Protocol for Safe Drinking Water in First Nations Communities

(Standards for Design, Construction, Operation, Maintenance, and Monitoring of Drinking Water Systems)

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1.0 Introduction

The Protocol for Safe Drinking Water in First Nations Communities contains standards for design, construction, operation, maintenance, and monitoring of drinking water systems in First Nations communities and is intended for use by First Nations staff responsible for water systems. It is also intended for use by Indian and Northern Affairs Canada (INAC) staff, Public Works and Government Services Canada (PWGSC) for INAC staff, and all others involved in providing advice or assistance to First Nations in the design, construction, operation, maintenance, and monitoring of their drinking water systems in their communities in accordance with established federal or provincial standards, whichever are the most stringent.

This protocol was developed with the support and advice provided by First Nations representatives, regional and headquarters staff of Indian & Northern Affairs Canada, regional and headquarters staff of Public Works and Government Services Canada, the First Nations and Inuit Health Branch (FNIHB) of Health Canada, and Environment Canada. It will be updated as required to reflect changes in policy or regulation and will be available on INAC’s website at (http://www.inac-ainc.gc.ca/h2o). The roles and responsibilities of each of the stakeholders that helped in the development of this Protocol can be found in Appendix K.

The Protocol for Safe Drinking Water in First Nations Communities was developed as part of the Standards Development & Implementation element of the First Nations Water Management Strategy (FNWMS). In 2003, work by INAC and Health Canada (HC) in partnership with First Nations representatives culminated in the First Nations Water Management Strategy, a 5-year program composed of the following seven elements:

1. A plan to upgrade and build water and wastewater facilities to meet established design, construction and water quality standards with a priority on identified facilities;
2. An effective water quality monitoring program combined with a comprehensive and coordinated compliance and reporting regime that will improve the detection of drinking water problems in a timely manner thereby reducing the possibility of risk to health;
3. An effective and sustainable operation and maintenance (O&M) program designed to ensure safety of the residents and the protection of the assets with a priority on identified high risk facilities;
4. A plan for the continued expansion and enhancement of training programs, to ensure that all operators have the skills, knowledge and experience required to fulfill their responsibilities, supported by the introduction of mandatory certification requirements for all operators;
5. A set of integrated water quality management protocols with clearly defined roles and responsibilities consistent with national performance standards along with improvement in emergency response procedures;
6. A public awareness campaign aimed at informing both First Nation decision-makers of their roles and responsibilities in ensuring the safety of water supplies within their communities and First Nation households of measures they can take to protect the quality of water within their home and community; and
7. A comprehensive set of clearly defined standards, protocols and policies, using a multi-barrier approach.
2.0 Application

Any water system that produces drinking water destined for human consumption, that is funded in whole or in part by INAC, and that serves five or more households or a public facility must comply with the requirements of this protocol. Specifically, this protocol and its requirements apply to the following types of drinking water systems:

- Small Community Systems - Small Community Systems are drinking water systems that serve between five and 100 private households, or public facilities/buildings, or both.
- Community Systems - Community Systems are drinking water systems that serve more than 100 private households, or public facilities/buildings, or both.
- Public Facilities – A Public Facility is a non-commercial facility that is owned or operated by the Crown or Chief and Council and serves a public function, such as a school, health clinic, band office, retirement or nursing home, or daycare centre.
- Trucked Systems – Trucked Systems are drinking water systems that use tank trucks to deliver potable water to consumers.

To assure compliance with INAC policies and industry best practices, PWGSC for INAC staff will provide professional and technical services with a view to assisting First Nations in the design, construction, operation, and maintenance of their water systems.

This protocol does not apply to drinking water systems that serve four or fewer households.
3.0 Multi-barrier Approach to Water Protection

This protocol is based on the multiple barrier approach to drinking water protection, a strategy intended to prevent water-borne contaminants in drinking water by ensuring effective safeguards are in place at each stage of a drinking water system. The four main components of the multiple barrier approach (MBA) include:

- Protection of raw water sources;
- Effective treatment of drinking water;
- Maintenance of a clean distribution system; and
- Comprehensive testing to confirm water quality.

At the point where it is delivered to a user for human consumption, drinking water must meet the water quality criteria set out in the latest edition of Health Canada’s Guidelines for Canadian Drinking Water Quality (GCDWQ). A summary table entitled “Summary of Guidelines for Canadian Drinking Water Quality” is updated periodically and published by Health Canada. The current web link to Health Canada’s Summary of Guidelines for Canadian Drinking Water Quality is listed in Appendix A.

In addition to this document INAC is developing a protocol for the treatment and safe disposal of wastewater in First Nations communities.

3.1 Source Protection Requirements

Source protection, the prevention of contaminants from entering into water sources, is the first layer of defence in a multi-barrier approach to water protection. FN authorities responsible for drinking water systems covered by this protocol shall participate with other stakeholders in the development and implementation of a watershed and aquifer protection plan. First Nations communities shall also develop and implement community-specific source protection plans to prevent, minimise, or control potential sources of contaminants in or near the community’s raw water sources. Guidance on developing a source protection plan is provided in Appendix B.

3.2 Treatment Requirements

The minimum level of treatment required to make drinking water microbiologically safe depends on the quality and type of water source as well as the size and type of the population served as previously defined. This protocol recognises that primary disinfection and secondary disinfection are separate treatment processes designed to provide different outcomes:

- Primary disinfection is a contiguous part of the treatment process and is intended to kill or inactivate pathogenic microorganisms that may be present in the source water before secondary disinfection (if installed) takes place.
- Secondary disinfection (distribution system disinfection) is intended to protect the distribution system from re-contamination. It provides a residual charge of disinfectant
throughout the distribution system to prevent re-growth of microorganisms in the system as well as to kill or inactivate microorganisms that may enter the distribution system. Distribution system means a system of water mains, reservoirs, pumping stations, valves, and other appurtenances used to supply water for human consumption. Chlorine is the most commonly used water disinfectant for secondary (residual) disinfection.

Any drinking water system that provides disinfected water for human consumption must be equipped with standby chlorination equipment to ensure adequate disinfection in case of emergency, particularly if the main disinfection equipment ceases to function.

Although disinfecting agents other than chlorine are available, each has usually demonstrated shortcomings when applied to a small-community water supply. Proposals for disinfecting agents other than chlorine must be approved by the reviewing authority prior to preparation of final plans and specifications. All chemical additives used for water treatment must be certified to NSF/ANSI Standard 60: Drinking Water Treatment Chemicals – Health Effects. A copy of this standard may be obtained from NSF International (www.nsf.org).

### 3.2.1 Minimum Treatment Requirements for Groundwater Sources

Groundwater is water located in subsurface soil aquifers where the overburden is sufficient to act as an effective filter to remove contaminants. For a groundwater source that supplies drinking water destined for human consumption to a distribution system serving five or more households or one or more public facilities, the minimum required treatment is:

- Primary and secondary disinfection combined with maintenance of a free chlorine residual of 0.2 milligrams per litre (mg/L) throughout the distribution system (and at all times provide at least 4-log (99.99 percent) removal or inactivation of viruses before water enters the distribution system).

Plants designed for disinfecting groundwater using a treatment process other than chlorine (or chlorine dioxide) disinfection (i.e. ultraviolet light, ozonation, membranes) must provide a treatment that achieves at least 4-log (99.99 percent) removal or inactivation of viruses. If a plant does not employ chlorination in its primary disinfection process, then it should employ chlorination in a secondary disinfection step to provide a residual disinfectant after treatment.

### 3.2.2 Surface Water and Groundwater Under Direct Influence

Surface water, which is susceptible to microbiological contamination through various pathways, requires more treatment than groundwater. For a surface water source, or a groundwater source under direct influence of surface water (GUDI), that supplies drinking water for human consumption to a distribution system serving five or more households or one or more public facilities, the minimum required treatment is:

- Filtration; and
- Primary disinfection for inactivation of microbes and secondary disinfection with maintenance of a chlorine residual of 0.2 mg/L throughout the distribution system [and at all
times provide at least 3-log (99.9 percent) removal or inactivation of both *Giardia lamblia* and *Cryptosporidium parvum* cysts, and at least 4-log (99.99 percent) removal or inactivation of viruses before water enters the distribution system].

At least 0.5-log removal or inactivation of Giardia cysts, and 2-log removal or inactivation of viruses, must be provided through the disinfection portion of the overall water treatment process.

A definition of groundwater that is under direct influence of surface water may be found in Appendix C. It is the responsibility of Chief and Council to obtain a determination of whether or not a groundwater supply is under the direct influence of surface water. Obtaining this determination may require the services of a licensed hydrogeologist.

### 3.2.3 Contact Time Requirements

The Water System Operator (WSO) is responsible to ensure that an appropriate contact time between drinking water and disinfectants is provided to the water before it reaches the first consumer on the distribution system during periods of peak flow. The period of contact time required (calculated at peak flow rates) is based on the type, temperature, and quality of source water.

References for calculating required dose concentration and contact time for small community systems and community systems can be found in Appendix D. In addition, concentration-time (CT) tables for the inactivation of protozoan cysts and viruses by chlorine, chlorine dioxide, and chloramine at various temperatures and pH values may be found listed in the document entitled “Procedure for Disinfection of Drinking Water in Ontario” (available from the Ontario Ministry of the Environment or at [http://www.ene.gov.on.ca/envision/gp/4448e.htm](http://www.ene.gov.on.ca/envision/gp/4448e.htm)). The tables identify the CT values for free chlorine and other chemical disinfectants required for specific values of log inactivation of protozoan cysts and target viruses at specific temperatures and pH levels.

### 3.3 Distribution System Requirements

To maintain drinking water quality after it leaves a treatment plant (whether via a piped distribution network or by trucked water delivery system), it is the responsibility of the Water System Operator to ensure that a minimum chlorine residual is maintained in delivered water at all times to protect against bacteriological re-growth in the system and to kill or inactivate microbes that may enter at some point in the distribution system. It is recommended that secondary disinfection be achieved by applying chlorine, or chloramine (unless prohibited by law) to provide a persistent residual disinfectant.

### 3.3.1 Piped Water Systems
In piped water systems, all water shall be chlorinated and shall have a free chlorine residual of no less than 0.2 mg/L at all points throughout the distribution system.

### 3.3.2 Trucked Water Systems

In trucked water systems, all water shall be chlorinated and shall have a free chlorine residual of no less than 0.2 mg/L at the time of delivery.

No person shall operate a trucked drinking water distribution system without first obtaining adequate training as described in Appendix E (including provincial water system operator certification if available). Other requirements beyond training for trucked water systems are discussed in Appendix E.

### 3.4 Monitoring Requirements

In general, the two primary health-related water quality parameters are: turbidity and bacteriological quality. The maximum acceptable concentration (MAC) for the bacteriological quality of small community systems, community systems, and systems serving one or more public facilities is no coliforms detectable per 100 mL. The maximum allowable turbidity in groundwater or filtered water is 1.0 nephelometric turbidity units. More information on turbidity requirements can be found in Appendix F.

Three types of monitoring are required for First Nations drinking water systems:
1. Operational monitoring
2. Quality Assurance & Quality Control
3. Compliance & third party monitoring

1. **Operational Monitoring**
   Operational monitoring is performed using daily and weekly water quality tests of raw, treated, and distribution system water (as summarised in Table 1). The purpose of ongoing operational monitoring is to verify water quality and system performance and is conducted by the water system operator under the direction of the band council.

   Sampling and testing methods and notification requirements for microbiological, chemical, physical, and radiological parameters are outlined in Health Canada’s “Procedure Manual for Safe Drinking Water in First Nations Communities South of 60°”, which can be obtained from the local Health Canada Environmental Health Officer or from an HC regional office.

   The frequency and location of sampling in First Nations water systems should be as specified in Sections 3.4.1, 3.4.2, 3.4.3, and 3.4.4 of this Protocol and as summarised in Table 1.

