

# Public Health Initiatives Related to Drinking Water Quality in Canada



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**Federal/Provincial/Territorial (F/P/T)  
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*For:*  
**Conference of F/P/T Deputy Ministers  
of Health**

***October 2003***

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\* In December 2002, this committee was restructured and is now called the F/P/T Advisory Committee on Population Health and Health Security (ACPHHS).

## Purpose

This document has been prepared by the Safe Drinking Water Subgroup of the Public Health Working Group (PHWG) for the Conference of Deputy Ministers of Health as requested at the latter's November 2001 meeting. At that meeting, the PHWG was tasked:

To work with the Committee [on] Environmental and Occupational Health (CEOH) in the context of three major reports from British Columbia, Saskatchewan and Ontario dealing with various aspects of this issue, and a growing interest on the part of the Canadian public to identify opportunities and issues requiring [federal/provincial/territorial] collaboration [with respect to drinking water].

## Introduction

Canadians have expressed increased concern over the safety of their drinking water in the past few years. This concern was brought to the forefront after reports hit the news of outbreaks of waterborne disease in Walkerton, Ontario, and North Battleford, Saskatchewan. Concern has also been expressed over the number of active boil water advisories in communities across the country, as well as over the presence of certain chemical compounds, such as disinfection by-products, in treated drinking water supplies.

For these reasons, the PHWG identified drinking water as a public health issue. This report includes background information on the role of the PHWG, the groups responsible for drinking water in Canada and what they are currently doing to address concerns, and recommendations for action by the Advisory Committee on Population Health (ACPH). For more information on the roles and responsibilities of the PHWG, the Federal-Provincial-Territorial (F/P/T) Committee on Environmental and Occupational Health and the F/P/T Committee on Drinking Water, see Appendix A.

## Drinking Water in Canada: Who Is Responsible?

In Canada, all levels of government have some responsibility for drinking water, whether direct or indirect. Because drinking water is considered a natural resource, the legislative responsibility for providing safe drinking water to the public generally falls under provincial or territorial jurisdiction. Each province and territory has adopted legislation to protect its source waters and to establish requirements to provide clean, safe and reliable drinking water to its citizens. In British Columbia, Manitoba, New Brunswick and the territories, the authority for drinking water rests with ministries of health. In all other provinces, this authority currently rests with ministries of environment. In these latter provinces, however, there is generally close collaboration with the health ministries when concerns with drinking water quality arise.

In addition, all levels of government have policies and agreements in place that affect the quality of drinking water, ranging from land-use agreements in watersheds; to water quality monitoring, inspections and operator certification; to purchasing policies for materials that come into contact with drinking water throughout the treatment and distribution chain.

The federal government is directly responsible for drinking water under federal jurisdiction, such as on board common carriers (e.g. ships, airplanes), in military and other federal facilities and in national parks.

In First Nations communities located south of 60°N, the responsibilities for drinking water are shared between First Nations Band Councils, Health Canada (First Nations and Inuit Health Branch) and Indian and Northern Affairs Canada (INAC). Band Councils are generally responsible for ensuring that water facilities are designed, constructed, maintained and operated in accordance with established federal or provincial standards, whichever are the most stringent. INAC provides funding through its Capital Facilities and Maintenance Program for capital construction or upgrading of water facilities, as well as covering a portion of the operation and maintenance costs. INAC may also fund First Nations communities to share services, such as water, with neighbouring municipalities. Health Canada ensures that water quality monitoring programs are in place in First Nations communities.

In First Nations communities located north of 60°N, responsibilities for drinking water generally rest with the territorial governments.

Bottled water and pre-packaged ice and water used in the federally regulated food industry are regulated as foods under the federal *Food and Drugs Act*. The authority for enforcing this Act is the Canadian Food Inspection Agency (CFIA). Currently, very limited mandatory requirements exist for these products to be tested for the presence of chemical contaminants. The only chemicals covered by the current requirements are fluoride, arsenic and lead. Only very basic requirements are in place for testing the microbiological safety of these products.

The Canadian public also has responsibilities related to drinking water. These responsibilities include taking care to conserve water and not dumping hazardous substances down drains or directly into water sources. In rural areas, citizens must follow rules about the placement of septic tanks and outhouses in relation to water sources. Single-family residences with single connections to wells or surface waters located on their private property are not covered by provincial or territorial drinking water legislation. These households are responsible for ensuring that their water is potable by having it tested regularly and treating it if necessary.

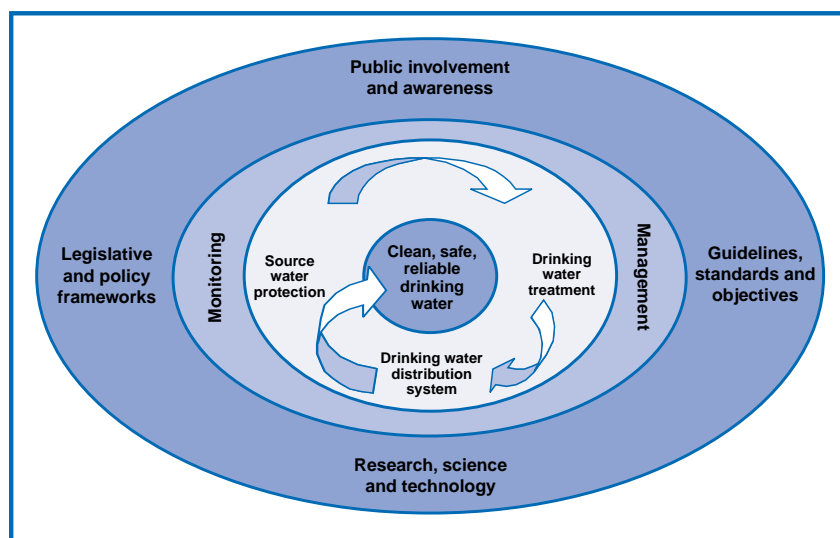
Another potential concern for consumers is the use of materials that come into contact with drinking water. These materials, which include point-of-use and point-of-entry (into the home) drinking water treatment units, are not required by law in Canada to be certified as meeting health-based performance standards. Consumers should take care to purchase only products that are designed and certified to treat the water in the required manner (e.g. filter out the specific chemicals or microbes present). Products are considered certified if the certification has been done by an organization accredited by the Standards Council of Canada and the product meets the relevant standards, such as those developed by the American National Standards Institute/NSF International. In Canada, certification programs for drinking water materials are voluntary for manufacturers.

