AN OVERVIEW OF THE REGULATORY FRAMEWORKS GOVERNING MUNICIPAL DRINKING WATER, BOTTLED WATER AND HOME TREATMENT DEVICES IN ONTARIO

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The report was drafted by Marcia Valiante and Paul Muldoon. Research was provided by Thea Dorsey. Karen Hamilton and Joanne Bigham were responsible for the production of the report.

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1. INTRODUCTION

This report compares the legislative and policy framework governing bottled water and point of use water treatment devices to that governing public water supplies. It was undertaken on behalf of the City of Toronto Department of Public Health.

1.1 PURPOSE

The purposes of this report are outlined in a letter from the City of Toronto Department of Public Health to the Canadian Institute for Environmental Law and Policy, dated October 26, 1989. (Attached) These tasks are as follows:

1) Identify and describe all regulations governing the municipal water supply, bottled water and home water treatment devices. Include a comparison of permissible contaminant levels and monitoring and enforcement requirements.

2) Identify and describe voluntary industry initiatives regarding water quality such as the Ontario Water Bottlers code.

3) Compare the frequency with which the major water bottling firms engage in bacteriological and chemical assessment compared with the Metropolitan Toronto Works Department (Water Supply)

4) Identify the standards that must be met in Canada and the United States before a home water treatment device can be placed on the market.

5) Described and comment on the apparent discrepancy in bacteriological standards for "natural" and "treated" bottled waters.

6) Identify and describe initiatives by government agencies to monitor bottled water and treatment device effectiveness. For example, describe Health and Welfare's compliance program, and the activities of

health inspectors in Municipal Departments of Public Health in monitoring local water bottling facilities.

7) Identify other jurisdictions that have more stringent policies and regulations governing the water bottling and home water treatment device industry than in Canada.

8) Identify and describe the policies (and regulations if any) stipulated by Consumer and Corporate Affairs to protect citizens against consumer fraud with respect to misleading advertising claims.

1.2 METHODOLOGY

The primary research approach in this report was a legislative and literature review in the relevant areas. In addition to the review, telephone interviews were conducted with a number of government and private agencies. Some of the contacts include:

- National Sanitation Foundation, Ann Arbor, Michigan
- Canadian Water Quality Association, Waterloo, Ontario
- Water Quality Association, Lombard, Illinois
- Metro Works, Toronto, Ontario
- U.S. Environmental Protection Agency, Washington, D.C.
- Ontario Ministry of the Environment, Toronto, Ontario
- Ontario Bottled Water Association, Richmond Hill, Ontario
- Consumer and Corporate Affairs
- Department of Public Health, Massachusetts

Copies of the statutes, regulations and policies referred to in this report are found in the appendices.

2. REGULATORY FRAMEWORK FOR DRINKING WATER

2.1 REGULATION OF MUNICIPAL WATER SUPPLIES.

By far, the most complete sets of regulations for drinking water quality in North America apply to community water supplies. In this section, regulation in Ontario is considered in detail and compared with equivalent regulation in the United States.

2.1.1 Ontario Regulations

In Ontario, the statutory basis for regulation of community water supplies is the Ontario Water Resources Act (OWRA), which governs the provincial approval and operation of "water works".[1] The OWRA requires that the Director of Approvals of the Ministry of the Environment approve the establishment of, extension of, or change in a water works. Such approval may be refused if it would be in the public interest to do so, and may be granted subject to certain terms and conditions. The Ministry requires as a condition of approval that all water works comply with the "Ontario Drinking Water Objectives". It is also a condition of approval for a water works that the municipality (or other operator) have "acceptable source protection and treatment processes" and "adequate sampling and monitoring programs" in place to ensure that the Objectives will be met.[2]

The Ontario Drinking Water Objectives

The Ontario Drinking Water Objectives ("ODWO") have been through four revisions and were last revised in 1983. The goal of the province in setting them is that "any water intended for human consumption should not contain any disease-causing organisms or hazardous concentrations of toxic chemicals or radioactive substances."[3] To achieve this goal, the province has set minimum objectives for 59 contaminants. These objectives include "Maximum Acceptable Concentrations" (or MACs) and "Interim Maximum Acceptable Concentrations" (or IMACs) for substances that are known or suspected to cause health-related effects and "Maximum Desirable Concentrations" (or MDCs) for substances that are aesthetically objectionable or could interfere with "good water quality control uses", such as corrosion. The Objectives are set out in Table I.

Objective - Setting Process

The Ontario Drinking Water Objectives are derived, with only minor modifications, from the Canadian Drinking Water Guidelines. This latter set of guidelines, in turn, is formulated through the Federal-Provincial Subcommittee on Drinking Water. This committee reports to the Federal-Provincial Committee on Environment and Occupational Health, which in turn, provides advice to the Conference on Deputy Ministers of Health.

The Federal-Provincial Subcommittee meets a few times a year. It is composed of representatives from the provinces and territories and representatives from the Department of National Health and Welfare and Environment Canada. The objectives are formulated from: toxicological data prepared by National Health and Welfare; monitoring data that is available; assessment of costs in attaining certain levels; and a risk evaluation. The actual guidelines are agreed to by 2/3 majority vote of the subcommittee.[4]

Most provinces have adopted the Canadian Drinking Water Guidelines with few modifications.

The Ontario Drinking Water Objectives are currently being revised (their last revision was 1983). This revision will update the objectives by incorporating the 1987 Canadian Drinking Water Guidelines. It is suspected that the revised Ontario Drinking Water Quality Objectives will include both modifications to existing parameters and the inclusion of new ones.

With respect to the Canadian Drinking Water Guidelines, there is no formal process for public comment or input to the development of those guidelines. In 1987, an invitation was extended for public comment for a period of one year past publication. However, this invitation was not

clearly or widely advertised, and as such, the response rate has not been great.[5]

Similarly, at the provincial level, there is no formalized means for public comment or participation in the objective-setting process. This will change with the establishment of the Advisory Committee on Environmental Standards (ACES). This is a committee designed to be a forum for public consultation in the development of all environmental standards in Ontario. ACES, however, is only now being established and may not be operational until later in 1989. This committee is expected to be reflective of a broad range of interests in the province, although as of this date, its precise composition has not been determined.

