

# Implementing Corrosion Control – Get the Lead Out

Walkerton Clean Water Centre 20 Ontario Road, PO Box 160 Walkerton, ON N0G 2V0

# Outline - Objectives

Recognizing sources of lead

What happened in Flint, MI?

Awareness of available guidance materials

Provide overview of Thunder Bay's  
Corrosion Control Plan (CCP)

Break Out session – Developing a  
Corrosion Control Plan

Discussion and Questions

# Sources of Lead



# Sources of Lead

Lead water service pipe connections used in homes and businesses built prior to 1955

Pipe solder (pre-1980's) and leaded-brass fixtures, such as faucets or valves





# Flint Michigan

- Michigan State took control of Flint in 2011
- Switched water source to save \$
- New source introduced in 2014 (Flint River)
- Resulted in toxic levels of lead and other contaminants
- Public health crisis revealed
- Switched back to Detroit source in 2015

# Flint Michigan

Flint explained in 3 minutes

- [Flint's water crisis explained in 3 minutes.mp4](#)

# Flint - 15 Decision-makers Charged

- Involuntary manslaughter
- Misconduct in office
- Obstruction of justice
- Lying to a police officer
- False pretenses
- Conspiracy
- Willful neglect of duty
- Tampering with evidence, etc...

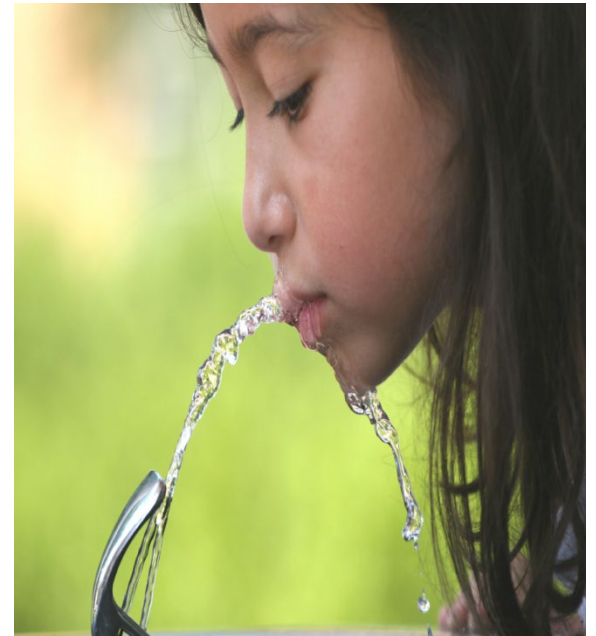
# Health Effects of Lead Exposure

## Target Areas of the Body

- Nervous system
- Brain
- Kidneys

## Who is at Highest Risk?

- Children under 6
- Pregnant Women

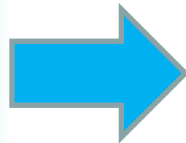




# MOECC Lead Action Plan

- Mandatory lead testing (requirement for DW licence renewal)
- Community Lead Testing Program for Municipal Drinking Water Systems

If 10% of test results are > 10 ppb



Municipalities must develop a **Plan** (approved by the MOECC) to reduce lead at the tap

# Emerging Issue: Proposed New Lead Guideline

- Current MAC: 0.01 mg/L (10µg/L)
  - Federal guideline and Ontario health-based standard
- Proposed MAC: 0.005 mg/L (5µg/L)
  - Federal guideline proposed by Health Canada (not yet an Ontario standard)

# Emerging Issue: Proposed New Lead Guideline

- Ontario typically adopts federal guidelines
- An estimated 40 Ontario municipalities will not be able to achieve 5 µg/L lead level
- Will your municipality be able to meet the proposed 5 µg/L lead level?

# Guidance Documents

- Health Canada-Guidance on Controlling Corrosion in Drinking Water Distribution Systems
- Health Canada – Lead in drinking Water
- MOECC Guidance Document - Preparing Corrosion Control Plans for Drinking Water Systems
- These documents will be posted to WCWC's Drinking Water Resource Library

# Sample Corrosion Control Plan

- Summary, Introduction and System Description
- Identification of Internal Corrosion - Sources of lead
- Assessment of the Significance of lead and Sources
- Identification of Alternative Methods for Corrosion Control

