Introduction

1. Purpose of this document

This document has been developed to promote effective, consistent and transparent administration of the Drinking Water Protection Act (the “Act”) and Drinking Water Protection Regulation (the “Regulation”) across British Columbia. It is intended to provide policy and procedural guidance to public health officials who are responsible for the implementation of this Act, recognizing the broad scope of regulatory authority conferred, and the demands placed on the human and financial resources of the regional health authorities in respect of this Act and other public health statutes.

In many respects, this document reflects policies and practices that have been applied by public health officials for years, based on prior legislation and professional expertise. This document seeks to assemble that knowledge and experience for the benefit of all public health officials and members of the general public, and to refine policy and practice to reflect the legislative regime established under the Act. This regime is based upon a multi-barrier approach, which seeks to address threats to drinking water at various stages, including its source, treatment systems, distribution, and at the tap. It is part of an overall strategy set out in the province’s Action Plan for Safe Drinking Water in British Columbia and reflects a comprehensive approach to drinking water protection based on sound risk assessment.

2. Updates in the 2017 Guide

The current amendment of the Drinking Water Officers’ Guide is an update to the December 2014 version. The current amendment includes new guidance on Provincial drinking water policies and addresses outdated links and typos from the previous version.

In Part A of the Guide, a new subsection was added indicating departures from the Guidelines for Canadian Drinking Water Quality. In Part B, three new guidance documents for drinking water policy were added: Decision protocols for Cyanobacterial Toxins in B.C. Drinking Water and Recreational Water; the Drinking Water Treatment Objectives for Ground Water Supplies in British Columbia; and British Columbia Guidelines (Microbiological) on Maintaining Water Quality in Distribution Systems. Each document in Part B is now available for separate download on the B.C. Ministry of Health website, allowing for easier distribution of pertinent information. Throughout the Guide, references to the Water Act have been changed to reflect the new Water Sustainability Act, which came into force on February 29, 2016. Lastly, outdated links and identified errors from previous versions have been addressed.

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3. Application to health authorities

This Guide, including amendments made from time to time, was established by the Minister of Health on the 28th of March 2007, as a “guideline” under section 4 of the Act. Section 4 states:

(1) The minister may establish
   (a) guidelines that must be considered, and
   (b) directives that must be followed
   by drinking water officers and other officials in exercising powers and performing duties or functions under this Act and the Public Health Act in relation to drinking water.

(2) The Provincial health officer must monitor compliance of drinking water officers with guidelines and directives established under this section.

Drinking water officials must consider this Guide in the exercise of their duties and discretion. They are, however, able to depart from the Guide in any case where sound reason exists to do so (as discussed further below).

The appendices referred to in this document contain a number of sample forms, letters and similar documents that are not “guidelines” approved by the minister. These are included for convenience and reference only. Drinking water officials may use such sample materials contained in the appendices if and as they see fit, or they may use other materials, provided those are developed having due regard to the portions of the Guide to which the appendices relate.

4. Relationship to the Act and Regulation

While approved as a guideline under section 4 of the Act, this Guide does not have the force of law. If there is ever a conflict between this Guide and the Act, the Regulation or the principles of administrative fairness, this Guide is superseded by the latter authorities to the extent of any such conflict.

This document is only intended as a policy guide to inform the exercise of statutory discretion. Decision-makers are expected to consider this document and to apply it as a general rule, but if application of this Guide is not considered appropriate to particular facts or circumstances, the provisions of this Guide should not be applied. The only exception relates to “directives” which may be issued by the minister, as “directives” must be followed. At present, there are no directives.

5. Overview of Guide

The Drinking Water Officers’ Guide is organized in three sections:

- Part A – Legislative Requirements
- Part B – Best Practices and Technical Assistance
- Part C – Appendices
5.1. Part A – Legislative Requirements

Part A of the guide is devoted to providing guidance around the legislative requirements in the Act and the Regulation. It will break down each section of the Act and Regulation and provide an interpretation of those sections that will assist drinking water officers throughout the province to remain consistent in their application of the legislation. In addition, Part A will provide an interpretation of the drinking water legislation as it relates to other legislation in British Columbia.

5.2. Part B – Best Practices and Technical Assistance

Part B contains a series of documents designed to provide further assistance with the technical aspects of applying the drinking water legislation. For example, the legislation does not provide a detailed break-down of treatment expectations; therefore, this document outlines treatment objectives based on the Guidelines for Canadian Drinking Water Quality (Health Canada).

Part B also contains a number of best practice documents. These documents were developed to provide drinking water officers with procedural guidance in the application of various administrative tasks such as finding small water systems or dealing with a request to investigate a drinking water threat. Each document in Part B is now available for separate download on the B.C. Ministry of Health website, allowing for easier distribution of pertinent information.

5.3. Part C – Appendices

Various forms and documents are referenced throughout the guidebook, with examples provided in the appendices. For example, there is a sample:
- Emergency Response and Contingency Plan
- Boil Water Notice
- Hazard Abatement and Prevention Notice

These are sample documents intended to provide the reader with an example of information that might be contained within each document. Health Authorities may wish to use these forms, or to replace them with standard forms for use within their authority.

6. Process for Guide Revision

Any questions or suggestions concerning this Guide, or proposed revisions, should be provided to:

Attention:
Health Protection Branch,
Ministry of Health
PO Box 9646
STN PROV GOV
Victoria, B.C., V8W 3C8
PH: (250) 952-1469
FAX: (250) 952-1713
EMAIL: HP-PHW@gov.bc.ca
Proposed revisions will be considered by the Drinking Water Leadership Council (discussed in Part A) on a regular basis, and this Guide may be amended from time to time, subject to approval by the minister.

The latest version of this document will be kept by the Secretariat of the Drinking Water Leadership Council and posted on the Ministry of Health website.
LEGISLATIVE REQUIREMENTS

Last updated August 2017
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Chapter 1: Roles and Responsibilities

There are a number of persons or agencies involved with or interested in the administration of the Act. These entities, and their respective roles and responsibilities regarding drinking water protection, are set out below.

1.1 Health Authorities

The five regional health authorities established under the Health Authorities Act are responsible for the implementation of most aspects of the Drinking Water Protection Act. In particular, the regional health authorities employ the drinking water officers who are the statutory officials that hold responsibility for most of the powers and functions under the Act.¹ The health authorities also employ other officials to whom the powers of drinking water officers may be delegated. This may include, for example, medical health officers, public health inspectors, environmental health officers and public health engineers.

1.2 Drinking water officers and delegates

Most of the discretionary decision-making power in the Act is provided to drinking water officers. Drinking water officers are appointed under section 3 of the Act. There may be one or more drinking water officers in each health authority.

Drinking waters officers can, in writing, delegate any or all of their powers to other persons under section 3(4).² Unlike some other acts, there is no provision in the Act that allows for delegation “on terms and conditions”.

Powers of drinking water officers may be delegated to officials employed as medical health officers, public health inspectors, environmental health officers, public health engineers and other officials. Delegation of specific powers may also be made to officials from other ministries and other individuals.

Before delegating powers under the Act, drinking water officers should be satisfied that the person to whom the delegation is provided has the appropriate skills, training and judgment to exercise the powers of drinking water officers in relation to the matters being delegated. They should also ensure that the person being delegated authority is provided with a copy of this guide.

A sample form of delegation is set out in appendix 1.

Any person who has been delegated the authority of a drinking water officer should be able to provide proof of that delegation if requested to do so.

1.2.1 Relationship between appointed and delegated drinking water officer functions

A person who has been delegated the powers of a drinking water officer holds those powers in the very same way as the person who delegated those powers. In other words, the delegated official has the same powers as a drinking water officer.

¹ A few powers and functions are held by the minister and the provincial health officer, as discussed later, but these do not relate to the day-to-day administration of the Act.

² The ability to delegate does not apply to the issuance of construction permits, although drinking water officers can designate public health engineers to do this. This is discussed further below.
water officer in respect of the matters delegated and is as much a statutory official as the drinking water officer himself or herself.  

Accordingly, references to the powers and functions of a drinking water officer in this guide should be taken to include any person who has been delegated the relevant powers of a drinking water officer, unless expressly noted otherwise.

Only persons who have been named or appointed as a drinking water officer should use that title to describe themselves. Persons who have been delegated the powers of a drinking water officer should not use that title, but be aware that they hold the relevant powers of a drinking water officer under the Act in any case where it is necessary to exercise those powers.

1.2.2 Relationship to other officials and managers within a health authority

Because the health authorities employ drinking water officers, they are responsible for their overall management, performance monitoring, and similar matters. Health authorities are also responsible for providing overall operational policy guidance to drinking water officers and their delegates. However, drinking water officers and their delegates cannot be directed by any officials within the health authority in the exercise of their statutory discretion in particular cases. Similarly, their decisions cannot be modified by other officials (except as provided for under section 39.1, discussed later). Drinking water officers are, however, encouraged to consult with medical health officers and other officials when appropriate, as discussed further throughout this guide.

Where a drinking water officer has delegated authority to another person, the drinking water officer does not have the ability to direct the delegate in the exercise of discretion in that particular case. The delegated official may consult with the drinking water officer, but the decision as to how to proceed must be made by the delegated official (unless the drinking water officer himself or herself assumes full responsibility for the file).

In some cases, exercise of discretion by drinking water officers or delegates may have implications for the health authority (e.g., a decision to take direct action to address a threat to drinking water and then seek cost recovery from the owner if possible). Drinking water officers and their delegates should discuss such matters with the appropriate senior manager of the health authority. In addition, there are a number of other specific circumstances for which this guide recommends such consultation. In all cases where consultation with a senior manager occurs, the final authority for the exercise of statutory authority rests with the drinking water officer or delegate.

1.2.3 Relationship to officials from other agencies or authorities

It may be appropriate for a drinking water officer to consult with officials from other agencies, organizations and governments in the discharge of responsibilities of the drinking water officer under the Drinking Water Protection Act. The requirements and limitations respecting such consultations are discussed in various sections of this guide as it relates to specific issues.

Drinking water officers may be consulted by other officials in the exercise of statutory decision-making under other acts, for example as “referrals”, or “requests for comments”. Where these practices occur, drinking water officers

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3 One exception is that a person who has been delegated the powers of a drinking water officer does not have the ability to further delegate those powers to other persons. In other words, delegation can only be undertaken by a person who is actually appointed as a drinking water officer under section 3 of the Act.

4 This Guide will make reference to the generic title of “senior manager” throughout. Organizational structure of health authorities differs across regions and the “senior manager” may have a different title depending on the health authority.
must clearly respect the distinction between comment or review functions and the exercise of statutory responsibilities under the *Drinking Water Protection Act*. They must ensure that any comments they provide to other agencies would not be seen as fettering or biasing their decision under the *Drinking Water Protection Act* in relation to matters that may come before the drinking water officer in due course.

### 1.3 Issuing officials

Under the Act, construction permits and operating permits may be issued by “issuing officials”. The Act and regulations specify who can be an issuing official for each type of permit, and this is discussed in more detail below. In sum, construction permits will generally be issued by public health engineers, and operating permits will be issued by drinking water officers or their delegates, and these two types of issuing officials should work together to coordinate their respective roles and responsibilities.

### 1.4 Minister of Health

The Minister of Health is responsible to the government and the Legislature for the overall administration of the Act and Regulation. This includes a general role in overseeing the implementation and administration of the Act by the regional health authorities.

The minister also has a number of specific statutory powers and functions under the Act. These include:

- Power to appoint drinking water officers (section 3(2))
- Power to issue guidelines and directives (section 4)
- Requirement to advise Cabinet of problems that cannot be remedied to the satisfaction of the provincial health officer (section 4.2(2))
- Ability to establish advisory committees (section 5)
- Ability to prescribe areas where other statutory decision makers must consult drinking water officers (if Cabinet enables this by Regulation) (section 30)
- Ability to designate an area for development of a drinking water protection plan, establish a process for those plans, and perform various related functions (Part 5)

Ministry officials also provide informal coordination and support functions to the health authorities, but have no formal oversight or operational role as it relates to health authorities and drinking water officers.

More generally, the Ministry has entered into agreements that set out the objectives and expectations for the provision of health services by regional health authorities. The Ministry also provides funding to the health authorities for matters that include, but are not limited to, public health programs such as drinking water protection.

### 1.5 Provincial health officer

#### 1.5.1 Advisory and reporting functions

Part 6, Division 2 of the *Public Health Act* provides:

64 The provincial health officer is the senior public health official for British Columbia.

66 (1) The provincial health officer must monitor the health of the population of British Columbia and advise, in an independent manner, the minister and public officials

(a) on public health issues, including health promotion and health protection,
(b) on the need for legislation, policies and practices respecting those issues, and

(c) on any matter arising from the exercise of the provincial health officer's powers or performance of his or her duties under this or any other enactment.

(2) If the provincial health officer believes it would be in the public interest to make a report to the public on a matter described in subsection (1), the provincial health officer must make the report to the extent and in the manner that the provincial health officer believes will best serve the public interest.

(3) The provincial health officer must report to the minister at least once each year on

(a) the health of the population of British Columbia, and

(b) the extent to which population health targets established by the government, if any, have been achieved, and may include recommendations relevant to health promotion and health protection.

(4) The minister must lay each report received under subsection (3) before the Legislative Assembly as soon as it is reasonably practical.

The provincial health officer’s general advisory function under this section extends to matters falling under the Drinking Water Protection Act.

1.5.2 Supervisions and direction to medical health officers

The provincial health officer plays a formal role in the supervision of actions by medical health officers across the province. Specifically, Part 6, Division 2 of the Public Health Act states:

67 (1) The provincial health officer may exercise a power or perform a duty of a medical health officer under this or any other enactment, if the provincial health officer

(a) reasonably believes that it is in the public interest to do so because

(i) the matter extends beyond the authority of one or more medical health officers and coordinated action is needed, or

(ii) the actions of a medical health officer have not been adequate or appropriate in the circumstances, and

(b) provides notice to each medical health officer who would otherwise have authority to act.

(2) During an emergency under Part 5 [Emergency Powers], the provincial health officer may exercise a power or perform a duty of a health officer under this or any other enactment, and, for this purpose, subsection (1) does not apply.

(3) If the provincial health officer acts under subsection (1), the provincial health officer may order a health authority to assist the provincial health officer, and the health authority must ensure that its employees and appointees comply with the order.
(4) For the purposes of exercising a power or performing a duty under this or any other enactment, the provincial health officer may exercise a power of inspection that a health officer may exercise under this Act, and, for this purpose, Division 1 [Inspections] of Part 4 applies.

68 (1) The provincial health officer may establish standards of practice for medical health officers in relation to the exercise of their powers and the performance of their duties under this or any other enactment.

(2) Without limiting subsection (1), a standard may include a requirement to make a report or take an action in addition to a requirement of this or any other enactment.

(3) The provincial health officer must

(a) monitor the performance of medical health officers for compliance with established standards, and

(b) conduct performance reviews of medical health officers in accordance with an order of the minister made under section 63 [power to establish directives and standards].

(4) The provincial health officer

(a) must disclose the results of a performance review to the medical health officer and the medical health officer’s employer, and

(b) may disclose the results of a performance review to the minister and the Lieutenant Governor in Council.

The provincial health officer does not have authority to direct the actions of drinking water officers or the medical health officers under the Drinking Water Protection Act. The one exception is the case in which a water supplier requests a review of a decision under the Drinking Water Protection Act:

39.1 (4) If a review is requested,

(a) the review is to be conducted by the Provincial health officer or a medical health officer designated by the Provincial Health officer,

(b) the review is to be a review based on the record,

(c) the person conducting the review may require the applicant to give notice of the review in accordance with the person’s directions, and

(d) the person conducting the review may

   (i) confirm, vary or reverse the initial decision, or

   (ii) refer the matter back to the drinking water officer, with or without directions.

For more information about this situation, go to Part 5, section 5.1.2 of this guide.

1.5.3 Specific functions under the Act

The provincial health officer also has several specific powers and functions under the Drinking Water Protection Act. These include:

- Advises minister on qualifications of drinking water officers (3(3))
• Must monitor drinking water officer compliance with ministerial guidelines and directives. (section 4(2))
• Prepares annual report respecting activities under the Act (section 4.1)
• Must advise minister of government action or inaction that significantly impedes protection of public health regarding drinking water (section 4.2)
• If a problem under section 4.2 cannot be resolved to the satisfaction of the provincial health officer then the minister must take it to Cabinet.
• Role in initiating drinking water protection plans (section 31)
• Advises minister in the establishment of advisory committees (section 5)

The office of the provincial health officer also employs a person in a position of “Provincial Drinking Water Officer”. This position does not hold any statutory functions under the Act, but is intended to facilitate consultation, cooperation and leadership among the interested parties, particularly as it relates to the role of the provincial health officer, and to support the provincial health officer in fulfilling his mandate under the Act.

1.6 Drinking Water Leadership Council
Recognizing that the health authorities, the Ministry, and the provincial health officer all play important roles in the administration of the Drinking Water Protection Act, a Drinking Water Leadership Council has been established to coordinate discussions and foster cooperation among these agencies.

The Drinking Water Leadership Council may include representation from other government ministries that have authority for various regulatory regimes affecting drinking water.

1.7 Advisory Committees
Under section 5 of the Act, the minister can establish technical advisory committees to consider matters referred to it by the minister. The Ministry draws upon the technical knowledge and expertise of various officials and organizations through informal committee consultations.

1.8 Laboratories
Water suppliers are required to have their bacteriological water monitoring analyses undertaken by laboratories approved by the provincial health officer. These can be found on the website of the Provincial Health Services Authority (PHSA). Testing for other parameters (chemical and physical) can be undertaken at any appropriate laboratory. Although there is no legal requirement in the Act or Regulation for any approval or certification of laboratories in respect of these parameters, some labs are voluntarily certified by the Canadian Association for Laboratory Certification in respect of specific testing. See www.cala.ca.

1.9 Environmental Operator’s Certification Program
Certain types of water suppliers must meet the qualification requirements set out in section 12 of the Regulation, which refers to classification and certification by the Environmental Operator’s Certification Program (EOCP).

The EOCP is a society, established under the Society Act. It classifies drinking water and waste water treatment facilities, and collection and distribution systems. The EOCP facility classification determines the level of the senior operator required for operating the facility and the EOCP certifies operators to meet classification requirements. It does not have any regulatory powers and cannot impose legally binding requirements on any party. However, classification of facilities and operator certification by the EOCP are required to meet the requirements of section 12 of the Regulation (as applicable). The EOCP does not offer operator courses, but provides accreditation of courses and
training programs to assist in obtaining certification under the EOCP. Those programs are delivered by other organizations (see 1.10 of this guide for more information).

For more information about requirements regarding operator training and accreditation see section 3.2.6.1 of this guide. For information related specifically to small water systems, see section 3.2.6.2 of this guide. The EOCP provides more detailed information on its web site at http://eocp.ca/facilities/small-systems.

1.10 Operator Trainers
Several organizations and individuals offer EOCP accredited courses and programs. The EOCP established an online training registry to help connect operator trainers with people seeking training in nearby communities. The registry is designed to encourage those who have valuable skills to register as trainers, and allow those seeking to learn about specific skills find training closer to where they work and live. This will make it easier to earn continuing education units towards EOCP certification, and save money in travel.

For more information contact the EOCP at http://www.trainingregistry.eocp.ca/.
Chapter 2: Scope of the Act

2.1 Who and what is covered?

One of the fundamental questions to arise in administration of the Act is, “Which persons or types of systems are covered by the Act and Regulation”? There is no single and simple answer to this, as there may be a number of persons responsible under the Act in relation to a water supply system, and there are various provisions that may impose different obligations on parties, even if they are not water suppliers. It is therefore always necessary to carefully review potentially relevant sections of the Act, and all related definitions, before deciding whether the Act imposes obligations on a person or in respect of a particular system.

Most of the provisions of the Act deal with “water suppliers” and “water supply systems”. To understand what these terms mean, it is necessary to consider a number of related definitions. These are set out below. Where a term that is used in a definition is itself defined by the Act or Regulation, this is noted by way of underlining, and the definition of the term is, in turn, discussed further below.

**Water Supplier**

an owner of a water supply system (See Act s 1)

**Owner**

Includes:

(a) a person who is

   (i) responsible for the ongoing operation of the water supply system or

   (ii) in charge of managing that operation, and

   if

   (i) parts of the water supply system are owned by different persons, or

   (ii) all or parts of the system is jointly owned by different persons,

all of those persons

**Water Supply System**

A domestic water system, other than:

(a) a domestic system that serves only one single-family residence

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5 For example, under section 23 of the Act, all persons are prohibited from contaminating drinking water or tampering with water supply systems, and under section 25 hazard abatement orders can be made against persons other than water suppliers in appropriate cases.

6 See Act, section 1. The term owner is defined to “include” these persons but is not necessarily limited to them. Part Four, section 3.1of this Guide provides additional information and guidance for cases where it is not readily apparent who the owner of a system is.

7 The term “single-family residence” is not defined in the Act. As such, it should be given its plain meaning and taken to mean any residence where not more than a single family resides. For example, two family residences, bed and breakfasts, seasonal accommodation for labourers, residences with guest houses and outbuildings would likely fall outside the term “single-family residence”. In general, community care facilities would also fall outside the term “single-family residence”. However, this is subject to section 20 of the Community Care and Assisted Living Act, which states:

   (1) This section applies to a community care facility

   (a) for which a licence has been issued,

   (b) is being, or is to be, used
(b) equipment, works or facilities prescribed by regulation as being excluded (as noted below in Domestic Water System)

(See Act, section 1)

Domestic Water System

A system by which water is provided or offered\(^8\) for domestic purposes, including:

(a) works used to obtain intake water,

(b) equipment, works and facilities used for treatment, diversion, storage, pumping, transmission and distribution,

(c) any other equipment, works or facilities prescribed by regulation has been included\(^9\)

(d) a tank truck, vehicle water tank or other prescribed means of transporting drinking water, whether or not there are any related works or facilities, and

(e) the intake water and the water in the system

(See Act, section 1)

The following are excluded from the definition of “domestic water system” in the Act:

(a) equipment, works and facilities constructed, operated or maintained

   (i) under a licence, as defined in the Water Sustainability Act, for conservation, power or storage purposes,

   (ii) under a permit issued under the Water Sustainability Act,\(^10\)

   (iii) for bottled water production or distribution,\(^11\) or

   (iv) for drinking water dispensing machines;\(^12\)

(i) as a day care for no more than 8 persons in care, or
(ii) as a residence for no more than 10 persons, not more than 6 of whom are persons in care
(c) from which, in the event of a fire, persons in care can safely exit unaided or be removed by its staff, and
(d) that complies with all enactments of British Columbia and the municipality where the community care facility is located that relate to fire and health respecting a single family dwelling house

(2) A provision in an enactment of British Columbia, other than this Act, or of a municipality, does not apply to the community care facility described in subsection (1) if that provision would

(a) limit the number of persons in care who may be accepted or accommodated at the community care facility
(b) limit the types of care that may be provided to persons in care at the community care facility, or
(c) apply to the community care facility only because
(i) it is not being used as a single family dwelling house, or
(ii) it operates as a community care facility, a charitable enterprise or a commercial venture.

(Even if a system is deemed to serve a “single-family residence” by virtue of section 20 of the Community Care and Assisted Living Act (and thus not a “water supply system” under the Drinking Water Protection Act) it would still be subject to any other applicable public health laws.)

\(^8\) In deciding whether water is “provided or offered” it is necessary to consider all the circumstances of a particular case. A person who makes water available for domestic use, but purports to not be doing so may still fall within this definition. Each case will have to be considered on its own facts, having regard to the plain meaning of these terms and the underlying intent of the act. If questions arise in this regard, it may be appropriate to seek legal advice.

\(^9\) None at present.

\(^10\) Permits are issued under the Water Sustainability Act to construct, maintain or operate works on Crown land. This exemption from the definition of “water supply system” applies only to such equipment, works and facilities. This is different than systems that are licensed under the Water Sustainability Act to obtain water from a particular source. Systems that draw water from a source licensed under the Water Sustainability Act are not exempt from the definition of “water supply system”.

\(^11\) These systems may still be subject to the Food Safety Act, as well as applicable federal laws.
(b) a reservoir relating to a licence or permit referred to in paragraph (a);
(c) a building system\(^{13}\);
(d) a system within a system\(^{14}\).

(see Regulation, section 3)

**Domestic Purposes**

the use of water for

(a) human consumption, food preparation or sanitation,
(b) household purposes not covered by paragraph (a), or
(c) other prescribed purposes\(^{15,16}\)

Given these interrelated and very specific definitions, it is important to carefully consider each of these provisions in assessing whether or not a person or system is subject to the provisions of the Act.

A person will not be considered to fall within or outside the Act simply by virtue of their status under other legislation (e.g. holders of water licences under the Water Sustainability Act, or water utilities under the Water Utility Act). However, these may be relevant factors in assessing whether they are owners of a water supply system.

There is no specific limitation on the type of entities that can be water suppliers. They might include individuals, partnerships, corporations, societies, improvement districts, utilities, water users communities, local government or any other entity that falls within the above noted definitions.

It will be apparent that the determination of whether a person is an “owner” may be a complex question that varies on the circumstances of individual cases, and that it may have important consequences. Consequently, legal counsel should be consulted in cases where staff are unclear who should be considered “owners” of a water supply system.

### 2.1.1 Application of the Act to other persons

Although most of the provisions of the Act relate primarily to water suppliers, the Act’s scope is broader. For example, many of the remedial actions discussed in Chapter 4, section 4.3 of this guide, such as the power to issue hazard abatement and prevention orders, are not limited to orders made to water suppliers. Similarly, section 23 of the Act contains broad prohibitions against contaminating drinking water or tampering with a water system, and these

\(^{12}\) These systems may still be subject to the Food Safety Act, as well as applicable federal laws.

\(^{13}\) The term “building system” is defined in section 1 of the Regulation to mean “a system, within a building, to which the British Columbia Plumbing Code applies, that receives water from a water supply system operating under a valid operating permit under the Act.”

\(^{14}\) This term is defined in section 1 of the Regulation to mean “a water supply system that, in the opinion of a drinking water officer or issuing official, (a) redistributes water from a water supply system operating under a valid operating permit under the Act, and (b) does not require further treatment processes, additional infrastructure or ongoing maintenance to prevent a drinking water health hazard.”

Further guidance on systems in systems is provided in section 5.5.1 of this Guide.

\(^{15}\) Systems supplying water (potable or non-potable) solely for use in toilets would generally fall within the definition of a “domestic water system.” Such systems are generally still subject to the requirements of the act unless section 3.1. of the regulation applies. Section 3.1. of the regulation provides an exemption to the potability requirement under section 6 of the act. A domestic water system exempted from section 6 of the act is still subject to all other sections of the act, including sections 7 and 8 pertaining to construction and operating permits.

\(^{16}\) Guidance on the determination of whether water for class D&E slaughter facilities is used for domestic purposes can be found in Part B: Water Systems For Class D & E Slaughter Establishments And Other Unregulated Uses of this Guide.
provisions are not limited to water suppliers. Drinking water officers must ensure that they are aware of and fully consider all of the options available under the Act to address drinking water problems.

2.2 What is a water supplier required to do?

The following comments provide a basic summary of the obligations imposed on water suppliers by the Act and Regulation. References are made to the relevant sections of the Act and Regulation, and these sections should be consulted to determine the specific nature and extent of obligations imposed.

In some cases, the relevant sections of the Act impose requirements only on “prescribed” water supply systems, meaning those specified as such in the Regulation. The Regulation provides (in section 4) that all water supply systems are prescribed as being covered by the requirements of sections 8, 10, 11 and 22(1)(b) of the Act, and all systems except “small systems” are prescribed for the purposes of section 9 of the Act.

Potable water

All water suppliers must supply water which is potable and meets any requirements set out in the operating permit or regulations. “Potable” is defined in section 1 to mean

(a) meets the standards prescribed by regulations, and

(b) is safe to drink and fit for domestic purposes without further treatment

The Regulation also requires all surface water to be “disinfected”. Unlike the former Safe Drinking Water Regulation under the old Health Act, there is no discretion to exempt water suppliers from this requirement. (See Act, section 1 and 6, Regulation, section 5)

Exception: A system is not required to meet the potability requirements if the system does not provide water for human consumption or food preparation and is not connected to a system that does. “Small systems” are not required to meet the potability requirement if each recipient of water from the system has a Point-of-Entry or Point-of-Use treatment system that makes the water potable. In each of these circumstances, the water supplier must

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17 According to subsection 3, these prohibitions do not apply to activities that are authorized or required by or under any other enactment or the person is otherwise acting with lawful authority. In such circumstances, a person cannot be charged for an offence. However, all other aspects of the Drinking Water Protection Act continue to apply to problems even if they arise from activities authorized under another act. This includes the power to issue hazard prevention and abatement orders under section 25.

18 Section 1 of the Regulation defines “small system” to mean all water supply systems that serve up to 500 individuals during any 24-hour period.

19 The term “disinfect” is not defined in the Act or Regulation. It is referred to in section 5(2) of the Regulation. A drinking water officer may impose specified disinfection requirements as terms and conditions of an operating permit, as discussed below in Part 3, section 2.6. However, even in the absence of any such terms and conditions, the requirement to disinfect surface water applies to all water suppliers.

For reference sources concerning the term “disinfect”, see the US Environmental Protection Agency EPA website at http://epa.gov.

20 Guidance on the determination of whether water for class D&E slaughter facilities is used for domestic purposes can be found in Part B: Water Systems For Class D & E Slaughter Establishments And Other Unregulated Uses of this guide.

21 The term “human consumption” is not defined in the Act. It must be given its plain meaning and applied to the facts of each case. In general, this would likely mean water that is used for purposes of ingestion (drinking, ice, cooking etc.) and would not include water used solely for washing and bathing (although there may be some cases where this is less clear, such as washing facilities to be used by toddlers). Similarly, the term “food preparation” is not defined in the Act. It must also be given its plain meaning and applied to the facts of each case. In general, water used for washing food before consumption, or for adding to food for the purposes of consumption, would be considered water used for “food preparation”. If drinking water officials have any questions concerning the application of these terms to the facts of a particular case, they should consult legal counsel.

22 Neither the Act nor the Regulation define what is a “Point-of-Entry” or “Point-of-Use” treatment system. For the purposes of this guide, a Point-of-Entry (POE) treatment device is taken to mean a treatment device applied to the drinking water entering a house or building for the purpose of making the water distributed throughout the house or building potable. A Point-of-Use (POU) treatment is taken to mean a treatment device applied to a single tap for the purpose of making the water distributed by that tap as potable when it leaves the tap. (For this reason, a kettle that may be used to boil water would not be considered a Point-of-Use device, even if boiling water can address certain threats to drinking water.) See Part B: Obligations of the Water Suppliers of Drinking Water Treatment Systems that have Point of Use/Point of Entry Devices of this Guide for more information about this exception.
ensure that the location of non-potable discharge and non-potable water piping are identified by markings that are permanent, distinct and easily recognized. (See Act section 1 and 6 and Regulation section 1 and 3.1)

**Construction permits**

Persons may only construct a water supply system if they obtain a construction permit in advance. (See Act section 7 and Regulation section 6)

**Exception:** for “small systems” the requirement for a construction permit may be waived (with or without conditions) by an issuing official. (See Regulation section 6(3)(c))

**Operating permits**

Water suppliers must not operate a water supply system without an operating permit and must comply with the terms and conditions of the permit. (See Act section 8 and Regulation section 7)

**Operator Training**

Persons must not operate a water supply system unless they meet the operator training and certification requirements set out in the regulation. (See Act section 9, Regulation section 12)

**Exception:** “small systems” are not required to meet any operator training and certification requirements unless their operating permit so specifies. (See Regulation section 4(2))

**Emergency response and contingency plans**

Water suppliers must have written emergency response and contingency plans\(^2\)(See Act section 10, Regulation section 13)

**Monitoring**

Water suppliers must engage in sample monitoring as required by the regulations, operating permit and directions of a drinking water officer (See Act section 11, Regulation section 8). This includes monitoring for total coliform and, effective April 1, 2006, *Escherichia coli*.

**Laboratory reports**

Laboratories must immediately report to water suppliers, the drinking water officer and the medical health officer if test results respecting E-coli and fecal coliform do not meet specified standards. Laboratories must also advise drinking water officers of other information if the drinking water officer so requests. Water suppliers must immediately advise the drinking water officer that they have been notified by the labs in such cases. (See Act section 12, Regulation section 9)

**Notifying drinking water officer of threats**

Water suppliers must immediately notify the drinking water officer of other threats to drinking water if they become aware of them. (See Act, section 13)

**Public notice of threats**

Water suppliers must provide public notice of threats to drinking water if requested by a drinking water officer. (See Act section 14, Regulation section 10)

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\(^2\) Samples and guides respecting Emergency Response and Contingency Plans for small systems are set out in appendix 2.
Also, if a laboratory advises that an immediate reporting requirement exists, or the supplier is otherwise aware of a potential drinking water health hazard, and the drinking water officer cannot be immediately contacted, the water supplier must notify the users of the water supply system immediately, in accordance with emergency response and contingency plans. In this case, no request or order from a drinking water officer is required. (See Act section 14, Regulation section 10)

**Publication of other information**

Water suppliers are required to make various other types of information public in accordance with the regulations and requirements of the drinking water officer. This includes information regarding emergency response plans and contingency plans\(^{24}\), an annual report of monitoring, and information concerning assessments. (See Act section 15, Regulation section 11).

**Flood-proofing of wells**

Owners and operators of wells must flood proof them if required by the regulations.\(^{25}\) (See Act section 16, Regulation section 14)

**Assessments**

Water suppliers must conduct water source and system assessments of water supply systems, if required by the regulations or a drinking water officer (See Act, section 19).

**Assessment Response Plans**

In response to an assessment, the drinking water officer may make changes to the terms and conditions of the operating permit as well as order the water supplier to prepare an assessment response plan. The purpose of an assessment response plan is to identify the measures that may reasonably be taken to address identified threats (e.g., cross connection) to the drinking water that is provided by the water supply system (see Act, section 22).

**Drinking Water Protection Plan**

If directed by a drinking water officer, a water supplier is required to participate in the development of a drinking water protection plan. (See Act section 33(1)(a)).

**Other**

In various other circumstances, drinking water officers have the ability to make requests or orders and impose requirements on water suppliers under the Act. Water suppliers must comply with those requests, orders and requirements.

**2.2.1 Best practice tools and reference documents for water suppliers**

Although there are specific legal obligations set out in the Act, Regulation, permits and other orders or requests of drinking water officers, these instruments will not provide specific direction in respect of every matter that a water supplier may encounter in the day-to-day operations of a water supply system. However, a number of best practices and technical assistance documents have been developed or identified that may assist water suppliers in this regard. These are set out in Part B of this guide. Drinking water officers are encouraged to bring the documents in Part B to

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\(^{24}\) A sample form of an Emergency Response and Contingency Plan is set out in appendix 2.

\(^{25}\) Applies only to wells identified through an assessment as being at risk of flooding.
the attention of water suppliers and other interested persons, with the caveat that they are not legally binding and, in the event of inconsistency between those documents and the Act, Regulation, permits, or any direction of the drinking water officer, the documents in Part B must give way to the legally binding requirements.
Chapter 3: Construction and Operating Permits

3.1 Construction permits

Section 7(1) of the Act requires a person to obtain a construction permit for the construction, installation, alteration or extension of:

- a water supply system, or
- (b) works, facilities or equipment that are intended to be a water supply system or part of a water supply system.

The requirement for construction permits is not limited to new systems. Any time a construction permit is requested – whether for the construction or installation of a new system, or the extension or alteration of an existing system – all the requirements of section 7 apply.

3.1.1 The issuing official

Section 6(1) of the Regulation specifies the following persons are issuing officials for the purposes of construction permits:

- (a) a drinking water officer who is a professional engineer, or who is working under the direction of a professional engineer;
- (b) a professional engineer who has been approved by a drinking water officer

It is only these people who can issue construction permits or, in the case of a small system, waive the requirement for one.

If a health authority wishes to ensure that only persons appointed as drinking water officers (and not their delegates) have the power to approve engineers for this purpose, then any delegation of drinking water officer powers should specifically exclude the power to approve engineers under section 6(1)(b) of the Regulation.

Professional engineers who have been designated as issuing officials must not consider applications for construction permits in respect of systems that they themselves have designed or would install.

3.1.2 Construction Permit Waivers for small systems

Under section 6(3)(c) of the Regulation, an issuing official may waive the requirement for a construction permit in the case of a small system. In deciding whether to waive the requirement for a construction permit, the issuing official should consider whether and to what extent a construction permit is necessary to address potential threat to public health. This should include consideration of all relevant information including:

- The nature and complexity of the proposed system
- The source of water that will be used by the system, and the potential for risks to arise in relation to it that would require addressing with specialized equipment or construction practices
- The likelihood that the applicant is prepared to accommodate suggestions or requests of the issuing official in the absence of any formal legal requirement for approval of a construction permit
- The knowledge and experience of the people undertaking the construction
- In the case of systems using Point-of-Entry or Point-of-Use treatment, whether the issuing official believes it is necessary to impose conditions respecting construction, design or equipment to provide reasonable
confidence that the POE / POU devices will be able to provide potable water, and where such conditions could not likely be addressed through an operating permit.

The issuing official responsible for issuing the construction permit is often not the drinking water officer responsible for issuing the operating permit or conducting field inspections. For such circumstances, the issuing official responsible for issuing the construction permit should consider consulting with his or her operating permit counterpart to obtain his or her views on the request for a waiver. Should the information obtained from the issuing official responsible for issuing the operating permit have the potential to negatively impact the person’s waiver request, it should be shared with the applicant for comment before a decision is made about whether to issue a waiver.

In general, if an applicant is prepared to construct a relatively simple system and there are no significant reasons why a construction permit is required, then it may be appropriate to provide a waiver. However, this is a matter that is solely within the discretion of the issuing official, who must exercise discretion on a case by case basis. There is no reason to provide or deny an applicant a waiver solely because of how another person’s waiver request was decided.

Even in cases where the waiver request is denied, the issuing official has considerable discretion to determine the form of application and supporting information required to obtain a construction permit. This discretion can be used to make the construction permit application process as efficient and practical as possible (as discussed below).

3.1.3 Submission of applications

Applications for construction permits must be made to the issuing official “in a form satisfactory to the issuing official” (Regulation section 6(2)). Appendix 4 sets out an operating permit cover letter and appendix 5, a standard form operating permit. Health Authorities may wish to use these forms, or to replace them with standard forms for use within their authority.

Issuing officials have discretion to permit other forms of applications where they consider that appropriate. For example, if a person has prepared relevant construction information and drawings as part of an application for a water utility, that information could be used in support of an application for construction permit if and to the extent an issuing official considers appropriate.

Similarly, the scope and detail required in drawings or plans submitted as part of a construction permit might also appropriately vary depending on the nature, size and complexity of a proposed system. Applicants should therefore be encouraged to discuss these matters with the issuing official before submitting their application. This will ensure that issuing official receive the information they consider necessary in the circumstances, without requiring the applicant to incur unnecessary effort or expense.

Where a person applies for a construction permit after construction has already commenced, the principles set out in Chapter 4, section 4.3.13.3 of the guide should be applied.

3.1.4 Confirming a responsible person

Before issuing a construction permit, the issuing official should ensure that an owner has been identified as being responsible for the water supply system (See Act, section 7(4)). The person responsible for the ongoing operation may or may not be the same as the person who is identified on the application as the “owner”, and there may be more than one “owner” of a system, as that term is defined in section 1 of the Act. For example, if a municipality is applying for a construction permit, the permit may be requested in the name of the municipality, but the person responsible for the ongoing operation of the system may be the senior operator with direct responsible charge.
Generally, the responsible person should be one who will have the authority and resources to manage the system; they may also operate the system on a general basis. The information required in this regard may vary, depending on whether the owner will be a natural person, a company, a society, etc. Some common situations, and the information that may be appropriate to request in relation to each, are set out below.

Applications by or on behalf of individuals

- Clarification of the person who proposes to be the principal responsible person, as well as the name of all other persons who will be “owners” as defined in section 1 of the Act

Applications by or on behalf of local governments

- Confirmation of the authority of the person making the application on behalf of the local government

Applications by or on behalf of partnerships

- Copies of any certificates or registration statements filed by the partnership with the Corporate Registry (BC Registry Services), and any acknowledgements by the Corporate Registry.
- Confirmation of the authority of the person making the application on behalf of the partnership

Applications by or on behalf of corporations established under the BC Business Corporations Act26 or the Canada Business Corporations Act,

- Copy of the company’s certificate of incorporation
- Confirmation of authority by the corporation to make application for permit on its behalf

Applications by or on behalf of societies established under the Society Act

- Copy of society’s certificate of incorporation
- Confirmation of authority by the society to make application for permit on its behalf

Applications by or on behalf of water users communities established under section 51 of the Water Users’ Communities Act

- The incorporation records of the water users’ community,
- The name of the manager, the committee of management, and all members of the water users’ community

The person designated as having primary responsibility for the ongoing operation of the system may not be the only “owner” of the system. The term “owner” is defined broadly in section 1 of the Act to “include” specified persons; it is not limited to them. As such, issuing officials should be careful to ensure that no assurances are made that limit which persons may be considered an “owner”.

If the issuing official is not satisfied that the applicant has identified an owner of the water system that will be responsible for the ongoing operation of the system, the issuing official should refuse to issue the permit, as contemplated by section 7(4) of the Act.

3.1.5 Consultation with other officials

Although the Act requires separate permits for construction and operation of the water supply system, the issues addressed by them are related. Consequently, before a construction permit is issued, the issuing official responsible for issuing the construction permit should commence a relationship of close consultation with the person who will be

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26 The B.C. Business Corporations Act replaced the B.C. Company Act in 2004. The B.C. Company Act was repealed at the same time.
responsible for considering an application for an operating permit in respect of that system. This relationship of close consultation should continue throughout the construction permitting process and into the operating permitting process. This may be particularly helpful in cases where the person seeking the construction permit proposes to use a water source for which no other operating permits presently exist. The issuing official should also consult, where applicable, with any other health authority staff that has been responsible for inspecting the system to date.

The issuing official should also consider consulting with the drinking water officer and the medical health officer in respect of health issues, particularly in respect of the proposed water source.

An issuing official may refer a construction permit application to other agencies that may have an interest in the matter. For example, the issuing official may wish to consult with:

- The Ministry of Transportation and Infrastructure approving officers, given their responsibility for subdivision approvals in rural areas and the approving officers’ information in respect of servicing issues.
- The Ministry of Environment and Climate Change Strategy and the Ministry of Forest, Lands, Natural Resource Operations and Rural Development, given their responsibilities for:
  - Licensing of surface water under the *Water Sustainability Act*,
  - Groundwater management and well protection under the *Water Sustainability Act* and Groundwater Protection Regulation (including Water Management Plans under Part 4 of the *Water Sustainability Act*)
  - Regulation of utilities under the *Water Utility Act*
  - Environmental protection
  - Technical information regarding water source quantity and quality (this may include seeking technical assistance with hydrogeological matters). Two critical issues in B.C. are: (1) wells intersecting artesian aquifers (i.e. flowing conditions) and (2) wells in areas at high risk of saltwater intrusion.
- Local governments that may have existing or planned water supply systems that may be impacted by the system for which a construction permit is sought.

Finally, issuing officials may choose to consult with specialists concerning matters that are outside their expertise in certain circumstances. While most specialist consultations will be undertaken by applicants and the results reported as part of the application process, an issuing official is free to consult other specialists directly. This may include experts within government who may be able to provide input free of charge, or, in exceptional cases, other persons. In the latter case, any decision to incur expenditures in this regard should be made only after consultation with the senior manager of the health authority.

Ultimately, there is no requirement that consultations occur with other officials, and this is a matter for the issuing official’s discretion. Furthermore, the issuing official is the responsible person for the decision regardless of whether consultation occurs.

Where an issuing official consults with another person in respect of an application, the issuing official must, as a matter of administrative fairness, ensure that any information or comment provided by the other person is shared with the applicant if it has the potential to adversely affect the applicant’s interests. In such cases, the applicant must be given an opportunity to respond to the comments or information before any final decision is made.

The issuing official should document the recommendations received, particularly from the person who will be responsible for considering an application for an operating permit in respect of that system, in the final report regardless if the recommendations are taken into consideration for the construction permit.
Issuing officials may also choose to inform other agencies when construction permits have been issued. There is no requirement in the Act that this occur, and this is a matter for the discretion of the issuing official.

3.1.6 Deciding whether to issue a construction permit

3.1.6.1 Information to be considered

In deciding whether to issue a construction permit, the issuing official should consider all relevant information, including:

- All of the information set out in or accompanying the application form
- The results of water quality analyses as required by sections 7(3)(a) or 7(3)(b) of the Act
- Any relevant best practices and technical assistance documents (see Part B of this guide)
- Operational history of the system (if any)
- Existing operating permit conditions (if any)
- Any information relevant to that system that has been obtained from assessments undertaken under section 19 of the Act in relation to systems that share the same water source or have other common conditions.

The issuing official should consult the reference treatment documents, the *Guidelines for Canadian Drinking Water Quality* (and the B.C. specific departures from the GCDWQ as listed in section 3.1.6.2 of this document), the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia and the Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia (found in Part B of this guide), British Columbia Guidelines (Microbiological) on Maintaining Water Quality in Distribution Systems and local water quality information when considering which water analyses should be required under sections 7(3)(a) or 7(3)(b).

If an issuing official believes that further information is required before deciding whether to issue a construction permit, he or she should request the additional information from the applicant. This may include, for example, drawings, reports or technical assessments from professional engineers and other professionals. It may also include other water quality analyses that have been requested by the issuing official or the drinking water officer under section 7(3)(b) of the Act.

3.1.6.2 Decision-making process

In deciding whether to issue a construction permit, a fundamental consideration for all systems is to determine if the proposed new system or changes to the existing system meet appropriate public health engineering standards for that type of system. Another fundamental consideration for an existing system is to determine if the new construction is an improvement to the system. Regardless if it is new or existing, the water supply system should have sufficient ability to provide appropriate water to the intended user given the end use of the water, source water quality, proposed and/or existing treatment and/or disinfection technology, potential source-to-tap threats the system could encounter and finances (i.e., will the system be sustainable).

