CODE OF PRACTICE FOR WATERWORKS SYSTEMS USING HIGH QUALITY GROUNDWATER

September 2003

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

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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) “continuous” means flow measurement or sample analysis through in-line equipment that creates flow measurements or frequent, discrete sample analysis output;

(c) “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 3.1.3;

(d) “disinfection” means a chemical or physical process of treating water to inactivate microorganisms;

(e) “GCDWQ” means the Guidelines for Canadian Drinking Water Quality, published by Health Canada, as amended or replaced from time to time;

(f) “grab”, when referring to a sample, means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(g) “high quality groundwater” means groundwater that:

(i) does not require treatment to comply with the applicable physical, chemical, and radiological MAC or I 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;

(h) “IMAC” means the Interim Maximum Acceptable Concentration, specified in the GCDWQ for a particular parameter;

(i) “MAC” means the Maximum Acceptable Concentration, specified in the GCDWQ for a particular parameter;

(j) “professional engineer” means a professional engineer or registered professional technologist (engineering) under the Engineering, Geological and Geophysical Professions Act;

(k) “regulations” means the regulations under the Act;

(l) “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; and

(m) “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.

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,

(ii) the Methods Manual for Chemical Analysis of Water and Wastes, published by the Alberta Research Council, as amended or replaced from time to time, or

(iii) 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, unless otherwise specified in writing by the Director.

2.2.3 Any analysis of a sample 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 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.

3.1.2 The operations program in 3.1.1 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 clause (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 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 that treatment equipment.

PART 4: OPERATIONAL REQUIREMENTS

4.1.1 The waterworks system shall be:

(a) operated; and

(b) maintained

at all times within its design capacity.

4.1.2 The registration holder shall maintain a minimum pressure of 150 kPa at all points in the water distribution system, at all times.

4.1.3 The registration holder shall prevent any structural or equipment malfunction in the waterworks system that may affect the quality or distribution of potable water.

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.

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
Any type of treatment
One operator with a Small Water Systems Certificate

500 – 1,500
System providing only disinfection
N/A
One operator with a Level I Water Distribution (WD) Certificate

System providing both disinfection and other treatment
One operator with a Level I Water Treatment (WT) Certificate
One operator with a Level I Water Distribution (WD) Certificate

1,501 – 15, 000
System providing only disinfection
N/A
One operator with a Level II Water Distribution (WD) Certificate

System providing both disinfection and other treatment
One operator with a Level I Water Treatment (WT) Certificate
One operator with a Level II 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)

15, 001 – 50,000
System providing only disinfection
N/A
One operator with a Level III Water Distribution (WD) Certificate

and

One operator with a Level II Water Distribution (WD) Certificate

System providing both disinfection and other treatment
One operator with a Level I Water Treatment (WT) Certificate
One operator with a Level III Water Distribution (WD) Certificate

and

One operator with a Level II Water Distribution (WD) Certificate

50,001 and over
System providing only disinfection
N/A
One operator with a Level IV Water Distribution (WD) Certificate

and
Two operators with a Level III Water Distribution (WD) Certificate
and
One operator with a Level II Water Distribution (WD) Certificate

System providing both disinfection and other treatment
One operator with a Level I Water Treatment (WT) Certificate

PART 5: LIMITS AND MONITORING REQUIREMENTS

5.1.1 The quality of potable water produced by the waterworks system must comply with the limits in Table 5-1:

(a) at all locations; and

(b) at all times.

TABLE 5-1: POTABLE WATER QUALITY LIMITS

Parameter
Limit

The bacteriological, physical, inorganic and organic chemical and pesticide parameters listed in the Compliance Monitoring section of the Standards and Guidelines Document, except fluoride
Applicable MAC or IMAC

Total chlorine
Greater than or equal to 0.1 mg/L

Naturally occurring fluoride
Less than or equal to 2.4 mg/L

Fluoride, if fluoridation is practiced
Less than or equal to 0.8 mg/L, with a maximum monthly average variation of 0.1 mg/L and a maximum daily variation of 0.2 mg/L

Iron – if reduced
Applicable aesthetic objective in the GCDWQ

Manganese – if reduced
Applicable aesthetic objectives in the GCDWQ

5.1.2 Compliance with:

(a) the MAC or IMAC for inorganic and organic chemical and pesticide parameters is determined by a running annual average of all the samples taken at any sampling point; and

(b) the Aesthetic Objective for iron and manganese is determined by a weekly average of all the samples taken at any sampling point.

5.1.3 Where a sample does not meet one or more of the bacteriological quality limits in Table 5-1, 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 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.

Raw Water Monitoring

5.1.4 Where a waterworks system practices fluoridation, the raw water shall be monitored 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 Where the waterworks system has treatment to reduce iron or manganese, the raw water shall be monitored 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.

