

Town of Arborfield
Waterworks
Quality Assurance and Quality Control Policy

Approved: January 17th, 2011

Date: January 17th, 2011

1. Policy Statement

We, the Council of the Town of Arborfield understand that supplying good quality drinking water is essential to the continued growth, prosperity, and well being of our citizens. We are committed to managing all aspects of our water system effectively to provide safe and aesthetically appealing water that tastes good and is free from objectionable colour or odour. It is our policy that the drinking water we provide will be produced in accordance with and meet or exceed the quality standards required by *The Water Regulations, 2002*.

To achieve our goals we will:

- Cooperate with the provincial government to protect our waterworks and water sources from contamination;
- Ensure the potential risks associated with water quality are identified and assessed;
- Ensure that our water supply, treatment, storage, and distribution infrastructure is properly designed, constantly maintained, and regularly evaluated and improved;
- Include the drinking water quality and quantity priorities, needs, and expectations of our citizens, the provincial authorities, and our water system employees into our planning;
- Develop a mechanism to ensure adequate funds are available for the water utility to maintain and improve the infrastructure, implement best practices, and ensure our water treatment employees are educated about their responsibilities and adequately trained and certified;
- Establish regular verification of the quality of drinking water provided to our citizens and monitoring of the water treatment processes that produce the water;
- Provide community awareness about the water supply and its management by establishing and maintaining effective reporting of the water quality and timely information about the water system to our citizens;
- Develop contingency plans and incident response capabilities in cooperation with Provincial authorities;
- Where possible participate in activities to ensure continued understanding of drinking water quality issues and performance; and

- Regularly assess our performance and continually improve our practices to produce good quality water.

We will develop a drinking water quality management system including an implementation plan to achieve these goals and adequately manage the risks to our drinking water quality.

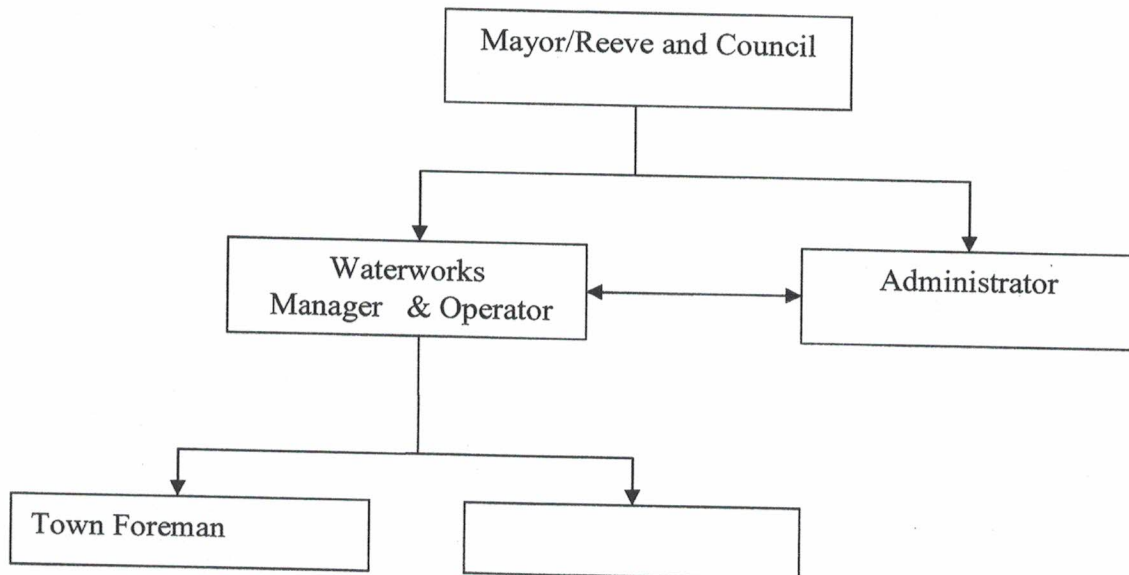
All of our officials, managers, and employees involved with the supply of drinking water are responsible for understanding, implementing, maintaining, and continuously improving the drinking water quality management system.

2. Organizational Structure

The waterworks manager is one of two operators employed by the *Town/Village/RM* and reports to the *Town/Village/RM* administrator. Roles of these employees as well as of the mayor with respect to water management are detailed below. The following organization chart reflects the administrative relationship between these parties.

