



**CODE OF PRACTICE FOR
WATERWORKS SYSTEMS USING
HIGH QUALITY GROUNDWATER**

Effective April 1, 2009

*made under the
Environmental Protection and Enhancement Act,
RSA 2000, c.E-12
and the
Environmental Protection and Enhancement (Miscellaneous)
Regulation, AR 118/93*

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ALBERTA ENVIRONMENT

**CODE OF PRACTICE FOR WATERWORKS SYSTEMS
USING HIGH QUALITY GROUNDWATER [made under the
Environmental Protection and Enhancement Act, RSA 2000, c.E-
12, and the *Environmental Protection and Enhancement
(Miscellaneous) Regulation*, AR 118/93]**

**Effective April 1, 2009, this document replaces the September 2003
document**

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Schedule 1 Operations Program Contents

PART 1: DEFINITIONS

- 1.1 All definitions in the Act and the regulations under the Act apply except where expressly defined in this Code of Practice.
- 1.2 In this Code of Practice:
- (a) “Act” means the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c.E-12, as amended from time to time;
 - (b) “alternate program” means the Alternate Laboratory Data Quality Assurance Program, as detailed in the Department’s *Laboratory Data Quality Assurance Policy Procedures and Guidelines*;
 - (c) “approved laboratory” means laboratory accredited to the requirements of ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories, for the drinking water tests methods specified by the Director;
 - (d) “Certification Guidelines” means the *Water and Wastewater Operators’ Certification Guidelines*, published by the Department, as amended or replaced from time to time;
 - (e) “chlorine residual” means free chlorine, or combined chlorine or total chlorine;
 - (f) “contact time” for a process unit means T_{10} which is the time taken in minutes for 10% of the water to pass through that unit;
 - (g) “continuous” means flow measurement or sample analysis through in-line equipment that creates flow measurements or frequent, discrete sample analysis output;
 - (h) “CT” means disinfectant residual in mg/L multiplied by the contact time in minutes;
 - (i) “CT_{lowest actual}” means the lowest CT calculated in a particular day, calculated as follows:

$$CT_{\text{lowest actual}} = C \times \frac{T_{10}}{T} \times \frac{V_{\text{min}}}{Q_{\text{peak}}}$$

where: C = lowest recorded daily disinfectant residual concentration (in milligrams per litre) at the point T₁₀ is measured;

$\frac{T_{10}}{T}$ = 0.1; OR

varies based on the empirical method using typical baffling conditions as per Appendix D in the Standards and Guidelines Document; OR

varies based on a tracer study, where

T₁₀ = the contact time (in minutes) established from the most recent tracer study; and

T = the calculated contact time (in minutes), assuming no short-circuiting and obtained by dividing the treated water contact storage volume that was used to determine T₁₀, by the flow that was used to determine T₁₀;

V_{min} = the daily minimum volume (in Litres) of treated water in the disinfection contact reservoir;

Q_{peak} = maximum recorded hourly flow (Litres per minute) or twice the daily average flow (Litres per minute)

- (j) “CT_{required}” means the CT required to demonstrate the specified log reduction of viruses as determined from the CT tables in Appendix B of the *Standards and Guidelines Document*;
- (k) “CT_{performance ratio}” means $CT_{\text{lowest actual}} / CT_{\text{required}}$;
- (l) “design capacity” means the production capacity for which the waterworks system was designed, as stated in the engineering drawings and specifications for the waterworks system, provided pursuant to section 3.1.3;
- (m) “disinfectant residual” means the concentration of free chlorine, chloramine, chlorine dioxide, or ozone used for disinfection;
- (n) “disinfection” means a chemical or physical process of treating water to inactivate microorganisms;
- (o) “four seasons” is comprised of “spring” - March to May, “summer” – June to August, “fall” – September to November, “winter” – December to February;
- (p) “GCDWQ” means the *Guidelines for Canadian Drinking Water Quality*, published by Health Canada, as amended or replaced from time to time;
- (q) “grab”, when referring to a sample, means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;
- (r) “high quality groundwater” means groundwater that:
 - (i) does not require treatment to comply with the applicable physical, chemical, and radiological MAC, except for fluoride, specified in the GCDWQ, for the parameters listed in the Standards and Guidelines Document,
 - (ii) contains a concentration of naturally occurring fluoride of less than or equal to 2.4 mg/L, and
 - (iii) is not under the direct influence of surface water;
- (s) “ISO / IEC” means the International Organization for Standardization / the International Electrotechnical Commission;