Monitoring and Compliance The Objectives also describe what sampling should be done to ensure compliance with the MACs and MDCs. For bacteriological testing, samples should be taken from the water source and from the treated water as it enters the distribution system "at least weekly in systems serving populations up to 100,000 and more often in larger systems."[6] In Metropolitan Toronto, bacteriological testing is done daily by the Public Works Department. All sampling in Toronto is done at three different locations in the distribution system[7]. If sampling shows that the bacteriological limits have been exceeded, repeat samples

should be taken. If the repeat samples show exceedances, three special samples should be collected at each site and the Regional Office of the MOE informed. If these special samples are also positive, "corrective action" is required.[8]

For radiological parameters, sampling and analytical frequency depend on the concentration of radionuclides in the water supply. Higher concentrations require more frequent sampling. If less than 0.1 of the MAC is found, sampling should continue on an annual basis. If 0.1 of the MAC is found, sampling should be done quarterly; if the MAC is exceeded, immediate resampling and "appropriate action taken as determined by the Ministry of the Environment."[9]

For chemical parameters, sampling and analysis are not usually required as frequently as for bacteriological parameters. The MOE determines the minimum standards for sampling frequency, which vary from source to source. For example, in Metropolitan Toronto, inorganic and organic indices are tested for monthly by the MOE from samples collected by Public Works. If any MAC is exceeded, "appropriate response procedures are to be followed."[10] According to the ODWO, this requires that three additional samples must be done within a month of the adverse sample. If the average of the four samples exceeds the MAC for the

contaminant, monitoring is to continue until the levels are below the MAC for two consecutive samples, or until the problem has been eliminated.[11] Physical examination of a water supply is also required, with the frequency determined by the MOE.[12] In Metropolitan Toronto, this occurs daily.

Routine sampling of drinking water supplies is the responsibility of each municipality or operator of a water works. In addition, the MOE runs the Drinking Water Surveillance Program ("DWSP"), which is a computerized information system covering 140 contaminants in 44 Ontario municipalities.[13] The results of the monthly analyses go into the Program's computer and to Regional and District officials of the MOE. If a water quality guideline or criterion is exceeded, further sampling and corrective action are required by the Ministry. An "Action Alert" is then issued by the Program to regional MOE and local public health authorities.

Once an action alert is issued, it is up to the local authorities to determine what action, if any, should be taken. It is difficult to generalize about how the action alerts are treated. Essentially, it is a function of what parameters are being exceeded, by how much, and how often. By and large, there are different mechanisms at the local

level to deal with non-compliance. Certainly the local Medical Officer of Health has an important role to play.

It should be noted that, apart from advising and assisting local authorities, the Ministry of the Environment has little enforcement power concerning the Drinking Water Objectives. One tool they could employ, for instance, is the use of terms and conditions on a certificate of approval when the certificate for the local water supply facility is being renewed or modified under the Ontario Water Resources Act.

2.1.2 U.S. Regulations

In the United States, drinking water quality is governed by national standards that are implemented by the states. The federal Safe Drinking Water Act was first passed in 1974 and subsequently amended in 1986.[14] The Act provides for the promulgation of national drinking water regulations that are either "primary" -- related to human health -- or "secondary" -- related to public welfare effects such as odour or taste.

Drinking water regulations and the regulation-setting process

The current primary drinking water regulations under the Safe Drinking Water Act are listed in Table I. Whenever new

regulations are to be established, the Administrator of the U.S. Environmental Protection Agency (U.S. EPA) must first give notice of a proposed rulemaking. Then, the Administrator sets a "maximum contaminant level goal" for each contaminant, at a level that gives an adequate margin of safety for human health. The regulation itself, called the maximum contaminant level, is then set at the level that is "as close to the maximum contaminant level goal as is feasible."[15] Feasibility is determined by the best technology that is available, taking into account cost and efficacy in the field.[16] The Act also allows U.S. EPA to specify a particular treatment technique in lieu of setting a maximum contaminant level.[17] A 15-member National Drinking Water Advisory Council gives advice on proposed regulations.

The 1986 amendments to the Safe Drinking Water Act specified a timetable for the establishment of new regulations for 83 contaminants. For other contaminants, U.S. EPA is required to publish a Drinking Water Priority List every three years and then move toward regulations for contaminants on the list. All regulations under the Act must be reviewed by U.S. EPA at least once every three years and amended "whenever changes in technology, treatment techniques, and other means permit greater protection" of human health.[18]

Monitoring and Compliance

Under the Safe Drinking Water Act, states are given primary enforcement authority for drinking water regulations, provided that they meet certain requirements including adopting their own regulations that are at least as stringent as the federal regulations and putting adequate monitoring, inspection, record-keeping and reporting procedures into place. Monitoring requirements are found in the Regulations promulgated under the Act and are carried out by the supplier of drinking water.

For microbiological contaminants, the frequency of required monitoring varies according to the size of the population served by the water supply, from 1 sample per month for a population of 25 to 1,000 people, to 500 samples per month for a population of 4,690,001 or more people.[19] The frequency can be reduced in certain circumstances, but the minimum is once every quarter. Turbidity sampling must be done at least once per day.[20] Following initial testing of a water supply, sampling and analysis for inorganic chemical contaminants is required to be done annually and organic contaminants are to be tested for every three years, as a minimum. Radiological parameters must be sampled and analysed every four years. There are also monitoring requirements for unregulated contaminants. Records must be kept of testing by the owner or operator of the water system

for 5 years for data relating to bacteriological parameters, and for 10 years for chemical analyses.

Despite these precise requirements, a study done in 1982 showed that failure to comply with these testing requirements was prevalent in many states, particularly in small water supply systems. The major reasons for failure to test are lack of trained or full-time personnel, operator apathy and ignorance of the requirements.[21]

The Safe Drinking Water Act intends that states and localities will have primary responsibility for carrying out its provisions. However, EPA also has a way of enforcing compliance when a state fails to do so. When the Administrator finds that a violation of a national primary drinking water regulation has occurred, he or she must notify the State and assist it to bring a water system into compliance. After 30 days, if the state has not commenced "appropriate enforcement action", the Administrator is required to issue a compliance order or commence a civil action, which carries a penalty of $25,000 per day.

In addition to compliance action, the operator of the water system must give the public notice of its failure to comply with the regulations. This must be done within 14 days of the breach for a serious failure that threatens serious potential health effects, and every three months for continuing violations. The public notice is to include a statement of the violation, the potential adverse health

effects and the steps being taken to correct the cause. Apparently, however, failure to notify the public of violations of the regulations has been the norm rather than an exception.[22]

The Act also contains a citizen "suit" provision, which allows any person to commence a civil action against a government or other person in violation of the Act or regulations or against the EPA Administrator for failure to perform a mandated task. However, if a government is diligently prosecuting an action against the violator, a citizen suit can not go forward but the person initiating it has a right to intervene in the government action.