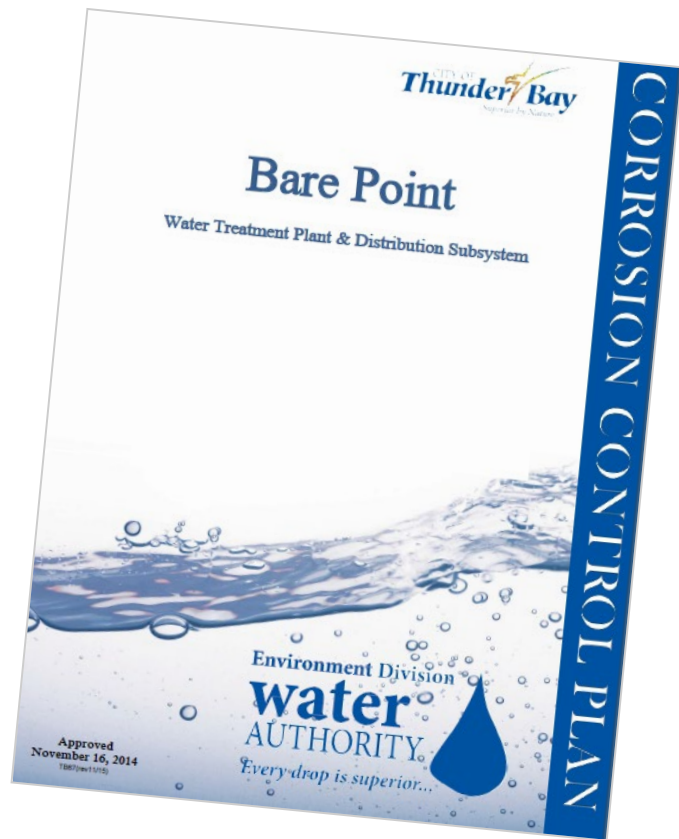


# Corrosion Control Plan (continued)

- Impacts of Methods on Treatment, Water Quality, and Distribution
- Preferred Method(s) Selected, with Rationale
- Public Communication and Stakeholder Consultation
- Corrosion Control Plan Implementation
- Monitoring Corrosion Control Effectiveness

# Consultation

- Important to consult prior to and during process
- City Council
- Local Medical Officer of Health
- Local MOECC Office
- MOECC Licensing and Approvals



# City of Thunder Bay's Corrosion Control Plan

# Lead Service Replacement Program

- Replacement of lead services as part of the CTB watermain rehabilitation program
- Free sampling for homeowners with known or suspected lead connection
- Priority replacement of the City's lead service when private service is replaced
- Public education / awareness on the impacts of lead in drinking water

# Public Education

- Determine if you have a lead service line
- Have your water tested for lead
- Stagnant water will have higher concentrations of lead
- Let cold water run for up to 5 minutes to flush pipes
- Clean aerators regularly
- Install point of use filters





# Thunder Bay's Corrosion Control Plan

- Overview of the drinking water system
- Identification of internal corrosion control problems and sources of contamination
- Identify known or potential lead service areas

# Thunder Bay's Corrosion Control Plan

- Review studies completed on corrosion control
- Identify the best chemical for controlling corrosion
- Pilot Study in a control area



# Public and Stakeholder Consultation

- Public Information sessions
- City of Thunder Bay website
- Thunder Bay Radio Stations
- Thunder Bay Television
- Local Newspapers
- Water bill inserts

# Monitoring Effectiveness

**Table 1: Monitoring the Effectiveness of Preferred Measures**

Column 1 Parameters <sup>#</sup>	Column 2 Point of Entry	Column 3 Distribution System (Sampling Points)	Column 4 Residential and Non-Residential (Sampling Points) <sup>#</sup>
Lead	12 minimum, annually	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Alkalinity	12 minimum, annually	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
pH	12 minimum, annually	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Inhibitor	Continuously	N/A	N/A
Chlorine Residual	N/A	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Temperature	N/A	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Dissolved Oxygen	N/A	N/A	N/A
Iron	N/A	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Sodium	N/A	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Turbidity	N/A	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Colour	N/A	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)
Microbiological Parameters (EC, TC and HPC)	N/A	120 minimum, annually	120 minimum, annually (100 private and 20 non-private)



# Required Reporting

Requirement to file report to MOECC annually, including (from MDWWL):

5.1 Corrosion Control Implementation

5.2 Lead Service Line Replacement

5.3 Corrosion Control Evaluation Report

5.4 Lead sampling data

# Lessons Learned

- Building temperature caused crystallization of sodium hydroxide (NaOH)
- Cl<sub>2</sub> and pH analyzers needed upgrading
- Dead ends require close monitoring
- Chemical handling SOP's are crucial
- Initial public resistance to chemical addition

# Lessons Learned

- Remember that *change* often precedes disease outbreaks
- Operators walk a tightrope:
  - a change in one part of a process will have an effect in other areas
  - What effect will increasing pH have on the process?
    - Disinfection?
    - Coagulation?

# Link to QMS

- Many elements of your QMS can be involved in a Corrosion Control Plan
  - Development
  - Implementation

# Group Activity

- Broketown, Ontario does not meet the new 5 µg/L standard for lead
- Older municipality, most homes built between the 1920s – 1980s
- Estimated 20% of consumers have lead service lines (municipal and private)
- Stagnant growth over the last decade – not an affluent community

# Group Activity (cont'd)

- Source is the Broke River with low pH and variable water quality
- Conventional drinking water plant using lime for corrosion control
- Develop a Corrosion Control Plan for Broketown using the guiding points on the following slide



# Group Activity (cont'd)

## Develop a Corrosion Control Plan:

- Identify lead sources
- Choose a preferred lead reduction option
- Provide incentives ?
- Communicate with the public
- Implement your strategy
- What elements of your QMS might be involved in this Corrosion Control Plan?

# Answer - QMS Elements

- Commitment and Endorsement 3
- Document and Record Control 5
- Drinking Water System 6
- Risk Assessment Procedure 7,8
- Competencies 10
- Personnel Coverage 11
- Communications 12
- Review / Provision of Infrastructure 14

# Answer - QMS Elements

- Infrastructure Maintenance, Rehabilitation and Renewal 15
- Sampling, Testing and Monitoring Procedure 16
- Measurement / Recording Equipment Calibration and Maintenance 17
- Emergency Management 18
- Continual Improvement 21

# Questions

- Further Information:
- <http://www.thunderbay.ca/water>
- [http://www.thunderbay.ca/Living/Environment/Drinking\\_Water/Lead\\_in\\_Drinking\\_Water.htm](http://www.thunderbay.ca/Living/Environment/Drinking_Water/Lead_in_Drinking_Water.htm)