- (t) “log reduction” means the base 10 logarithm of the ratio of raw water concentrations divided by the treated water concentration of total viruses;
- (u) “MAC” means the Maximum Acceptable Concentration, specified in the GCDWQ for a particular parameter;
- (v) “professional engineer” means a professional engineer or registered professional technologist (engineering) under the *Engineering, Geological and Geophysical Professions Act*;
- (w) “regulations” means the regulations under the Act;
- (x) “running annual average” means the arithmetic average of the concentrations of all the most recent samples taken covering a 365 day period;
- (y) “source sanitary survey” means a review of the water source for the purpose of evaluating the adequacy of the condition of the physical components and protection from contamination indicating the vulnerability for degradation of the source water quality;
- (z) “Standards and Guidelines Document” means the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*, published by the Department, as amended or replaced from time to time;
- (aa) “this Code of Practice” means the *Code of Practice for Waterworks Systems Using High Quality Groundwater*, published by the Department, as amended or replaced from time to time; and
- (bb) “weekday” means Monday, Tuesday, Wednesday, Thursday, or Friday.

PART 2: GENERAL PROVISIONS

Section 2.1: General

- 2.1.1 Any person who constructs, operates or reclaims a waterworks system that uses high quality groundwater must do so in accordance with this Code of Practice.
- 2.1.2 Any conflict between the registration application and the terms and conditions of this Code of Practice shall be resolved in favour of this Code of Practice.
- 2.1.3 The terms and conditions of this Code of Practice do not affect any rights or obligations created under any other authorization issued by the Department.
- 2.1.4 The terms and conditions of this Code of Practice are severable. If any term or condition of this Code of Practice or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and to the remainder of this Code of Practice shall not be affected by that invalidity.
- 2.1.5 If the registration holder monitors for any substances or parameters which are the subject of limits in this Code of Practice more frequently than is required, using procedures authorized in this Code of Practice, then the registration holder shall provide the results of such monitoring as an addendum to the reports required by this Code of Practice.

Section 2.2: Analytical Requirements

- 2.2.1 With respect to any monitoring required pursuant to this Code of Practice, all samples shall be:
 - (a) collected;
 - (b) preserved;
 - (c) stored;
 - (d) handled; and

- (e) analyzed in accordance with:
 - (i) the *Standard Methods for the Examination of Water and Wastewater*, published by the American Public Health Association, the American Waterworks Association and the Water Environment Federation, as amended or replaced from time to time; or
 - (ii) a method authorized in writing by the Director.

2.2.2 Any analysis of a sample required pursuant to this Code of Practice, shall be done only in an approved laboratory, or in accordance with the Department's alternate program.

2.2.3 Any analysis of a sample of treated water for bacteriological quality required pursuant to this Code of Practice shall be conducted only by the Alberta Provincial Laboratory for Public Health, unless otherwise specified in writing by the Director.

PART 3: ADMINISTRATION, DESIGN AND CONSTRUCTION REQUIREMENTS

Operations Program

3.1.1 If the waterworks system was not previously registered, no person shall apply for a registration unless that person has prepared or caused to be prepared a written operations program governing the operation of the waterworks system.

3.1.1.1 A registration holder shall have a written operations program governing the operation of the waterworks system completed by:

- (a) the requirements of 3.1.1, or
- (b) the date specified in a notice issued pursuant to S.8.1(4) of the *Environmental Protection and Enhancement (Miscellaneous) Regulation*, AR 118/93.

3.1.2 The operations program in section 3.1.1.1 shall contain, at a minimum, all of the information in Schedule 1.

- 3.1.3 In addition to the information required in the Act and the regulations, an application for a registration shall contain, at a minimum, the following information:
- (a) analytical results for groundwater intended to be the potable water source;
 - (b) written confirmation that the person applying for the registration has prepared, or caused to be prepared an operations program;
 - (c) engineering drawings signed and stamped by a professional engineer for the proposed waterworks system or proposed changes to the waterworks system, including the design capacity of the proposed waterworks system or proposed change;
 - (d) a statement, signed and stamped by a professional engineer, indicating whether the design of the project complies with all the design requirements of:
 - (i) this Code of Practice, and
 - (ii) the regulations under the Act, and
 - (e) in cases in which a design requirement in section 3.1.3 (d) is not met, a statement, signed and stamped by a professional engineer, identifying and justifying the deviation.
- 3.1.4 No person shall install any water treatment equipment that was not included in the registration application unless the Director has been advised in writing in advance of the intention to install and operate that water treatment equipment.
- 3.1.5 The registration holder shall undertake a risk assessment of the waterworks system to ascertain the integrity, reliability and the long-term sustainability of the waterworks system to provide safe drinking water according to the following:
- (a) the assessment shall be performed in accordance with the Standards and Guidelines Document, *Facility Risk Assessment Standards*; and
 - (b) the assessment shall be performed by an independent third party approved by the Director.
- 3.1.6 The completed assessment in 3.1.5 shall be submitted to the Director once every five years from the date the registration holder is required to comply with this Code of Practice.