Regulation of Lead in Drinking Water

In the Unites States, concern about high lead levels in drinking water has prompted the U.S. EPA and many states to adopt special regulations to minimize ingestion. Unlike other contaminants, most lead enters drinking water supplies after it leaves the treatment plant, from the corrosion of lead pipes or solder. In 1986, the Safe Drinking Water Act was amended to require the use of "lead-free" pipe, solder and flux in public water systems and plumbing. In addition, public water systems are required to identify whether lead materials are used in the system or corrosivity of the water

is sufficient to cause the leaching of lead, to identify persons who may be affected and to notify those persons. Notice is required even if the national drinking water standards are not exceeded. These regulations are implemented by states.

U.S. EPA is also in the process of making major changes in the regulation of lead in drinking water. The new regulation was proposed in August 1988 and a two-month comment period generated about 3,000 comments. The comments are now under review and the final regulation should be in place by late 1989. There are two parts to the new regulation. The first is a new MCL for water entering a distribution system of 5 ppb, down from 50 ppb under the existing regulation. The second part is a standard for tap water. If the average concentration of lead in tap water samples (50 samples per quarter for large cities, fewer for smaller) exceeds 10 ppb or if the pH is less than 8, the system must institute corrosion control treatment or demonstrate to the state that it has taken steps to minimize corrosion in the system. In addition, if the 95th percentile of the tap water samples contain lead at greater than 20 ppb or if the average of the samples contains more than 10 ppb, a public education program must be instituted. The supplier must determine the particular reasons for the

high lead levels and inform the public of the reasons and what they can do to minimize their exposure.

California's Proposition 65

Perhaps one of the most innovative and stringent drinking water statutes in North America is California's Safe Drinking Water and Toxic Enforcement Act, commonly known as Proposition 65.

Proposition 65, enacted by way of a state-wide ballot in 1986, has a number of components to it. First, the law states that industry must warn the public if it knowingly exposes persons to substance that poses "significant risk" of cancer or birth defects. To implement this component, the state has listed some 250 chemicals known to be carcinogens or reproductive toxins. It is setting standards or allowable doses for 50 sidely used ones. Further, the state has also defined "significant risk" the threshold test, at 10^{-5}, (or one excess cancer per 100,000 people with a reasonable lifetime exposure.)

When a chemical is listed, industry has 12 months to provide a "clear and reasonable" warning as to the chemicals involved. The warnings (by way of packaging labels, signs,

signs, etc.) applies to occupational exposures and ambient exposures in air or water as well as to consumer products.

Apart from the warning provisions of Proposition 65, there are also discharge provisions. Twenty months after a chemical is listed, no discharger can knowingly discharge that chemical into an actual or potential source of drinking water.

Apparently, the intent of the discharge provisions is to shift the burden of proof with respect to the use of chemicals in drinking water. Where an industry still intends to use the chemicals listed, they then have to establish that those chemicals do not pose a significant risk. In other words, it is industry that must establish that it complies with the Act, not the government that must establish non-compliance.

To enforce the law, Proposition 65 contains a citizen suit provision - that is, a provision that allows any person to enforce the act, even if that person is not personally affected by the violation. Moreover, the person who brings on enforcement action is able to keep 25% of the fines levied. This provision is pre-empted where the state decides to take over the case. From the date of filing, the state has 60 days to make this decision.

2.1.3 Comparison of Ontario and U.S. Regulatory Frameworks Municipal Drinking Water Supplies

There are a number of indices that should be employed when comparing various regulatory regimes governing any one subject-matter. The following indices are employed here: comparison of standards, guidelines, and objectives for drinking water; comparison of the processes as to how those standards, guidelines and objectives were arrived at, and comparison of the monitoring and compliance regimes associated with those regulatory frameworks.

(a) Comparison of Standards, Guidelines and Objectives

Generally, it is fair to say that, when comparing the numerical differences between the Canadian objectives and guidelines and U.S. federal standards, there are not many differences. Some of the differences include:

* small differences with respect to fluoride
* for sulphate, the Canadian criterion is 500 mg/l while the U.S. is 250mg/l
* for phenols, the Canadian criterion is .002 mg/l while the U.S. is .001 mg/l

* for mercury, the Canadian criterion is .001 mg/l while the U.S. is .002 mg/l

* for trihalomethanes, the Canadian objective is .35 mg/l while the U.S. is .1 mg/l

While there is similarity in terms of the contaminant levels in the various standards, objectives and guidelines, it is important to note that there is a significant difference in the number of parameters for which standards, guidelines and objectives exist.

For example, on an approximate basis, there are 54 parameters under the Canadian Drinking Water Guidelines, 59 under the Ontario Drinking Water Objectives while 35 under the Safe Drinking Water Act. Eventually this will be 83. There will be approximately 50 standards or allowable doses set under California's Proposition 65 law.

(b) Standard-Setting Processes

There are two fundamental differences between the standard-setting processes in the U.S. and Canada. First, the Canadian standard-setting process for drinking water

* for mercury, the Canadian criterion is .001 mg/l while the U.S. is .002 mg/l

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For example, on an approximate basis, there are 54 parameters under the Canadian Drinking Water Guidelines, 59 under the Ontario Drinking Water Objectives while 35 under the Safe Drinking Water Act. Eventually this will be 83. There will be approximately 50 standards or allowable doses set under California's Proposition 65 law.

(b) Standard-Setting Processes

There are two fundamental differences between the standard-setting processes in the U.S. and Canada. First, the Canadian standard-setting process for drinking water objectives and guidelines is undertaken on an ad hoc basis.

There does not seem to be any coherent rationale as to when and why the objectives and guidelines are updated, revised or amended. Presumably, the objectives and guidelines are periodically revised because new information surfaces or the inadequacies of existing objectives or guidelines are recognized. Practically, however, they are probably reviewed to fit the agendas of the committees and subcommittees delegated the tasks of revising them.

In contrast, the U.S. standard-setting process is characterized by a regularized, routine review of standards. This regularized review adds predictability into the review process as well as the opportunity to ensure that the data and criteria on which the standards are based are the most current and up-to-date.

The second major difference between the U.S. and Canadian standard-setting processes is in who is involved. In Canada, the public, whether it be industry, environmental groups, academics, scientists, or simply concerned individuals, is totally excluded from the process. The process in the development and formulation of the objectives and criteria is undertaken at an inter-governmental committee level where there is no input from those with potentially important information, different or novel perspectives on the issues, or from those who will be

affected by the workings of the committee - members of the public that drink the water. The few exceptions to this (such as ACES) have yet to be initiated or are in the formative stages of their work.