Generally, most systems will need to meet the requirement for potable water as set out in section 6 of the Act. This requirement does not apply in relation to:

- Systems that provide water for purposes that do not include human consumption or food preparation and are not connected with systems that do, or
- Small systems for which all recipients have a Point-of-Entry or Point-of-Use treatment system that provided potable water. (See Regulation, section 3.1)

For each of these circumstances, the water supplier must ensure that the location of non-potable discharge and non-potable water piping are identified by markings that are permanent, distinct and easily recognized.
Another consideration related to existing systems concerns the decision to allow for continuous improvements towards the desirable end-state rather than requiring all required changes in one construction cycle. The issuing official should consider the financial circumstances of the system and the ability of the water supplier to set out and follow a defined plan to work towards the desirable end-state over time.

Consideration may also be given to protective measures that may be available through legal regimes administered by other agencies, such as backflow prevention programs that may apply under municipal bylaws.

For water treatment requirements, specific factors and points that the issuing official may wish to consider include the following:27

New systems

- With respect to water quality analyses, the issuing official should ensure that he/she has adequate data to determine that the proposed treatment is adequate to address public health risks in relation to relevant microbiological and chemical/physical parameters.

- For microbiological risks: In deciding what treatment modalities are required to address risk to public health, the issuing official must consider the requirements of section 2 and Schedule A of the Regulation respecting coliform and *E. coli*. In addition, the issuing official should consider requiring that the water system meet the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia and the Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia found in Part B of this guide. These documents provide guidance about the multiple barrier approach, the removal or inactivation of viruses, the removal or inactivation of *Giardia* and *Cryptosporidium* cysts, as well as turbidity objectives, and *E. coli*. In addition, the issuing official should consult the British Columbia Guidelines (Microbiological) on Maintaining Water Quality in Distribution Systems to ensure that water quality is maintained after treatment.

- For chemical risks: The issuing official should consider whether to require any of the information described in the document Determining Appropriate Drinking Water Chemical and Physical Monitoring Guidelines found in Part B of this guide, along with any other information considered necessary in relation to that water system. The issuing official should consider whether, and at what levels, disinfectant residuals are to be present in the distribution system. The issuing official may wish to consider the particulars of the system, Canadian and B.C. best practice documents, and requirements by other Canadian and international drinking water regulators.

- A construction permit may not be issued for a system in which the water originates from surface water, or groundwater that is at risk of containing pathogens, unless the system provides for disinfection (See Regulation, section 5 (2)). The disinfection/treatment should result in water that meets the accepted levels as outlined above. There is no ability for a medical health officer to waive this requirement under the Act and Regulation. This circumstance does not necessarily apply to systems receiving an exemption (under section 3.1 of the regulation) to section 6 of the act, which is the potability requirement.

- Issuing officials may wish to consider whether alternatives exist for the provision of safe drinking water that would be preferable from a public health perspective. This might apply, for example, if a developer proposed to establish a small water system within reasonable proximity to an existing municipal system, and it would be possible to instead connect onto a municipal system with higher levels of treatment and protection. This is

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27 Some of all of these may not be relevant in respect of systems that are exempt from the potable water requirements, pursuant to section 3.1 of the Regulation.
only one relevant factor and each situation must be considered on its own merits, having regard to all relevant factors.  

Existing systems

- In some cases, an issuing official may decide to issue a construction permit for improvement or extension to an existing system in cases where, if the application were made to construct such a system today, the permit would not be issued. In doing so, the issuing official should:
  
a) satisfy himself or herself that the improvement will decrease the risk associated with the system or, at minimum, not adversely affect the risk and have other operational benefits,
  
b) ensure the water supplier and drinking water officer are aware of the aspects of system that would not meet present standards if an application were made to create such a system today,
  
c) advise that the approval of the construction permit does not affect the ability of the drinking water officer to impose any terms and conditions on the operating permit, or take any other steps he or she considers necessary under the act, to avoid unacceptable risks to public health,
  
d) if not the drinking water officer, advise the drinking water officer regarding the issuance of the construction permit

Departures from the Guidelines for Canadian Drinking Water Quality

The BC Ministry of Health applies Health Canada’s guidelines on a substance by substance basis, ensuring guidelines are appropriate to the B.C. context. The following substances depart from the guidance found in the Guidelines for Canadian Drinking Water Quality due to B.C. specific circumstances:

Selenium

- The B.C. Ministry of Health recommends a Maximum Allowable Concentration (MAC) of selenium in drinking water of 10 µg/L, while Health Canada has a MAC of 50 µg/L.
- British Columbians are exposed to higher levels of selenium in food than those living in other parts of the country. Specifically, infants and children in BC may have greater exposure to selenium and exceed recommended upper limits of exposure to selenium from food alone. Further risk of overexposure of selenium through drinking water is also higher for children because they ingest more water relative to their bodyweight than adults.
- In addition to these concerns, uncertainty surrounding the toxic effects of inorganic selenium from water on human health suggests a precautionary approach be taken.
- The Ministry is concerned that raising the selenium threshold in drinking water may result in additional exposure to selenium.
- Most water systems in BC are well below levels of 10 µg/L, so maintaining this threshold will have minimal impact on water supply systems across the province.

Systems exempted from the requirement to provide potable water

Where applications are made for systems that are exempt from the requirement to provide potable water (as per section 3.1 of the Regulation), the issuing official should consider the factors outlined under the following scenarios:

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28 Where the issuing officials considers that it may be appropriate to require a proposed system to become part of another existing system, the issuing official should consult the owner of the existing system to determine the willingness and ability of that water supply system to take on additional users. The issuing official may, in the case of water obtained from surface sources licensed under the Water Act, also wish to consult officials responsible for the Water Act, and the potential application of section 33 of that Act. It states, “If satisfied that the joint use of works would conserve water or avoid duplication of works, the comptroller may order the joint use and set its terms.”

29 An example may be improvement to provide chlorination to a non-disinfected surface supply. This will provide enhanced protection and is affordable, but it does not deal with Cryptosporidium risks and may not adequately deal with Giardia risks.
(a) Systems that do not provide water for human consumption or food preparation and are not connected to water supply systems that do provide water for these domestic purposes.

- The water supplier must ensure that the location of non-potable water discharge and piping are identified by markings that are permanent, distinct and easily recognizable.
- The potential that persons might inadvertently use the water for human consumption or food preparation.
- Steps that can be taken to mitigate the above-noted risk (e.g., posting of signs, monitoring use).
- What constitutes as appropriate labeling for discharge points and piping to prevent inadvertent use of non-potable water for potable purposes.
- The nature and extent of public health threat if the proposed system was inadvertently or intentionally used for human consumption or food preparation.

(b) Small systems that provide water only to Point-of-Entry or Point-of-Use systems and have the required permanent and distinct markings.

In addition to the factors noted above in relation to new systems and existing systems generally, issuing officials may wish to consider:

- What constitutes as appropriate marking for discharge points and piping to prevent inadvertent use of non-potable water for potable purposes.
- Whether the issuing official considers that such a system presents an unacceptable risk to public health, considering the potential threats that may not be addressed by the POE or POU devices, or considering the risk that the POE or POU devices may fail or not be properly maintained. In particular, the drinking water officer may wish to consider:
  - Whether the POE or POU devices being used have received certification by an accredited third party agency to comply with standards established by an independent and respected national or international standard setting agency,\(^\text{30}\) or whether the drinking water officer is aware of other information concerning a particular system that provides a similar degree of confidence in the system;
  - Whether the POE or POU systems have a warning device or other mechanism to alert users if the systems are not functioning properly;
  - Whether the POE or POU system has an automatic shut-off/warning system;
  - Whether the POE and POU system will be installed and operated in accordance with the manufactures suggestions or as directed by the issuing official;
  - In the case of POU systems, the potential for water to be used from access points that do not have a POU device, and to be used in a manner which poses a threat to public health;
- Whether there are other practicable means of providing potable water to the users of the water supply system that would provide significantly greater confidence regarding public health protection (e.g., whether it would be reasonably feasible for a water supplier to install a centralized treatment system that provides protection from a broader range of potential pathogens or contaminants, or for the same pathogens or...

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\(^{30}\) Examples include the Canadian Standards Association, NSF International, Underwriters laboratories Inc., Quality Auditing Institute International and Association of Plumbing & Mechanical Officers. For further information on standards and certification, see: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/water-quality/drinking-water/products-materials-that-come-into-contact-drinking-water.html
contaminants but with a significantly higher degree of reliability). In considering this factor it would be appropriate for the issuing official to weigh the marginal benefit to public health protection that would result from utilizing another form of treatment system against the feasibility and practicality of this other form of treatment to the applicant; and,

- Where the issuing official has concerns or potential concerns regarding a system that serves POE and POU devices, the degree to which those concerns could be addressed through the imposition of terms and conditions (discussed below).

The points and principles discussed above are set out solely for the assistance of issuing officials in the exercise of their discretion. Subject to those matters addressed by the Act and Regulation, the decision as to whether to issue a construction permit, and the decision to include any terms and conditions, rest with the discretion of the issuing official.

As a general matter, issuing officials may also consider the applicant’s history with drinking water matters, for applications respecting new and existing systems.

### 3.1.7 Terms and conditions

The types of terms and conditions that an issuing official may include in a construction permit are not specifically set out in the Act. Further, the Act specifically states that the terms and conditions of a construction permit may set requirements and standards that are more stringent than those established by the Regulation (section 8(5)). Where terms and conditions are included, they should be included in the permit itself, or referred to in the permit and appended to it (for example, as a schedule). Comments and directions set out in a cover letter would not likely be considered terms and conditions of a permit unless expressly incorporated into the permit.

In exercising the discretion to include terms and conditions in a permit, the issuing official should consider which terms and conditions are necessary to meet the test for approval of a permit application.

### 3.1.8 If the issuing official is not satisfied with the permit application

If the issuing official is not satisfied with an application and is not prepared to issue a construction permit based on the information provided to that point, having regard to terms and conditions that could be included, the issuing official should provide the applicant with reasons for the decision. If the issuing official believes that the application could potentially warrant approval if certain amendments are made to the proposed system, the issuing official should advise the applicant accordingly and invite the applicant to consider making the necessary changes and resubmitting the application.

If the issuing official believes a substantial amendment to the application is required, the issuing official should ask the applicant to consider making amendments to the application, rather than simply granting the permit with terms and conditions that would require substantial modification of the proposed construction. However, in cases where the proposed construction is acceptable to the issuing official with only minor proposed modifications, the issuing official may wish to simply issue the permit on the terms and conditions that the construction proceeds in accordance with specified minor modifications, rather than requiring an amendment and resubmission of the application.

### 3.1.9 Form of permit

Neither the Act nor Regulation specifies the form of a construction permit.
3.1.10 Pre and post-approval inspections

Pre- and post-approval inspections can be undertaken where the issuing official considers it necessary. In making this decision, the issuing official may wish to consult the drinking water officer or other public health official with knowledge of the system or local circumstances.

In most cases it is anticipated that the issuing official will not perform inspections, but rather will make it a term and condition of the construction permit that the system be constructed in accordance with the approved plans. The issuing official may also include a term and condition that the designer or installer of the system certify that it was installed or constructed in accordance with the plans as approved. The issuing official may also, in appropriate cases, wish to require the certification to be provided by a professional engineer.

If an issuing official for a construction permit believes that a system is not constructed in accordance with the plans as approved, he or she should advise the person who will be responsible for considering the application for an operating permit for that system. Such information should also be provided to the applicant.

3.1.11 Request for changes

Under the Act, an issuing official does not have the ability to vary a construction permit once issued. Therefore, if an applicant requests a substantial change to a construction permit and the issuing official believes that the change is appropriate, a new construction permit must be issued (Act, section 7(6)(c)).

To avoid the need for issuance of a new permit in cases of minor changes to design specifications, the issuing official may wish to include as a term and condition a requirement that the system be must constructed in accordance with the plans as approved, or with any modifications that may be subsequently approved by the issuing official in writing. In this way, the construction permit itself need not be changed to accommodate minor changes in design specifications.

3.1.12 Repairs

In some cases, people may have questions as to whether repair of an existing system requires a construction permit. Given the breadth of the wording in section 7, a construction permit will be required where repairs are undertaken if they result in the alteration or extension of the system. However, if a person is simply undertaking a repair to return a system to the condition for which construction had previously been authorized, then no construction permit would be required. Moreover, under section 6(3)(a) of the Regulation, a person is not required to obtain a construction permit for emergency repairs.

A person undertaking repairs to a system may also require certification under the EOCP program, depending on the class of system and the date on which the relevant requirements of the Regulation apply to it (see Regulation, section 12(3) and (4)). However, even in that case, EOCP certification will not be required if the person conducting the repairs is:

... a person with specialist knowledge immediately relevant to maintenance or repair of a water supply system provided the maintenance or repair is conducted following procedures approved by a person certified by the Environmental Operators Certification Program (See Regulation, section 12(6)).

This section is intended to allow people with specialized technical knowledge of water treatment and distribution equipment (e.g., a service representative from an equipment manufacturer) to work on the maintenance or repair of that system, without that person being certified by the EOCP program. However, this applies only if the following criteria are met:
The person must have “specialist knowledge”. That term is not defined in the regulations. It should generally be taken to mean knowledge that is not commonly held and which is acquired by some specific form of training or experience.

The specialist knowledge must be “immediately relevant” to the maintenance or repair. It is not sufficient if a person is a specialist in a particular area, but the maintenance or repair does not relate to that area. Similarly, the person cannot use this exemption to “get a foot in the door” and then conduct maintenance or repairs that do not require specialist knowledge.

The maintenance or repair must be conducted following procedures approved by a person certified by EOCP.

Drinking water officers and issuing officials should encourage water suppliers to call them in advance to discuss any situation in which the water supplier is unclear as to whether a person who plans to conduct maintenance or repairs without being certified himself or herself by EOCP meets the requirements of section 12(5) of the Regulations.

### 3.2 Operating permits

Section 8 of the Act prohibits a person from operating a water supply system unless the water supplier holds a valid operating permit. The water supplier must also comply with all terms and conditions of the permit.

The following sections address the process and principles for considering applications for new operating permits, or amendments to existing permits.

#### 3.2.1 The issuing official

Under section 8 of the Act, an operating permit can be issued (or amended) by an “issuing official”. According to section 7 of the Regulation, all drinking water officers are issuing officials for the purposes of operating permits.

Operating permits can also be issued by any person to whom a drinking water officer has delegated this power.

#### 3.2.2 Submission of applications

Applications for operating permits must be made to the issuing official “in a form satisfactory to the drinking water officer” (Regulation section 7(1)).

#### 3.2.3 Confirming a responsible person and specifying owners

Before issuing an operating permit, the issuing official should ensure that an owner has been identified as being responsible for the water supply system, that the system has been classified by the EOCP and that a senior operator that meets the level of the system classification is employed to operate the system. For circumstances in which the water supply system is owned by two or more persons, the owners should designate one of their numbers for the purposes of receiving and providing information and records as required or authorized under the Act (see Act, section 17(1)). The drinking water officer should designate one of the owners for the purposes of section 17 of the Act (see Act, section 17(2)). Issuing officials may require different types and amounts of information from different applicants, and may require more or less information than is in the standard operating permit application form. In general, the type of information that may be required in this regard, for different types of applicants, is as follows:

**Applications by or on behalf of individuals**

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31 In this context, the term “drinking water officer” refers to a person who has been appointed as a drinking water officer, and not a person to whom the powers of a drinking water office have been delegated. In other words, a person delegated powers is not able to further delegate them to another person.
- Clarification of the person who proposes to be the principal responsible person, as well as the name of all other persons who will be “owners” as defined in section 1 of the Act
- Copies of any agreements between such persons regarding responsibility for, and liability for, the ongoing operation of the system

**Applications by or on behalf of local governments**

- Confirmation of the authority of the person making the application on behalf of the local government
- Clarification of the person who will hold primary responsibility for the ongoing operation of the system
- Names of other persons who will provide assistance to the person with primary responsibility

**Applications by or on behalf of partnerships**

- Copies of any certificates or registration statements filed by the partnership with the Corporate Registry (BC Registry Services), and any acknowledgements by the Corporate Registry.
- Confirmation of the authority of the person making the application on behalf of the partnership

**Applications by or on behalf of corporations established under the BC Business Corporations Act** or the Canada Business Corporations Act.

- Copy of the company’s certificate of incorporation
- Confirmation of authority by the corporation to make application for permit on its behalf
- Names of the officer or employee who will hold primary responsibility for the ongoing operation of the system
- Names of other persons who will provide assistance to the person with primary responsibility

**Applications by or on behalf of societies established under the Society Act**

- Copy of society’s certificate of incorporation
- Confirmation of authority by the society to make application for permit on its behalf
- Names of the officer or employee who will hold primary responsibility for the ongoing operation of the system
- Names of other persons who will provide assistance to the person with primary responsibility

**Applications by or on behalf of water users communities established under section 51 of the Water Users’ Communities Act**

- The incorporation records of the water users’ community
- The name of the manager, the committee of management, and all members of the water users’ community
- Names of the person who will hold primary responsibility for the ongoing operation of the system
- Names of other persons who will provide assistance to the person with primary responsibility

In cases where the issuing official is aware of other persons who also fall within the definition of “owner” as that term is used in the Act, the issuing official should consider naming the additional owners on the operating permit. However, the issuing official should be careful to note, in the cover letter or otherwise, that the listing of persons as owners on the operating permit does not necessarily mean that other persons might not also be considered “owners” in appropriate circumstances.

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32 The B.C. Business Corporations Act replaced the B.C. Company Act in 2004. The B.C. Company Act was repealed at the same time.
3.2.4 Consultation with other officials

When considering applications for operating permits, issuing officials should be in or commence a relationship of close consultation with the person who issued the construction permit and this relationship should continue until the operating permitting process is complete. The issuing official should review comments provided by agencies consulted at the construction permit application stage, and may engage in further consultations with other agencies if the issuing official considers this appropriate. The issuing official should also consider consulting with the drinking water officer and the medical health officer in respect of health issues. Such consultation may also be appropriate when considering potential amendments to an existing operation.

Ultimately, there is no requirement that consultations occur with other officials, and this is a matter for the issuing official’s discretion. Furthermore, the issuing official is the responsible person for the decision regardless of whether consultation occurs. Any consultation does not fetter the decision-making discretion of the issuing official responsible for issuing the operating permit.

Where an issuing official consults with another person in respect of an application, the issuing official must ensure that any information or comment provided by the other person is shared with the applicant if it has the potential to adversely affect the applicant’s interests. In such cases, the applicants must be given an opportunity to respond to the comments or information, before any final decision is made.

The issuing official should document the recommendations received, particularly from the person who issued the construction permit for that system, in the final report regardless if the recommendations are taken into consideration for the operating permit.

Issuing officials may also choose to inform other agencies when operating permits have been issued. Again, there is no requirement in the Act that this occur, and this is a matter for the discretion of the issuing official.

3.2.5 Deciding whether to issue an operating permit

3.2.5.1 Information to be considered

In deciding whether to issue an operating permit, the issuing official should consider all relevant information, including:

- All of the information set out in the standard application form
- The water supply system has an EOCP certified senior operator with the same level of certification as the EOCP classification of the system (Regulation, section 12(2))
- The results of water quality analyses provided in the application for construction permit, as required by sections 7(3)(a) or 7(3)(b) of the Act
- Any relevant best practices and technical assistance documents (see Part B of this guide)
- Whether a construction permit has been issued and any conditions attached to it\(^{33}\)
- Information provided by the official that issued the construction permit or other agencies that were consulted
- Any information relevant to that system that has been obtained from assessments undertaken under section 19 of the Act in relation to systems that share the same water source or have other common conditions.

\(^{33}\) If a construction permit has not been issued and construction has occurred, the person will be in violation of section 7 of the Act, unless a waiver has been granted. Where a person is in violation of the construction permit requirements, they should be advised that a construction permit will be required before their application for an operating permit will be considered, and referred to the issuing official responsible for dealing with construction permits. In appropriate cases, the drinking water officer may also consider taking other compliance action, such as issuing a contravention notice under section 26 or pursuing an offence under section 45 of the Act.
• The existence or absence of approvals under other legislation which are necessary for the proper operation of a water supply system. This may include, for example, a water licence under the Water Sustainability Act, or, in the case of a water utility under the Water Utility Act, a certificate of public necessity and convenience. Potentially relevant statutes are discussed further below in Chapter 5, section 5.3.34

• Requests to use groundwater from a flowing artesian well should consider the adequacy of measures used to control flowing conditions as outlined in Section 52 of the Water Sustainability Act (consult Ministry of Forests, Lands, Natural Resource Operations and Rural Development staff.)

• Requests to use groundwater in Coastal Areas of B.C. should consider whether or not the well or wells being proposed for use can be operated without risk of causing intrusion of saline water as outlined in Section 58 (2) (a) of the Water Sustainability Act (consult Ministry of Forests, Lands, Natural Resource Operations and Rural Development staff).

If an issuing official believes that further information is required before a decision can be made whether to issue an operating permit, he or she should request that additional information from the applicant. This may include a request for reports or technical assessments from professional engineers and other professionals.

3.2.5.2 Decision-making process

In deciding whether to issue an operating permit for a new water system, consideration should be given to the matters discussed in section 3.1 of this guide (in relation to construction permit applications). Namely, the primary consideration should be whether the proposed system, if operated in accordance with the terms and conditions of the permit, will have sufficient ability to provide safe drinking water to the intended user, having regard to potential threats that the system may face. In particular, the system should:

• Have staff that meet any certification requirements applicable to that class of system (see Regulation, section 12)
• Be capable of operating on an ongoing basis without significant threat of failure or contamination of water in the system
• Meet the treatment standards expectations as per section 3.1.6 of this guide
• Comply with the recommended monitoring and reporting guidelines
• Have adequate cross connection procedures
• Comply with other operating best practice guidelines
• Address any other identified concerns that the issuing official considers to pose a threat to the water supply system in the circumstances

Issuing officials may wish to take into consideration a risk assessment of the particular water system when reviewing the timeline proposed by the water supplier to achieve the accepted treatment levels and other operational targets. Elements of that risk assessment could include:

• Quality of the source water
• Level of treatment, including secondary treatment, as per British Columbia Guidelines (Microbiological) on Maintaining Water Quality in Distribution Systems, currently provided
• Number of users of the water supply system
• Number of users from vulnerable populations.35

34 Although there is no specific requirement that issuing officials confirm compliance with other legislation, this is a relevant factor that they may consider. If the issuing official is aware that the applicant does not have the necessary approvals under another act, he or she may decline to issue the operating permit, or issue it subject to the condition that it becomes effective only when all necessary approvals have been obtained under other applicable laws.

35 Vulnerable populations within this context generally include children, elderly and people experiencing compromised immune systems due to circumstances such as HIV infection, diabetes, transplant medications and chemotherapy. This list is not exhaustive – the drinking water officer may need to use discretion in determining people that may be at increased risk to infections caused by water-borne diseases.
Part A: Chapter 3

- History of water-borne diseases
- Historical water quality
- Whether the water is for purposes or provided in circumstances that are exempt from the potability requirements of the Act
- Population demographics and trends
- Community socioeconomic status
- Financial assets and potential for infrastructure grants
- Other relevant operating information.

For some parameters (e.g., lead or trihalomethanes (THMs)) it may be appropriate to consider factors such as the whether the water will be consumed on an ongoing or intermittent basis, or special vulnerabilities of persons likely to consume the water.

The timelines for achieving treatment and other system outcomes should be shortened in the face of increased risk to public health. The issuing official should not issue an operating permit unless he or she is satisfied that all unacceptable risks to public health will be addressed by the proposed system.

Systems exempted from the requirement to provide potable water

Where applications are made for systems that are exempt from the requirement to provide potable water (as per section 3.1 of the Regulation), the issuing official should consider factors outlined under the following scenarios:

(a) Systems that do not provide water for human consumption or food preparation and are not connected to water supply systems that do provide water for these domestic purposes.

- The water supplier must ensure that the location of non-potable water discharge and piping are identified by markings that are permanent, distinct and easily recognizable.
- The potential that persons might inadvertently use the water for human consumption or food preparation.
- Steps that can be taken to mitigate the above noted risk (e.g., posting of signs and monitoring use).
- The nature and extent of the public health threat if the proposed system was inadvertently or intentionally used for human consumption or food preparation.
- The type of warning mechanisms or signs to advise the users and what constitutes as appropriate labeling for discharge points and piping to prevent inadvertent use of non-potable water for potable purposes.

(b) Small systems that provide water only to Point-of-Entry or Point-of-Use systems and have the required permanent and distinct markings.

In addition to the general factors noted earlier in this section, the drinking water officer may also wish to consider:

- What constitutes as appropriate markings for discharge points and piping to prevent inadvertent use of non-potable water for consumption or food preparation. Whether overall such a system presents an unacceptable risk to public health, considering the potential threats that would not be addressed by the POE or POU devices, or considering the risk that the POE or POU devices may fail or not be properly maintained. In particular, the drinking water officer may wish to consider:
  - The steps that the water supplier is prepared to take, and has the ability to take, on an ongoing basis to ensure the proper operation, maintenance and monitoring of POE and POU devices supplied by the water supply system;
  - The emergency response plan the operator has and how that may address threats to public health that may arise that the POE / POU systems may be incapable of effectively treating;
Whether a pilot study may be appropriate to help address any uncertainties that exist with respect to the efficacy of the system, whether the applicant is prepared to conduct such a pilot study, and the results of the pilot study where conducted;36

- The steps that the operator has taken and is prepared to take to provide or otherwise ensure ongoing education and training of POE and POU device users;

- In the case of POU systems, the potential for water to be used from access points that do not have a POU device, and used in a manner which poses a threat to public health;

  • Where an issuing official has exempted the applicant from the need for a construction permit, any of the factors that would have otherwise been considered at the stage of a construction permit application (see section 3.1.5.2 above); and,
  • Where the issuing official has concerns or potential concerns regarding a system that uses POE or POU devices, the degree to which those concerns could be addressed through the imposition of terms and conditions (discussed below).

As a general matter, issuing officials may also consider the applicants history with drinking water matters, for applications respecting new and existing systems.

3.2.6 Terms and conditions
The types of terms and conditions that an issuing official may attach to an operating permit are broad. They include, but are not limited to, terms and conditions respecting:

- Treatment requirements (which may include dates by which they must be implemented)
- Equipment, works, facilities and operating requirements (including compliance with the construction permit)
- Qualifications, training or certification of the persons operating, maintaining or repairing the water supply system
- Monitoring of the drinking water source and water in the water supply system, including specifying a minimum bacteriological sampling frequency
- Standards applicable to the water in the water supply system (e.g., setting a minimum free chlorine residual level)
- Reporting and publication of monitoring results or other information respecting the water supply system. (Act, section 8(3))37
- Well protection and source protection
- Developing a cross connection control plan
- Setting the frequency for reviewing and updating the Emergency Response and Contingency Plan (see appendix 2 for an Emergency Response and Contingency Plan template)
- Maintenance and servicing of Point-of-Entry and Point-of-Use systems38

36 Where a pilot study is conducted, the system must comply with any applicable provisions of the act and regulations (including the requirement for an operating permit where applicable). In such cases the drinking water officer may consider issuing an operating permit for a specified period of time, and with terms and conditions he or she considers necessary, to provide reasonable safeguards for public health while the pilot study is being undertaken.
37 In this regard, consideration should be given to require publication of all sampling undertaken, not merely sampling undertaken at the frequency required by the regulations.
38 These could be attached either to the operating permit of a water supply system that supplies water to point of use or point of entry systems, or to the operating permits respecting point of entry and point of use systems themselves if they are used in circumstances that render them a water supply system under the act and thus in need of their own operating permit.
Also, the Act specifically provides that terms and conditions of an operating permit may be more stringent than the requirements and standards set by the Act or Regulation (Act section 8(5)). Generally, the standards set out in terms and conditions may not be less stringent than those set out in the Act and regulations. However, there are two exceptions:

1. Section 12(5) of the Regulation allows the operating permit to set a different date on which the operator certification provisions apply. When deciding whether or not to set less stringent standards respecting EOCP certification, the drinking water office or delegate should consider whether there are sounds reasons for applying an alternate date (e.g., lack of availability of courses in the region), and he or she should be satisfied that modifying the requirements will not pose an unacceptable risk to public health in respect of that particular system. This does not constitute a “waiver” from the certification requirements, but allows suppliers some extra time, and an opportunity to provide a strategy for obtaining training and experience necessary to achieve certification.

2. Section 8(3) of the Regulation allows for sampling frequencies to be less stringent than those set out in schedule B. In deciding whether to set lower frequencies, consideration should be given to all relevant factors including:
   - The water source (including whether it is surface water or groundwater at risk of influence by surface water)
   - The history of the system
   - Any special vulnerabilities of the intended users
   - Experience of other systems using the same or related water sources
   - Whether the water is being provided to Point-of-Entry or Point-of-Use treatment systems
   - Other monitoring that is being undertaken by the water supplier (such as chlorine residuals, other disinfection effectiveness monitoring, turbidity, particle counts, etc.)

More generally, in exercising the discretion to attach terms and conditions to a permit, the issuing official should consider which terms and conditions are necessary to ensure that all significant threats to public health are addressed.

In general, terms and conditions should not duplicate requirements in the Act and Regulation unless there is some difference in the applied standard. Moreover, issuing officials should ensure that water suppliers are aware that they are required to meet the requirements set out in the Act, the Regulation and the operating permit, and that not all requirements are set out in the permit. Issuing officials may, in the cover letter accompanying the permit, wish to draw the permit holder’s attention to other obligations that exist by virtue of the Act and Regulation, but it must be made clear that the permit holder is responsible for ensuring compliance with all applicable requirements, whether or not they are listed in the permit and cover letter.

A sample cover letter for an operating permit is set out in appendix 4.

### 3.2.6.1 Requirements regarding operator training and certification

Operator training and certification requirements are set out in section 12 of the Regulation. It provides specific certification requirements (through the Environmental Operator’s Certification Program or EOCP) for persons who operate systems classified by the EOCP as level 1, 2, 3 or 4. Generally, these are systems other than “small systems.”

Persons who operate, maintain or repair such systems must be appropriately certified by the EOCP. EOCP certification involves four elements:

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39 An introduction to EOCP is available in section 1.9 of this guide. For more detailed information on the EOCP classification system, see [http://eocp.ca/facilities/facility-classification](http://eocp.ca/facilities/facility-classification).
1. **System Classification**

   The water supplier (owner) must submit an application and fee to the EOCP for review and consideration of a facility classification and number.

2. **Operator Training**

   A water system operator may be trained on the job, participate in classroom instruction, combined classroom and hands-on training, or distance educational training. Courses are not offered by EOCP, but EOCP maintains a registry of courses that can be applied towards EOCP certification.

3. **Operator Experience**

   Operator must have specified types and amounts of practical experience to be eligible to write a certification examination.

4. **Operators Certification**

   Upon completion of the operator training, the EOCP certification exam may be taken. Although no specific training is a requirement to write a certification exam, EOCP often schedules exams in conjunction with training activities for the convenience of Operators, especially those in remote locations.

Section 12(2) of the Regulation provides that operators of systems classified as classes 1, 2 and 3 require certification as of January 1, 2006. However, section 12(5) of the Regulation provides that an operating permit may establish a later date on which these rules apply to a water supply system. Drinking water officers should consider exercising their discretion to delay the operator certification requirements of the Regulation only in cases where they are satisfied that:

   (a) It would be impracticable for the water supplier comply within the timeframe specified in the Regulation,
   (b) The water supplier can demonstrate, to the satisfaction of the drinking water officer, that there would be minimal risk to public health by the delay in obtaining the certification required under the EOCP program, having regard to the circumstances of that water supply system and any potential threats to it, and
   (c) The water supplier has a strategy to provide the requisite degree of training and experience within a reasonable period of time.

The drinking water officer should consider contacting the EOCP prior to making discretionary decisions with respect to operator certification in order to receive aid with evaluating any information received from the water supplier.

### 3.2.6.2 Terms and conditions respecting operator qualification for small systems

Although section 12 of the Regulation does not directly impose any operator qualification requirements for small systems, section 12(4) does provide that an operating permit may require a person to be certified by EOCP to operate, maintain or repair a small system. The decision of whether to impose such a term and condition is one for the drinking water officer to make, in his or her discretion. Generally, the requirement for operator certification should be imposed (through operating permit terms and conditions) on small systems in cases where the drinking water officer considers that there is something about the system in question or that the persons operating it requires a higher standard of formal training than would be normal for a small system. This might include, for example:

- Systems which have a history of problems due to operator error or omission
- Systems which are particularly vulnerable to errors or omissions in operation
• Systems which may present significant public health risk even though they are a small system (for example, systems serving vulnerable users such as a small rural hospital).

Drinking water officials can impose terms and conditions related to operator training and knowledge, short of requiring formal certification by EOCP. This could include, for example, requiring an operator to read specified materials, complete a basic water safety course such as Watersafe,\textsuperscript{40} etc. The terms and conditions could also include requiring the water supplier to prepare an operations guide for the system,\textsuperscript{41} or having the system inspected from time to time by a person who is qualified by EOCP for small systems.

While reasonable efforts should be made to ensure some degree of consistency in the approach taken on these matters, there is no requirement that each system be treated exactly the same in this regard. To the contrary, the exercise of discretion on a case-by-case basis will require some differences in treatment of systems and this is to be expected under the terms of the Regulation.

3.2.7 If the issuing official is not satisfied with the permit application

If the issuing official is not satisfied with an application and is not prepared to issue an operating permit based on the information provided to date, having regard to terms and conditions that could be included, the issuing official should provide the applicant with reasons for the decision. If the issuing official believes that the application could potentially be approved if certain amendments were made to the application, then the issuing official should advise the applicant accordingly and invite the applicant to consider making the necessary changes and resubmitting the application.

3.2.8 Form of permit

Neither the Act nor Regulation specifies the form of an operating permit. A standard form permit is, however, set out in appendix 5 for consideration.

3.2.9 Changes

Where an owner seeks an amendment to an operating permit, the owner should be asked to make the request in writing, detailing how the circumstances of the water supply system have changed in such a way that they believe would warrant the amendment to the operating permit.

Where changes to the terms and conditions are proposed on the initiative of a drinking water officer, those changes can only be made after consultation with the water supplier and consideration of any comments the water supplier may provide in respect of the proposed changes (see Act, section 8 (4)). There is no requirement that this consultation occur in writing. In general, in the interest of time and efficiency, it may be sufficient to consult verbally with persons in respect of changes to which they are unlikely to have any objection. If, however, the person is likely to, or has indicated he or she does, object to a proposed change, the rationale for the proposed change should be provided in writing, and the person’s response should similarly be requested in writing. There is no requirement that the permit holder consent to the proposed amendments, but his or her views must be considered before any final decision is made.

Although operating permits can be changed, it is not possible to change the name on an operating permit to effectively transfer it to another person. Rather, section 7(2) of the Act expressly provides that operating permits are not transferable.

\textsuperscript{40} \url{http://www.watersafebc.ca}
\textsuperscript{41} The BCWWA website provides information that may assist in the preparation of operational guides. (See \url{www.bcwwa.org})
Chapter 4: Ongoing Functions of Drinking Water Officers

4.1 Routine monitoring, inspections, investigations and reports

There are a variety of ways in which drinking water officers may obtain information regarding potential problems with water supply systems. These include:

- Notice of immediate reporting circumstances by laboratories (Act, section 12)\(^\text{42}\)
- Report of threat to drinking water by water suppliers (Act, section 13)
- Report of threats where reporting is required under other acts (Act, section 24)
- Complaints or requests for investigations by users of the system
- Information generated through assessments (Act, section 19)
- Routine inspections, auditing and follow-up by the drinking water officers, Environmental Health Officers and Public Health Inspectors.

In addition, there is a potential for regulations to be developed that would require officials from other agencies to report concerns to drinking water officers when they become aware of them (Act, section 24(2)). However, no such regulations have been developed to date.

To ensure that drinking water officers are able to receive information in circumstances where it is to be provided to them, they should ensure that approved laboratories and water suppliers are provided with their contact information. Each health authority may wish to develop specific practices in this regard that suit its own circumstances. In general, this should ensure that the drinking water officer can be contacted immediately, and that there is no potential for information to sit for unacceptable periods of time on voice message systems or otherwise.

Health authorities are encouraged to consider designating a single, 24-hour on call number which could be provided as the contact number for all such circumstances. The health authority should ensure that any such number is staffed by a person who, in turn, is able to immediately contact the drinking water officer or another appropriate official.

4.1.1 Routine monitoring and inspections

4.1.1.1 Authority

Drinking water officers have the authority to conduct inspections under section 40 of the Act. This section in turn gives them all of the powers of a medical health officer under Division 1 of Part 4 of the Public Health Act.

4.1.1.2 When inspection may be made under the Public Health Act

23 Subject to section 25 [entering to inspect], a health officer may stop a person or vehicle, enter a vehicle or place and inspect a vehicle or place for any of the following reasons:

(a) for the purposes of determining whether

(i) the person is an infected person,

(ii) the person has custody or control of a person who is an infected person, or of a thing that is an infected thing,

(iii) the vehicle or place is an infected thing, or has an infected thing in it or on it,

\(^\text{42}\) Similar notice must also be provided to the medical health officer. See section 12(1)(c).
(iv) a health hazard exists or likely exists in or on the vehicle or place, or in relation to the activities of the person, or

(v) a provision of this Act or a regulation made under it, a term or condition of a licence or permit issued under this Act or an order made under this Act may have been, is being or is likely about to be contravened;

(b) if the person, vehicle or place is described in a report made under Division 3 [Reporting Disease, Health Hazards and Other Matters] of Part 2;

(c) to determine whether

(i) a licence or permit should be issued, or an order should be made, under this Act, or

(ii) a term or condition of a licence or permit issued under this Act, or an order made under this Act, should be varied or rescinded;

(d) to monitor or confirm compliance with

(i) a provision of this Act or a regulation made under it, or

(ii) a term or condition of a licence or permit issued under this Act, or an order made under this Act;

(e) if a health officer has the power to monitor or confirm compliance with a provision of another enactment, to monitor or confirm compliance with that provision;

(f) for any purpose for which an inspection by a health officer is expressly authorized under this or any other enactment;

(g) for a prescribed purpose.

4.1.1.3 Inspection powers under the Public Health Act

24 (1) A health officer may do one or more of the following for the purposes of an inspection:

(a) be accompanied or assisted by a person who has special, expert or professional knowledge of a matter relevant to the inspection;

(b) require a person to produce relevant records or things in the person's possession or control;

(c) inspect, copy or remove relevant records or things;

(d) require a person to stop engaging in an activity, or stop the operation of a thing;

(e) require a person to demonstrate a relevant skill, or operate a thing or carry out a procedure as directed by the health officer;

(f) make records in respect of a person, place or thing;

(g) take samples and perform analyses and tests, including tests in which a sample is destroyed;

(h) require that a place or thing not be altered or disturbed for a reasonable period of time;

(i) question a person whom the health officer reasonably believes to have relevant information;

(j) attend a relevant training program;
(k) make an order necessary for the purpose of exercising a power of inspection.

(2) If a health officer removes records or things under subsection (1) (c), the health officer must

(a) provide a receipt for the records or things to the person from whom they were taken, and

(b) subject to a power under this or any other enactment to order a thing destroyed, promptly return the records or things

(i) when they have served the purposes for which they were taken, or

(ii) if an action or a proceeding is taken under this or any other enactment as a result of an inspection, and the records or things are relevant to the action or proceeding, no later than 3 months after the conclusion of the action or proceeding.

(3) For the purposes of an order made under subsection (1) (k), the person who is subject to the order must comply with it.

4.1.1.4 Entering to inspect under the Public Health Act

25 (1) A health officer may conduct an inspection at any reasonable hour.

(2) Before entering a vehicle or place, a health officer must

(a) take reasonable steps to notify the owner or occupier of the place of the date and time that the health officer will be entering, and

(b) if the place is a private dwelling, obtain either the consent of the owner or occupier or a warrant to enter.

(3) Despite subsection (2) (a), a health officer may conduct an inspection without providing notice if

(a) providing notice would not be reasonably possible or practical in the circumstances, or

(b) in the case of a regulated activity, providing notice would frustrate the purposes of the inspection.

These inspections powers may be particularly important in relation to Point-of-Entry and Point-of-Use treatment systems, as these might not be subject to the general rules regarding monitoring of water under section 11 of the Act, or the requirement to hold an operating permit under section 8.

Drinking water officers should be familiar with all of these provisions and be prepared to use them where circumstances so require.

The inspection powers apply generally and, unlike some other provisions of the Act, they do not apply only to “water supply systems”. Inspection powers can be used in relation to systems serving a single family residence.

4.1.1.5 Frequency of inspections

The decision as to how frequently to conduct routine inspections is one that must be made by drinking water officers, based on risk assessment (see section 5, below) and all relevant factors. This may include consideration of matters such as the number of systems within their responsibility, distance and accessibility to sites, history of compliance or noncompliance, threats that have been identified in relation to the system or its area and overall workload demands.

43 The question of whether a system that uses point-of-entry or point-of-use treatment is a “water supply system” to which the various substantive requirements of the Act and Regulations apply is one that must be considered on the facts of each case, having regard to the definition of “water supply system”.
There is no specific requirement in the Act that all systems be inspected, and there is no specific requirement regarding the timing and frequency of inspections when they do occur. However, drinking water officers are encouraged to develop and document an inspection policy appropriate to the nature and circumstances of the systems within their area of responsibility. Such policies should be developed in consultation with management of each health authority.

Where inspections are conducted, the drinking water officer should:

- Assess the system’s compliance with the Act, Regulation and terms and conditions of construction and operating permits
- Review the emergency response and contingency plan (and refer the water supplier to supporting development tools where appropriate)\(^{44}\)
- Review monitoring and other records (including operational logs, results of confirmation of adequacy of treatment, chlorine residual levels),
- Determine if there are any identifiable threats to the drinking water source
- Identify any deficiencies in comparison with normal waterworks standards
- Review cross connection control program
- Review the risk-assessment rating for the water supply system (see section 4.5)
- Review the status of the water supplier’s continuous improvement plan (if any)
- Consider whether an assessment under section 19 is required.\(^{45}\)

For each inspection, the drinking water officer should complete an Inspection Form/Hazard Rating form. The specific type of form may vary by region to reflect the needs and circumstances of each health authority.

### 4.1.2 Investigations

An investigation differs from inspection in that an inspection is undertaken solely for the purposes of monitoring and assessing compliance and to identify threats. An investigation, by contrast, occurs when an official has some reason to believe that a form of noncompliance exists. An investigation is used to determine whether and to what extent this is the case, and to assemble evidence necessary to take remedial or enforcement action as appropriate.

While it may be difficult in some cases to draw a distinct line between inspection and investigation activity, where a drinking water officer believes that their activities might be reasonably characterized as being an investigation, the officer should:

- Notify the subject of the investigation that the drinking water officer has some reason to believe there may be a concern with respect to noncompliance (unless the provision of that information at the time would materially impair the ability to investigate)
- Take notes of all discussions and observations
- Where evidence is taken, ensure that the drinking water officer will, if necessary, be able to testify as to the integrity of the evidence from the time it was obtained to the time it may be presented in court (i.e. “the chain of continuity”).

Assembling evidence as part of an investigation does not necessarily mean that formal compliance action will be undertaken, and in many cases the concerns can be remedied through information, discussion and education of the

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\(^{44}\) For emergency response plans respecting small systems, see the Ministry of Health document entitled *Emergency Response and Contingency Planning for Small Water Systems*. A sample of an emergency response plan template can be found in the appendix 2 of this guide.

\(^{45}\) For more information about completing a source-to-tap screen or assessment go to [http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/resources-for-water-system-operators](http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/resources-for-water-system-operators).
water supplier. However, the foregoing principles should be followed in any event, to help avoid challenges to the drinking water officer’s actions if informal means do not resolve the matter and more formal compliance action is required.

### 4.1.2.1 Requests for investigations

The Act, under section 29, sets out a process for dealing with requests for investigations. It states:

1. If a person considers that there is a threat to their drinking water, the person may request the drinking water officer to investigate the matter.
2. A request under subsection (1) must be in writing and must include specifics of the facts that the person considers constitute the threat.
3. On receiving a request under subsection (1), the drinking water officer must review the request and consider whether an investigation is warranted.
4. As applicable,
   a. if the drinking water officer decides against undertaking an investigation, the officer must advise the requesting person of this, and
   b. if the drinking water officer undertakes an investigation, the drinking water office must advise the requesting person of the results of the investigation.

Under section 29 of the DWPA, any person has a right to request an investigation by a drinking water officer if they consider there is a threat to their drinking water. The drinking water officer is obligated to consider this request and should be able to make a decision whether to initiate an investigation based on the submission of information outlined in Part B: Requests For Investigation Of A Drinking Water Threat Under The Drinking Water Protection Act of this guide.

Drinking water officers’ should also proactively inform persons concerned with their drinking water, that they have a right to request an investigation under section 29 if they feel that the water is threatened and can bring forward specifics of the facts that constitute the threat.

Section 29 requires requests for an investigation to be in writing. If a request is made verbally to a drinking water officer, the drinking water officer should inform the person the request is required to be in writing.

Information provided by an applicant in relation to the questionnaire referred to in Part B: Requests For Investigation Of A Drinking Water Threat Under The Drinking Water Protection Act should provide sufficient evidence for a drinking water officer to make a determination as to whether to initiate an investigation into the matter. The purpose of an investigation is to gather information to determine whether and to what extent a threat exists. It is not incumbent on the person requesting the investigation to definitively prove to the drinking water officer that the threat exists.

If it can be reasonably demonstrated, based on the preponderance of responses in the questionnaire, that a threat to drinking water may exist, this is a sufficient basis on which to initiate an investigation.

In deciding whether or not to conduct an investigation, drinking water officers must consider all relevant factors. This may include, but is not limited to, considering:

- Whether the request for investigation includes credible information to suggest a threat may exist
• Any information that the drinking water officer has on file in respect of the water supply systems and prior dealings with the water supply system or owner
• The degree of potential harm that could occur if a threat complained of does exist or comes into existence
• The history of the drinking water officer’s dealings with the person requesting the investigation
• The extent the matter has already been reviewed (e.g., through other complaints or at the initiative of the drinking water officer)
• The extent to which the matter is being or will be investigated by another agency with related authority (e.g., Ministry of Forests, Lands, Natural Resource Operations and Rural Development staff responsible for administering the Groundwater Protection Regulation under the Water Sustainability Act or Ministry of Environment and Climate Change Strategy staff responsible for administering the Environmental Management Act)

If the drinking water officer decides not to conduct an investigation, he or she must provide a basic explanation as to why the decision was made. Drinking water officers should provide this to the person requesting the investigation in writing.