PART 4: OPERATIONAL REQUIREMENTS

- 4.1.1 The registration holder shall:
 - (a) operate, and
 - (b) maintain
 the waterworks system at all times within its design capacity.
- 4.1.2 Repealed.
- 4.1.2.1 The registration holder shall maintain positive pressure at all points throughout the distribution system where water is being supplied.
- 4.1.3 Repealed

Certified Operator

- 4.1.4 At all times, the operation of the waterworks system shall be performed by, or under the direction of, a person who holds a valid certificate of qualification at the applicable level as set out in Table 4-1.
- 4.1.5 At all times, the number of certified operators available to perform or direct the operation of the waterworks system must meet or exceed the applicable numbers in Table 4-1.
- 4.1.6 The registration holder shall obtain a statement of the facility’s classification for Water Treatment (WT) from Alberta Environment prior to providing water treatment.

TABLE 4-1: MINIMUM WATERWORKS SYSTEM OPERATOR CERTIFICATE OF QUALIFICATION REQUIREMENTS

Population Served by Waterworks System	Type of Treatment in the Waterworks System	Minimum Number and Minimum Qualifications of Water Treatment Certified Operator(s)	Minimum Number and Minimum Qualifications of Water Distribution Certified Operator(s)
< 500	Class I WT facility or system without treatment	One operator with a Small Water Systems Certificate	

TABLE 4-1 (continued)

Population Served by Waterworks System	Type of Treatment in the Waterworks System	Minimum Number and Minimum Qualifications of Water Treatment Certified Operator(s)	Minimum Number and Minimum Qualifications of Water Distribution Certified Operator(s)
500 – 1,500	System providing ONLY chlorine residual within the distribution system	N/A	One operator with a Level I Water Distribution (WD) Certificate
	System providing virus disinfection or other treatment	One operator with a Water Treatment (WT) Certificate at the Level of the facility classification for water treatment	
1,501 – 15,000	System providing ONLY chlorine residual within the distribution system	N/A	One operator with a Level II Water Distribution (WD) Certificate
	System providing virus disinfection or other treatment	One operator with a Water Treatment (WT) Certificate at the Level of the facility classification for water treatment	One operator with a Level II Water Distribution (WD) Certificate
15,001 – 50,000	System providing ONLY chlorine residual within the distribution system	N/A	One operator with a Level III Water Distribution (WD) Certificate
	System providing virus disinfection or other treatment	One operator with a Water Treatment (WT) Certificate at the Level of the facility classification for water treatment	and One operator with a Level II Water Distribution (WD) Certificate
50,001 and over	System providing ONLY chlorine residual within the distribution system	N/A	One operator with a Level IV Water Distribution (WD) Certificate

TABLE 4-1 (continued)

Population Served by Waterworks System	Type of Treatment in the Waterworks System	Minimum Number and Minimum Qualifications of Water Treatment Certified Operator(s)	Minimum Number and Minimum Qualifications of Water Distribution Certified Operator(s)
	System providing virus disinfection or other treatment	One operator with a Water Treatment (WT) Certificate at the Level of the facility classification for water treatment	

PART 5: LIMITS AND MONITORING REQUIREMENTS

- 5.1.1 The quality of potable water distributed by the registration holder must comply with the limits in Table 5-1
- (a) at all locations specified in Table 5-2, and
 - (b) at all times the registration holder is treating and distributing water.

TABLE 5-1: POTABLE WATER QUALITY LIMITS

Parameter	Limit (Maximum unless otherwise specified)
CT _{required} , subject to sections 5.1.3.3 and 5.1.3.4 of this Code of Practice	For systems with continuous monitoring of disinfectant residual, the CT value for 4-log inactivation of viruses specified in the CT Table for the disinfectant used, in Appendix B of the Standards and Guidelines Document, or
	For systems with grab sampling of disinfectant residual, 1.25 times the CT value for 4-log inactivation of viruses specified in the CT Table for the disinfectant used, in Appendix B of the Standards and Guidelines Document.
CT _{performance ratio} , subject to sections 5.1.3.3 and 5.1.3.4 of this Code of Practice	Greater than 1
Bacteriological quality	Applicable MAC
The physical, inorganic and organic chemical and pesticide parameters listed in the Compliance Monitoring section of the Standards and Guidelines Document, except fluoride	Applicable MAC, as per the <i>Potable Water Regulation</i> , based on the running annual average.
Disinfectant residual, subject to sections 5.1.3.3 and 5.1.3.4 of this Code of Practice	Greater than or equal to 0.2 mg/L if free chlorine or chloramine is used for disinfection.
Chlorine residual in the distribution system	Greater than or equal to 0.1 mg/L, based on at least 75% of the samples taken on a particular day.
Fluoride - if naturally occurring	Less than or equal to 2.4 mg/L, based on a running annual average.
Fluoride- if fluoridation is practiced	Daily average concentration of between 0.6 mg/L and 1.0 mg/L and monthly average concentration of between 0.7 mg/L and 0.9 mg/L