In the U.S., the situation is quite different. Under both federal and most state rule-making procedures, there are mandatory notice periods of new regulations, specifically defined comment periods for submissions from all sectors of the public, and upon request, formalized hearings. At the hearing stage, the data and findings upon which the regulations are based can be challenged and tested, with other data and findings adduced. The agency conducting the hearing is obliged to make findings and give reasons for the resultant decisions.

There are both direct and indirect benefits to the U.S. process. The direct benefits are derived from the fact that there is a greater chance that more informed, and thus better, decisions will be made since data and findings are likely to be presented, challenged, debated and scrutinized. Moreover, the data and findings which are adduced will be tested for their currency, relevance and comprehensiveness. The indirect benefits are that the public, who bears the risks and costs of the standards, has a voice in those regulations. Through such a process, there is a greater

chance for the public to become informed and aware of the important issues and accepting of the trade-offs that must be made.

(c) Compliance and Enforcement

As with the standard-setting process, there are fundamental differences between the compliance and enforcement mechanisms in the U.S. and Canada. The most fundamental difference is that there are no drinking water standards in Canada like there are in the U.S. - in Canada, the drinking water objectives and guidelines are non-enforceable and non-binding. Standards are, by their nature, incorporated into, and a part of, a legal framework, the breach of which makes one liable to prosecution. Objectives and guidelines, however, are not law in the sense that there is no remedy for violation - compliance is more of a moral duty than a legal one.

There are other important implications of enforceability of laws. First, for the most part, U.S. law has mandatory reporting and record-keeping duties such that compliance or non-compliance becomes much easier to monitor. These records are usually publicly available. In some cases, governmental authorities are obligated to act if there is

non-compliance; in other instances, there must be at least public notice of the violations.

Ontario's Drinking Water Surveillance Program, in its monitoring of some 140 contaminants, is a positive step and fairly effective. However, the fact that the onus is then left to local municipalities to deal with non-compliance suggests that the degree to which those alerts will be followed up will depend on the availability of resources and sensitivity of the local government.

Second, enforceability also carries the question of enforceability by whom. Under the federal Safe Drinking Water Act (and most other federal environmental laws), and many state safe drinking water laws (such as Proposition 65), the laws are enforceable by the public through what is known as the citizen suit provision. These provisions, which are usually very short and precise, essentially state that any person can enforce the law in the event of a violation. Not only is the legal procedure a very simplified process, but because there is mandatory reporting, there are often few evidentiary problems. The reporting results simply have to be compared with permit limits. Citizen suits have become very simple and effective. They make those violating laws publicly accountable for their actions.

2.2 Regulation of Bottled Water

The quality of bottled water is regulated very differently from the quality of community water supplies in North America. In both Canada and the U.S., bottled water is considered a "food" and its quality is governed through food quality standards.

2.2.1 Regulations in Ontario.

The Province of Ontario has no regulations that apply directly to the quality of bottled water, but through regulation of well drilling, it can influence the source of water for bottling. What applies in Ontario are the requirements of the federal Food and Drugs Act.[23] That Act defines "food" to include "any article manufactured, sold or represented for use as food or drink for man..." and prohibits the sale of articles of food that contain a harmful substance, are unfit for human consumption or are packaged under unsanitary conditions.[24] Also prohibited is labelling, selling or advertising that is "false, misleading or deceptive or is likely to create an erroneous impression regarding its character, value, quantity, composition, merit or safety."[25]

Food must also comply with prescribed standards. The standard for bottled water requires that water "represented as mineral water or spring water... shall be potable water

obtained from an underground source..., shall not contain any coliform bacteria... [and] shall not have its composition modified through the use of any chemicals" other than carbon dioxide, fluoride or ozone.[26] In addition, the standard describes what must be included on the label of a sealed container of water.

According to Health and Welfare Canada, "potable" means that the water complies with the Guidelines for Canadian Drinking Water Quality. As discussed in the last section, these Guidelines, last revised in 1987, were established by a federal-provincial-territorial committee. As was discussed in the last section, the process is not governed by statute, there is no mandatory strengthening whenever new information becomes available, and the role of the public is limited and not guaranteed.

The goal of the Guidelines is that water for domestic uses "should be free from pathogenic organisms, deleterious chemical substances and radioactive matter, and should be palatable, aesthetically appealing, and devoid of objectionable colour, odour and taste."[27] These guidelines are intended to operate as minimum standards for all water supplies in Canada. However, they are unenforceable guidelines until adopted as binding by governments. For bottled water, they have not been adopted as legally

binding. However, Health and Welfare is developing criteria for chemical contaminants in bottled water.[28]

The only jurisdiction in Canada which regulates the quality of bottled water is Quebec. The Quebec regulation, which dates from 1974, requires that bottled water be "bacteriologically pure and contaminant free". MACs are set and monitored by the Ministere de l'Environnement, however, the number of contaminants covered is small and includes only inorganic chemicals. The MACs are listed in Table I. The Quebec regulation also strictly controls the labelling of bottled water.

Compliance

There are three programs undertaken by the Department of National Health and Welfare pertaining to bottled water. First, Health and Welfare has a program to inspect bottling plants which is part of their food processing inspection program. Second, the Department is in the process of completing a data gathering program for microbiological parameters in bottled water. Third, the Department has a program for ensuring compliance with Division 12 of the Food and Drugs Act. This program tests for the presence of Division 12 parameters, in particular, coliform bacteria.[29]

2.2.2 U.S. Regulation.

In the United States, bottled water that is sold in interstate commerce is regulated by the federal Food and Drug Administration. As in Canada, water is a "food" whose quality is protected through regulations. The U.S. Food and Drug Administration's (FDA) regulations for bottled water[30] govern all bottled water and carbonated nonalcoholic beverages from out-of-state and foreign bottlers. The U.S. Standards of Quality for Bottled Water require that bottled water meet Maximum Acceptable Concentrations for microbiological, physical, chemical and radiological quality.[31] These standards are listed in Table I.

Under the Food and Drug Administration's regulations,[32] Part 129, facilities, methods, practices, controls used in the processing, bottling, holding and shipping of bottled drinking water must be in conformity with good manufacturing practice to assure that bottled drinking water is safe and that it has been processed, bottled, held and transported under sanitary conditions. The regulation then describes the essential criteria of "good manufacturing practice" in the context of processing, bottling, holding and shipping of bottled drinking water.