If an investigation is conducted, the drinking water officer must advise the person who requested the investigation of the results of the investigation. The drinking water officer should specify his or her findings regarding whether any threat was found, and what, if any, follow-up action will be taken. The amount of information and detail provided will vary depending upon the facts of the case, and other factors including, but not limited to, the significance of the threat with respect to human health, the complexity of the investigation, the availability of supporting data and the potential impact on the population at risk from the threat. The drinking water officer’s response should provide enough information to allow the recipient to understand the drinking water officer’s conclusions and the basis upon which they were drawn. Drinking water officers should also provide this information in writing.

4.1.3 Privacy rights and warrants

Section 8 of the Canadian Charter of Rights and Freedoms states:

Every person has the right to be secure against unreasonable search and seizure.

There is a significant body of case law defining what constitutes a “search” or “seizure” for the purposes of section 8 of the Charter, and when a search or seizure will be considered “unreasonable”. These will depend on various factors, including whether the person in question has a reasonable expectation of privacy in the place or thing being searched or seized and the nature of the inspection or enforcement activity being undertaken.

The Drinking Water Protection Act or the Public Health Act does not allow a drinking water officer to enter a private dwelling place, unless the occupant consents or a warrant has first been obtained from court. It is important to respect this limitation, as a failure to do so could compromise an investigation. Such failure may also constitute a violation of section 8 of the Charter and could result in a court awarding remedies against the health authority.

If a drinking water officer believes that it is necessary to enter a private dwelling and consent cannot be obtained, or it is not appropriate to request entry under the circumstances, a warrant should be sought. To obtain a warrant, an application must be made to a justice under section 41 of the Act. It states:

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46 In some cases, the person requesting the investigation may be the water supplier
47 The fact that there may be overlapping authority or activity being undertaken by another agency does not mean that the drinking water officer lacks authority or may disregard responsibility in relation to a matter. Such situations should be carefully assessed in accordance with the principles for cooperation with other agencies, discussed below in Chapter 5, sections 5.3 and 5.4 of this Guide.
If satisfied by evidence on oath or affirmation that access on or into property is necessary for the purposes of this Act, a justice may issue a warrant authorizing a person named in the warrant to enter on or into property and conduct an inspection, undertake hazard abatement or prevention activities or take other action as authorized by the warrant.

Legal counsel should be consulted regarding the form and process for applying for a warrant, as the Act does not prescribe the forms to be used.

Once a warrant is issued, it must be executed against the party to whom it is directed. When executing a warrant, the following principles and practices should be applied:

- The drinking water officer executing the warrant should be accompanied by at least one other person.
- If the drinking water officer executing the warrant has any reason to believe that the property owner or occupant will not cooperate with the warrant, the drinking water officer should speak in advance with the local police or RCMP and request that a peace officer accompany the drinking water officer in the execution of the warrant.
- Upon arrival at the property, the drinking water officer executing the warrant must attempt to advise the occupants of the property of the warrant. The drinking water officer should bring an additional copy of the warrant to leave for the occupant of the property.
- If there is no one at the property that is able to allow physical access, the drinking water officer should attempt to execute the warrant at another time, unless there is some imminent danger to human health that would result from any delay in executing the warrant.
- If there is a danger to human health that requires immediate attention and there is nobody at the property that is willing or able to provide the drinking water officer with access based on the warrant, entry to the property should be obtained with the assistance of a peace officer.

Warrants can also be obtained under the authority of the Offence Act and the Public Health Act. However, the relevant legal standards and process may differ somewhat from a warrant requested under the Drinking Water Protection Act. If a drinking water officer believes that the ability to obtain a warrant under section 41 of the Drinking Water Protection Act is not appropriate, they should discuss the matter with legal counsel before seeking a warrant under these other acts.

4.1.4 Reports that must be made by water suppliers and laboratories

Water suppliers are required to report various matters to a drinking water officer. This includes reports of monitoring under section 11 of the Act and any applicable operating permit requirements, reports made pursuant to emergency response plans (Act, section 10), and reporting of threats to drinking water (Act, section 13). Drinking water officers should consider all such information in assessing risks and deciding whether any further action is required under the act in relation to the relevant water supply system.

Reports may also be made by laboratories under section 12 of the Act where immediate reporting standards are not met.

To facilitate timely and effective reporting by laboratories, some health authorities have established protocols including a single number for the laboratories to call to discharge their obligations respecting reporting to the drinking water officer and medical health officer under section 12(3).
4.1.5 Reports that must be made by other officials

Section 24 of the Act allows the Lieutenant Governor in Council (Cabinet) to make regulations that would require specified public servants and public officials to report to a drinking water officer “any situation they observe, or of which they become aware that they consider may be a threat to drinking water”.

No regulations have been developed in this regard to date. However, drinking water officers are encouraged to establish working relationships with other statutory decision makers, and to request other officials to provide information about threats to drinking water on a voluntary basis wherever possible. If a drinking water officer believes that it is not sufficient to rely on voluntary cooperation by other agencies in this regard, then they should discuss the matter with their Senior Manager. The Senior Manager may wish to refer the matter for consideration by the Drinking Water Leadership Council, which may consider making recommendations to government respecting the development of regulations to compel such reporting.

4.2 Obtaining further information

When a potential concern regarding drinking water is identified through routine monitoring, inspections or investigation, the drinking water officer must consider whether additional information is required to determine an appropriate response. There are several ways in which additional information can be obtained.

4.2.1 Additional monitoring, testing and laboratory reporting

Section 8(6) of the Act allows the drinking water officer to order a water supplier to undertake additional monitoring or testing, if the drinking water officer considers that further information is necessary to determine whether the water supplied by the system meets the requirements of section 6 [potable water] or the requirements and standards established by the Regulation and operating permit. Further technical guidance on additional monitoring and testing can be found in Part B of this guide.

Additional monitoring and reporting requirements can be imposed without amending the operating permit itself. Where such an order is made, no particular form is required. However,

- The order should be made in writing,
- It should specify that the order is being made under the authority of section 8(6) of the Act,
- It should specify the precise type and frequency of monitoring or testing required, and
- It should specify the manner in which the results must be reported to the drinking water officer and, if directed by the drinking water officer, the public as well.

Further, section 8(5) of the Regulation allows a drinking water officer to request laboratories to provide the drinking water officer, the water supplier, or both, with listings of all water samples sent by the water supplier, and the results of testing for total coliform and *Escherichia coli*. Drinking water officers may exercise this power simply by contacting the laboratory in question.

Where potential concerns exist in relation to Point-of-Entry or Point-of-Use systems, drinking water officers have the following options available in terms of obtaining additional information:

- Request the end user to monitor voluntarily
- Require the water supplier who provides water to the Point-of-Entry or Point-of-Use systems to monitor the water, either
  - (a) Before the water enters the Point-of-Entry or Point-of-Use systems, or
(b) After those systems provided that the person using the Point-of-Entry or Point-of-Use system is prepared to provide the water supplier with access for sampling purposes

- Order a person causing or contributing to a health hazard to provide information and undertake tests under section 25(3)(a) and (b) of the Act (provided the drinking water officer has reason to believe a health hazard exists or is imminent as per section 25(1)).

4.2.2 Assessments

Under Part 3 of the Act, a drinking water officer can require a water supplier to complete a water source and system assessment. The drinking water officer can order a water supplier to prepare an assessment if

the drinking water officer has reason to believe that an assessment is necessary to properly identify and assess threats to drinking water in relation to the water supply system (section 19(1)(a)).

The term “threat” is defined in section 1 of the Act to mean:

in relation to drinking water, a condition or thing, or circumstances that may lead to a condition or thing, that may result in drinking water provided by a domestic water system not being potable water

In deciding whether an assessment should be ordered, it is important to recognize that the purpose of an assessment is, according to section 18(2):

…. to identify, inventory and assess:

(a) the drinking water source for the water supply system, including land use and other activities and conditions that may affect that source,

(b) the water supply system, including treatment and operation,

(c) monitoring requirements for the drinking water source and water supply system, and

(d) threats to drinking water that is provided by the system.

Circumstances in which an assessment might be appropriate include, but are not limited to, situations where there has been:

- A history of malfunctions or threats to drinking water from the water supply system
- A history of boil water orders / advisories
- A history of threats to drinking water in the area
- Significant changes in the quality of water in a water supply system
- Problems experienced by water suppliers in similar circumstances
- Impacts or potential impacts to the quality of the water source (e.g., nearby development or resource extraction)
- More than the prescribed number of years have passed since the previous assessment [there is nothing in the Regulation at present]

In deciding whether an assessment is necessary, the drinking water officer may wish to consult with the medical health officer, and should also consult the water supplier. However, it is not necessary to obtain the consent of a water supplier before ordering an assessment.

The drinking water officer can order two or more water suppliers to prepare a joint assessment if they use the same drinking water source or related sources (Act section 19(2)).
4.2.2.1 Process for assessments

Neither the Act nor the Regulation set out the specific process by which an assessment must be completed. Consequently, the process, preparation, form, content, area of coverage and time for completing an assessment must be done in accordance with the directions of the drinking water officer. In determining which directions to give, the drinking water officer must consult the medical health officer, and may establish a technical advisory committee (Act, section 20).

As guidance to drinking water officers and water suppliers in relation to assessments, the Ministry of Environment and Climate Change Strategy and the Ministry of Health developed three assessment tools for consideration. These are the Drinking Water Source-to-Tap Screening Tool (appendix 6), the Water Supply System Assessment (appendix 7) and the Comprehensive Drinking Water Source-to-Tap Assessment Guideline (appendix 8). These documents were on the basis of extensive consultation with water suppliers, industry and interested government agencies, and have been the subject of peer review and comment. Drinking water officers are encouraged to use these tools when they believe an assessment is required. There is no legal requirement that the drinking water officer require suppliers to use these specific tools, and if the drinking water officer believes that some other form of assessment is required, the drinking water officer should modify or replace these tools with the process and requirements the drinking water officer considers appropriate in the circumstances.

Where a drinking water officer orders a water supplier to complete an assessment, the drinking water officer must write a letter to the water supplier explaining that they are required to complete the assessment pursuant to section 19 of the Act. The letter must also indicate the process, form, content and area of coverage for the assessment. Where the tools referenced above are used, some of this information will be apparent from the tool itself, but it is the responsibility of the drinking water officer to ensure that the correspondence provides the information necessary for the water supplier to reasonably understand the requirements. The letter must also indicate the date by which the results of the assessment must be provided to the drinking water officer, and what form of public notice of the assessment is required (see section 21 of the Act).

As a matter of administrative fairness, the drinking water officer must provide the water supplier with an opportunity to make their views known before the decision to order an assessment (including the process for the assessment, form, scope of coverage, time frames etc.) is finalized. Although this consultation may occur though discussions, drinking water officers should also consider sending written correspondence to this effect. Appendix 9 sets out a sample letter for this purpose.

Finally, drinking water officers may consult with water suppliers regarding potential threats and remedial actions, without necessarily ordering a formal assessment under section 19. This may be particularly important for smaller systems with limited financial resources. In such cases, the Drinking Water Source-to-Tap Screening Tool (appendix 6), the Water Supply System Assessment (appendix 7) and the Comprehensive Drinking Water Source-to-Tap Assessment Guideline (appendix 8) can still be used.

Similarly, water suppliers may also be interested in undertaking assessments on their own initiative, and in such cases drinking water officers should consider providing the water suppliers with copies of, or references to, the Drinking

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48 The Screening Tool is a simple questionnaire that suppliers can complete themselves. The Comprehensive Assessment Guideline is intended for professionals who are investigating more complex risks to water supply systems. The Water System Assessment fills a gap between the Screening Tool and the Comprehensive Assessment Guideline. The intention is to offer an alternative that will allow for developing an action plan to reduce risks to and in a water system, without the added cost and time commitment of a comprehensive assessment.
Water Source-to-Tap Screening Tool, the Water System Assessment and the Comprehensive Drinking Water Source-
to-Tap Assessment Guideline.

4.2.2.2 Assessment follow-up

The drinking water officer should review each assessment to determine whether it has identified threats to the drinking water provided by the water supply system. If no such threats are identified, no further action is required.

If threats to the drinking water provided by the water supply system are identified, the drinking water officer should consider whether any changes to the terms and conditions of an operating permit are required, or whether an assessment response plan should be prepared (Act, section 22). Section 22(4) of the Act notes that the drinking water officer can require an assessment response plan to include provisions respecting any or all of the following:

(a) Public education and other means of encouraging drinking water source protection;
(b) Guides to best management and conservation practices;
(c) Infrastructure improvements;
(d) Cooperative planning and voluntary programs;
(e) Input respecting local authority zoning and other land use Regulation.

When ordering an assessment response plan, the drinking water officer should ask that the plan set out proposed responses to the threats identified by the assessment. In addition, section 15 of the Regulation requires that all assessment response plans include provisions to identify, eliminate and prevent cross-connections with non-potable water sources.

An assessment response plan must be submitted to the drinking water officer, who should review it relative to the threats identified in the assessment. If the drinking water officer is not satisfied the assessment response plan will address the threats, she or he can order the water supplier to review and revise it in accordance with the directions of the drinking water officer.

In every case where an assessment has been completed, the information obtained by the assessment (and the steps to be taken under an assessment response plan, if any) must be included in the appropriate physical file and electronic data storage systems.

4.3 Preventative and remedial action

Under the Act, there is wide range of preventative or remedial actions that can be taken by drinking water officers where a concern is identified. It is important that drinking water officers consider this full range of options and determine which may be appropriate in any particular circumstances. The specific options available, and general considerations of the circumstances in which they may be appropriate, are set out in the sections below.

There are other preventative and remedial actions that may be ordered or undertaken under other legislation that may have a positive impact on drinking water (See Chapter 5, section 5.3). Although drinking water officers will not have authority under those other acts (with a few exceptions to the Water Sustainability Act, discussed in Chapter 5, section 5.3), they should be aware of and consult other agencies in cases when they consider that appropriate.

4.3.1 Amending an operating permit

This option should be used when the drinking water officer believes it is important to change the legal requirements imposed upon a particular water supplier. Amendments can help ensure that the water supplier knows exactly what is
required of him or her, and to help ensure that water suppliers understand that taking the action specified is essential to meeting their legal obligations. Amending terms and conditions of an operating permit may also make enforcement action easier in the future, if necessary, as it may be easier to prove a violation of the specific term and condition of an operating permit, rather than some other potential violations of the Act that are more generally described. (For example, the requirement to provide potable water that is “safe to drinking and fit for domestic purposes without further treatment.”).

Any amendment of an operating permit must occur in accordance with section 8(4) of the Act, which requires prior consultation with the water supplier. In any such consultations, the drinking water officer must allow the water supplier to state his or her views as to whether amendments are required. Further, the drinking water officer may wish to discuss and solicit ideas from the water supplier as to the most efficient and effective means of addressing the drinking water officer’s concerns if there are a variety of possible ways to do so. The drinking water officer should not avoid amending an operating permit in a manner he or she considers necessary simply because the water supplier may be unwilling to comply, or have difficulty with complying with the amended permit.

4.3.2 Order to review and update emergency response and contingency plan

This option might be appropriate to consider in cases where there is no immediate concern about a drinking water health hazard, but there is some concern about the ability of the operator to respond appropriately in emergency situations.

Even if a drinking water officer believes that a review and update of an emergency response and contingency plan is required, it may not be necessary to issue a formal order under the Act in all cases. In practice, it may be sufficient for the drinking water officer to simply discuss the matter with the water supplier and allow the supplier an opportunity to amend the plan.

If, however, the drinking water officer believes the water supplier is not likely to review and update the plan voluntarily, the drinking water officer should consider making a formal order under the Act. There is no specific form by which an order must be made, but it should be made in writing and should specifically indicate that it is an order under section 10(2) of the Act.

4.3.3 Order for public notice of threats to drinking water

Under section 14 of the Act, the drinking water officer can request or order a water supplier to give public notice, in the manner approved by the drinking water officer, if:

- The drinking water officer has received a report from a laboratory indicating that an immediate reporting standard is not being met (as per section 12)
- The drinking water officer has received a report from a water supplier concerning threats to drinking water (as per section 13), or
- The drinking water officer considers there is, was or may be a threat to the drinking water provided by the water supply system

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49 The term “drinking water health hazard” is defined in section 1 of the Act to mean:
(a) a condition or thing in relation to drinking water that does or is likely to
   (i) endanger the public health, or
   (ii) prevent or hinder the prevention or suppression of disease,
(b) a prescribed condition or thing, or
(c) a prescribed condition or thing that fails to meet a prescribed standard;

50 A sample Emergency Response and Contingency Plan can be found in appendix 2 of this guide.
The term "threat" is defined very broadly in the Act to mean:

In relation to drinking water, a condition or thing, or circumstances that may lead to a condition or thing that may result in drinking water provided by a domestic water system not being potable water.

Drinking water officers should engage in dialogue about “public notice” provisions prior to the need for an order (e.g., at a time when no public notice is required). The water supplier is obligated to protect public health from threats to the drinking water (see Act, section 14(2)). The dialogue should seek consensus on the circumstances requiring public notice as well as the manner by which the public notice shall be issued. This dialogue should strive to result in the water supplier issuing a public notice without the need for a drinking water officer to make an order.

The power to order public notice also exists under the hazard abatement and prevention orders section of the Act (section 25(3)(f)). However, the powers under section 25 differ from the powers under section 14 in two important ways:

- An order under section 14 may be issued in the circumstances where the drinking water officer believes there is, was or may be a “threat”. By contrast, an order under section 25 can only be made where a drinking water health hazard exists, or there is a significant risk of an imminent drinking water health hazard.
- An order under section 25 is subject to a request for review and reconsideration under section 39.1 of the Act, whereas an order under section 14 is not subject to section 39.1.

4.3.3.1 What is the threshold necessary to request or order public notice?

Generally, public notice of some form may be appropriate when:

- Monitoring indicates:
  - There is detectable fecal coliform or E-coli per 100 ml (see Regulation, schedule A)
  - The detectable total coliform levels exceed those permitted under the Regulation for sample frequency (see Regulation, schedule B)
  - Testing has indicated the presence of some other bacteria, viruses or parasites that has a potential to cause health concerns and which may be addressed by boiling the water (such as Cryptosporidium, Giardia, Campylobacter, Shigella).
  - A turbidity event is likely to impede a system’s capacity to disinfect, or the source of turbidity is related to an event that is likely to introduce pathogenic microorganisms into the water. (see Part B: Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water of this guide)
- There is evidence of disease in the community and drinking water is suspected as the source of infection.
- An event has occurred that compromises the treatment and distribution systems, or which compromises the water source that is not reasonably expected to be addressed by the treatment system. These situations could include introduction of substances into water sources, breaks in water pipes, cross connections or natural disasters.
- A water supply system is using untreated surface water or groundwater that is at risk of containing pathogens, contrary to section 5 of the Regulation.

This list is not exhaustive and there may be other circumstances in which drinking water officers consider public notice appropriate.  

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When making decisions about requiring public notice of a threat to drinking water, drinking water officers must always be guided solely by consideration of public health protection. Expense, inconvenience, or other concern of a water supplier or water users is not a sufficient reason to avoid issuing public notice if the drinking water officer considers that necessary to ensure protection of public health. However, drinking water officers should ensure that where they believe the public notice is required, they are able to provide a rationale for this determination.

The drinking water officer should strive for consensus on the need for the order and the specific language of the order with the water supplier. The drinking water officer should provide the water supplier with an opportunity to make their views known and considered where possible, provided that no significant delay occurs on this account that could prejudice public health protection. In addition to meeting the tests of administrative fairness, this approach will, in most cases, result in better relations with the water supplier, and will ensure that public health requirements are dealt with in a manner that addresses the water supplier’s interests and concerns to the extent possible in the circumstances.

Drinking water officers should consider consulting with the medical health officer before requiring public notice, unless such consultations cannot be completed immediately and any delay would cause unacceptable risks to public health.

4.3.3.2 Internal communication systems to ensure timely action

All drinking water officers should have an appropriate contact system in place to ensure they can be contacted and take action under section 14 in a timely manner as appropriate. This should include identification of alternate persons who may act in a particular area when the drinking water officer is unavailable.

4.3.3.3 Request or order

Section 14 of the Act provides that the drinking water officer can “request” or “order” that a water supplier provide public notice in certain circumstances.

In general, a request may be appropriate in circumstances where the water supplier is in support of the public notice and is prepared to do so without any formal order. Where the drinking water officer is not sufficiently certain that a water supplier will comply with a request, an order should be used. A failure to comply with an “order” constitutes an offence under section 45(1) of the Act.

A sample form Order Respecting Public Notice is set out in appendix 10. A sample form Request Respecting Public Notice is set out in appendix 11.

Finally, notices may be issued by water suppliers on their own initiative whenever they deem that appropriate, even if a drinking water officer has not requested or ordered that to occur. Water suppliers are required to provide public notice without any request or order by the drinking water office if the water supplier has received a report that an immediate reporting standard is not met or they consider that there may be a drinking water health hazard in relation to the drinking water and they are not able to immediately contact a drinking water officer (Act, section 14(2)).

4.3.3.4 Type of notice

In the past, public health officials have implemented some form of boil water advisory when testing indicated the presence of fecal coliform or E-coli. However, some concerns have been expressed about this practice, including the following:
Different regions used different, and at times inconsistent, terminology (e.g. boil water advisories, boil water notices, water use advisories) so the public had difficulty understanding the specific meaning and consequences of such notice.

A zero tolerance policy was adopted that resulted in boil water advisories or notices being issued in circumstances where some questioned the need for that step to be taken.

Boil advisories or notices are not in any event sufficient to address threats that are not neutralized by boiling.

Given these concerns, and the fact that section 14 of the Act (and section 25, discussed below) provides broad discretion to drinking water officers regarding the type of public notice required, drinking water officers should consider use of the following range of public notice options, and should require whichever is appropriate to the facts of a particular case. If the drinking water officer believes some other form of notice should be used, he or she should request or order this, but should be able to rationalize the decision to require some form of notice other than those set out below.

**Water Quality Advisory**

A “Water Quality Advisory” should be used where a drinking water officer determines there is some level of risk associated with water use, but the circumstances do not warrant a “Boil Water Notice” or “Do Not Use Water Notice”, discussed below. A Water Quality Advisory should specify the nature of the risk presented, steps that the water supplier is taking or is required to take to address them, and steps that water users may take in the meanwhile to minimize the risk associated with that water.

**Boil Water Notice**

A “Boil Water Notice” should be used when a drinking water officer determines that there is a risk associated with consumption of water, and that risk can be adequately addressed by boiling the water in accordance with the notice, prior to human consumption. The notice should contain specific instruction regarding boiling requirements, and the steps that the water supplier is taking or is required to take to address the risks that exist other than through use of the boil water notice.

A sample form of Boil Water Notice and the information to be included in it is set out in appendix 12.

**Do Not Use Water Notice**

A “Do Not Use Water Notice” should be used when a drinking water officer identifies there is a risk associated with consumption of water, and that risk cannot be adequately addressed by boiling the water or issuing a Water Quality Advisory. This might include, for example, circumstances in which unacceptable levels of nitrates or lead are detected in the water, or where there is concern that a water system may have been subject to vandalism, accidents (such as chemical spills) or natural events such as mudslides or earthquakes. In some cases, it may be appropriate for the notice to specify those specific types of water use that are not acceptable (e.g. in some circumstances it may be acceptable to use water for showering, but not for human consumption.)

A sample form of Do Not Use Water Notice and the information to be included in it is set out in appendix 13.

**Guidance for determining appropriate form of notice**

In deciding which form of notice to require, the drinking water officer must conduct a risk assessment. This should be undertaken in consultation with the medical health officer and other public health officials the drinking water officer considers appropriate. It should involve consideration of all relevant matters. This may include, but is not limited to, matters such as:
• The degree to which it has been determined that a health hazard does exist in relation to the water (e.g., has only one of numerous samples indicated a low presence of fecal coliform, or presence of *E. coli*, is presence found in multiple samples, or is the presence at a high level even if only one sample?)

• The severity of harm that may result from consumption of the water in question

• The degree to which each type of notice would serve to address the threat

• Past history of the water source and water supply system in question

• Recent operational factors

Some of the specific issues typically considered by officials that may fall within the above noted principles include:

Background

- Type of water system
- Type of treatment
- Integrity of water supply system
- Size of system - number of connections
- Population served - type

Operational Information

- Certified operators
- Operations history
- Cross connection control
- Age of infrastructure
- Water conservation requirements
- Fire flow requirements
- Potential to isolate parts of water system
- Time involved for complete changeover of water
- Significant deterioration in source water quality
- Equipment malfunction during treatment or distribution
- Situations where operation of the system would compromise public health

Monitoring Information

- Known or suspected communicable disease outbreak in community
- Recent raw water quality events
- Monitoring records
- Chlorine residual records
- Turbidity records
- Public health inspector /drinking water officer inspection
- Public health engineer inspection
- Inadequate disinfection or disinfection residuals
- Unacceptable microbiological quality
- Unacceptable turbidities or particle counts

Sampling Information

- Sample location
- Sampling procedures and changes
- Sample shipping
- Re-sampling time element
- Lab certification
- Confidence in lab results
- Number of samples taken/available
4.3.3.5 Process for ensuring compliance with a public notification order

Given the importance of public notice to the protection of public health, drinking water officials should develop and document a plan for ensuring implementation of all public notification orders issued under sections 14 or 25. The specific measures that will be appropriate may vary with individual cases, depending on the nature of the risk, the vulnerability of the population at issue and other relevant factors. As such, it is ultimately for the drinking water official to decide what steps are appropriate. In making this decision, drinking water officials should consider the following possible steps, as well as any others they may consider appropriate:

- Contacting people within the affected community to determine if they have received notification
- Visiting the affected community at the earliest opportunity (and in any case no more than 48 hours after the order is issued) unless timely physical attendance is impracticable. In the latter case, other means should be explored to obtain the type of information that would have normally been obtained from personal attendance (such as requesting a local government official to attend and advise the drinking water officer of the results).

Drinking water officials should document all steps taken to ensure compliance with a public notification order.

Where non-compliance with a public notification order is found, the drinking water officer should take other remedial compliance action in accordance with this guide. The drinking water officer should also consider alternate means to ensure public notification occurs in a timely manner, such as posting information on the health authority’s website, alerting local governments and media or providing information directly to affected persons.

4.3.3.6 Rescinding public notification orders

In assessing whether a public notification order should be rescinded, the drinking water officer should consider, in consultation with the medical health officer and other public health officials as appropriate:

- Whether the problem or threat has been fully identified
- Whether the problem or threat has been resolved
- Whether the relevant microbiological quality, turbidity, particle counts or disinfectant residual of the treated water in at least two consecutive sets of samples has returned to an acceptable level;
- Whether sufficient water changeover or flushing has occurred in the distribution system to eliminate any remaining contaminated water.\(^\text{52}\)

When the drinking water officer determines that a public notification order may be rescinded, the drinking water officer should communicate that decision to the water supplier.

To minimize any potential for misunderstanding about whether and when an order has been rescinded, drinking water officers should ensure that all parties are aware that the order will remain in force unless and until it is rescinded in writing. A statement to this effect should be included in the original order.

4.3.4 Order flood proofing of well

Section 16(1) of the Act and section 14 of the Regulation provide that wells that supply water to a drinking water supply system must be flood proofed if they are identified in an assessment (under section 19) as being at risk of flooding. In some cases, other wells may also have the potential to affect the water supply system in question. Drinking water officers can also require flood proofing of those other wells (see section 16(2)).

In addition to the drinking water officer’s ability to order flood-proofing of wells under section 16 of the Drinking Water Protection Act, the well protection provisions of the Water Sustainability Act and Groundwater Protection Regulation may also be relevant (see Chapter 5, section 5.3 of this guide).

4.3.5 Hazard abatement and prevention orders

These powers are found in section 25 of the Act. It contains a broad range of orders that can be made when the drinking water officer has reason to believe that a drinking water health hazard exists, or there is a significant risk of an imminent drinking water health hazard (section 25(1)).

Such orders can be made against any person who falls within the terms of section 25(2), and must be served on the person (see section 25(4) and 46 regarding service).

The range of remedies that can be ordered is set out in section 25(3).

Although there are no specific requirements in the Act to provide prior notice to a person before a hazard abatement or prevention order is issued, this should be done in any case where it can be done without significant threat to public health. In cases where a delay would cause significant risks to public health, the order should be made immediately, but the person should, immediately thereafter, be given an opportunity to present their views as to whether the order is required, and whether the specific requirements of the order are appropriate in the circumstances.

Hazard abatement and prevention orders can, in urgent situations, be issued orally, to be following in writing as soon as possible thereafter (section 25(7)).

If the person to whom the order is addressed fails to take the action required, then the drinking water officer can, under section 27, take further steps to ensure it occurs. This is discussed further below in section 4.3.8.

A sample of a hazard abatement and prevention order is set out in appendix 14.

(Note: Section 25(5) and (8) – (10) contain other provisions respecting contravention Orders that might potentially be relevant in some cases, and must be considered any time an Order is issued.)

 Violations of orders under section 25 can be made the subject of a violation ticket. As such, enforcement action can be taken without the need to prepare a report to Crown Counsel and without the need for any approval by Crown Counsel to pursue charges in court.

4.3.6 Orders under the Public Health Act

Section 2(2) of the Act states:

Nothing in this Act affects the powers, duties and functions of a medical health officer under the Public Health Act or any other enactment

Consequently, any of the powers that a public health official holds under the Public Health Act continue in respect of drinking water matters, if the relevant provisions of the Public Health Act are applicable to the facts of the case.
One of the most significant parts to consider in this regard is Division 4 of Part 4 of the Public Health Act.

4.3.6.1 When orders respecting health hazards and contraventions may be made

30 (1) A health officer may issue an order under this Division only if the health officer reasonably believes that
   (a) a health hazard exists,
   (b) a condition, a thing or an activity presents a significant risk of causing a health hazard,
   (c) a person has contravened a provision of the Act or a regulation made under it, or
   (d) a person has contravened a term or condition of a licence or permit held by the person under this Act.

   (2) For greater certainty, subsection (1) (a) to (c) applies even if the person subject to the order is complying with all terms and conditions of a licence, a permit, an approval or another authorization issued under this or any other enactment.

4.3.6.2 General powers respecting health hazards and contraventions

31 (1) If the circumstances described in section 30 [when orders respecting health hazards and contraventions may be made] apply, a health officer may order a person to do anything that the health officer reasonably believes is necessary for any of the following purposes:
   (a) to determine whether a health hazard exists;
   (b) to prevent or stop a health hazard, or mitigate the harm or prevent further harm from a health hazard;
   (c) to bring the person into compliance with the Act or a regulation made under it;
   (d) to bring the person into compliance with a term or condition of a licence or permit held by that person under this Act.

   (2) A health officer may issue an order under subsection (1) to any of the following persons:

   (a) a person whose action or omission
      (i) is causing or has caused a health hazard, or
      (ii) is not in compliance with the Act or a regulation made under it, or a term or condition of the person’s licence or permit;

   (b) a person who has custody or control of a thing, or control of a condition, that
      (i) is a health hazard or is causing or has caused a health hazard, or
      (ii) is not in compliance with the Act or a regulation made under it, or a term or condition of the person’s licence or permit;

   (c) the owner or occupier of a place where
      (i) a health hazard is located, or
      (ii) an activity is occurring that is not in compliance with the Act or a regulation made under it, or a term or condition of the licence or permit of the person doing the activity.
4.3.6.3 Specific powers respecting health hazards and contraventions

32 (1) An order may be made under this section only

(a) if the circumstances described in section 30 [when orders respecting health hazards and contraventions may be made] apply, and

(b) for the purposes set out in section 31 (1) [general powers respecting health hazards and contraventions].

(2) Without limiting section 31, a health officer may order a person to do one or more of the following:

(a) have a thing examined, disinfected, decontaminated, altered or destroyed, including

   (i) by a specified person, or under the supervision or instructions of a specified person,

   (ii) moving the thing to a specified place, and

   (iii) taking samples of the thing, or permitting samples of the thing to be taken;

(b) in respect of a place,

   (i) leave the place,

   (ii) not enter the place,

   (iii) do specific work, including removing or altering things found in the place, and altering or locking the place to restrict or prevent entry to the place,

   (iv) neither deal with a thing in or on the place nor dispose of a thing from the place, or deal with or dispose of the thing only in accordance with a specified procedure, and

   (v) if the person has control of the place, assist in evacuating the place or examining persons found in the place, or taking preventive measures in respect of the place or persons found in the place;

(c) stop operating, or not operate, a thing;

(d) keep a thing in a specified place or in accordance with a specified procedure;

(e) prevent persons from accessing a thing;

(f) not dispose of, alter or destroy a thing, or dispose of, alter or destroy a thing only in accordance with a specified procedure;

(g) provide to the health officer or a specified person information, records, samples or other matters relevant to a thing's possible infection with an infectious agent or contamination with a hazardous agent, including information respecting persons who may have been exposed to an infectious agent or hazardous agent by the thing;

(h) wear a type of clothing or personal protective equipment, or change, remove or alter clothing or personal protective equipment, to protect the health and safety of persons;
(i) use a type of equipment or implement a process, or remove equipment or alter equipment or processes, to protect the health and safety of persons;

(j) provide evidence of complying with the order, including

   (i) getting a certificate of compliance from a medical practitioner, nurse practitioner or specified person, and

   (ii) providing to a health officer any relevant record;

(k) take a prescribed action.

(3) If a health officer orders a thing to be destroyed, the health officer must give the person having custody or control of the thing reasonable time to request reconsideration and review of the order under sections 43 and 44 unless

(a) the person consents in writing to the destruction of the thing, or

(b) Part 5 [Emergency Powers] applies.

4.3.6.4 Ordering others to comply and entering to take action

33 (1) If a health officer is not satisfied that a person is adequately complying with, or has adequately complied with, an order, the health officer may

   (a) if the person is the owner of the place in respect of which the original order was issued, order an occupier of the place to comply with the original order,

   (b) if the person is an occupier of the place in respect of which the original order was issued, order the owner of the place to comply with the original order, or

   (c) take action to prevent or remove, or mitigate the harmful effects of, the health hazard that is the subject of the original order, including authorizing a person to carry out work on behalf of the health officer.

(2) Subject to subsection (3), a health officer who has issued an order, or a person acting on behalf of the health officer, may enter on or into a place that is subject to the order for the purpose of taking an action under subsection (1) (c).

(3) Section 25 [entering to inspect] applies to entry under subsection (2) as if the health officer, or the person acting on behalf of the health officer, were making an inspection of the place.

4.3.6.5 Duties to comply with orders

42 (1) A person named or described in an order made under this Part (Part 4) must comply with the order.
4.3.6.6 Violations of orders under Part 4 of the Public Health Act

Violations of orders under Part 4 of the Public Health Act can be made the subject of a violation ticket. As such, enforcement action can be taken without the need to prepare a report to Crown Counsel, or the need for any approval by Crown Counsel to pursue charges in court.

4.3.7 Direct action by drinking water officer

In some cases, the test for issuing a hazard abatement and prevention order may be met, but there is no person against whom an order under section 25 can appropriately be made. In these circumstances, section 28 of the Act specifically authorizes the drinking water officer to take actions to address the health hazard or to authorize a water supplier or other person to do this. This section is very similar to the power to order remedial action under section 27 of the Act (see section 4.3.8 of this guide), but actions under section 28 can be taken immediately, without the requirement of first determining that a person named in an order is in default.

Where action is taken under section 28 of the Act, the cost recovery provisions of sections 27(3) and (4) of the Act apply. However, given that the powers of this section are to be used only when the drinking water officer is not aware of a person against whom a hazard abatement and prevention order can be made, there may be little practical ability to seek cost recovery in these circumstances.

Drinking water officers should consult with their senior manager and the appropriate spending authority within the health authority before expending funds through direct action under section 28.

4.3.8 Action in default

Section 27 of the Act provides that, if a person does not comply with a hazard abatement and prevention order (or a contravention order, as discussed below), the drinking water officer may advise the person that if they fail to take the action required, the drinking water officer can direct someone else to enter onto the property to do the work.

Where notice is given under section 27, before further steps are taken to remedy the matter, the drinking water officer should give the person reasonable time to respond. The amount of time that will be considered reasonable will depend on the circumstances and the nature of the threat posed, and is a matter for the drinking water officer’s discretion.

Notice under section 27 should be given in writing wherever possible. If, however, it would cause unacceptable delay and risks to public health to provide notice in writing, then verbal notice should be given, with written notice to follow as soon as possible thereafter. A sample letter advising of that steps may be taken under section 27 is set out in appendix 18.

When a person becomes aware of the potential consequences to them under section 27, they may be more inclined to take the remedial action required. If, however, the person still refuses to take the action required, then the drinking water officer can authorize a person to go onto the property and do the work (section 27(3)). The Act does not specify who such a person may be, and it could be either a person employed by the health authority, or a third party.

Although subsection 3 allows the person who has done the work to claim the costs against the person to whom the order was made, in practice, it is not likely that a third party contractor will be prepared to undertake the work solely on the basis of the right to claim against the party that has refused to take the action required. In such cases, section 27 may only provide a practical remedy if the health authority is prepared to directly undertake the work, or to fund the third party contractor, and then seek costs against the person to whom the order was made.
Drinking water officers should discuss with their senior manager situations that may warrant action under section 27. Drinking water officers must also consult with the appropriate spending authority within the health authority before expending funds under section 27.

### 4.3.9 Cost recovery by health authority

If the health authority takes or funds action under section 27, its ability to recover costs is not limited to recovery through court proceedings. Rather, subsection 4 provides that the costs and expenses may be recovered in accordance with section 35 of the Public Health Act:

#### 4.3.9.1 Recovery of costs by health authorities

**35 (1)** If a health officer or health authority does work or contracts for work to be done under section 33 (1) (c) [ordering others to comply and entering to take action], the health officer or health authority may recover reasonable costs from the person who was subject to the original order by filing a certificate in the prescribed form in the Supreme Court.

(2) A certificate must be filed within 2 years of the work being done.

(3) A certificate must be signed by the health officer or the corporate executive officer of the health authority or his or her delegate, and must include all the following information:

   (a) the details of the original order, including the date it was issued;

   (b) the total amount owing;

   (c) the name of the person who was subject to the original order;

   (d) the date the costs were incurred, and the manner in which they were incurred.

(4) Subject to the regulations, a certificate has the same effect, and proceedings may be taken on it, as if it were a judgment of the Supreme Court for the recovery of a debt in the amount stated against the person who was subject to the original order.

(5) A certificate is

   (a) admissible in any proceedings to recover the certified debt without proof of the signature or official position of the person appearing to have signed the certificate, and

   (b) proof of the certified facts.

(6) A copy of the filed certificate must be served in the prescribed manner on the person who was subject to the original order.

(7) A person who has been served with a copy of the filed certificate under subsection (6) may, within 30 days of being served, request the Supreme Court to review, in accordance with the regulations, the amount owing.

(8) After reviewing the amount owing, the Supreme Court may rescind or modify the certificate if satisfied that the amount owing is not reasonable.
Cost recovery under section 27 of the Act is an option that is not frequently required or used. If a drinking water officer believes it may be appropriate to explore use of this option in a particular case, he or she should discuss the matter with the senior manager before taking any action in this regard.

4.3.10 Orders respecting contraventions

Section 26 of the Act sets out circumstances in which a drinking water officer can make an order directing a person to comply with the Act or regulations. It can be made if the drinking water officer has reason to believe that the person is in contravention of the Act or regulations. The section also sets out process for issuing such an order.

A contravention of the Act is an offense even in the absence of a contravention order. However, contravention orders further clarify and confirm the nature of an alleged contravention, and the specific action that the drinking water officer requires for the person to come into compliance with the Act and regulations. As such, they can be important tools for ensuring a person understands the gravity of a matter and for securing compliance. They may also assist in establishing an appropriate record for cases where further compliance action, including prosecution, is required. However, a contravention order does not itself institute any form of charge and court proceeding. Such proceedings may be initiated through a report to Crown Counsel and related decision by Crown Counsel to pursue charges for an offence. Violations of orders under section 26 can be made the subject of a violation ticket. As such, enforcement action can be taken without the need to prepare a report to Crown Counsel, and without the need for any approval by Crown Counsel to pursue charges in court.

A contravention order, like a hazard abatement and prevention order, can be made the subject of the “action in default” provisions of section 27, discussed in section 4.3.8 of the guide, if the person to whom it is addressed does not undertake the action required.

A sample form contravention order is set out in appendix 16.

4.3.11 Drinking water protection plans

In circumstances where monitoring or assessment results indicate a potential threat to drinking water that may result in a drinking water health hazard, and no other practicable measures are available under the Act to address or prevent the drinking water health hazard, a drinking water protection plan may be initiated under part 5 of the Act.

The decision whether to initiate a drinking water protection plan is one for the minister to make, upon recommendation of the provincial health officer (section 31 of the Act). Although the drinking water officer does not have authority to initiate a drinking water protection plan on his or her initiative, section 31(3) provides that the provincial health officer must consider whether to make a recommendation to the minister to initiate a drinking water protection plan if requested to do so by a drinking water officer.

Drinking water officers must consider all other options available under the Act before requesting the provincial health officer to consider recommending a drinking water protection plan. A drinking water officer should, however, make such a request in circumstances where he or she considers it appropriate. Drinking water officers should, particularly, be familiar with the types of matters that can be considered in a drinking water protection plan (see section 32), as well as the steps that can be taken to implement a drinking water protection plan once developed (see sections 35 – 38). These are significant powers that can be used to address complex and multifaceted drinking water protection problems as necessary.

There is no ability under the Act to allow people other than drinking water officers to request the provincial health officer to recommend that a plan be developed. However, section 31(4) provides that a local authority or water
supplier can request a drinking water officer to make a request to the provincial health officer. If the drinking water officer is asked by a local authority or water supplier to do so, the drinking water officer must consider the request and should provide reasons as to whether or not a request will be made to the provincial health officer. If the request is made by a person other than a local authority or a water supplier, the person should be advised of the limits of section 31 (4) and advised that they should pursue the matter with the local authority and/or water supplier.

4.3.12 Reports of problems relating to provincial government action

Section 4.2 of the Act contains a unique provision respecting accountability for government action. Specifically, it provides that the provincial health officer must report to the minister on any situation that, in the opinion of the provincial health officer, significantly impedes the protection of public health in relation to drinking water and which arises in relation to the actions or inactions of government or government agencies.53

If a drinking water officer is aware of any situation in which it might potentially be appropriate for the provincial health officer to report to the minister under this section, the drinking water officer should discuss the situation with the senior manager and the medical health officer, who may wish to advise the provincial health officer accordingly.

4.3.13 Problem systems

4.3.13.1 Systems where ownership responsibilities are not clear or no apparent owner exists

One of the most challenging situations facing drinking water regulators is systems for which no apparent owner exists, and for which some form of action or improvement to the system is required to address threats to drinking water. In addressing these situations, it is important to remember that the definition of an “owner” of a water supply system in section 1 of the Act is broad, and it is not exhaustive. This means that there may be some people who, in specific circumstances, might be considered an “owner” under the Act, even if they might not be considered an owner in the common use of that term.

If a drinking water officer is uncertain as to who is an “owner” of the system as that term is defined in section 1 of the Act, the drinking water officers should contact the users of the system, asking them for information in this regard. This may be done verbally, or in writing. Where this is done in writing, drinking water officers may wish to consider using the sample letter set out in appendix 17.

If the drinking water officer identifies a person that the drinking water officer believes may fall within the definition of owner in the Act, but the person is not aware of this or is unwilling to acknowledge this responsibility, the drinking water officers should advise the person, indicating the tentative position of the drinking water officer in this regard, and asking the person to provide their views in respect of the matter. This may be done verbally, or in writing. Where this is done in writing, drinking water officers may wish to consider using the sample letter set out in appendix 18.

In any case where a drinking water officer is not able to determine any owner in relation to a system, he or she should discuss the matter with the senior manager. The purpose of such consultations would be to confirm that there is no “owner” for the purposes of the Act and, if there is no legal “owner”, to consider possible options and strategies for addressing public health threats in relation to that system.

While owners are the persons ultimately responsible for ensuring a system complies with the Act, this does not mean that remedial action under the Act can only be directed at owners. Rather, the hazard abatement and prevention

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53 The regional drinking water teams may provide a venue for solving interministerial issues at a local level.
orders under section 25 can, in appropriate cases, be directed at persons other than owners (discussed in section 4.3.5 of the guide).

4.3.13.2 Systems for which the owner is unable or unwilling to address the concerns

In situations where an owner is identified, but the owner is unable or unwilling to take the remedial action required, the drinking water officer should draw to the owner’s attention his or her obligations under the Act, as well as the potential actions that can be taken in relation to them. Generally, this information should be provided in writing. It should be provided not for the purposes of in any way threatening the owner, but to ensure that he or she is fully aware of their obligations. The person should also be advised that the drinking water officer is not willing or able to simply avoid taking action on the basis that there may be negative financial consequences for various parties.

Providing this information in writing to water suppliers may help those persons better understand the nature and extent of their obligations, and the consequences of failure to comply. Equally importantly, it may also assist water suppliers in engaging in discussions with the users of the system, with the view towards finding an acceptable means of addressing and funding the concerns with the water system.

While drinking water officers must not assume responsibility for solving all problems associated with water systems and the funding of them, the drinking water officers may consider providing basic referrals and information if that would be of assistance to people in certain situations. For example, this may include:

- Referring owners and water users to the local government to consider if there is a potential for the system to be taken over by the local government, with funding to be amortized over the long term through mechanisms such as the establishment of a local service area under Part 7, Division 5 of the Community Charter, or other such options
- Referring the owners and water users to the Ministry of Municipal Affairs and Housing to determine whether there is any potential for the water system to apply for financial assistance under the Canada / BC infrastructure program, if the systems were to be taken over by a local government
- Providing basic information about possible types of water systems and treatment systems, and recommending consultation with vendors of water supply / treatment systems, or professional engineers (without recommending particular vendors or suppliers)

4.3.13.3 Systems for which no operating or construction permit has ever been issued

Construction or operation of a water supply system without an applicable permit may constitute a violation of the Act\(^4\) and should be addressed in accordance with the Health Authority’s compliance policy.

The appropriate response under the compliance policy will depend on various factors such as the degree of threat to public health, history of the conduct of the water supplier, and the willingness of the water supplier to bring the system into compliance with the Act and Regulation.

