WORKSHOP ON THE REGULATION OF INDUSTRIAL SEWER-USE IN ONTARIO

January 25, 1988
9:00 a.m.- 4:30 p.m.

Canadian Bar Association Offices
120 Adelaide Street West
Toronto, Ontario
10th Floor

A G E N D A

This agenda is not intended to preclude the discussion of different topics suggested during the workshop. Neither is the time allocation fixed - participants may wish to spend more time discussing a specific topic.

8:30 - 9:00	Registration and coffee
9:00 - 9:15	Introductions and project overview
9:15 - 10:00	Topic 1 Nature of the problem: (a) Presentation - Canadian Environmental Law Research Foundation (b) Discussion • What risks are posed to the environment by industrial sewer-use in Ontario?
10:00 - 10:45	Topic 2 Current regulatory framework: (a) Presentation - Canadian Environmental Law Research Foundation (b) Discussion • What are the current problems with sewer-use regulation in Ontario?
10:45 - 11:15	Coffee
11:15 - 12:30	Topic 3 Setting standards for industrial sewer-use: Discussion • Should province-wide standards for sewer-use be set by the provincial government?

- Should standards be set on a sector-by-sector basis or should all industries be subject to the same standards?
- Is the best available technology approach to standard-setting adequate?
- Should standards based on the quality of the receiving water body be developed?
- By what means should standards be set and who should be involved in the standard-setting process?

12:30 - 1:30 Lunch (a sandwich lunch will be provided)

1:30 - 2:00 Topic 4
Monitoring

Discussion

- What are the barriers to an effective monitoring system?
- Who should play the lead role in monitoring sewer-use?
- What are the components of an effective monitoring system?
- How can spills and discharges into storm sewers best be monitored?

2:00 - 3:00 Topic 5
Enforcement
Discussion

- Should the province take over the field of sewer-use enforcement? If so, what changes and additional resources will be required?
- What, if any, additional investigatory powers would be required in order to enforce sewer-use regulation?
- What additional fines and penalties are required to ensure compliance?

3:00 - 3:30 Coffee

3:30 - 4:30

Topic 6
Costs and Financing
Discussion

- What will the major costs of increased regulation of industrial sewer-use be?
- How should these costs be met? Options include user-fees, increased provincial taxes, increased municipal property taxes, or some combination of these.
- Should an industrial surcharge or user-fee system be employed and, if so, how could this system be implemented?

PARTICIPANTS LIST - SEWER REGULATION WORKSHOP JANUARY 25, 1988

Ms. Bev Allen
Association of Municipalities of Ontario
100 University Avenue,Suite 805
Toronto, Ontario
M5J 1V6

Mr. John Archer
Ministry of the Environment
1 St. Clair Avenue West,7th Floor
Toronto, Ontario
M4V 1K6

Ms. Heather Bell
Association of Municipalities of Ontario
100 University Avenue,Suite 805
Toronto, Ontario
M5J 1V6

Mr. Ken Bradley
Ontario Waste Management Corporation
2 Bloor Street West,11th Floor
Toronto,Ontario
M4W 3E2

Mr. Bob Breeze
Ministry of the Environment
40 St. Clair Avenue West,5th Floor
Toronto,Ontario
M4W 1M2

Mr. Craig Camplong
Union Carbide
123 Eglinton Avenue East
Toronto, Ontario
M4P 1J3

Mr. Ron Clarke
Ministry of the Environment
1 St.Clair Avenue West,9th Floor
Toronto,Ontario
M4V 1K6

Frank Condlln
Regional Municipality of Peel
10 Peel Centre Drive
Brampton, Ontario
L6T 4B9

Ms. Penina Coopersmith
Canadian Water and Waste Water Association
24 Clarence Street,2nd Floor
Ottawa, Ontario
K1N 5P3

Mr. Harry Dahm
Barrister and Solicitor
22 Scollard Street
Toronto, Ontario
M5R 1E9

Mr. Jack Donnan
Ministry of the Environment
135 St. Clair Avenue West,12th Floor
Toronto, Ontario
M4V 1P5

Mr. Robert Ferguson
Metropolitan Toronto Works Dept.
439 University Avenue,10th Floor
Toronto, Ontario
M5G 1Y8

Mr. Gary Gallon
Ministry of the Environment
135 St.Clair Avenue West,15th Floor
Toronto, Ontario
M4V 1P5

Mr. Bill Glenn
Corpus Ltd.
1450 Don Mills Road
Toronto, Ontario
M3B 2X7

Mr. David Hay
Environment Canada
Place Vincent Massey
Ottawa, Ontario
K1A 0H3

Mr.Jim Jackson
Ministry of the Environment
135 St. Clair Avenue West,11th Floor
Toronto, Ontario
M4V 1P5

Dr. Bruce Janks
Environment Canada
867 Lakeshore Road
P.O. Box 5050
Burlington, Ontario

Mr. Brian LeClair
Ministry of the Environment
1 St. Clair Avenue West,7th Floor
Toronto, Ontario
M4V 1K6

Mr. R. Luhowy
Regional Municipality of Waterloo
20 Erb Street West,7th Floor
Waterloo, Ontario
N2J 4G7

Ms. Audrey McKinnon
Canadian Metal Finishers Ltd.
23 Musgrave Avenue
Toronto, Ontario
M4E 2H3

Mr. Jim McLaren
MISA Advisory Committee
c/o 2 Bloor Street West,Suite 700
Toronto,Ontario
M4W 3E2

Ms. Pam Millar
Pollution Probe
12 Madison Avenue
Toronto, Ontario
M5R 2S1

Ms. Sarah Miller
Canadian Environmental Law Association
243 Queen Street West, 4th Floor
Toronto, Ontario
M5V 1Z4

Mr. Kai Millyard
26B Renfrew Avenue
Ottawa, Ontario
K1S 1Z5

Mr. Jay Palter
Greenpeace
427 Bloor Street West
Toronto,Ontario
M5S 1X7

Ms. Sarah Rang
Minister's Office
Ontario Ministry of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M5V 1P4