   Analyses of samples for microbiological parameters may be conducted by the trained operator onsite using appropriate analytical equipment and field kits (ex: Colilert). Analyses of samples for chlorine residual are to be undertaken (immediately after sampling) by the Water System Operator using appropriate analytical equipment and field kits.
In the absence of appropriate onsite testing equipment, analyses of samples for microbiological parameters should be conducted by an accredited laboratory. First Nations water system operators must use a laboratory accredited by one of the following: Canadian Association for Environmental Analytical Laboratories (CAEAL), the Standards Council of Canada (SCC), or, in Quebec, the Programme d'accréditation de laboratoires d'analyse environnementale (PALAE). SCC/CAEAL defines accreditation as the formal recognition of the competence of a laboratory to carry out specific tests. Accreditation is awarded to a laboratory for each individual test, e.g., the analysis of pesticides in drinking water.

The Water System Operator must keep an up-to-date register in which the dates and results of all required operational testing are recorded along with the name of the person who conducted the testing. The data collected for the register must be kept for a minimum of five years.

2. Quality Assurance & Quality Control
For quality assurance/quality control (QA/QC) purposes, ten percent of all samples for microbiological parameters will be submitted to a second accredited laboratory for comparison purposes.

The Water System Operator must keep an up-to-date register in which the dates and results of all required QA/QC testing are recorded along with the name of the person who conducted the testing. The data collected for the register must be kept for a minimum of five years.

3. Compliance & Third-Party Monitoring
Any weekly testing of distribution system water by Health Canada is for compliance and third party monitoring from a public health perspective and is not meant to replace INAC-mandated daily and weekly operational monitoring (of the source water, treated water, and distribution system) that must be conducted by the trained First Nations Water System Operator. Nevertheless, if weekly Health Canada distribution system test results for chlorine residual and bacteria are reliably delivered weekly to the Water System Operator, then the WSO may use the HC test results in lieu of conducting required weekly tests for bacteria on water samples collected from the distribution system. However, if Health Canada distribution system test results for bacteria (which must be accompanied by the chlorine residual results for that time and location) are not reliably delivered weekly to the WSO, then the WSO must collect weekly water samples from the most remote part of the distribution system and test them for both chlorine residual and bacteria.

Note: Testing for quality parameters such as THMs is not conducted under normal operational practice but must be done as per “Procedure Manual for Safe Drinking Water in First Nations Communities South of 60°” under circumstances where the parameter is identified as a potential risk. If after 5 years of testing THM concentrations never exceed 50% of the maximum allowable concentration, then the frequency of testing for THMs can be reduced to once every 3 years.
Table 1 – Roles and Responsibilities for Monitoring of Drinking Water Systems

<table>
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<th>System Type</th>
<th>Source</th>
<th>Operational Monitoring by Water System Operator</th>
<th>QA/QC by First Nation</th>
<th>HC (Third Party) Monitoring</th>
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| Small Community Systems and Public Facilities | Surface water or GUDI | Microbiological – One raw water sample per month (SW) or one raw water sample per well per month (GW) and one distribution sample per week.  
Chlorine residual – One treated water sample per day and one distribution system sample per week.  
Turbidity – one raw water sample per month (filtered surface water to have continuous monitoring equipment on each filter effluent line). | Of samples sent to be tested by an accredited laboratory, 10% must be sent to a second, accredited laboratory to verify quality of first lab. | Periodic testing (by Community-Based Water Monitors or Environmental Health Officers) of distribution system only. |
| Groundwater                              |        | Microbiological – One raw water sample per well per month and one treated water sample per week and one distribution sample per week.  
Chlorine residual – One treated water sample per day and one distribution system sample per week.  
Turbidity – One raw water sample per month | As above | As above |
| Community Systems and Public Facilities   | Surface water or GUDI | Microbiological – One raw water sample per week (SW) or one raw water sample per well per week (GW), and one treated water sample per week, and eight distribution system samples per month (with at least one in each week).  
Chlorine residual – Treated water to have continuous monitoring equipment with alarm and one distribution system sample per week.  
Turbidity – one raw water sample per month, combined with continuous monitoring equipment on each filter effluent line. | As above | As above |
| Groundwater                              |        | Microbiological – One raw water sample per well per week, one treated water sample per week, and eight distribution system samples per month (with at least one in each week).  
Chlorine residual – Continuous monitoring of treated water and at least one distribution system sample per day.  
Turbidity – One raw water sample per month | As above | As above |
| Trucked Water Systems                     | Water treatment plant | Chlorine residual – One sample per delivery day. | As above | As above |

* Samples that are to be tested for microbiological parameters and chlorine residual are to be collected at the same time and location at the most remote part of the distribution system. Chlorine residual should be tested immediately upon a sample being collected. For treated water obtained under a municipal type agreement (MTA), results of chlorine residual testing should be obtained from the treated water provider but samples must still be collected from the most remote point in the distribution system and tested for chlorine residual and bacteria.
3.4.1 Monitoring of Small Community Systems and Public Facilities

The types and frequency of water quality tests required for Small Community Systems (systems serving between five and 100 private households), or any public facilities/buildings, or both are outlined in the following sections.

3.4.1.1 Groundwater

The following testing for ongoing operational parameters is required of the operator for Small Community Systems that obtain their raw water from a groundwater source:

- At least one raw water sample per month for each well is to be tested for microbiological parameters.
- At least one treated water sample per day to be tested for chlorine residual (equivalent to free chlorine residual) at a location where the minimum required chlorine contact time has been completed.
- At least one distribution system sample per week (collected from a location at the most remote point in the system) to be tested for microbiological parameters and one distribution system sample per week to be tested immediately for chlorine residual.
- The location and frequency at which distribution system samples are collected by the operator for chlorine residual testing must be the same as that for microbiological testing.
- Turbidity testing must include one raw water sample per month.

3.4.1.2 Surface Water or GUDI

The following testing is required of the operator for Small Community Systems that obtain raw water from a surface water source or from a groundwater source that is under the direct influence of surface water:

- At least one raw water sample (surface water) per month to be tested for microbiological parameters (if using a groundwater source, then one sample from each well to be tested for microbiological parameters weekly).
- At least one treated water sample per day to be tested for chlorine residual (equivalent to free chlorine residual) at a location where the required chlorine contact time has been completed.
- At least one distribution system sample per week (collected from a location at the most remote point in the system) to be tested for microbiological parameters and one distribution system sample per week to be tested immediately for chlorine residual.
- The location and frequency at which distribution system samples are collected for chlorine residual testing must be the same as that for microbiological testing.
- Turbidity testing must include one raw water sample per month, with the exception of filtered surface water, which will have continuous monitoring equipment on each filter effluent line.
3.4.2 Monitoring of Community Systems and Public Facilities

The types and frequency of water quality tests required for Community Systems (systems serving more than 100 private households), or any public facilities/buildings, or both are outlined in the following sections.

3.4.2.1 Groundwater

The following testing is required of the operator for Community Systems that obtain their raw water from a groundwater source:

- At least one raw water sample and one treated water sample per week per well to be tested for microbiological parameters.
- Testing for chlorine residual (equivalent to free chlorine residual) of treated water in community systems is to be carried out by continuous monitoring equipment equipped with an alarm in the treatment system at a location where the intended chlorine contact time has been completed. In the event that the system is offline, at least one treated water sample and at least one distribution system sample per day are to be taken and tested immediately for chlorine residual.
- At least eight distribution system samples per month (collected from a location at the most remote point in the system), with at least one of the samples being taken in each week, to be tested for microbiological parameters and at least eight distribution system samples per month tested immediately for chlorine residual, with at least one sample collected and tested per week.
- The location and frequency at which distribution system samples are collected for chlorine residual testing must be the same as that for microbiological testing.
- Turbidity testing will include one grab sample per month collected from the raw water source before treatment.

3.4.2.2 Surface Water or GUDI

The following testing is required of the operator for Community Systems that obtain their raw water from a surface water source or from a groundwater source under the influence of surface water:

- At least one raw water sample (for surface water) or one sample per well (for groundwater) and one treated water sample per week to be tested for microbiological parameters.
- Testing for chlorine residual (equivalent to free chlorine residual) of treated water in community systems is to be carried out by continuous monitoring equipment fitted with an alarm in the treatment system at a location where the intended chlorine contact time has been completed. In the event that the system is offline, at least one treated water sample and at least one distribution system sample per day are to be taken and tested immediately for chlorine residual.
- At least eight distribution system samples per month (collected from a location at the most remote point in the system), with at least one of the samples being taken in each week, to be tested for microbiological parameters and at least eight distribution system samples per
month tested immediately for chlorine residual with at least one sample collected and tested per week.

- The location and frequency at which distribution system samples are collected for chlorine residual testing must be the same as that for microbiological testing.
- Turbidity testing for Community Systems will include one raw water sample per month combined with continuous monitoring equipment on each filter effluent line.

### 3.4.3 Monitoring of Trucked Water Systems

The person(s) in charge of a trucked water system must, at least once per delivery day, measure the quantity of free residual chlorine present in a water sample collected at the outlet of the tank. More information on meeting this protocol’s requirements for trucked water can be found in Appendix E. In addition, the person(s) in charge of a trucked water system must keep an up-to-date register in which the dates and results of required testing are recorded along with the name of the person who conducted the testing. The data collected for the register must be kept for a minimum of five years.

### 3.4.4 Reporting and Corrective Action for Adverse Results

Adverse water quality results (including inadequate chlorine residual) are to be reported immediately by the designated individual (e.g. plant operator or Environmental Health Officer) to Health Canada, INAC, band administration, and (where appropriate) the Provincial Medical Officer of Health so that corrective action by Chief and Council, including notification to consumers and follow-up sampling, can be performed promptly and in accordance with the community’s emergency response plan. An adverse water quality result is defined here as any health-related parameter that does not meet the acceptable concentration set out in the latest edition of Health Canada’s Guideline for Canadian Drinking Water Quality. Recommendations regarding corrective action may be provided to the Chief and Council by the Environmental Health Officer, as well as other qualified persons such as the PWGSC for INAC engineer, water treatment plant operator, or facility inspectors. Similarly, corrective actions may be defined in the plant's Emergency Response Plan (see Section 7.0).
4.0 System Design

Design requirements established under this protocol are as stipulated in “Design Guidelines for First Nations Water Works (Design Guidelines). The Design Guidelines, which will be effective April 1, 2006 for systems where design work has not begun as of that date, are available at the INAC web site (http://www.inac-ainc.gc.ca/h2o) and may be printed and inserted in this document as Appendix G.

4.1 Treatment Plants

Treatment systems must be designed and constructed based on the results of source water assessments in terms of quality and quantity of a source, as well as current and future water demands and they should be regularly reviewed during Asset Condition Reporting System (ACRS) inspections and updated as necessary. Items to consider in designing effective treatment systems include the treatment processes required, treatment components (including redundancies), equipment design, chemicals used, treatment efficiency, monitoring procedures, and local conditions. In assessing these components, potential hazards and their causes should be identified along with their associated health risks so priorities for risk management can be established.

Comprehensive, scientifically defensible, and achievable performance standards - based on industry-recognized principles - are essential to ensuring the effectiveness and reliability of treatment technologies. Decision makers must balance the desire to use the latest technologies against site-specific economic realities (including life-cycle costing analyses). Public health goals should be at the forefront of any treatment-related decision. Alternative approaches may be used if these have been demonstrated to the satisfaction of INAC to be equivalent or better ways of achieving the same objectives.

4.2 Distribution System

Piped distribution systems must be designed, constructed, and upgraded as necessary to eliminate dead-ends and cross-connections, prevent unauthorised access, allow for adequate disinfection, and ensure that water system capacity is sufficient to meet domestic demand, and fire protection flows when provided.

Because it has been shown that a significant number of waterborne disease outbreaks are caused by breakdowns in the distribution system, water system authorities should have in place active cross-connection control programs.