### **Managing Drinking Water Supplies: The Multiple Barrier Approach and Hazard Analysis and Critical Control Points (HACCP)**

In order to help ensure that drinking water supplies are kept clean, safe and reliable, national and international drinking water experts recommend taking a broad view of the management of drinking water supplies, from source to tap. The most effective way to manage supplies is to implement multiple barriers that block pathogens or contaminants from entering the supply at various points in the system or controls that reduce the risks associated with their presence: in source water, at the treatment plant and throughout the distribution system to the consumer's tap.

Figure 1 (below) shows the various components of the multi-barrier approach and how they work together to ensure that drinking water supplies are kept clean, safe and reliable. As part of the regular assessment and evaluation of the drinking water system, public health concerns should be identified and addressed, at all stages from source to tap.

**Figure 1: Components of the Multi-Barrier Approach**



As noted in Appendix A, the concept of the multiple barrier approach, while not new, is being promoted in Canada by the federal, provincial and territorial governments. The federal government, in collaboration with the provinces and territories, has published two guidance documents; these documents are available on Health Canada's water quality website at: [www.hc-sc.gc.ca/waterquality](http://www.hc-sc.gc.ca/waterquality).<sup>1</sup>

The multi-barrier approach is complemented through the adaptation of HACCP principles, used successfully in the food industry to safeguard the food supply, to drinking water systems. The HACCP approach is one model that could be used to help identify the risk assessment and management systems required to provide safe drinking water and at what stages. The eight HACCP principles can help authorities identify the critical control points in their water systems and then manage the associated risks. The eight HACCP principles are:

1. Risk assessment
2. Identification of critical control points
3. Establishment of preventive measures with critical limits for each control point
4. Establishment of procedures to monitor the critical control points
5. Establishment of corrective actions to be taken as needed
6. Establishment of procedures for verifying that the hazard control system is working
7. Establishment of effective record keeping
8. Continual improvement of the quality of the product (water) and the process

For more information about the HACCP approach and how it could be applied to a drinking water system, see Appendix B.

## Current Federal, Provincial and Territorial Initiatives

Over the past two years—largely in response to the events in Walkerton, Ontario, and North Battleford, Saskatchewan—each province and territory, and the federal government, has conducted a review of its regulations, policies and programs related to drinking water. Many, like Manitoba, Ontario and Quebec, have made their regulations more stringent. Others, like British Columbia and Saskatchewan, are still reviewing their legislation and making decisions about the best way to manage watersheds and drinking water supplies in their jurisdictions. The federal government is looking at its responsibilities related to water in its own jurisdiction(s) and is strengthening its programs. At the same time, it is continuing to work closely with the other levels of government to ensure that public health is protected consistently across the country. For a detailed list of current initiatives, see Appendix A.

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1. The two documents are: *Guidance for Safe Drinking Water in Canada: From Intake to Tap* and *From Source to Tap: The Multi-barrier Approach to Safe Drinking Water*. The latter is also available on the website of the Canadian Council of Ministers of the Environment ([www.ccme.ca](http://www.ccme.ca)).

## Analysis

As mentioned above, the authority for managing drinking water supplies in Canada varies from jurisdiction to jurisdiction. Regardless, because the quality of drinking water is a public health issue, it is imperative that public health officials be kept involved in discussions and decisions made about drinking water supplies, to enable them to work with system managers and others in the municipality to take necessary actions to protect public health. Public health officials need to be kept informed about:

- Legislative and/or regulatory changes affecting drinking water supplies
- The presence and location of inadequacies in the drinking water system that could present a public health risk (such as an outbreak of waterborne disease), as detected by the responsible agencies
- The accreditation of laboratories
- Laboratory reports about the quality of drinking water samples (these reports also need to be made available to the drinking water authority and the purveyor)
- The results of microbiological testing of drinking water samples
- The results of hazard assessments of water systems
- The issuance and rescinding of boil water advisories (sometimes referred to as boil water orders)

Public health officials, especially in provinces where the authority over drinking water lies with a ministry of environment, are not necessarily kept regularly informed about the latest research or information about drinking water supplies. By creating stronger links with the F/P/T Committee on Drinking Water, which meets twice per year, public health officials would be kept regularly informed about federal, provincial and territorial initiatives related to drinking water, including those aimed at improving the safety and reliability of supplies. In addition, individual officials could join the Water Quality and Health Bureau's (WQHB) water quality listserv, launched to keep stakeholders informed of changes to the *Guidelines for Canadian Drinking Water Quality* and the publication of related documents on the WQHB's website.

Many jurisdictions likely have some or all of the above already in place, but in order for the health of all Canadians to be adequately protected, it is important for all jurisdictions to strive to achieve the same high level of internal communication and cooperation.

In this same vein, all jurisdictions should strive to incorporate the concepts of the multi-barrier approach into, and consider the HACCP principles as a model for, their drinking water programs. Again, many jurisdictions already have some of these elements in place; the goal is to strive towards adoption of best practices across the country.