Town of Arborfield

Waterworks Organization Chart



Mayor

Name: Alvin Alyek
Work No. (306)
Cell No.
Home No. 769-8687

The role of the Mayor with respect to waterworks operation includes:

- Overall responsibility for waterworks, quality of water and regulatory compliance
- In conjunction with council, allocates financial resources through a budgeting process and establishes water and sewer rates
- Chief official in the event of an emergency situation
- Reports on operational, maintenance or infrastructure issues or needs to council and ensures issues are addressed
- In conjunction with the waterworks manager reviews operational records and logs on a monthly basis in accordance with the requirements of section 43(2) of *The Water Regulations*.

Town Administrator

Name: Allan Frisky
Work No. 769-8533
Home No. 769-4193

The role of the municipal administrator includes:

- Receives and prepares administrative, budget and waterworks record submissions for review of Mayor and to be tabled at a Council meeting;
- Arranges for and provides annual notification to consumers served by the waterworks on the quality of drinking water provided and on sample submission compliance. Prepares a report to Council on the state of the drinking water on an annual basis;
- Receives and resolves or forwards all correspondence dealing with drinking water operations on behalf of Mayor/Reeve and Council;
- Prepares financial reports regarding waterworks operational and maintenance issues;
- Prepares strategies for ensuring waterworks sustainability;
- Invoicing and receipt of waterworks related expenses as well as consumer charges for water use; and
- Together with waterworks manager arranges for periodic flushing or swabbing of the distribution system as well as the sewer system.

Waterworks Manager/Operator

Name: Ryan Thompson

Work No. 769-8512

Home No. 769-4177

Cell No. 276-9149

The role of the waterworks manager includes:

- Overall responsibility for the day to day operation of the waterworks;
- Develops operational and maintenance protocols and plans;
- Develops safety plans and conducts safety inspections;
- Develops waterworks emergency response plan;
- Provides guidance to operators on operation of works;
- Staffing of waterworks operators and issues of supervision and scheduling;
- Together with administrator arranges for periodic flushing or swabbing of the distribution system as well as the sewer system; and

- Starts up, shuts down and performs periodic operating checks of plant equipment such as pumping systems, chemical feeders, auxiliary equipment (compressors), and measuring and control systems;
- Determines chemical feed rates, flow quantities, detention time and hydraulic loadings as required by plant operations;
- Monitors status of plant operating guidelines, such as flow pressures, chemical feeders, levels and water quality indicators;
- Performs routine preventive maintenance, such as lubrication, operating adjustments, cleaning and painting equipment;
- Maintains records including operating logs, daily diaries, and chemical inventories;
- Collects representative water samples and performs laboratory tests on samples as required;
- Performs minor corrective maintenance on plant equipment;
- Conducts tours of the waterworks and communicates with the public on issues associated with water quality;

- Orders chemicals, repair parts and tools;
- Loads, unloads and stores treatment chemicals; and
- Follows safety rules.

Town Foreman

Name: Ryan Thompson
Work No. 769-8512
Home No. 769-4177
Cell No. 276-9149

The role of the water distribution system operator includes:

- Assists with periodic flushing or swabbing of the distribution system;
- Locates and repairs water leaks and operates , assists in maintaining and repairing valves and hydrants;
- Collects and transports routine water samples from the distribution system and ensures proper packing and shipping to the laboratory;
- Performs repair work while ensuring safety procedures for the works site, traffic, and the public are maintained;
- Disinfects repaired and new sections of pipe and collects the necessary water samples;
- Maintains distribution system plans and maps;
- Cleans, disinfects and maintains pipeline;
- Operates and maintains any pumping equipment and facilities remote from the main water treatment plant as necessary; and
- Locates and eliminates cross-connections or potential cross-connections.

3. Operations and Maintenance Protocol

Operation of the community waterworks will be performed in accordance with design specifications and operating protocols developed for the Town of Arborfield Water Treatment Plant. Details regarding standards, operating procedures, range of operation, chemical feed, maintenance practices and intervals are outlined below.