Options for response may include:

- Informal discussions and education
- Contravention order (see section 4.3.10 of this Part)
- Charge for an offence (see section 4.4.1 of this Part)

\(^4\) Whether there is a violation of the requirement for a construction permit may depend on when the system was constructed, and whether a waiver has been issued
• In the case of failure to obtain construction permits, consideration of terms and conditions on operating permits to address any outstanding concerns that may exist as a result of the failure to obtain the construction permit.

In addition, in cases where the lack of compliance results in a threat to public health, the drinking water officer should consider the actions discussed in sections 4.3.3 (public notice of threats), 4.3.5 (hazard abatement and prevention), 4.3.7 (direct action by drinking water officer), 4.3.8 (action in default) and 4.3.9 (cost-recovery) of this Chapter of this guide.

In any case where a drinking water officer is dealing with a system that came into or is in existence without the necessary construction or operating permits, the drinking water office must make clear that the system is considered to be in violation of the Act. Additionally, it should be made known that in determining an appropriate response and working to bring the system into compliance, the drinking water office is not in any way accepting or sanctioning the non-compliance for any period of time.\(^{55}\)

If any legal questions arise regarding the status or appropriate means for dealing with such systems, the drinking water office should consider consulting legal counsel, in accordance with the Health Authority’s policies in that regard.

**4.3.13.4 Problem systems which involve Point-of-Entry or Point-of-Use treatment**

Water supply systems that supply water to Point-of-Entry and Point-of-Use treatment systems are exempt from the requirements of section 6 of the Act (potable water) provided the Point-of-Entry or Point-of-Use systems make the water potable (see Regulation section 3.1(a)). However, these water systems do remain subject to other provisions of the act.\(^{56}\) As such, questions may arise concerning the relationship between the water supplier and the end users of Point-of-Entry / Point-of-Use systems in cases where problems arise. The following principles may assist drinking water officers in determining an appropriate course of action in such cases:

• Even where the exemption from section 6 of the Act applies, the water supplier is still covered by other applicable sections of the Act. This includes the requirement to hold an operating permit (section 8), and the requirement to monitor (section 7);

• If the water supplier is providing water to Point-of-Entry or Point-of-Use systems that do not provide potable water, the water supplier may lose the exemption from section 6 of the Act because he or she is no longer providing water to a Point-of-Entry or Point-of-Use device “that makes the water potable”. It is necessary to avail oneself of the exemption in section 3.1(a) of the Regulation, and that in certain cases, the water supplier could be subject to a contravention order in this regard, or some other remedial order. The decision whether to issue such an order is one to be made by the drinking water officer using his or her discretion. This may involve consideration of issues such as whether, or to what degree the lack of potability at the end point relates to actions or inactions of the water supplier as opposed to the end user, and whether other steps are being or could be taken to address any public health threats (such as installation of a centralized treatment system); and,

• Where the water being used through a Point-of-Entry or Point-of-Use system may present a health hazard, the drinking water officer has all the powers available under section 25, 27 and 28 and related orders can be made against the water supplier and/or the end user(s) as appropriate to the facts of any particular case. This is ultimately a matter for the drinking water officer’s discretion.

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\(^{55}\) For help in finding unregulated systems, see Part B: Strategies, Tools And Procedures That Health Authorities May Use To Find And Regulate Small Systems of this Guide for more detail.

\(^{56}\) See Part B: Obligations of the Water Suppliers of Drinking Water Treatment Systems that have Point of Use/Point of Entry Devices of this Guide for more details.
4.3.14 Systems with significant source protection issues

The multi-barrier approach to drinking water protection begins at the water source, and this can raise complex questions regarding the relationship between the Act and Regulation and other legislation, including potentially complex and controversial issues associated with competing land use decisions. This is particularly for situations in which limiting activities to protect a water source would benefit a water supplier and users of a water supply system, but might have adverse consequences for other parties.

The Act recognizes the important but complex relationship between source protection and the safe and effective operation of water supply systems and, while it does not wholly displace responsibilities held by officials under other legislative regimes, it includes a number of provisions that must be considered by drinking water officers where source protection presents challenges in respect of a water supply system. Many of these provisions are discussed in other sections of this guide, but for ease of reference, the following are some of the options or steps that drinking water officers should consider and pursue as appropriate when source protection issues exist.

- Ordering that a water source assessment be completed under section 19 of the Act, particularly given that section 18(2)(a) indicates that one purpose of an assessment is to identify, inventory and assess the drinking water source for the water supply system, including land use and other conditions and activities that may affect that source. (See Chapter 4, section 4.2.2 of this guide)
- Designation by regulation of other officials that must report to the drinking water officer anything that may be a threat to drinking water under section 24(2) of the Act. (See Chapter 4, section 4.1 of this guide)
- Designation by regulation (by area or generally) of decisions under other acts that can only be made after consultation with drinking water officer, local authorities and water suppliers. (See Act, section 30)
- Under Part 5 of the Act, order the establishment of a drinking water protection plan, which can result in a wide range of potential outcomes including restricting the exercise of statutory decisions under other acts.
- Recommending that provincial health officer make a report to the minister about problems respecting provincial government action. (See Chapter 1, section 1.5 of this guide)

These provisions complement, but do not replace, informal consultation among agencies and individuals involved in drinking water protection issues.

Other ministries and agencies may also have statutory responsibilities that are relevant to addressing source protection issues. Some of these are discussed below in Chapter 5, sections 5.3 and 5.4 of this guide. Drinking water officers should consider these and consult with other interested ministries and agencies in cases where source protection issues may be of interest to them.

4.4 Dealing with non-compliance

Compliance activities are generally considered to fall into a continuum that includes education, warnings, requiring remedial action, and enforcement. Regulators frequently develop compliance policies and strategies based on the compliance continuum such as a “graduated enforcement” approach. In exercising the authorities discussed in this section, officials should consider and apply any general compliance policies and strategies that have been developed by the applicable health authority or the province in respect of public health matters.

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57 No such regulations have been developed to date. If drinking water officers are aware of situations that may warrant development of regulations in this regard, they should consult the senior manager so that recommendations may be made to the Ministry as appropriate.
4.4.1 Charge for offence

All violations of the Act, Regulation, permits, orders and directions of a drinking water officer constitute an offense under section 45(1) of the Act. It is also a violation of the Act to provide false or misleading information, or to hinder, obstruct, impede, or otherwise interfere with a drinking water officer, delegate or issuing official in the performance of their duties or the exercise of their powers (section 44).

Persons convicted of an offense are liable to a fine of up to $200,000, or imprisonment for up to 12 months, or both. In addition, where an offense is a continuing offense, the maximum fine of $200,000 can be applied to each day the offense is continued.

Charging a person for an offense is, in most cases, the last option that a drinking water officer would consider as part of the spectrum of compliance options. However, it is important that drinking water officers consider and pursue prosecution for an offense in appropriate cases.

Where a drinking water officer believes it may be appropriate to charge a person with an offense, they should discuss the matter with legal counsel. The drinking water officer must ensure that the case is fully investigated, that appropriate evidence is assembled, and that a report is made to crown counsel in an appropriate form. Information regarding the appropriate form of report may be obtained by speaking with Crown Counsel, or with the health authority’s legal counsel.

If a person is convicted of an offense under the Act, there are a wide range of additional things that a court may order in relation to the offense beyond the fine and imprisonment. Specifically, section 45(3) of the Act states that section 107 of the Public Health Act applies in relation to an offense under this Act. Section 107 of the Public Health Act allows a court to impose a range of orders to ensure remedial action and prevent future non-compliance. It states:

107 (1) To give effect to the purposes of sentencing as set out in section 106 [purposes of sentencing], a sentencing judge may order a person convicted of an offence under this Act to do one or more of the following:

(a) do a thing, or not do a thing, as set out in a joint submission under section 105 [determining sentence];

(b) take any action the court considers appropriate to remedy or avoid a health hazard or health impediment caused by the commission of the offence;

(c) pay a person an amount of money as compensation, in whole or in part, for the cost of a remedial or preventive action taken by or on behalf of the person as a result of the commission of the offence;

(d) perform community service for a period of up to 3 years;

(e) not do any act or engage in any activity that may, in the opinion of the court, result in the continuation or repetition of the offence or the commission of a similar offence under this Act;

(f) comply with any conditions that the court considers appropriate for preventing the person from continuing or repeating the offence or committing a similar offence under this Act;

(g) submit to the minister or a health officer information respecting the activities of the person that the court considers appropriate in the circumstances, for a period of up to 3 years;
(h) if the person is a corporation, designate a senior official within the corporation as the person responsible for monitoring compliance with the Act or the regulations made under it, or the terms or conditions of a licence or permit held by the corporation under this Act;

(i) develop guidelines or standards in respect of a matter, implement a process, or do another thing, for the purposes of preventing the person from continuing or repeating the offence, or committing a similar offence;

(j) make available, either free of charge or for a fee, to another person or class of persons guidelines or standards developed under paragraph (i), in any manner and under any conditions the court considers appropriate, for up to 3 years from the date by which the guidelines or standards must be developed;

(k) publish, in any manner the court considers appropriate, the facts relating to the commission of the offence and any other information the court considers appropriate;

(l) post a bond for an amount of money the court considers appropriate for the purpose of ensuring compliance with a prohibition, direction or requirement under this section;

(2) For the purposes of subsection (1) (j), the court may set or limit the amount of the fee, or put conditions on the charging of the fee.

Drinking water officers should keep the provisions of section 107 of the Public Health Act in mind when deciding whether it is appropriate to seek to charge a person for an offense under the Act.

4.4.1.1 Limitation period

Section 45(6) of the Act provides that, if a person is to be charged with an offense, this must be done within two years after the facts on which the charge is based first came to the knowledge of a drinking water officer.

Also drinking water officials should be aware that, at least in some cases, unnecessary delay in pursuing a charge can have negative impacts on the ability to have that charge prosecuted (even if the charge is brought within 2 years). Therefore, where drinking water officers conclude that prosecution may be appropriate, they should provide a report to Crown Counsel as soon as all the necessary information has been obtained.

If drinking water officers have any question regarding the application of the two year limitation, or questions about what may constitute unreasonable delay on the facts of particular cases, they should consult legal counsel.

4.4.2Violation tickets

Several drinking water-related offences under the Drinking Water Protection Act and Public Health Act have been designated as offenses for which a ticket can be issued under the Offence Act and the Violation Ticket Administration and Fines Regulation. The following is a listing of these offences and their related fines.

<table>
<thead>
<tr>
<th>Provision</th>
<th>Contravention</th>
<th>Fine</th>
<th>Victim Surcharge Levy</th>
<th>Ticketed Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision</td>
<td>Contravention</td>
<td>Fine</td>
<td>Victim Surcharge</td>
<td>Ticketed Amount</td>
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<tr>
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<tr>
<td><strong>Drinking Water Protection Act</strong></td>
<td></td>
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<tr>
<td>section 7 (2) (a)</td>
<td>Construct water supply system without permit</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 7 (2) (a)</td>
<td>Construct works, facilities or equipment without permit</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 7 (2) (b)</td>
<td>Construct water supply system contrary to terms of permit or regulations</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 7 (2) (b)</td>
<td>Construct works, facilities or equipment contrary to terms of permit or regulations</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 8 (1) (a)</td>
<td>Operate water supply system without permit</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 8 (1) (b)</td>
<td>Operate water supply system contrary to terms of permit</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 8 (1) (c)</td>
<td>Operate water supply system in violation of regulations</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 9 (1) (a)</td>
<td>Operate, maintain or repair water supply system without being qualified</td>
<td>$300</td>
<td>$45</td>
<td>$345</td>
</tr>
<tr>
<td>section 9 (1) (b)</td>
<td>Operate, maintain or repair water supply system without supervision of qualified person</td>
<td>$300</td>
<td>$45</td>
<td>$345</td>
</tr>
<tr>
<td>section 11</td>
<td>Fail to comply with water monitoring requirements established by permit or regulations</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
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<tr>
<td>section 14</td>
<td>Fail to comply with order to provide public notice of a drinking water threat</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 23 (1)</td>
<td>Contaminate drinking water</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td>section 23 (2)</td>
<td>Tamper with water supply system</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
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<tr>
<td>section 25</td>
<td>Fail to comply with hazard abatement or prevention order</td>
<td>$500</td>
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<td>$575</td>
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<tr>
<td>section 26</td>
<td>Fail to comply with an order respecting a contravention</td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
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<tr>
<td><strong>Drinking Water Protection Act – Drinking Water Protection Regulation, B.C. Reg. 200/2003</strong></td>
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</tr>
<tr>
<td>section 5 (2) (a)</td>
<td>Fail to disinfect drinking water originating from surface water</td>
<td>$300</td>
<td>$45</td>
<td>$345</td>
</tr>
<tr>
<td>section 5 (2) (b)</td>
<td>Fail to disinfect drinking water originating from groundwater at risk of containing pathogens</td>
<td>$300</td>
<td>$45</td>
<td>$345</td>
</tr>
<tr>
<td>section 8 (2)</td>
<td>Fail to monitor for total coliform bacteria or <em>Escherichia coli</em></td>
<td>$500</td>
<td>$75</td>
<td>$575</td>
</tr>
<tr>
<td><strong>Public Health Act</strong></td>
<td></td>
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</tr>
<tr>
<td>section 99 (1) (k)</td>
<td>Fail to comply with an order issued under Part 4</td>
<td>$300</td>
<td>$45</td>
<td>$345</td>
</tr>
<tr>
<td>section 99 (4) (a)</td>
<td>Provide false or misleading information</td>
<td>$100</td>
<td>$15</td>
<td>$115</td>
</tr>
<tr>
<td>Provision</td>
<td>Contravention</td>
<td>Fine</td>
<td>Victim Surcharge</td>
<td>Levy</td>
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<tr>
<td>section 99 (4) (b)</td>
<td>Interfere with or obstruct an official</td>
<td>$100</td>
<td>$15</td>
<td>$115</td>
</tr>
</tbody>
</table>

**Public Health Act – Health Hazards Regulation, B.C. Reg. 216/2011**

<table>
<thead>
<tr>
<th>Provision</th>
<th>Contravention</th>
<th>Fine</th>
<th>Victim Surcharge</th>
<th>Levy</th>
</tr>
</thead>
<tbody>
<tr>
<td>section 7</td>
<td>Fail to provide sufficient potable drinking water</td>
<td>$100</td>
<td>$15</td>
<td>$115</td>
</tr>
</tbody>
</table>

**Public Health Act – Public Health Act Transitional Regulation, B.C. Reg. 51/2009**

<table>
<thead>
<tr>
<th>Provision</th>
<th>Contravention</th>
<th>Fine</th>
<th>Victim Surcharge</th>
<th>Levy</th>
</tr>
</thead>
<tbody>
<tr>
<td>section 15</td>
<td>Fail to notify of a discharge</td>
<td>$200</td>
<td>$30</td>
<td>$230</td>
</tr>
</tbody>
</table>

Nothing in the *Drinking Water Protection Act* affects the application of the *Public Health Act*, and there may be some circumstances in which facts that give rise to an offense under the *Drinking Water Protection Act* could also constitute an offense under the *Public Health Act* or its regulations. This includes failure to report spills under section 15 of the Public Health Act Transitional Regulation, and failure to comply with health hazard abatement orders under section 42 of the *Public Health Act* (discussed in section 4.3.6 of this guide). As such, a ticket under the *Public Health Act* can be issued in appropriate cases, even if the violation of the *Public Health Act* occurs in relation to drinking water matters.

### 4.4.3 Court order to require compliance

In addition to the ability to prosecute a person for an offense, a health authority can make an application to court to seek an “injunction.” This requires the person to stop contravening the Act, regulations or order, or take action as directed by the court for the purpose of achieving compliance or remedying or preventing a drinking water health hazard (section 42).

The importance of an injunction under this section is that, if a person fails to comply, they are not only in noncompliance with the Act, but they would also be in contempt of court.

An order to require compliance under section 42 of the Act does not necessarily require the same evidentiary standards or legal burdens of proof that may be required when prosecuting a person for an offense under the Act.

Where a drinking water officer believes an application to court under section 42 would be appropriate, they should discuss the matter with the senior manager and legal counsel as appropriate.

### 4.5 General policy for prioritizing compliance activity based on health risks

Given the large number of water systems that are subject to the Act, and the fact that resources for drinking water officers and their delegates is limited, oversight and compliance activity should be prioritized to ensure that resources are allocated based on a principled and risk-based policy if necessary.

Drinking water officers are encouraged to establish a prioritization policy that meets these basic principles, having regard to the circumstances of the health authority in which they are operating. This policy should categorize systems as being of low, medium or high priority for the purposes of drinking water officer activity. It should be based on the professional judgment of the drinking water officer and should, in general, consider factors that include, but are not limited to:

- Risk that the system is not providing or will not provide potable water
- Likelihood and impact, consequence or severity of the threat posed
• Number of persons using the system (i.e. number of users/connections)
• Population demographics (i.e. vulnerable population groups like schools and care facilities)
• Past history of compliance, threat identification and voluntary remedial action
• System complexity

A sample of a basic tool for assessing the hazard rating of a water system can be found in appendix 19.

The prioritization of systems should be regularly reviewed and revised as necessary, particularly at any time that a drinking water officer obtains new information about a system that may affect its priority rating.

Once prioritizations have been assigned, compliance activities should be undertaken in accordance with the policy framework set out below.

4.5.1 Low priority systems

Where water systems are considered to be low risk in terms of possible threats to human health, these systems should be considered low priority. While drinking water officers should take steps to ensure compliance with these systems to the extent possible, it is important to consider how these systems should be prioritized relative to others. More specifically, where drinking water officers cannot be reasonably expected to take routine monitoring and compliance action in relation to such systems without compromising regulatory efforts in respect of medium and high-risk systems (discussed below), these low priority files should be noted as such. Files should be maintained and information should be added to the file as it becomes available. If any information comes to the attention of the drinking water officer to suggest that such a file is no longer appropriately considered low priority, that information must be considered and the file managed accordingly.

Although low priority files may not be the principal focus of drinking water officer’s activity where resource limitations present challenges, the obligation of water suppliers to comply fully with the Act remains. It is therefore important that drinking water officers not do or say anything to the operators of such systems to indicate that less than full compliance with the Act is acceptable. Rather, if the drinking water officer believes that it is appropriate to provide some relief or relaxation from the standards of the Act and Regulation in relation to such low risk systems, the drinking water officer should do so by exercising the authority available under the Act. For example, this could include amending the terms and conditions of an operating permit regarding the date on which the operator qualification provisions become applicable, or modifying frequency of sampling required.

4.5.2 Medium priority systems

Where water systems are considered to propose moderate risk to public health, these should be considered medium priority. They should be subject to regular and systematic review and inspection, to the extent time and resources permit. Drinking water officers should draw to the attention of the water supplier any concerns that exist regarding potential threats to public health and compliance with the Act, and should indicate the actions that might be taken if the concerns are not addressed. Drinking water officers should also exercise their discretion in deciding whether to take further actions in respect of systems that are considered medium priority, having regard to available resources and other higher priority risks. If a system that has been considered to be medium priority is subject to a change in

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58 This is important because it could lessen a water supplier’s commitment to compliance with the Act and Regulation, and also because it could have potentially negative implications for enforcement action if that is necessary at some point, as the water supplier might potentially argue the defense of “officially induced error”.


circumstances such that the drinking water officer believes there is a significant threat or potential threat to public health, the system should be considered a high priority system, and dealt with as discussed below.

### 4.5.3 High priority systems

In any case where a drinking water officer is aware of a system that poses a high risk to public health, that system should be considered to be high priority. Drinking water officers should consider the full range of remedial actions that may be required or taken in relation to such a system, and should take steps to ensure that the appropriate action is taken. If a drinking water officer is not able, due to time or resource constraints, to attend to high priority systems within a time frame that the drinking water officer considers reasonable having regard to the risk presented, the drinking water officer should advise the senior manager and the medical health officer immediately.

Drinking water officers should maintain a system of tracking the prioritization of files, and should provide regular updates to the senior manager regarding overall caseload and risk prioritization. This will ensure that the health authority executive is fully informed of the status of files, and can make appropriate resource allocation decisions within the overall public health protection functions of the health authority.

Health authority officials should consider consulting the Ministry of Health and other Health Authorities in the development of risk assessment tools and supporting data systems. This is a matter that can be discussed through the Drinking Water Leadership Council forum.
Chapter 5: Other Considerations

5.1 Reconsideration and review of decisions

Under the Act, there is no way for persons who are dissatisfied with a decision of the drinking water officer or issuing official to appeal that decision.

The Act does, however, provide for limited rights of reconsideration and review, in section 39.1. Specifically, a person who is affected by a decision\textsuperscript{59} can request a review or reconsideration only in relation to the following types of decisions of a drinking water officer:

(a) section 19 [drinking water officer authority in relation to assessments];

(b) section 25 [hazard abatement and prevention orders];

(c) section 26 [orders respecting contraventions];

(d) section 31 (4) [request respecting plan initiation];

(e) a decision resulting from a reconsideration under subsection (3) of this section.

If a drinking water officer is asked to make one of these orders but elects not to, this should be considered a “decision” for the purposes of determining a person’s right to request a review or reconsideration.

Reconsideration and review are two different matters. It is important that the difference be clearly communicated to persons who may inquire about such options.

5.1.1 Reconsideration

A request for reconsideration can be made at any time after a decision is made. Where a request for reconsideration is made, the person must indicate new evidence that they believe would justify the drinking water officer changing, reversing or varying a prior decision.

“New evidence” means evidence that was not provided to or considered by the drinking water officer when the original decision was made. Although there is no specific requirement that a person use a designated form when requesting reconsideration, people should be encouraged to use the standard form set out in appendix 20. If, however, a person simply writes a letter that provides the basic information necessary to consider a request for reconsideration, then that request should be considered and the person should not be required to complete the standard form.

In deciding whether to confirm, vary or reverse the initial decision, the drinking water officer should assess whether there is new evidence which, if it had been available when the decision was made, would have caused him or her to make a different decision.

\textsuperscript{59} The Act does not specify who is “affected by a decision”. If a drinking water officer has a question as to whether a person requesting a review or reconsideration meets this test, they should discuss the matter with legal counsel.
Reconsideration of decisions should be made by the drinking water officer that made the original decision, unless the drinking water officer is not available to make the reconsideration decision within a reasonable period of time (for example, if the drinking water officer is on extended leave). In that case, another drinking water officer may consider the request for reconsideration.

Decisions resulting from a request for reconsideration should be provided in writing.

### 5.1.2 Reviews

A review differs from reconsideration in two significant ways. First, a review is conducted by a person other than the drinking water officer that made the original decision. Second, a review is not based on consideration of whether new evidence justifies varying or reversing the initial decision. To the contrary, new evidence cannot be provided or considered in a review.

### 5.1.3 How are requests processed?

Although there is no specific requirement that a person use a designated form when requesting a review, people should be encouraged to use the standard form found on the Office of the Provincial Health Officer’s [website](#). If, however, a person simply writes a letter that provides the basic information necessary to consider a request for review, then that request should be considered and the person should not be required to complete the standard form.

The person requesting the review should send it directly to the provincial health officer. The provincial health officer may undertake the review himself, or he may, pursuant to section 39.1(4)(a), direct that it be undertaken by a medical health officer. More information on requesting a review is available on the Office of the Provincial Health Officer’s [website](#).

### 5.1.4 Which information can be considered?

Reviews can only be conducted “on the record”. This means the person conducting the review can only consider information in the file that was available to the original decision maker when the decision was made. A person is not able to introduce new evidence on a review. If the person believes there is new evidence relevant to the matter, they must request reconsideration from the original decision-maker instead (see 5.1.1 of this chapter of the Guide). The person can also request a review after reconsideration, if the person is still dissatisfied with the decision.

### 5.1.5 When should other parties be notified?

If a person conducting a review believes that the decision in question could have a material impact on persons other than the party requesting the review, then they should direct the applicant to give notice of the review to those other persons, pursuant to section 39.1(4)(c). This would generally be appropriate in cases where third parties were consulted when the original decision was made, although it would not necessarily be limited to those circumstances.

The reviewing official should specify the type of notice that must be given, and the time by which it must be provided. A sample form of notice to third parties is set out in appendix 21.

### 5.1.6 Determining the result of a review

Upon completing a review, the decision can be confirmed, varied or reversed, or the matter can be referred back to the drinking water officer, (with or without directions) (section 39.1(4)(d)). This is a decision for the reviewing official to make.
Generally, if the reviewing official is in a position to confirm, vary or reverse the decision based on the information on the record, he or she should do so. If, however, the reviewing official believes it is more appropriate to refer the matter back to the drinking water officer for further consideration, he or she may do so. Circumstances in which it may be more appropriate to refer the matter back to the drinking water officer may include, but are not limited to:

- Situations in which the reviewing official believes the drinking water officer should have obtained further information before making a decision
- Situations in which the reviewing official believes the decision should be varied, but the decision as to precisely how the decision should be varied is one best left for the drinking water officer with knowledge of the water supply system

Where the reviewing official has decided it is appropriate to refer a matter back to the drinking water officer, the reviewing official should attempt to provide directions and comments that would help the drinking water officer address any of the factors that, in the opinion of the reviewing officer, resulted in the matter being referred back.

5.2 Application of Act to First Nations’ and federal lands

The federal government holds jurisdiction over federal land and First Nations’ lands with respect to drinking water. Provincial laws may be applied differently on First Nations’ lands in relation to other federal lands.

5.2.1 First Nations’ Lands

Health authority staff should consult with their legal counsel in determining whether or to what extent the Act may apply to any particular case involving First Nations’ lands.

5.2.2 Federal land

Health authority staff should consult with their legal counsel in determining whether or to what extent the Act may apply to any particular case involving other federal land.

5.3 Other relevant acts

Because drinking water protection is affected by so many factors from source to tap, there are a variety of other pieces of legislation that have relevance to drinking water protection. To some extent, regulation under these other acts has the potential to overlap with regulation under the Drinking Water Protection Act.

Section 2 (1) of the Drinking Water Protection Act recognizes this principle, and it states that the authority provided under this Act is in addition to and does not restrict authority provided by or under any other enactment that may be used to protect drinking water.

Beyond this, the Act does not contain any general rules about how it relates to other legislation. There are, however, a number of sections that contain specific rules relating to other legislation. For example, section 25(10) provides that, in the event of a conflict between an order under section 25 and an order of a health officer under the Public Health Act, the order of the health officer prevails.

Similarly, section 23(3) of the Act provides that the prohibitions against contaminating drinking water or tampering with the system in section 23 do not apply if the introduction or activity is authorized or required by or under another enactment. This provision serves only to prevent prosecution for an offence under section 23 of the Act. Other sections of the Act remain applicable and there is no general rule that, if a person is in compliance with another law, they are allowed to violate the Drinking Water Protection Act.
For these reasons, it is important to carefully consider the details of each relevant section of the Drinking Water Protection Act, and to consider how it may relate to other legislation on the facts of a particular case. If a drinking water officer has any questions in this regard, he or she should consult with legal counsel.

While there are a wide range of acts that may be of interest to drinking water protection other than the Drinking Water Protection Act, a number of the most significant ones are discussed below. This does not represent an exhaustive list of relevant acts, or an exhaustive examination of relevant provisions within the acts noted (or regulations made under the act). In any case that an official has questions regarding the applicability or effect of other legislation as it relates to the Drinking Water Protection Act, the official should consult legal counsel, in accordance with the process established by the health authority.

5.3.1 Public Health Act

Any of the powers that may be used to address public health issues generally under the Public Health Act continue to apply to drinking water issues. They are complemented – and not displaced – by the Drinking Water Protection Act. These Public Health Act powers include, but are not limited to powers under Part 4 respecting “health hazards”, and regulations developed under the Health Act.

5.3.2 Water Sustainability Act

5.3.2.1 General

The Water Sustainability Act — which came into force on February 29, 2016 — updated and replaced the historic Water Act. The Water Sustainability Act makes improvements in seven key areas:

1. Protecting stream health and aquatic environments
   - Ensuring Environmental Flow Needs (EFN’s) are considered
   - Expanding prohibitions on dumping debris into streams and aquifers

2. Considering water in land use decisions
   - Consider water objectives in resource and land use decisions
   - Allows for the development of Water Sustainability Plans

3. Regulating and protecting groundwater
   - Licensing groundwater use, except for domestic use
   - Improve information on wells and aquifers
   - Updates well drilling requirements

4. Regulating water use during times of scarcity;
   - Ensuring adequate water for human needs
   - Allowing temporary water use restrictions to protect Critical Environmental Flows and fish habitat

5. Improving security, water use efficiency and conservation;
   - Provides for Area-Based Regulations to address local issues and conditions
   - Allow Agricultural Water Reserves to be created
   - Make most water licences reviewable after 30 years
   - Ensure water is used beneficially and encourage water conservation
6. Measuring and reporting large-scale water use;
   - Require large-volume water users to report water use

7. Providing for a range of governance approaches.
   - Supports the creation of advisory groups for surface and groundwater
   - Allows for delegation of some activities or decisions to agencies outside of government.

Note: Provisions related to the above themes will be enacted as regulations are developed to support them.

The Water Sustainability Act continues the regulatory scheme for the acquisition and management of rights to stream water and expands that scheme to apply to groundwater. Both resources are managed as one.. The Water Sustainability Act also establishes a Comptroller of Water Rights and water managers, whose role is to make licensing and other decisions regarding the regulation of water use and water works under this act. Section 48 of the act also defines a “professional” to mean

(a) a professional engineer, or a professional geoscientist, who is registered or licensed under the Engineers and Geoscientists Act, or

(b) a holder of a limited licence under the Engineers and Geoscientists Act acting within the scope of the limited licence;

A water licence grants the right to use water beneficially for a specific water use purpose. Every groundwater user is required to have an authorization (licence or use approval), except in the following situations:

- Domestic purpose, unless specified otherwise in the Regulations,

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60 The term “works” is defined to mean:
   (a) anything capable of or used for
       (i) diverting, storing, measuring, conserving, conveying, retarding the flow of, confining or using water,
       (ii) producing, measuring, transmitting or using electricity, or
       (iii) collecting, conveying or disposing of sewage or garbage or
       (iv) preventing or extinguishing fires,
   (b) booms and piles placed in a stream,
   (c) obstructions placed in or removed from streams or the banks or beds of streams, and
   (d) changes in and about a stream,
   (e) access roads to any of the works referred to in paragraphs (a) to (d) or (f)(i), and
   (f) wells and works related to wells, including
      (i) wellheads,
      (ii) anything that can be or is used for injecting or otherwise adding water or any other substance to a well,
      (iii) anything that can be or is used for constructing, deactivating or decommissioning a well,
      (iv) anything that can be or is used for exploring for, testing, diverting or monitoring groundwater,
      (v) anything that can be or is used for disinfecting a well,
      (vi) an injection system attached to a work that is used for conveying, from a well, groundwater that will be used for applying fertilizers or pesticides, and
      (vii) anything that can be or is used in relation to a monitoring well or a well made for the purpose of groundwater remediation.

61 “domestic purpose” means the use of water for household purposes by the occupants of, subject to the regulations, one or more private dwellings, other than multi-family apartment buildings, including, without limitation, hotels and strata titled or cooperative buildings, located on a single parcel, including, without limitation, the following uses:
   (a) drinking water, food preparation and sanitation;
   (b) fire prevention;
   (c) providing water to animals or poultry kept
      (i) for household use, or
      (ii) as pets;
The diversion or use is authorized under the Regulations (well drilling, etc.),
Extinguishing a fire,
Testing the quality or quantity of water,
Conducting a flow test,
Using unrecorded water for prospecting for a mineral

One new, mandatory consideration is that the decision maker must consider the reliance of the aquatic habitat on groundwater discharge or stream flow (environmental flow needs) in deciding an application that is on a stream, or an aquifer that is reasonably likely to be hydraulically connected to a stream.

The Drinking Water Protection Act operates independently of the Water Sustainability Act, and a person who holds a licence under the Water Sustainability Act is, like any other person, required to comply with the applicable provisions of Drinking Water Protection Act if they are an owner of a “water supply system” as that term is defined in the Drinking Water Protection Act. \(^{62}\)

Similarly, the mere fact that something is authorized under the Drinking Water Protection Act does not serve to authorize it under the Water Sustainability Act. In other words, if a person has a permit under the Drinking Water Protection Act to construct or operate a water supply system, they will still require a separate licence under the Water Sustainability Act to draw water from a surface water or groundwater source. Water licences may also specify certain water works that are approved in relation to the licence, and, if changes are made to the system in relation to Drinking Water Protection Act issues, the person may require an amendment to their Water Sustainability Act licence.

For more information concerning the regulation of surface water under the Water Sustainability Act, see http://www.env.gov.bc.ca/wsd/water_rights/licence_application/index.html.

### 5.3.2.2 Groundwater Protection Regulation

The Groundwater Protection Regulation protects groundwater quality and quantity by setting strict standards for the construction and maintenance of wells, establishing qualifications for well drillers and well pump installers, and requiring that most wells be constructed by qualified well drillers who are registered with the province. The Groundwater Protection Regulation also distinguishes between well related activities that may be carried out by the well owner or property owner, and those activities that must be performed by qualified well drillers, qualified well pump installers and professionals.

Under the Water Sustainability Act, the Groundwater Protection Regulation:

- Regulates minimum standards for well construction, maintenance, deactivation and decommissioning, and
- Recognizes the types of qualified people certified to drill wells, install well pumps and perform related services

All wells under the Water Sustainability Act are regulated, including those that provide water for domestic purposes. The Ground Water Protection Regulation regulates:

- Water supply wells

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\(^{62}\) As discussed in Chapter 2, section 2.1 (under Domestic Water System) of this Guide, this would not include equipment, works and facilities constructed, operated or maintained under (i) a licence, as defined in the WSA, for conservation, power or storage purposes, or (ii) a permit issued under the WSA, because these are excluded from the definition of “domestic water system”, which is used in the definition of “water supply system”. See Act, section 1 and Regulation, section 3)
Constructing and decommissioning wells, installing well pumps, disinfecting wells and conducting flow tests are usually restricted activities that can only be performed by qualified well drillers or well pump installers, or professional engineers and geoscientists.

The well driller, professional or other person responsible for constructing a well is required to comply with the provisions of the Groundwater Protection Regulation related to how the well is constructed. This person must ensure that the well meets the minimum standards for the casing material, wellhead completion, surface seal, well caps and covers and well identification. The person must also submit a well construction report to the province if required.

Different types of wells have different requirements.

A well pump installer or other professional is responsible for complying with the provisions of the Groundwater Protection Regulation when installing a pump in a well. Provisions include ensuring that the casing is not damaged, maintaining the surface seal, using appropriate materials and installing related equipment.

The Groundwater Protection Regulation requires well drillers who are dealing with artesian wells to:

- Equip wells to prevent backflow
- Produce construction and decommissioning reports for all artesian wells
- Measure and report shut-in pressure
- Report on the management of artesian flows that cannot be controlled

The well owner, and in some cases the well driller, is required to ensure proper maintenance and care, whether or not the well is in service. Requirements include:

- Floodproofing new wells that are part of water supply systems
- Decommissioning any well not used for five years
- Protecting the wellhead
- Attaching a well identification plate to an existing well that supplies a water supply system

Some of these rules are directly relevant to the construction, maintenance, operation, assessment and protection of wells that serve water supply systems.

The groundwater protection provisions of the Water Sustainability Act and the Groundwater Protection Regulation are administered by officials from the Ministry Forests, Lands, Natural Resource Operations and Rural Development.

Drinking water officers hold some powers under the Water Sustainability Act. Specifically, drinking water officers have the ability to request and receive certain types of information respecting well driller and pump installer qualifications, well reports, well water analyses and rights to access land and premises. These provisions are found in sections 51, 57, 63, 89 and 90 of the Water Sustainability Act.

The provisions of the Water Sustainability Act also contain provisions allowing for the establishment of water sustainability plans. These plans are in some ways similar to drinking water protection plans that can be developed under Part 5 of the Drinking Water Protection Act. Given the potential for overlap, the acts provide that if plans are
developed under both acts in respect of a particular area, they can be developed jointly. Further, the acts allow the Lieutenant Governor in Council (Cabinet) to pass regulations which would apply the licensing provisions of the *Water Sustainability Act* to domestic groundwater users in specified areas.

### 5.3.3 Water Utility Act

This act provides that a “water utility” is subject to the control and regulation of the Comptroller of Water Rights under the *Water Sustainability Act*. The term “water utility” is defined as:

(a) a person who owns or operates in British Columbia equipment or facilities for the diverting, developing, pumping, impounding, distributing or furnishing of water, for compensation,

(i) to or for more than the prescribed number of persons or, if no number is prescribed, 5 or more persons, or

(ii) to a corporation, and

(b) the lessee, trustee, receiver or liquidator of a person referred to in paragraph (a),

but does not include

(c) a municipality in respect of services furnished by the municipality,

(d) a person who furnishes services or commodity only to himself or herself, the person's employees or tenants, if the service or commodity is not resold to or used by others,

(e) the Greater Vancouver Water District under the *Greater Vancouver Water District Act*,

(f) an improvement district as defined in section 1 (1) of the *Water Sustainability Act*,

(f.1) a water users' community as defined in section 1 (1) of the *Water Users’ Communities Act*,

(g) a regional district under the *Local Government Act* in respect of the service of the supply of water

(i) in bulk to a municipality or electoral area participating in that service, or

(ii) to consumers in a municipality participating in that service,

(h) a person who supplies water by tanker truck,

(i) a person who sells bottled water, or

(j) a strata corporation, if the comptroller is satisfied that the owner developers within the meaning of the Strata Property Act have ceased to own a majority of the strata lots in the strata plan.63

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63 See section 5.5.1 and Part B of this Guide for more information.
Water utilities can only be established if the Comptroller of Water Rights issues a Certificate of Public Convenience and Necessity under the *Water Utility Act*. Drinking waters officers do not have authority under that act, but officials responsible for regulation of water utilities may consult with drinking water officers in the exercise of their regulatory responsibilities.

For more information concerning the regulation of water utilities, see [http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/private-water-utilities](http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/private-water-utilities)

### 5.3.4 Water Protection Act

This act places restrictions on the removal of bulk water from British Columbia, and imposes restrictions on the large scale transfer of water between watersheds.

### 5.3.5 Local Services Act (Subdivision Regulations)

Under section 2 of the *Local Services Act*, the Lieutenant Governor in Council may establish areas of British Columbia not incorporated as a city, town, village or district municipality as a local area to which this act applies.

Under this act, the *Subdivision Regulations* have been established. Sections 1.01 and 1.03 set out its scope of application. These sections state:

1. **1.01** These regulations apply to the subdivision of all land in the Province except land

   (a) within a municipality,

   (b) regulated by a bylaw under section 938 of the *Municipal Act*, and

   (c) within [B.C. Regulation 274/69, the Community Planning Area Number 24 (Gulf Islands) Regulations](http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/private-water-utilities).

And

1. **1.03** Notwithstanding section 1.01 (b), where a bylaw does not regulate a matter covered by these regulations, these regulations apply to that matter.

The Subdivision Regulations provides that the ability to subdivide is limited by consideration of water supply issues. Specifically, section 4.01 states:

4. **4.01** No subdivision shall be approved

   …

   (d) if it does not comply with these regulations

And section 4.09 states:
4.09 (1) The design of any community water system\(^{64}\) to serve the subdivision shall be in accordance with the requirements of any authority having jurisdiction over the system pursuant to

(a) the *Health Act\(^{65}\)* and the *Water Utility Act*,

(b) the *Health Act* and the *Water Sustainability Act*, when an improvement district has an applicable subdivision bylaw pursuant to the *Water Sustainability Act*, or

(c) the *Health Act* and the *Local Government Act*, when a regional district has an applicable bylaw setting out the terms and conditions of any extension to its community water system,

as the case may be.

(2) The community water system approved pursuant to section 4.09 (1) shall be installed as approved before the subdivision is approved.

(3) Notwithstanding the requirements of section 4.09 (2), a subdivision may be approved prior to the construction of the community water system, provided that an arrangement securing performance of such construction satisfactory to the approving officer has been made with

(a) the Comptroller of Water Rights (under the *Water Utility Act*),

(b) an improvement district having an applicable subdivision bylaw adopted pursuant to the *Water Act*, or

(c) a regional district having an applicable bylaw setting out the terms and conditions of any extension to its community water system,

as the case may be, but in no case shall the subdivision be approved before the plans for the community water system have been approved.

5.3.6 Environmental Management Act

The *Environmental Management Act* is the primary statute for regulation of waste discharge and pollution prevention in British Columbia. The *Environmental Management Act* does not provide any specific powers to drinking water officers, but it is a statute that drinking water officers should be familiar with, as there will be ongoing relationships between drinking water officers and officials implementing the *Environmental Management Act*. The *Environmental Management Act* will allow for the establishment of area based plans, which are similar to drinking water protection plans under part 5 of the *Drinking Water Protection Act*, and water sustainability plans under the *Water Sustainability Act*. This legislation allows for plans under it to be coordinated with plans under the *Drinking Water Protection Act* and the *Water Sustainability Act*, as appropriate.

\(^{64}\) A system of waterworks which serves 2 or more parcels and which is owned, operated and maintained by an improvement district under the *WSA* or the *Local Government Act*, or a regional district, or which is regulated under the *Water Utility Act*

\(^{65}\) The Subdivision Regulations makes reference to the *Health Act*. This is an old piece of legislation that was replaced by the *Public Health Act*. The *Interpretation Act* allows the *Public Health Act* to be considered in lieu of the *Health Act*.
There are a significant number of regulations under this act that may also have relevance to drinking water protection, including regulations respecting contaminated sites, animal waste control and organic matter recycling.

For more information concerning this act and its regulations, see [http://www.env.gov.bc.ca/epd/main/ema.htm](http://www.env.gov.bc.ca/epd/main/ema.htm).

### 5.3.7 Forest and Range Practices Act

This act sets out a number of stewardship planning and other protection measures respecting forestry and range practices. This includes the ability of the Lieutenant Governor in Council to make regulations:

- Allowing the minister responsible for the *Land Act* to designate an area of land in a watershed as a community watershed and the minister responsible for the *Water Sustainability Act* to establish water quality objectives in relation to a community watershed (section 150). The Minister of Forests, Lands and Natural Resource Operations is currently responsible for both Acts.
- Allowing the minister responsible for the *Wildlife Act* to designate areas and set objectives generally in watersheds with significant downstream fisheries values and significant watershed sensitivity (section 150.1)
- Allowing the Minister [responsible for the *Forest and Range Practices Act*] to designate areas as lakeshore management zones, and to set objectives in relation to those zones (section 150.2)
- To classify streams, wetlands and lakes, and make regulations respecting riparian zones (section 150.5)

Drinking water officers should contact a local representative of the Ministry of Forest, Lands, Natural Resource Operations and Rural Development (MFLNR) to find out information concerning regulations made pertaining to these sections of the *Forest and Range Practices Act* as well as implications related to regulating drinking water supply systems.

Responsibilities related to forest and range practices are also set out under this act. Sections 59 and 60 of the Forest Planning and Practices Regulation, which is established under the *Forest and Range Practices Act*, states:

**Protecting water quality**

59 Unless exempted under section 91 (1) [minister may grant exemptions], an authorized person who carries out a primary forest activity must ensure that the primary forest activity does not cause material that is harmful to human health to be deposited in, or transported to, water that is diverted for human consumption by a licensed waterworks.

**Licensed waterworks**

60 (1) Unless exempted under section 91 (1) [minister may grant exemptions], an authorized person who carries out a primary forest activity must ensure that the primary forest activity does not damage a licensed waterworks.

(2) An agreement holder must not harvest timber or construct a road within a community watershed if the timber harvesting or road construction is within a 100 m radius upslope of a licensed waterworks where the water is diverted for human consumption, unless the timber harvesting or road construction will not increase sediment delivery to the intake.

The term “licensed waterworks” is defined in section 1 of this regulation to mean:

- a water supply intake or a water storage and delivery infrastructure that is licensed under the *Water Sustainability Act* or authorized under an operating permit issued under the *Drinking Water Protection Act*;
Other relevant provisions may be found in the Government Actions Regulation, the Range Planning and Practices Regulation, and the Woodlot Licence Planning and Practices, all established under this act.

Drinking water officers may wish to consult with local MFLNRO officials in cases where the drinking water officer believes this act may have relevance to drinking water issues.

5.4 Relationship between DWO activities and officials from other agencies

In some cases, there may be considerable overlap between the legislative responsibilities of drinking water officers and those of officials from other agencies. In many cases it will be appropriate for these agencies to collaborate. In some circumstances, it may be appropriate for drinking water officers to rely on steps being taken by other agencies if and to the extent those may address concerns held by drinking water officers in relation to the decisions of the other officials (and vice versa).

At the same time, it is essential to ensure that regulatory responsibility is not unduly disregarded because there may be another agency with potentially relevant authority under other legislation. This is especially important when various relevant acts disclose slightly different requirements and procedures that may make reliance on another agency inappropriate from the public health perspective even though it appears that there are two agencies that are equally able to take appropriate action.

The following principles should be applied by drinking water officers with a view to achieving appropriate cooperation with other agencies, while at the same time ensuring appropriate regard for the role and function of drinking water officers under the Drinking Water Protection Act.

- Drinking water officers may decide to defer taking action under the Drinking Water Protection Act while a matter is being reviewed or action taken under another act, if

  (a) The drinking water officer believes that the action being taken under another act has the potential to address all outstanding issues that exist in respect of drinking water protection

  (b) The drinking water officer remains apprised of the situation and actions being taken by the other agency(ies) and resumes direct involvement if at any time the drinking water officer considers that necessary protect public health.

- Statutory officials must not use powers under one statutory mandate solely and specifically for the purposes of assisting an official with a different statutory mandate. However, information that is obtained by an official for the purposes of the act he or she is administering, can, subject to the next point, be shared with other relevant agencies.

- Statutory officials must ensure that any sharing of personal information is permissible under the Freedom of Information and Protection of Privacy Act, or other relevant legislation.

Provided these basic principles are respected, strong communication and cooperation with other relevant agencies can provide considerable practical benefit to all the regulators involved, and may also be of benefit to the water supplier (or other concerned persons).
5.5 Additional Considerations under the Act

5.5.1 Systems within systems

There are many situations in which a water supply system operating under a valid permit may re-distribute water to a number of connections through a separate water supply system while maintaining public health protection goals without further treatment or complex infrastructure. This is a “system within a system” that involves nothing more than the installation pipes for distribution. The application of the Drinking Water Protection Act to this situation separately would be unnecessarily onerous as it would result in the unwarranted use of health authority resources for reviewing and monitoring, and would create unnecessary costs and requirements to the users of these systems, for little, if any, public health benefit.