- 5.1.2 Repealed
- 5.1.3 If any bacteriological quality sample contains *E. coli* or Total coliform, in addition to any reporting or other requirements pursuant to the Act, the regulations, or this Code of Practice, the registration holder shall carry out the corrective actions set out in the *Communication and Action Protocol for Failed Bacteriological Results (including potential failures) in Drinking Water for Waterworks Systems Authorized under the Environmental Protection and Enhancement Act*, entered into by Alberta Environment, the Alberta Provincial Laboratory for Public Health, and Alberta Health and Wellness, as amended or replaced from time to time.
- 5.1.3.1 If the first sample result of a chlorine residual sampling event pursuant to 5.1.6 does not meet the chlorine residual limit in Table 5-1, the registration holder shall:
- (a) flush the distribution line in the vicinity of the sample;
 - (b) resample and analyze the chlorine residual at the same location as the first sample, and
 - (c) resample and analyze the chlorine residual from
 - (i) a service connection upstream from the location of the first sample, and
 - (ii) a service connection downstream from the location of the first sample.
- 5.1.3.2 In the event that the chlorine residual in any of the sample results in section 5.1.3.1(b) or 5.1.3.1(c) is less than 0.1 mg/L chlorine, the registration holder shall immediately report the incident to the Director by telephone at 1-780-422-4505.
- 5.1.3.3 If a system is registered under the Act at the time this subsection comes into force, the requirements with respect to disinfection CT in Table 5-1 and Table 5-2 do not apply until the virus disinfection standard is applied in accordance with the *Potable Water Regulation*.
- 5.1.3.4 If the Director has exempted the registration holder from 4-log virus reduction performance monitoring, by notice in writing, the requirements with respect to disinfection CT in Table 5-1 and Table 5-2 do not apply.

- 5.1.3.5 If the Director has exempted the registration holder from 4-log virus reduction performance monitoring by notice in writing, the registration holder shall:
- (a) undertake a source sanitary survey of the waterworks system at least once every five years; and
 - (b) submit the source sanitary survey to the Director prior to the 5th anniversary of the previous source sanitary survey.
- 5.1.3.6 If iron reduction is practiced and the iron concentration in the water entering the distribution, based on the weekly average of all the results taken, is greater than 0.3 mg/L the registration holder shall:
- (a) notify the Director at 1-780-422-4505; and
 - (b) take the corrective action required to reduce the iron concentrations to less than 0.3 mg/L for the next monitoring period.
- 5.1.3.7 If manganese reduction is practiced and the manganese concentration in the water entering the distribution system, based on a weekly average of all the results taken, is greater than 0.08 mg/L the registration holder shall:
- (a) notify the Director at 1-780-422-4505; and
 - (b) take the corrective action required to reduce the iron concentrations to less than 0.08 mg/L for the next monitoring period.
- 5.1.3.8 If the concentration of a parameter where treatment is provided to reduce the concentration for aesthetic purposes is greater than the aesthetic objective specified in the GCDWQ, based on the weekly average of all samples taken, the registration holder shall:
- (a) notify the Director at 1-780-422-4505; and
 - (b) take the corrective action required to reduce the parameter concentration to less than the aesthetic objective for the next monitoring period.

Raw Water Monitoring

- 5.1.4 If a waterworks system practices fluoridation, the registration holder shall monitor raw water for fluoride concentration in the following manner:
- (a) at least once per week; and
 - (b) at a location in the waterworks system prior to the addition of fluoride.

- 5.1.5 If the waterworks system has treatment to reduce iron or manganese, the registration holder shall monitor raw water for iron or manganese as applicable:
- (a) at least once per week; and
 - (b) at a location in the waterworks system prior to any chemical addition or treatment unit.

- 5.1.5.1 If the waterworks system has treatment for an aesthetic parameter listed in the GCDWQ, the registration holder shall monitor raw water for the concentration of that parameter:
- (a) at least once per week; and
 - (b) at a location in the waterworks system prior to any chemical addition or treatment unit.

Potable Water Monitoring

- 5.1.6 The registration holder shall monitor the potable water in the waterworks system in accordance with Table 5-2, unless otherwise specified in writing by the Director.

TABLE 5-2: POTABLE WATER MONITORING LOCATION AND FREQUENCY

Parameter	Type of System	Sample Type	Monitoring Location	Minimum Monitoring Frequency and Minimum Number of Samples
Bacteriological	All systems	Grab	At random location(s) within the water distribution system	The frequency and number of samples as set out in the GCDWQ, without any reduction
Volume for CT calculation, subject to sections 5.1.3.3 and 5.1.3.4	All systems	(a) Calculated, based on continuous depth monitoring	Clearwell reservoir	(a) One depth measurement every hour, recording all results and reporting the minimum volume for each day, or
		(b) Calculated, based on controlled minimum water volume		(b) Calculated and reported when setting or changing minimum volume control point.