Potable Water Monitoring

5.1.6 The potable water shall be monitored 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 quality	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
Total chlorine	All systems	(a) and either (b) or (c)		
		(a) Grab		
		and		

(a) and either (b) or (c)

(a) At the same location as the bacteriological quality sample is collected

and
(a) and either (b) or (c)

(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 monitoring day within that week, monitoring is not required on that day

or

(c)

Continuous
(c) at the point of entry into the water distribution system
(c) One sample, every five minutes

TABLE 5-2 (continued)

Parameter
Type of System
Sample Type
Monitoring Location
Minimum Monitoring Frequency and Minimum Number of Samples

The physical, inorganic and organic chemical and pesticide parameters listed in the Compliance Monitoring section of the Standards and Guidelines Document, except total chlorine and trihalomethanes
Single well system
Grab
After treatment, within the water distribution system
One sample per year

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

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

Fluoride
All systems practicing fluoridation
At a location after fluoridation
(a) or (b)

(a) Grab

or
(a) or (b)

(a) One sample per day, seven days per week,

or

(b) Continuous
(b) One sample, every five minutes

TABLE 5-2 (continued)

Parameter
Type of System
Sample Type
Monitoring Location
Minimum Monitoring Frequency and Minimum Number of Samples

Iron
All systems employing iron reduction
After treatment, at the point of entry into the water distribution system
(a) or (b)

(a) Grab

or
(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
(b) One sample, every five minutes

Manganese
All systems employing manganese reduction
After treatment, at the point of entry into the water distribution system
(a) or (b)

(a) Grab

or
(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
(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 5.1.6, the registration holder shall monitor for:

(a) bacteriological quality; and

(b) total chlorine

by grab sample, in the following manner:

(i) immediately after each repair, and

(ii) at a point closest to the location of the repair.

Trihalomethanes

5.1.8 In addition to any other monitoring requirements pursuant to this Code of Practice, or the Act or the regulations, trihalomethanes shall be monitored in waterworks systems in the following manner:

(a) for waterworks systems serving a population of:

(i) ten thousand or more people:

(A) three grab samples shall each be taken at a random location in the water distribution system;

(B) one grab sample shall be taken at the location in the water distribution system furthest away from treatment; and

(C) all four samples shall be taken within a 24 hour time period; or

(ii) less than ten thousand people, one grab sample shall be collected at the location in the water distribution system furthest away from treatment, and

(b) all samples shall be analyzed for trihalomethanes.

5.1.9 All monitoring required in 5.1.8 shall be conducted once every three months.

5.1.10 Despite 5.1.9, if the trihalomethanes results from the previous four (4) monitoring events are all less than the applicable MAC or IMAC, subsequent monitoring shall be conducted, at a minimum, in the following manner:

(a) for waterworks systems serving a population of:

(i) ten thousand or more people:

(A) at least one grab sample shall be collected at the location in the water distribution system furthest away from treatment; and

(B) the monitoring frequency shall be at least once a year, unless otherwise authorized in writing by the Director; or

(ii) less than ten thousand people:

(A) at least one sample shall be collected at the location in the water distribution system furthest away from treatment; and

(B) the monitoring frequency shall be at least once every three years, unless otherwise authorized in writing by the Director; and

(b) all samples shall be analyzed for trihalomethanes.

5.1.11 If any trihalomethanes result exceeds the applicable MAC or IMAC, monitoring pursuant to 5.1.9 shall be continued.

Additional Measurements

5.1.12 The water volume from each source of water supply shall be measured each day, five days per week; if a statutory holiday falls on a measuring day within that week, measuring is not required on that day.

5.1.13 If the waterworks system practices fluoridation:

(a) the total volume of water to which fluoride is added; and

(b) the total weight of fluoride added to the water;

shall be measured on a daily basis.

5.1.14 Where any treatment chemical is added to the waterworks system, the daily dosage of each chemical added:

(a) shall be calculated in milligrams of chemical per litre of water; and

(b) shall 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 REQUIREMENTS

6.1.1 The registration holder shall dispose of wastewater only:

(a) to a wastewater collection system, that is part of a wastewater system holding 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 permanently ceases operation, the registration holder shall submit a reclamation plan to the Director.

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 (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, the Act, or the regulations, the registration holder shall immediately report to the Director by a method under 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 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 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 monthly reports.

8.1.6 The monthly report in 8.1.5 shall include, at a minimum:

(a) the name and telephone number 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 submit to the Director 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.

8.1.8 The annual report in 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;

(b) 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

(c) 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) more frequently than specified in 8.1.5 and 8.1.7 of this Code of Practice.

8.1.10 The registration holder who receives a notice as specified in 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 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 information

required 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 or IMAC), 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 annual reports,

(ix) all registrations issued under the Act for the waterworks system,

(x) all annual reports, and

(xi) all reports prepared pursuant to 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 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; and

(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) methods used for monitoring and analysis; and

(c) locations of monitoring points.

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;

(e) water distribution system pipeline break and repair, and the return of the pipeline to service;

(d) power failure; and

(e) the waterworks system becoming inoperable, including steps in providing an alternate potable water supply.

4. Date of last update.

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