In addition to the above, there are some areas in which the Government of Canada has clear jurisdiction and therefore needs to take the leadership to make positive changes in order to safeguard public health. The three areas that stand out are:

- First Nations communities (shared) and federal lands
- The safety of pre-packaged water and ice and water used in the preparation of processed foods
- The safety of materials that come into contact with drinking water (drinking water treatment additives, devices and system components)

Consultations on federal regulations related to the quality of pre-packaged water have begun. For drinking water materials, the federal government should strengthen certification requirements, which are currently voluntary. Certification could be made mandatory through the adoption of legislation such as the *Drinking Water Materials Safety Act*. This Act has been introduced into the House of Commons on two separate occasions and has died on the order paper both times.

## Recommendations

The working group reviewed what is required to continue to improve water quality in Canada. While the recommendations below focus on public health officials, they also deal with areas that could be improved on by the provincial, territorial and federal governments.

A cross-cutting key issue identified in the major reports from the Walkerton, Ontario, and North Battleford, Saskatchewan, waterborne disease outbreak inquiries and the British Columbia special report on drinking water quality was the need to ensure that public health officials are closely involved with drinking water programs and are kept informed in a timely fashion when health-related issues arise.

The link to public health officials is particularly critical in jurisdictions where a ministry of environment,<sup>2</sup> rather than a ministry of health, is the legislated authority for ensuring that purveyors provide safe drinking water, although the working relationships must exist regardless of jurisdictional issues, in order to protect public health.

ACPH, following discussion with the working group, recommends to the Deputy Ministers three groups of recommendations: the overarching approach to drinking water protection, governance and legislative authority for drinking water protection and access to and sharing of information about the safety of drinking water.

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2. Or other legislated authority.



### **Overarching approach to drinking water protection**

1. That the concepts of the multiple barrier approach be incorporated into regulated drinking water programs in all jurisdictions across Canada and that the principles of hazard analysis and critical control points (HACCP) be considered as a model for implementing the multiple barrier approach.

### **Governance and legislative authority for drinking water protection**

2. That public health officials in the provinces and territories and the Council of Chief Medical Officers of Health have representation on the appropriate F/P/T committees and working groups in order to stay current with and influence the development of policies, programs and regulations on safe drinking water.
3. That provincial/territorial ministries of health and environment continue to work closely together by forming ongoing joint committees or working groups in recognition that safe drinking water is a shared responsibility and that the multi-barrier approach requires collaboration by many players.
4. That these groups should ensure that appropriate legislative authority, administrative arrangements and sufficient resources exist to enable public health officials to be provided with monitoring results of drinking water systems to take the necessary action to protect public health.
5. That the Government of Canada strengthens regulatory requirements for bottled water and ice and for materials that come into contact with drinking water as essential elements of a national safe drinking water program.

### **Access to and sharing of information about the safety of drinking water**

6. That local public health officials have access to ongoing monitoring information on water quality test results, hazard assessment reports, laboratory accreditation reports, etc. in order to take immediate action in the case of a threat to drinking water quality and to be able to work proactively with operators and other agencies to prevent water-related illness.
7. That F/P/T ministries of health and environment share science/research, best practices, surveillance information, etc. through a national mechanism to support public health policy and action to improve drinking water quality.
8. That F/P/T ministries of health and environment provide and share information and educational materials to the public through websites, publications and promotional materials so that consumers can play an active role in managing their own drinking water systems where applicable, conserving water and using water treatment devices such as filters appropriately.



## Appendix A: Roles, Responsibilities and Current Initiatives

### Public Health Working Group (PHWG)

PHWG receives its mandate from, and serves as a resource and advisor to, the Advisory Committee on Population Health (ACPH). The PHWG's work and deliberations focus on, but are not limited to, public health issues and services delivered through government-funded public health agencies at the federal, provincial/territorial and regional/local levels.

The PHWG's mandate has been to:

- Identify issues of importance in the public health context, establish priorities with the assistance of an agenda-setting framework, agree on the work plan with ACPH, investigate priority issues and report findings and recommendations to ACPH
- Advise ACPH on processes to respond to emerging public health issues
- Develop recommendations to achieve more effective and better-integrated federal/provincial/territorial (F/P/T) public health systems
- Investigate and make recommendations concerning the capacity of public health agencies to respond to ongoing, urgent and emerging issues
- Make recommendations with respect to research and evaluation in public health
- Maintain liaison with F/P/T and similar groups concerned with public health issues

### Federal-Provincial-Territorial Committee on Environmental and Occupational Health (CEOH)

CEOH acts to facilitate and coordinate activities related to environmental and occupational health across jurisdictions. Its membership consists of representatives from the departments of health, environment and labour at both the federal and provincial/territorial levels. In the area of drinking water, CEOH is the parent committee to the F/P/T Committee on Drinking Water (formerly the Subcommittee on Drinking Water). Together, these groups establish the *Guidelines for Canadian Drinking Water Quality* (see below).

CEOH currently reports to the Assistant Deputy Minister (ADM) of Health Canada's Healthy Environments and Consumer Safety Branch (HECS). Discussions are under way about changing this reporting structure to give more visibility to the group's activities. The following three options are on the table, with the first or second option being the most likely:

1. Establishing informal links between CEOH (as a joint forum), ACPH and the Environmental Planning and Protection Committee<sup>3</sup> (EPPC) by having CEOH members be appointed by ACPH/EPPC and by asking the ADM/HECS to report regularly to ACPH and EPPC. The CEOH would continue to report to the ADM/HECS.
2. Establishing formal links between CEOH, ACPH and EPPC by establishing CEOH as a joint forum reporting to ACPH and EPPC, co-chaired by ADM-level representatives appointed by ACPH and EPPC. Members would be appointed by ACPH and EPPC.
3. Having CEOH report directly to the federal Deputy Ministers of Health and the Environment. Deputy Ministers would appoint co-chairs and members to CEOH.