TABLE 5-2 (continued)

Parameter	Type of System	Sample Type	Monitoring Location	Minimum Monitoring Frequency and Minimum Number of Samples
Disinfectant residual (C) for CT calculation, subject to sections 5.1.3.3 and 5.1.3.4	All systems	(a) or (b) (a) Grab	Prior to entering the distribution system, at the point where the CT is measured	(a) or (b) (a) One sample per day, five days per week; if a statutory holiday falls on a weekday within that week, the sample is not required on that day, and the frequency may be reduced by one day for each statutory holiday, or
		or (b) Continuous		(b) One sample, every five minutes, recording all results and reporting the minimum value for each day.
CT _{lowest actual} , subject to sections 5.1.3.3 and 5.1.3.4	Systems without continuous disinfection residual monitoring	Calculated	Prior to entering the distribution system, at the point where the CT is measured	(a) One calculation per day, five days per week; if a statutory holiday falls on a weekday within that week, the sample is not required on that day, and the frequency may be reduced by one day for each statutory holiday, or
	or Systems with continuous disinfection residual monitoring			(b) One calculation for each day and one calculation if: i) volume < minimum volume control point, or ii) Flow > flow control point setting.

TABLE 5-2 (continued)

Parameter	Type of System	Sample Type	Monitoring Location	Minimum Monitoring Frequency and Minimum Number of Samples
CT _{required} , subject to sections 5.1.3.3 and 5.1.3.4	All systems	Calculated	N/A	One calculation per month and each time the V _{min} setting or Q _{peak} is changed.
CT _{performance ratio} , subject to sections 5.1.3.3 and 5.1.3.4	Systems without continuous disinfection residual monitoring	Calculated	Prior to entering the distribution system, at the point where the CT is measured	(a) One sample per day, five days per week; if a statutory holiday falls on a weekday within that week, the sample is not required on that day, and the frequency may be reduced by one day for each statutory holiday, or
	or Systems with continuous disinfection residual monitoring			(b) One calculation for each day and one calculation if: i) volume < minimum volume control point, or ii) Flow > flow control point setting.
Flow (Q _{peak}), for CT calculation, subject to sections 5.1.3.3 and 5.1.3.4	All systems	Continuous	Prior to entering the distribution system, at the point where the CT is measured	(a) One sample, every five minutes, recording all results and reporting the minimum value for each day, or
		or Calculated, based on controlled maximum flow.		(b) Calculated and reported when setting or changing maximum flow control point.

TABLE 5-2 (continued)

Parameter	Type of System	Sample Type	Monitoring Location	Minimum Monitoring Frequency and Minimum Number of Samples
Temperature, for CT calculation, subject to sections 5.1.3.3 and 5.1.3.4	All systems	Grab	Prior to entering the distribution system, at the point where the CT is measured	One sample per month.
Chlorine residual	All systems	(a) and either (b) or (c)	(a) and either (b) or (c)	(a) and either (b) or (c)
		(a) Grab, and	(a) At the same location as the bacteriological quality sample is collected and	(a) One sample, taken at the same time as the bacteriological quality sample is collected and
		(b) Grab or	(b) At random location(s) within the water distribution system, or	(b) One sample per day, five days per week; if a statutory holiday falls on a weekday within that week, the sample is not required on that day, and the frequency may be reduced by one day for each statutory holiday or
		(c) Continuous	(c) at the point of entry into the water distribution system	(c) One sample, every five minutes, recording all results and reporting the minimum value for each day

TABLE 5-2 (continued)

Parameter	Type of System	Sample Type	Monitoring Location	Minimum Monitoring Frequency and Minimum Number of Samples
The physical, organic and inorganic chemical and pesticide parameters listed in the Compliance Monitoring section of the Standards and Guidelines Document, except UV absorbance, trihalomethanes and chloramines	Single well system	Grab	After treatment within the water distribution system	One sample per year. Despite this requirement, if the results of the most recent samples indicate that the applicable MAC has been complied with, the (a) physical and inorganic chemical parameters shall be sampled once every three years, and (b) organic chemical and pesticide parameters shall be sampled once every five years.
	Multiple well fields within a single system, in which water is blended prior to entry into the water distribution system	Grab	After treatment within the water distribution system, at a location where the water from all well fields has been blended	One sample per year. Despite this requirement, if the results of the most recent samples indicate that the applicable MAC has been complied with, the (a) physical and inorganic chemical parameters shall be sampled once every three years, and (b) organic chemical and pesticide parameters shall be sampled once every five years.

