameter</u>	<u>Limit (mg/L)</u>
BOD	300
TSS	350
Oil & Grease (A&V)	100
Oil & Grease (S&M)	15
Cadmium (T)	0.5
Chromium (T)	5
Copper (T)	5
Nickel (T)	5
Zinc (T)	5
Mercury (T)	0.1
Phenols (T)	1
Cyanide (T)	2

The sewer use by-law also contains the following provisions: surcharge agreements for conventional parameters; sampling and analysis specifications; sampling manhole specifications and offences. The municipality has also developed and implemented an excellent sampling and inspection program.

In 1986, the regional municipality collected 2,768 samples from 203 IUs. The IUs have been grouped by the municipality into a number of classes. These classes include: 35 users who discharge toxics; 40 users with surcharge agreements; 69 general users; 42 users with a discharge to a storm sewer; and 20 miscellaneous dischargers. Sixty of the IUs were inspected. The regional municipality has developed and issued a standard enforcement strategy which ensures that similar violations are addressed in a similar fashion. The municipality initiated 131 enforcement actions against IUs, the majority being written warnings. There were two prosecutions and 13 compliance programs were established.

The municipality spent \$411,800 in 1986 on their sewer use control program and utilized 11.1 person years. The samples were analyzed for conventionals and metals in the municipal lab.

Program Effectiveness

Legal Authority: The municipality has adequate authority under Section 147 Paragraph 210 of the Municipal Act to implement and enforce a sewer use by-law. The municipality should upgrade their sewer use by-law by including provisions for industrial waste surveys, compliance programs and spills control.

Application of Standards: The municipality should review their local limits by carrying out a local limits development program.

Compliance Monitoring: The regional municipality has an adequate compliance monitoring program.

Enforcement: The regional municipality has an adequate enforcement program.

Data Management: The regional municipality should develop a computer based system for the data developed by its industrial waste survey and sampling, inspection and enforcement programs.

Resources: An adequate level of resources has been provided to meet the objectives of the program.

CITY: CITY OF WINDSOR

Program Description and Implementation

The City of Windsor passed their local municipal sewer use by-law in 1985 and operates two waste treatment facilities with a total combined flow of 156,000 cubic metres per day (41 USMGD). The facilities receive waste from a number of adjacent towns and townships. There are no operating agreements with these municipalities and the industrial wastes discharged in these adjacent municipalities are not regulated. The treatment facilities have Certificates of Approval with limits. The sludge from the facilities is utilized on agricultural land or composted and applied on agricultural lands. The municipality is not operating under any control order pertaining to its treatment plant operations.

Most of the IUs discharging to the collection system are located within the jurisdictional boundaries of the municipality. The municipality has 233 potential dischargers to the system according to water use records. Based on EPA data, and using the population of the municipality for estimation, 70 SIUs would be expected. The total water use in the municipality was 143,000 cubic metres per day (38 USMGD) in 1986. The water use was 39% residential, 44% industrial and 13% commercial.

The local limits in the by-law are as follows:

<u>Parameter</u>	<u>Limit (mg/L)</u>
BOD	500
TSS	600
Oil & Grease (A&V)	150
Oil & Grease (S&M)	15
Cadmium (T)	2
Chromium (T)	5
Copper (T)	5
Nickel (T)	5
Zinc (T)	5
Mercury (T)	0.1
Phenols (T)	1
Cyanide (T)	2

The sewer use by-law also contains the following provisions: surcharge agreements for conventional parameters; sampling and analysis specifications; sampling manhole specifications and offences. The municipality has also developed and implemented a sampling strategy.

In 1986, the municipality collected 242 samples from 95 IUs. Industrial waste surveys were carried out at many of the industries; however, water use information was not collected. The users have been grouped by the municipality into a number of manufacturing classes. These classes include: food and beverage producers; chemical products; electroplaters; metal finishers and general manufacturers. Seventeen industries have surcharge agreements. The city initiated 55 enforcement actions against IUs, the majority being verbal or written warnings. There was one compliance program issued and one prosecution.