### **Federal-Provincial-Territorial Committee on Drinking Water**

Over the past 30 years, the federal and provincial government departments with responsibility for drinking water have collaborated through the F/P/T Committee on Drinking Water to develop the *Guidelines for Canadian Drinking Water Quality*. As mentioned above, this Committee reports to CEOH. It meets twice per year to review the guidelines, share research and policy information and generally ensure that all jurisdictions are kept informed about drinking water quality issues across Canada.

In response to the recent outbreaks of waterborne disease mentioned above, the Committee established a working group to develop a guidance document for water purveyors. The purpose of the document was to promote the concept of the multi-barrier approach as a way of ensuring the safety of drinking water supplies. This document, *Guidance for Safe Drinking Water in Canada: From Intake to Tap*, is now posted on Health Canada's water quality website at [www.hc-sc.gc.ca/waterquality](http://www.hc-sc.gc.ca/waterquality). The working group has also contracted out the development of a technical supporting document to provide more detailed guidance on the various aspects of the multi-barrier approach to water purveyors.

In addition, this working group collaborated with the Canadian Council of Ministers of the Environment's (CCME) Water Quality Task Group to expand the guidance document to include source water considerations. This document, *From Source to Tap: The Multi-barrier Approach to Safe Drinking Water*, is posted on the websites of both Health Canada's Water Quality and Health Bureau (WQHB) ([www.hc-sc.gc.ca/waterquality](http://www.hc-sc.gc.ca/waterquality)) and the CCME ([www.ccme.ca](http://www.ccme.ca)). Additional collaborative efforts are being made with other departments such as Natural Resources Canada on issues such as groundwater research.

3. EPPC is the Steering Committee for the Canadian Council of Ministers of the Environment (CCME). Its membership is made up of senior staff from each jurisdiction (federal, provincial and territorial). CCME's membership is made up of the 14 ministers of the environment. For more information, see [www.ccme.ca](http://www.ccme.ca).

## Federal Government

### *Health Canada*

Health Canada plays a well-established leadership role in drinking water quality throughout Canada. The WQHB's key tasks include:

- Establishing and publishing the *Guidelines for Canadian Drinking Water Quality*, in collaboration with the provinces/territories, via the F/P/T Committee on Drinking Water
- Coordinating the flow of information to authorities across the country through its role as the technical secretariat to the Committee
- Conducting health assessments related to the Guidelines
- Conducting research into, and evaluations of, the safety of drinking water materials and contaminants; sharing expertise and scientific advice with other agencies and the public
- Coordinating the development of analytical methodologies for drinking water contaminants where such methodologies do not currently exist (e.g. microcystins)
- Responding to emergencies such as chemical spills, on request
- Hosting the water quality website and listserv
- Working with other organizations and government departments interested in drinking water issues
- Participating in and providing input to the Enteric National Disease Surveillance Committee

Health Canada is also responsible for:

- Monitoring and investigating waterborne disease (Population and Public Health Branch)
- Regulating pre-packaged water and ice and water used in food production (Health Products and Food Branch)
- Assisting other federal departments in providing safe drinking water on federal lands (Workplace Health and Public Safety Programme – WHPSP – HECS)
- Assisting industries serving the travelling public to ensure the provision of safe drinking water on board common carriers, e.g. railways, ships, aircraft (WHPSP)
- Collaborating with Indian and Northern Affairs Canada (INAC) to assist First Nations' communities in ensuring safe drinking water on their lands. Health Canada's First Nations and Inuit Health Branch (FNIHB) works in partnership with First Nations to ensure that drinking water quality monitoring programs are in place in First Nations communities. (In communities north of 60°N, much of the responsibility for drinking water on reserves has been delegated to territorial governments.)

Health Canada's WQHB has established working relationships with other programs within Health Canada (such as FNIHB) and federal departments with responsibilities for water, including Environment Canada and INAC. For example, FNIHB is working with the WQHB, representatives from First Nations communities, INAC and Environment Canada to develop a comprehensive series of protocols for managing drinking water supplies on First Nations lands.

The WQHB also collaborates with the U.S. Environmental Protection Agency, when appropriate, to develop health-based assessments of contaminants in drinking water. These assessments are key to the development of drinking water guidelines. In addition, the WQHB is recognized internationally as a World Health Organization/Pan American Health Organization Collaborating Centre for Water.

### ***Indian and Northern Affairs Canada (INAC)***

As mentioned above, INAC shares responsibility with Health Canada and First Nations to ensure safe drinking water on First Nations reserves. INAC assists First Nations with the construction and management of water and wastewater facilities on reserves and provides support for operator training. While INAC is responsible for water treatment plants, their operators and any monitoring within the plants, the bands themselves are responsible for repair and maintenance of their drinking water systems.

### ***Environment Canada***

Environment Canada plays a lead role with respect to source water (quality and quantity), including advice/support, monitoring, freshwater research (National Water Research Institute), risk management, pollution prevention, emergency response and policy support. It also provides support to other federal departments in assessing and managing source water on federal lands and undertakings. In addition, Environment Canada provides the Chair and Secretariat for the CCME and its water-related activities and develops and publishes ambient water quality guidelines to protect surface water quality and groundwater for raw drinking water, aquatic life and agricultural uses (irrigation and livestock watering).

## **Provincial and Territorial Governments**

### ***Alberta***

In Alberta, potable water is regulated under the *Environmental Protection and Enhancement Act* and the Potable Water Regulation. The Potable Water Regulation makes the health-related parameters of the *Guidelines for Canadian Drinking Water Quality* legal requirements for municipal or community drinking water treatment systems in Alberta.