Mr. Bob Redhead
Tricil Limited
89 The Queensway West
Mississauga,Ontario
L5B 2V2

Mr. Bill Robson
Drycleaners and Launderers Institute
5401 Eglinton Avenue West
Etobicoke, Ontario
M4P 1G6

Mr.Peter Seto
Ministry of the Environment
1 St. Clair Avenue West,3rd Floor
Toronto, Ontario
M4V 1K6

Mr. Tom Tseng
Environment Canada
25 St. Clair Avenue East,7th Floor
Toronto, Ontario
M4T 1M2

Mr. George Voth
CAO, Niagara-on-the-Lake
Box 100, Lorraine Street
Virgil, Ontario
LOS 1SO

Mr. Walter Wickruk
c/o Electroplaters Society
68 Burnhamthorpe Crescent
Islington, Ontario
M9A 1G7

Mr. Len Yust
Halton Region
1151 Bronte Road
Oakville, Ontario
L6J 6E1

Canadian Manufacturing Association
151 Sparks Street,Suite 812
Ottawa, Ontario
K1P 5E5

REGULATION OF INDUSTRIAL SEWER-USE IN ONTARIO:

BACKGROUND PAPER

Prepared by the Canadian
Environemtal Law Research
Foundation for the January 25,
1988 workshop on Regulation of
Sewer-use in Ontario.

TABLE OF CONTENTS

REGULATION OF INDUSTRIAL SEWER-USE IN ONTARIO

This background document is intended to assist participants in preparation for the Canadian Environmental Law Research Foundation workshop on industrial sewer-use regulation in Ontario. The paper is divided into six parts, each part corresponding to an agenda topic for the workshop. The first two parts provide background on the sewer-use problem in Ontario. Part 1 describes the environmental impacts of industrial discharges into municipal sewer systems. Part 2 provides an overview of the current regulatory framework and identifies some of the problems with this regime. The next three parts outline specific options for addressing these problems. Part 3 describes ways of setting standards for sewer disposal, and Parts 4 and 5 focus on the means for ensuring compliance with these standards. The last part identifies the costs of regulatory action and sets out some alternative ways of meeting those costs.

1. NATURE OF THE PROBLEM

1.1 Introduction

This project addresses only one aspect of a larger environmental problem - the long-term ecological and human health risks associated with the exposure of toxic wastes to our natural environment. While this problem is properly viewed in a larger context by studying all direct and indirect pathways of toxic contaminants to air, land and water, including non-point sources, the workshop is asked to focus mainly on the discharge of industrial wastes into the environment via municipal sewer systems.

This part identifies the ways in which industrial wastes which are discharged into municipal sewer systems could reach the natural environment, and identifies some of the health and environmental problems which are associated with industrial sewer-use in Ontario.

1.2 Potential Pathways for Exposure

After industrial wastes are discharged into the municipal sewer systems, they may reach the natural environment via a number of routes.

Surface water exposure

Combined sewer overflow: Many of Ontario's municipal sewer systems are combined, carrying both storm runoff and domestic and industrial wastewater. During times of high flows such as during storm or spring runoff, industrial waste as well as domestic waste, could travel untreated into local water bodies.

STP By-Passes: Some sewage treatment plants must allow waste water to bypass the plant untreated due to operational problems and hydraulic over loads. During these times, industrial as well as domestic waste water flows untreated to the receiving body. Further, STPs are not designed to remove all of the pollutants received by the way of industrial discharge, and thus STP effluent may contain contaminants detrimental to the quality of the receiving body.

Groundwater exposure

Contaminants, in particular heavy metals, removed by STP and accumulate in sludges during the sewage treatment process. These sludges must be disposed of by way of landfilling, agricultural landspreading, or incineration. Landfilling or landspreading these sludges could result in the contamination of groundwater as contaminants in the sludge leach, down through the soil.

Exposure to foodchain

Sludges from some sewage treatment plants are spread on agricultural land as fertilizer. Unless sludges are tested prior to landspreading, there is a risk that certain heavy metals contained in the sludge will bioaccumulate in farmers' crops.

Any exposure of industrial wastes to the environment presents the risk of bioaccumulation and biomagnification of those contaminants through the foodchain. For example, persistent loading of contaminants by sewage treatment plant discharges and combined sewer overflow could result in bioaccumulation and biomagnification of these contaminants in the marine life of the receiving water body.

Exposure to air

Toxic contaminants contained in industrial discharges into sewers could reach the air by two routes: evaporation from sewers and sewage treatment plants; and by incineration of sewage treatment plant sludges.

Occupational exposure

Workers who operate sewage treatment plants run the risk of exposure of contaminants contained in industrial wastes which enter the plant through the sewage system.

1.3 The Adverse Impacts of Industrial Sewer-use in Ontario

A number of studies have documented the problems experienced in municipal sewage treatment works in Ontario which can be associated with industrial sewer-use. The following observations about the impact of industrial wastes on Ontario's sewage treatment works are abstracted from two sources: a series of ten interviews with Ontario municipalities conducted as part of this project; and a 1986 study of eighteen municipalities, including twelve from Ontario, conducted jointly by the Municipal Engineers of Ontario, Environment Canada, and the Ontario Ministry of the Environment. ("Sewer-use By-law Implementation and Enforcement. Current and recommended practices.", February 1986.)

Hydraulic overloading: In some cases, sewage treatment plants are overloaded as a result of heavy discharges by industries. Such overloads reduce treatment efficiency.

Sludge quality: Sludges from STPs receiving industrial discharges often contain high levels of heavy metal content, including cadmium, chromium, copper, lead, mercury, molybdenum, nickel, and zinc. Common sources of these metal wastes include metal finishing industries, tanneries, battery manufacturers, tool and die makers, and automobile manufacturers. Contaminants discharged to sewer systems, such as heavy metals, solvents, oils, and other organic chemicals inhibit sewage or sludge treatment processes within STPs.