Compliance

When the standards are exceeded, the label on the bottle of water must contain a statement about the specific substandard quality of the product. Water that contains a substance that is considered "injurious to health" is deemed to be "adulterated" and government action is required, whether or not the label contains an accurate statement of substandard quality. Apparently, enforcement of the regulations is not a high priority for federal officials and inspection occurs only after a compliant has been filed.

U.S. State initiatives

According to one source, many states have rewritten or are in the process of rewriting their bottled water regulations to include specific labelling requirements, sampling and testing procedures, quality standards, source protection and requirements for the bulk transport of water. By and large, states have incorporated quality and labelling standards that are a combination of the Food and Drug Administration (FDA), Association of Food and Drug Officials (AFDO) and the International Bottled Water Association (IBWA) standards.

Massachusetts

The Massachusetts bottled water regulations incorporate relevant material from other states, the FDA and from the AFDO and IBWA model codes. They pertain to the manufacture and bottling of carbonated nonalcoholic beverages and all types of bottled water. The comprehensive package of regulations governs application forms, granting of permits, building and equipment requirements, personnel, hygiene, water sources and licensing of out-of-state bottlers. They define various types of bottled water and specify requirements for source water protection, bulk storage, transportation, sampling, testing, labelling. The contaminant limits are consistent with the U.S. EPA Drinking Water Regulations. Copies of these regulations are attached in the appendices.

2.2.3 Comparison.

The regulations of bottled water quality that apply in Ontario contain no enforceable criteria or standards for contaminants other than bacteriological parameters. While testing is done by Health and Welfare for bacteriological parameters, the reports are not required to be made public. Within Canada, only Quebec has enforceable standards and labelling requirements. However, these standards are for much fewer contaminants than the Provincial regulations for community water supplies.

In contrast, in the United States, there is a full set of enforceable standards at the federal level, based on the standards that apply to community water systems. As well, there are regulations in many states, including comprehensive requirements for sampling, testing, labelling, protection of sources, etc..

The impact of the Canadian system is that regulation is scattered and piecemeal. The effectiveness of the system in protecting public health is not known. There is no clear reason for the difference in the treatment of community water and bottled water. A more intensive review of the present regulatory and policy framework is needed before a comprehensive evaluation can be made.

2.3 Regulation of Home Treatment Devices

Point of use devices are increasing in popularity because of concerns about drinking water quality. There are several different techniques designed to disinfect or improve chemical or aesthetic quality, including filtration, ultra-violet irradiation, iodisation, chlorination, ozonation and distillation for disinfection, and activated carbon and reverse osmosis for chemical and aesthetic improvements. As a group, treatment devices are not regulated other than through limitations on advertising and promotion.

2.3.1 Regulation in Ontario

The Province of Ontario does not regulate water treatment devices. However, an Ad Hoc Committee on Home Water Treatment Devices with members from the Ministry of the Environment, the Ministry of Consumer and Commercial Relations, Health and Welfare Canada, Ontario Research Foundation and the Canadian Water Quality Association prepared some guidelines in 1988. The guidelines are designed to provide information on different treatment devices, including conditions for use that will ensure their effectiveness and limitations on their usefulness. In addition, the guidelines suggest that claims for devices conform with the voluntary industry standards for the promotion and advertising of water treatment devices,

discussed in Section 3. These guidelines are informational only and not enforceable.

At the federal level, promotional claims by manufacturers and sellers of water treatment devices are governed by the Competition Act provisions on misleading or false advertising.[33] The Act prohibits representations to the public about a product that are false or misleading in any material aspect and representations about performance that are not based on adequate and proper tests. The penalty for contravention of the Competition Act ranges from an unlimited fine and imprisonment for five years if prosecution proceeds by way of indictment to a maximum fine of $25,000 and one year in jail on summary conviction. Water treatment devices are also governed by the Consumer Packaging and Labelling Act.[34] This Act prohibits labels that contain a false or misleading representation about the quality or performance of a product. This act is also enforced by Consumer and Corporate Affairs.

Compliance

The Competition Act is enforced through the Director of Investigations and Research. Under the Director, there is the Bureau of Competition Policy which has a number of branches, including: merger services, manufacturing and

resource industries, regulated industries, service industries and business practices.

The two primary means of enforcement in this respect are through (1) telephone or written complaint procedure or (2) as a result of the monitoring of advertisements by bureau staff. (Advertisements for food on T.V. go through a slightly more rigorous procedure in the sense that there is a pre-clearance or pre-screening process for food products.)

Once a telephone complaint has been received, there is a preliminary review of the compliant. If the complaint is thought to be well-founded, the Director will launch a formal review. This formal review involves an investigation and, potentially, the testing of the consumer goods to determine whether the advertisements are founded in fact. The Act gives the Director a number of investigatory powers, including search and seizure warrants. Upon the review, the Director makes a decision as to whether to proceed with the case or close it at that point. If the decision is to proceed, the case will be turned over to the Attorney General's office. A number of remedies are included under the Act including prohibition orders (see s. 34(2) of Act).

According to the complaints branch at the Department of Consumer and Corporate Affairs, there seems to be an identifiable problem in terms of the frequency and nature of the complaints being received with respect to water treatment devices.[35] It is somewhat difficult, however, to quantify how serious the problem is. The bureau does not have to follow up on each complaint and when a complaint is followed up, there may be a significant cost attached to it in terms of testing of devices. What is clear is that the devices are being heavily promoted and that there are a very large number of the available from a and varied manufacturing base both within Canada and beyond its borders.

2.3.2 U.S. Regulations Governing Water Treatment Devices

As a general statement, there are essentially no federal regulations governing point of use treatment devices.[36] One of the few exceptions pertains to certain point of use devices such as those using silver bacteriostasis which have to be registered with the U.S. Environmental Protection Agency under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). There are no further obligations over and above registration under FIFRA.

States have also been slow in regulating point of use devices. Some states have regulated them to a certain extent through truth in advertising laws.

Some states such as California and Iowa have even gone further. For example, in California, all manufacturers must register the devices where health claims have been made. This is a state registration process.

3. VOLUNTARY STANDARDS FOR DRINKING WATER QUALITY

3.1 Voluntary Standards for Bottled Water

3.1.1 Ontario.

In Ontario, the Ontario Bottled Water Association has developed a Model Bottled Water Code that all members of the Association are expected to follow. The Code provides that all bottled water be from a source that has been tested and found to be of "safe and sanitary quality" and not contain "any constituent in quantities that may be injurious to health."[37] The Model Code requires that bottled water not exceed the Maximum Acceptable Concentrations for chemical, radiological and microbiological parameters specified by the most rigorous standards and guidelines set by Health and Welfare Canada, Ontario Ministry of the Environment, Quebec Ministere de l'Environnement, U.S. EPA and World Health Organization.[38] These guidelines are set out in an Appendix to the Code and are listed in Table I to this report. The Code also sets Maximum Desirable Concentrations for aesthetic quality.