Regulated by Alberta Environment, Alberta's drinking water program adopts the multi-barrier approach and includes the following key elements:

- Watershed assessment and protection
- Legislation and regulations supported by scientifically defensible design and performance standards
- Treatment facilities and infrastructure using state-of-the-art technology
- Operator training and certification
- Drinking water monitoring/risk assessments
- Appropriate compliance action (regulatory approach)
- Consumer confidence (education, communication and database availability)

Systems outside of the licensing jurisdiction of Alberta Environment include individual and communal drinking water systems such as water wells, dugouts, cisterns or truck-hauled supplies that serve individual families or small communities and water cooperatives. Alberta Health and Wellness and the Regional Health Authorities deal with private drinking water supplies and health.

#### *Alberta's Provincial Water Strategy*

The Government of Alberta is currently completing a provincial water strategy—*Water for Life: Alberta's Strategy for Sustainability*—focusing on four specific areas:

- Safe, secure drinking water supply
- Healthy aquatic ecosystems
- Reliable, high-quality water supplies for a sustainable economy
- Knowledge to make effective water management decisions

To help develop this strategy, an extensive provincial consultation process was held between November 2001 and June 2002, consisting of three major components—ideas generation, public outreach and consultation, and a Minister's Forum on water. During the consultation on the water strategy, feedback from Albertans specifically related to drinking water included:

- Encourage wise use of drinking water
- Increase efforts to ensure safe drinking water
- Protect water from contamination
- Develop a long-term risk management approach to supply and demand

Following the final report from the Minister's Forum, Alberta Environment led a team that compiled the ideas and feedback heard through all three levels of the consultation process and developed a series of recommendations and a framework for a draft strategy, released in spring 2003.

Recommendations in the draft strategy related to ensuring that all Albertans have safe and secure drinking water were as follows:

## **New**

### *For regulated systems*

- Determine the full cost of drinking water so that consumers and governments can make informed decisions.

### *For non-regulated systems*

- Provide accurate, accessible and clear information to Albertans on private systems so that they can make informed decisions on how to ensure the quality and safety of their drinking water.

## **Enhance**

### *For regulated systems*

- Continue to adopt drinking water standards and monitoring processes that protect the health of Albertans.
- Improve risk management of potential threats to drinking water safety.
- Support and facilitate regional delivery of drinking water through partnerships with the private sector and large municipalities.

The final *Water for Life* strategy will be released in fall 2003 and will include specific actions and timelines, along with an accountability framework, based on these recommendations. A copy of the draft provincial water strategy is available at [www.waterforlife.gov.ab.ca](http://www.waterforlife.gov.ab.ca).

## **Other initiatives**

- Current health surveillance of waterborne and foodborne diseases relies upon conventional laboratory techniques. The development of new technology is critical for the prevention and control of infectious disease, and Alberta Health and Wellness supports several research programs for the development of new technology, health risk management protocols and the study of health effects.
- A “Communication and Action Protocol for Failed Bacteriological Results in Drinking Water for Waterworks Systems Authorized under the *Environmental Protection and Enhancement Act*” was developed in collaboration with Alberta Environment, Alberta Health and Wellness and the Provincial Laboratory for Public Health (Microbiology). This revision to the 2001 communication and action protocol for failed bacteriological samples was completed in March 2003.
- In the fall of 1999, an “Inter-Departmental Committee on Municipal Water/Wastewater” was initiated. Its purpose includes: funding for projects eligible under the Alberta Municipal Water/Wastewater Partnership, design and quality standards

for water/wastewater (i.e. Alberta Environment standards), budget allocations, changes to funding criteria, and changes to project prioritization and performance measures for the grant program.

### ***British Columbia***

In British Columbia, the legislation for drinking water falls under the Ministry for Health Services (from the intake to the tap). Multiple ministries, coordinated by the Ministry of Water, Land and Air Protection, have been responsible for source water. In 1992, British Columbia introduced a Safe Drinking Water Regulation. In 1999, B.C.'s Auditor General published a report, *Protecting Drinking-Water Sources*. In 2000, the Provincial Health Officer published *Drinking Water Quality in British Columbia: The Public Health Perspective (2000)* and the province developed a Drinking Water Protection Plan. In 2001, a *Drinking Water Protection Act* was introduced into the legislature and passed, but most of the Act requires regulations to proclaim the implementation. In February 2002, a government-appointed Drinking Water Review Panel reviewed the *Drinking Water Protection Act* and made recommendations.

On June 19, 2002, the province announced an Action Plan for Safe Drinking Water in British Columbia. This plan is available at [www.gov.bc.ca/prem/popt/cabinet](http://www.gov.bc.ca/prem/popt/cabinet).

The plan calls for:

- The safety of drinking water being a public health issue
- Source protection to be a critical part of drinking water protection
- An integrated approach to providing safe drinking water
- All systems to be thoroughly assessed to determine risks
- Recognizing that proper treatment and the integrity of water distribution systems are important to protect human health
- Tap water to meet acceptable safety standards and be monitored
- A flexible system with safeguards for small systems
- Affordable safe drinking water, with users paying appropriate costs

The Cabinet has endorsed a process that will see an implementation plan for the above developed by the fall of 2002, including the development of funding mechanisms and legislative changes. New funding will be made available for:

- Health Authority Drinking Water Officers
- Provincial Health Officer support
- Information systems
- Drinking Water Advisory Committee
- Laboratory testing
- Emergency source to tap assessments



- Drinking Water Protection Plan development
- Source protection assessment and monitoring
- Ministry standards-setting and technical support for drinking water programs
- Groundwater protection assessment and monitoring
- Programs for research, training and certification of water system operators
- Partnerships and community stewardship grants
- Governance and planning grants

### ***Manitoba***

On May 9, 2001, the Ministers of Health and Conservation jointly announced that the Manitoba government was introducing a mandatory certification program for operators of water and wastewater facilities in Manitoba. The certification program ensures that the people overseeing the public supply and disposal of water in this province have received the training they need to maintain a safe water system. To date, 350 operators have successfully written the exam; of these, 50 operators were from First Nations utilities.