Treated water reservoirs and distribution systems will be designed, constructed, reviewed and upgraded as necessary, to take the following into account: best water management practices, and regulations; prevention of access by wildlife and unauthorized personnel; system capacity;
emergency water storage; contact time required for disinfection; minimization or elimination of dead ends, and cross-connection potentials.

4.3 Trucked Water Systems

Tank trucks used to deliver water in a trucked water system are to be considered as an extension of the water distribution system.

Under this protocol, drinking water that is transported in delivery trucks shall be obtained only from a public drinking water system that meets fully the requirements of this protocol. Every delivery truck shall be equipped with a tank fabricated from stainless steel or another material that is suitable for transporting drinking water and meets the requirements of NSF/ANSI Standard 61: Drinking Water System Components – Health Effects.

The operator of the delivery truck must have adequate training and certification, if available, in distribution systems. The tank must not be used to transport other materials, as these are likely to contaminate the water.

4.4 Building Code Requirements

Buildings and infrastructure should comply with the more stringent of either the applicable provincial or federal regulation or codes of practice for all building trades:

- Structures – Comply with the more stringent of either the applicable provincial building code or the National Building Code.
- Piping – Comply with the more stringent of either the applicable provincial plumbing code or the National Plumbing Code of Canada.
- Electrical and mechanical components - Comply with the more stringent of either the applicable provincial or national codes.

4.5 Commissioning Plans

Prior to any new or upgraded Small Community System or Community System being placed into service, it must undergo commissioning as set out in a commissioning plan that meets the requirements of INAC commissioning guidelines. A generic commissioning guide will be made available shortly at the INAC website (http://www.inac-aine.gc.ca/h2o).
5.0 Quality Assurance

To protect public health and safety and prolong the service life of water system assets, the water system must be inspected regularly to monitor its physical condition, identify maintenance deficiencies, and monitor ongoing system performance in providing safe drinking water.

5.1 Asset Condition Report System (ACRS) Inspection

For Small Community Systems, Community Systems, and systems serving a Public Facility, an ACRS inspection of the water system is to be performed once every three (3) years by a qualified person (as defined in the Guide for Annual Inspections of First Nations Drinking Water Systems (see Appendix H) to assess:

- Condition of the asset, adequacy of operating and maintenance efforts, and needs for additional maintenance work;
- Performance of the treatment process (in terms of monitored water quality parameters);
- Potential for microbiological contamination of the water works and identification of operational and physical improvements to mitigate this potential; and
- Adequacy of operator competency, overall risks, and conformity with this document.

The ACRS inspection report will be discussed with and submitted to the FN community, INAC/PWGSC, and HC. Water quality testing results from HC (exceedances and deficiencies only) and the FN and follow-up action reports for 3 years prior to the inspection will be submitted to the inspector or inspection agency for review and inclusion in the ACRS report. Inspections will be conducted in accordance with the ACRS Manual, the latest version of which will be made available at the general INAC web site (http://www.inac-ainc.gc.ca/h2o).

5.2 Annual Inspection

For Small-Community Systems, Community Systems, and systems serving a Public Facility, an inspection shall be completed annually to verify the performance of the system and update the information provided by ACRS inspections. The Annual Inspection is a collaborative process between the Chief and Council, INAC, and PWGSC. The purpose of an inspection is to ensure that:

a) Maintenance projects identified in ACRS inspections and approved as part of the bands annual capital plan have been completed;
b) Any additional urgent maintenance project needs are identified and the ACRS database is updated accordingly;
c) Updated cost information is entered into the ACRS database to reflect a) and b);
d) The treatment process performs to meet design standards; and

e) Operator level of certification meets the complexity level of the treatment plant.

The annual inspections will be site visits conducted by PWGSC regional staff or other qualified persons as defined in the Guide for Annual Inspections (see introduction of Appendix H). Water
quality testing results (from both HC and the FN) for the previous year along with follow-up action reports will be given to the inspector (PWGSC regional staff or other qualified persons as defined in Appendix H) for review and inclusion in the annual report/update to the ACRS report. The annual report/updated ACRS report will be discussed with and submitted to the FN and INAC.

Guidance on requirements for inspections can be found in Appendix H.

### 5.3 Record Keeping

The Water System Operator must keep an up-to-date register in which the dates and results of all required operational testing are recorded along with the name of the person who conducted the testing. The data collected for the register must be kept for a minimum of five years. In addition, water system managers must keep on file all records related to water quality monitoring, operations, and system maintenance (including laboratory analyses, ACRS reports, annual reports, and consultants reports) for a period of not less than five years.

### 5.4 Compliance Assurance

The intention of compliance assurance is to ensure appropriate remedial action and monitoring requirements are implemented to protect the quality of drinking water. The local authority (ex: Environmental Health Officer) and other stakeholders (such as INAC and PWGSC for INAC) may, depending on jurisdiction, recommend to Chief and Council remedial actions when there is a suspected or known risk to public health and safety or, where necessary, closure of the system may be requested. Procedures related to issuing and lifting Boil Water Advisories and Orders are outlined in Sections 6.4 through 6.9 of Health Canada’s “Procedure Manual for Safe Drinking Water in First Nations Communities South of 60°”, which can be obtained from the local Health Canada Environmental Health Officer or from an HC regional office.

INAC will ensure compliance with this protocol via ongoing funding conditions. As a term and condition of funding, First Nations will agree that where public health is at risk and the First Nation lacks the ability to address the issue, INAC has the right to intervene and engage third-party service providers to temporarily take over control and operation of a water system that is not in compliance with this protocol. In such a case, the required funding of the operations under INAC’s temporary control to operate and maintain the system will come from the First Nation’s budget.
6.0 Operator Certification Requirements

Water System Operator certification requirements will match the requirements of the applicable provincial system. Thus, operators of water treatment plants and distribution systems must be certified to the level specified by provincial operator certification requirements for the classification of system they operate. Managers of trucked water systems shall ensure that each operator of the delivery truck possesses adequate training (or a provincial Operator Certificate for distribution systems where applicable).

Guidance on provincial requirements for certification of water treatment plant and distribution system operators is provided in Appendix I. Information provided in Appendix I is subject to change by the Provincial department/agency responsible. Updates of Appendix I will appear periodically at the INAC web site (http://www.inac-ainc.gc.ca/h2o). But the latest information must be obtained directly from the respective Provincial department/agency.

7.0 Emergency Response Plan Requirements

It is required that all water system operating authorities have an emergency response plan (ERP) that can be referred to in case of an emergency that might present a threat to the health of people drawing their water from that system. Guidance for First Nations on developing emergency response plans for water systems in their communities can be found in Appendix J. Note: The emergency response plan should be reviewed from time to time. Reviewing the ERP and ensuring that emergency contact phone numbers are up to date is the responsibility of the FN.

8.0 PUBLIC REPORTING

To help community members stay informed as to the quality of drinking water provided by their water system, it is strongly encouraged that all First Nations water system operating authorities make available to their customers a copy of the most recent Annual Inspection Report (Appendix H) as well as copies of up-to-date annual summaries of water quality monitoring results. These records should be made available in printed format in an accessible on-reserve location such as the Band offices.
Appendix A

Summary of Guidelines for Canadian Drinking Water Quality

The Guidelines for Canadian Drinking Water Quality were published in booklet form by Health Canada in 1996. Since then, a number of changes have been made to various criterion values in the Guidelines but a new edition of the booklet has not been published.

To keep interested parties informed of changes to the Guidelines between publications of new editions of the booklet, a summary table called “Summary of Guidelines for Canadian Drinking Water Quality” (Summary Guidelines) is updated and published every spring on Health Canada’s website (http://www.hc-sc.gc.ca/ewh-semt/water-eau/index_e.html).

Each new summary supercedes all previous versions, including that contained in the published booklet.

It is recommended that every six months the Water System Manager and Operator of the band responsible for a water system obtain a printed copy of the most current version of the Summary Guidelines, from a local Health Canada office or from the Health Canada web site (http://www.hc-sc.gc.ca/ewh-semt/water-eau/index_e.html) and insert them in this document as Appendix A.
Appendix B
General Guidance on Developing a Source Water Protection Plan

(Environment Canada is developing a Guide, designed to aid Operating Authorities of water systems in First Nations Communities to develop an SWPP, which will supersede the material presented here).

Overview

A source water protection plan is the first element in the multi-barrier approach to water protection, which prevents contaminants from entering drinking water by providing a layered defence based on four main elements:

- Source water protection;
- Effective drinking water treatment;
- Maintenance of a clean distribution system; and
- Regular testing.

A primary element of the First Nations Water Management Strategy (FNWMS) is to encourage First Nation communities to develop source water protection plans (SWPPs) for their drinking water systems. Persons responsible (i.e. First Nations operating authorities) for drinking water systems covered by the protocol, must participate with stakeholders (ex: province, territory, conservation authorities, local municipalities, etc.) in the development and implementation of an SWPP.

The goal of a Source Water Protection Plan is to maintain healthy watersheds and aquifers that benefit all who have a stake in them. The plan is intended to be a flexible, evolving strategy providing an initial template of goals and actions based on current conditions, potential risks and hazards, and desired water quality objectives. The plan and its objectives can be expanded and adapted as its implementation progresses.

Source protection involves all steps required to prevent contaminants from entering raw drinking water sources.

The leadership of a team formed to develop an SWPP will depend on the mandates and interests of the team members, which will vary from area to area. Developing an SWPP can be approached in five steps:

- Step 1 – Identify team members (partners)
- Step 2 – Delineate a source water protection area boundary
- Step 3 – Identify potential contaminants and assess risk
- Step 4 – Develop the source water protection plan
- Step 5 – Develop a monitoring program
Step 1 – Identifying Team Members

Partners in the development of a Source Water Protection Plan should include representatives from all parties that have either a regulatory or stakeholder interest in the water resource.

A good start is to list the names, phone numbers, mailing addresses, and e-mail addresses of any potential partners who should be involved in either the development or implementation of the SWPP. This participant list should include individuals as well as representatives from various organisations and institutions including:

- Local or Regional Municipalities – Participants may include municipal planners, city engineers, city clerk department officials, transportation and utilities supervisors,
- Institutions – Participants may include people from universities and colleges representing various disciplines (agriculture, forestry, lake studies, ecological studies, environmental studies, water quality management, facilities management, and economics and business).
- Government department and agencies – Participants may include representatives from: federal departments (Indian and Northern Affairs Canada, Environment Canada, Natural Resources Canada, Agriculture Canada, Health Canada), provincial government departments (Ministry of the Environment, Ministry of Natural Resources), conservation authorities, etc.
- Agricultural interests – Participants may include representatives from provincial or local government departments as well as representatives of farm producers or processors.
- Industry – Participants may include representatives from local utilities, resource-based companies, and manufacturers.
- Commercial enterprises – Participants may include representatives from tourism-based enterprises such as lodges, campgrounds, and river tour operators.
- Non-profit/ public interest groups – Participants may include representatives from local residents associations, environmental groups, and wilderness and conservation groups.
- Technical Consultants/Advisors – Participants in this category are usually consultants who have been hired by the First Nation to help with the development and implementation of the Source Water Protection Plan.

Step 2 – Delineate a Source Water Protection Area Boundary

The purpose of Step 2 is to gather information that you and your partners will need for Step 3 (developing a source water protection plan). Historical information is gathered from published sources and local agencies, and new information is gathered from field surveys. Very often, the partners invited in Step 1 to participate in the development of the Source Water Protection Plan will themselves be excellent sources of information. Information to be gathered will fall into four categories:

- Data on watersheds and aquifers
- Natural features inventory
- Current and projected land uses
- Water users
Threats to water quality

Data on Watersheds and Aquifers
You will need maps and data detailing:
- Watershed and aquifer boundaries;
- Soil type zones;
- Significant hydrologic features including groundwater discharges (to surface waters), known recharge areas, wetland areas, and groundwater supplies under the direct influence of surface water (GUDI); and
- A provisional (tentative) water budget for the watershed(s) and aquifers(s).