The municipality spent \$233,000 in 1986 on their sewer use control program and utilized 3.5 person years. The samples were analyzed for conventionals and metals in the municipality's labs.

Program Effectiveness

Legal Authority: The municipality has adequate authority under Section 147 Paragraph 210 of the Municipal Act to implement and enforce a sewer by-law. The municipality should develop agreements with the adjacent municipalities discharging sewage to their systems. These agreements should contain provisions for control of the industrial discharges in the adjacent municipalities. The municipality should upgrade its sewer use by-law by including provisions for industrial waste surveys, spills control and compliance programs.

Application of Standards: Adequate. The municipality should review their local limits by carrying out a local limit development program.

Compliance Monitoring: The municipality has a good compliance monitoring program.

Enforcement: Adequate.

Data Management: The data management system provides good documentation of the program activities.

Resources: Adequate

CITY: CITY OF BARRIE

Program Description and Implementation

The City of Barrie passed their local municipal sewer use by-law in 1970 and operates a waste treatment facility with a total flow of 26,800 cubic metres per day (7.08 USMGD). The treatment facility has a Certificate of Approval with limits of 0.3 mg/L for total phosphorus and 10 mg/L for BOD. The effluent from the facility complied with ministry requirements. The sludge from the facility is utilized on agricultural lands. The municipality is not operating under any control order pertaining to its treatment plant operations.

All IUs discharging to the collection system are located within the jurisdictional boundaries of the municipality. The municipality has 91 potential dischargers to the system according to water use records. Based on EPA data, and using the population of the municipality for estimation, 22 SIUs would be expected. The total water use in the municipality was 26,300 cubic metres per day (7.0 USMGD) in 1986. The water use was 40% residential and 60% industrial and commercial.

The local limits in the by-law are as follows:

<u>Parameter</u>	<u>Limit (mg/L)</u>
BOD	300
TSS	350
Oil & Grease (A&V)	100
Oil & Grease (S&M)	15
Cadmium (T)	5
Chromium (T)	3
Copper (T)	3
Nickel (T)	5
Zinc (T)	5
Phenols (T)	0.1
Cyanide (T)	3

The sewer use by-law also contains the following provisions: surcharge agreements for conventional parameters; sampling and analysis specifications; sampling manhole specifications and offences. The municipality has also developed and implemented a sampling strategy.

In 1986, the municipality collected 239 samples from 21 IUs. Thirty-five IUs were inspected and industrial waste surveys have been carried out at most of the IUs. The users have been grouped by the municipality into a number of classes. These classes include: metal finishing; food processing; surcharged industries and dischargers of cooling water. One IU has a surcharge agreement. No enforcement actions were initiated against IUs.

The municipality spent \$105,000 in 1986 on their sewer use control program and utilized 2.8 person years. The industrial effluent samples were analyzed for conventionals and metals in the municipality's lab.

Program Effectiveness

Legal Authority: The municipality has adequate authority under Section 147 Paragraph 210 of the Municipal Act to implement and enforce a sewer use by-law. The sewer use by-law should be upgraded to include requirements for industrial waste surveys, spills control and compliance programs.

Application of Standards: Adequate.

Compliance Monitoring: The municipality has an adequate compliance sampling program.

Enforcement: Adequate.

Data Management: Adequate.

Resources: Good.

CITY: CITY OF BRANTFORD

Program Description and Implementation

The City of Brantford passed their local municipal sewer use by-law in 1982. The OMOE operates two waste treatment facilities for the city with a total combined flow of 52,100 cubic metres per day (13.8 USMGD). The city operates one facility which discharges to a tile field. The operating agreement between the city and the ministry requires the city to pass and enforce by-laws controlling industrial discharges to the sewers. The treatment facilities have Certificates of Approval without parameters or limits. The effluents from the facilities comply with OMOE Policy 08-01, except for total phosphorus at the small lagoon. Approximately one-third of the sludge produced is utilized on agricultural lands. The municipality is not operating under any control order pertaining to its treatment plant operations.