In the same May 9, 2001, announcement release, the Ministers stated that the Manitoba government had reinstated subsidized bacterial testing of private and semi-public drinking water systems on a yearly basis. The Ministers announced that the province would cover 70 per cent of the cost of bacterial water testing for private and semi-public water supplies. This water-testing program remains available to approximately 30,000 Manitoba homeowners and 1,500 semi-public water system owner/operators.

On November 29, 2001, Conservation Minister Oscar Lathlin and Health Minister Dave Chomiak announced that the new provincial central drinking water unit (Office of Drinking Water) had begun its role of enhancing drinking water programs and related measures already in place to better protect public health.

On July 2, 2002, Bill 36, the *Drinking Water Safety Act*, was introduced into the current legislative session by Health Minister Chomiak and Conservation Minister Lathlin and received Royal Assent on August 9, 2002. Regulation drafting and enactment action are ongoing.

This legislation improves drinking water safety by strengthening prevention measures and enables faster and more effective responses to water quality concerns. The legislation provides for mandatory licensing for all public and semi-public water systems and drinking water quality standards to be met by public and semi-public water system operators. The legislation also requires a comprehensive assessment of these systems every five years. Based on the assessment, owners of water systems may be ordered to make repairs and upgrades to maintain safe drinking water.

Other legislative provisions include:

- Requiring immediate reporting and effective communication of abnormal water tests so steps can be taken to protect the public
- Requiring all public and some semi-public water suppliers to disinfect and regularly test the water supply
- Requiring all public and semi-public water suppliers to do bacteriological testing and provide reports to the provincial Office of Drinking Water
- Providing for drinking water officers to carry out monitoring and enforcement activities
- Improving the powers of officials to provide for effective monitoring and action where necessary to protect the public, including inspection powers and the ability to issue drinking water safety orders requiring testing, repairs or other remedial action
- Confirming the power of officials to require and enforce boil water advisories to protect the public
- Providing whistle blower protection
- Prohibiting the construction or alteration of a public or semi-public water system without a permit
- Enabling the director and medical officers of health to issue orders for costs in specified circumstances (i.e. for costs incurred where action is taken to carry out an order when there is non-compliance)
- Provision for appeals to the Minister

### ***New Brunswick***

The Departments of Health and Wellness (HW) and Environment and Local Government (ELG) have agreed on a protocol that will enhance the existing monitoring and compliance framework. The safety of water supplies will continue to be a shared mandate between both departments. Some of the requirements to be phased in include mandatory waterworks operator certification and the use of accredited laboratories for water analysis.

The definition of a public water supply will be expanded to include small waterworks systems such as mobile home parks and campgrounds. Six new positions have been created within ELG to proceed with the enhancement. ELG will be the primary contact with water system operators, will issue approvals to operate on all public water supplies and will perform audits/inspections on water system maintenance and operation. HW will continue to determine minimum water sampling requirements for each water system, monitor water sampling plans and results and issue/revoke interdictions/health advisories on water supplies. In response to water test results from private wells showing the presence of methyl tert-butyl ether (MtBE), HW's Office of the Chief Medical Officer

of Health adopted an interim maximum acceptable concentration (IMAC) for MtBE in drinking water of 15 µg/L. Criteria used for setting the IMAC at this level were based on the aesthetic guidelines currently used in other jurisdictions.

### ***Newfoundland***

The Government of Newfoundland and Labrador has taken a number of steps in its drinking water strategy to further ensure the safety of public drinking water supplies. The development and implementation of a multi-barrier action plan to drinking water safety have resulted in a number of recent drinking water-related initiatives. Included in multi-barrier action plan initiatives are:

- Continuation of source water protection program
- Funding for upgrades to public water supply disinfection systems
- Training programs for the operators of drinking water systems
- Implementation of a chemical water quality monitoring program
- Enhancement of the bacteriological water quality monitoring program
- Enhancement of public water supply inspections
- Development of electronic databases for all water quality monitoring data
- Adoption of the national drinking water guidelines into a provincial drinking water standard

### ***Northwest Territories***

A number of special initiatives are designed to ensure the safety of public water systems. These include detailed assessments of all public water systems, regulatory changes requiring certification of water treatment plant operators (currently voluntary), implementation of a Northwest Territories drinking water quality database, and increased staff and resources dedicated to drinking water programs. The government is preparing a guidebook entitled *Good Engineering Practice for Northern Utilities (Water and Sewer Systems/Facilities)*, scheduled for distribution in 2002.

### ***Nova Scotia***

The province is continuing to review programs and policies and is working on water hauler guidelines.

### ***Nunavut***

The government is proposing regulatory amendments to better deal with drinking water issues. Training for treatment plant operators is being done through the Canadian Water and Wastewater Association (CWWA), but there are language and educational barriers. The government is discussing the idea of creating a unique training course with CWWA.

## Ontario

The Ontario government has committed itself to the full implementation of all 121 recommendations of the Walkerton Inquiry Report, Parts One and Two. The Drinking Water Protection Regulation (O. Reg. 459/00) was passed to impose stricter standards on municipal drinking water systems. The Ontario Drinking Water Guidelines became Ontario Drinking Water Standards. Provincial standards are now being developed for the following parameters: antimony and cyanobacterial toxins.