Town of Arborfield Waterworks Operation and Maintenance Protocol

System Design Capacity (m³/day): _____

Well(s) _____

Number of wells: _____

Pump maintenance/change-out: _____

as required

Well/pump service disinfection _____

3-4 years

Wellhead protection inspection _____

annually

Supply Pipeline

Flow meter reading _____

weekly

Pressure readings _____

weekly

Check heater in pumphouse _____

weekly (winter)

Inspect air release valves _____

annually

Exercise valves _____

annually

Aeration

Inspect blower _____

Inspect Tower _____

Raw Water Storage and Retention

Capacity _____

Retention time minimum _____

Frequency of inspection _____

Frequency of draining _____

twice annually

Frequency of cleaning _____

as needed

Iron/Manganese Control

KMnO₄ Dosage Rate _____

Pre-Filter Ferric Iron Target _____

Test Frequency _____

Filtration

Capacity _____

Filtration Rate _____

Media type _____

Maximum allowable head loss _____

Backwash type _____

Backwash rate with air _____

Backwash rate without air _____

Media evaluation frequency _____

as needed

Filter vessel inspection _____

Disinfection

Disinfectant used _____

sodium hypochlorite 12%

Dosage Rate _____

target as needed to maintain free residual of 0.13 ppm

Monitoring location _____

WTP

Clearwell Storage

Volume of clearwell _____

Fire water capacity _____

Output Meter recording _____

Daily

Cleaning and Inspection as needed

Water Distribution System

| | |
|--------------------------------|------------------------|
| Piping types | <u>Schedule PVC</u> |
| Flushing schedule | <u>twice annually</u> |
| Swabbing frequency | <u>five year cycle</u> |
| Backflow prevention | <u>no</u> |
| Hydrant maintenance schedule | <u></u> |
| Valve exercise frequency | <u>annually</u> |
| Repair safety procedures | <u></u> |
| Line/main break disinfection | <u>yes</u> |
| Break sampling | <u>yes</u> |
| Truck fill station inspection | <u>weekly</u> |
| Truck fill backflow prevention | <u>yes</u> |

4. Water Quality Monitoring, Data Collection, Record Keeping, Record review and Reporting Procedures

The following monitoring and record keeping protocols apply to the operation of the waterworks and distribution system:

Water Quality Monitoring

The Town of Arborfield will conduct all monitoring required by Permit or ministers order issued by Saskatchewan Environment (SE). The Environmental Project Officer (EPO) responsible for regulation of the waterworks, Bob Busch, will be advised of any positive bacteriological sample result as well as any exceedence of other water quality standards as determined through sampling and analysis for other substances as required by the *Permit to Operate Waterworks*. All required drinking water quality monitoring samples, other than samples for chlorine residual, turbidity, and pH will be sent to and analysed by an accredited laboratory.

The Town of Arborfield will conduct daily free chlorine residual monitoring of drinking water entering the distribution system and turbidity monitoring at each filter. The EPO, Bob Busch, will be advised of any failure to meet a free-chlorine residual of at least 0.1 mg/L for water entering the distribution system, as well, any exceedence of turbidity levels as required by operational permit, ministers order or regulatory requirement. Additionally, the Town of Arborfield will advise EPO Bob Busch of any failure of the disinfection equipment or of any other upset of concern to the water treatment process, operation, or to the distribution system, in accordance with good practice and/or the emergency response plan for the waterworks. See **Table 1** below for the Town of Arborfield treated water quality monitoring plan. Results of each test are to be compared to the objectives listed.

Table 1

Town of Arborfield

Waterworks Water Quality Monitoring Plan

| Parameter | Overall Sampling | Sampling Location | Sampling Frequency for | SE Guidelines Presence or | Guid e-line |
|-----------|------------------|-------------------|------------------------|---------------------------|-------------|
|-----------|------------------|-------------------|------------------------|---------------------------|-------------|

| | Frequency for All Locations | | Each Location | mg/L | type |
|----------------------------|-----------------------------|---------------------------------|------------------|--------------------------|----------|
| Bacteriological | | | | | |
| Coliform Bacteria | 1/week | Various locations (Location) | | 0 coliforms | MAC |
| | | | | 0 coliforms | MAC |
| | | | | | MAC |
| | | | | | MAC |
| | | | | | MAC |
| General Chemical | Once/two years | Water Treatment Plant | Once / two years | | |
| Alkalinity | | | | 500 mg/L | AO |
| Bicarbonate | | | | None set | |
| Calcium | | | | None set | |
| Carbonate | | | | None set | |
| Chloride | | | | None set | |
| Conductivity | | | | 250 mg/L | AO |
| Fluoride | | | | None set | |
| Hardness | | | | 1.5 | MAC |
| Magnesium | | | | 800 as CaCO ₃ | AO |
| Nitrate | | | | 200 | AO |
| Sodium | | | | 45.0 as NO ₃ | MAC |
| Sulphate | | | | 300 | AO |
| Total dissolved solids | | | | 500 | AO |
| pH | | | | 1500 | AO |
| | | | | 6.5 – 9.0 | MAC |
| Health and Toxicity | | Water Treatment Plant | Once / two years | | |
| Aluminum | | | | None set | |
| Arsenic | | | | 0.025 | MAC |
| Barium | | | | 1.0 | IMA C |
| Boron | | | | 5.0 | IMA C |
| Cadmium | | | | 0.005 | MAC |
| Chromium | | | | 0.05 | MAC |
| Copper | | | | 1.0 | AO |
| Iron | | | | 0.3 | AO |
| Lead | | | | 0.01 | MAC |
| Manganese | | | | 0.05 | AO |
| Selenium | | | | 0.01 | MAC |
| Uranium | | | | 0.1 | MAC |
| Zinc | | | | 5.0 | AO |