Common examples of such systems would include:

- Those created by strata properties
- Townhouses
- Mobile home parks
- Small resorts

Section 3 (d) of the Drinking Water Protection Regulation authorizes the drinking water officer, or issuing official, to exempt these systems from the definition of a “domestic water system” in the Act, and the associated requirements for construction permits, operating permits, water sampling and operator training.

The intended outcomes are to:

- Empower the drinking water officer or issuing official with the flexibility to make risk-based decisions on whether a system within system should be exempted from requirements of the Act.
- Reduce the need for unnecessary resources (permits, applications, reviews etc.) being put towards creating small systems where water is simply being redistributed from a permitted water supply system.
- Ensure that where water re-distribution requires further treatment, additional infrastructure, or on-going maintenance to prevent a drinking water health hazard, the Act will apply.

5.6 Considerations and advice for those with compromised immune systems

Those with compromised immune systems, such as some people with HIV, or undergoing certain types of cancer treatment, may be at higher risk of water-borne infections.

BC's HealthLink File Preventing Water-Borne Infections For People with Weakened Immune Systems #56 provides messaging on drinking water and those with weakened immune systems, and is updated form time to time (BC HealthLink website at http://www.healthlinkbc.ca/healthfiles/hfile56.stm). These guidelines provide advice on precautions that those at risk should be taking with drinking water to avoid risk of water borne diseases associated with bacteria, virus or parasites.

The information from HealthLink File #56 should be incorporated into policy and operations manuals as necessary, and/or distributed when the public seeks information on this subject.

5.7 Finding and regulating systems

There are likely many (possibly thousands) systems that meet the definition of a water supply system under the Drinking Water Protection Act. In some cases, operators either do not know they are subject to the Drinking Water Protection Act, or intentionally operate outside of the Act and regulations. Many of these systems come to the
attention of the health authority over time. Water supply system operators have a legal obligation to comply with the Act and report to the health authority. In some cases, health authorities have the resources to systematically look for "underground" systems that have not been identified. There are currently tools, such as databases held by the Ministry of Environment and Climate Change Strategy that health authorities can use to locate water supply systems. These information tools and their application to find water supply systems are described in Part B: Strategies, Tools And Procedures That Health Authorities May Use To Find And Regulate Small Systems of this guide.

5.8 Complaints and enquiries

All agencies receive concerns from time to time pertaining to stakeholder dissatisfaction. In the case of drinking water programs, these often pertain to:

- Complaints regarding a specific public health concern in a community (e.g. drinking water threat).
- Complaints related to services provided by a health authority, or policies a health authority has adopted.
- Complaints regarding a policy or service of the Ministry of Health.

Part B: Drinking Water Complaints And Inquiries Process of this guide contains advice on processes to address and respond to complaints when they happen, as well as recommendations on how stakeholders may file their concerns, and what they might expect as an outcome once they are filed.
DRINKING WATER OFFICERS’ GUIDE:
PART B

BEST PRACTICES AND TECHNICAL ASSISTANCE

Last updated August 2017
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DETERMINING APPROPRIATE DRINKING WATER CHEMICAL AND PHYSICAL MONITORING GUIDELINES

1. Purpose

To assist in determining Chemical Standards that are applicable to the water in a water supply system and how these should be monitored. This guideline is particularly relevant for sections 3.1.5.2, 3.2.5.2, 3.2.6 and 4.2.1 of the Drinking Water Officers’ Guide as these sections deal with decision-making related to permitting, terms and conditions, and monitoring of water systems.

This guideline provides supplemental guidance for drinking water officer (DWO) decisions on monitoring water for various chemical and physical parameters. It also provides a decision tree to guide the DWO through a decision-making process to help determine if there is sufficient evidence to support the requirement to test for additional parameters in a specific water source. The approach specified also supports local DWOs in determining which parameters a new or existing water supply system should test for and how often the testing should be conducted.

2. Background

Under Section 8(3) of the Drinking Water Protection Act (DWPA), a DWO may place terms and conditions on an operating permit respecting monitoring of the drinking water source and the water in the water supply system, as well as standards applicable to the water in the water supply system.

The Ministry adopts the Guidelines for Canadian Drinking Water Quality (GCDWQ) as the water quality objectives that B.C.’s water supply systems should strive to achieve when evaluating potability for chemical constituents. One exception to the general adoption of GCDWQ in B.C. is the MAC for Selenium (see DWOG, Part A: Legislative Requirements section 3.1.6.2 for more information). The Maximum Allowable Concentration (MAC) in the GCDWQ generally represents a health-based numerical water quality objective. The drinking water officer will use this and other factors to evaluate the level of risk associated with drinking water.

For most water systems, it would be a significant financial burden to require frequent testing for all the chemical and physical parameters listed in the GCDWQ. This approach would not necessarily improve public health outcomes, especially if data indicates that a parameter consistently meets criteria for the protection of public health. This guideline does not specify a testing frequency for a water supply. Rather, it allows flexibility to ensure testing is focused on site-specific parameters relevant to a particular water source.

Minor exceedances of the guidelines would normally trigger actions such as:

- Increasing monitoring or sampling,
- Source investigation and management,
• Long term planning to meet the water quality objective, and
• Communication of the situation and the mitigation plan.

Where more significant exceedances occur, DWOs will use their discretion, based on available evidence, to determine at what point the level reaches an unacceptable risk and the appropriate public health response.

3. Process

Any new water source typically requires comprehensive testing. For example, a typical suite of tests may include something similar to the following:

For surface water sources (includes groundwater that is at risk for containing pathogens):

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Surface Water Sources</th>
<th>Groundwater Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkalinity</td>
<td>Fluoride</td>
<td>Nitrite (dissolved)</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Hardness</td>
<td>Organic Nitrogen</td>
</tr>
<tr>
<td>Calcium</td>
<td>Iron</td>
<td>pH</td>
</tr>
<tr>
<td>Chloride</td>
<td>Manganese</td>
<td>Sulphate</td>
</tr>
<tr>
<td>Colour</td>
<td>Metals Scan</td>
<td>Total Dissolved Solids</td>
</tr>
<tr>
<td>Conductivity</td>
<td>Nitrate (dissolved)</td>
<td>Total Organic Carbon</td>
</tr>
<tr>
<td>Corrosiveness</td>
<td>Bacterial indicators</td>
<td></td>
</tr>
<tr>
<td>Turbidity</td>
<td>Bromide</td>
<td></td>
</tr>
</tbody>
</table>

For groundwater sources:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Groundwater Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkalinity</td>
<td>Fluoride</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Iron</td>
</tr>
<tr>
<td>Calcium</td>
<td>Hardness</td>
</tr>
<tr>
<td>Chloride</td>
<td>Magnesium</td>
</tr>
<tr>
<td>Colour</td>
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</tr>
<tr>
<td>Conductivity</td>
<td>Metal Scan</td>
</tr>
<tr>
<td>Corrosiveness</td>
<td>Nitrate</td>
</tr>
<tr>
<td>pH</td>
<td>Turbidity</td>
</tr>
<tr>
<td>Uranium</td>
<td></td>
</tr>
</tbody>
</table>

Many analytical labs provide testing packages that cover many of these parameters. Consideration should also be given to appropriateness of testing source water or post-treated water or both.

The DWO may also require additional testing for other parameters should evidence suggest that additional substances of concern exist. DWOs should also consider the type of water source, local community history, known contaminant sources, seasonal variation, and local historical water quality reports when deciding on a testing regime. These factors may give clues to what parameters may be likely to be of concern in the future.

Where the results of initial testing indicates that additional chemical parameters are less than the GCDWQ, and local history shows that the parameters are unlikely to vary above the MAC, then further routine testing frequency may be

---

1 Aluminum, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Potassium, Zinc (expand if mineralized to include Mercury)
2 Conductance/Specific Conductance
3 Calcium Carbonate saturation/Langelier’s index
4 Conductance/Specific Conductance
5 Aluminum, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Potassium, Zinc (expand if mineralized to include Mercury)
6 Calcium Carbonate saturation/Langelier’s index
reduced. Another consideration in this decision involves determining whether the water will be consumed by persons on an ongoing or seasonal basis, special vulnerabilities of intended users (e.g., school children), or other such matters.

For chemical or physical parameters that are identified as being near the threshold set out in the GCDWQ, the DWO should review the magnitude of the hazard that may be posed by the parameter falling in this range. If the DWO concludes that there is a health concern, he/she should consider requiring routine testing of the parameter at a defined frequency in the operating permit.

The DWO may wish to re-evaluate the testing requirements based on any new potential risks in situations that impact water quality such as a chemical spill, a new industry with new emission sources, a change in land use, an unusual weather event, or other situation.

Where there is an established history of stable and predictable chemical results, a DWO may amend the operating permit to waive, or reduce the frequency of testing of a parameter. Where a parameter experiences great variability in values over time, risk increases and therefore increased monitoring frequency should be considered.
4. Decision Tree for Drinking Water: Requiring Additional Parameters

**Planning Phase**

- New Water Source

- Gather Data on Source water

- Those falling well below MAC

- Identify Parameters of Concern

- Evaluate Health Risk of Parameter

  - Acceptable/Negligible Risk
  - Uncertain/Questionable Risk
  - Unacceptable Risk

  - Unacceptable Risk requires control measures

  - Require testing of post treatment water for that parameter when issuing operating permit

**Operational Phase**

- Review Sample Results

- Negligible Risk

- Questionable Risk

- Unacceptable Risk

  - Corrective action required

- Reduce Frequency, or cease requirement for routine testing of that parameter

- Continue to require testing of raw and/or water in distribution system for that parameter on operating permit
5. Decision Tree Endnotes

1. A new source for a water supply system under the DWPA, or re-evaluation of an existing system after an incident of contamination, or significant system modification.

2. The DWO should ask the supplier to provide the following information for consideration:
   a. Historical data from nearby water sources
   b. A suite of chemical and physical testing on the new source for health parameters in GCDWQ
   c. Activities in the watershed that may contribute to elevated sample results (e.g., local industry, agriculture, historical chemical spills)
   d. The type of water source (i.e. groundwater vs. surface supply etc.)
   e. The anticipated effect of proposed treatment on parameters (e.g., formation of disinfection by-products)
   f. Anticipated seasonal fluctuations in water quality and quantity

   The supplier may accomplish this by providing the health authority a health risk assessment of water quality.

3. The DWO will compare data collected to GCDWQ and/or other standards to identify those which may require further consideration. Those that are measured at or near the MAC, or other standards need further consideration. This may include consideration of the anticipated effect of proposed treatment on parameters (e.g., formation of disinfection by-products)
   a. Subject to consideration given under box 2, those falling well below the MAC or other standards may not require further routine testing.

4. Evaluate the magnitude of the risk for each parameter that is near or exceeding the threshold in the GCDWQ or other standards. The information in Box 2 should be considered in this evaluation.

5. Where the DWO concludes that the risk of a parameter is:
   a. Acceptable/Negligible: no further routine testing is required; unless there is reason to believe the situation has changed. (Where an event such as a chemical spill, or the introduction of a new industry in the community occurs, the DWO may wish to re-evaluate the testing requirements based on this new information).
   b. Uncertain/Questionable: Require periodic sampling of the parameter in question on the operating permit (go to box 6)
   c. Unacceptable – (go to box 7)

6. The DWO should require periodic sampling and reporting of this parameter on the conditions of the operating permit at source and/or distribution system as appropriate.

7. Where source water is found to be unacceptable, the DWO should require mitigation of the parameter to reduce risk, by:
   a. Requiring control measures (e.g., water treatment)
   b. Finding another source
   c. Where water is currently in use, notifying users
   d. Continuing to monitor to verify that control measures are effective (go to box 6)

   This may be done through adding or modifying conditions on permit or by an order issued under the DWPA

8. Once a water supply system is in operation, routine sampling will give an indication of whether the risk:
   a. Is shown to be negligible (e.g., reducing concentration over time)
   b. Requires further monitoring to ensure that risk does not increase, or
c. Increases to an unacceptable level on a temporary or long term basis.

9. With an established history of stable and predictable chemical and/or physical results, a DWO may amend the operating permit to reduce frequency or waive the requirements for testing of a parameter. The DWO may, however take into consideration that if a parameter monitored is part of a suite of measurements offered by a lab, it may not be of any consequence to reduce testing of a particular parameter.

10. Conditions on operating permit should require regular monitoring to ensure that risk does not increase.

11. Where monitoring reveals that the concentration of the parameter increases to an unacceptable level, the DWO should require notification of users. The DWO should evaluate the magnitude of the exceedance of the guideline, as well as whether the condition of the water is of a temporary or long term nature. As most parameters identified in the *Guidelines for Canadian Drinking Water Quality* are based on lifetime exposure, temporary minor exceedances are usually not a cause for immediate remedial action. However, if there the problem is of a long term nature, the DWO should consider requiring the water supplier to develop a plan for mitigating the problem which includes an established timeline for completion.

### 6. Definitions

**Acceptable/Negligible Risk**

- The parameter is below the MAC in the GCDWQ or other prescribed standards

**Uncertain/Questionable Risk:**

- The parameter is near or exceeds the MAC in the GCDWQ or other prescribed standards, or;
- There is inadequate data to determine if levels are consistently below MAC.

**Unacceptable:**

- Exceeds the MAC in the GCDWQ, or other prescribed standards or,
- Where no standard exists, the DWO has assessed the risk and determined that a drinking water health hazard exists.
REQUESTS FOR INVESTIGATION OF A DRINKING WATER THREAT UNDER THE DRINKING WATER PROTECTION ACT

1. Purpose

Under section 29 of the Drinking Water Protection Act, if a person considers that there is a threat to their drinking water, the person may request the drinking water officer (DWO) to investigate the matter. This document contains a sample template questionnaire form for such investigations.

2. Application

INFORMATION FOR THOSE REQUESTING AN INVESTIGATION UNDER SECTION 29

Requests for investigation can be made by any person that believes that there is a threat to their own drinking water supply. Section 29 requires requests to be in writing.

A request for investigation should include the information contained in the form below. The questionnaire will assist in documenting the specific facts related to the drinking water threat and provide health authority staff with relevant information that can be reviewed in an expeditious manner to determine if an investigation is warranted.

This form should provide the local DWO with enough information as to determine whether an investigation should be initiated under section 29, however the DWO may ask for further information depending on the specifics of the case. Consequently, it is recommended that persons making these requests contact the DWO beforehand.

If the DWO decides not to conduct an investigation, he or she should provide a written explanation as to why the decision was made.

If an investigation is conducted, the DWO must advise of the results of the investigation. When doing so, the DWO should specify his or her findings regarding whether any threat was found, and what, if any, follow-up action will be taken. DWO’s should also provide this information in writing.
### REQUEST FOR A SECTION 29 INVESTIGATION UNDER THE DRINKING WATER PROTECTION ACT

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
<th>Phone Numbers:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailing address:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address of well property:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Is your water supply or residence located on federal or First Nation Lands  □ Yes  □ No  □ Unsure

2. **Source of Water**
   - □ Private Well
   - □ Private Surface Water (Provide Name of Stream or Lake) ____________
   - □ Permitted Community Water System (Provide Name) ____________ (if municipal option applicable please proceed to question 24)

3. Describe the location of your drinking water supply (i.e. well) on your property. (ex. 20 m from north boundary and 60 m from east boundary of property)

### Well Information (If Applicable)

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Is your well</td>
<td></td>
</tr>
<tr>
<td>□ Drilled  □ Excavated (dug)  □ Driven (sand point)  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>5. What year was your well drilled?</td>
<td></td>
</tr>
<tr>
<td>____________________________________________</td>
<td></td>
</tr>
<tr>
<td>6. Name of well driller</td>
<td></td>
</tr>
<tr>
<td>____________________________________________</td>
<td></td>
</tr>
<tr>
<td>7. Do you have a copy of the well Drillers log (Please attach copy if available)</td>
<td></td>
</tr>
<tr>
<td>□ Yes  □ No  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>8. How deep is the well?</td>
<td></td>
</tr>
<tr>
<td>___________________________ (meters) □ Unsure</td>
<td></td>
</tr>
<tr>
<td>9. How deep is the water table below the ground?</td>
<td></td>
</tr>
<tr>
<td>___________________________ (meters) □ Unsure</td>
<td></td>
</tr>
<tr>
<td>10. Does the well draw water from</td>
<td></td>
</tr>
<tr>
<td>□ Sand and/or gravel aquifer  □ Fractured bedrock  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>11. During well construction were there any layers of clay, silt, till or hardpan encountered above the well screen or well intake?</td>
<td></td>
</tr>
<tr>
<td>□ Yes  □ No  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>12. Does the well have a secure well cap?</td>
<td></td>
</tr>
<tr>
<td>□ Yes  □ No  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>13. Does the well have a surface seal?</td>
<td></td>
</tr>
<tr>
<td>□ Yes  □ No  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>14. Is the well located in an area where there is known flooding or where water can pond?</td>
<td></td>
</tr>
<tr>
<td>□ Yes  □ No  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>15. Are there any structures, buildings, material storage, or animals near your well-head? (Please describe)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Is your well-head protected by a covered structure?</td>
<td></td>
</tr>
<tr>
<td>□ Yes  □ No  □ Unsure</td>
<td></td>
</tr>
<tr>
<td>17. Has your well been disinfected in the past? (please describe)</td>
<td></td>
</tr>
<tr>
<td>18. Any other relevant information about your well? (Please describe)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Have there been any groundwater assessments of your well water supply conducted by a professional hydrogeologist? (Please provide a copy of the report)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Is water stored at your home stored prior to use in a:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
21. What type of material is used for the water distribution pipes?
- Pressure tank
- Holding tank
- Other _________________________________
- No water storage

22. Do you currently treat your drinking water supply?  
- No  
- Yes,  
  If yes, please specify method used:  
  - Chlorine  
  - UV  
  - Osmosis  
  - Boiling  
  - Filtration (specify type) ___________________  
  - Other ___________________

23. Are any of the following located close to your water well or surface water intake? If so, please describe and include approximate distance:

   a. Chemical storage (household or agricultural, including pesticides) Distance: ________ meters

   b. Fuel storage (above ground or underground) Distance: ________ meters

   c. Manure storage or application Distance: ________ meters

   d. Livestock Distance: ________ meters

   e. Wildlife Distance: ________ meters

   f. Other wells including abandoned well(s) Distance: ________ meters

   g. Septic systems, (including your own or those on nearby properties) Distance: ________ meters

   h. Major roads, highways, railways, pipelines, drainage ditches Distance: ________ meters

   i. Lake, stream, river, pond or ocean Distance: ________ meters

   j. Landfill, refuse storage, contaminated sites Distance: ________ meters

   k. Other (Specify)

24. Have you noticed any taste, odour and/or appearance changes (colour, cloudiness) to your drinking water?
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. Has anyone become ill as a result of drinking the tap water from your home?</td>
<td>(Please provide supporting documentation if possible, including water test reports, medical testing results and/or doctor’s report).</td>
</tr>
<tr>
<td>26. Have there been any water quality tests performed on your drinking water supply (Chemical, Bacteriological, other)?</td>
<td>(Please attach copies of lab reports)</td>
</tr>
<tr>
<td>27. Are you aware if your municipal water supplier has issued a boil water notice or drinking water advisory? If so, what was the nature of the advisory?</td>
<td></td>
</tr>
<tr>
<td>28. Have you contacted your municipal water supplier about your concerns? If so, what was their response?</td>
<td></td>
</tr>
<tr>
<td>29. If applicable, please provide municipal contact person you have interacted with on this issue</td>
<td></td>
</tr>
<tr>
<td>30. Other evidence which supports your concern about the safety of your drinking water?</td>
<td>(Please provide specific details and attach any relevant supporting documents.)</td>
</tr>
<tr>
<td>31. What initiated your complaint?</td>
<td></td>
</tr>
<tr>
<td>32. How do you expect your complaint to be resolved?</td>
<td></td>
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</table>

Name of person requesting an Investigation
(Please Print)

___________________________
Name of person requesting an Investigation
 _______________________
Signature
___________________________
Date
STRATEGIES, TOOLS AND PROCEDURES HEALTH AUTHORITIES MAY USE TO FIND AND REGULATE SMALL SYSTEMS

1. Purpose

The Document outlines strategies that health authorities may use find small water systems that have not been permitted as required by the Drinking Water Protection Act.

2. Background

There are likely many (possibly thousands) systems that meet the definition of a Water Supply System under the Drinking Water Protection Act that are unknown to the health authorities. Many of the operators of these systems either do not know that they are subject to the Drinking Water Protection Act, or would prefer not to be regulated.

Should health authorities have the resources to systematically find systems that have not been permitted, there are tools such as databases held by the Ministry of Environment Climate Change Strategy that health authorities could utilize. This document identifies these tools and provides basic procedures on how they may be used. The document also outlines other strategies that may assist in preventing new systems from falling outside of the regulatory process.

3. Strategies to Find Un-permitted Systems

3.1. Use the Ministry of Environment and Climate Change Strategy's Water Licence Information System, to find licences for water extraction.

All surface water intakes should have a licence from the Ministry of Environment and Climate Change Strategy, and information on such systems is found under the Water License Information System (WLIS). Health Authorities can use this database to search for systems that hold licences.

Example procedure to find water supply systems that were issued water works licences since the beginning of 2009:

a) Go to http://a100.gov.bc.ca/pub/wtrwhse/water_licences.input
b) Under Purpose, from the dropdown menu choose Waterworks - other.
   c) Under New Licences or Applications from this date forward; enter the January 1, 2009 date like this: 20090101
d) Click the Submit button

This will produce a list of the new applications and licences for this purpose.

This procedure can be done for other purposes or dates, and/or refined to include only specific geographical areas by selecting the watershed or water district drop down boxes.
For a list of purposes involving water distribution systems for human consumption, see the Water Use Purpose Definitions as listed on the Ministry of Environment and Climate Change Strategy’s website: http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/water-rights/water_use_purpose_defns.pdf.

3.2. Use the Ministry of Environment and Climate Change Strategy’s "WELLS Database, Report 6" to search for groundwater drinking water supply systems.

The Ministry of Environment and Climate Change Strategy has a well database that contains information submitted on a voluntary basis by well drillers. Health Authorities can use this database to search for systems that have been registered.

Example Procedure to find wells that were drilled as drinking water supply systems in a given year:

a) Go to http://a100.gov.bc.ca/pub/wells/public/common/wellsreport6.jsp
b) Select any fields you wish to be displayed, i.e., Well Use, Street Name, Area, Water Supply System Name, Water Utility (to see if it is a large system) by checking the box next to that field
c) Under "Well Use", choose "drinking water supply system",
d) Under Date Started, input a general date range. By entering "%2009%" the system will return all records that show 2009 under the Date Started field,
e) Click the "Search" button

This will produce a list of those wells drilled in a given year that are a drinking water supply system, and allows the user to then pull up the well construction report for each well.

This procedure can be repeated for other dates or for other well uses such as "domestic", "community water supply", "Municipal", or "water utility", and can be further refined by land district if desired.

Please note: The WELLS database does not distinguish between large or small drinking water supply systems. The best way to determine if it is a large system is to select the water utility field – this will at least tell you if you are dealing with a water utility.

• Until recently, groundwater reports on WELLS were submitted to this database on a voluntary basis, and it does not represent all wells that may exist.
• The WELLS database may have gaps in owner contact information.
PART B: Drinking Water Complaints and Inquiries Process

1. Purpose
The Health Protection Branch in the Ministry of Health is contacted from time to time by the public about concerns pertaining to drinking water, including:

- Complaints regarding a specific public health concern in a community (e.g. drinking water threat).
- Complaints regarding service provided by a health authority, or a policy a health authority has adopted.
- Complaints regarding a policy or service of the Ministry of Health’s Health Protection Branch.

The purpose of this document is to provide guidance to the public and health protection staff on to how to file concerns, and what to expect once they are filed.

2. How Do I Make a Complaint or Inquiry?
There are a number of ways you can contact the Ministry of Health to make a drinking water complaint or inquiry. It is most efficient if you phone, email or send a letter to the Health Protection Branch:

Health Protection Branch
Population and Public Health Division
Ministry of Health

4th Floor, 1515 Blanshard Street
Victoria, B.C., V8W 3C8
phone: 250 952-1469, fax: 250 952-1713
e-mail: HP-PHW@gov.bc.ca

Hours of operation: 8:30 a.m. to 4:00 p.m., Monday to Friday, excluding holidays

When contacting us, please provide us with as much information as possible, including:

- Your name and contact information.
- The location of your concern.
- The nature of your concern.
- Names of individuals or businesses, or organizations related to your concerns and, where possible, contact information.
3. How Will My Concern Be Addressed?

3.1. Concerns about Drinking Water Systems

Many concerns received by Health Protection Branch staff are about a particular drinking water system, incident, event or situation occurring in the person's community.

Most of these issues fall under the jurisdiction of local health authorities, and are best addressed by their staff. Please contact health authorities directly. Health authority contact information is found on this page.

If you are unable to reach the correct person at the health authority, the Health Protection Branch will be happy to assist by:

- Recording the name, contact information, and location of the complainant.
- Recording any pertinent details provided by the complainant.
- Referring the complainant to the relevant person in the health authority for follow up, and/or providing the complainant with contact information, and sources of further information.

Formal requests for investigations under section 29 of the Drinking Water Protection Act must be made directly to your local health authority in writing. If you are wishing to request an investigation under this section, Health Protection Branch staff can guide you to the appropriate contact person within your local health authority.

3.2. Concerns about Service Provided by Health Authorities

The Health Protection Branch from time to time receives concerns about service provided by health authorities. The health authority staff do not have a direct reporting relationship with the Ministry of Health. The Branch's initial response will be to help people find the right person in the health authority to follow up on their complaints, usually beginning with the supervisor.

Requests for reconsideration of a decision as per Part 6 of the Drinking Water Protection Act will be referred to health authorities.

Requests for review of decisions as per Part 6 of the Drinking Water Protection Act will be referred to the office of the Provincial Health Officer.

If, after following this approach, the complainants are not satisfied with the service they have received from the health authority, concerns can be brought to the Health Protection Branch. For these types of concerns, Health Protection Branch staff will:

- Record the name, contact information, and location of the complainant
- Record any pertinent details provided by the complainant, including:
  - The name of the organization about which the complainant is concerned.
  - Names of the people with whom the complainant has dealt.
  - The nature of the concern.
  - The measures the complainant has already taken to try to resolve the concern.
- Refer the concern to the relevant person in the health authorities for follow up, and provide the complainant with the contact information.

For more information, see the Drinking Water Health Authority Contacts website.

For a link to other public health agency contact information, see this page.
3.3. Concerns about Policies or Services Provided by the Health Protection Branch, Ministry of Health

If you have views about the Ministry of Health’s drinking water policies, its services or the way they are provided, or other inquiries, we would like to hear from you. Our staff value ensuring that all enquiries are treated properly and promptly. Let us know if you have an inquiry that needs answering, or if you are unhappy about:

- A decision we have made.
- Any aspect of our work.
- A member of our staff providing incorrect information or treating you unprofessionally.

When contacted, Health Protection Branch staff will:

- Record the name, contact information, and location of the complainant.
- Record any pertinent details provided by the complainant, including:
  - The name of the organization about which you are concerned.
  - Names and or titles of the people with whom you have dealt.
  - The nature of your concern.

Once we have received this information, we will either direct you to the right person or take a note of your complaint or inquiry, and pass it to him or her. We will usually do this within 24 hours, but please allow up to 20 working days for an initial response. If you do not have all the information above, we will work with you to determine the best person to address your concern.

If your concern falls outside of the Ministry’s range of responsibilities we will inform you of this and forward your complaint to the right service agency as quickly as possible.

As a learning organization, we value your feedback. Please let us know if your complaints or inquiries have been satisfactorily resolved and what steps we can undertake to improve our responses. We would also like feedback if you are satisfied with our response.

4. Still Not Satisfied?

If you have already contacted the Health Protection Branch and are still not satisfied, you can contact the Deputy Minister or Minister of Health for further consideration of your matter. Please put your concerns in writing and send them to the Minister of Health. A reply will be provided within 20 working days. Your complaint will be logged and tracked to ensure it is resolved.

Office of the Deputy Minister
Minister of Health
1515 Blanshard Street
Victoria, B.C., V8W 3C8
Phone: 250 952-1911
Fax: 250 952-1909

Office of the Minister of Health
Phone: 250 953-3547
Fax: 250 356-9587
E-mail: hlhs.minister@gov.bc.ca

If you are unhappy with the minister’s response, you can also send a written complaint to the Office of the Premier.
5. Ombudsperson

If you are not able to reach a resolution and you feel that you have been treated unfairly by the Ministry of Health, you can refer your complaint to the Office of the Ombudsperson. The Ombudsperson can:

- Provide information about what steps to take in dealing with a public agency.
- Try to settle complaints through consultation.
- Investigate complaints about administrative unfairness by a public agency.
- Make recommendations to a public agency to resolve an unfair situation.
- Report to the provincial legislature.
- Issue public reports.

**Ombudsperson**

Local phone: (250) 387-5855 (Greater Victoria area)
Toll-free phone: 1-800-567-3247 (all of B.C.)
In Person: 947 Fort Street – 2nd floor, Victoria, B.C., Canada
Hours: 8:30 a.m. to 4:30 p.m. Monday to Friday
By mail: PO Box 9039 STN PROV GOVT, Victoria, B.C., V8W 9A5, Canada
Fax: (250) 387-0198
Website: [www.ombudsman.bc.ca](http://www.ombudsman.bc.ca)
1. Objective

To provide a general overview of microbiological drinking water treatment objectives for surface water supplies in British Columbia.

2. Background and Regulatory Framework

There are three main types of microorganisms (pathogens) that pose risks to human health in drinking water: viruses, bacteria and protozoa. The B.C. Drinking Water Protection Act (DWPA) (2001) and Drinking Water Protection Regulation (DWPR) (2003) specify water quality standards, monitoring schedules, applicability and recommended treatment aimed at reducing the risks from these pathogens.

Schedule A of the DWPR specifies bacteriological water quality standards for potable water for the protection of human health. These standards represent partial drinking water treatment goals and are consistent with the Guidelines for Canadian Drinking Water Quality: Guideline Technical Document — Escherichia coli and total coliform (Health Canada, 2012a).

Schedule B of the DWPR outlines the monitoring schedule and its applicability based on population served. Section 5 of the regulation requires that surface water sources must, as a minimum, receive disinfection. Reducing risks from virus and protozoa through disinfection of drinking water are dealt with through the application of best management principles as outlined in this document and detailed in the Guidelines for Canadian Drinking Water Quality (GCDWQ). As no one type of treatment system is effective in treating all hazards, a multi-barrier approach is usually required to adequately address all risks, which typically includes two or more forms of treatment.

The DWPA and the DWPR give drinking water officers (DWOs) the flexibility and discretion to address public health risks through treatment requirements in operating permits to deal with pathogenic risks. Discretion of the drinking water officer also includes, but is not limited to, understanding the source water characterization, effectiveness of system-specific treatment technologies, operational management issues and reasonable time frames to achieve incremental improvements to existing systems. With respect to water quality analyses, the issuing official should

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1 Potable water is defined under the Drinking Water Protection Act as water provided by a domestic water system that (a) meets the standards prescribed by regulation, and (b) is safe to drink and fit for domestic purposes without further treatment.
ensure that he/she has adequate data to determine that the proposed treatment is adequate to address public health risks in relation to relevant microbiological and chemical/physical parameters.

Existing water supply systems may have some appreciable risk for certain parameters without treatment in place. In such cases, it is acceptable from a public health perspective for water supply systems to present drinking water officers with a continuous improvement plan that addresses implementing treatment for these parameters within a reasonable time period.

3. Purpose and Scope

Under the DWPA, water suppliers have the responsibility to provide potable water to all users of their systems. Drinking water treatment requirements are site specific, risk based and dependent on a number of factors, including source water quality and efficacy of treatment technology.

This document provides the basic minimum framework towards goals for drinking water treatment for pathogens in surface water supply systems in British Columbia. It may also be used as a general reference for assessing progress towards updating or improving existing water supply systems. This document does not address the treatment of groundwater or disinfection of distribution systems.

These objectives rely on the Guidelines for Canadian Drinking Water Quality (See Summary table - Health Canada, 2014) as a primary reference for potability. However, given site-specific conditions of water systems in various regions of B.C., it is necessary to apply these guidelines in consideration of a risk assessment of individual cases. In all cases, the drinking water officer must be contacted to confirm the necessary treatment objectives for microbiological parameters when planning or upgrading water supply systems.

4. Treatment Objectives

These objectives provide treatment requirements that address the following microbiological parameters: enteric viruses, pathogenic bacteria, Giardia cysts and Cryptosporidium oocysts. The general objectives are as follows and described in more detail below:

- 4-log reduction or inactivation of viruses.
- 3-log reduction or inactivation of Giardia and Cryptosporidium.
- Two treatment processes for surface water.
- Less than or equal to (≤) one nephelometric turbidity unit (NTU) of turbidity.
- No detectable E. Coli, fecal coliform and total coliform.

These drinking water treatment objectives provide a minimum performance target for water suppliers to treat water to produce microbiologically safe drinking water. Depending on specific situations, the actual amount of treatment required will depend on the risks identified and may require greater levels of treatment. Water treatment is only one part of the multi-barrier approach to providing safe drinking water. Choosing an appropriate water source, protecting that source and reducing distribution system risks can be essential complementary steps to providing treatment when dealing with microbiological risks.

While there are numerous precautionary treatment steps available to reduce the risk of microbiological contamination of drinking water supplies, no system is fail-safe. Risk management is based on applying scientific
evidence that documents the quality and variability of the water source and the efficacy of management measures selected to achieve acceptable public health outcomes.

4.1. 4-log Inactivation of Viruses

Viruses are micro-organisms that are incapable of replicating outside a host cell. In general, viruses are host specific, which means that viruses that infect animals or plants do not usually infect humans, although a small number of enteric viruses have been detected in both humans and animals (Health Canada, 2011). Viruses are ubiquitous and often species-specific. Viruses of concern in drinking water are those that cause human illness or are capable of cross-species transfer. The role of nonhuman viruses as facilitators of pathogens or in transmitting genetic material that could be pathogenic is not clearly understood; hence, overall reductions of viruses in source water are preferred.

Health Risk Management Outcomes for Enteric Viruses

The level of risk deemed tolerable or acceptable by Health Canada for enteric viruses has been adopted from the World Health Organization’s (WHO) Guidelines for Drinking-Water Quality (WHO, 2004) based on the Disability Adjusted Life Year (DALY) as a unit of measure for risk.

The basic principle of the DALY is to calculate a value that considers both the probability of experiencing an illness or injury and the impact of the associated health effects (Murray and Lopez, 1996a; Havelaar and Melse, 2003; cited from Health Canada, 2011). The WHO (2004) guidelines adopt $10^{-6}$ DALY/person per year as a health risk management target. Table 1 describes the relationship between viruses in source water and the level of treatment necessary to achieve this health risk management goal.

Table 1: Overall treatment requirements for virus log reduction as a function of approximate source water concentration to meet a level of risk of $1 \times 10^{-6}$ DALY/person per year
(Cited in Health Canada, 2011)

<table>
<thead>
<tr>
<th>Source water virus concentration (no./100 L)</th>
<th>Overall required treatment reduction for viruses ($\log_{10}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>100</td>
<td>6</td>
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<td>1000</td>
<td>7</td>
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</table>

Treatment Objectives for Enteric Virus

A minimum 4-log reduction of enteric viruses is recommended for all surface water sources. Depending on the surface water source, especially those subject to human fecal contamination, a greater than 4-log reduction may be necessary (See Table 1).

Reductions can be achieved through physical removal processes, such as filtration, and/or through inactivation processes, such as disinfection (Health Canada, 2011). Disinfection of water systems is recommended as a means to
Drinking water treatment plants that meet the turbidity limits established in the Guidelines for Canadian Drinking Water Quality: Supporting Documentation — Turbidity (Health Canada, 2012b) can apply the estimated physical removal credits for enteric viruses. For example, for conventional filtration, the virus credit is 2-log and for direct filtration the virus credit is 1-log.

Alternatively, log removal rates can be established on the basis of demonstrated performance or pilot studies. The physical log removal credits can be combined with the disinfection credits to meet overall treatment goals. In all cases, the drinking water officers must be consulted when planning treatment for a water supply system.

It is recommended that water supply systems should provide, as a minimum, 4-log reduction of viruses for all surface water systems.

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2 The Ministry of Health is awaiting further clarification from Health Canada as to what constitutes as human fecal contamination. In lieu of clarification, it is best to use as much available information as possible to make an informed decision on a case-by-case basis.
4.2. 3-log Inactivation of Giardia and Cryptosporidium

Protozoa such as *Giardia* and *Cryptosporidium* are relatively large pathogenic microorganisms that multiply only in the gastrointestinal tract of humans and other animals. They cannot multiply in the environment, but their cysts/oocysts can survive in water longer than intestinal bacteria, and they are more infectious and resistant to disinfection than most other microorganisms (Health Canada, 2004).

**Health Risk Management Outcomes for Giardia and Cryptosporidium**

While *Giardia* and *Cryptosporidium* can be responsible for severe and, in some cases, fatal gastrointestinal illness, the *Guidelines for Canadian Drinking Water Quality* have not established maximum acceptable concentrations for these protozoa in drinking water. Routine methods available for the detection of cysts and oocysts have low recovery rates and do not provide any information on their viability or human infectivity. Until better monitoring data and information on the viability and infectivity of cysts and oocysts present in drinking water are available, measures should be implemented to reduce the risk of illness as much as possible.

**Treatment Objectives for Giardia and Cryptosporidium**

The goal of surface water treatment is to reduce the presence of disease-causing organisms and associated health risks to an acceptable safe level.

Treatment of drinking water is another integral part of the multi-barrier approach. In addition to disinfection, where warranted by source water conditions, physical treatment of surface supplies should be included. Because *Giardia* and *Cryptosporidium* are ubiquitous in surface waters in Canada and more resistant to disinfection than most other infectious organisms, it is desirable that treatment achieves at least a 99.9% (3-log) reduction of *Giardia* and *Cryptosporidium* (Health Canada, 2004).

*Giardia* may be partially inactivated by large doses of free chlorine, ozone or chlorine dioxide. Filtration can be effective in removing *Giardia* cysts and *Cryptosporidium* oocysts, but the performance is significantly dependant on the methods of filtration and operational performance. *Giardia* and *Cryptosporidium* may also be inactivated using UV disinfection. Many commercially available UV systems have undergone testing to verify that the dosage provided under design operating conditions achieves the 3-log inactivation required.

**It is recommended that** water supply systems should provide, as a minimum, 3-log reduction of *Giardia* and *Cryptosporidium* for systems that have a water source considered to have low risk of these parasites and have not had an outbreak of the disease. A higher level of reduction may be required if the situation justifies it.

4.3. Two Methods of Treatment (Dual Treatment)

**Health Risk Management Outcomes for Dual Treatment of Drinking Water**

Some microbiological agents of concern are more resistant to certain forms of treatment than others. Ultimately, the best approach to ensure complete disinfection of water intended for human use is a multi-barrier one, which begins with collecting water from the cleanest source possible.

As most disinfection systems require clear water to ensure maximum efficiency, it may be necessary to combine multiple specific treatment technologies. To provide the most effective protection, the *Guidelines for Canadian*
*Drinking Water Quality* recommend that filtration and one form of disinfection be used to meet the treatment objectives.

Alternatively, two forms of disinfection (for example, chlorination and UV disinfection) may be considered if certain criteria are met.

**Filtration Exemption**

A water supply system may be permitted to operate without filtration if the following conditions for exemption of filtration are met, or a timetable to implement filtration has been agreed to by the drinking water officer:

1. **Overall inactivation** is met using a minimum of two disinfections, providing 4-log reduction of viruses and 3-log reduction of *Cryptosporidium* and *Giardia*.
2. The number of *E. coli* in raw water does not exceed 20/100 mL (or if *E. coli* data are not available less than 100/100 mL of total coliform) in at least 90% of the weekly samples from the previous six months. Treatment target for all water systems is to contain no detectable *E. coli* or fecal coliform per 100 mL. Total coliform objectives are also zero based on one sample in a 30-day period. For more than one sample in a 30-day period, at least 90% of the samples should have no detectable total coliform bacteria per 100 mL and no sample should have more than 10 total coliform bacteria per 100 mL.
3. Average daily turbidity levels measured at equal intervals (at least every four hours) immediately before the disinfectant is applied are around 1 NTU, but do not exceed 5 NTU for more than two days in a 12-month period.
4. A watershed control program is maintained that minimizes the potential for fecal contamination in the source water. ([Health Canada, 2012b](#))

Applying the filtration exemption criteria does not mean filtration will never be needed in the future. A consistent supply of good source water quality is critical to the approach, but source quality can change. Therefore, the exemption of filtration must be supported by continuous assessment of water supply conditions.

Changing source water quality can occur with changes in watershed conditions. Increased threats identified through ongoing assessment and monitoring may necessitate filtration. Maintaining the exemption condition relies on known current and historic source water conditions, and provides some level of assurance to water suppliers that a filtration system may not be necessary unless the risk of adverse source water quality increases.

**It is recommended** that dual water treatment should be applied to all surface water.

### 4.4. ≤1 NTU in Turbidity

Events such as sedimentation from road surfaces, higher surface runoff peak flows, landslides and debris flows increase a condition commonly referred to as “turbidity.” Turbidity in water is caused by suspended organic and colloidal matter, such as clay, silt, finely divided organic and inorganic matter, bacteria, protozoa and other microscopic organisms. It is measured in nephelometric turbidity units (NTU) and is generally acceptable when less than 1 NTU, as per the exemption criteria in section 4.3, and becomes visible when above 5 NTU.

**Health Risk Management Outcomes for Turbidity**

Turbidity is an indicator of the potential presence of human pathogens such as bacteria and protozoa. Furthermore, a greater concentration of organic and/or microbiological matter in source water has the potential to disrupt or
overload drinking water disinfection processes, such as UV light and chlorination, to the point that they may no longer effectively control pathogens in the water. In addition, organic matter in the water can react with disinfectants such as chlorine to create byproducts that may cause adverse health effects (Health Canada, 2012b).

**Treatment Objectives for Turbidity**

In general, turbidity is caused by particles in water and can be effectively reduced by filtration. Depending on the filtration technologies applied to the water, filtered water from well operated filtration systems could have turbidity ranges from 0.1 to 1.0 NTU. The Canadian Guideline on turbidity applies to filtered surface water and is categorized by the type of filtration technology: conventional and direct filtration, slow sand or diatomaceous earth filtration, and membrane filtration. To comply with the Canadian Guideline, continuous monitoring of turbidity is required.

Turbidity is effectively reduced through filtration, using one of a number of common technologies. The goal of treating water for turbidity is to reduce its level to as low as possible and minimize fluctuation. For this reason, when filtration technology is employed, the system should strive to achieve a treated water turbidity target from individual filters or units of less than 0.1 NTU at all times. Where this is not achievable, the treated water from filters or units should be less than or equal to 0.3 NTU for conventional and direct filtration; less than or equal to 1.0 NTU for slow sand or diatomaceous earth filtration; and less than or equal to 0.1 NTU for filtration systems that use membrane filtration. Inability to achieve these objectives in filtered systems indicates a breakdown of the treatment train and potential health impacts to users.

For nonfiltered surface water to be acceptable as a drinking water source supply, average daily turbidity levels should be established through sampling at equal intervals (at least every four hours) immediately before the disinfectant is applied. Turbidity levels of around 1.0 NTU but not exceeding 5.0 NTU for more than two days in a 12-month period should be demonstrated in the absence of filtration. In addition, source water turbidity also should not show evidence of harbouring microbiological contaminants in excess of the exemption criteria under section 4.3 of this document.

**It is recommended that** turbidity of treated surface water should be maintained at less than 1 NTU. Where filtration is part of the treatment process, the turbidity levels should comply with the Canadian guideline on turbidity, entitled *Guidelines for Canadian Drinking Water Quality: Guideline Technical Document — Turbidity* (Health Canada, 2012b) (expected turbidity reduction depends on the filtration methods). Continuous monitoring of turbidity should be required for water systems with filtration to verify compliance with system performance objectives. Systems that meet the criteria for exemption from the requirement for filtration should be monitored to verify that the system continues to meet the exemption criteria.

**4.5. No Detectable E. Coli, Fecal Coliform and Total Coliform**

*E. coli* and other fecal coliforms are members of the total coliform group of bacteria, but *E. coli* is the only member found exclusively in the feces of humans and other animals. Other members of the total coliform group (including fecal coliforms) are found naturally in water, soil, and vegetation, as well as in feces. The presence of *E. coli* and other fecal coliforms in water indicates not only recent fecal contamination, but also the possible presence of intestinal disease-causing bacteria, viruses, and protozoa.

**Health Risk Management Outcome for *E. Coli* and Total Coliform**

The absence of *E. coli*, *fecal coliform* and total coliform is used as an indicator that treated water is free from intestinal disease-causing bacteria. Their presence in drinking water distributed from a treatment plant indicates a serious
failure and that corrective action is necessary. The presence of total coliform bacteria in the water distribution system indicates that the system may be vulnerable to contamination or experiencing bacterial regrowth.

**Treatment Objectives for E. coli, Fecal Coliform and Total Coliform**

*E. coli*, fecal coliform and total coliform are easily controlled with disinfection processes such as chlorine or UV light and can also be reduced by filtration. The DWPR calls for water suppliers to provide water with nondetectable *E. coli*, fecal coliform and total coliform based on sampling frequency established by the DWPR or through agreement with the drinking water officer.

**In summary**, according to Schedule A of the DWPR (updated 2008), the treatment target for all water systems is to contain no detectable *E. coli* or fecal coliform per 100 ml. Total coliform objectives are also zero based on one sample in a 30-day period. For more than one sample in a 30-day period, at least 90% of the samples should have no detectable total coliform bacteria per 100 ml and no sample should have more than 10 total coliform bacteria per 100 ml.

**5. Conclusion**

These objectives are intended to provide general requirements for surface water supply treatment systems in B.C. and rely on the *Guidelines for Canadian Drinking Water Quality* (Health Canada, 2014) as a primary reference for potability and treatment. However, given site-specific physical, chemical and biological conditions of water supplies throughout various regions in B.C., it may be necessary to apply these guidelines based on risk assessment of individual cases.

In all cases, the treatment objectives for microbiological parameters in specific water supply systems must be developed in consultation with a drinking water officer when planning or upgrading drinking water supply systems in the province.