Biochemical Oxygen Demand (BOD) and suspended solids overloading: Industries discharging high levels of BODs and suspended solids overload sewage treatment plants, sometimes reducing efficiency of treatment and causing odor problems. Overloading can be traced to such industries as meat and fish packing plants, breweries, tanneries, cheese and vegetable processors, and septic tank haulage companies. Heavy BOD loading can cause system exhaustion, raise costs and reduce treatment efficiencies.

Petroleum by-products: Waste oils, grease, gasoline, phenolics, and other petroleum by-products discharged to sewer systems cause problems in the sewer system, as well as in pumping stations and at the sewage treatment plant. Problems include: grease build-up in the sewer, odor from solvents, potential explosions due to mixtures of chemicals, and equipment problems at sewage treatment plants.

Pipe deterioration: Discharge of corrosive materials such as those from metal plating industries, chemical manufacturers, electrical equipment manufacturers and others can cause corrosion of sewer pipes and, in certain instances, pipe collapse.

Physical blockage and plugging: Some sewage treatment works experience blockages and clogging due to fibrous discharges from industries such as tanneries, textile mills and carpet manufacturers. Problems created by these discharges include blockages of sewer lines and clogging of pumps, aerators and clarifiers at sewage treatment plants. Some discharges can build up on the inside of sewer pipes and reduce pipe capacity.

Odors: Odor problems in sewage treatment works are often related to industrial sewer-use. Some common sources of such odors are mixing of chemicals from various sources, discharges from food processing plants, and industries using acids or solvents.

Foaming: Foaming at sewage treatment plants is often the result of industrial discharges of detergent and alkaline. Problems associated with foaming include pH fluctuations, and grease fouling of sewage treatment equipment such as chlorine contact tanks and gratings.

A central impediment to regulatory actions with respect to sewer-use is the lack of information on the impact to the environment and the municipal infrastructure of industrial discharges to sewers. The Ontario Ministry of the Environment is currently completing a 40-plant survey of Ontario's STPs to determine the quality of effluent and sewage sludge at these plants. Approximately 180 chemicals are being monitored as part of this study.

2. CURRENT REGULATORY FRAMEWORK

2.1 Introduction

This part outlines the manner in which industrial sewer-use is currently being regulated in Ontario as well as identifies the problems with current regulation which should be addressed through regulatory change.

2.2 International and Federal Role

Sewer-use issues arise at an international level in the context of clean-up efforts in the Great Lakes. The International Joint Commission (IJC) established under the International Boundary Water Treaty Act, administers the Great Lakes Water Quality Agreement of 1972, between Canada and the United States, which sets objectives for water quality and specifies remedial programs. This agreement was expanded in 1978 to include a commitment to "virtual elimination of persistent substances" and to set standards for water quality for industrial pollutants. In November 1987, the IJC met for five days to discuss the water quality of the Great Lakes. During these meetings, the signators renewed their commitment to the objectives of the Agreement and signed a pact which set out some deadlines for progress on clean-up activities and the control of toxic substances.

The Federal government's role with respect to sewer-use is largely advisory. In the past, it has been involved in nation-wide studies on sewer-use problems, and has assisted the Ontario Ministry of the Environment in the development of its model sewer-use by-law.

2.3 Provincial Role

Currently, the Ontario government has primary regulatory responsibility for water quality and use in the province. Legislation related to industrial sewer-use is found in two statutes: Environmental Protection Act (EPA) and the Ontario Water Resources Act (OWRA).

The EPA regulates the discharge of contaminants into the natural environment generally, and also regulates waste management activities in Ontario.

The OWRA regulates the discharge or deposit of any material into water bodies, wells, reservoirs, shores or any other place that may impair water quality or cause injury to humans or other living things. Among other things, the Act gives the Minister of the Environment the power to regulate and control the content of sewage entering sewage works. The Act also requires that a permit be obtained from the Minister prior to the construction and operation of a sewage works.

Prior to the development of the MISA program, the Ministry of the Environment has regulated direct discharges into water bodies by developing guidelines rather than setting regulatory standards. The principal policy document for water quality management is the Ministry's "Blue Book", entitled "Water Management - Goals, Policies , Objectives and Implementation Procedures of the Ministry of the Environment - May 1984". Direct discharges are also regulated through case-by-case approvals under the OWPA and the EPA.

Municipalities currently have sole regulatory responsibility for indirect discharge into municipal sewer systems. The province, however, retains regulatory control in the operation of sewage treatment works in two areas:

Approvals: The province retains the power to approve the construction and operation of private sewage treatment works under the EPA and municipal sewage works under the OWRA. The Ministry of the Environment can set standards for STP effluent and sewage treatment works operations in conditions attached to certificates of approval.

Sludge Disposal: Sludge generated by municipal sewage treatment works is disposed of in three ways: incineration, landfilling in an approved site, and by conditioning and spreading on agricultural land as fertilizer. All three methods are regulated by the province - incinerators must meet provincial emissions and operating standards; disposal at landfills are regulated by the EPA waste management provisions and Ministry of the Environment disposal guidelines; and

disposal to agricultural land is subject to the Ministry of the Environment's "Guidelines for Sewage Sludge Utilization on Agricultural Land", which suggests allowable limits for eleven heavy metals in sludges applied to the soil.

2.4 Municipal Regulatory Responsibility

As stated above, primary responsibility for control of discharges into municipal sewage systems rests with the local or regional municipality. Regulatory standards are set by municipal by-laws made pursuant to either the Municipal Act or the appropriate Regional Municipality Act.

Standards

Standards for industrial sewer-use are contained in municipal by-laws. Most by-laws are designed to ensure the safe operation of municipal sewage treatment facilities. Typically, the object of a by-law is to protect the capital works, ensure proper operation of the STP, prevent misuse or unsafe conditions, and ensure that STP effluent requirements can be met by limiting BOD, suspended solids and, in some cases, phosphorus, ammonia, nitrogen, and heavy metals.

