



Updates to the MECP's Watermain Disinfection Procedure

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DRAFT, FOR DISCUSSION PURPOSES ONLY

Overview

- Part I, Background, 2015 Watermain Disinfection Procedure (WDP) review
 - Reasons for revisions and updates
- Parts II - V, Proposed revisions for discussion only:
 - Conditions of your DWWP and the 2015 WDP will continue to be in force, unless you have applied for exceptions or regulatory relief
- Next Steps





PART I

BACKGROUND, 2015 WATERMAIN DISINFECTION PROCEDURE

Water Research Foundation, Project 4307 Main Break Classification By Risk Factors

Type I Break	Type II Break	Type III Break	Type IV Break
Positive pressure maintained during break	Positive pressure maintained during break	Loss of pressure at break site/ depressurization elsewhere in system	Loss of pressure at break site/ depressurization elsewhere in system
Pressure maintained during repair	Pressure maintained until break exposed	Partially or un-controlled shutdown	Widespread depressurization
No signs of contamination intrusion	No signs of contamination intrusion	Possible contamination intrusion	Possible/ actual contamination intrusion
Based on risk factors identified as part of the workshop held during Project 4307, used as the basis for determining appropriate response measures to control public health risk			

Review of 2015 WDP: Section 2, 3 & 4, Watermain Disinfection Procedures for Emergency Repairs

- Categorization of watermain breaks based on risk of contamination
- Requirement for OIC to determine category and document
- Agency Notification and reporting of observation of improper disinfection, Sch. 16-4
- Watermain Break Common Disinfection Procedures
- Documentation requirements for maintenance and repair activities for appurtenances and fittings, and emergency repairs (Section 4)



Note: Where the watermain remained pressurized throughout the excavation, it is unlikely that potentially contaminated water was directed to users.

Review of 2015 WDP: Section 2&3 Categorization

Watermain Disinfection Procedures for Emergency Repairs

Categorization of watermain breaks based on risk of contamination, before or after flow reduction following break:

- Category 1, no “evident or suspected contamination intrusion”
- Category 2, there is “evident or suspected contamination intrusion”
 - Repairs of more than 6 metres of replaced pipe classified as Category 2
- Not an observation of improper disinfection unless contaminated water was directed to users, in which case Reg. 170 followed
- Notification of MECP not required unless water advisory declared, or is a special case in 3.4.4 or 3.4.5
- Microbiological samples not mandatory for Category 1



Amendment Requests/Opportunities Regarding 2015 WDP



64 Separate Issues/Opportunities Identified for Changes to Ministry's Watermain Disinfection Procedure (WDP), since 2015

Focus of previous document was watermain breaks/emergency repairs, proposed revisions more focused on new watermain construction/replacement

Proposed exceptions to ANSI/AWWA C651 for new watermains to address public safety and constructability issues in transportation corridors

Proposed clarification of disinfection, sampling, certified operator requirements for new watermain commissioning

Proposed clarification of main break categorization, and disinfection requirements

Proposed addition of documentation requirements for new/replacement watermains, and amendments to watermain break documentation

MECP/OWWA/OMWA/Stakeholder WDP Revision Group

Angela Storey	OCWA
Andrew Hallett	Sault Ste. Marie PUC
Nectar Tampacopoulos/Justyna Burkiewicz/Allen Dawson/October Bell	Region of Peel
Dan Huggins/Andrew Henry	City of London
Joe Cirillo/Antonio Longo/Frank Trinchini/Ying Zheng	Toronto Water
Jason Giffen/John Thompson	City of Barrie
Michele Grenier	OWWA
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John-Paul Palmer/Kier Taylor	City of Guelph
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Sharon Bottomley	City of Sarnia
Aleksandra Sokolowski/Sylvain Campbell/Riaz Haq/Aziz Ahmed	MECP
Alex Davidson	County of Brant
Joel Corbeil	WCWC

PART II – Section 1

Proposed Revisions

ADDITION, MODIFICATION,
REPLACEMENT, EXTENSION AND
PLANNED MAINTENANCE

DEFINITIONS – Additions and Edits

“Acceptable Disinfectant Concentration” means:

- a. A disinfectant concentration of at least 0.2 mg/L free chlorine in a chlorinated system or 1.0 mg/L combined chlorine in a chloraminated system; or if these disinfectant concentrations cannot be achieved,
- b. A disinfectant concentration representative of the area.. as long as.. at least 0.05 mg/L in a chlorinated system....

“Backflow Prevention” means the prevention of a reversal of normal flow that could introduce *Contamination* to the potable water supply; ~~accomplished by an Air gap or a CSA approved backflow preventer selected, installed and tested in accordance with CSA Standard B64.10: “Selection and Installation of Backflow Preventers”~~

“Connection” means all watermain and *Appurtenances* installed between an existing watermain and a new or future watermain/*Appurtenance*.