**6. References**

B.C. *Drinking Water Protection Act.*
http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_01009_01

B.C. *Drinking Water Protection Regulation.*

http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/how-drinking-water-is-protected-in-bc

Health Canada, 2014. *Guidelines for Canadian Drinking Water Quality (Summary Table).*


http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/index.cfm

**Executive Summary**

The Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia (this document) provides guidance on what microbiological objectives need to be achieved for a ground water source to be considered potable. The Drinking Water Protection Regulation requires that ground water sources used for drinking water supply systems are disinfected if the ground water is at risk of containing pathogens, and disinfection must be sufficient to achieve these provincial water treatment objectives. This document is specific to microbiological objectives and it does not address parameters around secondary (residual) disinfection or any treatment required to mitigate chemical contaminants.

Determining if a water supply source is at risk of containing pathogens is outlined in a separate document entitled Guidance Document for Determining Ground Water at Risk of Containing Pathogens (GARP) (GARP assessment). The GARP assessment considers the likelihood of pathogens being present in the ground water source based on a combination of source water quality results, well location, well construction, and aquifer type and setting. The GARP assessment can result in three outcomes which influence how microbiological treatment objectives for ground water may be achieved:

**Ground water supplies determined to be ‘at risk’ of containing pathogens (GARP):** As a minimum, GARP water sources require disinfection by treatment methods equivalent to surface water supplies. This includes treatment that provides 4-log removal of viruses, 3-log removal of protozoa, maintaining less than 1 NTU effluent turbidity, and no detectable E. coli and fecal coliform in delivered water. These objectives are achieved through a multi-barrier approach that consists of at least two treatment processes. As with surface water sources, ground water sources may be exempted from filtration if the ground water source meets the filtration exemption criteria. Subsurface filtration, a natural treatment process unique to ground water sources, is also recognized as a potential treatment method and may provide upwards of 3-log removal credit for protozoa and 4-log virus removal credit (where supported by site-specific information).

**Ground water supplies determined to be ‘at risk’ of containing viruses (GARP-viruses only):** These water sources require treatment to provide 4-log removal of viruses.

**Ground water supplies determined to be at ‘low risk’ of containing pathogens:** These water sources are not required to employ disinfection to be considered potable.

The information gathered during the GARP assessment helps inform the Drinking Water Officer of the potential hazards to a water source. This document has been developed to ensure that, where disinfection is necessary, these hazards are sufficiently addressed to ensure potable water.
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1. Objective

Reducing risks from bacteria, protozoa, and viruses by disinfection of ground water at risk of containing pathogens to provide guidance for establishing microbiological treatment objectives for drinking water systems drawing from ground water sources in British Columbia (B.C.) to achieve potable water as set out in the B.C. Drinking Water Protection Act (DWPA) (2001). Potable water is defined as water provided by a domestic water system that (a) meets the standards prescribed by regulation, and (b) is safe to drink and fit for domestic purposes without further treatment.

2. Background and Regulatory Framework

2.1. Requirements for Potable Water

There are three main types of microorganisms in drinking water that pose risks to human health (pathogens) and for which microbiological treatment objectives are required: bacteria, protozoa, and viruses. The DWPA provides the regulatory framework for establishing groundwater treatment objectives in terms of potability and prescribed standards.

Section 6 of the DWPA describes the obligations of a water supplier as follows:

Subject to the regulations, a water supplier must provide, to the users served by its water supply system, drinking water from the water supply system that

- (a) is potable water, and
- (b) meets any additional requirements established by the regulations or by its operating permit.

Under the DWPA, water suppliers have the responsibility to provide potable water to all users of their systems, unless exempted under section 3.1 of the Drinking Water Protection Regulation (DWPR) (2003):

The following are exempt from section 6 of the Act:

(a) a small system, if

- (i) each recipient of the water from the small system has a point of entry or point of use treatment system that makes the water potable, and
- (ii) the water supplier ensures that the location of non-potable water discharge and non-potable water piping are identified by markings that are permanent, distinct and easily recognized;

(b) a water supply system, including a small system, if

- (i) the system does not provide water for human consumption or food preparation purposes,
- (ii) the system is not connected to a water supply system that provides water for human consumption or food preparation purposes, and
- (iii) the water supplier ensures that the location of non-potable water discharge and non-potable water piping are identified by markings that are permanent, distinct and easily recognized.

2.2. Requirement to Disinfect

The requirement to disinfect ground water sources at risk of containing pathogens is given in Section 5 (2) (b) of the DWPR (2003):

For the purposes of section 6 (b) of the Act, drinking water from a water supply system must be disinfected by a water supplier if the water originates from

- (b) ground water that, in the opinion of a drinking water officer, is at risk of containing pathogens.

The Guidance Document for Determining Ground Water at Risk of Containing Pathogens (GARP) (MOH, 2015) (GARP assessment) provides an evidence-based procedure that assists public health officials in determining if a ground water
source is GARP. Based on the outcome and information gathered during a GARP assessment, disinfection requirements can be established for a specific ground water source.

2.3. Water Quality Objectives (Microbiological)

Reducing risks from bacteria, protozoa, and viruses by disinfection of ground water at risk of containing pathogens is achieved through the application of best management principles as outlined in this document and supplemented by the Guidelines for Canadian Drinking Water Quality (GCDWQ) (Health Canada, 2012a). As no single type of treatment system is effective in addressing all hazards, treatment objectives incorporate a multi-barrier approach which typically includes two or more forms of treatment. The specific treatment required depends on the risks posed by the raw quality of the source of the drinking water.

Schedule A of the DWPR specifies bacteriological water quality standards for \textit{Escherichia coli} (E. coli) and total and fecal coliform bacteria for the protection of human health as no detectable bacteria per 100 mL of drinking water. These standards represent partial drinking water treatment objectives and are consistent with the GCDWQ Guideline Technical Documents, specifically those for \textit{E. coli} (Health Canada, 2012b) and \textit{Total Coliforms} (Health Canada, 2012c).

This document provides treatment objectives for the removal or inactivation of protozoa and viruses in addition to bacteria. While the finished water quality for these other groups of pathogens is not explicitly defined in the DWPA or DWPR, they must be addressed for water to meet the definition of potable water (section 1 above). Treatment objectives for any pathogen also become legal requirements when included in the conditions of a water system’s construction or operating permit.

The DWPA and the DWPR give DWOs the authority to address public health risks from pathogens by specifying water treatment objectives and requirements in construction or operating permits. Given an understanding of the risks to the ground water source, the DWO may stipulate treatment requirements based on the overall quality of the water source, identify operational management issues, and work with the water supplier to establish reasonable time frames to achieve incremental improvements to existing systems. It is the responsibility of the DWO to ensure that they have adequate information to determine that the treatment proposed by a water supplier will address the microbiological risks from a water supply, in addition to any chemical and physical parameters that need to be addressed.

Existing drinking water supply systems drawing from a ground water source may have some appreciable risk for certain pathogens without treatment in place. In such cases, it may be acceptable, from a public health perspective, for a water supply system to present a DWO with an improvement plan that specifies how adequate treatment will be implemented within a reasonable time period.

3. Purpose and Scope

3.1. Purpose

This document provides consistent provincial guidance for drinking water objectives that protect human health by addressing the need to disinfect GARP sources in B.C.. The information in this document may also be used as general reference for upgrading or improving existing water supply systems. A DWO must be contacted to confirm treatment requirements for microbiological parameters when existing water supply systems come under review, when permits are required for the construction of new systems or when upgrades to existing systems are planned. The GCDWQ provides broad, high-level guidance for potability and treatment

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1 Where possible, hyperlinks to guidance documents are provided. Readers should ensure that they are consulting the correct version as documents can be revised or replaced. The version used at the time of writing has been indicated in the text, usually by the date, and a full citation appears in the reference list at the end of this document.

2 Where more than 1 sample is collected in a 30 day period the standard for total coliform is at least 90% of samples may have no detectable total coliform bacteria per 100 mL and no sample has more than 10 total coliform bacteria per 100 mL.
requirements. However, site-specific conditions and the available resources of water systems in various regions of the province require a flexible approach and the DWO has the discretion to adjust what treatment may be required to make a specific water source potable.

3.2. Scope
This document is intended to provide guidance on:

- the treatment necessary to address microbiological contaminants of GARP sources, and the application of subsurface filtration (also called riverbank filtration) treatment credits.

This document does not address:

- secondary (residual) disinfection for storage and distribution systems;
- the determination of a ground water source as GARP (see section 4);
- source water monitoring; and
- treatment for chemical contaminants.

Chemical contaminants can reduce the effectiveness of disinfection methods (e.g., by increasing the chlorine demand or by blocking/absorbing UV irradiation) and can present a long-term risk to human health (such as from arsenic). The GCDWQ provides comprehensive technical documents regarding chemical and physical water quality parameters and these should be consulted for further guidance.

4. Ground Water at Risk of Containing Pathogens (GARP)

The Guidance Document for Determining Ground Water at Risk of Containing Pathogens (GARP) (MOH, 2015) (GARP assessment) has been developed to assist public health officials and water suppliers in determining when a ground water source is at risk of containing pathogens. It presents a methodical approach for DWOs to formulate their opinion with a four-stage process, beginning with an initial screening and assessment of the risk factors associated with a ground water source, followed by a determination of risk. Determining whether a ground water source is at risk of containing pathogens is not regarded as a one-time investigation but is subject to the results of ongoing monitoring of source water quality and the hazards to the water source.

For the purposes of setting treatment requirements, ground water sources are regarded as either ‘at risk’ (GARP), ‘at risk from viruses only’ (GARP-viruses only) or at ‘low risk’ of containing pathogens. Drinking water systems that draw from sources determined to be GARP or GARP-viruses only must employ disinfection. Ground water sources determined to be at low risk of containing pathogens do not require disinfection.

Information collected during a GARP assessment should be used by a DWO to rationalize what treatment is required to ensure the reliable delivery of potable water. If a water supplier has reason to believe that the treatment requirements for an existing system could be reduced, they should contact their local DWO to discuss whether a GARP assessment may be warranted.

5. Sources at Low Risk of Containing Pathogens

Ground water sources that are considered at low risk of containing pathogens as a result of a GARP assessment do not require disinfection. However, the DWO may still specify treatment requirements for a water system to address chemical contaminants or other water quality factors.

6. Well Protection

The physical protection of a well from contamination is part of a multi-barrier approach to drinking water safety and is a consideration in the GARP assessment. Wells that are located adjacent to surface waters or sources of contamination and/or wells that are improperly constructed are at risk of being contaminated. If the risk of
contamination cannot be fully addressed then the risk to the water source will need to be mitigated by appropriate methods of treatment.

The location and construction of a well should be consistent with legislated construction standards in the Groundwater Protection Regulation (GWPR) (2016) and the Health Hazards Regulation (2011). The B.C. government’s Well Protection Tool Kit (MOE, 2006) provides specific guidance on well protection planning and guidance on source protection can also be found in Comprehensive Drinking Water Source-to-Tap Assessment Guideline (MHLS, 2010). The GWPR also includes specifications for the floodproofing of wells and protection of the wellhead. Wells constructed before 2005 may be exempt from certain sections of the GWPR. However, compliance with, or exemption from, the GWPR does not mean that the source is not GARP. Risks related to well construction and position should be noted and assessed during a GARP assessment along with the other risk factors that need to be considered.

7. Microbiological Treatment Objectives

7.1. Microbiological Treatment Objectives for ‘GARP’ Sources

Ground water sources classified as ‘GARP’ as a result of the GARP assessment (section 4) require treatment equivalent to surface water, with the exceptions and special considerations noted in the following subsections and Figure 1. Requirements for surface water treatment can be found in Part B of the Drinking Water Officer’s Guide, under the section entitled Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia (MOH, 2012).

The site-specific physical, chemical and microbiological conditions of ground water supplies throughout various regions in B.C., and the differences in the resources available to large and small water systems, necessitate the creation of individualized treatment requirements. The DWO and the water supplier should use a collaborative process to determine treatment requirements that meet provincial objectives.

7.2. Microbiological Treatment Objectives for ‘GARP-virus only’ Sources

Where the GARP assessment has identified only those risk factors related to the potential presence of viruses (and not protozoa or turbidity) for a ground water source, the DWO has the discretion to limit the microbiological treatment objectives for the water system to only those for viruses (4-log removal) and bacteria (zero E. coli, fecal coliforms, and total coliforms), as outlined in the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia found in Part B of the Drinking Water Officers’ Guide (MOH, 2012). A 3-log removal of Cryptosporidium and two methods of treatment would not be required in this case (Figure 1).

7.3. Subsurface Filtration Treatment Credits

Subsurface filtration is a naturally occurring process that filters surface water as it passes through river or lakebed sediments, lake/river bank substrate, and into an aquifer before being drawn up by a well. Engineered filtration structures, such as infiltration galleries, are not naturally occurring and therefore are not considered equivalent to subsurface filtration treatment. Through the filtration process particulates, turbidity, and microorganisms can be removed or inactivated. Numerous facilities that rely on subsurface filtration in the United States and Europe have demonstrated that the process can yield high quality source water (Kuehn & Mueller, 2000). However, the effectiveness of subsurface filtration is site specific and can depend on many factors such as surface water quality, water temperature, ground water flow conditions, dilution rates, surface water-ground water interface characteristics (such as pH, specific surface area of substrate particles, and organic matter content), and aquifer material (Wang et al., 2002). Further, subsurface filtration can vary seasonally and in response to extreme climatic events (Hrudey and Hrudey, 2004). The effectiveness of subsurface filtration may be demonstrated through field data, laboratory tests, and modelling methodologies.

Subsurface filtration may be considered by the DWO for credit of up to 3 log-removal of Giardia and Cryptosporidium and, in certain cases, credits of up to 4-log removal of viruses (where proven by a demonstration of performance, see Appendix A) for an eligible well drawing from a GARP source. There are no treatment credits available for bacteria.
since the bacterial treatment requirement in the DWPR is zero detectable *E. coli* and total coliforms. Subsurface filtration can be considered as one of the two treatment processes, only if it has been awarded greater than 1 log-removal credit for *Giardia* and *Cryptosporidium* and the second treatment process achieves the remainder of the treatment objectives.
Figure 1. Microbiological Treatment Objectives for GARP Sources

Water source is determined to be
GROUND WATER AT RISK OF CONTAINING PATHOGENS (GARP)
OR
GARP-viruses only

GARP-viruses only?

NO

Two forms of treatment required
FILTRATION EXEMPTION MAY APPLY

Zero E. coli, fecal coliforms, and total coliforms
4-log removal of viruses
3-log removal of protozoa
< 1 NTU Turbidity

YES

Two forms of treatment NOT required
SUBSURFACE FILTRATION CREDITS MAY APPLY

Zero E. coli, fecal coliforms, and total coliforms
4-log removal of viruses

POTABLE WATER
7.4. Turbidity in GARP Sources

The presence of suspended organic matter, which can strongly suggest the presence of pathogens, is uncommon in ground water systems. Turbidity in ground water that contains organic matter and pathogens may indicate infiltration of surface runoff, subsurface waste discharge (such as from onsite sewerage systems) or a direct hydraulic connection to surface water with unknown quality. Conversely, turbidity from inorganic mineralogical origin in a well, for example from well packing materials or geologic strata, may not harbour pathogens nor provide definitive evidence of surface water impact.

Turbidity, whether caused by inorganic or organic particles, or biological organisms, also has the potential to disrupt or overload drinking water disinfection processes, such as UV light and chlorination, to the point that they may no longer effectively control pathogens in the water. Organic matter in the water can also react with disinfectants such as chlorine to create by-products that may cause adverse health effects (Health Canada, 2012d).

Turbidity of concern is any intermittent turbidity, or consistent turbidity, greater than 1 NTU. The GARP assessment requires identifying if the source of the observed turbidity is organic or inorganic in nature, and whether or not it contributes to a ground water source being at risk of containing pathogens. Any turbidity in ground water must also not compromise disinfection processes.

7.5. Filtration Exemption

Turbidity can impact disinfection processes and the effective operation of distribution systems. Achieving low levels of turbidity prior to where disinfection is applied is the best method to minimize potential interference with disinfection and to reduce sediment loading to the distribution system (Health Canada, 2012d). The GCDWQ also recommends that the minimum level of treatment to meet microbiological treatment objectives should include filtration and one form of disinfection (Health Canada 2011, 2012b, and 2012e).

However, a GARP source may be permitted to operate without filtration if it meets the filtration exemption criteria as described in section 4.3 of the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia (MOH, 2012).

To reflect differences between ground water and surface water sources, alternate wording is provided below for filtration exemption criteria ‘3’ and ‘4’:

3. Average daily turbidity levels measured at equal intervals (every four hours or at an interval acceptable to the DWO). Samples are to be taken immediately prior to any disinfection process. Samples should be around 1 NTU and may not exceed 5 NTU for more than two days in a 12-month period.

4. The well is properly constructed and protected to minimize the potential for fecal or other pathogenic-related contamination in the source water, and a Well Protection Plan (or equivalent satisfactory to the DWO) is in place.

7.6. Other Bacteriological Concerns

Iron and sulphur bacteria can affect aesthetic water quality and the effectiveness of some treatment technologies. They should be tested for separately and addressed appropriately (e.g., the cleaning of the pumping equipment, scrubbing of the well casing, disinfection of the well by chlorination, etc.).

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3 See, for example, Step 4 of the BC Well Protection Toolkit: http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/wells/well_protection/pdfs/step4.pdf. Other procedures for developing a Well Protection Plan may be accepted at the DWO’s discretion.
8. References


http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/resources-for-water-system-operators


http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/wells/well_protection/wellprotect.html


http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/how-drinking-water-is-protected-in-bc


Health Canada (2012a). Guidelines for Canadian Drinking Water Quality (Summary Table).


APPENDIX A – SUBSURFACE FILTRATION DETAILS

A1 Treatment Credits Available for Subsurface Filtration

Studies have shown that subsurface filtration is effective in reducing bacterial (WHO, 2006), protozoan, and viral loads (Tufenkji et al., 2002, Weiss et al., 2005, Schijven et al., 2003, and Wang, 2002). For the purposes of these guidelines, however, subsurface filtration is considered only as a form of treatment for the removal of Giardia and Cryptosporidium and, in certain cases, viruses. There are no treatment credits available for bacteria since the bacterial treatment requirement in the DWPR is zero detectable E. coli and total coliforms. Log removal calculations are relevant only if the source concentration, which is often unknown, is determined. As bacteriological analyses are included in all ground water monitoring programs, bacterial removal efficiency is best demonstrated through raw well water sampling. Consequently, subsurface filtration treatment credits are not applied to bacteria. If pathogenic bacteria are present in the raw well water, the water must be sufficiently disinfected regardless of subsurface filtration processes.

A2 Eligibility

A2.1. Giardia and Cryptosporidium Treatment Credits

If the GARP assessment (section Error! Reference source not found.) of a ground water source included Microscopic Particulate Analysis (MPA) testing (EPA, 1992) and ranked the source as “high risk” under the MPA rating, there is a likelihood of contamination with Giardia and Cryptosporidium from surface water sources. Wells drawing from these MPA “high risk” sources would be ineligible for subsurface filtration credits.

Removal of Cryptosporidium occurs primarily in the ground water-surface water interface. For example, Medema et al. (in Berger, 2002) found that anaerobic spores, surrogates of Cryptosporidium, had 3.3 log removal over a 13 m distance from the Meuse River into an aquifer, while only a 0.6 log removal was achieved over 12 m of travel once in the aquifer. Wells utilizing subsurface filtration may be prone to deterioration in water quality during flood conditions. In addition to flood water potentially entering the well casing, high surface water flow rates can disrupt or erode riverbed sediments that form an essential part of the subsurface filtration mechanism. Consequently, in situations where there is a high potential for riverbed scour due to flooding, the DWO may consider the system ineligible for credit.

There are three methods by which to demonstrate subsurface filtration and obtain subsurface filtration treatment credits for Giardia and Cryptosporidium. Each method is independent of the others and can be used as the sole assessment of subsurface filtration efficacy. The accepted methods are noted as follows and described in more detail in Section A3 below:

1) Well/Surface Water Separation
2) Subsurface Filtration Study
3) Demonstration of Performance

Regardless of the method chosen, the well in question must be properly constructed, have a satisfactory well protection plan in place, and must draw from an unconsolidated and granular (e.g., sand and gravel) aquifer to qualify for credit. The aquifer should have interconnected pores without substantial cementation, as cementation may be indicative of preferential flow pathways.

A number of case studies on subsurface filtration facilities have demonstrated removals in excess of 3-log protozoa (Gollnitz et al., 1997, 2003, and 2005, and Weiss et al, 2005). If a consistent level of removal greater than the credits discussed in this Appendix can be proven by a demonstration of performance study, a DWO may decide to increase the credit being applied accordingly.

The GARP assessment document (MOH, 2015) provides details on MPA analysis.
A2.2. Virus Treatment Credits

The only means of obtaining subsurface filtration credits for virus removal is through a Demonstration of Performance study. The eligibility criteria for subsurface treatment virus credits are the same as the eligibility criteria for *Giardia* and *Cryptosporidium* treatment credits outlined in section A.2.1.

A3 Treatment Credit Demonstration Methods

A3.1. Well/Surface Water Separation

The effectiveness of subsurface filtration improves with decreasing pore size of the natural filter media and increasing distance from the surface water source. Wells that demonstrate the following are eligible for a 1-log credit for *Giardia* and *Cryptosporidium*:

- are located at least 15 m from a surface water source (i.e., high water mark\(^5\) for horizontal separation, river bed for vertical separation) through the shortest flow path;
- have core samples continuously collected along at least 85% of the well screen depth with composite samples that:
  - are collected at intervals of no greater than 60 cm (2 feet) in length; and
  - have more than 10% of particles passing through a 1.5 mm screen; or
- in the absence of continuous core samples, a DWO may consider wells screened in sand with a grain size of 1 mm\(^6\) or finer where well log information is provided, supplemented by field review and aquifer mapping (if available).

A 1-log credit by the well/surface water separation method cannot be claimed in addition to log credits demonstrated by other methods.

A3.2. Subsurface Filtration Study

Treatment credits for subsurface filtration may also be obtained through the completion of a subsurface filtration study. The hydrogeological conditions should be determined by a qualified professional (QP)\(^7\) to characterize the subsurface filtration in question and include the collection of paired (surface water and ground water) MPA samples under or close to worst case conditions.

If the subsurface filtration study determines that filtration is effectively reducing pathogen loads, the water system may be eligible for up to 3-log credits for *Giardia* and *Cryptosporidium* reduction. The treatment credits are awarded on a case-by-case basis at the discretion of the DWO following a review of the subsurface filtration study and consideration of how other risk factors identified in the GARP assessment have been managed.

**A3.2.1. Subsurface Filtration Study Scope**

The scope of the subsurface filtration study, including water quality sample timing and proposed analyses, should be established by a QP for consideration by the DWO prior to the start of the study. The scope of the subsurface filtration study should consider the following factors:

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5. High water mark is the visible high water mark of any lake, stream, wetland or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river stream, or other body of water a character distinct from that of the banks, both in vegetation and in the nature of the soil itself. Typical features may include, a natural line or "mark" impressed on the bank or shore, indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive physical characteristics. The area below the high water mark includes the active floodplain, which is the area of land that receives annual flood events as shown by riparian area conditions (http://www.env.gov.bc.ca/wld/instreamworks/glossary.htm).

6. Sand with a diameter of 1 mm is considered medium sand according to the Unified Soil Classification System (ASTM, 2006) and coarse sand according to the Canadian System of Soil Classification (SCWG, 1998).

7. A qualified professional (QP) is an individual who is registered with the Association of Professional Engineers and Geoscientists of British Columbia with competency in the field of hydrogeology and experience in evaluating sources of ground water supply.
Surface Water Conditions

- Historic flow patterns
- Seasonal variations
- 50, 100, and 200 year flood levels (considering diking, where applicable)
- High water mark
- Likelihood of extreme precipitation events and the impact on surface water quality
- Assessment of potential for riverbank or lake bed scour and flow rates that may cause scour
- Expected flooding frequency
- Clogging potential

Aquifer Conditions

- British Columbia Aquifer Classification System ranking
- Grain size and porosity
- Aquifer stratigraphy and lithology
- Hydraulic conductivity
- Storativity and transmissivity (in confined aquifers)
- Ground water dilution rate (related to the pumping rate)
- Ground water flow directions and gradients (under both natural and pumping conditions)
- Ground water flow rate or velocity

Well Conditions

- The location and construction of a well should be consistent with legislated construction standards
- Time of travel from high water mark to well under various pumping and water level conditions
- Water level readings to capture seasonal fluctuations and recharge events (monthly readings should be completed at a minimum, however, continuous monitoring is ideal); sampling frequency can be reduced if aquifer does not show significant variation
- Pumping test data
- Well capture zone
- Summary of hydrogeological cross sections showing stratigraphy, aquifers, confining layers, well capture zones under high pumping and high surface water stage conditions

Ground Water and Surface Water Quality

- Paired MPA sampling results (see ‘MPA Analysis’ below)
- Total coliforms, *E. coli*, level and nature (organic vs inorganic) of turbidity
- Field measurements of temperature, pH, electrical conductivity
- Observed variations between ground water and surface water quality with time
- Correlation between variations in surface water and ground water quality employing statistical methods

Many of these factors are studied in Level 2 and 3 hydrogeological investigations in the GARP assessment. If a Level 2 and/or 3 hydrogeological investigation has already been completed for the ground water source in question, the subsurface filtration study need only address any data gaps identified by the DWO.

**A3.2.2. MPA Analysis**

Details on MPA analysis are provided in Appendix C of the *Guidance Document for Determining Ground Water at Risk of Containing Pathogens* (GARP) (MOH, 2015). As is the case with GARP assessments, MPA sample results are intended to contribute to, not replace, the weight of evidence provided in the subsurface filtration study.

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The number of samples required to demonstrate eligibility for treatment credits through MPA testing should be discussed with the DWO. At a minimum, two paired samples should be collected from the ground water and the surface water source to which it is hydraulically connected. Studies on MPA test results have found, however, that one or two tests cannot reliably predict future values (Jacangelo et al., 2001). Consequently, one MPA sample pair must be collected annually during worst case conditions to maintain this treatment credit. The DWO may request that additional samples be taken to provide greater clarity on the efficacy of subsurface filtration.

During MPA sample collection, additional samples should be collected for analysis of turbidity, electrical conductivity, temperature, pH, total coliform, and E. coli to compare surface water quality with ground water quality.

A review of the MPA test results, not just the risk ranking, should be completed as it provides a picture of the surface water indicators present in the water sample. Analysis of MPA indicator counts in both the surface water and ground water sources may enable a rough estimation of protozoa log-removal.

**A3.2.3. Alternatives to MPA Testing**

MPA analysis provides both a physical count of the surface water indicators and a systematic means of determining the risk that a ground water sample, and by extension, the well, may have surface water interaction. Analysis for *Giardia* and *Cryptosporidium* surrogates, such as bacterial spores *Bacillus subtilis* or *Clostridium perfringens* may be considered as alternative test parameters to MPA for the subsurface filtration study, at the discretion of the DWO. As bacterial spore analysis provides only quantitative results, consideration should be given to increasing the number of samples required or to completing the sampling as part of a more intensive demonstration of performance (below).

**A3.3. Demonstration of Performance**

A demonstration of performance is a thorough sampling program that involves completing a subsurface filtration study, but with a far more rigorous testing protocol. The testing protocol may involve increased testing frequencies, longer study durations, additional sample locations, and an expansion of the parameters to be tested. It should include the collection of a sufficient number of paired samples from the surface water source and the collection well, with samples taken from the well after the estimated lag time has passed.

In addition to the study of *Giardia* and *Cryptosporidium* removal, the demonstration of performance study can include a testing protocol to demonstrate virus removal. Since *Giardia* and *Cryptosporidium* concentrations, as well as virus concentrations, in both surface and well water samples may be too low to calculate required log-removals, log-removal calculations can be based on the concentrations of a number of relevant surrogates. A summary of potential surrogates (such as *Bacillus subtilis* or *Clostridium perfringens*) for protozoa can be found in the *Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) Toolbox Guidance Manual* (EPA, 2010). MS-2 bacteriophage or other F-specific RNA bacteriophages are potential surrogates for viruses (Schijven et al., 2002). Dilution of surface water by ambient ground water may also skew the effectiveness of subsurface filtration and, therefore, calculated log-removals should be adjusted for expected dilution effects.

Section 4.7 of the LT2ESWTR Toolbox Guidance Manual also provides detailed information on testing and monitoring protocols that could constitute a sufficient demonstration of performance plan. Water suppliers should retain a QP to develop a demonstration plan according to this or other suitable criteria. Credits granted may differ from the log removals determined by the study at the DWO’s discretion.

**A4 Credit Maintenance**

Turbidity monitoring is necessary to maintain the treatment credit for all methods used to obtain subsurface filtration log-removal credit. Average daily turbidity levels should be established through sampling at equal intervals (at least every 4 hours) immediately prior to where the disinfectant is applied. The DWO may specify different sampling
requirements and intervals. Turbidity levels of around 1.0 NTU for 95% of the measurements per month and not exceeding 3.0 NTU should be demonstrated.9

In addition, to maintain a treatment credit obtained as a result of a subsurface filtration study or demonstration of performance, water suppliers should collect and submit for analysis at least one pair (ground water and surface water) of MPA samples (and virus surrogate samples, if virus credit was obtained) annually or at a frequency agreed upon by the DWO. The timing of the sample should coincide with the reasonable worst case conditions, as identified during the initial MPA sampling. If the sample yields a risk ranking for the ground water source that is higher than the ranking for which the credit was awarded, a second MPA sample should be collected. Similarly, if the calculated virus removal efficiency calculated with annual sampling results is lower than that for which the virus removal credit was granted, a second pair of samples should be collected. The DWO may decide that an adjustment to the previously awarded treatment credits is warranted based on the sample results.

If any single MPA ground water sample is ranked as “high risk” or if the ground water quality does not meet the turbidity requirements, the water supplier should investigate the source of the water quality deterioration and report the findings to the DWO. The DWO will then assess whether a treatment credit for subsurface filtration remains appropriate for the system.

9 Log-credit for subsurface filtration allows for reduced or no treatment for *Giardia* and *Cryptosporidium*. Therefore, subsurface filtration is considered an integral part of disinfection. An increase in turbidity at the well may be indicative of a failure of the treatment barrier provided by subsurface filtration. In comparison, a system with a filtration exemption (as outlined in MoH’s *Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia*) does not rely on filtration to help reduce *Giardia* and *Cryptosporidium*, rather sufficient disinfection technologies are employed. This is why the allowable upper limit for turbidity in systems that have credit for subsurface filtration is lower (3.0 NTU) than the 5.0 NTU maximum permitted for a system that has a filtration exemption.
1. Overview

Distribution systems are at risk of breaches in system integrity that could negatively impact the microbiological quality of the potable water. Water suppliers should focus on prevention and use a multi-barrier approach to protecting the water as it travels through the distribution system from the source/treatment facility to the consumer.

The best risk management practice (BMP) of maintaining a disinfectant residual in the drinking water as it travels through the distribution system is often referred to as “secondary disinfection” or “residual disinfection.” It is an important BMP that is strongly recommended for most systems due its unique ability to help the water supplier respond quickly to potential incidents of water quality degradation and its ability to control the growth of microorganisms. Drinking water officers and other issuing officials may require water suppliers to use secondary disinfection for distribution systems that are at risk for pathogen contamination and/or significant microbial growth.

1.1. Objective

To provide provincial guidance to drinking water officers and water suppliers for making decisions related to implementing the multi-barrier approach to protecting and maintaining microbiological water quality in water supply distribution systems. This includes specific guidance for implementing the best risk management practice of secondary disinfection.

1.2. Regulatory Framework

Potable water is defined under section 1 of the Drinking Water Protection Act as water that is “safe to drink and fit for domestic purposes without further treatment.” Further to this, section 6 of the act requires potable water from the water supply system. The definition of a water supply system in the act includes the distribution system, which is the portion of the water supply system used to convey potable water from the treatment plant or source to the users served by the system. This means potability must be maintained, in accordance with section 6 of the act, as water travels through the distribution system to system users.

The use of disinfectants in the distribution system (secondary disinfection) is an industry practice to maintain the microbiological quality of the potable water because potable water in distribution systems is vulnerable to degradation and contamination (see Section 2.1 of this document). This practice is independent of the primary disinfection requirements based on source water quality as outlined in section 5(2) of the Drinking Water Protection Act.
The act and regulation give drinking water officers the flexibility and discretion to address public health risks. They do this on a case-by-case basis using available system-specific information (e.g., system records, source-to-tap risk assessment and documentation from qualified professionals).

A drinking water officer may request, require as a condition on the operating permit, or order a water supplier to use specific risk management practices, including the addition of a secondary disinfectant, to protect potable water as it travels through the distribution system.

1.3. Purpose and Scope

This document provides general guidelines on using a preventative, multi-barrier approach to maintaining potable water in the water supply distribution system and includes specific guidance on the use of the best risk management practice of secondary disinfection. The guidelines are consistent with the act, regulation and Guidelines for Canadian Drinking Water Quality (Health Canada, 2012a).

This document does not address primary disinfection (i.e., “the application of a disinfectant in the drinking water treatment plant, with a primary objective to achieve the necessary microbial inactivation” (Health Canada, 2009a)). With respect to primary disinfection, the guidelines are based on the assumption that systems are in compliance with the act, regulation, policy, and any conditions on the operating permit. See Appendix A for further resources about these and other issues.

This document does not provide guidelines on water supply systems exempt from section 6 of the Drinking Water Protection Act (see section 3.1 of the Drinking Water Protection Regulation concerning non-potable water, and point-of-entry and point-of-use water supply systems).

Site-specific conditions may warrant a flexible approach to maintaining water quality in the distribution system. Such an approach should incorporate these guidelines in conjunction with a risk assessment of individual cases in collaboration with the drinking water officer.

2. Background

2.1. Factors Affecting Microbiological Water Quality in Distribution Systems

The purpose of the distribution system is to convey potable water from the treatment plant or source (if treatment is not required) to the consumer. Potable water is a “perishable product” that is at risk of degradation and contamination as it travels through the distribution system. Degradation and contamination in the distribution system can affect the aesthetic quality of drinking water, as well as its safety if the water is at risk of contamination or regrowth/growth of pathogenic microorganisms (e.g., bacteria, protozoa and viruses).

Several factors can impact or degrade microbiological water quality in the distribution system:

- Biological stability of the water.
- Conditions in the distribution system.
- Formation of biofilms.
- Contamination from outside the distribution system.
These risk factors can be threats to public health as demonstrated by documented outbreaks associated with distribution systems (Hrudey and Hrudey, 2004; Payment and Robertson, 2004; Wilson et al., 2009). The following sections provide further detail on these factors.

### 2.1.1. Biological Stability of the Water

The potable water entering the distribution system is not sterile; it typically contains microscopic particles, nutrients, and live and inactivated microorganisms (Liu, Verberk and Van Dijk, 2013). The composition and quantity of this material in the water distribution system depends on the source water quality characteristics, technology used for disinfection and/or treatment, and storage conditions. The material often includes biologically available nutrients that support the growth and multiplication of bacteria and biofilm (see section 2.1.3), which increases the risk of degradation of the microbiological water quality (Ashbolt, 2015; LeChevallier et al., 2015b). For example:

- Potable water produced from surface water sources and some high-risk ground water sources is highly likely to contain biodegradable organic matter that can contribute to significant bacterial growth, particularly if treatment does not have the ability to remove it (LeChevallier et al., 2015b).
- Water chemistry can also indicate a source of nutrients (e.g., a significant concentration of biologically available nitrogen and/or phosphorus) (Ashbolt, 2015).

Biologically stable water is potable water that is “at low risk of supporting significant bacterial growth” (Liu, Verberk and Van Dijk, 2013). In other words, the nutrient levels in the potable water are reduced and/or maintained at a level that significantly reduces the ability of the water to support growth.

### 2.1.2. Conditions in the Distribution System

Most bacteria need specific conditions to multiply, such as: nutrients, dark spaces, warmth, moisture and time. Water distribution systems can have many of these conditions. System design and operational practices can have a limiting effect on conditions to limit microbiological growth and biofilm formation. For example, retention time is an important factor associated with growth. The longer water remains in the distribution system, the more opportunity there is for bacterial growth. Systems with many dead ends or systems that do not have a high turnover of water are at risk for having stagnant zones in the distribution system that contain “old water,” particularly if they do not practice regular flushing.

### 2.1.3. Formation of Biofilms

The particles, nutrients and microorganisms in potable water (as discussed in section 2.1.1 of this document) can attach to surfaces in the distribution system within a slime layer to form unique microbiomes referred to as biofilm. Technically, biofilm is a complex mixture of microbes, and organic and inorganic material accumulated amidst a microbially produced organic polymer matrix, which is attached to the inner surface of the distribution system (USEPA, 2002b). Most of the microorganisms and biomass in the potable water in distribution systems exists as biofilms (LeChevallier et al., 2015a).

Biofilms can be associated with water quality deterioration. They can affect the aesthetic quality of drinking water by having a negative impact on the taste, smell and visual qualities of the drinking water. They can also cause physical

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1 Systems with low turnover may be too large for the number of system users (e.g., communities with declining population) or may need a large capacity for occasional use (e.g., communities with large fluctuations in population during the year due to seasonal tourism or seasonal workers, and communities that retain large quantities of water for fire suppression).
damage to the distribution system by corroding the inner surface of metal pipes and blocking valves (American Academy of Microbiology, 2012; USEPA, 2002a).

Biofilms can have a negative impact on human health when they contain pathogenic organisms. Biofilms provide environments in which pathogens can survive and accumulate, and are associated with the proliferation of opportunistic pathogens such as *Legionella pneumophila* (American Academy of Microbiology, 2012; USEPA, 2002a). Whenever the biofilm is disturbed, there is potential for these pathogens to be released back into the water in high concentrations.

### 2.1.4. Contamination from Outside the Distribution System

Under certain circumstances, contact between the potable water in the distribution system and outside influences can provide a means for pathogenic contamination. Table 1 shows some common means by which pathogens can enter the distribution system (FCM, 2003; Kirmeyer et al., 2001; USEPA, 2002a). Once pathogens are introduced to the distribution system, favourable conditions (e.g., temperature and dead ends) may provide a suitable environment for bacterial growth and pathogen survival in biofilms (USEPA, 2002b).

**Table 1: Potential Sources of Contamination to Potable Water in the Distribution System from Outside Sources**

<table>
<thead>
<tr>
<th>Source of Contamination</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment breakthrough</td>
<td>Pathogens may escape treatment and enter the distribution system.</td>
</tr>
<tr>
<td>Potable water storage reservoirs</td>
<td>Storage reservoirs can be susceptible to outside contamination if they are not adequately designed and/or maintained.</td>
</tr>
<tr>
<td>Cross connections and backflow</td>
<td>A major contamination event can occur during negative pressure and backflow events.</td>
</tr>
<tr>
<td>Transient contamination</td>
<td>Intrusions can occur via leaky pipes, valves, joints and seals if there is a negative pressure event.</td>
</tr>
<tr>
<td>Water main installation, breaks and repair</td>
<td>The interior of pipes can be contaminated during installation and repair, particularly if appropriate steps (e.g., flushing and/or chlorination) are not taken to decrease risk before, during and after construction.</td>
</tr>
</tbody>
</table>

### 3. Guidelines

Water suppliers should focus on prevention and take a multi-barrier approach to protecting the microbiological water quality in the distribution system (see section 3.1). The water supplier should use the information gleaned from a source-to-tap risk assessment to determine any system-specific factors (e.g., the design and installation of system components (see Appendix B) and the biological stability of the potable water) that could negatively impact the ability of the distribution system to protect the microbiological quality of the potable water. The water supplier should, in conjunction with the drinking water officer, use this information to determine the most appropriate combination of best risk management practices (BMPs) to implement, based on the system-specific risks.
From a public health perspective, the BMP of secondary disinfection is strongly recommended in most circumstances due to its unique ability to help the water supplier respond quickly to potential incidents of water quality degradation and its ability to control the growth of microorganisms (see section 3.2).

The following sections provide information about the multi-barrier approach, and include specific guidance of the use of secondary disinfection as a component of the multi-barrier approach. Information about protective system-specific design elements and other BMPs can be found in other documents (see Appendix A and B). This guidance recommends water suppliers consult with a drinking water officer when conducting risk-management planning for their distribution systems.

3.1. The Multi-Barrier Approach to Maintaining Water Quality in the Distribution System

The multi-barrier approach to safe drinking water involves implementing a series of integrated procedural and physical risk management practices throughout the water supply system. These practices work together to prevent or reduce the contamination of drinking water from source to tap in order to protect public health (Health Canada, 2002; Federal-Provincial-Territorial Committee on Drinking Water and CCME Water Quality Task Group, 2004).

A comprehensive multi-barrier system should have the ability to manage identified and unforeseen risks, and take action to minimize or prevent harm in the case of an event in which one or more of the risk management practices fail. This approach is considered the standard for protecting drinking water by the World Health Organization, Health Canada, and the Ministry of Health and regional health authorities in British Columbia.

There are several BMPs that, when used together, form a robust multi-barrier approach to protecting the drinking water as it travels through the distribution system. They include, but are not limited to:

- Employing knowledgeable certified (where applicable) operator(s), and ensuring their training is adequate and remains current.
- Operating system components as per good engineering and operational practices that include routine maintenance (Appendix B).
- Employing a cross-connection control program.
- Maintaining hydraulic integrity.
- Using secondary disinfection (FCM, 2003).
- Using an extensive distribution-system monitoring program.
- Maintaining comprehensive service-and-monitoring records to demonstrate due diligence.
- Implementing an asset management plan that includes a replacement and rehabilitation schedule.
- Creating and maintaining a comprehensive emergency response and contingency plan that includes a communication and risk assessment strategy to resolve issues with the distribution system.

The above BMPs aim to achieve the following goals:

- Promptly identify potential or actual risks, and take action to prevent or minimize harm to water users.
- Minimize biological growth and accumulation of other contaminants in the distribution system.
- Eliminate identified contamination of the drinking water from outside the distribution system network.
- Minimize harmful interactions between the drinking water and pipe material.
As no one BMP is capable of achieving all of the goals laid out above, a combination of BMPs is necessary, and should be tailored to a water supply system’s particular needs, to protect drinking water as it travels through the distribution system.

### 3.2. Operating with Secondary Disinfection

#### 3.2.1. What is Secondary Disinfection

The BMP of maintaining a disinfectant in the drinking water as it travels through the distribution system is often referred to as “secondary disinfection” or “residual disinfection.” It can be achieved by maintaining a residual of the primary disinfectant in the distribution system or by adding disinfectant to the distribution system.

Although this document uses the term “secondary disinfection,” it pertains to both methods. Secondary disinfection differs from primary disinfection in that the concentration of disinfectant used will not necessarily be large enough, or have the necessary contact time, to deactivate pathogens to the extent needed to meet the definition of potability under section 6 of the act.

Not all disinfectants are capable of maintaining a residual as they degrade too quickly (e.g., ozone and chlorine dioxide), or do not produce a residual effect (e.g., ultraviolet light) (Health Canada, 2009b; Health Canada, 2012b). Currently, chlorine and chloramines are considered the most effective secondary disinfectants (Black & Veatch Corporation, 2010; Federal-Provincial-Territorial Committee on Drinking Water and CCME Water Quality Task Group, 2004; Health Canada, 2012b).

#### 3.2.2. Why is Secondary Disinfection Recommended?

Secondary disinfection contributes to the achievement of the best management goals described in section 3.1 by:

- Indicating potential breaches in distribution system integrity.
- Aiding in the control of biofilm growth.
- Inactivating some pathogens in the distribution system.

As with any other distribution system BMP, the use of secondary disinfection alone will not protect water quality. Many of the other BMPs are primarily aimed at preventing microbiological risks through physical controls on which secondary disinfection will have no effect. For example, secondary disinfection will not prevent contaminants from breaching the physical integrity of a water supply system.

Secondary disinfection, however, does provide a valuable, multifunctional layer of protection that is simple and cost effective. It is unique among other BMPs because it can help the water supplier respond quickly to potential incidents of water quality degradation if there is an unforeseen break-down in the preventative BMPs. In this capacity, it generally compliments a water supply system’s set of other BMPs for protecting the water in the distribution system. The following subsections provide a brief overview of the unique qualities and advantages to applying secondary disinfection.

#### Indicating Potential Breaches in Distribution System Integrity

Secondary disinfectants can be used as a sentinel to indicate potential breaches in water supply system integrity because the disinfectant concentration drops as it oxidizes constituents encountered in the distribution system water. With regular monitoring, a water supplier can establish a baseline secondary disinfectant concentration for different
parts of the system during normal operating conditions. Any observation of lower than expected concentrations could be an indicator of potential threats to the drinking water, such as:

- Biofilm or bacterial regrowth.
- An intrusion event.
- Stagnant water.
- Primary treatment process failure/emerging source water quality challenges.

Chlorine can be more effective in this capacity than chloramine because chloramine is a more stable compound that does not degrade as quickly as chlorine (USEPA, 2002a; Health Canada, 1995).

The Drinking Water Protection Regulation requires monitoring for specific bacteriological parameters that are indicative of fecal contamination or other water quality problems, but it can take several days to obtain test results from a sample. This lag time may expose system users to potentially contaminated water before warnings are issued.

Secondary disinfectant monitoring is not a specific indicator of fecal contamination, but real-time monitoring of fluctuations in disinfectant concentrations can provide immediate indications of potential hazards in the system. This gives the water supplier the opportunity to investigate and respond immediately to any threats to the system.

**Aiding the Control of Biological Growth**

Secondary disinfectants can contribute to the biological stability of potable water because they can break down biodegradable organic matter and inhibit the growth of biofilm. Although both chloramines and chlorine can resist biofilm growth in systems, chloramines are more effective at penetrating existing biofilm to reduce growth (USEPA, 2002a). The concentration of secondary disinfectant needs to be high enough to outweigh the natural growth tendency.

**Inactivating Pathogens in the Distribution System**

Secondary disinfectants can inactivate some pathogens in the distribution system (USEPA, 2002a). Secondary disinfection is most effective against minor contamination events (e.g., marginal intrusions and pathogens sloughing away from biofilm). The concentration of disinfectant used in the distribution system will not necessarily be large enough or have the necessary contact time to control a major contamination event. Additionally, secondary disinfectants are not considered to be effective at inactivating protozoan pathogens.

