Waterworks System Assessment – Round 3 Standards

The following standards have been developed in accordance with section 35 of *The Water Regulations, 2002* (the Regulations). A Waterworks System Assessment (Assessment) is intended to be a useful tool both for waterworks owners and for the Water Security Agency. This report should be designed to serve as a valuable resource for waterworks owners to help in further decision making regarding operation, maintenance and upgrades of their works. Relevant information from previous Assessments or engineering reports should be utilized and updated, so as to avoid unnecessary or redundant costs and efforts. This round of Assessments will:

Help in planning for the future.

- A Waterworks System Assessment can help a waterworks owner anticipate upgrades and maintenance needs. Upgrades, maintenance or changes to the system may be necessary to maintain compliance with provincial regulations, as well as to protect public health and safety. Inadequate planning can hinder community growth when unexpected needs arise.
- By helping a waterworks owner anticipate the needs of the system, the Assessment can also help waterworks owners to anticipate and prepare for the costs of these future upgrades, parts replacements or maintenance needs, ensuring that foreseeable problems do not become an impediment to growth.

Help in setting appropriate water rates.

- A proper analysis of the day to day and long term costs of a waterworks can help communities to set rates that will cover those day to day costs as well as anticipated future costs. This information will help councils and administrators implement appropriate water rates based on the actual cost of producing drinking water and maintaining the waterworks.

Help communities anticipate capacity challenges in their system.

- If most of the treatment system is capable of serving a population of 1000, but one key component can only treat enough for 800, a proper assessment should draw attention to this limitation before it becomes problematic.

Waterworks System Assessments help give Saskatchewan communities a better understanding of their water system, its value, and what is involved in its operation and maintenance. And above all, these Assessments will help us to ensure that Saskatchewan communities have safe drinking water to support continued sustainable growth.

Some waterworks regulated by the Water Security Agency must perform a Waterworks System Assessment according to section 35 of *The Water Regulations, 2002.* These Assessments must be conducted according to the frequencies outlined in Table 3, Table 4, and in section 35 of the Regulations, or as outlined in the waterworks' Permit to Operate a Waterworks. Those communities that require a Round 3 Assessment must complete the Assessment by the later of either December 31, 2015, or the date outlined in their Permit to Operate and must submit the Assessment within 90 days of completion of the work (see preparation and submission of a report that appears later in this document).

The following systems will be required to submit a Waterworks System Assessment for Round 3:

- Any system treating and/or distributing treated water from a true ground water source to **500 or more consumers**; and
- Any system treating and/or distributing treated water from a source **other than** true ground water to **101 or more consumers**.

Pipelines are not required to submit a Round 3 Assessment, unless specified in their Permit to Operate. Other private or corporately owned systems governed by *The Water Regulations, 2002* may still be required to submit a Round 3 Assessment, and the Regulations should be consulted in order to determine whether a system is exempt or not. If unsure, consult your Environmental Project Officer for assistance in determining whether your system will be required to submit an Assessment.

These standards have been developed in order to clarify what is expected of a Waterworks System Assessment, and to ensure that each Assessment is of use to both the community and to the Water Security Agency. "The waterworks" in this document refers to all aspects of the waterworks, from the source to the service connection. This includes raw water supply (wells, intakes), raw water storage, water treatment, water treatment facilities, treated water storage and treated water distribution, which includes water mains, pipelines, pump stations, and all other distribution system components.

The Waterworks System Assessment shall include a review of information since the most recent Assessment, since the latest major facility upgrade, or over the previous 10 years if no Assessment or major upgrades have been done within that time frame.

The Assessment shall evaluate the following areas:

1. **Raw water supply system**:

- Assess the raw water supply system, including intakes or wells, storage, pumps and pipes.
- Assess the raw water supply capacity and the current raw water allocation.
- Report any contingency plans in place for any problems that may occur with the main raw water supply.
- Categorize the raw water source as true groundwater, surface water, or GUDI (groundwater under direct influence of surface water).
- Identify any source water protection concerns.

2. **Treatment process assessment:**

- Describe all treatment processes and develop a process flow diagram of the system.
- List the chemicals that are applied in the treatment process, and their dosages and chemical feed rates over the previous year.
- Identify any chemicals that are exceeding the Maximum Use Level (MUL).
- Assess chemical storage and chemical feeders.
- Describe the disposal of all wastewater generated by the waterworks.

3. **Disinfection:**

- Describe the disinfection process and disinfectant used.
- Demonstrate the effectiveness of the disinfection process. This can be done using a CT calculation, or equivalent depending on the disinfectant used. (More information on performing a CT calculation and estimating appropriate baffle factors can be found in EPB 233A). Actual calculations must be included in this section of the report, where applicable.
- Identify areas in which the system's disinfection processes could be optimized.

4. **Water Quality:**

- Report and evaluate the treated water quality produced by the waterworks.
    - Report the in-plant turbidity and chlorine levels for the waterworks, as well as all other aspects of the treated water quality.
- Report and evaluate the quality of the raw water that is entering the system.
- Provide conceptual recommendations for any upgrades necessary to meet treatment standards.

5. **Water treatment performance:**

- Identify any components of the waterworks that are not performing optimally.
- Identify problems that do or have the potential to jeopardize the finished water quality.
- Identify upgrades necessary to maintain or achieve compliance with the Water Security Agency's requirements.
- Examine any non-compliance issues/incidences since the most recent Assessment, most recent major treatment system upgrade, or over the previous ten years. More information on this can be obtained from the waterworks' Environmental Project Officer with the Water Security Agency.