“Flushing” means post repair valve operation to restore ~~secondary disinfection~~ *an Acceptable Disinfectant Concentration* and discharge suspended materials by flowing water through the repaired a section of watermain and out of the system. This definition does not include recharging the watermain or a requirement to achieve scouring velocity within the watermain.

“Directly Supervised” means directly supervised within the meaning of Section 5.1.1 of the Certification Guide for Operators...but it does not expressly refer to the definition of supervisor under the Occupational Health and Safety Act



1. Addition, Modification, Replacement, Extension and Planned Maintenance

AWWA Standard C651-14, as amended, applies to:

- addition, modification, replacement, extension of watermains, including installation of **temporary watermains**, and **Service Pipes of ≥ 100 mm ϕ**
- relining of watermains

Exceptions:

NEW!

- Exceptions to backflow prevention in 4.8.9
- Exceptions when scouring velocity of 3.0 ft/sec for new watermain commissioning not practical, alternative flushing consisting of swabbing or flushing 2-3 pipe volumes can be used at sole discretion of operating authority
- Exceptions to disinfection procedures for watermains/service pipes crossing transportation corridors



NEW! Language about the use of hydrants to supply temporary watermains



REALLY NEW! Considering language for use of pre-disinfected piping in repair scenarios

AWWA C651-14, 4.8.9 Backflow Protection

4.8.9 *Backflow protection (optional).** ~~As an optional procedure~~ (if required by the purchaser), the **new water main shall be kept isolated** from the active distribution system **using a physical separation** (see Figure 1) until **satisfactory bacteriological testing** has been completed and the disinfection water flushed out. Water required to fill the new main for hydrostatic pressure testing, disinfection, and flushing shall be supplied through a temporary connection between the distribution system and the new main or other supply source approved by the purchaser.

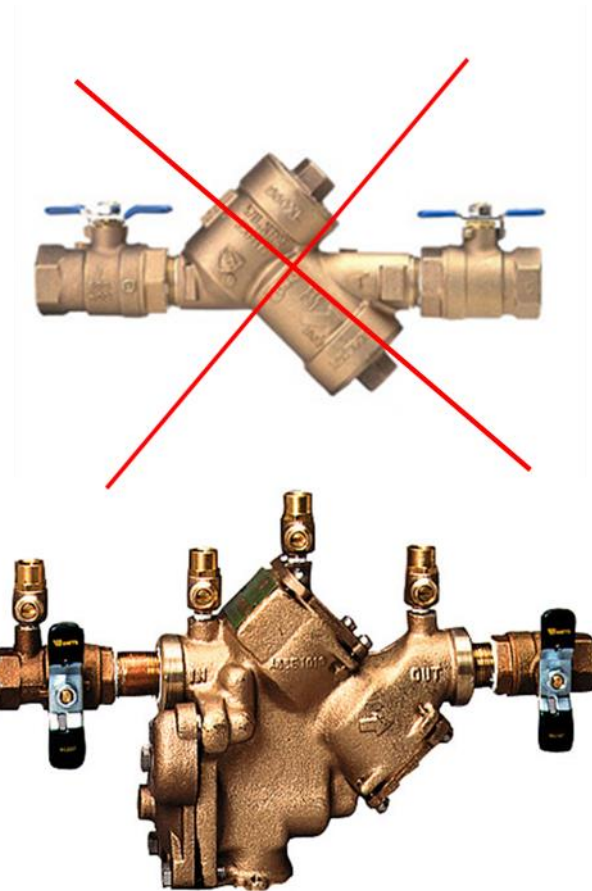
The **temporary connection shall include an appropriate cross-connection control device** consistent with the degree of hazard (~~a double check valve assembly or a~~ **reduced pressure zone assembly**) and shall be disconnected (physically separated) from the new main during the hydrostatic pressure test. It will be necessary to reestablish the temporary connection after completion of the hydrostatic pressure test to flush out the disinfectant water prior to final connection of the new main to the distribution system.

1.1.1. Backflow Prevention for New Watermains



Backflow Prevention shall be accomplished as per CSA **B64.10** (Selection and Installation of Backflow Preventers:

- An air gap or reduced pressure (**RP**) backflow preventer selected, installed and tested in accordance with B64.10
- Double check valve assembly (**DCVA**) no longer accepted
- **RP** device must be field tested in accordance with **B64.10**
 - **Exception: if device relocated within the same day, testing only required for the first installation of the day**
- **Tester's Licence** shall be **OWWA** Certified Cross Connection Control Specialist, include certified operator or water quality analyst with tester's licence



Ministry Direction to Ontario Licensed Laboratories – August 7, 2009 (Excerpts)

Analysis of any waters in respect of a drinking water system to determine water quality for the purpose of drinking water safety...must be performed at an accredited and licensed laboratory...

