

Waterworks System Assessment (WSA) Standards Round 2



These standards were developed to ensure a detailed inspection and evaluation of waterworks infrastructure and activities takes place on a regular basis. This will enhance functionality and avoid unnecessary health risks associated with waterworks.

The first round of Waterworks System Assessment (WSA) was completed by December 31, 2005. This standard is for the second round of WSA, to be completed by December 31, 2010 or date outlined in the waterworks permit to operate.

A WSA is an inspection and reporting process intended to aid waterworks owners to:

- identify, analyze and mitigate potential adverse health risk and environmental impacts associated with waterworks;
- determine and evaluate the current performance and sustainability of waterworks;
- understand options and costs so as to implement improvements needed to meet the province's regulatory water quality standards;
- identify opportunities to reduce costs and risks and to increase the efficiencies and capability of waterworks operation; and
- determine the progress made, in the context of successive reviews, in accordance with past assessments and recommendations for change or improvement to waterworks infrastructure and maintenance.

Facilities Needing a Waterworks System Assessment:

Facilities regulated by the Ministry of Environment are required to undertake a WSA on the following new schedule:

Water Treatment Plant Type	Number of Consumers Served	Frequency and Deadline of WSA
True municipal groundwater plant	< 50	Not required
True municipal groundwater plant	50 to 500	Once by the later of December 31, 2005 or the date listed in the operating permit conditions.
True municipal groundwater plant	> 500	Once by the later of December 31, 2005 or the date listed in the operating permit conditions, <u>and</u> every 5 years thereafter.
Any municipal plant other than true groundwater	<101	Once by the later of December 31, 2005 or the date listed in the operating permit conditions.
Any municipal plant other than true groundwater	101 and more	Once by the later of December 31, 2005 or the date listed in the operating permit conditions, <u>and</u> every 5 years thereafter.
Pipelines with < 15 service connections		Not required.
Pipelines with 15 or more service connections		Once by the later of December 31, 2005 or the date listed in the operating permit conditions.
Waterworks permitted as hygienic		Not required.
All other waterworks governed by <i>The Water Regulations, 2002</i>		Once by the later of December 31, 2005 or the date listed in the operating permit conditions, <u>and</u> every 5 years thereafter.

EPB 233 Dec/08



Saskatchewan
Ministry of
Environment

www.environment.gov.sk.ca

SaskH₂

A true groundwater plant is a water treatment facility that draws all of its water supply from groundwater that is beyond the direct influence of surface water. For the above schedule, if the water supply is Groundwater Under Direct Influence (GUDI) or suspect of being GUDI or is surface water, the water supply is not true groundwater. Use most recent Canada Census population data if the number of consumers is unknown. Some owners of smaller municipal waterworks and pipelines that have completed a WSA in accordance with Round 1 requirements are now exempt from the need to complete further WSA's as a result of April 2007 amendments to *The Water Regulations*. Please see the above table to determine if a second and subsequent WSA is generally required. However in some cases the frequency and deadline for WSA as listed in operating permit conditions supersedes the above table.

Scope of Waterworks System Assessments:

The WSA is to focus on:

- detailing upgrades needed to provide drinking water that meets all Ministry of Environment requirements, and
- detailing system capacity upgrade requirements.

The WSA is to contain recommended improvements with conceptual cost estimates for these quality and capacity upgrades. See [EPB 233A Questions and Answers WSA Report](#) for more information on cost estimates and water quality requirements.

The WSA is to maximize information from the prior Round One WSA. For example, modify past CT calculations instead of performing entirely new CT calculations. Where possible modify existing prior WSA information instead of performing an entirely new review. In most cases there will be no need to complete a WSA on upgraded portions if upgrades were previously reviewed as part of application to construct since December 5 2002, unless there is significant implication for other functioning of the system. Mention should be made to which portions of a waterworks have been upgraded.

The WSA is to include a determination if recommendations from prior WSA have been undertaken, and is to specify actions taken to fulfil prior recommendations.

The WSA planning phase involves a review of the available information on the water supply, treatment, storage and distribution systems. The review includes raw and treated water quality and system capacities.

The historical information review is limited to the previous 10 years, or since the latest major facility upgrade. Historical review beyond 10 years is considered relevant only with significant reason. For regional systems where a supply, treatment and transmission facility may supply several separate storage and distribution facilities, a WSA is required by each permittee for their works. The WSA shall clearly identify waterworks problems and emphasize solutions.

As each waterworks system is unique, the studied WSA characteristics shown in this standard will need to be modified. Further information can be obtained by reviewing the Ministry document [EPB 201 A Guide to Waterworks Design](#) and through discussion with Ministry staff.