All IUs discharging to the collection system are located within the jurisdictional boundaries of the municipality. The municipality has 195 potential dischargers to the system according to water use records. Based on EPA data, and using the population of the municipality for estimation, 31 SIUs would be expected. The total water use in the municipality was 45,800 cubic metres per day (12.1 USMGD) in 1986. The water use was 38% residential and 54% industrial and commercial.

The local limits in the by-law are as follows:

<u>Parameter</u>	<u>Limit (mg/L)</u>
BOD	300
TSS	300
Oil & Grease (A&V)	100
Oil & Grease (S&M)	15
Cadmium (T)	2
Chromium (T)	5
Copper (T)	5
Nickel (T)	5
Zinc (T)	5
Mercury (T)	0.1
Phenols (T)	1
Cyanide (T)	2

The sewer use by-law also contains the following provisions: surcharge agreements for conventional parameters; compliance programs for noncomplying users; sampling and analysis specifications; sampling manhole specifications and offences. The municipality has also developed and implemented a sampling and inspection program.

In 1986, the municipality collected 250 samples from 30 IUs. Fifty inspections of IUs were carried out. The users have been grouped by the municipality into two classes; surcharged industries and non-surcharged industries. There are 13 industries in the surcharge group. The city initiated 18 enforcement actions against IUs, the majority being verbal or written warnings. Six compliance programs were also issued.

The municipality spent \$136,500 in 1986 on their sewer use control program and utilized 2.4 person years. The industrial effluent samples were analyzed for conventionals and heavy metals in the municipality's labs.

Program Effectiveness

Legal Authority: The municipality has adequate authority under Section 147 Paragraph 210 of the Municipal Act to implement and enforce a sewer use by-law. The municipality should update its by-law by including the requirement for industrial waste surveys and spills control.

Application of Standards: Inadequate. There is an unacceptable number of uncatalogued industries. The municipality should conduct an industrial waste survey; sample those industries discharging metals and conventionals at levels which are potentially harmful; then conduct a local limits study to determine whether the limits in the by-law should be lowered to the levels in the 1988 Model By-Law.

Compliance Monitoring: Inadequate. The municipality only samples surcharged industries.

Enforcement: To date, the municipality appears to be reluctant to sample and enforce the sewer use by-law requirements.

Data Management: The municipality provides adequate documentation of program activities.

Resources: Adequate.

CITY: CITY OF BROCKVILLE

Program Description and Implementation

The City of Brockville passed their local municipal sewer use by-law in 1983 and operate a primary waste treatment facility with a total flow of 17,000 cubic metres per day (4.5 USMGD). The treatment facility has a Certificate of Approval, however there are no parameters with limits in the certificate. The facility did not meet the requirements for suspended solids and total phosphorus in Policy 08-01. The sludge from the facility is disposed of in a landfill site. The municipality is not operating under any control order pertaining to its treatment plant operations.

The municipality also accepts waste from the Township of Elizabethtown and has an agreement with the township for controlling the industrial discharges in the township. The municipality has 48 potential dischargers to the system according to water use records. Based on EPA data, and using the population of the municipality for estimation, 12 SIUs would be expected. The total water use in the municipality was 15,200 cubic metres per day (4.0 USMGD) in 1986. The water use was 45% residential; 37% industrial and 11% commercial.

The local limits in the by-law are as follows:

<u>Parameter</u>	<u>Limit (mg/L)</u>
BOD	350
TSS	350
Oil & Grease (A&V)	100
Oil & Grease (S&M)	15
Cadmium (T)	2
Chromium (T)	3
Copper (T)	3
Nickel (T)	3
Zinc (T)	3
Mercury (T)	0.1
Phenols (T)	1
Cyanide (T)	2

The sewer use by-law also contains the following provisions: surcharge agreements for conventional parameters; sampling and analysis specifications; sampling manhole specifications; and offences. All IUs with an MOE waste generator number were surveyed. The municipality has also developed and implemented a sampling and inspection strategy. The maximum fine for noncompliance is \$2,000.00.