TABLE 5-2 (continued)

Parameter	Type of System	Sample Type	Monitoring Location	Minimum Monitoring Frequency and Minimum Number of Samples
	Multiple well fields within a single system in which water is not blended prior to entry into the water distribution system	Grab	At the chosen well(s), after treatment, at the point of entry into the water distribution system	At least one well monitored each year, rotated so that all wells have been monitored within the previous 3 years. Despite this requirement, if the results of the most recent samples indicate that the applicable MAC has been complied with, the (a) physical and inorganic chemical parameters shall be sampled once every three years, and (b) organic chemical and pesticide parameters shall be sampled once every five years.
All aesthetic parameters for which treatment is provided, except iron and manganese	All systems practicing treatment for aesthetic parameters other than iron and manganese	(a) or (b) (a) Grab	After treatment, prior to entering the distribution system	(a) or (b) (a) One sample per week
		or (b) Continuous		or (b) One sample, every five minutes, recording all results and reporting the maximum value for each week

TABLE 5-2 (continued)

Parameter	Type of System	Sample Type	Monitoring Location	Minimum Monitoring Frequency and Minimum Number of Samples
Iron	All systems practicing iron reduction	(a) or (b) (a) Grab	After treatment, prior to entering the distribution system	(a) or (b) (a) One sample per day, five days per week; if a statutory holiday falls on a monitoring day within that week, monitoring is not required on that day
		or (b) Continuous		or (b) One sample, every five minutes, recording all results and reporting the maximum value for each day
Manganese	All systems practicing manganese reduction	(a) or (b) (a) Grab	After treatment, prior to entering the distribution system	(a) or (b) (a) One sample per day, five days per week; if a statutory holiday falls on a monitoring day within that week, monitoring is not required on that day,
		or (b) Continuous		or (b) One sample, every five minutes, recording all results and reporting the maximum value for each day
Fluoride	All systems practicing fluoridation	(a) or (b) (a) Grab	Prior to entering the distribution system	(a) or (b) (a) One sample per day, seven days per week
		or (b) Continuous		or (b) One sample, every five minutes

- 5.1.7 In the event of a repair within the water distribution system, in addition to the monitoring required in section 5.1.6, the registration holder shall monitor for:
- (a) bacteriological quality, and
 - (b) chlorine residual
- by grab sample, in the following manner:
- (i) immediately after each repair, and
 - (ii) at a sampling point closest to the location of the repair.

Trihalomethanes

5.1.8 Repealed

- 5.1.8.1 In addition to any other monitoring requirements pursuant to this Code of Practice, the Act or the regulations, trihalomethanes shall be monitored in the waterworks system in the following manner:
- (a) for systems where the total organic carbon concentration in the raw water is less than 2 mg/L and:
 - (i) the trihalomethane concentrations in any sample are greater than the applicable MAC, or no analytical results are available:
 - (A) the registration holder shall take two grab samples per year, one sample taken during the summer and one sample taken during the winter;
 - (B) the registration holder shall take all samples at a location furthest from the point at which the water enters the distribution system; or
 - (ii) the trihalomethane concentrations in all samples in the previous sampling event are less than the applicable MAC:
 - (A) the registration holder shall take two grab samples every three years, one sample taken during the summer and one sample taken during the winter;
 - (B) the registration holder shall take all samples at a location furthest from the point at which the water enters the distribution system; or

- (b) for systems where the total organic carbon concentration in the raw water is greater than 2 mg/L and:
 - (i) the trihalomethane concentrations in any sample are greater than the applicable MAC, or no analytical results are available:
 - (A) the registration holder shall take four grab samples per year, one sample taken during each of the four seasons;
 - (B) the registration holder shall take all samples at a location furthest from the point at which the water enters the distribution system; and
 - (C) there shall be a minimum of two months between samples; or
 - (ii) the trihalomethane concentrations in all samples in the previous sampling event are less than the applicable MAC:
 - (A) the registration holder shall take four grab samples every three years, one sample taken during each of the four seasons;
 - (B) the registration holder shall take all samples at a location furthest from the point at which the water enters the distribution system; and
 - (C) there shall be a minimum of two months between samples.

5.1.9 to 5.1.11 Repealed

Additional Measurements

5.1.12 Repealed

5.1.12.1 The registration holder shall measure the total water volume entering the distribution system as required to fulfil the requirements of 5.1.14 and the total water volume entering the distribution system shall be computed a minimum of once per month.

- 5.1.13 If the waterworks system practices fluoridation, the registration holder shall measure the following on a daily basis:
- (a) the total daily volume of water to which fluoride is added; and
 - (b) the total daily weight of fluoride added to the water;
- 5.1.14 If the registration holder adds any treatment chemical to the waterworks system, the dosage of each chemical, other than fluoride shall:
- (a) be calculated in milligrams of chemical per litre of water (mg/L) by measuring the amount of chemical added in a period not exceeding seven (7) calendar days divided by the total volume of water to which the chemical was added in that time period; and
 - (b) not exceed the dosage specified as Maximum Use in *Standard 60*, published by the National Sanitation Foundation and the American National Standards Institute (NSF/ANSI), as amended or replaced from time to time, unless otherwise authorized in writing by the Director.