6. **Distribution System:**

- Report on the age and condition of the distribution system and its components.
- Report and evaluate any water quality data from the distribution system.
- Determine the materials used within the distribution system, where possible.
- Determine the remaining service life of the distribution system, along with the cost of replacement for components that are likely to require replacement within the next 10 years.

7. **Waterworks condition:**

- Assess the condition of all aspects of the waterworks; this should include equipment, treatment processes, distribution system, storage system, buildings, and any other relevant components of the waterworks.
- Report on the age of major components of the system.
- Determine any existing or anticipated maintenance needs.

8. **Operations and Maintenance:**

- Check that operation and maintenance procedures and manuals are accessible and up to date.
- Document any relevant maintenance records and maintenance requirements and include in the report.
- Include options for optimizing the operation and maintenance of the system.

9. **Remaining service life of the system:**

- Estimate the life expectancy/remaining service life of all equipment and components of the waterworks. This should be expressed in terms of the life expectancy of the actual equipment as well as in terms of the population growth rate.
    - For example, if the waterworks equipment has an estimated remaining service life of 10 years, but a remaining capacity that will likely be outgrown within five years, this information should be included.
- Identify any individual system components that have a shorter remaining service life than the rest of the system.

10. **System capacity:**

- Report the capacity of the waterworks in terms of both the maximum population that can be served and the flow rate that can be treated by the system.
- Report the capacities of each individual treatment process with respect to both flow rate and the population that can be served.
- Identify any capacity limitations, and determine possible solutions to these limitations.
    - The limitations assessment should include storage limitations and treatment limitations, and should identify any potential "bottlenecks" within the system that could limit overall treatment capacity. For example, if the majority of the treatment facility can service up to 1000 people, but the clarifier can only handle up to 800, this should be identified in the report.

11. **Municipal waterworks cost analysis:**

- Municipal systems must identify opportunities to reduce costs and risks and to increase the efficiencies and capability of waterworks operation.
- This section should include:
    - The annual operation and maintenance costs of the municipal waterworks, including items such as chemical costs, electrical costs, personnel costs, sampling and monitoring costs, and routine maintenance costs.
    - An estimate of the capital replacement costs of any major system components that are expected to require replacement within the next 10 years.
    - Approximate cost estimates for anticipated non-routine maintenance, upgrades or expansions.
    - Recommend appropriate water rates for municipal systems to meet all Operation and Maintenance costs as well as expected or anticipated future costs to ensure that the system will be financially self-sustainable.

12. **Waterworks Sustainability:**

- Evaluate the economic sustainability of the waterworks.
- Identify current or potential risks to public health or the environment associated with the waterworks, determine the cause of these risks, and recommend appropriate solutions.

13. **Recommendations:**

- Report the progress made on the recommendations and concerns of previous Assessments, along with details on any actions taken.
- Recommend possible solutions for problems identified in the Assessment. These problems may include capacity issues, treatment problems, recurring non-compliance problems, or any other relevant issue.
- Provide approximate cost estimates for the solutions proposed.

Other information:

- A completed "Round 3 Waterworks System Assessment Summary" must be submitted with the draft and final copies of the Assessment.
- Appropriate and conservative assumptions should be made where applicable, such as for peaking factors, population growth rates or baffling factors.
- Justification must be provided for all assumptions.
- Growth rates and consumption rates should be based on historical data, and appropriate and conservative assumptions should be made where required. In cases where historical growth rates are negative or near zero, a minimum growth rate of at least 0.5 per cent should be assumed to ensure a factor of safety.
- Direct sources or any detected instances of microbial contamination or malfunctioning disinfection equipment must be reported immediately to the owner of the waterworks and to the appropriate Environmental Project Officer.

Systems that do not provide any treatment but instead distribute treated water received from another permitted system are not required to submit the information required in sections 1, 2, 3, 4, or 5 or those portions of other sections that are not directly related to the distribution system.

Preparation and Submission of a Report

The Waterworks System Assessment must be performed by, or performed under the direct supervision of, an independent Professional Engineer licensed to practice in Saskatchewan.

- The individual performing the assessment must perform an inspection and evaluation of the above mentioned aspects of the waterworks infrastructure.
- A report must be submitted that satisfies the information required in the standards section of this document.
- Engineering reports for new works may form part of the Assessment, and those portions of the waterworks that received a Permit to Construct since the last Assessment do not need to be reassessed.

Prior to submitting the final report, a draft report must be submitted to the Environmental Project Officer for approval. At this point, the Environmental Project Officer may request changes to the report, request the inclusion or addition of information to the report, or reject the report if it does not satisfy these standards or the Regulations.

The report must contain the following declaration, signed and sealed by the Engineer responsible for the report:

> "I, the undersigned, declare that the information contained within this submission is, to the best of my knowledge, complete and accurate, and has been prepared in accordance with the standard for this submission as published by the Saskatchewan Water Security Agency."

Four copies of the report shall be submitted to the owner, and the Engineer who inspects the works shall meet with the owner to discuss the assessment and report. If the waterworks owners disagree with the findings of the Assessment, they may attach a written statement of disagreement to the report before submission to the Water Security Agency, including the reasons for each disagreement. Two paper copies and one searchable electronic copy of the finalized report and summary sheet must be submitted to the waterworks' Environmental Project Officer.