The Model Code requires bottlers to follow Health and Welfare Canada's "Code of Practice: General Principles of Food Hygiene for Use by the Food Industry in Canada" in processing and bottling water. These are guidelines about ensuring sanitary conditions. The Code also requires that bottled water be disinfected by ozonation or carbonation and

that particular procedures be followed to minimize the chance of microbiological contamination.[39]

The Model Code makes bottling plant operators responsible for sampling and analysis of the water source. Routine monitoring for microbiological parameters is to be carried out weekly, while monitoring for chemical parameters is to be done at least annually. Monitoring is to be done by qualified personnel and analyses conducted by an "approved laboratory", that is, one that follows prescribed testing methods and can give a certified copy of its results.[40]

If sampling and analysis reveal the presence of contaminants, a resampling program must be instituted immediately to confirm the results. If an MAC is exceeded, the operator must begin immediately to treat the source to remove or reduce the contaminant and to monitor until the contaminant is not detectable at one order or magnitude below the MAC for at least four samples.[41] The plant operator is required to maintain records of analyses for a minimum of five years.[42]

In addition to source monitoring, finished product monitoring is required by the Model Code. Microbiological analyses are to be carried out on a representative sample of every batch or segment of a continuous production run and

chemical and other analyses are to be done annually on a representative sample. The Code recommends that these analyses be retained for five years and be released, on request, to customers.[43]

There is at present no mechanism for the OBWA to ensure that its members comply with the provisions of the Code. A committee within the OBWA is looking into ways of ensuring compliance, but has yet to institute any rules for members. Compliance is therefore entirely voluntary at this point.[44]

3.1.2. U.S. Voluntary Standards

The Ontario Bottled Water Association's Model Code is based on the code of the International Bottled Water Association based in the United States. The IBWA represents its members, who make up more than 90% (by sales) of the water bottlers in the U.S.. The model code was developed by the IBWA in conjunction with the Association of Food and Drug Officials and in consultation with the Federal Food and Drug Administration and state agencies. The maximum contaminant levels in the code are the same as those set by U.S. EPA for public water supplies. (The IBWA Code does not refer to other criteria or standards as the Ontario Code does).

The IBWA uses the model code in discussions with states to try and get them to adopt it. Once adopted, the code is enforced by the states through their regular enforcement processes. In addition, the IBWA requires its members to participate in an annual plant inspection program, which is conducted by the National Sanitation Foundation. A confidential file containing the inspection reports is kept on each member of the IBWA, but there is no authority in the IBWA to sanction members who exceed the MCLs.

3.2 Voluntary Standards for Home Treatment Devices

3.2.1 Ontario.

In Canada, the industry association that represents the manufacturers of water treatment devices is the Canadian Water Quality Association (CWQA), an affiliate of the U.S. based Water Quality Association. The Association has developed Voluntary Industry Standards for three types of point-of-use devices - reverse osmosis, distillation and filters. In addition, the CWQA has developed voluntary Product Promotion Guidelines.

The industry standards are aimed at ensuring the physical integrity and performance of the different devices. They address materials, design and construction, chemical and hydrostaic performance, including correct testing procedures, and instructions for operation, maintenance and installation. The Product Promotion Guidelines are designed to "provide guidance to companies in the point of use water treatment industry in their efforts to minimize the likelihood that their advertising and other promotional material will mislead the public." The Guidelines are a general framework only and adherence is not a defence to a charge of false or misleading advertising. The Guidelines provide that claims about the performance or benefits of products be based on factual data from professionally

conducted tests and be true in every aspect and situation. they also address the use of warranties and endorsements.

The CWQA monitors complaints involving promotion of treatment devices. It has investigated complaints and tried to resolve problems. It also cooperates with Consumer and Corporate Affairs in its investigations of misleading advertising.

U.S. Voluntary Standards for Home Treatment Devices

In the United States, in addition to the Water Quality Association's Industry Standards, the National Sanitation Foundation has developed four standards for home treatment devices. The NSF is an independent, non-profit public health organization that conducts research and education programs and establishes public and environmental health standards and service programs. The industry standards, two of which are included in the appendices, are:

* standard #53 - Health Effects
* standard #42 - Aesthetic Effects
* standard #58 - Reverse Osmosis
* Standard #44 - Cation exchange

The National Sanitation Foundation "lists" or certifies home treatment devices. The criteria for listing include:

* verification of the manufacturers' claims
* structural integrity
* material review (toxicological testing to see if any of the parts of the device itself are toxic)
* packaging and other

To be listed, the device has passed all of the NSF requirements and the manufacturer's claims have been verified by testing. Once listed, the product can carry the NSF listing mark. At present, there are between 200 and 250 major manufacturers of these devices in the U.S. and 26 are certified while 55 have applied for certification.

In the event of non-compliance, once the product has been listed, the NSF can recall the product, issue public notice, etc. A public recall is an extensive notice campaign to the NSF's 24,000 mailing list of regulators, newspapers, trade journals, etc. of the problem and of course, the delisting of the product.

4. CONCLUSIONS AND RECOMMENDATIONS

The issues pertaining to drinking water regulation are not new, and indeed, can easily be traced back to the 1970s. With new information regularly surfacing on environmental problems generally, and in particular, on drinking water, it can be expected that drinking water regulation will be an issue that will continue to be on the public's agenda for some time.

This report has provided at least a cursory review of the regulatory and policy frameworks for municipally supplied drinking water, bottled water, and point-of-use or home treatment devices. Each of these areas, though related, carries with it different regulatory issues, including different jurisdictional considerations, different regulatory approaches, and the need for different types of controls. However, while there is a need to look at the regulatory framework for municipal water, bottled water, and home treatment devices, separately, a number of common principles should pervade each framework, and in effect, act as criteria to evaluate their appropriateness.

(a) General Principles

There are four general principles which are important for drinking water regulation. These principles include: the

need for consistency in the quality of drinking water, the need for a more publicly accessible process for regulation, the need for a more effective system for accountability for compliance and enforcement, and the need for more public awareness and education of drinking water issues.

1. **Consistency of Quality**

The intent of drinking water regulation should be that drinking water end-users, the consumers of water, have some assurance that the water they drink is "safe". It would then seem reasonable, from a policy point of view, that a regulatory approach should be focused on ensuring safe drinking water irrespective of whether a person drinks from the municipally supplied tap water, bottled water, or from a point-of-use device.