While the standards set in municipal by-laws vary from municipality to municipality, most by-laws are based on a 12 year-old model sewer-use by-law prepared by the Ontario Ministry of the Environment and the Municipal Engineers Association.The model by-law limits concentrations rather than total loading and sets limits only for conventional parameters and not for other pollutants. Current municipal by-laws reflect this approach. The model by-law has not been uniformly implemented. Therefore, the types of contaminants limited and the number of parameters set vary throughout the province.

In 1987, the Ministry of the Environment released a new model by-law in draft form for public comment. This by-law contains a number of innovations:

- A general prohibition on sewer disposal of any substance:
  - which may cause STP effluents to contravene standards under the EPA or OWRA;
  - cause sludge to fail to meet land disposal criteria;
  - interfere with proper operation of the sewer works; or
  - cause any hazard to human health;

- Restrictions on disposal of certain heavy metals, and prohibition of the practice of diluting liquid industrial waste to achieve limits described in the by-law;

- Prohibition of discharge of certain specified hazardous materials including waste pesticide and other wastes and chemicals controlled by Regulation 309 under the EPA;

- Discharge agreements are allowed, but are limited to sanitary and combined sewers and specific limits have been placed on the use of surcharges in these agreements.

Monitoring and Enforcement

Enforcement of municipal by-laws varies widely across Ontario. In most cases, enforcement powers are established in each by-law and exercised by municipal by-law enforcement officers. Some larger municipalities monitor industrial discharges into their sewer systems after a violation has been detected. In a few cases, a regular monitoring program has been set up through voluntary agreement between the municipality and a particular industry. The level of enforcement varies. The Municipality of Metropolitan Toronto, has developed Ontario's most advanced Monitoring and Detection Program and has a high success rate with its prosecutions. On the other hand, in many smaller municipalities, sewer use by-laws are rarely enforced. Current penal provisions are established under the Municipal Act, which sets a maximum $2,000.00 fine for by-law violations.

2.5 The Municipal-Industrial Strategy for Abatement (MISA) Program

In June 1986, the Ontario Minister of the Environment released a "White Paper" describing a new program to control municipal and industrial discharges into surface waters. The stated objective of this program is the "virtual elimination of toxic contaminants in municipal and industrial discharges into waterways". The "White Paper" calls for action taken by direct dischargers in eight industrial sectors and one municipal sector. Features of this proposed program include:

- municipal sewage treatment plants;
- setting effluent standards on a sector-by-sector basis;
- the major criterion for standard-setting is to be the "best available technology that is economically available" (BATEA);
- in cases where these standards prove insufficient to ensure environmental protection, water quality standards will be developed based on local water quality impact.

The "White Paper" sets out the following components of the Program:

- selection of a set of priority pollutants to be controlled by regulations set under the program;
- development of monitoring regulations on a sector-by-sector basis with industries within a given sector to have primary responsibility for monitoring their effluent;
- development of effluent limit regulations which control direct discharges to surface waters and are based in part on the results from the monitoring phase.

Both monitoring and effluent limit regulations will be developed for each sector by way of joint technical committees with representatives from both the Ministry and the regulated sector. The regulations developed will apply uniformly across each sector.

One common response to the "White Paper", during public consultation, was its failure to focus on the problem of indirect discharges into sewer systems. Responses also emphasized the need to develop industrial pre-treatment

standards to be applied to industrial discharge sources. The Ministry of the Environment appears to agree that MISA will have to address industrial discharges into municipal sewage systems in order to meet the program's objectives. In February 1987, the Ministry awarded a contract to M.M. Dillon, a consulting company, to evaluate sewer-use control options. This study is now complete, and the Ministry is planning to release a discussion paper which outlines its proposal for sewer-use regulation in March 1988.

2.6 Evaluation of the Current Regulatory Regime

This section summarizes some of the problems with the current regime for regulating industrial sewer-use in Ontario. These concerns are divided into three areas representing the three components of the CELRF project.

Standards

- There is a lack of uniformity in standards across the province since each municipality adopts its own by-law, depending on local conditions and resources.

- Since by-laws vary, industries potentially are able to select municipalities with more permissive sewer-use standards.

- Most by-laws set standards only for conventional pollutants such as BODs or suspended solids. Persistent toxic chemicals such as those identified as priority pollutants in the MISA program are, for the most part, not regulated.

- Limits set by by-laws are generally based on concentration levels rather than quantity of contaminants released into the environment.

- Discharge agreements vary from municipality to municipality, and are not necessarily related to the capability of the sewage treatment plant to treat the discharges authorized by the agreement, and do not address the risks associated with combined sewer overflow and STP by-passes.

- There is no formal route for public input into standards set through municipal by-laws. The level of public input will vary from municipality to municipality.

- Current by-laws do not require industrial pre-treatment.

- Current by-laws do not provide incentives or requirements for industries to reduce the amounts of industrial wastes generated.

- The MISA "White Paper" focussed on the regulation of direct discharges from STPs and did not address the need for industrial pre-treatment prior to discharging waste water into the municipal sewer systems.

Monitoring and Enforcement

- Most municipalities do not have the resources to adequately monitor and enforce industrial discharges into municipal sewers;

- Monitoring capabilities vary widely from municipality to municipality. Many municipalities have the laboratory facilities to monitor only conventional parameters such as BOD and suspended solids. Other contaminants contained in industrial discharges, such as organic chemicals and heavy metals will go undetected;

- Municipalities generally monitor only influent and effluent at their STPs in order to meet operational standards set by certificates of approval. Monitoring of industrial dischargers occurs relatively infrequently.

- Many municipalities express concerns about the lack of legal powers available to adequately enforce sewer-use by-laws and in particular:
  - the legality of cutting off services to habitual violators, a power established in a number of by-laws;
  - the legality of on-site inspections by by-law enforcement officers;
  - the evidentiary burden in by-law prosecutions, and in particular, the need to demonstrate deleterious effects despite the fact that by-law limits are clearly exceeded.