Natural Features Inventory
The purpose of the natural features inventory (NFI) is to collect information relating to the condition of riparian zones (areas, such as shoreline, that adjoin a body of water) in the watershed. Undisturbed, vegetated riparian land can protect surface water bodies from pollutant loading. For example, vegetated stream banks prevent erosion from contributing sediments and other pollutants, such as phosphorus, to the water and provide shade to the water and aquatic biota. Vegetated riparian lands also provide habitat for wildlife. The types of vegetation growing in the riparian zone, the width of the riparian zone and other features can provide clues about the health of the water body. Additionally, the identification of rare or endangered native plants and animals can help watershed managers prioritize areas for protection.

Information for the NFI is collected both from field surveys and from published sources of data. Provincial and federal departments of natural resources may have compiled inventories of the plant and animal life in your area. With a large study area and limited time frame, field personnel cannot visit all of the riparian land to conduct new surveys. Therefore, selected areas, such as the locations of storm sewer outfalls or the headwaters of a water body, are chosen for site visits. Field visits are conducted to collect four types of information:
- The width of the riparian zone and the dominant vegetation growing in it
- Any apparent pollutant loading, such as stream bank erosion, road side litter or storm sewer outfalls
- The feasibility of using the site to collect future water quality samples
- Photographs to document the appearance and state of the site

Only dominant vegetation is documented during field visits, due to the large area covered and the impact riparian vegetation has on water quality. Vegetation information collected through this study will be supplemented by previously documented floral and faunal information. Therefore, all available, obtainable information will be integrated to provide an understanding about the nature of the watersheds’ natural resources.

Information collected from field visits and previous studies will be integrated to produce an assessment of the health of the watersheds as a whole and the relative health of various areas within the watersheds. Areas that contain rare or endangered native species or that are relatively undisturbed may be selected for preservation, as they perform significant
functions in the protection of water resources. Areas that are disturbed or that are sources of pollutant loading will be targeted for improvements. This information will not stand alone, but will be utilized with other data collected during this study, such as water quality data. A watershed is an integrated entity, impacted by all of our actions.

**Current and Projected Land Uses**
The following is a recommended list of information required to help identify current and projected land uses:
- Generalized maps of current land uses (scale of 1:50,000) including land-use designations as the principle designation of land-use business including large and small industry, residential, urban, agricultural and protected (parks, conservation easements)
- Specific maps designating and outlining current plans for projected development including type of development, timeframes and plans for provision of water to the current developments as outlined in current Official Plans for the area;

**Water Users**
Finally, collect all available information on major water users drawing water from aquifer sources to assemble:
- Water use inventories including groundwater takings (including private, communal, and municipal drinking water supplies as well as industrial, commercial, and agricultural water takings) as well as delineation of areas experiencing stress due to water taking presently; and
- Details of existing water rate schedules.

**Step 3 – Identify Potential Contaminants and Assess Risk**

In this step the team will survey the source protection area to develop a more-or-less comprehensive list of all potential threats to water quality within the protection area. Your review of potential threats to water quality may include:
- Known areas of water contamination (surface and groundwater), as well as
- Designated high-risk land uses;
- Identification of areas vulnerable to contamination;
- Identification of historical potential contaminants;
- Identification/decommissioning of abandoned or poorly constructed wells;
- Identification of existing wellhead protection areas, including risk reduction measures being undertaken;
- Past attempts for identification of potential contaminant sources that have been undertaken, such as through municipal groundwater studies or equivalent initiatives;
- Preliminary analysis of water quality including both surface water [compared to applicable water quality guidelines, such as Ontario’s Provincial Water Quality Objectives (PWQOs)] and groundwater [compared to applicable water quality guidelines, such as Ontario’s Drinking Water Standard (ODWS) highlighting areas in which chemical contamination currently appears to constrain current use as a raw water source for drinking water and where current contaminant levels in lakes and streams may be impairing ecological function or impairing beneficial uses.
- An inventory and analysis of high-risk activities including:
- Hazardous, municipal and private land-fill sites;
- Known locations of groundwater contamination with industrial by-products;
- Brownfields and abandoned sites;
- Direct industrial and municipal discharges to surface waters;
- Storm water discharges and infiltration lagoons/ponds;
- Septic fields and cemeteries; and
- Uncovered road-salt piles and snow dumps.

Where groundwater studies have been undertaken and wellhead protection areas designated, your assessment will outline:

- Documented threats to drinking water;
- Existing control or prevention initiatives;
- Evaluations of additional initiatives that could be utilized or explored as part of the Source Water Protection Plan;
- Monitoring and information needs highlighted by existing studies which, if addressed, can improve the quality of the subsequent SWPP; and
- Designations of existing groundwater supplies for which remediation activities are necessary so as to obtain contaminant levels consistent with applicable water quality guidelines and sufficient water quantities where apparently impaired by adjacent water takings.

**Step 4 – Develop the Source Water Protection Plan (SWPP)**

Once information about your watershed(s) and aquifer(s) has been pulled together, you are ready to start putting together a Source Water Protection Plan. Remember, your plan will be based on whatever information is readily available; it is unrealistic to hope to have all information required for a comprehensive SWPP. Be sure to note missing information during the plan development process. This process can be broken into three stages:

- **Stage 1 – Developing Objectives:** This is the stage where one decides what will be the objectives and priorities of the source water protection plan. During this stage, the partners will go back and forth between identifying objectives, how to set them, and how to measure them.
- **Stage 2 – Identify & Select Alternatives:** This is the stage where the partners will identify and select best source water protection alternatives that meet objectives, identify strategies to implement the selected alternatives, and determine how to measure progress.
- **Stage 3 – Write action plan and implement strategies and evaluate progress of efforts periodically.**

Remember, that these stages need not necessarily be done in this order. For instance, your group may want to conduct water quality monitoring in a stream while it continues to develop its objectives.
Step 5 – Develop a Monitoring Program

The purpose of a monitoring program is to verify that the SWPP developed in Step 4 meets its objectives and to ensure that the SWPP is updated if those objectives are not being met.

It is in this step that partners will select the type and amount of monitoring needed to verify that the SWPP is being implemented and is meeting its objectives. Monitoring should reveal changes or updates required for the SWPP.

Note

Environment Canada is developing a Guide designed to aid Operating Authorities of water systems in First Nations Communities to develop an SWPP.

References

- Ontario White Paper on Watershed-based Source Protection Planning
  Ontario Ministry of Environment, February, 2004
  Document web site: [http://www.ene.gov.on.ca/programs/3585e01.pdf](http://www.ene.gov.on.ca/programs/3585e01.pdf)

- Proposed Ontario Drinking Water Source Protection Act
  Ontario Ministry of Environment, 2004
  Document web site: [http://www.ene.gov.on.ca/envregistry/023184ea.htm](http://www.ene.gov.on.ca/envregistry/023184ea.htm)

- The Source Water Protection Primer
  Published by Pollution Probe, July, 2004
  Pollution Probe web site: [http://www.pollutionprobe.org](http://www.pollutionprobe.org)

- Developing a Municipal Source Water Protection Plan: A Guide for Water Utilities and Municipalities
  Published by Nova Scotia Environment and Labour, 2004

- Consider the Source – Drinking Water Pocket Guide # 3
  Published by U.S. Environmental Protection Agency
  Web site: [http://www.epa.gov/safewater/protect/swpocket.html](http://www.epa.gov/safewater/protect/swpocket.html)

- Know Your Watershed
  Published by Purdue University
  Web site: [http://www.ctic.purdue.edu/KYW/kyw.html](http://www.ctic.purdue.edu/KYW/kyw.html)
Appendix C

Definition of Groundwater
Under Direct Influence of Surface Water

The following drinking water systems will be deemed to be relying on groundwater under the direct influence of surface water:

1. A drinking water system that obtains water from a well that is not a drilled well or from a well that does not have a watertight casing that extends to a depth of 6 m below ground level.

2. A drinking-water system that obtains water from an infiltration gallery.

3. A drinking-water system that is not capable of supplying water at a rate greater than 0.58 L/s and that obtains water from a well, any part of which is within 15 m of surface water.

4. A drinking-water system that is capable of supplying water at a rate greater than 0.58 L/s and that obtains water from an overburden well, any part of which is within 100 m of surface water.

5. A drinking-water system that is capable of supplying water at a rate greater than 0.58 L/s and that obtains water from a bedrock well, any part of which is within 500 m of surface water.

6. A drinking-water system that exhibits evidence of contamination by surface water.

7. A drinking-water system in respect of which a written report has been prepared by a professional engineer or professional hydrogeologist that concludes that the system’s raw water supply is ground water under the direct influence of surface water and that includes a statement of his or her reasons for reaching that conclusion.

A water system is not deemed to be under direct influence of surface water if a written report prepared after August 1, 2000 by a professional engineer or professional hydrogeologist concludes that the raw water supply is not ground water under the direct influence of surface water and the report includes a statement of his or her reasons for reaching that conclusion.
Appendix D
Guidance on CT (Concentration x Time) Concept

The water system operator is responsible to ensure that an adequate contact time between drinking water and an appropriate concentration of chemical disinfectant is provided to the water before it reaches the first consumer on the distribution system during periods of peak flow.

Chlorine should be applied at a point that will provide optimum contact time after adequate mixing.

The actual period of contact time required (calculated at peak flow rates) varies based on the type of raw water source and temperature. As a rule of thumb, at least 15 minutes of contact time must be provided to the water before it reaches the first consumer on the distribution system during periods of peak flow.

References for calculating required dose concentration and contact time for community systems can be found below. In addition, concentration-time (CT) tables for the inactivation of protozoan cysts and viruses by chlorine, chlorine dioxide, and chloramine at various temperatures and pH values may be found listed in “Procedure for Disinfection of Drinking Water in Ontario” (available from the Ontario Ministry of the Environment or at http://www.ene.gov.on.ca/envision/gp/4448e.htm). The tables identify the CT values for free chlorine and other chemical disinfectants required for specific values of log inactivation of protozoan cysts and target viruses at specific temperatures and pH levels.

References
- Ontario Ministry of Environment, 2003, Procedure for Disinfection of Drinking Water in Ontario
  Web site: http://www.ene.gov.on.ca
  Web site: http://www.infraguide.ca
INAC has formed a working group to review technical requirements for trucked water systems as well as available training material and certification processes required for truck operators engaged in delivering potable water. First Nations will operate trucked water systems in accordance with established federal standards (under development) or provincial standards – whichever are the most stringent.

The working group will develop a standard for training which will be attached here as part of Appendix E. The balance of Appendix E will address technical requirements for a trucked water system, including:

- The definition of a trucked water system
- Who is responsible for a trucked water system
- Requirements for permits to operate
- Suspension of permits to operate
- Requirements for inspections and engineering assessments
- Operator training requirements
- Specifications and standards for equipment including tanks
- Operation and maintenance requirements
- Disinfection requirements
- Monitoring of drinking water quality
- Equipment storage
- Corrective action requirements
- Record keeping
- Public information
- Enforcement
Appendix F
Turbidity Requirements

Maximum allowable turbidity levels established under this protocol will be as required under Health Canada’s Guidelines for Canadian Drinking Water Quality. Health Canada criteria for turbidity requirements in drinking water are outlined below. It is recommended that the operator obtain a printed copy of the most current version of health Canada’s Turbidity Guideline, either from a local Health Canada office or from the Health Canada web site (http://www.hc-sc.gc.ca/ewh-semt/water-eau/index_e.html) and insert it in this document as part of Appendix F.

Under proposed changes to Health Canada’s turbidity guideline, systems that use a surface water source, or that use a groundwater source under the direct influence of surface water, should filter the source water to meet the following turbidity limits:

- **Chemically assisted filtration:**
  The treated water turbidity levels from individual filters should:
  - Be less than or equal to 0.3 NTU in at least 95% of the measurements made, or at least 95% of the time each calendar month; and
  - Not exceed 1.0 NTU at any time.