Second, consistency of quality means that all aspects of drinking water supply should be examined: that is, water quality control should not only be focused at the water treatment facility, but also on the supply lines to the end-user. For bottled water, the quality of the water should be viewed, in addition to the source controls, also to bottling and packaging controls. And for treatment devices, some care should be taken that the device itself does not have some toxic consequences.

2. Public Process of Defining "Safe" Drinking Water

It was mentioned above that the intent of drinking water regulation is to ensure "safe" drinking water. "Safe" however, suggests there is some compromise between "absolutely pristine" and just barely "acceptable". In light of the scientific uncertainty concerning terms such as "safe" and the social, economic and technological trade-offs which often come into play in defining such terms, the whole exercise is more akin to public policy decision-making, than some sort of precise scientific calculation. As a matter of public policy, it is fair and reasonable that the public have the opportunity to be heard and have their views expressed as to what trade offs are appropriate and reasonable in the circumstances. Ultimately, the public will have to bear the risks and pay the costs.

There are a variety of models available to ensure adequate and fair public participation in the decision making process concerning environmental standards, some of which will be discussed below.

3. Compliance

The third principle common to the development of a comprehensive drinking water regulatory framework is that there must be adequate mechanisms and resources in place to

implement the framework. Apart from the details of the scheme, a comprehensive compliance and enforcement regime must ensure for adequate fact-finding or information gathering processes and mechanisms for accountability. In terms of information-gathering processes, it is clear that the U.S. has moved toward mandatory monitoring, mandatory reporting of results, record keeping in a manner that is understandable and available to the public, mandatory enforcement provisions, including the potential for members from the public to enforce the laws in lieu of governmental action, and course, a series of sanctions which are meaningful and appropriate for the violation.

4. Public Education and Awareness

One principle that underlies the abovementioned principles is public education. At present the public is acutely concerned with environmental quality and its impact on human health. Drinking water is at the leading edge of this concern, and the public is, for the lack of a more profound way of putting it, vulnerable to misinformation as to the state or condition of drinking water and what can be done to avoid any adverse consequences.

Hence, any regulatory program, regardless if directed to municipal water, bottled water, or home treatment devices, must be predicated with an effective, even handed, and

comprehensive education campaign. Through public education, the public becomes more aware of the issues, more willing to participate in and contribute to the process of protecting drinking water, and simply better informed to make decisions as to whether to purchase bottled water or a home treatment device, and if so, what kind.

RECOMMENDATIONS FOR REFORM

1. RECOMMENDATIONS FOR PROVINCIAL REFORM

From a review of the above principles, the concerns expressed centre more on the processes associated on drinking water regulation that on specific parameters or specific risk levels. The challenge in this regard pertains to the fact that regulatory regimes or reforms must take into account the ever changing state of knowledge with respect to environmental contaminants and the evolving societal attitudes toward the control of those contaminants.

The regulation of drinking water from municipal sources will probably remain best suited to provincial regulation. Hence, municipal authorities should initiate a campaign to persuade provincial authorities to enact some type of safe drinking water law. At present, there are a variety of options available as the structure and content of such a law, for reference, two such examples are included the appendices, one is a private members bill introduced by MLA Ruth Grier in 1987 and another is derived from an article published by Vigod and Wordsworth. Both these initiatives only go part way in ensuring public participation in the standard setting processes and the opportunity for public enforcement actions. These weaknesses may in part stem from

the view that such opportunities should be open for all environmental regulations, a proposal which is incorporated in Bill 13, "An Act Respecting Environmental Rights."

This private members bill, which has received second reading, is commonly referred to as the "Environment Bill of Rights." A copy of an article which fully discusses this initiative is also in the appendices, along with a copy of the bill itself.

IT IS THEREFORE RECOMMENDED THAT THE TORONTO BOARD OF HEALTH RECOGNIZE THE IMPORTANCE OF A COMPREHENSIVE REGULATORY REGIME GOVERNING DRINKING WATER QUALITY AND THAT SUCH INITIATIVES ENSURE PUBLIC ENFORCEMENT AND PUBLIC PARTICIPATION IN THE DECISION MAKING PROCESS.

This Safe Drinking Water Act would include, at minimum:

1. Enforceable criteria for all sources of drinking water (including bottled water);
2. Mandatory periodic review of drinking water criteria;
3. Avenues for public participation in the development and formulation of the drinking water criteria;
4. Mandatory monitoring and analysis, reporting of findings, and public availability of those results;
5. Notice requirements for non-compliance and exceedances; and
6. Public enforcement mechanism.

2. RECOMMENDATIONS FOR THE CITY OF TORONTO

As noted above, the bulk of regulatory reform probably is best suited to the provincial level. However, there are a number of reforms that can be developed to support provincial reform, and in some cases, act as a catalyst to it. Most of these reforms are directed to informing the public on drinking water issues through notice, labelling, and certification requirements. Further, it would be advantageous for the City to take a particularly aggressive approach to the control of lead.

IT IS THEREFORE RECOMMENDED THAT THE TORONTO BOARD OF HEALTH RECOMMEND TO CITY COUNCIL A PROGRAM TO DEAL WITH THE FOLLOWING MATTERS:

(a) There should be routine and regularized testing of municipal drinking water and bottled water sold in the city and these test results should be publicly released and made available through:

  (i) a public information campaign; and

  (ii) notices on residents' water bills.

(b) There should be a labelling requirement for bottled water sold in the City of Toronto mandated by the City that:

(i) discloses results of tests for all bacteriological and chemical parameters which are listed in the Ontario Drinking Water Objectives;

(ii) discloses the expiry date for that product, if appropriate; and

(iii) any other information deemed relevant.

(c) There should be a certification process established by the City of home treatment devices. This process could incorporate approval mechanisms by reputable, independent bodies (such as the National Sanitation Foundation in the U.S.). This certification process would have three elements:

(i) criteria which would have to be satisfied for approval;

(ii) a seal of approval to inform the public that it has been certified; and

(iii) the products would have to have clear instructions as to the installation, maintenance and use of the device.

(d) The City of Toronto should institute a "lead in drinking water" public awareness campaign, which

would provide information to the public about the levels of lead in drinking water at the point of use, the risks of exposure and how to minimize exposure, through flushing, for example.

(e) The City of Toronto should recommend the adoption of a program to investigate the potential for corrosion within the Metropolitan Toronto water distribution system. A program should also provide for the dissemination of the findings from this investigation and the development of corrosion control measure is appropriate to bring water at the point of use into compliance with the Ontario Drinking Water Objectives.