In 1986, the municipality collected 52 samples from five IUs and inspected two of the IUs. There were no IUs with surcharge agreements. The city initiated one verbal compliance program against an IU.

The municipality spent \$17,000 in 1986 on their sewer use control program and utilized 0.4 person years. The industrial effluent samples were analyzed for conventionals and metals in the municipality's lab. No samples were analyzed for organics.

Program Effectiveness

Legal Authority: The municipality has adequate authority under Section 147 Paragraph 210 of the Municipal Act to implement and enforce a sewer use by-law. The municipality has an agreement with Elizabethtown which requires the township to pass a sewer use by-law and allow the city to sample the industrial dischargers. The township has not passed a sewer use by-law and the city has not done any sampling in the township. The municipality should upgrade its sewer use by-law by including provisions for industrial waste surveys, spills control and compliance programs.

Application of Standards: The by-law standards have been properly applied.

Compliance Monitoring: Inadequate. The municipality should conduct an industrial waste survey and sample those industries discharging metals and conventionals at levels which are potentially harmful.

Enforcement: Inadequate. To date, the municipality has been reluctant to take enforcement actions. The program would be improved by the adoption of an enforcement strategy.

Data Management: Adequate.

Resources: Inadequate. The staff complement should be increased.

CITY: TOWN OF COBOURG

Program Description and Implementation

The Town of Cobourg passed their local municipal sewer use by-law in 1969 and operate two waste treatment facilities with a total combined flow of 13,000 cubic metres per day (3.4 USMGD). The treatment facilities have Certificates of Approval without limits. The effluent from the facilities did not comply with the total phosphorus requirements of OMOE Policy 08-01. The sludge from the facilities is utilized on agricultural lands. The municipality is not operating under any control order pertaining to its treatment plant operations.

All IUs discharging to the collection system are located within the jurisdictional boundaries of the municipality. The municipality has 47 potential dischargers to the system according to water use records. Based on EPA data, and using the population of the municipality for estimation, nine SIUs would be expected. The total water use in the municipality was 11,200 cubic metres per day (2.95 USMGD) in 1986. The water use was 48% residential and commercial and 52% industrial.

The local limits in the by-law are as follows:

<u>Parameter</u>	<u>Limit (mg/L)</u>
BOD	350
TSS	350
Oil & Grease (A&V)	150
Oil & Grease (S&M)	15
Cadmium (T)	6
Chromium (T)	6
Copper (T)	5
Nickel (T)	6
Zinc (T)	6
Phenols (T)	0.5
Cyanide (T)	3

The sewer use by-law also contains the following provisions: surcharge agreements for conventional parameters; sampling and analysis specifications; sampling manhole specifications; and offences. The municipality has also developed and implemented a sampling and inspection program.

In 1986, the municipality collected 1,360 samples from 10 IUs. Twenty industries were inspected and industrial waste surveys were also carried out at these industries. The users have been grouped by the municipality into a number of classes, based on the nature of the waste discharged. One IU had a surcharge agreement. The town initiated 29 enforcement actions against IUs, the majority being verbal warnings. Three program approvals were issued.

The municipality spent \$32,000 in 1986 on their sewer use control program and utilized 0.85 person years. The industrial effluent samples were analyzed for conventionals in the municipality's lab and the metals analysis was contracted out.

Program Effectiveness

Legal Authority: The municipality has adequate authority under Section 147 Paragraph 210 of the Municipal Act to implement and enforce a sewer use by-law. The municipality should upgrade their by-law by including provisions for industrial waste surveys, spills control and compliance programs.

Application of Standards: Adequate. The municipality should conduct a local limits study to determine whether the metals limits in the by-law should be lowered to levels in the 1988 Model Sewer Use By-Law.

Compliance Monitoring: Adequate.

Enforcement: Adequate.

Data Management: Adequate.

Resources: Inadequate. Additional resources should be made available.

APPROVED BY IJC
1987.04.10

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