**3.2.3. When is Secondary Disinfection recommended?**

Drinking water officers and other issuing officials have discretionary authority to require secondary disinfection for distribution systems that are at risk for pathogen contamination and/or significant biofilm/microbial growth. It is generally expected that new water supply systems and new system components (e.g., reservoirs) provide secondary disinfection. Existing systems requiring secondary disinfection should develop a continuous improvement plan for implementation. See section 3.3 for information about circumstances in which water supply systems may be allowed to operate without it.

The type of disinfectant used for secondary disinfection depends on the characteristics of the distribution system. For example, a physically long system, or one with long retention times, may need chloramine because it is a more stable chemical disinfectant and will not degrade as quickly as chlorine.
Water suppliers considering the addition of a secondary disinfectant should conduct an analysis of the potable water and distribution system components to determine any potential unintended consequences due to potential chemical interactions. For example, water with high iron and/or manganese concentrations can form a precipitate in the presence of chlorine under certain conditions (Black & Veatch Corporation, 2010). Consequently, water suppliers should ensure they understand the consequences of their specific water chemistry and consult with their drinking water officer before using a secondary disinfectant.

### 3.2.4. What is the Recommended Operational Range for Disinfectant Concentration?

The concentration of the disinfectant will depend on the type of disinfectant used and the individual system characteristics (e.g., biological stability of potable water, physical infrastructure characteristics and operational practices). Systems that use most (if not all) of the BMPs listed in section 3.1 and have protective factors built into the design (see appendices B and C), may have the ability to operate with a minimal concentration; whereas, other water supply systems may require a higher concentration due to the absence of some BMPs or other factors.

Water suppliers should maintain secondary disinfection at concentrations that will maximize benefits while minimizing the impact on the aesthetic quality of the drinking water (e.g., taste and smell) and disinfection by-product formation.

#### Chlorine

The *Guidelines for Canadian Drinking Water Quality* (Health Canada, 2009a) state that there is no evidence to demonstrate that free chlorine is toxic to humans at the concentrations needed to maintain distribution system integrity, normally less than 5 mg/L. The guidelines suggest that chlorine “concentration be determined on a system-specific basis to ensure effectiveness of disinfection and maintenance of an appropriate residual, while minimizing by-product formation and aesthetic concerns” (Health Canada, 2009a).

A generally accepted target range concentration for free chlorine at distribution system end points is at least detectable to 0.2 mg/L for control of bacterial growth (LeChevallier, Welch and Smith, 1996). Due to individual characteristics between systems, most distribution systems in Canada operate with a free chlorine concentration in the range of 0.4 to 2.0 mg/L leaving the treatment plant, and 0.04 (detectable) to 0.8 mg/L at distribution system end points (Health Canada, 2009a).

Individual sensitivities to chlorine in the population vary widely. Sensitive individuals may notice it at levels as low as 0.6 mg/L, but the majority of people will not likely detect it at the concentrations discussed in this guideline (Health Canada, 2009a). At these concentrations, taste and odour related to chlorine or its by-products are generally within the range of acceptability for most consumers.

#### Chloramine

Health Canada (1995) recommends a maximum acceptable concentration of 3.0 mg/L for chloramines in drinking water. A generally accepted target concentration for chloramines as they enter the distribution system is at least 2.0 mg/L with a residual of no less than 0.5 mg/L throughout the distribution system (Health Canada, 1995).

### 3.2.5. What are the Recommended Monitoring Practices?

In addition to the microbiological monitoring requirements of Schedule A of the Drinking Water Protection Regulation, the water supplier should monitor for the secondary disinfectant. The drinking water officer may specify monitoring locations and frequencies that differ from those listed in the regulation for microbiological monitoring. Records should
be kept for inspection and to provide a context by which the operator may identify water quality issues by a change in disinfectant residual for a particular location.

Water supply systems using chloramines should consider monitoring for N-nitrosodimethylamine (NDMA), which is a by-product of chloramination. The Canadian Guidelines for Drinking Water Quality recommend a Maximum Acceptable Concentration of 0.04 µg/L of NDMA in drinking water. Other recommended monitoring parameters for chloraminated systems include: ammonia, monochloramine, dichloramine, nitrite, nitrate, HPC, pH and alkalinity.

3.3. Operating Without Secondary Disinfection

3.3.1. Is There an Opportunity to Operate Without Secondary Disinfection?

Water supply systems may be allowed to operate without secondary disinfection if they demonstrate to the satisfaction of the drinking water officer that the physical characteristics of the system and the other BMPs in place adequately protect the microbiological water quality. Water suppliers should be able to say yes to the following questions and provide sound rationale (as confirmed by the drinking water officer) to demonstrate their ability to protect the water without secondary disinfection:

1. Does the system select or produce biologically stable water?
2. Do the physical characteristics (e.g., design elements) of the system in conjunction with the use of a comprehensive set of the other BMPs provide the ability to proactively manage risks to the distribution system?
3. Does the system transport microbiologically safe water to system users as demonstrated by the water supplier’s monitoring records (e.g., no history of recurring or persistent indicator organisms)?
4. Does the system display an ongoing commitment to meet the BMPs as demonstrated by the water supplier’s monitoring records, compliance with conditions on permit, annual reports and inspection records?

The use of a comprehensive set of the BMPs listed in section 3.1 (e.g., maintaining hydraulic integrity and using a cross-connection control program) is highly recommended. Appendix B provides a list of BMPs for designing, building, operating and maintaining distribution system components for maintaining water quality. Appendix C provides some examples of protective factors related to design elements and operations. Section 3.1 and these appendices provide information for water suppliers to consider when developing the rationale to support question #2.

No one factor outweighs the others. A water supplier should have the ability to demonstrate the use of a well-rounded suite of BMPs and protective factors, and that they work together to protect microbiological water quality.

3.3.2. Ongoing Evaluation of Water Supply Systems Operating Without Secondary Disinfection

Systems operating without secondary disinfection need to be re-evaluated on a recurrent basis to ensure they continue to function within an acceptable range of risk. Reasons a water supply system may be required to implement secondary disinfection include, but are not limited to:

- The system is experiencing the recurring or persistent presence of indicators that demonstrate the BMPs in place are no longer effective or that contamination risks are not being managed to the satisfaction of the drinking water officer.
- The drinking water officer notes a lack of commitment or ability on the part of the water supplier to meet the BMPs.
APPENDIX A: SOURCES OF FURTHER INFORMATION

Distribution System Hazards Affecting Microbiological Water Quality

Water-Borne Illnesses Associated with Distribution Systems


Distribution System Contamination


Biofilms and Microbial Growth


Multi-BARRIER Approach to Maintaining Water Quality in the Distribution System


Monitoring


Secondary Disinfection


APPENDIX B: DESIGN, INSTALLATION AND OPERATION OF DISTRIBUTION SYSTEM COMPONENTS

The following is a list of best risk management practices (BMPs) for designing, building, operating and maintaining distribution system components for maintaining water quality (FCM, 2003).

This list is based on a policy statement of the American Water Works Association (AWWA, 2012), research from the Water Research Foundation, the Guidelines for Canadian Drinking Water Quality (Health Canada, 2012a), documents from the U.S. Environmental Protection Agency, and a document produced by the Federation of Canadian Municipalities (FCM, 2003).

AWWA’s suite of practice manuals and standards provide information on many of the BMPs listed below.

Design

- Design distribution system and storage facilities in accordance with engineering best practices, including:
  - Minimizing water age and dead ends.
  - Maintaining sufficient physical separation from sources of underground contamination (e.g., sewers).

Installation

- Use certified materials (i.e., NSF/ANSI standard 61).
- Properly install and disinfect distribution system components (AWWA Standard C651) and storage facilities (AWWA Standard C652).

Operation

- Operate distribution system and storage facilities in accordance with best practices.
- Flush and swab water mains.
- Regularly inspect and maintain valves and hydrants.
- Regularly monitor, inspect and maintain storage facilities.
- Control internal corrosion.
- Control blending of water sources.
- Communicate and engage regularly with stakeholders (e.g., system users and drinking water officer).
- Promptly respond to and communicate water quality issues.
- Use a calibrated water quality model of the distribution system.
APPENDIX C: PROTECTIVE FACTORS ASSOCIATED WITH DESIGN ELEMENTS AND OPERATIONS OF WATER SUPPLY SYSTEMS

In addition to using the best risk management practices listed in section 3.1 of these guidelines, the following protective factors should be considered when a water supplier is developing rationale for operating without secondary disinfection.

<table>
<thead>
<tr>
<th>PROTECTIVE FACTOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| System design: short retention time                    | • Systems with short retention times throughout the distribution system may be able to demonstrate that water quality is adequately protected through source protection and treatment.  
• The longer water remains in the system, the more opportunity there is for pathogen contamination and re-growth.  
• Systems at risk for having “older water” include, but are not limited to:  
  o Large systems\(^2\) : the larger the system, the higher the risk.  
  o Underutilized systems (e.g., capacity is greater than is needed or there is seasonal variation).  
  o Systems with multiple dead ends. |
| System design: simple distribution system              | • Simple distribution system design allows an operator to reasonably manage each of the system components.  
• Complex systems (e.g., many pressure zones) generally have difficulty maintaining water quality in the distribution system as there are many components to manage. |
| System design: few sources of contamination            | • System design should avoid, to the extent possible, predisposing the system to increased risks of contamination.  
• This includes minimizing submerged mains and maintaining sufficient vertical and horizontal separation from sanitary and storm sewers. |
| System operation: flushing and/or shock chlorination    | • The use of regular flushing and/or shock chlorination can help control biological growth. |

\(^2\) As per the Drinking Water Protection Regulation, a small system is a water supply system that serves up to 500 individuals during any 24-hour period.
<table>
<thead>
<tr>
<th>PROTECTIVE FACTOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance: low leakage</td>
<td>• Systems with low rates of water loss from leakage are at lower risk for contamination via intrusions during pressure differentials than systems with higher rates.</td>
</tr>
</tbody>
</table>
| Monitoring: alternative microbial and real-time parameters | • Monitoring is necessary to continually demonstrate that distribution system barriers are consistently maintaining the microbiological quality of the water.  
• Systems operating without secondary disinfection could use additional monitoring parameters (in addition to legislated parameters) in lieu of monitoring for residual.  
• This could include:  
  o Using a comprehensive combination of microbial indicators that are specifically indicative of biofilm growth (e.g., heterotrophic plate count (HPC) bacteria, Pseudomonas and Aeromonas).  
  o Using alternative real-time parameters (e.g., turbidity, pressure, flow, conductivity, pH and temperature).  
• Water suppliers should establish background levels of the different parameters at normal operating conditions. Observed changes in background levels of any of these parameters could indicate a reduction in distribution system integrity, requiring further investigation. |
| Asset management | • As systems age, they are increasingly at risk for breaches in integrity.  
• Adherence to a defined asset management plan as well as adhering to the BMPs listed in section 3.1 and appendix B ensures that aging infrastructure is regularly maintained and replaced in order to manage this risk. |
REFERENCES


1. Purpose

The purpose of these protocols (recreational water and drinking water) is to provide standardized processes (steps) for water suppliers, local governments and health authorities to follow when monitoring cyanobacterial bloom events. Each protocol recommends actions that should be taken to address potential cyanobacterial blooms and associated microcystin issues. Examples include directing a water supplier to switch to an alternative water source, issue a “Do Not Use” notice or warn recreational water users of unacceptable water quality before it becomes a health hazard.

The decision trees in these protocols are modified from the Health Canada’s Guidelines for Canadian Drinking Water Quality: Supporting Documentation: Annex A: Stepwise Protocol for Microcystin-LR in Water Supplies Used for Human Consumption, and Cyanobacterial Toxins in Drinking Water – Document for Public Consultation (prepared by the Federal-Provincial-Territorial Committee on Drinking Water, 2002).1

This document also takes into account interim drinking water advice on microcystins provided by Health Canada on June 17, 2015. This includes the addition of precautionary advice concerning infants, as a result of the collaborative assessment undertaken by Health Canada and the United States Environmental Protection Agency:

“A seasonal maximum acceptable concentration (seasonal MAC) of 0.0015 mg/L (1.5 μg/L) is proposed for total microcystins in drinking water. This guideline is considered to be protective of the general population, including young children. Because of the increased exposure of infants relative to body weight, as a precautionary approach during a cyanobacterial bloom, or when microcystins are detected in finished water, drinking water authorities should consider informing the public in the affected area that an alternate suitable source of drinking water (such as bottled water) should be used to reconstitute infant formula.”

The goal of this document is to simplify the steps in the original protocol by separating drinking water and recreational water, and incorporating additional screening indicators that may reduce the costs associated with sampling. It also incorporates screening for the broader microcystin toxin as risk indicator rather than the more specific Microcystin-LR that is in the current Health Canada advice. These protocols and the accompanying decision trees summarize the important factors that should be considered during bloom events and recommended actions that may be taken to address the issue.

1. Background Information on Cyanobacteria

The growth of cyanobacteria (also known as blue-green algae) in water bodies (generally smaller or shallow lakes, reservoirs, sloughs or dugouts) can occur throughout Canada at any time of year, but blooms happen predominantly in the summer. In many cases, blooms tend to recur within the same water bodies year after year. While most species of cyanobacteria are capable of producing nerve and liver toxins, not all do. When present, the amount of toxin can vary dramatically within the body of water and over time.

Analytical studies in dugouts and other water supplies in Manitoba, Saskatchewan and the Peace River region of Alberta indicate that cyanotoxins (i.e., microcystins) are much more common in rural water supplies than originally thought. Although there are few quantitative sources of data available, there are indications that these toxins may also be occurring in various water supplies in other provinces (e.g., Ontario, British Columbia, Quebec and PEI). This has led to increasing concern by government agencies and the public about the safety of water supplies that may be potential sources of these toxins.

The factors inducing the production of toxins by cyanobacteria are complex. Laboratory studies demonstrate that some environmental factors could be important, such as temperature, light, nitrogen concentrations, carbon availability (in the form of bicarbonate, carbonate and carbon dioxide), phosphate concentrations and pH.

As toxin production varies greatly among different strains of the same species, genetic differences and metabolic processes may also be important in the production of these secondary metabolites. Studies have shown that the ability to produce toxins can vary temporally and spatially at a particular site. Therefore, different parts of the same water body may have different concentrations, and this should be considered when deciding on testing protocols.

Cyanobacterial toxins tend to be associated with cyanobacterial cells and may be membrane-bound or occur free within the cells. In laboratory studies, most of the toxin release occurs as cells age and die and passively leak their cellular contents. Some active release of toxins can also occur from young, growing cells.

Toxin levels do not necessarily coincide with maximum algal biomass. There can be a significant variation in the amount of toxin per unit biomass of cyanobacteria over time, which is independent of changes in the blue-green algal population. In one study, for example, concentrations of microcystins were higher in bloom samples taken during the day than at night. In another study, no significant difference was observed in toxin concentrations from cyanobacteria incubated for 24 hours at different depths in a reservoir.

Microcystins are relatively persistent in the aquatic environment. Studies in Australia have shown that Microcystin-LR was present up to 21 days following treatment of a Microcystin aeruginosa bloom with an algaecide.

2. Sampling, Portable Test Kits and Laboratories

Agencies typically involved with cyanotoxin testing of raw and drinking water sources include the Ministry of Environment and Climate Change Strategy (regional offices), local governments, water system operators and health authorities’ environmental health officers. These agencies should make themselves familiar with these protocols and work together to develop local communication protocols before bloom events. They should ensure each group understands their role with respect to observation, sampling and decision-making for a given source of drinking or recreational water.
This document refers to field test kits methods and laboratory testing. To limit the potential for error when using the protocols, field testing for microcystins is intended to determine their presence or absence only within the sample (vs. a specific quantifiable amount), as field test kits have a range of detection limits, and levels of accuracy/reliability vary. Subsequent to field tests showing the presence of microcystins, samples should be forwarded to an analytical laboratory to confirm whether microcystin concentrations exceed the recommended thresholds.

A number of commercial microcystin tests kits suitable for field use are available. These are discussed in the recent Health Canada report Evaluation of Field Test Kits to Detect Microcystins. They include technologies based on ELISA, immunochromatography, and phosphatase inhibition.

When choosing a portable test kit, it is important to pick one that is appropriate for the range of toxin concentrations being screened for (i.e., 0.5 µg/L to 5µg/L for drinking water, and a higher range for recreational water). In some cases, where the test kit range is below thresholds (as in recreational water), dilution of samples with fresh water may be required to provide results test within the range of interest.

Several B.C. laboratories are equipped to test specifically for microcystins. Sampling agencies should determine, in consultation with the local health authority, where and how to send samples for analysis well before any bloom event occurs. A description of appropriate laboratory techniques is discussed in the supporting documentation for Health Canada’s guidance on cyanobacterial toxins.

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Decision Tree for Drinking Water: Cyanobacterial Toxins

A. Test drinking water sources for total nitrogen, and phosphorous (where resources available).
   1. N > 658 µg/L
   2. P > 26 µg/L
   3. N:P ratio < 23
   4. Blooms observed

B. YES to any of:
   Raw Water
   Sample raw water.
   Use portable field test kit to test for microcystins.
   Micocystins detected.
   Micocystins not detected.

C. NO

D. Notify health authority.
   Use portable field kit to test treated water supply for microcystins.
   Micocystins detected.
   Send sample to lab for confirmation.
   Notify health authority.
   Micocystins not detected.

F. Lab confirms total microcystins > 1.5 µg/L.
   Notify community/relevant agencies.
   Health authority consultation and decision making.

G. Lab confirms total microcystins < 1.5 µg/L.
   1. Use alternate water supply.
   4. Status quo.

*Advisory in effect until 2 consecutive water samples (raw & treated) tested & confirmed to be <1.5 µg/L for microcystins.
Decision Tree for Drinking Water: Cyanobacterial Toxins – Step Descriptions

**STEP A:** Initial screening for suspected blooms: Examine the water for one or more of total nitrogen and phosphorus. Check for bloom formation.

- **Test for nitrogen/phosphorus:**
  - Spring turnover typically results in an increase in water nutrients cycled to the surface. This nutrient cycling coupled with increased sunlight and temperature can provide the conditions that lead to an algae bloom. Testing for phosphorous and/or nitrogen may serve as an alert for impending algal blooms and increasing the frequency of visual checks.

- **Visually check for bloom formation:**
  - As blooms tend to recur in the same water supplies, water bodies that have historically exhibited algal blooms should be visually monitored for bloom formation. As well, water bodies that experience changes in variables such as temperature, size, water depth and nutrient content may be susceptible to algal blooms and should be considered for increased monitoring. Public enquiries/complaints may also serve as a flag to check for blooms.
    - A visual bloom is identified by the appearance of “soupy” water. Colours can range from grey or tan, to blue-green or bright blue, to reddish. The appearance of blooms may also be described as fine grass clippings or small clumps. Changes in secchi (cloudiness/turbidity) depth readings may be a sign of an impending bloom.

**STEP B:** If yes to any of: nitrogen (N)>658 µg/L; phosphorus (P)> 26µg/L; an N:P ratio < 23; changes in secchi depth; or blooms observed, go to Step C. If no, return to Step A.

- High levels of nitrogen and phosphorus, as well as low ratio of nitrogen to phosphorous, can contribute to algal blooms and the presence of microcystins.
- According to Orihel et al., 95% percent of the cases where microcystin concentrations exceed the WHO drinking water guideline occur with phosphorus concentrations above 26 µg/L and nitrogen concentrations above 658 µg/L. Maximum concentrations of microcystins occur in hypertrophic lakes at mass ratios of N:P below 23. The probability of microcystin concentrations exceeding all toxin thresholds is highest when N:P ratios are less than 20, and drop to near zero above N:P ratio of 40.4
- As growth conditions and nutrient content of each water body are unique, these numbers are provided as a screening reference for anticipating the risk of a bloom. They are not intended to be exact thresholds.
- For a rationale on bloom observation, see step A, second bullet (above).

**STEP C:** Sample the raw water. Use a portable field kit to test for the presence of microcystins.

- Raw water samples should be collected before any treatment. Sampling from a reservoir should be done as close to the inlet/shore and/or the bloom formation as possible. When choosing a sampling

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location, be aware that cyanobacterial species/cell abundance and biomass vary spatially within a water body (e.g., cells may be transported by wind currents).

- For the purpose of this decision protocol, the presence of microcystins means >1.0µg/L using a portable test kit. See *Evaluation of Field Test Kits to Detect Microcystins* regarding how to select a portable test kit.\(^5\)

- Be aware that toxins may persist following the collapse of blooms. This can happen particularly in the late summer and early fall, when colder temperatures and a decrease in light intensity result in decreased rates of toxin degradation. This may indicate a need for sampling for toxins during and after collapse of the bloom.

- Further sampling (optional) for algal identification may also be helpful. Species identification, especially from sites positive for toxin, can provide additional information regarding the source, conditions and type of other toxins that might be present.

**STEP D:** *If the presence of microcystins is detected (>1.0µg/L) with a field test kit, go to step E, and alert the health authority of a potential issue. If microcystins are absent, return to step A.*

**STEP E:** *Use a portable test kit to test the treated water supply for microcystins.*

- Samples should be taken at a tap located after treatment from the water plant or from within the distribution system.

**STEP F:** *If the portable test kit indicates microcystins are present (>1.0µg/L) in the treated water, send a sample to the lab for confirmation and immediately notify the health authority.*

- The presence of microcystins indicates there is a potential concern for infants who use formula reconstituted from that water. Consult the health authority about informing the public that an alternate source of drinking water should be used for reconstituting infant formula.

- Contact the health authority to confirm an appropriate laboratory for microcystin testing.

- Samples for lab analysis should be collected in glass containers or as directed by the lab, as studies indicate that the toxin, if present, can be adsorbed to plastic.

**STEP G:** *If the lab results indicate the seasonal MAC of 1.5µg/L has been exceeded, immediately contact the health authority for consultation and decision-making.*

Where lab analysis indicates that levels of microcystin are near or exceed the seasonal MAC of 1.5µg/L, the health authority should be consulted to determine a short-term and long-term course of action. Health agencies, municipal councils and water supply system operators should be included in these discussions.

Factors to consider may include the site history, size and location of the bloom, available treatment technology, uses of the source water (recreational vs. domestic uses) and monitoring of the environmental conditions that might affect

In response, the water supplier may need to do one or more of the following:

- Resample the treated water supply using a field kit or laboratory, or do other monitoring.
- Use an alternate water source or supply.
  - Discussions regarding alternative supplies should be reviewed with the health authority.
- Adjust treatment (if doing so will be effective).
  - Discussions regarding treatment adjustments should be reviewed with the health authority.
- Issue a “Do Not Use” notice. See appendix B for suggested messaging.
  - As blooms may be of short duration (ranging from days to weeks), the health authority may recommend that a “Do Not Use” notice be issued, and that consumers seek alternative supplies of safe drinking water until the risk passes.
  - Any “Do Not Use” notice should remain in effect until two consecutive water samples (for both raw and treated supplies) are tested and confirmed to be less than their respective thresholds for microcystins.
- Maintain the status quo (continue monitoring).
- Take other actions as required by the health authority.

Long-term issues and/or recurrence of cyanobacteria blooms may require planning to incorporate specific treatment to correct the problem, and the use of an alternate source of water in the interim.
Decision Tree for Recreational Water: Cyanobacterial Toxins

A
1. Test drinking water sources for total nitrogen, and phosphorous (where resources available).
2. Visually check for bloom formation.
3. Consider the past history of these parameters.

B
YES to any of:
1. N > 658 μg/L
2. P > 26 μg/L
3. N:P ratio < 23
4. Blooms observed

NO

C
Sample raw water. Use portable field test kit to test for microcystins.

D
Micocystins detected.
Send sample to lab for confirmation. Notify health authority.
Micocystins not detected.

E
Health authority consultation and decision making.
Notify community/relevant agencies.
1. Post beach area "closed"*
2. Other action

* Beach closure in effect until 2 consecutive water samples lab tested & confirmed to be < 20 μg/L for total microcysts.
Decision Tree for Recreational Water: Cyanobacterial Toxins – Step Descriptions

**STEP A:** *Initial screening for suspected blooms: Examine the water for one or more of total nitrogen and phosphorus. Check for bloom formation.*

- Test for nitrogen/phosphorus:
  - Spring turnover typically results in an increase in water nutrients cycled to the surface. This nutrient cycling coupled with increased sunlight and temperature can provide the conditions that lead to an algae bloom. Testing for phosphorous and/or nitrogen may serve as an alert for impending algal blooms and increasing the frequency of visual checks.

- Visually check for bloom formation:
  - As blooms tend to recur in the same water supplies, water bodies that have historically exhibited algal blooms should be visually monitored for bloom formation. As well, water bodies that experience changes in variables such as temperature, size, water depth and nutrient content may be susceptible to algal blooms and should be considered for increased monitoring. Public enquiries/complaints may also serve as a flag to check for blooms.
  - A visual bloom is identified by the appearance of “soupy” water. Colours can range from grey or tan, to blue-green or bright blue, to reddish. The appearance of blooms may also be described as fine grass clippings or small clumps. Changes in secchi (cloudiness/turbidity) depth readings may be a sign of an impending bloom.
  - Be aware that toxins may persist following the collapse of blooms. This can happen particularly in the late summer and early fall, when colder temperatures and a decrease in light intensity result in decreased rates of toxin degradation. This may indicate a need for sampling for toxins during and after collapse of the bloom.

**STEP B:** *If yes to any of: nitrogen (N)>658 µg/L; phosphorus (P)> 26µg/L; an N:P ratio < 23; changes in secchi depth; or blooms observed, go to Step C. If no, return to Step A.*

- High levels of nitrogen and phosphorus, as well as a low ratio of nitrogen to phosphorous, can contribute to algal blooms and the presence of microcystins.

- According to Orihel et al., 95% percent of the cases where microcystin concentrations exceed the WHO drinking water guideline occur with phosphorus concentrations above 26 µg/L and nitrogen concentrations above 658 µg/L. Maximum concentrations of microcystins occur in hypereutrophic lakes at mass ratios of N:P below 23. The probability of microcystin concentrations exceeding all toxin thresholds is highest when N:P ratios are less than 20, and drop to near zero above N:P ratio of 40.⁶

- As growth conditions and nutrient content of each water body are unique, these numbers are provided as a screening reference for anticipating the risk of a bloom. They are not intended to be exact thresholds.

- For a rationale on bloom observation, See step A, second bullet (above).

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**STEP C:** Sample raw water. Use a portable field kit to test for microcystins.

- Samples should be taken as close to beaches or recreational sites as possible. However, if sampling agency resources are available, it is suggested that samples from several sites be taken and tested for the presence of microcystins, as cyanobacterial biomass varies spatially within a water body (e.g., cells may be transported by wind currents).
- See Evaluation of Field Test Kits to Detect Microcystins regarding how to select a portable test kit.\(^7\)
- Further (optional) sampling for algal species identification may also be helpful. Species identification – especially from sites positive for toxin identification – can provide additional information about the source, conditions and type of other toxins that might be present.

**STEP D:** If the presence of microcystins is detected with a field test kit (>1µg/L), send a sample to the lab for quantitative analysis.

- For the purpose of this protocol, presence of microcystins means >1.0µg/L using a portable test kit.
- See Evaluation of Field Test Kits to Detect Microcystins regarding how to select a portable test kit.
- Contact the health authority to confirm an appropriate laboratory for microcystin testing capability.
- Samples should be sent (in coolers) to the laboratory for analysis and collected in glass containers or as directed by the lab, as studies indicate that the toxin, if present, can be adsorbed to plastic.

**STEP E:** Health authority consultation and decision-making.

- Where the laboratory analysis indicates that levels of microcystins are near or exceeding the threshold of 20 µg/L, the health authority should be consulted to determine a short-term and long-term course of action.
- Health agencies, municipal councils and water supply system operators should be included in these discussions. Factors to consider may include the site uses (e.g., swimming), size and location of the bloom, environmental conditions (e.g., wind) and history of the water body.
- The authority responsible for the recreational water body may need to do one or more of the following:
  - Resample the water immediately and send the resample to lab for confirmation of result.
  - Take appropriate action(s), which may include:
    - Post “Beach Closed” and notify the community. See appendix B for suggested messaging.
    - Making available the B.C. HealthLink fact sheet entitled *Blue-green Algae (Cyanobacteria) Blooms* to provide communities with information. It is available online at [http://www.healthlinkbc.ca/healthfiles/hfile47.stm](http://www.healthlinkbc.ca/healthfiles/hfile47.stm).
    - Any beach closure should remain in effect until two consecutive water samples are tested and confirmed to be less than 20 µg/L for total microcystins.
  - Notify the local water supply operator that toxins have been found in the area.

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○ Take any other actions recommended by the health authority.
APPENDIX A: CYANOBACTERIA PREPARATION CHECKLIST AND SAMPLE CONTACT LIST

Cyanobacterial Bloom Preparation Checklist

Preparation is key to an effective response to cyanobacterial blooms. Establishing relationships with other agencies and practising collecting and analyzing samples are important. Water suppliers and/or local governments should establish a plan for recreational and drinking water sources that may be vulnerable to cyanobacterial blooms, before the anticipated bloom season. This plan should lay out what to do in case a cyanobacterial bloom is visually detected in the water source. It should:

- Identify agencies responsible for sampling (establish clear responsibility for water sources requiring sampling).
- Describe the sampling strategy (parameters, frequency, timing, locations) to be followed for the duration of the bloom with respect to both routine sampling and resampling when microcystins are detected.
- Identify the analytical laboratory or laboratories that can do microcystin analysis.
- Ensure that agreement(s) and protocol(s) are in place with lab(s) for receiving and processing samples in a timely manner, and for communicating results from the lab to the appropriate contact people.
- Outline individual responsibilities for how samples will be collected and delivered to the laboratory.
- Specify the method(s) of microcystin detection/analysis that can be used.
- Identify the appropriate contact people to receive the results from the lab and who they must notify if microcystins are detected.
- Identify which authority or authorities are responsible to decide further notifications and actions.
- Identify which authority will take the lead role in notifying communities and other appropriate agencies or authorities.
- Set out a communications plan describing the circumstances and target groups for notifications, including when an advisory is issued or rescinded.
- Include sample messages and Qs & As to deal with different situations (e.g., microcystins level above guideline, microcystins detected below guideline level but still of concern for infants) and provide clear guidance to the public.
- Identify any corrective actions (e.g., treatment adjustments) and the triggers for such actions.

Sample Contact List of Relevant Agencies

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<thead>
<tr>
<th>Organization</th>
<th>Role</th>
<th>Contact Name</th>
<th>Phone</th>
<th>Email</th>
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<tbody>
<tr>
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<td>MoE</td>
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<td>Media</td>
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APPENDIX B: SUGGESTED MESSAGING

Microcystins Detected in Drinking Water

**Notice: Do Not Use Water for Reconstituting Infant Formula**

- Use the format of appendix 13 of the *Drinking Water Officers’ Guide*.

Suggested Messaging

- This notice is being issued because blooms of blue-green algae (cyanobacteria) have been detected in the water supply.
- The Drinking Water Officer, in consultation with the Medical Health Officer, advises that the seasonal maximum acceptable concentration of 0.0015 mg/L (1.5 μg/L) has not been exceeded, and there is no reason for a health warning for the general population, including young children.
- However, because of the increased exposure of infants relative to body weight, another suitable source of drinking water (e.g., bottled water) should be used to reconstitute infant formula.

"Do Not Use" Notice

**Notice: Do Not Use Water**

- Use the format of [appendix 13 of the Drinking Water Officers’ Guide](#).

Suggested Messaging

- This notice is being issued because blooms of blue-green algae (cyanobacteria) have been detected in the water supply, and the seasonal maximum acceptable concentration of 0.0015 mg/L (1.5 μg/L) has been exceeded.
- Consumers should seek other supplies of safe drinking water.
- Boiling is not effective in reducing or removing these toxins, although some point-of-use devices may be effective.
- Dialysis treatment units in the community should also be notified, especially if it is a first-time occurrence for blooms on this supply.
- A HealthLinkBC fact sheet entitled *Blue-green Algae (Cyanobacteria) Blooms* is available online at [http://www.healthlinkbc.ca/healthfiles/hfile47.stm](http://www.healthlinkbc.ca/healthfiles/hfile47.stm).

Recreational Water

**Notice: Beach Closed, Issued by: _____________**

Suggested Messaging:

- This notice is being issued because blooms of blue-green algae (cyanobacteria) have been detected in the water supply, and the recommended Health Canada guideline of 20μg/L for recreational water has been exceeded.
- Exposure to blue-green algae may cause nausea, vomiting, diarrhea and/or fever in humans and pets.
- People and pets should not drink or swim in the water until further notice.
- Anyone who comes in contact with blue-green algae should rinse off with fresh water.
Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water

April 2013

1. Objective

The Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water (decision tree) is intended to provide water supply system operators and health authority drinking water officers (DWOs) with a tool to help:

- Plan for future turbidity events in unfiltered drinking water from systems meeting the filtration exemption criteria.
- Provide quick response to acute turbidity events.

This tool will help decision makers take proactive measures to mitigate potential health risks from pathogens before there is a threat to public health. The decision tree applies to unfiltered surface water and groundwater at risk of containing pathogens and should be incorporated into a water supply system’s standard operating procedure.

The decision tree is not intended to provide guidance for determining if a drinking water system is in compliance with provincial treatment objectives or to be used as an alternative to providing appropriate treatment.

2. Introduction

Turbidity is caused by suspended organic and colloidal matter—such as: clay, silt, finely divided organic and inorganic matter, bacteria, protozoa, and other microscopic organisms. Turbidity can increase following events, such as, landslides, higher surface runoff, peak flows, debris flows, or road sedimentation due to construction. Turbidity does not necessarily pose a threat to human health, but it can be an indicator of the potential presence of human pathogens. It also has the potential to disrupt or overload drinking water disinfection processes, such as ultraviolet (UV) light and chlorination, to the point that they no longer effectively deactivate pathogens.

The decision tree outlines the steps for evaluating the health risks associated with the turbidity event and the appropriate course of action. Appendix A contains expanded explanations for each step within the decision tree. Appendix B contains turbidity-related risk factors that should be considered when determining the appropriate course of action.

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1 For information about what to do in the case of a turbidity event related to filtered water, please speak to the local Drinking Water Officer immediately.
3. Filtration

Under section 6 of the Drinking Water Protection Act, water supply systems must provide potable water to all users. This is an important responsibility. The Ministry of Health developed the following documents to set out minimum performance targets for treating surface water and groundwater at risk of containing pathogens (GARP) which are considered to pose increased risk to human health:

- **Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia** (Version 1.1, November 2012).
- **Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia** (Version 1, November 2015).

- These documents endorse the recommendations from the Guidelines for Canadian Drinking Water Quality which state that systems using surface water or GARP sources should use filtration and one form of disinfection. A second form of disinfection may be considered in lieu of filtration if certain criteria are met. The filtration exemption criteria can be found in the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia and the Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia. Should a water system qualify for an exemption, it is important to remember that these criteria need to be reassessed on an ongoing basis to confirm continued validity. It should not be considered a permanent exemption as source water quality can change with alterations in watershed conditions.
- If turbidity is an ongoing issue for a water system, the filtration exemption should be re-evaluated. The decision tree is only to be used for isolated incidents.

4. Communication and decision-making

- Under section 10 of the Drinking Water Protection Act, water suppliers must have a written emergency response and contingency plan that includes a strategy for communication with users of the system. Response to a turbidity event should be part of this plan.
- It is important for water system operators and DWOs to maintain open dialogue during any emergency situation. The two parties should reach agreement regarding the degree of potential health risk associated with a turbidity event and its related considerations (set out in appendix B). There should be agreement on the appropriate public communication and/or water quality monitoring strategy. In circumstances where there is no agreement, the DWO has the authority to request or order the water system operator to comply.
- When a notice regarding turbidity is issued, the risk event(s) underlying the turbidity should be communicated to the public, as well as the scientific evidence. For example, if a Boil Water Notice (BWN) is issued, the notice should specify if sampling evidence indicates the presence of potential indicator organisms or if the BWN is based on other available (or lack of available) evidence or information. The situation may change over the course of an event, and further testing and new data may allow the water supplier to rescind the BWN. It is the responsibility of the water supplier to provide the scientific evidence that the drinking water is safe for human consumption. A DWO has the authority to order the issuance of

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2 If a system does not use filtration and does not meet the filtration exemption criteria, it is not in compliance with the Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia or the Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia. In this situation, system operators should consult with the local DWO about the steps that need to be taken in order to be compliant.
5. Definitions

- **Boil Water Notice (BWN)** – Notice provided to water users to boil their water before any use that may involve ingestion of the water. A BWN infers that an adverse microbiological health risk exists if the water is ingested. A BWN is issued by the system operator at their own discretion or on request or order by the DWO. Consultative agreement between the operator and the DWO is the preferred approach. The DWO should verify that the BWN has been issued to users of the system.

- **Drinking Water Officer (DWO)** – The DWO is responsible for enforcing drinking water legislation, ensuring water systems are operating within the parameters of their permits and providing advice/orders during events that have potential to adversely affect public health. The local medical health officer is appointed as the DWO. The medical health officer has the authority to designate the duties of a DWO to environmental health officers. Generally, it is these designated environmental health officers that perform the front-line DWO duties.

- **Filtration** – A treatment process for the removal of particulate matter that has been approved by the issuing official (a person authorized under the Drinking Water Protection Regulations to issue a construction permit, operating permit or other permit required under the Drinking Water Protection Act). The filtration system has been granted removal credits for pathogens and is operating as expected.


- **Medical Health Officer (MHO)** – A physician appointed under the Public Health Act to advise and report on local public health issues within a health authority. The MHO is responsible for fulfilling the role of a DWO unless the MHO delegates this responsibility to another qualified individual.

- **Nephelometric Turbidity Unit (NTU)** – This is the unit of measurement that is used for evaluating the level of turbidity (suspended and colloidal particles and/or microscopic organisms) in water.

A BWN should there be a failure on the part of the water supplier to provide the information that is needed to assess the health risk posed by the turbid drinking water.
Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water

1. If turbidity levels are above normal operating conditions, the water system operator must initiate communication with the DWO.

2. Turbidity ≤1 NTU
   - If turbidity is ≤1 NTU, quickly assess immediately available information (see Appendix B) and consult the system’s emergency response plan.
   - If system is designed to effectively disinfect at 1 NTU, consider issuing a communication to the public if the water is noticeably turbid, but safe for human consumption.

3. Turbidity >1 NTU
   - If turbidity is >1 NTU, ask if this is an elevated risk event?

4. Yes
   - Issue a Boil Water Notice
   - Enhance monitoring as required
   - Track monitoring results
   - Take and review actions

5. No
   - Has turbidity event & health risk passed?

6. Yes
   - Rescind BWN

7. No
   - Make record of event
   - Maintain surveillance or increase monitoring as required, and review as needed
APPENDIX A: EXPANDED NOTES FOR THE DECISION TREE

- The following notes provide an expanded explanation for each box in the decision tree. The numbering below corresponds to the numbering in the decision tree boxes.

**Box 1.** In the case that a system operator identifies a turbidity spike above normal operating conditions, that system operator should first determine if it is possible to remove the source of the turbidity from the system (e.g., switch to an alternate source). The system operator must notify the DWO of a turbidity event immediately. The level of the measured turbidity will determine which box the system operator, with consultation from the DWO, should proceed to from this point:

- Less than or equal to 1 Nephelometric Turbidity Units (NTU), move to box 2.
- Greater than 1 NTU, move to box 3.

**Box 2.** This box applies when the turbidity level is <1 NTU. Generally, cases of turbidity that measure ≤1 NTU are not associated with adverse health effects when treatment by disinfection is provided. There are, however, some circumstances in which this condition may not apply. For example, if the water system is designed to operate at an extremely low NTU (e.g., 0.25) than it may become overwhelmed at a measurement above that level even if it is still below 1 NTU (e.g., 0.99 NTU). It is important to investigate all turbidity spikes regardless if the measurement is ≤1 NTU. From here, investigators should proceed to box 4.

**Box 3.** This box applies when turbidity levels are >1 NTU. Turbidity spikes above this threshold should be investigated because turbidity levels >1 NTU are associated with a greater probability of adverse health effects. The actual health risk may depend on a number of factors that include the parameters under which the system is designed to operate. Other factors to consider include identifying the source of the turbidity to assess the potential for pathogens harmful to human health (e.g., organic vs. inorganic material) and whether harmful pathogens have been identified through bacteriological water monitoring during previous similar turbidity events. From here, investigators should proceed to box 4.

**Box 4. Assessment:** Each of boxes 2 and 3 moves through box 4. This is the stage in which stakeholders quickly assess the situation for the purpose of decision-making. Decision makers may consult with the system’s emergency response plan for prescribed actions. Monitoring and water testing takes time – to wait for results before taking action could put the public at risk for adverse health effects. Only evidence that is immediately available should be considered in this step. Appendix B contains potential risk factors that should be considered during the assessment. Once assessment information is gathered, continue on to box 5 for measurements of ≤1 NTU or box 6 for measurements >1 NTU to make decisions about the safety of the water and corresponding actions.

**Box 5. Decision: Disinfection sufficient?** - If the water system is designed to provide disinfection up to 1 NTU, adjust disinfection and maintain surveillance or increase monitoring as required. Proceed to box 12 and review as needed. Documented evidence must be available to demonstrate that disinfection at this level of turbidity is effective. If historical evidence demonstrates disinfection could be insufficient at this level, or no data is available, continue to box 6 for further investigation.

**Box 6. Decision: Is this an elevated risk event?** – This box applies to a turbidity event when the level is >1 NTU or if there is evidence indicating that disinfection is insufficient for turbidity spikes ≤1 NTU. The information assessed in box 4 is used to determine the risk level of the turbidity event. The DWO has the discretion to default to a determination of elevated risk should the water system operator not provide compelling evidence to the contrary (as per Appendix B).
Box 7. Proceed to box 8 and issue a BWN if:

- The emergency response plan prescribes this action in this circumstance;
- Risk factors of concern demonstrate an adverse risk to human health;
- Historical evidence indicates a relationship between adverse health effects and similar turbidity events; or
- There is no strong documented evidence (current or historical) of a low level of risk.

In some circumstances, a BWN may not be necessary. For example, the treatment system is designed to effectively disinfect at the measured turbidity level (e.g., measured at 3.0 NTU and designed to effectively disinfect up to 3.5 NTU), or there is documented evidence of an acceptable low level of risk (e.g., historically, similar turbidity events have not been related to adverse health effects). It is the responsibility of the water supplier to provide solid evidence to the DWO that either of these situations applies. Under these circumstances, decision makers can increase disinfection processes as required and continue to box 7.

Box 8. Issue a communication to the public: A public communication may be issued to notify users that the water is turbid, but there is a low risk of adverse health effects. This communication should explain the reason (e.g., water line flushing, harmless algae bloom, etc.) for the turbidity as well as provide contact information should they have any further questions. The decision to issue a communication (as well as the form of communication – informal notice or formal advisory) should be jointly agreed upon by the water system operator and the DWO. This is not a requirement, but something to consider for mitigating concerns in consumers. Proceed to box 12.

Box 9. Issue Boil Water Notice: Issue a BWN with the guidance of the water system operator’s emergency response and contingency plan. A BWN is issued by the system operator and the DWO should verify that the users of the system have received the notice. Proceed to box 9.

Box 10. Evaluation: When a BWN is issued, it is important to increase/enhance monitoring as required and track the results of monitoring. This may include bacteriological or other water tests. This is done to determine when the event of concern has passed. If possible, the water supplier should undertake actions that can mitigate the turbidity. It is also important to review decisions on an ongoing basis to ensure that the water system operator has taken appropriate action. Continue to box 10.

Box 11. Decision: This box provides two options:

- If monitoring demonstrates continuing elevated risk, stay on the BWN and continue monitoring (proceed back to box 9).
- If monitoring demonstrates that the turbidity event and elevated health risk has passed, rescind the BWN (proceed to box 11).

Box 12. Rescind BWN: When conditions have returned to normal (i.e., the health risk is no longer elevated), the BWN may be rescinded. The DWO should provide oversight to the process of rescinding the BWN by the water system operator to ensure that users of the system are notified. Proceed to box 12.

Box 13. Record turbidity events, causes, and actions taken so they can be reviewed in case of a future similar event. At this stage, the system should be back to normal operating conditions; although, there may be increased monitoring during and after the turbidity event (e.g., post-treatment bacteriological testing, distribution system bacteriological testing, operational parameters, disinfectant residuals, illness among users and possibly other parameters).
APPENDIX B: TURBIDITY-RELATED RISK FACTORS: CONSIDERATIONS FOR HEALTH RISK ASSESSMENT

1. Source Water
   1. Has there been contamination or a spill in which there is likely to be human pathogens? For example:
      - Sewage.
      - Animal waste.
      - Any substance likely to contain fecal material (e.g., agricultural run-off).
   2. Are there recent changes in the hydrological characteristics of the watershed due to factors such as ground disturbances (e.g., mining, road work or other development projects) or vegetative cover disruptions (e.g., mountain pine beetle or planting/harvesting)?
   3. Has precipitation been abnormally intense and/or have there been anomalies in weather (e.g., the amount and timing of rain, snow or snowmelt)?

2. Treatment System
   1. Has the turbidity level exceeded the level for which the system has been designed or validated (e.g., system designed to operate effectively for turbidity levels ≤3.5 NTU but the current turbidity level is 4 NTU)?
   2. Have there been failures in the treatment train? For example:
      - Power outage.
      - Existing treatment outcomes from chemical disinfection cannot be maintained (e.g., loss of chlorine residual).
      - Decrease in UV dose or lamp failure.
      - Decrease in UV transmittance (the amount of light passing through the water).

3. Other Considerations
   1. Is there evidence of indicator organisms in the distribution system?
   2. Is there evidence of illness related to the current event?
   3. Has there been a history of health concerns under similar turbidity conditions? Or, is there lack of evidence to the contrary? There should be documented historical evidence demonstrating a lack of elevated health risk; otherwise, all involved parties should consider a precautionary approach and issue a BWN.

3 There is the possibility that some of these questions may not be applicable to all systems. Additionally, this is not an exhaustive list of risk factors. Should the answer to any of these questions be ‘yes,’ it is possible that the water is not safe for human consumption.
WATER SYSTEMS FOR CLASS D & E SLAUGHTER ESTABLISHMENTS AND OTHER UNREGULATED USES

1. Purpose
To clarify the circumstances when a domestic water system serving one single family dwelling and used for other purposes is not regulated as a water supply system under the Drinking Water Protection Act (DWPA).