- Fines established in the Municipal Act are not high enough to deter industrial dischargers. This, combined with the high cost of prosecution procedures, deter many municipalities from pursuing industrial polluters.

- Municipalities must cope with the dual function of encouraging industrial development and enforcing industrial sewer-use.

Financing

- Most municipalities do not have the resources and facilities to adequately monitor and enforce current sewer-use by-laws;

- Given the current allocation of regulatory authority, municipalities will need both additional funds to upgrade current facilities, and increased regulatory authority and resources to control industrial sewer-use at its source, in order to meet tougher MISA standards.

3. SETTING STANDARDS FOR INDUSTRIAL SEWER-USE

3.1 Introduction

This part identifies four areas for discussion:

- Standard-setting authority;
- Categorical versus uniform minimum standards (scope of application);
- Standard-setting approach;
- Standard-setting process.

For each area, the options available to address each of these standard-setting issues are identified and described.

3.2 Standard-setting Authority

As noted in Part 2 above, the power to set standards with respect to industrial discharges into sewer systems currently rests with each municipality. In order to ensure consistency across the province with respect to sewer-use standards, standard-setting authority must be centralized at the provincial level. Province-wide industrial sewer-use standards should be established through provincial regulation.

3.3 Scope of Application

In this section, the appropriate scope for a set of sewer-use standards is discussed. The central question is whether or not standards should be developed and applied on a sector-by-sector basis after determining appropriate industrial categories, or whether one province-wide standard should be developed. Three options have been identified:

Categorical pretreatment standards

This approach involves identifying the major types of industries that discharge into Ontario's sewer systems and dividing these industries into industrial categories. In the United States, sewer-use control is based on pretreatment standards for twenty-five categories of industrial discharges. For each industrial sector, regulators work with representatives from the sector to develop standards restricting discharge of contaminants in industrial wastes generated by industries within the sector. Standards are based on a determination of what constitutes the best available technology economically achievable for

each sector. For industries which do not fit within one of the main sectors, there is a general set of sewer-use standards of more general application.

Advantages

- It is consistent with the MISA approach for direct discharges of identified industrial categories and developing regulations on a sector-by-sector basis;

- Competing industries within a sector would all be subject to the same sewer-use standards;

- The regulator can focus on the key contaminants generated by each industrial sector;

- The approach would assist the discussion of BATEA since economic circumstances and available technology will be specific to each sector.

Disadvantages

- Industries not included in any of the selected sectors may be left unregulated;

- It may take a long time to develop standards using this approach, if the U.S. experience is indicative;

- The approach may be more complex to administrate and enforce than one uniform set of standards.

Uniform Industrial Effluent standard

A second option is to develop one uniform set of standards for all industrial discharge into sewer systems. This approach would not lend itself to a BATEA standard since technologies and economic conditions tend to vary from industry to industry.

Advantages

- It may be simpler to administrate since it would require monitoring and enforcing only one set of standards.

- Places the focus on the cumulative effects of certain types of contaminants on the environment, instead of the particular concerns of individual industries.

- Standards would apply to industries not covered by a sector-by-sector approach.

Disadvantages

- Since the standard must apply to a broad range of industries with varying technological and economic characteristics, it may result in a "lowest common denominator" standard;

- It is difficult to develop one standard based on best available technology standards since technologies will vary among industrial sectors.

Combined Approach

A combined approach could involve setting minimum standards across the board and then requiring higher standards, based on best available technology on a sector-by-sector basis. For example, the new model sewer-use by-law described in Part 2 above could be incorporated into a province-wide regulation immediately as an interim measure until stricter standards can be developed for individual sectors.

Advantages

- This approach captures advantages of the categorical and uniform approaches outlined above.

Disadvantages

- It may be more difficult to implement and enforce than the first and second approaches.

- Once the uniform minimum standard has been implemented, it may be difficult to move to stricter standards.

3.4 Approaches to Standard-setting

In this section, alternative approaches to the setting of industrial sewer-use standards are identified and discussed. Three general approaches can be identified:

Ambient water quality standards

The traditional approach to standard-setting in North America is based on the ambient quality of a receiving water body. Typically, this approach would require the setting of standards which specify maximum concentration of pollutants which that water body can receive without impairing a designated use. This approach is no longer acceptable to governments, environmentalists, or the public because it allows dilution to meet standards and does not address the problem of total loading of contaminants to a water body. Ambient standards are designed around the perceived assimilative capacity of the particular water body for a specific chemical, and therefore do not address the problem of persistent toxics. This approach would be clearly inappropriate in the context of the objective of the MISA program to reduce the toxic substances entering Ontario water bodies.

Technology-based standards

This approach is an improvement over the ambient approach described above since it requires determination of standards based on concentration per unit of production as opposed to concentration in the receiving body and thus dilution cannot be used as a means of meeting standards. The MISA program employs a technology-based standard as its principal standard-setting approach. Under MISA, effluent standards for direct discharges are based on BATEA.

Advantages

- It provides assurances that the standards set are economically and technically achievable.

- It provides industries with flexibility, since once the effluent levels are set, the actual choice of methods or technologies to be used will be up to each individual discharger provided that the standards are met.

Disadvantages

- Existing technology and cost of achieving effluent reduction become the limiting factors, rather than direct environmental effects and necessary responses. Thus, there are no assurances that standards will be sufficiently stringent to ensure adequate protection.

- Since the quality of the receiving medium is not considered in determining technology-based standards, the approach does not ensure that tougher standards are set where the receiving environment is particularly sensitive to a particular contaminant, or where high levels of that contaminant have already accumulated within the local environment. (The MISA program's "water quality component" is designed to address this concern.)

- In some cases, the only way to ensure adequate environmental protection is to prohibit the discharge of the substance into the sewer system. It is not clear that this approach will involve such prohibitions.

