

Presentation for

Corrosion Control Best Practices Evaluation

Presented to

**City of Milwaukee
Public Works Committee**



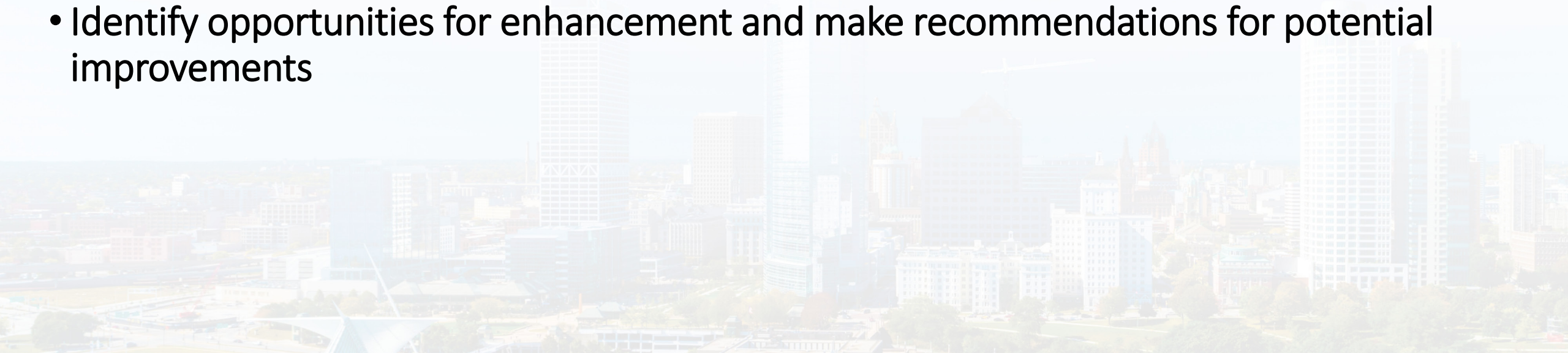
Presented by
JACOBS

March 11, 2020



Purpose of Best Practices Review

- Perform an outside review of the Milwaukee Water Works' additives and corrosion control products in response to the City of Milwaukee Resolution number 170525
- Review the current practices utilized by Milwaukee Water Works for lead and copper corrosion control
- Review of MWW's history of compliance with the Lead and Copper Rule
- Research best practices nationally for comparison with MWW current practices
- Identify opportunities for enhancement and make recommendations for potential improvements



The Experts who reviewed Milwaukee Water Works best practices.

Dr. Vern Snoeyink – International expert in corrosion control. Consulted with many large water utilities for lead corrosion control optimization in the US and abroad. Author of numerous publications on water chemistry and corrosion control.