| Residual Disinfectant in Distribution | | | | | |
|---------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------------|--|
| Free chlorine | Same as bacteriological | Same as bacteriological | Same as bacteriological | >= .1 if total chlorine < 0.5 | |
| Total chlorine | Same as bacteriological | Same as bacteriological | Same as bacteriological | >0.5 if free chlorine < 1.0 | |

Water Treatment Plant (WTP) Operational Monitoring Plan

Observational and measurement-related operational monitoring of water quality and associated reporting requirements are established for the Town of Arborfield waterworks. Additional monitoring is undertaken

as needed for process quality control. Water works operators will monitor operational process in accordance with **Table 2** below.

Table 2

Town of Arborfield

WTP Operational Monitoring Parameters

| Operational Parameter | Treatment Process | | | | |
|-----------------------|-------------------|------------|--------------|-----------|--------------|
| | Retention | Filtration | Disinfection | Clearwell | Distribution |
| Turbidity | | | | | X |
| Total Coliform | | | | | X |
| Chemical Dosage | | | X | | |
| Chlorine Residual | | | | | X |
| Chlorine Total | | | | | X |
| Iron | | | | | |
| Manganese | | | | | |
| Filter Head Loss | | | | | |
| Pressure | | | | | |

Record Keeping

Waterworks records and logs will be kept in accordance with the requirements of *The Water Regulations, 2002*. The following persons are delegated responsibility for operational record and log keeping:

- 1) Brian Johnson

Operational records and logs will include:

- Total water pumped into the distribution system on a daily basis or the total raw water used;
- Types, dosages and total amounts of chemicals applied to the water for treatment;

- Locations from which samples for any tests conducted by the permittee of the waterworks were taken in accordance with the permittee's permit and the name of the person who conducted the sampling or testing and the results of those tests;
- Any departures from normal operating procedures that may have occurred and the time and date that they occurred;
- Any instructions that were given during operation of the waterworks to depart from normal operating practices and the name of the person who gave the instructions;
- Any upset condition or bypass condition, with time and date and measures taken to notify others and resolve the upset or bypass condition;
- Any condition of low disinfectant levels, the time, date and location of occurrence and measures taken to restore disinfectant to required values;
- The dates and results of calibrating any metering equipment and testing instruments; and
- The dates and types of maintenance performed on equipment and any actions taken to ensure the normal operations of the waterworks.

The operational records or logs mentioned above will be recorded and maintained in the following manner:

- must be made in chronological order, with the dates, times and testing locations clearly indicated;
- entries in an operational record or log will only be made by the permittee or person specifically appointed by the permittee;
- persons making an entry in an operational record or log shall do so in a manner that allows the person to be unambiguously identified as the maker of the entry;
- operational records or logs must be maintained for at least five years;
- any anomalies or instances of missing entries in an operational log must be accompanied by explanatory notes;
- operational logs must only contain data that is actually observed or produced;
- operational logs must not contain default values generated manually or by automated means; and
- operational records or logs maintained in accordance with the above requirements must be made available promptly on request of the Minister of Environment or a representative of the Minister.

Record Review and Reporting

The Mayor or an assigned Council member and the waterworks manager will review all monitoring results, records and operational logs on a monthly basis. If the review of the records or logs indicates that

the quality of water from the waterworks has been adversely affected, the findings will be reported to SE as soon as reasonably practical after the report has been completed.

5. Emergency Response Planning

The Town of Arborfield has developed a Waterworks Emergency Plan. See attached.