Where possible, the filtration system is to be designed and operated to reduce turbidity levels as low as possible, with a treated water turbidity target of less than 0.1 NTU at all times.

- **Slow sand or diatomaceous earth filtration:**
  The treated water turbidity levels from individual filters should:
  - Be less than or equal to 1.0 NTU in at least 95% of the measurements made, or at least 95% of the time each calendar month; and
  - Not exceed 3.0 NTU at any time.

Where possible, the filtration system should be designed and operated to reduce turbidity levels as low as possible, with treated water turbidity targets always less than 0.1 NTU.

- **Membrane filtration:**
  The treated water turbidity levels from individual filters should:
  - Be less than or equal to 0.1 NTU in at least 99% of the measurements made, or at least 99% of the time each calendar month; and
  - Not exceed 0.3 NTU at any time.

If membrane filtration is the sole treatment technology employed, secondary disinfection using chlorine or chloramine should follow the filter process. Where possible, the filtration system should be designed and operated to reduce turbidity levels as much as possible, with a treated water turbidity target of less than 0.1 NTU at all times.
Appendix G
Design Guidelines for First Nations Water Works

Design requirements established under this protocol are as stipulated in “Design Guidelines for First Nations Water Works” (Design Guidelines). A copy of the most current version of the Design Guidelines can be obtained from your local INAC office in your region and it is also available at the INAC web site (www.inac-ainc.gc.ca/h2o). It is recommended that the operator obtain a current copy of the Design Guidelines and insert them in this document as Appendix G. The Design Guidelines must be adhered to in relation to the design of new systems or upgrades to existing systems (including projects that had not entered the design stage by April 1, 2006).
Appendix H
Guide for Annual Inspections of First Nations Drinking Water Systems

The inspection report is to be completed once a year for any system that produces water for human consumption, that is funded in whole or in part by INAC, and that serves five or more households or a public facility. The inspection is to be completed by a qualified person and who is not from the band involved [i.e. one of either: PWGSC engineer, Tribal Council engineer, Circuit Rider, engineering consultant, provincial water system inspector; all of whom must be certified (or equivalent) to the level of the system being inspected]. The purpose of this inspection is to assist First Nations in ensuring that their drinking water systems produce safe drinking water. This report concentrates on water system performance as indicated by water quality testing results, operational procedures, and operator certification level. All fields marked with an asterisk (*) are required by INAC headquarters for central agency reporting.

1.0 GENERAL INFORMATION

Band name: _____________  Band number: ______  WATERS database system #: ______

Population served: ____  * No. of connections: ____  *

Inspection date: ___ / ___ / ___ (yy/mm/dd)  Period being reported: ___ / ___ / ___ to ___ / ___ / ___

Name of inspector: ____________________________

Operating authority: ( band / service provider / MTA / other: ____________ )

Operator(s) or other person(s) interviewed (name/title): _____________ / _________

Type of source: (surface water / groundwater / groundwater under direct influence¹ / other)

Wellhead protected?  Yes/No  How? (bollards/capped/graded/other: _________)

Source water protection plan² (SWPP) in place? Yes / No
If no, target date: ___ / ___ / ___ (yy/mm/dd)

Treatment system type_________________ (Pressure filters, greensand filters, sand filters, membranes, etc)

Location where Annual Report will be available for public review: _______________

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1. See Appendix C of this Protocol for a definition of groundwater under direct influence of surface water.
2. See Appendix B of this Protocol for an explanation of Source Water Protection Plans
2.0 WATER SYSTEM PERFORMANCE

2.1 First Nation Water Quality Testing Results
For the period since the last inspection, the operator should provide a summary of all water quality testing results in accordance with INAC’s Protocol for Safe Drinking Water in First Nations Communities. Also provide a summary of operational and water quality testing (water chemistry, flow rates, etc.). A recommended tabular format for summarising data is shown in Annex A.
1. Provide a summary of dates and test results for any exceedance (ex: E. Coli) or deficiency (ex: chlorine residual) in measured (raw, treated, and distribution system) water quality parameters since the last inspection.
2. Describe remedial actions taken in response to adverse test results.

2.2 Health Canada Water Quality Testing Results
For the period since the last inspection, the operator should obtain from a Health Canada representative a summary of test result exceedances or deficiencies for all water quality testing conducted by Community-Based Water Monitors (CBWMs) or Environmental Health Officers (EHOs) as part of Health Canada’s third-party monitoring from a public health perspective and in accordance with sections 4 and 5 of Health Canada’s Procedure Manual for Safe Drinking Water in First Nations Communities South of 60°. A suggested format for summarising data is shown in Annex B.
1. Were water quality monitoring data obtained from Health Canada? (Yes / No) *
2. If no, why not? (HC did not collect data / Collected HC data not provided / Other ___________________ ) *
3. Provide a summary of dates and test results for any exceedance (ex: E. Coli) or deficiency (ex: chlorine residual) in measured water quality parameters. *
4. Describe remedial actions taken in response to exceedances or deficiencies in water quality parameters as detected by HC monitoring.

2.3 Drinking Water Advisories / Remedial Actions
Within one week of a drinking water advisory (DWA) being issued, the water system operator (WSO) must forward to the EHO and INAC/PWGSC representatives a written plan for remedying the problem(s) associated with the DWA. Since the last inspection, provide a summary listing of dates and durations (i.e. start dates and end dates) of drinking water advisories (DWAs) as well as follow-up actions, and the results of the actions (in terms of whether or not the DWA was lifted). Do not include DWAs arising from (non-public building) cistern problems, as these are private systems.
1. Is there a record of communications/reminders between the EHO and WSO regarding remedial actions taken in response to DWAs? Yes / No

3. An adverse test result is one in which the concentration of the water quality parameter being measured exceeds the guideline criterion value listed in Health Canada’s Guidelines for Canadian Drinking Water Quality published by Health Canada. Please check with Health Canada’s web site to obtain the latest criterion values of drinking water parameters.
3.0 SYSTEM MAINTENANCE AND OPERATIONS

3.1 Maintenance

1. a.) Is there a functional maintenance management plan (MMP) for the water system? Yes / No *

b.) If no, is there a plan to develop an MMP for the system? Yes / No

c.) If yes, what is the target date? __ / __ / ___ (yy/mm/dd)

2. Are maintenance activities scheduled and performed? Yes / No

3. Is there an annual budget allocated by the band for day-to-day operation and maintenance (not major capital) costs of the water system? Yes / No

4. Is the operator involved in the budget preparation process for operation and maintenance? Yes / No

5. Is the operator involved in tracking billing and expenditures related to the system? Yes / No

6. Does the budget appear to be adequate for normal operations and maintenance for this system? Yes / No

7. Is there a responsible and qualified party to ensure that operations and maintenance work is being undertaken? Yes / No

8. Are records kept of system repairs and upgrades and their costs? Yes / No

9. Are instruments and equipment calibrated on an appropriate schedule and used for their intended purpose? Yes / No

10. State the number and percent of outstanding health and safety projects (ACRS Group 2, Type 1) addressed for this year under review.
    Number: _______ Percent: _______ *

11. Summarise the status (# planned / budgeted /scheduled / underway / completed) of health & safety projects (ACRS Group 2, Type 1) that were identified in and since the last ACRS inspection (i.e., please submit two tables. A recommended tabular format for summarising data is shown in Appendix B).

12. Using a range from 0 to 3, estimate the O&M effort: ______
    (Where 0 = nonexistent, 1 = substandard, 2 = acceptable, 3 = exemplary)
3.2 Operations

1. Is there a current copy of standard operating procedures (SOPs) on site? Yes / No

2. Are there adequate quantities of treatment chemicals onsite? Yes / No

3. Are treatment chemicals stored properly? Yes / No
   (If no, provide details) ______________________________________________________

4. Are there any work-related health & safety issues? (ex: confined space) Yes / No
   (If yes, provide details) ______________________________________________________

5. Are there any worker compensation safety issues that need to be addressed? Yes / No
   (If yes, provide details) ______________________________________________________

6. Are there any significant changes to the plant since the last inspection? Yes / No
   (If yes, provide details) ______________________________________________________

7. a.) Are all major components of the system operating (pumps, filters, chlorinators)?
       Yes / No  (If no, provide details) ____________________________________________

       b.) Is the secondary disinfection (chlorination) system in constant operation and
           performing adequately? Yes / No

8. Are the following maintenance activities being performed?
   ▪ System equipped with (flushing stations / hydrants)
   ▪ Line flushing  Yes / No
   ▪ Line swabbing  Yes / No
   ▪ Hydrant flushing  Yes / No
   ▪ Reservoir cleaning  Yes / No
   ▪ Stand-by generator test runs  Yes / No
   ▪ Stand-by generator service hours  Date: ____  Hours: _____
   ▪ Fire pump tests  Yes / No
   ▪ Calibration of equipment
     ▪ Flow meter  Yes / No  Date: _____
     ▪ Chlorine dosing pump  Yes / No  Date: _____
     ▪ Chlorine residual meter  Yes / No  Date: _____
     ▪ Turbidity meter  Yes / No  Date: _____
     ▪ pH meter  Yes / No  Date: _____
     ▪ Other equipment calibrated:
       ▪ ___________  Yes / No  Date: _____
       ▪ ___________  Yes / No  Date: _____
       ▪ ___________  Yes / No  Date: _____
3.3 Testing & Record Keeping

1. Is adequate water quality testing equipment available? Yes / No

2. Are records being kept of daily meter readings for water volume flow rate? Yes / No

3. Are records being kept of daily test results of chlorine residual in the treated water? Yes / No

4. Are records being kept of daily test results of chlorine residual in the distribution system water? Yes / No

5. Are records kept of types, dosages, usage dates, and total amounts of chemicals used? Yes / No

6. Are records kept of operational problems (power failure, dose pump failure, low chlorine residual, high turbidity, etc.) and the actions that were taken to remedy the problem? Yes / No

7. Were anomalies and missing records properly explained? (Ex: operator away on sick leave) Yes / No / n/a

8. Are there records that should have been kept but were not? Provide list / n/a

3.4 System Classification and Operator Training

1. Treatment plant classification: ____ *

2. Distribution system classification: ____ *

3. a.) Operator certification level: WT: ____ * WD: ____ * (copy of certification must be made available to inspector)

   b.) If the operator is not certified to the classification level of both the treatment plant and distribution system, has the band created a training plan to prepare the operator for certification or to increase the level of certification? Yes / No / Pending

   c.) If yes, what is the target date: __ / __ / __ (yy/mm/dd)

4. a.) Is there a back-up operator? Yes / No *

   b.) If no, what is the target date to obtain certified back-up operator: __ / __ / __ (yy/mm/dd)

   c.) Back-up operator certification: WT: ____ * WD: ____ * (attach copy of certificate)
d.) If the backup operator is not certified to the classification level of both the treatment plant and distribution system, has the band created a training plan to prepare the operator for certification or to increase the level of certification? Yes / No / Pending

3.5 **Trucked water systems** (if no trucked water system, go to section 3.6)

1. Are maintenance activities such as tank inspection and cleaning scheduled and performed? Yes / No

2. Are adequate operational records being kept? Yes / No

3. Provide for the period since the last inspection a summary of dates for any deficiencies in measured chlorine residual concentrations in delivered water. Attach summary

4. a.) Does the bulk water truck operator possess appropriate training? Yes / No

   b.) If not, has the band created a training plan for the operator? Yes / No / Pending

5. Is printed information on cleaning and safety of individual cisterns and tanks made available to householders? Yes / No

3.6 **Circuit rider trainer report**

Summarise the previous circuit rider trainer (CRT) report in terms of issues recommendations, actions taken, and outstanding issues, including:

- Number of call-outs made by CRT
- Number of unscheduled emergency visits made by CRT.