Samples which have been taken **from** temporary water mains or hydrants which are not in service or **watermains under construction** (ie. not connected to the distribution system) are not to be uploaded to DWIS or reported as an adverse if they are not taken to determine the quality of water in respect of the drinking water system...for the purpose of the SDWA..., as they would then **not be drinking water tests as defined in the SDWA.**

1.1.3 Microbiological Samples For New Watermains

Clarification:

Microbiological Samples taken in accordance with AWWA C651:

- Must be tested by a licensed and accredited laboratory
- OA must take another sample at same time and location, test for disinfectant residual

Samples prior to final connection to an existing municipal watermain in operation **are not drinking water tests** for the purposes of the SDWA:

- **Not reportable**
- Can be collected by any person authorized by the operating authority

1.1.4 Connections for New Watermains



- Clarification of requirements of s.4.10 (Final Connections to Existing Mains) of C651
- Exceptions from s4.10.2 (Connections greater than one pipe length)
- Backflow protection measures within s4.8.9 are not mandatory for Connections

AWWA C651-14, 4.10 Final Connections to Existing Mains

4.10.1 **Connections equal to or less than one pipe length (generally ≤ 20 ft [6 m])**. The new pipe, fittings, and valve(s) required for the connection **may be spray disinfected or swabbed with a minimum 1 percent solution of chlorine just before being installed**, if the total length of the connection from the end of a new main to the existing main is equal to or less than 20 ft (6 m).

- **Certified Operator** required to witness installation and disinfection of *Connection* unless:
 - *Connection* is isolated until one satisfactory *Microbiological Sample* taken in accordance with 1.1.3 of WDP from water directed through the *Connection*



AWWA C651-14, 4.10 Final Connections to Existing Mains

4.10.2 *Connections greater than one pipe length (generally >20 ft [6 m])*. The pipe required for the connection must **be set up aboveground, disinfected, and bacteriological samples taken**, as described in Section 5, if the total length of the connection from the end of a new main to the existing main is greater than 20 ft (6 m). **After satisfactory bacteriological sample** results have been received for the **predisinfected pipe**, the pipe can be used in **connecting the new main to the active distribution system**. Between the time the satisfactory bacteriological sample results are received and the time that the connection piping is installed, the **ends** of the piping must be **sealed** with **plastic wraps, watertight plugs, or caps**.

Exceptions will be provided to allow the procedures for one pipe length or less to be used, in lieu of 4.10.2



1.1.4.2 Connections Greater Than One Pipe Length

NEW!

- Follow s4.10.2 of C651-14

EXCEPTION

- *Connection* crosses a transportation corridor, where extended closure will result in significant community impacts (traffic congestion, loss of emergency vehicle access, safety concerns, etc.); or,
- New watermain cannot be constructed within one pipe length due to risk of destabilizing existing thrust block;



1.1.4.2 Connections Greater Than One Pipe Length

NEW!

Connections greater than one pipe length and up to a total length of 40m may be constructed within the excavation and disinfected similar to one pipe length (spray/swab), and if conditions below are complied with, in lieu of s4.10.2

Conditions for Exception to s4.10.2 of C651-14

- Watermain and *Appurtenance* forming *Connection* spray disinfected or swabbed with a minimum 1% sodium hypochlorite solution immediately prior to installation
- *Certified Operator* witnesses installation of *Connection*
- *Connection Isolated*, *Microbiological Samples* taken by *Certified Operator* or **water quality analyst**, until two samples are satisfactory as per s1.1.3 of WDP and s5.1.1 of C651-14
- Hydrostatic testing against isolating valve will not be undertaken until satisfactory results above obtained



1.1.4.3 Placing New Watermains Into Service



Clarification:

- *Certified Operator* required to operate valves to place new watermain into service
- *Flushing* through the **Connection** piping shall be performed until an *Acceptable Disinfectant Concentration* is achieved.
- Tests of samples taken after watermain is in service are drinking water tests for the purpose of SDWA (reportable).



1.3 Planned Watermain Inspection and Cleaning

- Disinfection procedures for electromagnetic, acoustic or video inspection equipment in contact with potable water in any part of a drinking water system.
- Dedicated equipment, sanitary practices, disinfection, chlorine residual testing, certified operator requirements, and flushing procedures



1.4-1.5 Planned Maintenance of Watermain Appurtenances and Fittings, Tapping of Watermains

- Section of existing watermain **realigned** around other infrastructure, follow disinfection procedures for Connecting New Watermains.