2. Position
The use of water supplied by a domestic water system to one single family dwelling, for a purpose that does not come within the definition of “domestic purposes”, as defined in the DWPA, does not require the system to be regulated as a water supply system under the DWPA.

3. Application
There are many uses to which water supplied by a domestic water system to one single family dwelling may be put which will not change the status of the water system and require it to meet the requirements under the DWPA. One of these is the use of water in the slaughtering process by the holders of Class D or E licences issued under the Meat Inspection Regulation. Water used in Class D and E slaughter facilities is regulated under the Food Safety Act (FSA), Meat Inspection Regulation, which requires that it be potable. In determining whether or not the water is potable, an Environmental Health Officer may rely upon those water quality standards which are in common use in the field of public health protection.

Other uses of water which are not domestic in nature could include:

- watering animals;
- irrigating crops;
- washing buildings or machinery;
- cooling machinery; and
- industrial uses.

Examples of uses which could change the status of a water system so that it is to be regulated as a water supply system are:

- supplying water to a second dwelling; or
• supplying water to a food service establishment where food was being prepared and the water is likely consumed directly by the public

4. Questions and Answers

Q. Is a slaughter establishment a food establishment, as defined in the FSA?
A. Yes, a slaughter establishment is a food establishment for the purposes of the FSA, with the result that inspectors appointed under the FSA are authorized to inspect and take action with respect to slaughter establishments.

Q. Does the fact that slaughter establishments are food establishments for the purposes of the FSA mean that the Public Health Act Food Premises Regulation applies to them?
A. No. The Public Health Act Food Premises Regulation applies to food premises, as defined in the Food Premises Regulation. The FSA and the Meat Inspection Regulation apply to slaughter establishments.

Q. Must the water for a Class D or E slaughter establishment come from a water supply system for which the water supplier holds a valid operating permit issued in accordance with the DWPA?
A. No. The only requirement for water used during slaughter in a Class D or E slaughter establishment is that the water must be potable.

Q. If a Class D or E slaughter establishment is supplied with water by a domestic water system that serves only one single family residence, and the slaughter establishment has a separate sink and toilet for the use of the people working in the slaughter establishment, does this change the status of the water system into a water supply system regulated under the DWPA?
A. An argument could be made that the existence of a separate toilet and sink for sanitation purposes would attract the application of the DWPA. The Health Protection Branch suggests that the Drinking Water Officers assess this situation in the same way they do those where separate sanitation facilities are provided in out buildings on agricultural property, which is supplied by a domestic water system serving one single family residence. A similar situation would be an auto body shop with a separate toilet and sink, where the water for the shop is supplied by a single domestic dwelling; this would not be considered a water system under the DWPA.

Q. Must the water used in the slaughtering process be potable?
A. Yes. This refers to the water actually used in the process, not the source water from which it is drawn. Secondary treatment of water that is used (with bleach for example) may be all that is required if there are ongoing concerns with the source water.

Q. Could the standards set out in Schedule A to the Drinking Water Protection Regulation be used as the standard for measuring the potability of water used in the slaughtering process?
A. Yes, as could the standards set out in the Meat Inspection Regulation Class D and E Licensing Policy and Procedures Manual.
OBLIGATIONS OF THE WATER SUPPLIERS OF DRINKING WATER TREATMENT SYSTEMS THAT HAVE POINT OF USE/POINT OF ENTRY DEVICES

1. Objective

To clarify the obligation of water suppliers operating decentralized drinking water treatment systems.

2. Background

The Drinking Water Protection Act (DWPA) contains requirements for drinking water suppliers to ensure the water supplied to their users is potable and meets any additional requirements established by the Drinking Water Protection Regulation (DWPR) and the water supply system’s operating permit. The DWPR sets out requirements for drinking water quality — including treatment, construction and operation of water systems, monitoring, reporting, and public notification should health hazards arise.

The DWPR includes options for small water systems (systems serving under 500 people in a 24 hour period) to provide potable water via a decentralized system that utilizes Point-of-Use (POU) or Point-of-Entry (POE) devices.\(^1\)

Section 3.1(a) of the DWPR contains the specific amendment pertaining to POU/POE devices:

The following are exempt from section 6 of the [Drinking Water Protection] Act:

(a) a small water system, if:

(i) each recipient of the water from the small system has a point of entry or point of use treatment system that makes the water potable.

(ii) the water supplier ensures that the location of non-potable water discharge and non-potable water piping are identified by markings that are permanent, distinct and easily recognized.\(^2\)

---

\(^{1}\) POE provides each service user with a device that treats all the water entering the property, house or building (ensures that all of the water entering the service user’s system is treated). POU provides a device for individual locations within the building where potable water is required (e.g., a single outlet or faucet such as a kitchen sink).

\(^{2}\) Section 6 (DWPA):

Subject to the regulations, a water supplier must provide, to the users served by its water supply system, drinking water from the water supply system that

(a) is potable water, and

(b) meets any additional requirements established by the regulations or by its operating permit.
3. Water Supplier Obligations

Section 3.1(a)(i) of the DWPR exempts small systems with POU/POE devices from section 6 of the DWPA, but it does not exempt suppliers from providing potable water to end users. This provision provides an alternative to the construction and operation of a centralized treatment facility by permitting decentralized treatment for individual homes. The effect is to shift the requirement to provide potable water from one section of the DWPA to another section under the DWPR.

The shifting of the requirement to provide potable water does not exempt the water supplier from other obligations under the DWPA or DWPR. The provision of potable water to the end user is not a one-time obligation. The provision of potable water is an on-going obligation that water suppliers are expected to meet by monitoring water quality, maintaining systems and dealing with operational failures. There is nothing in the DWPA or DWPR to suggest that a water supplier is absolved of these on-going responsibilities.

Section 4(1) of the DWPR provides that all water supply systems are prescribed for the purposes of sections 7, 8, 10, 11, and 22(1)(b) of the DWPA. These sections outline obligations with respect to Construction Permits, Operating Permits, Emergency Response and Contingency Plans, Water Monitoring Requirements and Assessment Response Plans. In the case of water supply systems using POU/POE devices, the water monitoring requirements under section 11(1) of the DWPA are limited to water that has been treated by the POU/POE device.

POU/POE devices are not excluded from definition of a domestic water system due to section 3(c) of the DWPR, which refers to “building system.” The definition of a “building system” refers to systems to which the B.C. Plumbing Code applies that receive water from a water supply system operating under a valid permit under the DWPA. The B.C. Plumbing code (now contained within the B.C. Building Code as Book II (Plumbing Systems)) makes no provision for POU/POE systems; rather, it sets out the requirements for plumbing for distributing potable water within homes (e.g., pipes, taps and toilets). POU/POE systems are considered to be part of the water supply system and requirements for their construction and operation are regulated by the provisions of the DWPA and DWPR.

The exemption from section 6(b) of the DWPA does not apply to the regulations made under the DWPA or to all of the requirements on the operating permit of a water supplier. The only effect of section 3.1(a)(i) of the DWPR is to exempt the water in the distribution system from the source up to the point of connection with a POU/POE device from meeting the requirement of being potable and meeting any additional requirements established by the regulations or by the system’s operating permit related to water quality. This exemption no longer applies once the water enters the treatment device as section 3.1(a)(i) states specifically that the exemption is contingent on there being a POU/POE device that “makes the water potable.”
NOTE: Some of the appendices are under development and all of the forms listed in the appendices are samples. As local health authorities may use and/or require alternate versions of these forms, you should contact your local health authority for the version of the form you need.
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Appendix 5: Sample Standard Form Operating Permit
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Appendix 7: Water Supply System Assessment
Appendix 8: Comprehensive Drinking Water Source-To-Tap Assessment Guideline
Appendix 9: Sample Letter Ordering Assessment Under Section 19
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Appendix 12: Sample Boil Water Notice
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Appendix 21: Sample Notice to Third Parties on Request for Review
SAMPLE DRINKING WATER OFFICER DELEGATION

WHEREAS:

A. Section 3(4) of the Drinking Water Protection Act S.B.C. 2001, C. 9 (“the Act”) authorizes a Drinking Water Officer, subject to the regulations to delegate to any person a power or duty of a Drinking Water Officer,

B. I am a Drinking Water Officer under section 3 of the Act, and

C. I consider it to be necessary and appropriate for the better administration of the Act to delegate my authority under the Act.

THEREFORE:

1. I, [NAME OF DRINKING WATER OFFICER], Drinking Water Officer, hereby delegate to [NAME OF DELEGATE], all of my powers and duties under the Drinking Water Protection Act and Drinking Water Protection Regulation, except,

   (a) The power to delegate under section 3(4) of the Act,

   (b) [OTHERS?] 

2. This delegation does not purport to exhaust or limit my authority as Drinking Water Officer to exercise my powers or duties in respect of any matter where I consider that appropriate.

3. This delegation revokes all previous delegations.

4. This delegation may be revoked or modified by me at any time.

Dated at [CITY/TOWN], this __ day of ________, 20__.

________________________________
[NAME OF DRINKING WATER OFFICER]
Drinking Water Officer
EMERGENCY RESPONSE AND CONTINGENCY PLAN TEMPLATE

This template is designed to be a starting point to aid you in preparing your own plan. Please modify to suit the needs of your water supply system (e.g., add or delete emergency contacts as you see fit). For resources and information on Emergency Response and Contingency Plans, see the Emergency Response and Contingency Planning for Small water Systems document on the Ministry of Health’s website.

Name of Water Supply System:
Mailing Address:
Phone Number(s):
Date Prepared:

EMERGENCY CONTACT INFORMATION

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<th>Name</th>
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<td></td>
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<td>Other owner(s):</td>
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Health Authority Contacts

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<tr>
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<td>Secondary:</td>
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<th>Public health engineer:</th>
<th>Office:</th>
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<tr>
<td>After-hour health authority emergency contact:</td>
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**Government Agencies**

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<tr>
<td>Local Government Emergency Program Coordinator (Municipality):</td>
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<td>Local Government Emergency Program Coordinator (Regional District):</td>
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<tr>
<td>Emergency Management BC; Emergency Coordination Centre:</td>
<td>1-800-663-3456</td>
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<td>Ministry of Environment &amp; Climate Change Strategy:</td>
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<td>Ministry of Forests, Lands, Natural Resource Operations &amp; Rural Development:</td>
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<td>Ministry of Transportation &amp; Infrastructure:</td>
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**Media**

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**Laboratories**

Bacteriological:  
Address:  

Chemical:  
Address:  

**Emergency Departments**

Police/RCMP:  

Fire Department:  

Ambulance:  

Hospital:  

Health Centre:  

**Repair Services**

Utility:  

Electrician:  

Plumber:  
### Appendix 2: Emergency Response and Contingency Plan Template

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<td>Bulk water hauler/alternate water supplier:</td>
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<td>Excavator:</td>
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<tr>
<td>Water Well Drilling Contractor:</td>
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<tr>
<td>Pump Installer:</td>
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<tr>
<td>Computer Support:</td>
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**Equipment Supplier(s)**

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<td>Water Treatment Supplier:</td>
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**Other Local Water Supply System(s)**

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<tr>
<th>Name</th>
<th>Phone Number(s)</th>
<th>Email</th>
<th>Fax</th>
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</table>

In the case of emergency contacts, provide as many forms of communication to each contact as possible (including: primary, secondary and after-hours phone numbers). The Emergency Contact Information must be reviewed on annually to ensure the contact information is up to date. Forward any changes to your local drinking water officer or delegate.
<table>
<thead>
<tr>
<th>Date Reviewed</th>
<th>Completed by</th>
<th>Forwarded to Drinking Water Officer</th>
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# Template for Planned Responses

Fill in the following blank template with your planned responses to possible emergencies you listed under “other.” Make more copies of this page as necessary. For sample planned responses and more information on Emergency Response and Contingency Plans, see the [Emergency response and Contingency Planning for Small water Systems](#) document on the Ministry of Health’s website.

<table>
<thead>
<tr>
<th>EMERGENCY:</th>
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<tbody>
<tr>
<td>CONTACTS</td>
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<th>ACTIONS</th>
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<tr>
<td>CONTACTS</td>
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</table>
SAMPLE OPERATING PERMIT COVER LETTER

Dear _________________:

Please find enclosed an operating permit issued under section 8 of the Drinking Water Protection Act (the “Act”). This permit is effective [specify start date and end date, if any].

Please note this operating permit is issued on terms and conditions, and that, according to section 8(1)(b) of the Act, the water supply system must be operated in accordance with these terms and conditions. [If the Terms and Conditions are not all set out on the permit but instead reference other documents, including this letter, that should be highlighted here]

Please also note that water suppliers have various responsibilities under the Act and the Drinking Water Protection Regulation (The “Regulation”), beyond those set out as terms and conditions of the operating permit. It is your responsibility to familiarize yourself with the Act and Regulation. See section 2.2 of Part A of the Drinking Water Officers’ Guide for a summary of responsibilities and references to some of the relevant provisions of the Act and Regulation. This is intended for basic information purposes only and it is important that you read the Act and Regulation in their entirety.

If you have any questions about this operating permit, please do not hesitate to contact me.

Yours truly,

[ISSUING OFFICIAL NAME]
[TITLE]
SAMPLE STANDARD FORM OPERATING PERMIT

Permit to Operate

A Drinking Water System with ___ to ___ connections
[CHOOSE EITHER 2 to 14, 15 to 300, or 301 to 10,000 CONNECTIONS]

Purveyor:
Facility Name:
Facility Number:
Facility Address:

Conditions of Permit

__________________________  ________________________________________
Effective Date                                                              Public Health Inspector

This permit must be displayed in a conspicuous place and is nontransferable.
 Permit to Operate

This permit must be displayed in a conspicuous place and is nontransferable.

This self-screening tool is the easiest to use of the assessment tools produced by the Ministry of Health, but it is also the tool that produces the least amount of detail. It should be completed by the water supplier (voluntarily or as required by the local DWO) and submitted to the DWO. If significant risks are identified, the DWO can determine if a water supplier needs to undertake a more comprehensive source-to-tap assessment to further analyze and mitigate the risks.

The tool includes 97 questions designed to inventory and assess the:

- administration, management and operation of the water supply system
- water source
- water treatment system
- water storage system
- distribution system
- tap water quality
WATER SUPPLY SYSTEM ASSESSMENT

The Water System Assessment User’s Guide, and associated assessment forms, is a source-to-tap assessment designed to be completed by the water supply operator or the DWO. It was developed in 2012 to fill a gap between the Drinking Water Source-to-Tap Screening Tool and the Comprehensive Drinking Water Source-to-Tap Assessment (below). The intention is to offer an alternative that will allow for developing an action plan to reduce risks to and in a water supply system, without the added cost and time commitment of a comprehensive assessment. You can find the Water System Assessment User’s Guide at http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/resources-for-water-system-operators.

The full assessment is designed to enable quick and efficient data collection, and completed in about one day. It consists of the following assessment forms:

- **Hazard Assessment**: The questions in this form take you step by step through your water supply system. They are designed to cover the water supply system from the water source through to the customer’s taps.

- **Risk Rating**: This form breaks the potential problems (hazards) down to try to identify how serious they are (risk).

- **Risk Grouping**: This form orders the hazards into similar groupings to help you see areas that need the most work. This will add perspective to help you deal with the risks to your system.

- **Action Plan**: This will be a short report to develop timelines and prioritize system improvements.

These assessment forms are available in Microsoft Excel or hard copy, and both will yield the same results. If you are able to use the computer version, though, you will have access to extra features such as information brought forward to the next form and automatic calculations.

The Water System Assessment User’s Guide explains how to use the forms and provides helpful tips to get you started. It includes suggestions and examples to help you understand where problems may arise. The appendices provide guidance to answering questions in the hazard assessment, as well as information about useful resources.
COMPREHENSIVE DRINKING WATER SOURCE-TO-TAP ASSESSMENT GUIDELINE

The Comprehensive Drinking Water Source-to-Tap Assessment Guideline is a tool to help water suppliers develop a more comprehensive understanding of the risks to drinking water safety and availability of their system. This is the most comprehensive and time-consuming assessment tool produced by the Ministry of Health and should only be completed with the assistance of a qualified professional.

This guideline can be applied as a voluntary measure by water suppliers wanting to understand risks to drinking water safety in their systems, but it may not be the most cost-effective approach for assessing a small water system. A DWO can order this assessment if significant risks to a water supply system are identified through the Drinking Water Source-to-Tap Screening Tool or by some other means. This order can include completing the entire assessment, or taking a more targeted approach and using only the modules that will address the risks identified through the screening tool.

The professionals conducting the assessments, DWOs and water suppliers are the intended audiences for this guideline. It provides a structured, consistent approach to evaluating risks to drinking water. The purpose is to help water supply systems learn how to operate more effectively, as well as ensuring the best possible water quality and assured quantity.

The guideline consists of an introduction, which should be reviewed in detail for information on the assessment process prior to commencing and eight modules. The complete document can be accessed at http://www.health.gov.bc.ca/protect/source.html. The introduction and individual modules are available at:

- **INTRODUCTION**: Understand and Prepare for the Assessment Process:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-intro.pdf

- **MODULE 1**: Delineate and Characterize Drinking Water Source(s):  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-intro.pdf

- **MODULE 2**: Conduct Contaminant Source Inventory:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-mod2.pdf

- **MODULE 3**: Assess Water System Elements:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-mod3.pdf

- **MODULE 4**: Evaluate Water System Management, Operation and Maintenance Practices:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-mod4.pdf

- **MODULE 5**: Audit Water Quality and Availability:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-mod5.pdf

- **MODULE 6**: Review Financial Capacity and Governance of Water Service Agency:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-mod6.pdf
• MODULE 7: Characterize Risks from Source to Tap:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-mod7.pdf

• MODULE 8: Recommend Actions to Improve Drinking Water Protection:  
  http://www2.gov.bc.ca/assets/gov/environment/air-land-water/cs2ta-mod8.pdf
SAMPLE LETTER ORDERING ASSESSMENT UNDER SECTION 19

[DATE]

Dear _______________

Further to our recent discussions, I am writing pursuant to section 19 of the Drinking Water Protection Act (the “Act”) to order you to complete a water source and system assessment. You may find a copy of the Act on the government website at http://www.bclaws.ca/civix/document/id/complete/statreg/01009_01, or if you do not have access to the internet, please call me and I can provide you with a copy.

It is my view that I have reason to believe that an assessment is necessary to properly identify and assess threats to drinking water in relation to the water supply system because:

[INSERT REASONS]

Section 20 of the Act provides that I may provide directions respecting the process, preparation, form, content, area of coverage, and time for completing an assessment. In this regard, I am directing that you complete an assessment in accordance with

[CHOOSE ONE OF: The enclosed Screening Tools Assessment document
  The Enclosed Water Supply System Assessment document
  The enclosed Comprehensive Risk Assessment Document
  Set out some other process]

With respect to timing, I am directing that the assessment be completed, and a copy of the assessment results provided to me, by [DATE]. I should also note that section 21(2) of the Act requires that an assessment be made public in accordance with section 15. In this regard, I require you to make the assessment public, after it has been provided to me, through the following means:

[SPECIFY]

If you have any questions or comments respecting this order, please do not hesitate to call or write me by [14 days from date of letter]. This order will not become effective until [21 days from the date of letter] and if, upon considering any further questions or comments by you, I consider it appropriate to rescind or modify this order, I will advise you before [21 days from the date of this letter].

Yours truly,

[NAME]
Drinking Water Officer

---

1 In any case where this tool is selected, the letter should note that this is an initial tool that is less time-consuming and resource intensive to implement than the Comprehensive Risk Assessment Tool, and that the drinking water officer reserves the right to direct that the Comprehensive Risk Assessment Tool, or some other additional process, be completed if the Screening Tool identifies concerns that warrant a more thorough assessment.
SAMPLE ORDER RESPECTING PUBLIC NOTICE

[DATE]

[Person to whom order is directed]
[Address]

Dear ______________:

Re: Order to Provide Public Notice

This letter constitutes an Order under section 14 of the Drinking Water Protection Act, S.B.C. 2001, C. 9 (the “Act”), which states:

The drinking water officer may request or order a water supplier to give public notice in a manner approved by the drinking water officer, or in accordance with the directions of the drinking water officer, if

(a) the drinking water officer has received a report under section 12 [notice if immediate reporting standard not met],

(b) the drinking water officer has received a report under section 13 [water supplier must report threats], or

(c) the drinking water officer considers that there is, was or may be a threat to the drinking water provided by a water supply system.

Action required

The action that I am requiring you to take is as follows:

• Issue a [Choose one: Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] in the form and including the information specified on the attached form; and

• Publicize the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] through the following means:

  [CHOOSE, ADD, DELETE, AMEND AS APPROPRIATE]

  o Immediately telephone all users of the water system and notify them of all the contents of the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] and advise
them how they can obtain a written copy of the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] if they wish to do so.

o Notify each user of the system by providing a copy of the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] in person, or in the event they are not home by leaving a copy of the Notice in their mailbox.

o Post a copy of this Order and the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] at the following locations and check those locations every ____ days to confirm that the posting remains, or re-post as necessary.

o Advise the following local media of the existence of the Order and the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice].

o Advise the [LOCAL GOVERNMENT] of the existence of the Order and the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice].

o Document all steps taken to provide notice as outlined above.

Reasons for this Order

I have determined that this Order is necessary under section 14 for the following reasons:

• [Specify whether the Order is based upon section 14(1)(a), (b) or (c)]

• [Summarize relevant facts and the reasons for the decision to issue this Order, e.g. monitoring results, other events etc.]

Authority to issue this Order

I have issued this Order under my authority as a Drinking Water Officer under section 3 of the Act.

[OR]

I have issued this Order as a person who has been delegated the powers and duties of a Drinking Water Officer, under section 3(4) of the Act.

Duration of this Order

This Order remains in effect unless and until you are notified in writing by me or another Drinking Water Officer that the Order is amended or rescinded.

No right of appeal

There is no ability to appeal this Order, or to request a review or reconsideration under the Drinking Water Protection Act. If you have information that you believe may be relevant to my decision whether or when to rescind this Order, I invite you to provide it to me, but I wish to emphasize that the Order
remains in effect unless and until it is modified or rescinded by me or another Drinking Water Officer, in writing.

**Consequences of failure to comply**

It is an offence under the *Drinking Water Protection Act* to fail to comply with an Order under section 14. Penalties upon conviction for an offence may be up to $200,000 per day and up to 12 months imprisonment.

Please do not hesitate to contact me if you have any questions respecting this Order.

Yours truly,

[NAME]
[TITLE]

Attachment
SAMPLE REQUEST RESPECTING PUBLIC NOTICE

[DATE]

[Person to whom order is directed]
[Address]

Dear ______________:

Re: Request to Provide Public Notice

As you may be aware, section 14 of the Drinking Water Protection Act, S.B.C. 2001, C. 9 (the “Act”) provides that a Drinking Water Officer may

...request or order a water supplier to give public notice in a manner approved by the drinking water officer, or in accordance with the directions of the drinking water officer, if

(d) the drinking water officer has received a report under section 12 [notice if immediate reporting standard not met],

(e) the drinking water officer has received a report under section 13 [water supplier must report threats], or

(f) the drinking water officer considers that there is, was or may be a threat to the drinking water provided by a water supply system.

Pursuant to this section, I am requesting that you:

• Issue a [Choose one of: Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] in the form and including the information specified on the attached form; and

• Publicize the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] through the following means:

  [CHOOSE, ADD, DELETE, AMEND AS APPROPRIATE]

  o Immediately telephone all users of the water system and notify them of all the contents of the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] and advise them how they can obtain a written copy of the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] if they wish to do so.
APPENDIX 11: Sample Request Respecting Public Notice

Notify each user of the system by providing a copy of the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] in person, or in the event they are not home by leaving a copy of the Notice in their mailbox.

Post a copy of this Request and the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice] at the following locations and check those locations every ____ days to confirm that the posting remains, or re-post as necessary.

Advise the following local media of the existence of the Request and the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice].

Advise the [LOCAL GOVERNMENT] of the existence of the Request and the [Water Quality Advisory / Boil Water Notice / Do Not Use Water Notice].

Document all steps taken to provide notice as outlined above.

Reasons for this Request

I am making this request for the following reasons:

- [Specify whether the Request is based upon section 14(1)(a), (b) or (c)]

- [Summarize relevant facts and the reasons for the decision to issue this Request e.g. monitoring results, other events etc.]

Duration of this Request

This Request remains in effect unless and until you are advised by me or another Drinking Water Officer that the Request is amended or rescinded.

Please do not hesitate to contact me if you have any questions respecting this Request.

Yours truly,

[NAME]
[TITLE]

Attachment
SAMPLE BOIL WATER NOTICE

BOIL WATER NOTICE

Issued pursuant to [an Order OR a Request] of a Drinking Water Officer under section 14 of the Drinking Water Protection Act

WATER SUPPLY SYSTEM COVERED BY THIS NOTICE

This Boil Water Notice applies to the following water supply system:

[DESCRIPTION OF SYSTEM], Operating permit number _______

and should be followed by all persons using water from the system.

REASON FOR THIS NOTICE

This Notice is being issued because:

[Include:

- A description of the drinking water threat that occurred, including the potential health effects
- The population at risk
- What the water system is doing to correct the problem]

RECOMMENDATIONS

The Drinking Water Officer, in consultation with the Medical Health Officer, recommends the following steps be taken to minimize the risks associated with this water system.
[Set out proposed steps including length of boiling required, use of alternate water supplies, avoiding consumption by vulnerable groups etc.]

OBLIGATION OF OWNERS OF PUBLIC PREMISES

Owners of public premises served by this water system must:

(a) notify the public that the water is not potable water by posting a sign at every sink or drinking water fountain accessible to the public;
(b) if normal business practices provide an opportunity, verbally advise any person who may use the domestic water system for a domestic purpose that the water is not potable water.

(See Drinking Water Protection Regulation, section 10)

DURATION OF THIS NOTICE

This Notice remains in effect unless and until another public notice is issued upon the [Request OR Order] of a Drinking Water Officer advising that the Notice has been amended or may be rescinded.

WHAT IS A “BOIL WATER NOTICE”

A Boil Water Notice is one of three types of public notices commonly used by Drinking Water Officers. The decision whether to request or order issuance one of these notices rests with the discretion of a Drinking Water Officer, but in general, they are used in the following circumstances:

Water Quality Advisory
Used in situations in which the public health threat posed by the water supply system is modest, and actions can be taken to reduce the risks through means other than requiring a Boil Water Notice or Do Not Use Water Notice.

Boil Water Notice
Used in situations in which the public health threat posed by the water supply system is significant and the nature of the threat is one that can be effectively addressed through boiling of the water.

Do Not Use Water Notice
Used in situations where a significant public health threat exists in relation to the water supply system, and the threat cannot be adequately addressed through a Water Quality Advisory or Boil Water Notice.
The Drinking Water Officer reserves the right however to Request or Order another form of public notice in relation to this water supply system, if he or she determines that necessary in future. If that were to occur, a subsequent public notice would be issued.

QUESTIONS

If you have any questions concerning this notice, please contact:

__________, Owner or Operator of the water supply system at [TELEPHONE]

[OR]

[SELECT ONE OR MORE OF THE FOLLOWING, AS APPROPRIATE FOR THE CIRCUMSTANCES AND THE OFFICE / HEALTH AUTHORITY IN QUESTION]

__________, Drinking Water Officer, at [TELEPHONE]

__________, Medical Health Officer, at [TELEPHONE]

__________, Environmental Health Officer, at [TELEPHONE]

__________, Public Health Inspector, at [TELEPHONE]

__________, Public Health Engineer, at [TELEPHONE]
SAMPLE DO NOT USE WATER NOTICE

DO NOT USE WATER NOTICE

Issued pursuant to [an Order OR a Request] of a Drinking Water Officer under section 14 of the Drinking Water Protection Act

WATER SUPPLY SYSTEM COVERED BY THIS NOTICE

This Do Not Use Water Notice applies to the following water supply system:

[DESCRIPTION OF SYSTEM], Operating permit number ______

and should be followed by all persons using water from the system.

REASON FOR THIS NOTICE

This Notice is being issued because:

[Include:

- A description of the drinking water threat that occurred, including the potential health effects
- The population at risk
- What the water system is doing to correct the problem]

RECOMMENDATIONS

The Drinking Water Officer, in consultation with the Medical Health Officer, recommends that the water from this water supply system not be used for domestic purposes—i.e., it should not be used for drinking, cooking, bathing [ADD / EDIT AS NECESSARY]—until further notice.
OBLIGATION OF OWNERS OF PUBLIC PREMISES

Owners of public premises served by this water system must:

(c) notify the public that the water is not potable water by posting a sign at every sink or drinking water fountain accessible to the public;
(d) if normal business practices provide an opportunity, verbally advise any person who may use the domestic water system for a domestic purpose that the water is not potable water.

(See Drinking Water Protection Regulation, section 10)

DURATION OF THIS NOTICE

This Notice remains in effect unless and until another public notice is issued upon the [Request OR Order] of a Drinking Water Officer advising that the Notice has been amended or may be rescinded.

WHAT IS A “DO NOT USE WATER NOTICE”

A Do Not Use Water Notice is one of three types of public notices commonly used by Drinking Water Officers. The decision whether to request or order issuance one of these notices rests with the discretion of a Drinking Water Officer, but in general, they are used in the following circumstances:

**Water Quality Advisory**
Used in situations in which the public health threat posed by the water supply system is modest, and actions can be taken to reduce the risks through means other than requiring a Boil Water Notice or Do Not Use Water Notice.

**Boil Water Notice**
Used in situations in which the public health threat posed by the water supply system is significant and the nature of the threat is one that can be effectively addressed through boiling of the water.

**Do Not Use Water Notice**
Used in situations where a significant public health threat exists in relation to the water supply system, and the threat cannot be
adequately addressed through a Water Quality Advisory or Boil Water Notice.

The Drinking Water Officer reserves the right however to Request or Order another form of public notice in relation to this water supply system, if he or she determines that necessary in future. If that were to occur, a subsequent public notice would be issued.

**QUESTIONS**

If you have any questions concerning this notice, please contact:

__________, Owner or Operator of the water supply system at [TELEPHONE]

[OR]

[SELECT ONE OR MORE OF THE FOLLOWING, AS APPROPRIATE FOR THE CIRCUMSTANCES AND THE OFFICE / HEALTH AUTHORITY IN QUESTION]

__________, Drinking Water Officer, at [TELEPHONE]

__________, Medical Health Officer, at [TELEPHONE]

__________, Environmental Health Officer, at [TELEPHONE]

__________, Public Health Inspector, at [TELEPHONE]

__________, Public Health Engineer, at [TELEPHONE]
SAMPLE HAZARD ABATEMENT AND PREVENTION ORDER

[DATE]

person to whom the hazard abatement order is issued – see Section 25(2)

[Address]

Dear ____________________:

Re: Hazard Abatement or Prevention Order

This letter constitutes an Order under section 25 of the Drinking Water Protection Act (the “Act”). For your ease of reference, I enclose a copy of the Act.

Action required

The action that I am ordering you to take is as follows:

SPECIFY, HAVING REGARD TO RANGE OF POWERS SET OUT IN SECTION 25(3)

Reasons for this Order

I am issuing this Order because I have reason to believe that a health hazard exists AND / OR there is a significant risk of an imminent drinking water health hazard. I have formed this belief in the circumstances of this case for the following reasons:

SPECIFY

Authority to issue this Order

I have issued this Order under my authority as a Drinking Water Officer under section 4 of the Act.

[OR]

I have issued this Order as a person who has been delegated the powers and duties of a Drinking Water Officer, under section 4(3) of the Act.

Duration of this Order

This Order remains in effect unless and until you are notified in writing by me or another Drinking Water Officer that the Order is amended or rescinded.
Right for review or reconsideration

You may request that I reconsider this decision if you believe that there is sufficient new evidence for this purpose. You may also request that this decision be reviewed by the Provincial Health Officer or a Medical Health Officer nominated by him.

If you wish to make a request for reconsideration or review, please review section 39.1 of the Drinking Water Protection Act. I can also provide you with forms if you wish, but there is no requirement to use a specific form.

Please note however that a request for reconsideration or review does not put the Order into abeyance while any such request is considered. If you believe that the Order should be deferred while a review or reconsideration is requested, please advise me accordingly and I will consider whether to amend the Order accordingly. Unless I do so, the Order remains in force during any period of review or reconsideration.

Consequences of failure to comply

It is an offence under the Drinking Water Protection Act to fail to comply with an Order under section 25. Penalties upon conviction for an offence may be up to $200,000 per day and up to 12 months imprisonment. In addition, if you fail to comply with the Order, a Drinking Water Officer may take or authorize actions to be taken as necessary, at your expense (see sections 27 and 28).

Please do not hesitate to contact me if you have any questions respecting this Order.

Yours truly,

[NAME]
[TITLE]

Enclosure

[cc: registered owner of land in cases where order is directed against a person who is not the owner, as per section 25(4)]
SAMPLE LETTER ADVISING THAT ACTION MAY BE TAKEN AND COSTS RECOVERED UNDER SECTION 27

[DATE]

[person to whom hazard abatement or contravention order was issued]
[Address]

Dear _________________________:

Re: Notice under section 27 of the Drinking Water Protection Act

On [DATE] a [hazard prevention OR contravention] Order was issued to you under section [25 OR 26] of the Drinking Water Protection Act. To date, it appears that you have failed to take the following actions required by that Order:

[SPECIFY]

I am writing to direct, pursuant to section 27, that if you fail to take the outstanding action necessary to comply with the Order by [DATE], the action may be taken by the Health Authority or a person authorized by it, at your expense, and without further notice to you.

Please note that under section 27(3) and (4) of the Act, cost recovery can be pursued by way of a claim for debt in court, or by adding the costs and expenses to property taxes under section 27(4). For your ease of reference, I enclose a copy of the Act.

If you have any questions concerning this letter, please contact me at [TELEPHONE].

Yours truly,

[NAME]
[TITLE]

Enclosure

[cc: registered owner of land in cases where order is directed against a person who is not the owner, as per section 26(4) and 25(4)]
SAMPLE CONTRAVENTION ORDER

[DATE]

[Name of person in contravention]
[Address]

Dear ____________________:

This letter constitutes a Contravention Order under section 26 of the Drinking Water Protection Act, S.B.C. 2001, C. 9 (copy enclosed). It is issued on the basis that I have reason to believe you are in contravention of the following sections of the Act:

[SPECIFY SECTIONS]

Reasons for this Order

I am issuing this Order because I have reason to believe you are in contravention for the following reasons:

[SPECIFY REASONS]

Action required

The action that I am ordering you to take is as follows:

[SPECIFY, HAVING REGARD TO RANGE OF POWERS SET OUT IN SECTION 26(3), AND INCLUDE TIMEFRAMES]

Right for review or reconsideration

You may request that I reconsider this decision if you believe that there is sufficient new evidence for this purpose. You may also request that this decision be reviewed by the Provincial Health Officer or a Medical Health Officer nominated by him.

If you wish to make a request for reconsideration or review, please review section 39.1 of the Drinking Water Protection Act. I can also provide you with forms if you wish, but there is no requirement to use a specific form.

Please note however that a request for reconsideration or review does not put the Order into abeyance while any such request is considered. If you believe that the Order should be deferred while a review or reconsideration is requested, please advise me accordingly and I will consider whether to amend the Order accordingly. Unless I do so, the Order remains in force during any period of review or reconsideration.
Authority to issue this Order

I have issued this Order under my authority as a Drinking Water Officer under section 4 of the Act.

[OR]

I have issued this Order as a person who has been delegated the powers and duties of a Drinking Water Officer, under section 4(3) of the Act.

Consequences of failure to comply

It is an offence under the Drinking Water Protection Act to fail to comply with an Order under section 25. Penalties upon conviction for an offence may be up to $200,000 per day and up to 12 months imprisonment. In addition, if you fail to comply with the Order, a Drinking Water Officer may take or authorize actions to be taken as necessary, at your expense (see sections 27 and 28).

Yours truly,

[NAME]
[TITLE]

Enclosure
SAMPLE LETTER REQUESTING INFORMATION ABOUT “OWNERS” OF A SYSTEM

[DATE]

[Recipient]
[Address]

Dear __________________: 

I am writing to advise that I am presently reviewing [concerns OR outstanding issues] respecting the water supply system located at _____________, which serves [DESCRIBE].

In the course of doing so, it is appropriate that I consider which party or parties may fall within the definition of “owner” of the water supply system as that term is defined in section 1 of the Drinking Water Protection Act. Specifically, section 1 states:

"owner" in relation to a water supply system includes

(a) a person who is
   (i) responsible for the ongoing operation of the water supply system, or
   (ii) in charge of managing that operation, and

(b) If
   (i) parts of the water supply system are owned by different persons, or
   (ii) all or part of the system is jointly owned by different persons,

all of those persons;

If you have any information as to the names and addresses of parties that may potentially fall within the definition of “owner” I would appreciate if you could contact me at [TELEPHONE].

Yours truly,

[NAME]
[TITLE]
SAMPLE LETTER ADVISING PERSON THEY MAY BE CONSIDERED AN “OWNER” OF A SYSTEM

[DATE]

[Recipient]
[Address]

Dear _____:

I am writing to advise that I am presently reviewing [concerns OR outstanding issues] respecting the water supply system located at _____, which serves [DESCRIBE].

In the course of doing so, it is appropriate that I consider which party or parties may fall within the definition of “owner” of the water supply system as that term is defined in section 1 of the Drinking Water Protection Act. Specifically, section 1 states:

“owner” in relation to a water supply system includes

(c) a person who is
   (i) responsible for the ongoing operation of the water supply system, or
   (ii) in charge of managing that operation, and

(d) if
   (i) parts of the water supply system are owned by different persons, or
   (ii) all or part of the system is jointly owned by different persons,

all of those persons;

It appears to me that you may fall within the definition of being an “owner” on the basis that [EXPLAIN]. However, before I reach any conclusion in this regard, I wish to provide you with an opportunity to make your views known to me, and to provide any information you consider relevant.

Please provide any response you may have by [DATE]. In considering any response, I would encourage you to review the various provisions of the Act that relate to the rights and responsibilities of owners, including the various requests and orders that can be made by a Drinking Water Officer in relation to an owner. For your ease of reference I enclose a copy of the Act.

Please note that if I do not receive a response from you by [DATE] I will consider you to be an “owner” of the system, as defined in the Drinking Water Protection Act, and may take further action I consider appropriate. This could include orders directed against you, or other steps that may result in financial liability by you.
Please do not hesitate to call me at [TELEPHONE] if you have any questions regarding this letter.

Yours truly,

[NAME]
[TITLE]

Enclosure
SAMPLE WATER SYSTEM HAZARD RATING ASSESSMENT TOOL

The following water system assessment tool was developed by a Health Authority. It is a simple tool that aids a drinking water officer in determining the hazard rating associated with an individual water supply system by providing a basic hazard rating depending on the level of risk of various components and factors of the water supply system. The drinking water officer has discretion to use whatever information available and deemed relevant to make a determination related to risk ratings. The final decision concerning the overall risk of the water supply system is at the discretion of the drinking water officer.

**How to Use**: Go through each category and choose the component/factor that best reflects the individual water supply system. Circle or make note of the corresponding risk rating number for the given component/factor. Once complete, add up the risk rating numbers to determine the corresponding hazard rating for the system as a whole: high, medium or low (see *Hazard Rating Upper Limits* in the grey table).

<table>
<thead>
<tr>
<th>Item</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number Of Connections</strong></td>
<td></td>
</tr>
<tr>
<td>More than 300 connections</td>
<td>5</td>
</tr>
<tr>
<td>15 to 300 connections</td>
<td>4</td>
</tr>
<tr>
<td>Less than 15 connections</td>
<td>3</td>
</tr>
<tr>
<td><strong>Population Served</strong></td>
<td></td>
</tr>
<tr>
<td>&gt; 10 000</td>
<td>10</td>
</tr>
<tr>
<td>&gt; 1 000</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 100</td>
<td>5</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>3</td>
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<tr>
<td><strong>High Risk Populations</strong></td>
<td></td>
</tr>
<tr>
<td>List of High Risk Populations</td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td></td>
</tr>
<tr>
<td>Child Care</td>
<td></td>
</tr>
<tr>
<td>Adult Care</td>
<td></td>
</tr>
<tr>
<td>Camps/Campsite</td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td></td>
</tr>
<tr>
<td>Restaurants</td>
<td></td>
</tr>
<tr>
<td>Amount for Each Population</td>
<td>1</td>
</tr>
<tr>
<td><strong>Water Source</strong></td>
<td></td>
</tr>
<tr>
<td>Surface Water</td>
<td>10</td>
</tr>
<tr>
<td>Combined</td>
<td>8</td>
</tr>
<tr>
<td>Shallow Well</td>
<td>7</td>
</tr>
<tr>
<td>Deep Well</td>
<td>3</td>
</tr>
<tr>
<td>Item</td>
<td>Risk Rating</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Surface Water Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>Not Disinfected</td>
<td>15</td>
</tr>
<tr>
<td>Disinfected</td>
<td>10</td>
</tr>
<tr>
<td>Disinfected, Residual</td>
<td>8</td>
</tr>
<tr>
<td>Disinfected, Parasite Reduction</td>
<td>6</td>
</tr>
<tr>
<td>Disinfected, Parasite Reduction, Residual</td>
<td>2</td>
</tr>
<tr>
<td><strong>Shallow Well Water Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>Not Disinfected</td>
<td>12</td>
</tr>
<tr>
<td>Disinfected</td>
<td>10</td>
</tr>
<tr>
<td>Disinfected, Residual</td>
<td>8</td>
</tr>
<tr>
<td>Disinfected, Parasite Reduction</td>
<td>6</td>
</tr>
<tr>
<td>Disinfected, Parasite Reduction, Residual</td>
<td>2</td>
</tr>
<tr>
<td><strong>Deep Well Water Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>Untreated</td>
<td>5</td>
</tr>
<tr>
<td>Treated</td>
<td>1</td>
</tr>
<tr>
<td><strong>1. Bacteriological History</strong></td>
<td></td>
</tr>
<tr>
<td>Current Permanent Boil Advisory</td>
<td>15</td>
</tr>
<tr>
<td>Current Periodic Boil Advisory</td>
<td>12</td>
</tr>
<tr>
<td>Past Boil Advisories or Periodic Unsatisfactory Results</td>
<td>9</td>
</tr>
<tr>
<td>Meets Guidelines</td>
<td>1</td>
</tr>
<tr>
<td><strong>2. Chemical History</strong></td>
<td></td>
</tr>
<tr>
<td>Insufficient Chemical Analysis History</td>
<td>5</td>
</tr>
<tr>
<td>Chemical Contamination Identified - No Treatment</td>
<td>5</td>
</tr>
<tr>
<td>Chemical Contamination Identified - Appropriate Treatment</td>
<td>3</td>
</tr>
<tr>
<td>Meets Guidelines</td>
<td>1</td>
</tr>
<tr>
<td><strong>3. Emergency Plan</strong></td>
<td></td>
</tr>
<tr>
<td>Not Submitted</td>
<td>10</td>
</tr>
</tbody>
</table>
## Item Risk Rating

<table>
<thead>
<tr>
<th>Item</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete Plan</td>
<td>5</td>
</tr>
<tr>
<td>Complete Plan</td>
<td>1</td>
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</tbody>
</table>

### 4. Maintenance

<table>
<thead>
<tr>
<th>Item</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient Information</td>
<td>15</td>
</tr>
<tr>
<td>Poor Attention</td>
<td>12</td>
</tr>
<tr>
<td>Moderate Attention</td>
<td>4</td>
</tr>
<tr>
<td>Excellent Attention</td>
<td>1</td>
</tr>
</tbody>
</table>

### 5. Staff Training

<table>
<thead>
<tr>
<th>Item</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient Information</td>
<td>10</td>
</tr>
<tr>
<td>No Training</td>
<td>10</td>
</tr>
<tr>
<td>Some Training</td>
<td>5</td>
</tr>
<tr>
<td>Completed Certificate Program</td>
<td>1</td>
</tr>
</tbody>
</table>

Add up the risk rating numbers to determine the corresponding hazard rating: high, medium or low

<table>
<thead>
<tr>
<th>Hazard Rating Upper Limits</th>
<th>Total Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>101</td>
</tr>
<tr>
<td>Moderate</td>
<td>65</td>
</tr>
<tr>
<td>Low</td>
<td>45</td>
</tr>
</tbody>
</table>
SAMPLE REQUEST FOR RECONSIDERATION FORM

REQUEST FOR RECONSIDERATION OF A DECISION
OF A DRINKING WATER OFFICER

Pursuant to section 39.1 of the Drinking Water Protection Act, I request reconsideration of the following decision of a Drinking Water Officer:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

(Please attach a copy of the decision letter or order issued by the Drinking Water Officer)

I consider this decision is subject to reconsideration under section 39.1 on the basis that it is a decision under:

☐ section 19 [drinking water officer authority in relation to assessments]
☐ section 25 [hazard abatement and prevention orders]
☐ section 26 [orders respecting contraventions]
☐ section 31(4) [request respecting plan initiation]
☐ it was a decision that resulted from a reconsideration of one of the above

I make this request on the basis of the following new evidence:
(attach documents as necessary)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
I consider this new evidence to justify a reconsideration and different decision because:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Name and contact information for person making the request:

Name: ________________________________________________________________

Address: ______________________________________________________________

Telephone: ______________________________________________________________

__________________________  ______________________________
Date  Signature

When completed, please send this form to [CONTACT NAME OR TITLE], at:

[ADDRESS]
[FAX NUMBER]
SAMPLE NOTICE TO THIRD PARTIES ON REQUEST FOR REVIEW

[DATE]

[Person requesting the review]:
[Address]

Dear _____________:

I have reviewed your request for review of the ________ decision of [NAME], [TITLE] under section 39.1 of the Drinking Water Protection Act.

Before reaching a decision on this matter, I have determined, pursuant to section 39.1(c), that it is appropriate for you to give notice of this request to the following person(s):

[SPECIFY, INCLUDING ADDRESSES]

In this regard, I am directing you to provide the above named person(s) with the following information, at the address(es) noted above:

- A copy of this letter
- A copy of your request for review form (including all attachments)
- [OTHER]

This notice must be provided by [DATE].

I will give the above noted person until [DATE PLUS 10 DAYS OR AS OTHERWISE DETERMINED] to make any submission they consider appropriate. They must also provide a copy of any such submission to you.

If you have any response to such submissions, you must provide that to me by [DATE PLUS 15 DAYS OR AS OTHERWISE DETERMINED], with a copy to the other party(ies).

Yours truly,

[NAME]
[TITLE]