- BATEA is difficult to define and will vary from industry to industry.

- The difficulties in defining BATEA has led to lengthy delays in the implementation of water quality standards in the United States. These delays were due in part to disagreement over what criteria should be included within the definition of BATEA and in part on the difficulties inherent in sector-by-sector development of standards based on technical and economic considerations.

- This approach offers little incentive to industry to develop new, more advanced and efficient technology since standards are required to be only as good as the current technology will allow.

Quantity-based or water-quality standards

Both of the first two approachs described above are based on standards that are relative to some factor: to the use of the water for a certain purpose in the case of the ambient approach; and to the technological and economic feasibility in the case of the technology-based approach. The quantity-based approach involves setting standards to achieve total or "absolute" reduction in loadings of pollutants into the environment. This approach focusses on the need to improve the quality of the receiving medium through reduction of pollution loadings. The second component of the MISA program, water quality-based effluent limits, appears to be similar to this approach. This component calls for more stringent effluent limits identified through water quality impact assessments if BATEA standards are found to be insufficient to protect water quality at a particular site.

Advantages

- It focusses on the state of the natural environment, and on problems with a specific local water body.

- It ensures a reduction of contaminants entering the environment since it focusses on total loading rather than other "relative" factors.

- It is "technology forcing", providing incentives for industry to develop new and more effective technologies.

Disadvantages

- It may involve the development of standards which are not achievable either economically or technically.

- Setting load reduction targets based on the impact of contaminants on local waterways and ecosystems may be difficult and time-consuming.

- Implicit in the approach is the need to distribute load allocation among discharging industries. It may be difficult to develop an allocation formula which is fair to discharging industries.

- Developing water quality-based standards will require information on the current quantities of contaminants within identified water bodies or ecosystems, including loadings from non-point sources. The extensive data collection required will be costly.

If one of the goals of sewer-use regulation is consistency with the goals and the basic framework of the MISA program, any approach to standard settings for industrial sewer-use should have components of both the technology-based and quantity-based approaches outlined. Two options have been identified:

The current MISA approach for direct dischargers: This approach calls for the development of effluent standards based on BATEA with water quality-based effluent limits to be used only in "sensitive and confined aquatic areas" where BATEA standards are found to be insufficient to protect water quality. The Ministry plans to identify these priority areas and assist dischargers in undertaking detailed water quality impact studies to determined more stringent effluent limits. A pilot study of six sites by the Ministry is now underway. There are a number of potential problems with this approach:

- The criteria for identifying a "sensitive and confined aquatic area" may be difficult to develop. It is likely that all water bodies are sensitive to contaminants contained in industrial discharges;

- The MISA approach has not given priority to the water-quality approach in developing standards for direct dischargers;

- Once BATEA standards are in place, it may be difficult to establish more stringent standards based on a water-quality approach.

Ecosystem approach: Like the MISA approach, this option would combine BATEA and water quality impact assessments, but would give greater prominence to total loading into the environment. Some components of this approach are:

- Developing formulae for allocating loading reductions among industries discharging both directly and indirectly into the subject water body;

- Identification of the total loadings within the ecosystems receiving industrial discharges;

- Development of load reduction targets according to a preset timetable and commensurate with reductions needed to protect waterways and local ecosystems from toxic contamination; and

- Consideration of non-point sources of environment contamination.

Potential problems with this approach include:

- It requires extensive information gathering and analysis;

- Identification of non-point sources is a relatively unexplored area of inquiry;

- Developing formulae for allocation of loading reductions is likely to be contentious.

3.5 Standard-Setting Process

A key feature of any regulatory regime is the process by which standards are set. The MISA program has adopted the following standard-setting process components to develop standards for direct discharges:

- Pre-regulation effluent monitoring programs to be undertaken primarily by industrial and municipal sectors and shared with provincial regulators;

- Technical committees for each regulated sector;

- A formal public review of draft regulations prior to finalization;

- The commitment to providing public access to data on contaminant discharges to surface waters and on effluent limits set for all dischargers; and

- A MISA Advisory Committee (MAC) with representation from water quality experts and public interest groups to review draft regulations and provide advice and recommendations to the Minister.

All of these components would benefit the standard-setting process for industrial sewer-use regulation. However, a number of additional options should be considered.

The options listed below include suggestions on how a standard-setting process for sewer-use regulation could be structured and who should be involved in that process. The options are divided into two parts. The first part lists options where technology-based standards are being developed and the second part lists options for water-quality standards based on contaminant loading in the receiving water body.

Process for technology-based standards

- A public process for determining and expanding the list of priority pollutants should be developed. A standing committee composed of both government and non-government experts should review chemicals and evidence on their impact on human health and the environment. Recommendations from this committee would assist in setting both sector-by-sector and uniform minimum standards for industrial sewer-use

- Technical committees which determine pre-treatment standards should be required to obtain and assess information on raw materials and processes which go into the products produced by the sector as well as the waste streams generated. A complete inventory of products processes and wastes would assist in identifying contaminants entering the waste stream as well as opportunities for reduction, re-use, recovery and re-cycling

- Technical committees should be required to determine all reduction opportunities available when developing a BATEA standard

- Technical committees should include representatives from the regulated sector, the municipalities affected, and independent experts from outside government. The inclusion of outside experts should enhance the public perception and credibility of a standard-setting process.

- Development of standards for laboratory services and monitoring requirements should be concurrent with the development of the standards themselves. Laboratory standards would include specifics on the testing procedures to be used and the quality of laboratory equipment and procedures

- Criteria should be developed for determining when water quality-based standards are required to supplement technology-based standards

Process for water-quality standards

- Impact assessment models should be developed to assist in determining appropriate water-quality standards

- Local water quality-based standards should be developed concurrent with technology-based standards

- A process should be set up which involves all concerned parties for each receiving body of water, in a standard-setting process. The list should include property owners, local industry, municipalities, local interest groups and other members of the public.