PART 6: WASTEWATER MANAGEMENT

- 6.1.1 The registration holder shall dispose of wastewater only:
- (a) to a wastewater collection system, that is part of a wastewater system that is the subject of a valid approval, registration or permit, as applicable, or
 - (b) as otherwise authorized in writing by the Director.

PART 7: RECLAMATION REQUIREMENTS

- 7.1.1 Where the land surface has been disturbed during construction, expansion, modification or repair of any portion of a waterworks system, reclamation of the land surface to equivalent land capability shall be performed following the construction, expansion, modification or repair, in accordance with the Standards and Guidelines Document.
- 7.1.2 Within six months after the waterworks system, or a portion of the waterworks system, permanently ceases operation, the registration holder shall submit a reclamation plan to the Director for the portion of the system that is no longer in operation.
- 7.1.3 No person shall commence reclamation of the waterworks system until that person has received written authorization from the Director for the reclamation.
- 7.1.4 Any person conducting reclamation of the waterworks system shall comply with the reclamation plan, as authorized in writing by the Director.

PART 8: REPORTING REQUIREMENTS

Contravention Reporting

- 8.1.1 In addition to any other reporting required pursuant to this Code of Practice, the Act, or the regulations, the registration holder shall immediately report to the Director any contravention of this Code of Practice, either:
 - (a) by telephone at 1-780-422-4505; or
 - (b) by a method:
 - (i) in compliance with the release reporting provisions in the Act and the regulations, or
 - (ii) authorized in writing by the Director.
- 8.1.2 In addition to any other reporting required pursuant to this Code of Practice, the Act, or the regulations, the registration holder shall immediately report to the Director by a method under section 8.1.1, any structural or equipment malfunction in the waterworks system that may affect the quality or supply of potable water.

- 8.1.3 In addition to the immediate report in section 8.1.1, the registration holder shall provide a report to the Director:
- (a) in writing; or
 - (b) by a method:
 - (i) in compliance with the release reporting provisions in the Act and the regulations, or
 - (ii) authorized in writing by the Director
- within seven (7) calendar days after the discovery of the contravention, or within another time period specified in writing by the Director, unless the requirement for the report is waived by the Director.
- 8.1.4 The report required under section 8.1.3 shall contain, at a minimum, the following information:
- (a) a description of the contravention;
 - (b) the date of the contravention;
 - (c) the duration of the contravention;
 - (d) the legal land description of the location of the contravention;
 - (e) an explanation as to why the contravention occurred;
 - (f) a summary of all preventive measures and actions that were taken prior to the contravention;
 - (g) a summary of all measures and actions that were taken to mitigate any effects of the contravention;
 - (h) a summary of all measures that will be taken to address any remaining effects and potential effects related to the contravention;
 - (i) the number of the registration issued under the Act for the waterworks system, and the name of the person who held the registration at the time the contravention occurred;
 - (j) the name, address, phone number and responsibilities of all persons operating the waterworks system at the time the contravention occurred;
 - (k) the name, address, phone number and responsibilities of all persons who had charge, management or control of the waterworks system at the time that the contravention occurred;
 - (l) a summary of proposed measures that will prevent future contraventions, including a schedule of implementation for these measures;
 - (m) any information that was maintained or recorded under this Code of Practice, as a result of the incident; and
 - (n) any other information required by the Director in writing.

Monthly Reporting

- 8.1.5 The registration holder shall compile and retain monthly reports.
- 8.1.6 The monthly report in section 8.1.5 shall include, at a minimum:
- (a) the name, telephone and fax numbers of all certified operators;
 - (b) the analytical results for all parameters required to be monitored in accordance with this Code of Practice during the month;
 - (c) the locations of all sampling performed during the month in accordance with this Code of Practice;
 - (d) the name and manufacturer of all treatment chemicals added during the month, and each manufacturer as listed in the *Standard 60*, published by the American National Standards Institute and the National Sanitation Foundation (ANSI/NSF), as amended or replaced from time to time; and
 - (e) the results of all required measurements conducted during the month in accordance with this Code of Practice.

Annual Reporting

- 8.1.7 In addition to any other reporting required under the Act, the regulations and this Code of Practice, the registration holder shall compile an annual report, by February 28 of the year following the calendar year in which the information on which the report is based was collected.
- 8.1.7.1 Until a notice under section 8.1.9 is issued by the Director, the registration holder shall submit to the Director the annual report in section 8.1.7, by February 28 of the year following the calendar year in which the information on which the report is based was collected.
- 8.1.8 The annual report in section 8.1.7 shall contain, at a minimum, all of the following information:
- (a) a summary of the monthly reports, specifying the monthly minimum, average, and maximum results for each parameter monitored, excluding bacteriological results, for each month;
 - (b) a summary of the number, results, and sampling dates of the bacteriological samples analyzed for each month;

- (c) the results of any other compliance monitoring done during the year pursuant to this Code of Practice that was not included in any monthly report; and
- (d) a description of any problems experienced and corrective actions taken at the waterworks system during the year with respect to environmental matters.