3.7 **Emergency response plan**

1. a.) Is there an emergency response plan (ERP) in place? Yes / No *
   (Note: if no ERP in place, operator may obtain a sample plan from regional office of PWGSC for INAC)
   
   b.) If no, what is the target date for an ERP to be prepared? _________

2. Do key players, including provincial government, INAC, and HC regional offices have a copy of the ERP? Yes / No

3. When was it last updated or reviewed? ___ / ___ / ___ (yy/mm/dd)
ANNEX A
SUMMARY OF FIRST NATION OPERATIONAL WATER QUALITY TESTING RESULTS

Operational water quality test results may be provided using the following tabular formats.

Table 1 - Summary of microbiological testing by operator

<table>
<thead>
<tr>
<th>Sampling Location</th>
<th>Total # of samples tested for E. coli or Fecal Coliform</th>
<th>Number of samples containing E. coli or Fecal Coliform</th>
<th>Total # of samples tested for Total Coliforms</th>
<th>Number of samples containing Total Coliforms</th>
<th>Total # HPC samples tested</th>
<th>Range of measured HPC test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Min</td>
</tr>
<tr>
<td>Treated Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Please record the unit of measure used if it is not milligrams per litre.
Note 2: The MAC for bacteriological quality of drinking water is zero coliforms detected per 100 mL.
Note 3: No consecutive samples from the same sampling location or not more than 10% of samples from a distribution system in a given calendar month should show the presence of total coliform bacteria.

Table 2 - Summary of chlorine residual deficiencies (i.e. less than 0.2 mg/L free chlorine) and turbidity exceedances (as per Appendix F of the Drinking Water Protocol) in treated water sampled by the operator after a minimum 15 minutes contact time with disinfectant

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Chlorine residual</th>
<th>Total chlorine</th>
<th>Turbidity (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Please record the unit of measure used if it is not milligrams per litre.
Table 3 - Summary of chlorine residual deficiencies (i.e. less than 0.2 mg/L free chlorine) and turbidity exceedances (as per Appendix F of the Drinking Water Protocol) in treated water sampled by the operator from distribution system locations remote from the treatment facility

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Chlorine residual</th>
<th>Total chlorine</th>
<th>Turbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Please record the unit of measure used if it is not milligrams per litre.
Note 2: In very small water systems, the data from Table 2 would essentially be the same as that for Table 3.

Table 4 - Summary of status of health and safety projects (ACRS Group 2, Type 1) that were identified during and since the last ACRS inspection

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Status of Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Planned</td>
</tr>
<tr>
<td>Example: Change out chlorinator</td>
<td></td>
</tr>
</tbody>
</table>
Health Canada water quality test results obtained from EHOs or CBWMs may be provided using the following tabular formats.

**Table 1 - Summary of microbiological exceedances in the distribution system as measured by Health Canada’s EHOs or by CBWMs**

<table>
<thead>
<tr>
<th>Sampling Location</th>
<th>Total # of samples tested for E. coli or Fecal Coliform</th>
<th>Number of samples containing E. coli or Fecal Coliform</th>
<th>Total # of samples tested for Total Coliforms</th>
<th>Number of samples containing Total Coliforms</th>
<th>Total # HPC samples tested</th>
<th>Range of measured HPC test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Min</td>
</tr>
</tbody>
</table>

Note 1: Please record the unit of measure used if it is **not** milligrams per litre.

Note 2: MAC for bacteriological quality of drinking water is zero coliforms detected per 100 mL.

Note 3: No consecutive samples from the same sampling location or not more than 10% of samples from a distribution system in a given calendar month should show the presence of total coliform bacteria.

**Table 2 - Summary of chlorine residual deficiencies (less than 0.2 mg/L free chlorine) and turbidity exceedances (as per Appendix F of the Drinking Water Protocol) measured by Health Canada’s EHOs or by CBWMs**

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Free Chlorine Residual</th>
<th>Total Chlorine</th>
<th>Turbidity (NTUs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Please record the unit of measure used if it is **not** milligrams per litre.
### Table 3 - Results of routine chemical monitoring as per Section 4 of Health Canada’s Procedure Manual for Safe Drinking Water in First Nations Communities South of 60°

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sampling Locations</th>
<th>Criterion Guideline Value from GCDWQ**</th>
<th>Type of Criterion (i.e.: MAC, IMAC, AO)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Source Water</td>
<td>Distribution System</td>
<td></td>
</tr>
<tr>
<td>Alkalinity</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Aluminium</td>
<td>0.1</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Ammonia (as nitrogen)</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.05</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Barium</td>
<td>1.0</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Benzene</td>
<td>0.005</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Boron</td>
<td>5</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.005</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Calcium</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Chloride</td>
<td>≤ 250</td>
<td></td>
<td>AO</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.05</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Colour (in true colour units)</td>
<td>≤ 15 TCU</td>
<td></td>
<td>AO</td>
</tr>
<tr>
<td>Copper</td>
<td>≤ 1.0</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Corrosivity (saturation index at 4° C)</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Cyanide</td>
<td>0.2</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Fluoride</td>
<td>1.5</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Hardness</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Iron</td>
<td>≤ 0.3</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Lead</td>
<td>0.010</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Magnesium</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Manganese</td>
<td>≤ 0.05</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.001</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Nitrate</td>
<td>45</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>pH</td>
<td>6.8 – 8.5</td>
<td></td>
<td>AO</td>
</tr>
<tr>
<td>Phenols</td>
<td>--</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Phosphorous</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Potassium</td>
<td>n/a</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.01</td>
<td></td>
<td>MAC</td>
</tr>
<tr>
<td>Silver</td>
<td>--</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Substance</td>
<td>Limit</td>
<td>Unit</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>≤ 200</td>
<td>MAC</td>
<td></td>
</tr>
<tr>
<td>Sulphate</td>
<td>≤ 500</td>
<td>MAC</td>
<td></td>
</tr>
<tr>
<td>Total dissolved solids</td>
<td>≤ 500</td>
<td>MAC</td>
<td></td>
</tr>
<tr>
<td>Total solids</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Turbidity (in NTUs)</td>
<td>See Appendix F</td>
<td>MAC/AO</td>
<td></td>
</tr>
<tr>
<td>Uranium</td>
<td>0.02</td>
<td>MAC</td>
<td></td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>0.002</td>
<td>MAC</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>≤ 5.0</td>
<td>AO</td>
<td></td>
</tr>
</tbody>
</table>

Note: Please record the unit of measure used if it is not milligrams per litre.

** - Guideline criterion values listed above are per the *Guidelines for Canadian Drinking Water Quality* published by Health Canada as of the date of issue of this Guide. Please check with Health Canada’s web site to obtain the latest criterion values of drinking water parameters.
Appendix I
Guidance on Provincial Operator Certification Requirements

Operator certification requirements for First Nation water systems will match applicable provincial requirements. Thus, operators of water treatment plants and distribution systems must be certified to the level required for their respective drinking water system as specified by the appropriate provincial operator certification program. Managers of trucked water systems shall ensure that the operator of the delivery truck possesses adequate training (or a provincial Operator Certificate for distribution systems where applicable).

The most up-to-date version of this appendix will be made available at the INAC web site (www.inac-ainc.gc.ca/h2o). At this web site, you will also find links to sources of information on water and wastewater operator training, certification and courses. A province-by-province summary of provincial requirements for operator training and certification is outlined below:

**British Columbia**

Pre-requisites: Grade 12 or combination of education and experience (see tables below)
Length of program: Varies by level
Method of delivery: In-class or self-directed
Certifications provided: Small System, Operator-in-Training (OIT), and Levels 1, 2, 3, and 4

<table>
<thead>
<tr>
<th>Category</th>
<th>Education</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator-in-training</td>
<td>12 years of education</td>
<td>3 months experience or completion of an approved course</td>
</tr>
<tr>
<td>(OIT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small water system</td>
<td>10 years of education + 1.5 CEUs</td>
<td>6 month of experience/50 hours hands-on</td>
</tr>
<tr>
<td>(SWS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small wastewater system</td>
<td>10 years of education + 1.5 CEUs</td>
<td>6 month of experience/50 hours hands-on</td>
</tr>
<tr>
<td>(SWWS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pre-requisites: Operator-in-training and Small Systems
Pre-requisites: Levels 1, 2, 3, and 4

<table>
<thead>
<tr>
<th>Category</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water treatment (WT)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Water distribution (WD)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Municipal wastewater treatment (MWWT)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Wastewater collection (WC)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Industrial wastewater treatment (IWWT)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
</tbody>
</table>

British Columbia notes:
- GED = General Education Diploma
- CEU = Continuing Education Unit
- DRC = Direct responsible charge
- Education of 14 years means Grade 12 or General Education Diploma 12 (GED 12) plus 2 additional years of education.
**Alberta**

Pre-requisites: Grade 12 or combination of experience and training (see tables)
Method of delivery: In-class from AWWOA or other applicable approved training
Certifications provided: Small Systems Operations, Operator Levels 1, 2, 3, and 4

### Pre-requisites

<table>
<thead>
<tr>
<th>Category</th>
<th>Education</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small water systems (SWS)</td>
<td>1.2 Continuing Education Units (CEUs) small water system course</td>
<td>Minimum 6 months experience in municipal facility</td>
</tr>
<tr>
<td>Small wastewater systems (SWWS)</td>
<td>1.2 CEUs small wastewater system course</td>
<td>Minimum 6 months operating experience in municipal facility</td>
</tr>
<tr>
<td>Level 1</td>
<td>High school diploma, GED Transcript, or high school equivalency diploma</td>
<td>1 year operating experience in a municipal facility</td>
</tr>
<tr>
<td>Level 2</td>
<td>High school diploma, GED Transcript, or high school equivalency diploma.</td>
<td>3 years operating experience in a municipal facility or 2 years operating experience in a municipal facility plus 1 year post-secondary education (45.0 CEUs). Must be 1 year elapsed time between passing Level 1 exam and challenging Level 2 exam.</td>
</tr>
<tr>
<td>Level 4</td>
<td>High school diploma, GED Transcript, or high school equivalency diploma.</td>
<td>4 years operating experience in a municipal treatment plant</td>
</tr>
</tbody>
</table>

Alberta notes:
- GED = General Education Diploma
- CEU = Continuing Education Unit
- Each level has four categories: water treatment, wastewater treatment, water distribution, and wastewater collection.
- It is possible to work in more than one category in the same year.
Saskatchewan

Pre-requisites: Grade 10 (or GED 10), or Grade 12 (or GED 12), or combination of experience and training (see tables).
Length of program: Varies by level
Method of delivery: Accredited college
Certifications provided: Small Systems, Classes 1, 2, 3, and 4

Pre-requisites: Operator-in-training and Small Systems

<table>
<thead>
<tr>
<th>Category</th>
<th>Education</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small water system (SWS)</td>
<td>Grade 10 or GED 10</td>
<td>6 month of experience</td>
</tr>
<tr>
<td>Small wastewater system (SWWS)</td>
<td>Grade 10 or GED 10</td>
<td>6 month of experience</td>
</tr>
</tbody>
</table>

Pre-requisites: Classes 1, 2, 3, and 4

<table>
<thead>
<tr>
<th>Category</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Class 4</th>
<th>Class 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water treatment (WT)</td>
<td>Educ.</td>
<td>Exp.</td>
<td>Educ.</td>
<td>Exp.</td>
<td>DRC</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Wastewater treatment (WWT)</td>
<td>Educ.</td>
<td>Exp.</td>
<td>Educ.</td>
<td>Exp.</td>
<td>DRC</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Wastewater collection (WWC)</td>
<td>Educ.</td>
<td>Exp.</td>
<td>Educ.</td>
<td>Exp.</td>
<td>DRC</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>16</td>
</tr>
</tbody>
</table>