- A method of load distribution should be developed to allocate the allowable discharges among industries. The process would involve identification of all industries in an area that discharge contaminants and requir load reduction.

4. MONITORING

4.1 Introduction

This part discusses monitoring: the appropriate allocation of roles and responsibilities; and alternative ways of implementing an effective monitoring system.

4.2 Roles and Responsibilities

Who should have primary responsibility for monitoring discharges into municipal systems? A number of options have been identified:

Primary industry role

Industry could have primary responsibility for collecting and analyzing industrial wastes discharged into municipal sewers. The regulator would receive monitoring data in accordance with a regular schedule and could verify data by spot-checks.

Advantages:

- Costs of monitoring are borne by industry discharging the waste. The approach could therefore provide an incentive to reducing industrial waste generated.

Disadvantages:

- Industry could argue that providing such data is self-incriminating;
- Questions could arise about the credibility of industry data;
- Monitoring program may not be realistic for all industries or industries that discharge minimal amounts of industrial wastes into sewers.

Municipal monitoring

Primary responsibility for testing and documenting samples could be given to the local municipality. If this approach were taken, funding sources

for the program would have to be found since most municipalities do not have adequate resources, manpower and equipment to take on the monitoring role.

Advantages:

- Most municipalities tend to be more aware of the behaviour of industries within their jurisdiction and in some cases have developed a co-operative approach to monitoring of sewer-use. Thus municipal monitoring may be easier to implement than one which requires industries' cooperation with a new monitoring agency.

Disadvantages:

- The stringency of monitoring could vary from municipality to municipality.

- Most municipalities do not have the resources and facilities to adequately monitor all industries within their jurisdiction.

Monitoring by the provincial Ministry of the Environment

Monitoring could be done in Ministry labs from samples taken by staff at Regional or District MOE offices, with industry doing the sampling and Ministry officials testing and recording results.

Advantages:

- It would be easier to ensure uniform monitoring standards across the province;

- If province-wide regulation is adopted, it would consolidate standard-setting monitoring functions in the hands of the regulator;

- It may be more efficient, due to economies of scale, to undertake monitoring of wastes at the provincial level.

Disadvantages:

- The shift of responsibility from the municipality to the Ministry of the Environment is potentially disruptive.

- Additional resources and staffing would have to be allocated to Regional and District offices as well as MOE Laboratory Services.

- The increase in workload may make the program unworkable.

Private technical service sector

A licenced private technical service sector could be allocated primary monitoring responsibility. This could involve taking samples and doing off-site testing to verify the accuracy of industry self-monitoring reports.

Advantages:

- The problem of self-incrimination, which arises in the case of industry self-monitoring, is avoided.

- The use of an independent, licensed third party would address concerns about the credibility of industry self-monitoring

- Private firms could share with regulators the onorous task of ensuring compliance with standards.

Disadvantages:

- The sector may not develop without government assistance;

- Involves delegating some regulatory powers and thus would require the establishment of Rigorous licensing requirements would have to be established, and regulatory powers

4.3 Implementation Considerations

A number of options should be considered as components of any monitoring program including:

- The development of province-wide standards for obtaining and testing samples;

- The development of a licensing process for laboratories which evaluate samples;

- A requirement that industry undertake self-monitoring, including a provision that if they fail to do this the regulatory agency can commission sampling and testing to an independent laboratory and recover costs from industry;

- The development of regular reporting and monitoring requirements and schedules to be complied with by the party doing the monitoring;

- A policy for developing a monitoring schedule which sets reporting requirements based on the facility's potential impact on sewage system and the environment including such factors as

  - volume of waste water discharged,
  - toxicity of discharge,
  - consistency of monitoring reports;

- Provision for frequent, unannounced sampling by regulatory body to verify monitoring data;
- A computerized data management and verification system, in order to compare standards with actual levels and automatically detect violations;
- Immediate public access to monitoring information with restrictions on access only if industry can show that trade secrets would be revealed; and
- A means of modifying existing standards based on data collected during monitoring.

5. ENFORCEMENT

5.1 Introduction

Enforcement is defined as including detection of violation, other than by ongoing monitoring, prosecutions, and a system of fines, penalties and other deterrent mechanisms.

5.2 Responsibility for enforcement

A central question is: who should have primary responsibility for enforcing sewer-use regulations? Two options are identified:

Enforcement by municipality

The Ministry could delegate its responsibility for enforcing province-wide standards to each municipality. The municipalities would thus retain enforcement responsibilities. If this approach is adopted, increased resources will have to be allocated to municipalities and investigatory powers of the municipal enforcement officer will have to be explicitly set out in legislation.

Advantages:

- The program could be easily implemented since an enforcement system is already in place in most municipalities.

- Municipalities may be more aware of behaviour of industries within their jurisdiction, as well as local problems detected at STPs.

Disadvantages:

- Current problems with municipal enforcement are outlined in section 2.4 above.

- Regulatory responsibility for sewer-use will be split between two levels of government, creating potential conflicts and inefficiencies.

Enforcement by provincial officers

MOE could retain full responsibilities for enforcing sewer-use standards.

Advantages:

- Levels of enforcement would be more uniform across the province.

- The growing expertise of the Ministry of the Environment's Investigations and Enforcement Branch could be utilized.

- Standard-setting and enforcement would be consolidated at one level of government.

- It avoids the problem of local government being required to, on the one hand, enforce provincial regulations with respect to industrial discharges, while on the other hand, comply with regulations for discharges from its sewage treatment plants.

Disadvantages:

- Frustration could arise, at the municipal level, from a lack of responsiveness, perceived or actual, on the part of the province to local conditions and problems.

- It would require a potentially costly and disruptive transition of enforcement function from municipal to provincial level.

- Municipal expertise with respect to local problems and locally effective enforcement strategies may be lost.

- MOE operates STPs across the province and thus will be both regulator and regulated.

5.3 Components of an Enforcement Program

Investigations and spot-checks

- The enforcement agency may require increased investigatory powers in order to ensure that industries are complying with standards.