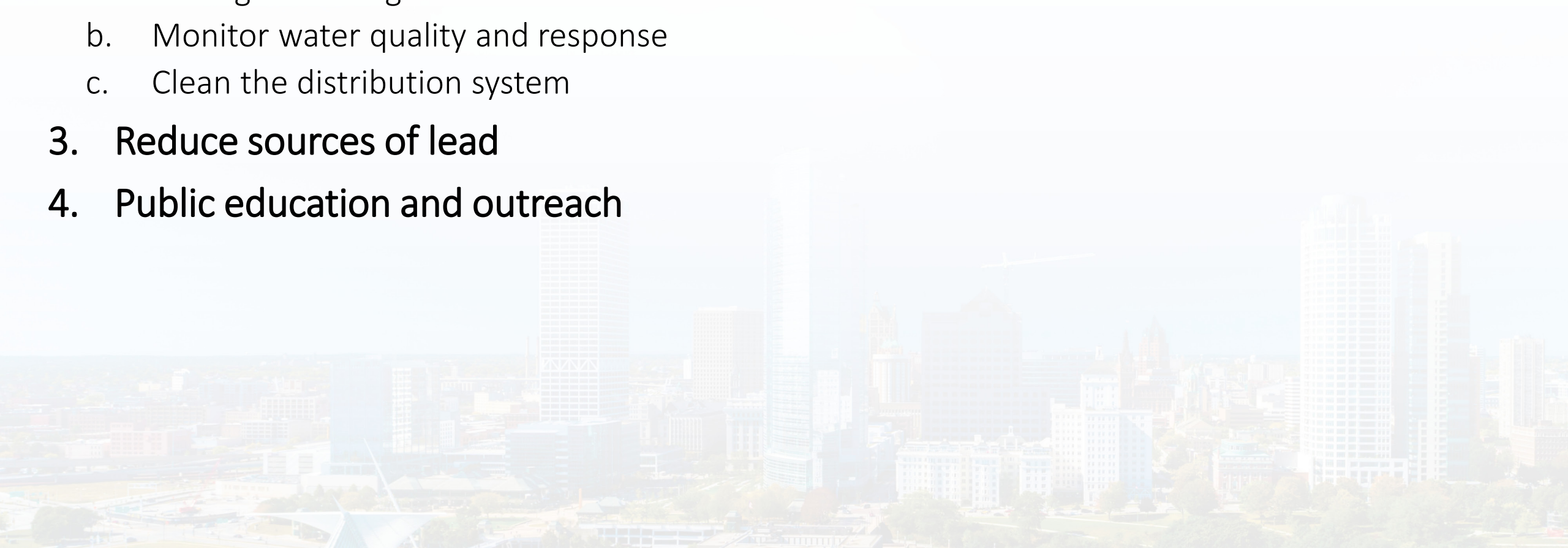
Rich Giani – Technical Drinking Water Coordinator for Jacobs water operations. Author of AWWA Manual 58 - Internal Corrosion Control in Water Distribution Systems. Former water quality manager for DC Water in Washington DC.

Monique Waller – Global technology leader for distribution system water quality for Jacobs. Worked with many water utilities to optimize lead and copper corrosion control in similar water systems.



Corrosion control best practices areas

1. Optimize corrosion control treatment
2. Distribution system
 - a. Manage water age
 - b. Monitor water quality and response
 - c. Clean the distribution system
3. Reduce sources of lead
4. Public education and outreach