Saskatchewan notes:
- GED = General Education Diploma
- CEU = Continuing Education Unit
- DRC = Direct responsible charge
- Education of 14 years means Grade 12 or GED 12 plus 2 additional years of education.
- In cases where an operator is required to have four years of operational experience, two of those years must be in a direct responsible charge (DRC) position.
Manitoba

Pre-requisites: Grade 10 (or GED 10) or Grade 12 (or GED 12) (see tables)
Length of program: Varies by level
Method of delivery: Accredited provincial college
Certifications provided: Small Systems, Classes 1, 2, 3, and 4

Pre-requisites: Small Systems

<table>
<thead>
<tr>
<th>Category</th>
<th>Education</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small water system (SWS)</td>
<td>Grade 10 or GED 10</td>
<td>6 month of experience</td>
</tr>
<tr>
<td>Small wastewater system (SWWS)</td>
<td>Grade 10 or GED 10</td>
<td>6 month of experience</td>
</tr>
</tbody>
</table>

Pre-requisites: Classes 1, 2, 3, and 4

<table>
<thead>
<tr>
<th>Category</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Class 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water treatment (WT)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Water distribution (WD)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Wastewater treatment (WWT)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Wastewater collection (WWC)</td>
<td>12</td>
<td>1</td>
<td>12</td>
<td>3</td>
</tr>
</tbody>
</table>

Manitoba notes:
- GED = General Education Diploma
- CEU = Continuing Education Unit
- DRC = Direct responsible charge
- Education of 14 years means Grade 12 or GED 12 plus 2 additional years of education.
Ontario

Pre-requisites: Grade 12, GED 12, or combination of experience and training (see table)
Length of program: Varies by level
Method of delivery: Private training companies and community colleges
Certifications provided: Operator Classes 1, 2, 3, and 4

Pre-requisites for Classes 1, 2, 3, and 4

<table>
<thead>
<tr>
<th>Category</th>
<th>Education</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator-in-Training</td>
<td>Grade 12 or GED 12</td>
<td>N/A</td>
</tr>
<tr>
<td>Class 1</td>
<td>Grade 12 or GED 12</td>
<td>1 year operating experience at Class 1</td>
</tr>
<tr>
<td>Class 2</td>
<td>Grade 12 or GED 12</td>
<td>Three years operating experience at Class 1 or higher</td>
</tr>
<tr>
<td>Class 3</td>
<td>Grade 12 or GED 12 plus 2 years of relevant education or training</td>
<td>Four years of experience as an operator including at least 2 years as operator-in-charge at a Class 2, 3, or 4 facility.</td>
</tr>
<tr>
<td>Class 4</td>
<td>Grade 12 or GED 12 plus 4 years of relevant education or training</td>
<td>Four years of experience as an operator including at least 2 years as operator-in-charge at a Class 3 or 4 facility.</td>
</tr>
</tbody>
</table>

Ontario notes:
- GED = General Education Diploma
- DRC = Direct responsible charge
- Each level has four categories: water treatment, wastewater treatment, water distribution, and wastewater collection.
Quebec

Pre-requisites: High school graduation or combination of experience and training.
Length of program: Varies from 3 days to 8 days based on complexity of facility for which the training is designed.
Method of delivery: Centre de Formation Professionnel Paul-Gérin Lajoie (UQAM)
Certifications provided: Training is for existing operators. Certification is not by standardised level (ex: 1, 2, 3, 4) but instead is tailored to operator’s particular facility.

Atlantic Canada
(Comprised of Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland and Labrador)

Pre-requisites: Grade 12, GED 12, or combination of experience and training (see table)
Length of program: Varies by level
Method of delivery: ?
Certifications provided: Operator Classes 1, 2, 3, and 4

Pre-requisites for Classes 1, 2, 3, and 4

<table>
<thead>
<tr>
<th>Category</th>
<th>Education</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Grade 12 or GED 12</td>
<td>Minimum 1 year operating experience at Class 1</td>
</tr>
<tr>
<td>Class 2</td>
<td>Grade 12 or GED 12</td>
<td>Three years operating experience at Class 1 or higher</td>
</tr>
<tr>
<td>Class 3</td>
<td>Grade 12 or GED 12 plus 2 years of post-secondary education</td>
<td>Four years operating experience of which 2 years must be in Class 2 or higher. Half of the experience must be in DRC</td>
</tr>
<tr>
<td>Class 4</td>
<td>Grade 12 or GED 12 plus 4 years of post-secondary education</td>
<td>Four years operating experience of which 2 years must be in Class 3 or higher. Half of the experience must be in DRC</td>
</tr>
</tbody>
</table>

Atlantic notes:
- GED = General Education Diploma
- DRC = Direct responsible charge
- Each level has four categories: water treatment, wastewater treatment, water distribution, and wastewater collection.
Appendix J
Guidance on Developing Emergency Response Plans for Water Systems in First Nations Communities

This guide has been developed to aid operating authorities of water systems in First Nations communities to develop an Emergency Response Plan.

1.0 Introduction

This appendix includes the rationale for an emergency response plan, provides examples of the most common types of emergencies and specific responses to those emergencies, and prompts operators to develop a list of people and agencies they may need to contact in case of emergency. Although this material is designed to be used by smaller facilities, it can also serve as a useful review document for operators of larger waterworks systems with established emergency response plans.

When an emergency does happen you should immediately start taking the necessary actions to resolve it - not stand around wondering what you should do first, or next. A properly prepared, well thought out emergency response plan will tell you exactly what to do and whom to call so that you can respond rapidly and effectively to any disruption or contamination of your water system.

To develop your own Emergency Response Plan, first you have to identify the different kinds of potential problems that could affect water quality or quantity in your system. Then you have to determine specific solutions to each of those problems before they occur. The act of planning for an emergency may actually help you prevent one from happening. By making a thorough evaluation of all the potential “trouble spots” or vulnerable points in your particular system, you may identify steps you can take now that will prevent an emergency from happening later. Conditions which will require boil water advisories, requests for assistance, advice about tapping into alternative sources, and other possible concerns should all be identified in advance...because when the emergency happens you don’t want to waste time deciding whom to call and what to tell people.

Attached are several examples of situations when an emergency response plan is necessary and the appropriate types of actions required addressing the situation. The following list is by no means exhaustive. This document should be used as a guideline for outlining your own community specific emergency response plan.
2.0 WHAT SHOULD YOUR EMERGENCY RESPONSE PLAN INCLUDE?

2.1 LIST OF CONTACTS

Your emergency response plan should include a list of phone numbers (updated regularly) of people and agencies that should be contacted in the event of any kind of emergency:
- System owners and operators;
- repair services;
- alternative water suppliers;
- media representatives;
- government agencies; and
- the people who draw water from your system.

Having a list of all of the people and agencies you will need to contact, and the order in which you should contact them all in the event of an emergency, will save you time when time is really important. It will also act as a checklist to make sure you have contacted everyone you are supposed to. In addition, it will also help remind you of local resources that may be available to help you respond to an emergency.

2.2 LIST OF POTENTIAL EMERGENCY SITUATIONS

All potential emergency situations, which could either make the water unsafe, prevent the flow of water or pose a health risk should be identified while preparing the emergency response plan. Some of the potential categories you should identify include:
- Contamination of source (i.e. leakage of gas or other hazardous material into water course)
- Loss of source
- Flood conditions
- Mudslides above intake
- Chlorinator failure
- Broken water main
- Pump failure
- Power failure
- Backflow or back siphonage
- Chlorine gas leaks
- Spills of disinfected water into fish bearing streams
- Earthquake
- Fire (forest fire in watershed or fire at the water treatment plant)

Operators of small water systems of FN communities need to list only the actions that they must carry out immediately to deal with the specific emergency situation. Longer term solutions or activities to correct the situation can always be developed – with the assistance and input of local experts – after these initial activities, depending on the specifics of that particular emergency situation.
2.3 COMMUNICATIONS PLAN

A good communications plan is the key element of your emergency response plan. It plays a key role in how well you are able to respond during an emergency. First, you must be able to alert all the users on your system as soon as possible, especially if there is any possible risk to their health from drinking the water you provide.

Your particular communications plan depends, more than anything else, on the type of customers your system serves. Usually, small water systems serve one of the three following types:

- small to medium sized communities, from 15 to 300 connections, mostly residential homes, schools and commercial businesses;
- very small communities, from 2 to 14 connections, usually residential homes, nursing stations, band offices, etc, and;
- single commercial establishments, which provide drinking water to non-resident (transient) populations, such as day care centers, gas stations, trailer parks, restaurants.

3.0 HOW TO GET THE MESSAGE OUT TO THE COMMUNITY

3.1 Public Notices

A simple flyer is an effective way to ensure that every household in the community is aware of the current situation regarding the drinking water. The key is to make sure everyone gets the message that an emergency has occurred and that the water is no longer safe to drink. Some possible suggestions for the flyer include:

- Use a bright color paper to ensure that it is visible, especially for the youth and older community members (always use the same color paper for a water issue);
- Use a large font to ensure that the message can be read by everybody;
- Post or tape the flyer to the house and don’t simply place it in a mailbox or through the mail slot, where it has the chance to be missed.

3.2 Phone trees

In case of very small or medium sized communities, your communications plan may include organizing a “phone tree”. This is a pre-arranged plan that allows every household in the community to be contacted with an important message by their neighbours, by telephone. People who are phoned have the names of other people to phone, who in turn have the names of other people to phone, and so on down the line until everyone on the system has been alerted.

Many small communities already have some kind of “phone tree” system in place so they can respond quickly to other emergencies, such as alerting local volunteer firefighters.
Talk to your local fire chief; you may be able to use the same system for an emergency involving your water system.

For very small water systems where there are only one or two or a dozen connections, all located near each other, a “phone tree” probably isn’t necessary. In these cases, assuming that you (as the water purveyor) are already at the scene, you can pass the word around just by knocking on a few doors, and getting others to pass the word around too so that all the users are made aware of the problem right away.

If you are using a “phone tree” to send out a message to your community members telling them not to drink the water or to boil it before they drink it, make sure that people who either do not have phones or who are not in when the call is made also get the message.

3.3 Media

Local media—radio, television and newspaper—can also carry warnings to community members if the situation is serious enough. Make sure you contact local media as part of your emergency planning to establish your credibility with them, and to ensure that if you ever do have to call they’ll know who you are and how important it is to cooperate with you in alerting their readers or listeners.

3.4 Signs

If you are the owner of an operation which makes drinking water available to the public (i.e., a tap at a gas station which trailers or campers might use to fill up their water tanks, or a communal tap which people use to get their drinking water), you should hang a sign on the tap, which tells people that the water may be contaminated or unfit to drink. Include this in your emergency plan if this applies to you.
4.0 SYSTEM INFORMATION

The operators and administrators of FN water systems should include in the Emergency Response Plan a set of copies of as-built drawings for the system along with an overall plan of the system that shows the locations of:

- Water mains
- Critical control points (i.e. intakes, pump house(s), shut-off valves, connections between alternate sources, pressure zones, etc)
- Access routes, roads or trails to these critical control points
- The emergency contact list
- Tools and maintenance equipment
- High water-use industries
- High-risk facilities such as schools, day care centres, hospitals and long term care facilities

5.0 EQUIPMENT OPERATIONS

Standard operating procedures for switching to alternate power supplies and/or maintaining generators, including schematics of electrical systems in pump houses, may also be part of your emergency response plan, and should be located beside the equipment they refer to.
# EXAMPLES OF EMERGENCY SITUATIONS AND POSSIBLE RESPONSES

## CONTAMINATION OF SOURCE—SPILLS, VEHICLE ACCIDENT

### ACTIONS:
- Shut down pump or intake.
- Notify the Environmental Health Officer—Health Canada.
- Notify the Chief and Council.
- Contact the Provincial Emergency Preparedness Program.
- Notify all users.
- Contact government agencies for advice and assistance.
- Contact local media for public service announcement (where all customers can not be notified by phone).
- Arrange alternate source (i.e. bottled water, bulk hauler, storage tank, etc).
- Purge and disinfect lines as directed, after corrections have been made.