Electronic Reporting

- 8.1.9 The Director may, by notice in writing, require the registration holder to submit periodic reports:
- (a) in an electronic format; and
 - (b) at a different frequency than specified in sections 8.1.5 and 8.1.7.1 of this Code of Practice.
- 8.1.10 The registration holder who receives a notice as specified in section 8.1.9 shall comply with the notice.

PART 9: RECORD KEEPING REQUIREMENTS

- 9.1.1 The registration holder shall
- (a) record the following information, and
 - (b) maintain and retain the following records for five (5) years from the date the record was created:
 - (i) bacteriological analysis results;
 - (ii) daily records, including but not limited to:
 - (A) flow meter readings,
 - (B) chlorine concentrations,
 - (C) treatment chemical dosages,
 - (D) iron and manganese concentrations, and
 - (E) all fluoridation informationrequired under this Code of Practice;
 - (iii) all monthly reports required under this Code of Practice; and

- (iv) records of action taken by the registration holder to correct contraventions of potable water quality limits (MAC), including the following information for each contravention:
 - (A) name and address of the person who discovered the contravention, and
 - (B) copies of all notifications to the public.

9.1.2 The registration holder shall maintain the following records for the life of the waterworks system:

- (a) the operations program;
- (b) copies of all:
 - (i) applications submitted to the Department for a registration regarding the waterworks system and correspondence related to the registration,
 - (ii) engineering drawings and specifications,
 - (iii) project reports,
 - (iv) construction documents,
 - (v) record drawings,
 - (vi) all reports of inspections conducted by the Department,
 - (vii) all correspondence sent to the Department regarding a proposed extension of a water distribution system, replacement of a portion of a water distribution system, expansion or modification of potable water storage within the water distribution system,
 - (viii) all registrations issued under the Act for the waterworks system,
 - (ix) all annual reports, and
 - (x) all reports prepared pursuant to sections 8.1.3 and 8.1.4, and

- (c) all physical, organic and inorganic chemical and pesticide analytical results required pursuant to this Code of Practice, excluding daily monitoring.

9.1.3 The results and records in sections 9.1.1(b) and 9.1.2(c) shall contain, at a minimum, all of the following information:

- (a) the date, location and time of monitoring, and the name of the person collecting the sample;
- (b) identification of the sample type, including, but not limited to whether the sample is a routine water distribution system sample, repeat sample, source or potable water sample, or other special purpose sample;
- (c) date of analysis;
- (d) laboratory name and person responsible for performing analysis;
- (e) the analytical method used; and
- (f) the results of the analysis.

9.1.4 The registration holder shall immediately provide any records, reports or data required to be created under this Code of Practice to the Director or an inspector, upon request.

PART 10: CODE OF PRACTICE ADMINISTRATION

10.1.1 This Code of Practice will be reviewed as changes in technological or other standards warrant.

Schedule 1
Operations Program Contents

1. Routine Operational Procedures, which shall, at a minimum, include:

- (a) contact name and telephone numbers for the system owner, system operator, engineering consultants and equipment suppliers;
- (b) operating instructions:
 - (i) general description of treatment process and operating procedures,
 - (ii) performance requirements, and
 - (iii) location of equipment major controls;
- (c) general maintenance schedule;
- (d) general maintenance instructions for:
 - (i) treatment/process equipment,
 - (ii) monitoring equipment, and
 - (iii) pumping equipment; and
- (e) the schedule and procedures for cleaning and flushing of the entire water distribution system, including potable water storage reservoirs.

2. Routine Operational Procedures for Monitoring and Analysis, which shall, at a minimum, include:

- (a) operational and compliance tests to be performed;
- (b) bacteriological quality monitoring plan;
- (c) methods used for monitoring and analysis;
- (d) locations of monitoring points; and
- (e) laboratory data quality assurance information.

3. Emergency Response Plan, which shall, at a minimum, include steps to be taken in the event of the following:

- (a) bacteriological results exceeding the prescribed limits;
- (b) low chlorine residual;
- (c) equipment breakdown;
- (d) flood and other natural disasters;
- (e) water distribution system pipeline break and repair, and the return of the pipeline to service;
- (f) power failure;
- (g) the waterworks system becoming inoperable, including steps in providing an alternate potable water supply.; and

- (h) list of contacts – Alberta Environment, Alberta Health, Regional Health Authorities, Fire Department, Disaster Coordinator, and other agencies.

4. Date of last update.