



A Guide to Waterworks Design

January 2008

EPB 201

Changes (highlighted) made to the following Sections: Section 1.1; and Section 3.2.1.

1. Information Submissions for Approvals

1.1 General

An approval to construct, extend, or alter any waterworks must be obtained from Saskatchewan Ministry of Environment before starting construction of such works. Applications for approval are required to be made on prescribed forms obtained from SE.

Applications for approvals are required to contain information as outlined below. Information should be in a concise form and logical order. Drawings and plans should conform to good engineering practices. Previously submitted information need not be resubmitted unless it is affected by the construction, extension or alteration or updating is appropriate.

The following summarizes the regulatory requirements and includes other recommended submissions that will facilitate the review and processing of applications.

When a person makes an application for a permit to construct, extend or alter waterworks as required in Section 22 of the Act, he/she shall include in the application:

- engineering reports for new systems and major modifications;
- name(s) of owners and responsible party for operation and maintenance;
- designer or responsible engineer or engineering firm;
- proposed period of construction and anticipated operation date;
- cost estimates for the work including applicable local improvement or capital portions; and
- if applicable, application for permit shall include easement agreement containing the following information and provisions:
 - a) the name of the person proposing to construct, extend, alter or operate the waterworks that is the subject of the easement;
 - b) the nature and extent of the construction, extension, alteration or operation of the waterworks that is the subject of the easement;
 - c) the name of the registered owner of the land on which the waterworks that is the subject of the easement is to be constructed, extended, altered or operated and, if different, the name of the registered owner of the land affected by the waterworks that is the subject of the easement;
 - d) the legal description of the lands mentioned in clause (c); and
 - e) a provision that:
 - i. grants an easement by the registered owners of the lands affected by the waterworks that is the subject of the easement;
 - ii. conveys a right to use the land for the purposes and to the extent required to construct, alter, extend or operate the waterworks that is the subject of the easement; and
 - iii. states that the easement runs with the land and is binding on the present and subsequent registered owners of the lands affected by waterworks that is the subject of the easement and their heirs, executors, administrators and assigns.

Municipalities and other waterworks owners are advised that First Nations and Métis Consultation must take place before any waterworks or distribution system construction, upgrading or decommissioning activities that could adversely affect Treaty or Aboriginal rights is developed or put in place. Although the need for notification or

consultation will depend on the specific circumstances of construction, upgrading or decommissioning, such consultation is to begin at the earliest possible time (conceptual stage) and to some degree could involve the municipalities or other waterworks owners and their consultants. More information Government of Saskatchewan Guidelines for Consultation with First Nations and Métis Consultation people can be obtained at: <http://www.fnmr.gov.sk.ca/documents/policy/consultguide.pdf>. Municipalities and other waterworks owners are also advised that such construction, upgrading or decommissioning activities with a significant areal impact will need to have an initial review called a Heritage Resource Review or HRR which will determine if a broader Heritage Resource Impact Assessment or HRIA is necessary.

3.2 Surface Water and Groundwater under Surface Influence

3.2.1 Processes

A water treatment plant should be designed so that the treated water meets turbidity and other water quality standards specified in the regulations. In general, treatment facilities for a surface water source or groundwater source directly affected by surface water shall include screening, coagulation-flocculation, sedimentation, filtration, taste and odour control and disinfection to ensure greater than 3-log (99.9%) removal and/or inactivation of *Giardia Lamblia* cysts and *Cryptosporidium parvum* oocysts and 4-log (99.99%) removal and/or inactivation of viruses. The removal/inactivation of microbial contaminants as a function of treatment processes are shown in Table 3.2.

Filtration of a surface water source or a groundwater source under the direct influence of surface water may not be necessary if *all* of the following conditions are met:

1. Overall inactivation is met using a minimum of two disinfectants:

- ultraviolet irradiation or ozone to inactivate cysts/oocysts;
- chlorine (free chlorine) to inactivate viruses; and
- chlorine or chloramines to maintain a residual in the distribution system.

Disinfection must reliably achieve at least a 99% (2-log) reduction of *Cryptosporidium* oocysts,* a 99.9% (3-log) reduction of *Giardia lamblia* cysts and a 99.99% (4-log) reduction of viruses. If mean source water cyst/oocyst levels are greater than 10/1000 L, more than 99% (2-log) reduction of *Cryptosporidium* oocysts and 99.9% (3-log) reduction of *Giardia lamblia* cysts must be achieved. Background levels for *Giardia lamblia* cysts and *Cryptosporidium* oocysts in the source water should be established by monitoring as described in the most recent "Protozoa" guideline document produced by the Federal/Provincial/Territorial Committed on Drinking Water, or more frequently during periods of expected highest levels (e.g., during spring runoff or after heavy rainfall).

2. Prior to the point where the disinfectant is applied, the number of *Escherichia coli* bacteria in the source water does not exceed 20/100 mL (or, if *E. coli* data are not available, the number of total coliform bacteria does not exceed 100/100 mL) in at least 90% of the weekly samples from the previous 6 months.

3. Average daily source water turbidity levels measured at equal intervals (at least every 4 hours), immediately prior to where the disinfectant is applied, are around 1.0 NTU but do not exceed 5.0 NTU for more than 2 days in a 12-month period. Source water turbidity also does not show evidence of protecting microbiological contaminants.

4. A watershed control program (e.g., protected watershed, controlled discharges, etc.) is maintained that minimizes the potential for faecal contamination in the source water. The Ministry must be informed and consulted on any watershed control program.