### CONTACTS:
- Local Health Practitioners (Community Health Representatives – Health Director and Nurse)
- Tribal Council Representative
- Provincial Emergency Preparedness Program
- Indian and Northern Affairs Canada (Capital Management Officer and/or Funding Services Officer)

## LOSS OF SOURCE

### ACTIONS:
- Ensure pump is shut off.
- Notify the Chief and Council
- Notify all users.
- Contact government agencies for advice and assistance.
- Arrange alternate source (i.e. bottled water, bulk hauler, storage tank, etc).
- Purge and disinfect lines as directed, after corrections have been made.

### CONTACTS:
- Local Health Practitioners (Community Health Representatives – Health Director and Nurse)
- Tribal Council Representative
- Indian and Northern Affairs Canada (Capital Management Officer and/or Funding Services Officer)
- Provincial Ministry of Environment.
# FLOOD CONDITIONS

**ACTIONS:**
- Notify the Chief and Council.
- Contact the Provincial Emergency Preparedness Program.
- Notify all users regarding the potential for water contamination, loss of pump, power, etc. Users should be advised to store some drinking water in advance, and to boil any suspect water to a “rolling boil” (approximately two minutes) or disinfect with chlorine when flood conditions exist.
- Contact government agencies for advice and assistance.
- Contact local media for public service announcement (where all customers can not be notified by phone).
- **ARRANGE ALTERNATE SOURCE (I.E. BOTTLED WATER, BULK hauler, storage tank, etc).**
- Purge and disinfect lines as directed, after corrections have been made.

**CONTACTS:**
- Local Health Practitioners (Community Health Representatives – Health Director and Nurse)
- Tribal Council Representative
- Provincial Emergency Preparedness Program
- Indian and Northern Affairs Canada (Capital Management Officer and/or Funding Services Officer)

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# BROKEN WATER MAIN

**ACTIONS:**
- Reduce pressure (but maintain enough pressure to prevent backflow).
- Call for repairs (i.e. plumber, excavator).
- Notify the Chief and Council.
- Notify all users of interruption of service.
- Advise local Public Health Agency.
- Arrange alternate source (i.e. bottled water, bulk hauler, storage tank, etc).
- Purge and disinfect lines as directed, after corrections have been made.

**CONTACTS:**
- Local Public Health Agency
- Environmental Health Officer
### CHLORINATOR FAILURE

**ACTIONS:**
- Advise local Public Health Agency.
- Notify the Chief and Council.
- Notify all users to boil suspect water to a “rolling boil” (approximately two minutes) or take other disinfection procedures in accordance with recommendation of local health officials.
- Arrange chlorinator repairs.
- Purge and disinfect lines as directed, after corrections have been made.

**CONTACTS:**
- Local Public Health Agency
- Environmental Health Officer
- Indian and Northern Affairs Canada (Capital Management Officer and/or Funding Services Officer)
- Chlorinator manufacturer and other technical advisors (Tribal Council representative)

### PUMP FAILURE

**ACTIONS:**
- Notify the Chief and Council.
- Notify all users of interruption of service.
- Call for repairs: pump manufacture.
- Advise local Public Health Agency (if interruption is not short-term).
- Arrange alternate source (i.e. bottled water, bulk hauler, storage tank, etc).
- Purge and disinfect lines as directed, after corrections have been made.

**CONTACTS:**
- Local Public Health Agency
- Environmental Health Officer
- Indian and Northern Affairs Canada (Capital Management Officer and/or Funding Services Officer)
- Pump manufacturer and other technical advisors (Tribal Council representative)

### POWER FAILURE

**ACTIONS:**
- Notify the Chief and Council.
- Call Hydro provider.
- Start back-up generator.
- Notify all users of interruption of service if back up is not capable of maintaining supply.
- Advise local Public Health Agency.
- Arrange alternate source (i.e. bottled water, bulk hauler, storage tank, etc).
- Purge and disinfect lines as directed, after corrections have been made.

**CONTACTS:**
- Local Public Health Agency
- Environmental Health Officer
- Indian and Northern Affairs Canada (Capital Management Officer and/or Funding Services Officer)
<table>
<thead>
<tr>
<th>ACTIONS:</th>
<th>CONTACTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>⬮ Advise local Public Health Agency.</td>
<td>⬮ Local Public Health Agency</td>
</tr>
<tr>
<td>⬮ Notify the Chief and Council.</td>
<td>⬮ Environmental Health Officer</td>
</tr>
<tr>
<td>⬮ Notify all users to boil suspect water to a “rolling boil” (approximately two minutes) or</td>
<td>⬮ Indian and Northern Affairs Canada (Capital Management Officer and/or Funding Services Officer)</td>
</tr>
<tr>
<td>take other disinfection procedures in accordance with recommendation of local health officials.</td>
<td></td>
</tr>
<tr>
<td>⬮ Purge and disinfect lines as directed, after corrections have been made.</td>
<td></td>
</tr>
</tbody>
</table>
CHECKLIST FOR EMERGENCY RESPONSE PLAN PREPARATION

1. EMERGENCY PHONE CONTACT LIST
   - Personnel
   - Government agencies
   - Repair services
   - Tribal Council

2. EMERGENCY PROCEDURES
   Response plan for each possible emergency situations:
   - Contamination of source
   - Loss of source
     - Flood conditions
     - Mudslides above intake
   - Chlorinator failure
   - Broken water main
   - Pump failure
   - Power failure
   - Backflow or back siphonage
   - Chlorine gas leaks
   - Spills of disinfected water into fish bearing streams
   - Earthquake
   - Fire (forest fire in watershed or fire at the water treatment plant)

3. MAP OF SYSTEM SHOWING
   - Water Mains
     - Critical control points
     - Intake(s)
   - Shut-off valves
   - Access routes to critical control points
   - Pump house
   - Emergency plan, tools and maintenance equipment
     - High risk facilities (schools, day care centers, hospitals, etc)

4. ELECTRICAL SCHEMATICS
   - Generators
     - Disinfection equipment and room

5. GENERAL PROCEDURES
   - Generator start-up
     - Power source change over
     - Disinfection operation
     - Disinfection procedures for wells and distribution system
   - Work Place Hazard Information System
   - Occupational Safety and Health Procedures
## Personnel Contact Information

<table>
<thead>
<tr>
<th>Operator’s name</th>
<th>Staff Name</th>
<th>Staff Name</th>
<th>Staff Name</th>
<th>Staff Name</th>
</tr>
</thead>
</table>

## Government Agencies/Repair Services/Media

| Health Canada (Medical Services Branch) | Phone | Fax |
| Health Services (First Nations) | Phone | Fax |
| Environment Canada | Phone | Fax |
| Police | Phone | Fax |
| Ambulance/Rescue | Phone | Fax |
| Fire Department | Phone | Fax |
| Emergency Preparedness Program | Phone | Fax |
| Emergency Operations Center (First Nation) | Phone | Fax |
| Emergency Social Services (Provincial) | Phone | Fax |
| Public Works (First Nation Engineering Department) | Phone | Fax |
| INAC (Indian & Northern Affairs Canada, Regional Office) | Phone | Fax |
| Radio Station | Phone | Fax |
| Newspaper | Phone | Fax |
| TV Station | Phone | Fax |
| Department of Fisheries | Phone | Fax |
| Spill Report Center (Provincial) | Phone | Fax |
| Natural Resources (Provincial) | Phone | Fax |
| Department of Highways (Provincial) | Phone | Fax |
| Energy/Power/Hydro (Provincial) | Phone | Fax |
| Pump Manufacturer | Phone | Fax |
| Chlorinator Manufacturer | Phone | Fax |
| Excavation Services | Phone | Fax |
| Plumbing Services | Phone | Fax |
| Bulk Water Hauler | Phone | Fax |
| Bottled Water Suppliers | Phone | Fax |
## EMERGENCY RESPONSE PLAN – ACTION LIST

<table>
<thead>
<tr>
<th>TYPE OF EMERGENCY</th>
<th>ACTIONS:</th>
<th>CONTACTS:</th>
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<tr>
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Appendix K
Roles and Responsibilities

Provision of water services to First Nations communities is a shared responsibility between three groups:

1. First Nations - First Nation Band Councils are responsible for ensuring that potable water facilities and systems are designed, constructed, maintained, and operated in accordance with this protocol. First Nations are responsible for maintaining effective sampling and testing programs to continuously monitor drinking water quality and ensure that their residents are provided with clean, safe, and reliable drinking water.

2. Indian & Northern Affairs Canada - INAC provides First Nations with financial assistance for designing, constructing, upgrading, operating, and maintaining water facilities. INAC also assists in the provision of training and services shared between reserves and municipalities through MTAs (municipal-type agreements). Technical services related to water systems are provided to INAC by regional and headquarters staff of Public Works and Government Services Canada (PWGSC). Compliance with the Protocol for Safe Drinking Water in First Nations Communities is monitored by INAC.

3. Health Canada – Health Canada works in partnership with First Nations communities to ensure drinking water quality monitoring programs are in place in communities, South of 60°, as per the Guidelines for Canadian Drinking Water Quality. These programs include testing, sampling drinking water quality, and reviewing, interpreting and disseminating results. In order to build community capacity in environmental health, Health Canada facilitates community-based drinking water quality sampling and testing through support and training of community-based drinking water quality monitors. Health Canada investigates potential problems, provides advice and makes recommendations to First Nations communities and federal partners, such as Indian and Northern Affairs Canada. Health Canada is also actively involved in the development of community-based education and awareness programs on drinking water issues. In First Nations communities where Environmental Health Programs are transferred, the First Nations stakeholders are responsible for drinking water quality monitoring.

Figure No.1 describes the multi-faceted Partner Roles/Relationships between First Nations and the federal government (as well as other levels of government and groups) in the management of water. Independent review of project designs for First Nations drinking water systems is a shared task undertaken by Environment Canada, Health Canada, Indian & Northern Affairs Canada, and PWGSC for INAC under the National Framework for the Review Process of Water and Wastewater Systems in First Nations Communities.
Partnerships and Relationships in Water Management

**Core Water ADM’s Committee**
- INAC/HC/EC high level coord. mtg. on water issues

**Health Canada**
- Monitoring/surveillance – HC partners with FN to ensure that DWQ monitoring programs are in place.
- Carry out public health risk assessments
- Develop federal drinking water quality guidelines
- Review plans and designs (from health and safety perspective)

**INAC**

**Regional Offices**
- Regular inspection of all FN dw and ww facilities.
- Prioritise capital projects
- Certification using Provincial bodies
- Review plans

**Headquarters**
- Funding and advice to FN for water and wastewater facilities.
- Overall direction to regional offices
- Co-ordination with other government departments

**Provinces**
- Responsible for standards, certification, training, and watershed plan.

**First Nations (FN)**
- Plans, designs, and constructs water and wastewater facilities.
- Provides O&M for water and wastewater facilities using trained and certified operators

**FN Technical Advisory Group**
- Provide technical advice to FN w.r.t. planning, design, construction, and operations and maintenance of water and wastewater facilities.

**Environment Canada**
- Develops guidance tools for FN on source water protection and sustainable water use
- Provides advice to INAC on water awareness and outreach
- Provides information on federal regulatory requirements for wastewater systems
- Reviews environmental aspects of infrastructure projects including those subject to the Canadian Environmental Assessment Act

**Local Municipalities**
- Municipal Type Agreements (MTA’S)
- Watershed planning

**Regional Offices**
- Assist in implementation of capital and O&M programs
- Assist in ACRS inspections
- Assist INAC regional offices
- Assist with plan reviews

**Headquarters**
- Provide technical and policy assistance w.r.t. planning, design, construction, and operations and maintenance of water and wastewater facilities by FN

**PWGSC - RPS**
- Assist with implementation of water and wastewater facilities.