The Drinking Water Protection Regulation for Smaller Water Works Serving Designated Facilities (O. Reg. 505/01) covers waterworks supplying services to vulnerable populations for which the Ministry of Health and Long Term Care, the Ministry of Community and Social Services or the Ministry of Education is the interested authority through a financial and/or regulatory role.

The province will introduce a *Safe Drinking Water Act* in the fall of 2002. The proposed components include:

- Licensing and accreditation of drinking water laboratories
- Drinking water standards, including an Advisory Council on Standards
- Mandatory training and certification of operators of municipal waterworks
- A requirement for an owner's licence for the operation of municipal waterworks
- A statutory standard of care for municipalities
- Specific inspection, compliance and enforcement provisions

A Water Project Office was established under a new Assistant Deputy Minister to coordinate the Ontario Ministry of the Environment's efforts to address the recommendations in the Walkerton Inquiry Report, Part One.

The province has passed the *Nutrient Management Act, 2002* (Bill 81), which will provide major protection to watersheds through control of the land application of nutrients. The regulations for this Act will be quickly put in place. The *Nutrient Management Act* is one part of a new watershed-based approach to drinking water management that is being developed.

The province is establishing a \$50 million Clean Water Legacy Trust and Clean Water Centre of Excellence in Walkerton to address education and research programs concerning drinking water.

The *Sustainable Water and Sewage Systems Act, 2001* (Bill 155), which is before the Legislature, will require full cost recovery for municipal drinking water works and sewage systems.

The province is cooperating with the federal government to address the Walkerton Inquiry recommendations that relate to First Nations and F/P/T collaboration on drinking water matters.

Since June 2000, the Ministry of Health and Long Term Care has provided a rapid notification service for all private well water adverse test results. This system is being converted into an electronic notification system between the Public Health Laboratories, Public Health Branch and 37 health units. The Safe Water Mandatory Program of the Mandatory Health Programs and Services Guidelines under the *Health Protection and Promotion Act* is being revised to address the legislative changes and need to ensure safe drinking water for everyone. A draft Boil Water Advisory Protocol is in use and is in the process of being finalized. The Ministry of Health and Long Term Care, Ministry of Agriculture and Food and Ministry of the Environment have developed a new detailed educational package for private well owners.

Ontario plans to actively participate in the national consultation on the proposed revised turbidity guideline. Notice of the consultation will be posted on the province's Environmental Bill of Rights Registry, and key stakeholders will be notified directly by the Ministry of the Environment. Plans are to hold a series of workshops to (a) discuss the requirements of the proposed guideline in the context of its eventual adoption into Ontario legislation as a standard and (b) assist waterworks owners/operators in identifying any problems they may have in meeting the guideline and how to assess the cost associated with addressing those problems. The Ministry of the Environment also plans to provide hands-on assistance to waterworks owners/operators to optimize equipment and processes to meet the proposed guideline.

### ***Prince Edward Island***

A drinking water strategy was announced in June 2001. Changes are currently being made to well water and sewage disposal regulations. The province is looking at an umbrella regulation for the water supply. Regulations should be drafted by fall 2002, with implementation phased in over two years. Anticipated dates for these components are: mandatory sampling requirements by fall 2002, mandatory operator certification by spring 2003, and completion of well field protection plans by 2004. The province is looking at new database possibilities, to be accessed through either the Internet or regional service centres. New public information materials are being prepared under the drinking water strategy on such areas as proper well construction and maintenance, water treatment technology, individual water quality parameters of concern, etc. The department has been busy with private well sampling over the past two years and is still getting busier. Nitrate contamination of wells appears to be a growing area of concern and is the focus of some attention by the provincial agriculture department. Two areas that are being looked at are nutrient management plans and crop rotation legislation.

## *Quebec*

The events of May 2000 in Walkerton had a significant impact on Quebec. In June 2000, Quebec's environment minister made public a list of 90 municipal and private water supply systems of which the quality of the distributed water was deficient. The owners were to take corrective measures swiftly.

In June 2001, Quebec adopted very strict regulations on water quality standards and testing frequency. The standards with respect to turbidity and trihalomethanes are more strict than the Canadian recommendations. Moreover, all the educational and health institutions, including daycare centres and special housing, and all tourism businesses, including campgrounds and roadside rest areas, are subject to quality control as soon as they serve more than 20 people, just as municipalities and private systems are. If water contamination occurs, the accredited laboratory must inform the environment and health ministers.

By June 2007, all systems fed by surface water must filter their raw water in accordance with the design criteria for parasites and viruses. Continuous monitoring of chlorine and turbidity is required at the point where the water exits the treatment station. By July 2004, all operators must have been recognized as competent. As soon as groundwater shows fecal contamination, disinfection becomes mandatory. The overall costs of upgrading the systems are twice as high as estimated (\$600 million), owing to, among other things, the costs of locating surface water and groundwater connections and requests by municipalities wishing to improve their existing equipment.

To assist the operators of water supply systems, the government has put in place a grant program for municipalities and has developed a program for certification of operators' competence. The Ministère de l'Environnement [department of the environment] has, among other things, developed a number of tools that are available on its website: Highlights, Guide de conception des installations de production de l'eau potable [guide for designing drinking water production facilities], Procédure de mise aux normes pour mieux accompagner la clientèle [upgrading procedure to better assist the clientele], Contenu des demandes d'autorisations [content of applications for authorization], Procédure de validation des nouvelles technologies en eau potable [validation procedure for new drinking water technologies]; Guide vulgarisé pour les clientèles touristiques [guide in non-technical language for tourist clienteles]; and Procédure d'analyse des puits individuels [procedure for testing individual wells].