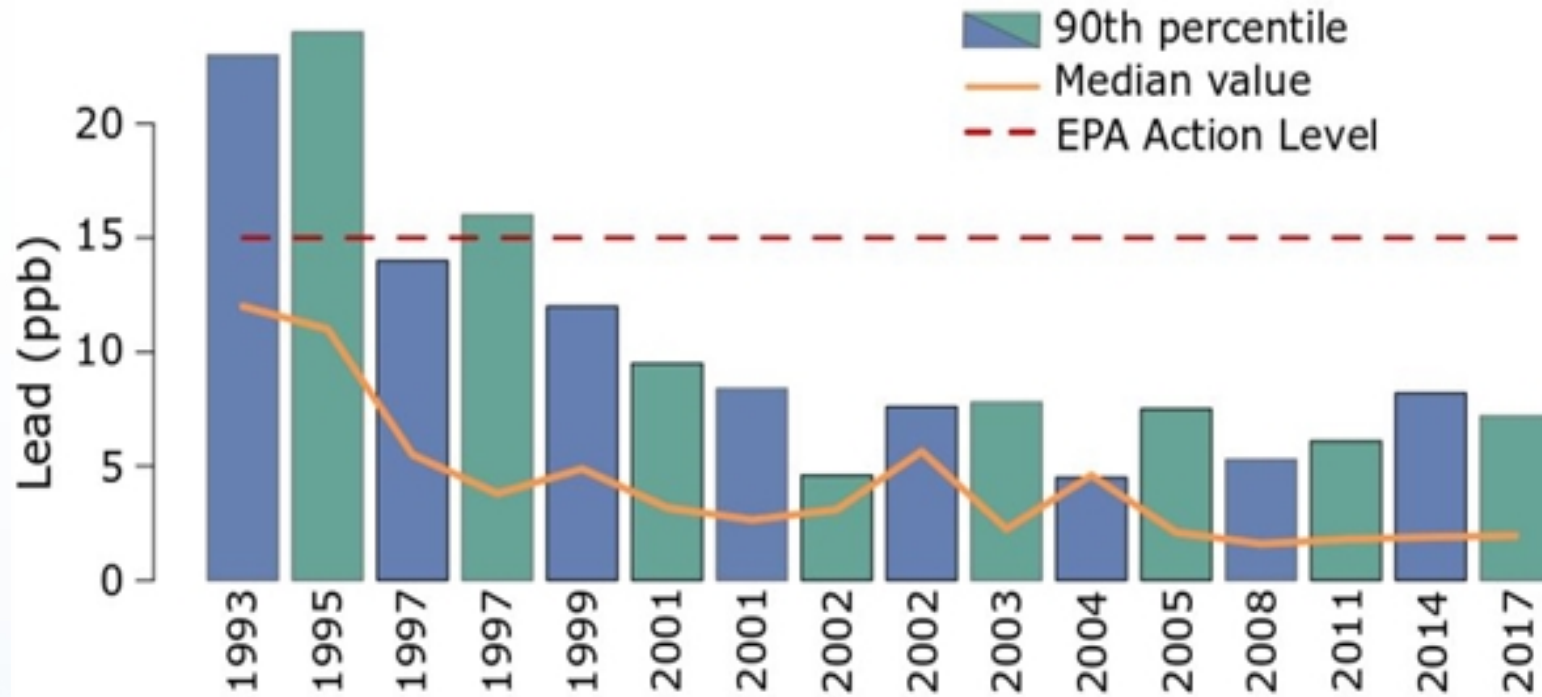


1. Optimize corrosion control treatment



Accomplishments

- Milwaukee Water Works has been using an effective lead corrosion inhibitor (orthophosphate) for nearly 25 years.
- Lead levels at customers tap are less than half the EPA action level.



Opportunities for improvement:

- Optimize orthophosphate dose
- Reduce aluminum phosphate particles

2. Distribution system – manage water age, monitor water quality, and clean the system

Accomplishments

- Water quality is excellent and stable.
- Milwaukee Water Works greatly exceeds required water quality monitoring requirements



Opportunities for improvement:

- Additional on-line water quality monitoring and analysis
- Consider mixers to storage facilities to reduce water age
- Enhance and calibrate the existing hydraulic model
- Improve site specific flushing procedures



3. Reduce sources of lead

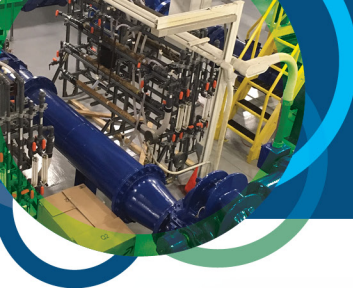
Accomplishments

- Over 2,550 Lead Service Lines replaced since 2017
- Invested an estimated \$25,500,000 in lead reducing efforts
- Prioritized lead service line replacement for customers with highest exposure risks

Opportunities for improvement:

- Accelerate development of privately-owned service line material inventory
- Establish long-term Lead service line replacement rate goals and financial plan
- Continue efforts to investigate funding sources to offset private property owner costs
- Establish strategic partnerships to increase privately-owned Lead service line replacements