Live tapping (“wet tapping”) of watermain that is part of an operating drinking water system must be performed by a *Certified Operator*

Exception:

A person or contractor authorized can perform wet taps if they are Directly Supervised by a certified operator

1.6 Service Pipes

AWWA Standard C651-014 will apply to:

- Addition, modification, replacement, extensions of watermain, including installation ***Service Pipes* of $\geq 100 \text{ mm } \phi$**
- For *Service Pipes* of **$<100 \text{ mm } \phi$** , requirement to maintain sanitary condition, and *Flush* prior to placing in service

In accordance with 1.1.4.2, exceptions from Section 4.10.2 of AWWA C651-14 will also apply to sections of *Service Pipes* of $\geq 100 \text{ mm } \phi$, with lengths greater than one pipe length and up to 40 metres that cross a transportation corridor, as long as the requirements of 1.1.4.2 are met



1.7 Recommissioning Watermains Isolated from the Distribution System

Apply to:

- Section of watermain *Isolated* from the distribution system, where disinfectant residual not maintained (eg. valved off stub)
- Implement recommissioning plan based on time isolated and risk
 - Implement disinfection and sampling procedure for new mains as per 1.1.2-3
 - Perform unidirectional *Flushing* through *Isolated* section
 - Minimum of one *Microbiological Sample* prior to recommissioning



PART III – Section 2

Proposed Revisions

EMERGENCY/UNPLANNED REPAIRS,
WATERMAIN DISINFECTION
PROCEDURES

2.1 Categorization Watermain Disinfection Procedures for Emergency Repairs


Categorization of watermain breaks based on risk of contamination, before or after flow reduction following break:

- Category 1, no “evident or suspected contamination”
- Category 2, there is “evident or suspected contamination”
 - Repairs of more than 6 metres of replaced pipe classified as Category 2

All breaks now classified as Category 2, unless OIC conducts visual examination upon completion of excavation and classifies it as Category 1 as per s2.1.1.

OIC must assess evidence of *Contamination* through the repair procedure, reclassify as required.





PART IV – Section 3

Proposed Revisions

DOCUMENTATION

3. Documentation

- Now applies to **new watermain/planned replacement** installation, **s3.1**
- Record keeping requirements of Reg. 128/03, and Condition 13, Sch. B of MDWL
 - Not all information has to be on single form
- Documentation overview:
 - *Backflow Prevention* (Air gap, RP, testing as per 1.1.1)
 - Swabbing and/or flushing completed
 - Disinfection process
 - Method of disinfection (Table 1, s1.1.2 of WDP)
 - Date/time started/ended
 - Chlorine residual at start/end



3.1 Documentation Overview, New Watermains (continued)

- Documentation overview (continued):
 - *Microbiological Sampling*
 - Schematic showing location of sample
 - Microbiological and disinfectant residual sample results
 - Staged sampling
 - Flowrate, time of each sample and calculated length
 - *Connections*
 - Date of *Connection*, length
 - Sanitary conditions maintained and proper disinfection completed
 - *Connection* less than 6m with operator present, name of operator
 - *Connection* less than 6m with no operator present,
 - Results of microbiological and disinfectant residual as per 1.1.4



3.1 Documentation Overview, New Watermains (continued)

- Documentation overview (continued)
 - *Connections* (continued)
 - *Connection* greater than 1 pipe length and up to 40m, using exception to C651-14 s4.10.2 disinfection procedure,
 - Reason exception used,
 - Name of *Certified Operator* present, and statement of proper disinfection and sanitary conditions as per 1.1.4.2
 - Results of microbiological and disinfectant residual sampling as per 1.1.4
 - Disinfectant residual after watermain is flushed and put into service, including name of *Certified Operator* who took sample

Note: These are minimum requirements, no specified format

PART V

Proposed Revisions

APPENDICES

NEXT STEPS

- Have revised our 2015 “Made in Ontario” implementation of AWWA C651-14 based on stakeholder input organized by OWWA
- Draft document provided to municipal drinking water system owners, operating authorities, consultants and stakeholders for comment December 7, 2018
- 225 comments received from 32 organizations during comment period
- All comments are being discussed with the working group prior to finalization of document
- Implementation planned through license renewal, by updating DWWPs May 2019 – September 2021, with lead times for Operating Authorities to develop local SOPs, incorporate into Operational Plans in accordance with DWQMS if applicable
- 2015 Watermain Disinfection Procedure will remain in force until your license is renewed
- Ministry will continue to provide interpretation and advice on implementation

Questions



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