Obvious problems associated with the waterworks that presently or may jeopardize the finished water quality to the point that it no longer meets the health protection standards adopted in regulation are to be highlighted in the WSA. The WSA will not assess regulatory compliance in relation to Quality Assurance and Quality Control (QA/QC) Policy, record keeping, training and monitoring requirements found within *The Water Regulations* as this is performed by the Ministry of Environment. Water quality testing shall be based on risk reduction and the amount of testing is to be minimized. The WSA is to contain recommended improvements with conceptual cost estimates.

The WSA will estimate capital replacement costs and remaining service life of all existing components of the waterworks. Major components include the raw supply system, treatment works, storage and distribution works, minor components include wells, pipelines, plant building, clarifiers, filters, pump stations and distribution mains piping. The total waterworks replacement cost shall be the sum of all major component replacement costs. Remaining service life means years the component will last before it has to be replaced. See [EPB 233A](#) for more information on cost and service life reporting.

The WSA includes an on-site inspection and assessment of the following existing system components and maintenance activities:

Raw Water Supply:

The WSA shall categorize all raw water sources as either true groundwater, groundwater under the influence of surface water or surface water, or present a written plan and timeline to determine GUDI status. For more information on determining GUDI status see Ministry publication [EPB 284 Groundwater Under the Influence of Surface Water \(GUDI\) Guideline](#). The WSA shall assess capacity and condition of the raw water supply to meet current and estimated future water demands, and recommend upgrades and provide conceptual cost estimates.

Water treatment and disinfection system:

Characteristics to be evaluated include but are not limited to:

treatment processes and water quality	treatment components
equipment condition	treatment competence
capacity to meet current and future water demands	controls and instrumentation
in-plant turbidity levels (where employed as a diagnostic aid)	chemicals applied and dosage of chemicals in last year
chemical feeders	feed rate capacity
chemical storage	wastewater disposal
operation and maintenance procedures	type of disinfection process
disinfectants used	estimated disinfectant contact time
disinfection effectiveness	ability to meet appropriate CT values
housekeeping and cleanliness	backflow prevention
reliability	metering (detail meter locations; type (raw/treated/fire/waste); detail the method of calculating meter records for Saskatchewan Watershed Authority Community Water Use Records including peak day volumes)

The assessment shall examine historic plant and distribution water quality and treatment plant capacity and required changes to produce water which meets the associated turbidity and chemical health and disinfection standards found within Sections 32, 33 and 34 of *The Water Regulations* and all other pertinent water quality regulations. The assessment report is to recommend upgrades and provide conceptual cost estimates. The Ministry of Environment may be consulted to obtain raw and treated water quality data, and to determine compliance with monitoring requirements including disinfectant residuals.

Storage and distribution system:

Storage system characteristics to be evaluated include storage condition and sizing to meet current and estimated future demands. For pipeline and distribution systems, the assessment shall examine the pipeline supply capacity in relation to current and estimated future demand on the system and presence of backflow prevention at service connections. The assessment report shall recommend upgrades and provide conceptual cost estimates

Immediate Reporting of Operating Anomalies

Direct sources or instances of microbial contamination or malfunctioning chlorine equipment must be reported immediately to the owner of the waterworks (permittee) and to the Ministry’s local Environmental Project Officer (EPO).

Preparation and Submission of a Report

WSAs are to be completed by a professional engineer or under the supervision of a professional engineer by means of an inspection and evaluation of the above noted aspects of waterworks infrastructure and maintenance protocols. Where an engineer is in direct responsible charge of the day-to-day operations of the waterworks, an assessment which has been conducted in conjunction with an independent engineer or engineering firm (audited assessment) is acceptable. Engineer reports prepared for new works may form part of

the WSA. The WSA will be a valuable resource for waterworks owners in support of further decision making regarding upgrading and operation.

- The Engineer in charge of preparing this assessment report shall prepare a written report to the owner of the water treatment facility outlining findings and recommendations.
- Four copies of the report shall be submitted to the owner. The Engineer shall inspect the works and shall meet with the owner to discuss the WSA.
- The report shall contain a signed declaration made by the Engineer responsible for the report as follows:
“I, the undersigned, hereby declare that to the best of my knowledge, the information contained herein and the information in support of this submission as completed by me is complete and accurate in accordance with my obligations under *The Engineering and Geoscience Professions Act (2000)* and its regulations. I further declare that this submission has been prepared in accordance with the published standard for this submission.”
- If the waterworks owners disagree with the facts or findings of the WSA then the owners may attach a written statement of disagreement to the WSA. The statement shall contain the reasons for each disagreement.

Supporting Legislation and Rationale:

Requirements for completion of an engineering waterworks assessment are derived from subsections 35 of *The Water Regulations (2002)*.