The Quebec health network is also active, since, as soon as the standards are outdated or an epidemic is suspected, its personnel are asked to investigate and determine the sanitary measures to recommend for protection of public health. Also, the health network advocates the precautionary principle, whereby the population would be informed of any suspected risk, even for a substance with respect to which there appears to have been compliance with the regulatory standards.



By making public its national policy on water in the spring of 2003, Quebec has committed itself to developing an action plan for as early as 2004 for protection of surface water sources. In the case of groundwater, the regulation adopted in June 2002 imposes, among other things, the delimitation of recharge areas and prohibits the spreading of manure in bacteriological protection areas.

### *Saskatchewan*

Saskatchewan has developed a long-term safe drinking water strategy as the primary means to address and improve future drinking water management in the province. The strategy builds on positive aspects of the existing program to deliver a source to tap solution for better drinking water for the residents of the province. This strategic plan will deliver on key objectives, including the need to ensure that waterworks and operations provide safe and sustainable drinking water, that the drinking water regulatory system is clear and effective, that high-quality source waters are protected, and that citizens and consumers trust and value their drinking water and drinking water systems.

A number of initiatives listed in the strategy include:

1. Reorganization of existing departments and agencies in government to address three primary areas. Saskatchewan Environment (SE) will fill a regulatory role, a newly created Saskatchewan Watershed Authority will undertake a watershed protection role, and a renewed Saskatchewan Water will focus on provision of drinking water and raw water supplies in the role of a utility. Other agencies with roles or activities affecting drinking water, such as Saskatchewan Health (SH) and Saskatchewan Agriculture, Food and Rural Revitalization, are also reviewing and renewing related programming, policy and requirements.
2. SE will create a separate Drinking Water Quality Section (DWQS) to manage the drinking water programming for the department. The DWQS will develop and deliver the department's drinking water and wastewater regulations, licensing requirements, enforcement policies, standard development and other regulatory requirements including construction and operational approvals, using a compliance-driven model with a rigorous monitoring, inspection prevention and abatement enforcement policy. Additional activities will include implementing the need to have continuing education for operators.
3. SE is developing regulatory amendments to address the goals and objectives of the Long-Term Safe Drinking Water Strategy, which will include: readily enforceable drinking water quality standards for key parameters; enhanced operator training and certification requirements; independent assessment of waterworks once every five years; reporting to SE of



process upset or low disinfectant levels; public reporting by owners of waterworks on water quality and sample submission compliance; and moving all permitting and approval responsibilities to SE.

4. SE's planned complementary non-regulatory actions include: phase-in of water quality standards as permit conditions for parameters that represent a long-term risk; additional attention to waterworks through increased inspection and compliance activities; further refinement of follow-up protocols for bacteriological contamination of water systems; development of emergency response templates; preparation of annual provincial drinking water quality reports by SE; as well as better integration of SE and Health District staff activities and information exchange.

SH is developing new regulations that will address public water supplies (e.g. campgrounds, tourist camps) that are not currently regulated by SE. These regulations will contain provisions that will require owners/operators of public water supplies to ensure that the water is safe for drinking. Funding equivalent to six positions is being provided to the Regional Health Authorities to support these regulations.

SH is developing an enhanced system to address the provincial laboratory's management of water samples and electronic transmission of data. This system will also assist public health officials to perform surveillance activities related to water quality. In addition, 7.5 positions have been added to the water section of the provincial laboratory to address enhanced water testing.

The province is creating an Internet-accessible water quality database that the public will be able to access to obtain water quality information related to public water supplies.

### ***Yukon***

The assessment of community drinking water systems was completed by May 31, 2002. The Yukon now has its own branch of the British Columbia Water and Waste Association (BCWWA). The branch successfully organized two small water system training sessions in November 2001, as well as a half-day drinking water conference. The branch members meet monthly and have begun planning for water and sewage disposal training sessions for fall 2002. A one-day drinking water conference is planned to link into the training sessions. The branch wrote an article on its activities for the upcoming edition of the *Watermark* publication. A course may be developed with BCWWA to address the needs of water truck operators and sewage truck operators.

## Appendix B: Adaptation of HACCP Approach to Drinking Water Systems

HACCP is used successfully in the food industry to safeguard the food supply. The HACCP approach is one model that could be used to help identify the risk assessment and management systems required to provide safe drinking water and at what stages those systems should be put in place.

### HACCP: Hazard Analysis and Critical Control Points for a water system<sup>4</sup>

1. Assemble a multidisciplinary water system HACCP team.
2. Identify the drinking water usages.
3. Describe the water processing requirements needed to meet the beneficial use.
4. Develop a schematic diagram that describes the collection, storage and distribution of the water.
5. Verify the schematic diagram.
6. Apply HACCP Principle 1: Conduct a hazard analysis and risk assessment. Identify the potential hazards (biological, chemical or physical) associated with water.
7. Apply HACCP Principle 2: Identify critical control points. These are points in the collection, storage and distribution of water—from raindrop to tap—where a potential hazard can be controlled or eliminated.
8. Apply HACCP Principle 3: Establish preventive management measures with critical limits for each control point.
9. Apply HACCP Principle 4: Establish procedures to monitor the control points.
10. Apply HACCP Principle 5: Determine corrective actions to be taken when monitoring shows that a critical limit has not been met.
11. Apply HACCP Principle 6: Establish procedures to verify that the system is working consistently.
12. Apply HACCP Principle 7: Establish effective record keeping to document the HACCP system.
13. Apply HACCP Principle 8: Establish a program to identify and carry out continual improvement of the quality of the water from source to tap.

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4. Adapted from Barry J. *et al.*, "Developing and Implementing a HACCP-Based Program to Control *Cryptosporidium* and Other Waterborne Pathogens in the Alameda Creek Watershed: Case Study," Proceedings of the American Water Works Association 1998 Annual Conference.