Home Treatment Devices

There is virtually no regulation governing home treatment devices except for those relating to advertising. Because of the popularity of these devices, and thus, the potential profitability of such industries selling these products, there is a need for a regulatory regime that will provide some minimum standards for these devices.

The most progressive of U.S. states have moved toward the governmental certification of these devices. This

certification process should guarantee two things: first, that the home treatment device will ensure that the water will meet all governmental drinking water objectives (and that the device itself will not cause or contribute to any contamination); and second, that the manufacturer's claims with respect to these devices are verifiable, with the onus on industry that their claims are supportable.

THEREFORE IT IS RECOMMENDED THAT THE TORONTO BOARD OF HEALTH RECOGNIZE THE LACK OF A REGULATORY FRAMEWORK GOVERNING HOME TREATMENT DEVICES AND THAT THEY PROMOTE PROVINCIAL REGULATION TO CREATE A MECHANISM TO:

1. Certify home treatment devices;
2. Verify claims of manufacturers;
3. Provide clear instructions on proper use of such devices; and
4. Promote public awareness of the wise and effective use of such devices.

NOTES

1. R.S.O. 1980, c. 361, as amended, s. 23.

2. Ontario, Ministry of the Environment, "Drinking Water Quality: Ontario Drinking Water Objectives," M.O.E. Policy Manual, Policy No. 15-06, dated 12 November 1986, Policy Statements 1.1 and 1.2.

3. Ontario, Ministry of the Environment, Ontario Drinking Water Objectives (Toronto: M.O.E., 1983), p. 1.

4. Conversation with H. Graham, Drinking Water Section, Ontario Ministry of the Environment, February 27, 1989.

5. In fact, the invitation for public comment was in a footnote at the end of the Guidelines. Footnote 2 following the actual guidelines states: "It is proposed that a guideline be added for this parameter for the first time (A); a change be made to the previous guideline (R); or the guideline be deleted (D). If after one year no evidence comes to light that questions the appropriateness of the proposal, it will be adopted as the guideline."

6. Ontario, Ministry of the Environment, Ontario Drinking Water Objectives, supra, p. 20. The number of samples to be taken at the point water enters the distribution system differ depending on the size of the population served: for a population up to 100,000, a minimum of 8 plus 1 per 1,000 people samples must be taken per month, with a weekly sampling frequency; for a population of more than 100,000, a minimum of 100 plus 1 per 10,000 people samples must be taken per month, with a sampling frequency of "several times per week".

7. Communication with Victor Tishe, Public Works Dept., Metropolitan Toronto, 28 Feb., 1989.

8. Ontario, Ministry of the Environment, Ontario Drinking Water Objectives, supra, p. 34. Corrective measures can include the institution of chlorination, increasing chlorine dosage, flushing and foam swabbing for coliform.

9. Ministry of the Environment, Ontario Drinking Water Objectives, supra, p. 22.

10. Ministry of the Environment, M.O.E. Policy Manual, Policy No. 15-06, supra, Policy Statement 1.3.

11. Ministry of the Environment, Ontario Drinking Water Objectives, supra, p. 17.

12. Ministry of the Environment, Ontario Drinking Water Objectives, supra, p. 18.

13. Ontario, Ministry of the Environment, Drinking Water Surveillance Program, Annual Report - 1986: Plant Summaries, May, 1987. Eventually, the Program will cover every municipality in Ontario. Parameters are divided into: Bacteriological, Inorganic and Physical, and Organic. See, MOE, Drinking Water Surveillance Program, Easterly Water Treatment Plant, Annual Report 1987.

14. 42 U.S.C. ss. 300f, et seq.

15. Safe Drinking Water Act, s. 300g-1(4).

16. Safe Drinking Water Act, s. 300g-1(5).

17. For example, granular activated carbon is considered as feasible for the control of synthetic organic chemicals; any other technologies used for their control should be at least as effective. See, U.S. EPA, Office of Drinking Water, Fact Sheet: Drinking Water Regulations under the Safe Drinking Water Act, February 12, 1988.

18. Emphasis added. Safe Drinking Water Act, s. 300g-1(9).

19. 40 CFR 141.21.

20. 40 CFR 141.22.

21. U.S. General Accounting Office, States' Compliance Lacking in Meeting Safe Drinking Water Regulations, Report to the Administrator Environmental Protection Agency (Washington, D.C.: GAO, March 3, 1982), c. 2. In 1980, 90 of 140 systems reviewed failed to comply with at least one of the federal testing requirements.

22. U.S. General Accounting Office, States' Compliance Lacking, supra, c. 3.

23. R.S.C. 1985, c. F-27.

24. Food and Drugs Act, ss. 1 and 4.

25. Food and Drugs Act, s. 5.

26. Food and Drugs Act, Division 12, Prepackaged Water and Ice, B.12.001.

27. Health and Welfare Canada, Guidelines for Canadian Drinking Water Quality, prepared by the Federal-Provincial Subcommittee on Drinking Water of the Federal-Provincial Advisory Committee on Environmental and Occupational Health (Ottawa: Health and Welfare, 1987), p. 7.

28. Communication with J. Morgan, Dept of National Health and Welfare, 2 March 1989.

29. Communication with R.B. Burke, Department of National Health and Welfare, 2 March 1989.

30. 21 CFR Chapter 1, parts 103,110,129,165 and 184)

31. 21 CFR 103.35.

32. 21 CFR Chapter 1 (4-1-88 Edition)

33. Competition Act (formerly Combines Investigation Act), R.S.C. 1985, c. C-34, as amended, ss. 52 and 53.

34. R.S.C. 1985, c. C-38

35. Communication with R. Lally, Consumer and Corporate Affairs, February 24, 1989.

36. Nancy Culotta, National Sanitation Foundation, Ann Arbor, Michigan. February 27, 1989.

37. Ontario Bottled Water Association, Model Bottled Water Code, September 24, 1987, s. 2.

38. Ontario Bottled Water Association, Model Code, supra, s. 2(b).

39. Ontario Bottled Water Association, Model Code, s. 3.

40. Ontario Bottled Water Association, Model Code, supra, s. 4(a), (b).

41. Ontario Bottled Water Association, Model Code, supra, s. 4(d).

42. Ontario Bottled Water Association, Model Code, supra, s. 2(e).

43. Ontario Bottled Water Association, Model Code, supra, s. 5.

44. Communication with Bill Nace, OBWA, 28 Feb., 1989.