Prosecutions

- Legislative changes could be implemented to make prosecution of sewer use offences less expensive and time-consuming for the enforcement agency. Procedural evidentiary and reverse onus changes could be considered.

Administrative penalties

- Enforcement officers could be empowered to issue tickets for minor sewer-use violations, similar to traffic tickets.

5.4 Ensuring Compliance: Deterrents and Incentives

Deterrents

The most obvious method of deterring sewer-use violations is by increasing fines and penalties. A number of other innovative deterrents could be considered including:

- Restricting approvals for new undertakings by industries with a record of sewer-use violations;

- Cutting off municipal services for industries who repeatedly violate sewer-use regulations;

- Requiring industry to pay clean-up costs associated with violations and to compensate for any damage to the municipal sewage works;

- Publicizing in the media the names of industries that violate sewer-use standards.

Incentives

Incentives which should be used to encourage industries to exceed sewer-use standards including:

- Tax credits for research and development, to improve pre-treatment systems;

- Reduction in surcharges for industries that exceed standards;

- Government assistance in the form of training and information for industries setting up pre-treatment programs.

6. COSTS AND FINANCING

6.1 Introduction

This part identifies the costs associated with increased regulation of industrial sewer-use and suggests options for meeting these costs. The costs identified are those incurred when implementing a regulatory response. However, it should be noted that a calculation of the true cost of regulatory action would include identification of the benefits of increased regulations. This should include: reduced risk to human health and the environment, increased quality of natural resources, and reduced damage to property and equipment.

6.2 Costs

The budget required to implement and operate a regulatory program will depend in part on the options selected and the level of protection sought. Listed below are a number of categories of costs. For each category, the types of activity which must be financed are described:

Standard-setting costs

These include the cost of generating, compiling and assessing data which feed into the standard-setting process. For example, identification of the contaminants to be controlled could involve toxicological studies, profiles of industries and industrial sectors and the wastes they produce, and ongoing monitoring of industrial waste discharges. Developing BATEA standards would involve surveys of current technologies and economic analyses for identified industries and industrial sectors. Standards based on water quality impacts could involve environmental impact studies. Other costs of standard-setting include initial consulting, administrative support for the development of the program, and the costs of public consultation.

Implementation costs

This could include processing of pre-treatment permits, and the setting up of an administrative system for monitoring and enforcement.

Treatment costs

These include the capital costs such as upgrading sewage treatment facilities, installing industrial treatment and pollution control equipment, and operational costs such as increased manpower and training. Steps taken to reduce the types and quantities of contaminants generated during production are likely to involve initial costs, but could also increase efficiency and thus reduce operational costs over time.

Process changes

In order to meet standards, industries may be required to alter their processes or use more expensive or cleaner materials during production.

Monitoring

Set-up costs of monitoring include training personnel, purchase of sampling equipment, set-up of reporting systems including computerization, and establishment or expansion of laboratory facilities. Operational costs include salaries for trained laboratory scientists, cost of laboratory supplies, on-line computer time, and other costs associated with testing and record-keeping.

Enforcement

An expanded enforcement program will involve increased manpower, training and equipment for investigations and increased legal fees and disbursements for prosecutions.

Follow-up costs

One important component of the program will be assessing the effectiveness of regulatory action. Expenditures will be required for on-going program monitoring and periodic program reviews.

Social costs

Increased regulation could potentially discourage industrial development within the province, or within a given municipality, or could cause migration of industries outside the regulated jurisdiction. Some of the

costs arising from this are employee dislocation and loss of jobs, as well as loss of secondary economic benefits. It should be noted that increased regulation could also create employment opportunities in pollution-control and related industries.

6.3 Financing regulatory action

The selection of methods of financing regulatory action will depend on both the way in which regulatory responsibilities have been allocated and the largely political question of how the cost burden should be allocated. Potential funding sources are identified and described below:

Provincial funding

The cost of increased regulation could be borne by the Ontario taxpayer through provincial funding. The province could fund regulatory action using the following methods:

- Implementing, operating and financing all standard-setting, monitoring and enforcement;

- Transfer payments to municipalities to upgrade sewage treatment plants, monitor and enforce sewer-use regulations;

- Provide government grants, low-interest loans, or tax incentives to industry for pollution control and pre-treatment programs. Such incentives could be tied to industry performance in exceeding treatment standards.

Municipal financing

Municipalities can recover costs of their monitoring and enforcement programs by an increase of industrial property taxes, special assessment fees for discharging or violating industries, and various types of user fees such as surcharges on water usage or sewer-use charges discussed in more detail below.

Industry financing

One option is to allocate monitoring and enforcement costs of increased regulation to discharging industries. Industries could be responsible for setting up and financing their own pre-treatment and monitoring programs. The monitoring and enforcements costs incurred by the regulator could be recovered through fines and compensation paid out by polluting industries. Any monitoring contracted out to the private sector could be paid directly by industry. The cost of sewer-use regulation would thus be borne by the consumer of the goods and services produced by the discharging industries.

Sewer-use charges

One means of financing the implementation and operating costs of a regulatory program is through a user charge system. Briefly, this approach would involve two steps: estimation of project costs including implementation, monitoring, enforcement and the costs of any government-run treatment programs; and design of a cost allocation scheme.

Three types of user charge systems can be identified:

Service charge system involves grouping industries by the type of sampling and analysis required since monitoring costs are a significant portion of the overall program. Industries are then charged on the basis of their service group.

Industry surcharge approach involves charging the industries that is dischrging directly into the sewers and being charged for their effluents with loadings above a specified level. This would only apply to industries which generate contaminants that could adequately be treated by the government-owned facility. Other industries will be responsible for the removal of the contaminants from their waste stream.

Pollution strength charges distribute pre-treatment costs according to the type and/or amount of pollutants discharged. The main advantage of this approach is that it would provide the discharging industry with an economic incentive to reduce the types and quantities of wastes discharged.