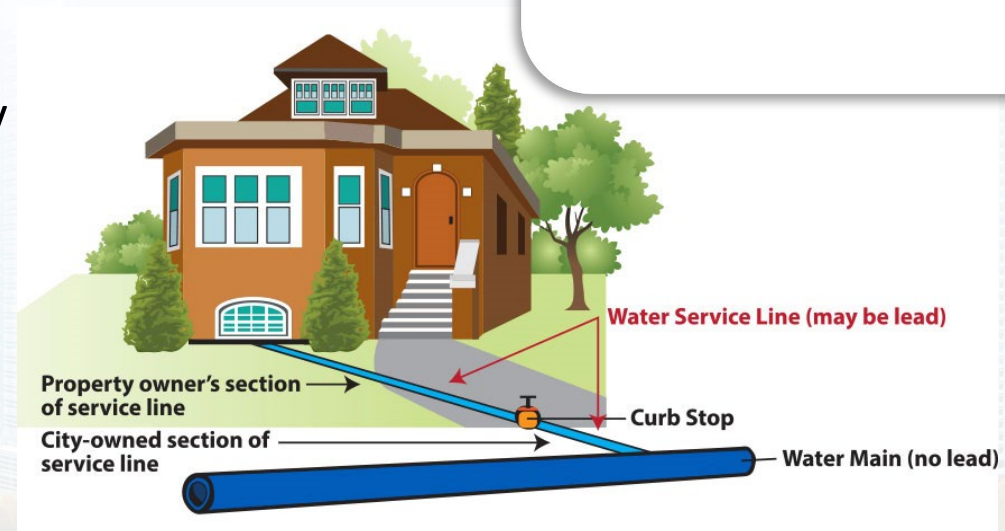
4. Public education and outreach

Accomplishments

- Milwaukee Water Works provides informative resources to help customers understand lead health risks and ways to minimize those risks
- Milwaukee Water Works conducts lead awareness outreach through meetings within the community.

Opportunities for improvement:

- Provide greater website information transparency
- Update Communication Plan



Flush your household plumbing after construction or plumbing work

Construction and plumbing activities can release particles and lead from lead service lines and plumbing fixtures. Flushing the plumbing brings fresh, cold water from the main in the street into the pipes in your property.

If you have a lead service line, flush your household plumbing at the end of each work day during active construction. Not running the water for the recommended length of time may increase your risk of lead exposure.

You may want to flush your plumbing even if you have a copper water service line.

Flushing your pipes for 10 minutes will cost 16 cents on the water portion of your Municipal Services Bill.

Active construction includes:

- Plumbing work
- Replacement of the lead service line with copper
- Water main replacement
- Department of Public Works street and sewer reconstruction

When the entire project is complete, flush your household plumbing again.

Here's how:

1. Remove aerators, or the screens, from the end of every faucet and rinse any particles from them.

2. Start in the basement or lowest level and work your way to the top floor. Fully open each cold water tap and allow the water to run.

3. Your water should be clear after 10 minutes. Start at the top floor and turn off the water at each faucet, finishing in the basement.

4. Re-attach aerators to the faucets.

If the water is discolored, continue flushing until clear. If it is still discolored after 30 minutes, please call our 24-hour Control Center at (414) 286-3710.



Milwaukee
Water Works

MWW is currently using many best practices

- ✓ Optimized corrosion control treatment to minimize customers' exposure to lead
- ✓ Monitoring distribution system water quality in excess of regulatory requirements to avoid water quality conditions that increase the potential for corrosion
- ✓ Routine cleaning of extensive portions of the distribution to help maintain high quality water
- ✓ Mandatory full LSLRs required by ordinance in 2017
- ✓ Grant funding to provide financial incentives for private side LSLRs
- ✓ Prioritized LSLRs at childcare facilities, service lines that leak, and CIP projects
- ✓ Provide point-of-use lead filter pitchers to customers when service lines have been disturbed or replaced
- ✓ Targeted communications strategy for customer outreach – including electronically available information in multiple languages



The Best Practices Evaluation identified 14 opportunities for potential further improvement



Accelerate development of privately-owned service line material inventory



Establish long-term LSLR rate goals and financial plan



Establish strategic partnerships to increase privately-owned LSLRs



Reduce effective water age in storage facilities



Enhance distribution system operations with process control charts



Develop a better understanding of corrosion with a library of pipe corrosion samples from entire system



Enhance distribution system hydraulic model to better understand system performance and aid in system operation and maintenance



Use distribution system model to aid design of a customized flushing program



Provide greater website information transparency



Update Communication Plan



Conduct research to explore how biomechanisms in MWW system may affect lead release



Consider future use of advanced automation to track water quality events



Study ways to reduce aluminum phosphate precipitation (an unintended consequence of CCT) that do not adversely impact corrosion control. Study impacts of other water quality changes on corrosion through continued pipe loop testing.



Plan for meeting future proposed LCR sampling requirements in partnership with City of Milwaukee Health Department



Corrosion Control Best Practices Evaluation

Questions?