Assessment and audit of water – water for human consumptive use

35(1) Subject to subsections (2) to (8), the permittee of a waterworks supplying water intended or used for human consumptive use shall ensure that an independent engineering assessment of the following respecting the waterworks is conducted at least once every five years:

- (a) the waterwork’s performance;
- (b) the waterwork’s condition;
- (c) the waterwork’s capacity;
- (d) the waterwork’s functionality;
- (e) the waterwork’s processes;
- (f) the waterwork’s optimization;
- (g) the waterwork’s sustainability;
- (h) the waterwork’s maintenance.

(2) An assessment conducted pursuant to this section must be conducted in accordance with the standards developed by the minister.

(3) Subject to subsection (6), the permittee of a municipal waterworks or a municipal well connected to a distribution system mentioned in clause 20(1)(a) or (b), supplying water intended or used for human consumptive use, and constructed and permitted for operation on or before December 31, 2005, shall complete an independent engineering assessment of the waterworks on the frequency set out in Table 3 of the Appendix (Note: Table 4 is included as the table on the first page of this document).

(3.1) For the purposes of subsection (3), the permittee of a municipal waterworks or a municipal well shall provide the minister with a report in a form satisfactory to the minister and within the period required by the minister respecting the number of consumers to be served by the municipal waterworks or the municipal well.

(3.2) Subject to subsection (6), the permittee of a water pipeline mentioned in clause 20(1)(c) or (d), supplying water intended or used for human consumptive use, and constructed and permitted for operation on or before December 31, 2005, shall complete an independent engineering assessment of the waterworks on the frequency set out in Table 4 of the Appendix (Note: Table 4 is included as the table on the first page of this document).

(3.3) The permittee of a waterworks mentioned in clause 20(1)(e), supplying water intended or used for human consumptive use, and constructed and permitted for operation on or before December 31, 2005, shall complete an independent engineering assessment of the waterworks:

- (a) by the later of:
 - (i) December 31, 2005; or
 - (ii) the date listed in the operating permit conditions; and
- (b) every five years thereafter.

(3.4) The permittee of any waterworks or water pipeline shall complete an independent engineering assessment of the waterworks or water pipeline in accordance with subsection (3.5) if the waterworks or water pipeline:

- (a) supplies water intended or used for human consumption; and
- (b) is:
 - (i) constructed after December 31, 2005;
 - (ii) permitted for operation after December 31, 2005; or

(iii) constructed and permitted for operation after December 31, 2005.

(3.5) The permittee of a waterworks or water pipeline described in subsection (3.4) shall complete the independent engineering assessment required by that subsection no later than five years after:

(a) if the permit for the waterworks or water pipeline issued pursuant to section 23 of the Act authorized the use of water from the waterworks or water pipeline for human consumption, the date the permit was issued pursuant to

section 23 of the Act; or

(b) if the permit for the waterworks or water pipeline issued pursuant to section 23 of the Act did not originally authorize the use of water from the waterworks or water pipeline for human consumption, but the permit was

subsequently altered pursuant to section 30 or 34 of the Act to authorize the use of water for human consumption, the date the permit was altered pursuant to section 30 or 34 of the Act.

(4) An assessment is to be done at the sole expense of the permittee of the waterworks.

(5) The permittee of a waterworks supplying water intended or used for human consumptive use shall report the findings of an independent assessment required by this section to the minister within 90 days after the completion of the assessment.

(6) If a waterworks or a water pipeline supplying water intended or used for human consumptive use is required to complete a waterworks system assessment once by the later of December 31, 2005 or the date listed in the operating permit

conditions pursuant to subsection (3) or (3.2), the minister may direct, in writing, one or more additional independent engineering assessments as a condition of a permit to operate a waterworks issued pursuant to section 23, 30 or 34 of the Act if the minister considers it necessary:

(a) due to growth of the waterworks system; or

(b) due to evidence that, in the opinion of the minister, may indicate a potential problem.

(7) No permittee to whom a written direction is issued pursuant to subsection (6) shall fail to comply with the direction within the period specified by the minister in the direction.

(8) In this section and in Table 3 and Table 4, “**operating permit conditions**” means the conditions imposed by the minister on a permit to operate a waterworks.

WSA will help the waterworks in improving the overall performance of the system and possible compliance of the regulatory requirements. Other benefits include:

- stronger operational control;
- employee awareness;
- commitment to protect customer’s health while minimizing any effect on the environment; and
- improved relations with the stakeholders and public.

For more information contact:

Ministry of Environment
Environmental Protection Branch
4th Floor, 3211 Albert Street
Regina, SK S4S 5W6
Telephone: (306) 787-6504