Review of key lead research issues addressed by WRF

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advancing the science of water
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Research Manager
Water Research Foundation
50 years of water research

- 1966: WRF Founded
- 1974: SDWA Established
- 1986: WRF Subscription Program
- 2016: WRF turns 50
Presentation Overview

WRF LCR research
History of SDWA Lead Regulation

1986: SDWA Lead Ban
1988: Lead Contamination Control Act
1991: Lead and Copper Rule
2011: Reduction of Lead Act
2017: Proposed LCR Revisions
WRF Lead Research since late 1980’s

>45 LCR Projects

>$14 million value
Lead and Copper Corrosion: An Overview of WRF Research

Summary of Common Themes

Ongoing Projects

List of all Projects

January 2016 Update

Lead and Copper Corrosion: An Overview of WRF Research

Jonathan Corgett, Water Research Foundation

This summary of relevant Water Research Foundation (WRF) research projects, both completed and ongoing, provides a basic understanding of the issues surrounding lead and copper corrosion and the Lead and Copper Rule (LCR).

BACKGROUND

In 1991, the U.S. Environmental Protection Agency (EPA) published the LCR, which established that all community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) would be subject to the rule requirements. The primary purpose of the LCR is to protect public health by minimizing lead (Pb) and copper (Cu) levels in drinking water. Pb and Cu enter drinking water mainly from corrosion of Pb- and Cu-containing plumbing materials. A unique aspect of the LCR is that lead and copper have action levels (AL) of 0.015 mg/L for lead and 1.3 mg/L for copper, and therefore do not have Maximum Contaminant Levels (MCLs). The action level for lead is a screening technique for optimal corrosion control based on treatment feasibility, and is not a health-based threshold. The action level for copper does have a health reference based on the prevention of nausea. Copper also has a secondary MCL (SMCL) of 1.0 mg/L, which is based on aesthetics or taste and staining. Table 1 highlights the different regulatory levels of Pb and Cu.

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<thead>
<tr>
<th>Table 1. Lead and copper regulatory framework</th>
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<tr>
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<tr>
<td>AL (mg/L)</td>
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<tr>
<td>Health Based Action Level</td>
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<tr>
<td>MCL</td>
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<td>MCLG (mg/L)</td>
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<td>SMCL (mg/L)</td>
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WRF Lead Research

Past, Present, Future
Notable Past WRF Projects

- **1990**: Development of a Pipe Loop Protocol For Lead Control
- **1994**: Innovative Techniques for Lead Service Line Location
- **1995**: Lead Pipe Rehabilitation and Replacement Techniques
- **2000**: Role of Phosphate Inhibitors in Mitigating Corrosion
- **2001**: Lead Control Strategies
Notable Past WRF Projects

2008
Contribution of Service Line and Plumbing Fixtures to Lead and Copper Rule Compliance Issues

2010
CSMR: Changes from Water Treatment and Its Impact on Lead Leaching

2011
Lead and Copper Corrosion in New Construction

2013
Galvanic Corrosion Following Partial Lead Service Line Replacement
Project Spotlight

- 2015 publication “4569”
- WRF - AWWA collaboration
- Response to attention to profile sampling
- Highlighted challenges with customers performing profiles
- No sampling method was particularly proficient at finding the peak lead level compared to doing a full profile for each sampling event
- Webcast available
- JAWWA publication forthcoming
Project Spotlight

- 2015 publication “4409”
- WRF - AWWA collaboration
- Overview of Lead in drinking water and corrosion chemistry
- Lead service line replacement strategies
- 6 - OCCT Case Studies
Present LCR Projects

2016
- Evaluation of Lead Service Line Lining and Coating Technologies
- Evaluation of Flushing to Reduce Lead Levels

2017
- Optimization of Phosphorus-Based Corrosion Control Chemicals and Flushing for Lead and Copper Control
- Corrosion of Nonleaded Pump Impeller Alloys in Chlorinated Potable Water
Future of WRF LCR Research

- Expert Symposium
- LCR Focus Area request in 2016
- Potential Research Needs
  - Service line material identification
  - Water corrosive to copper
  - Communication Issues

WRF Webcast: April 21, 12-2 MT

“Lead and Copper Rule: Potential Regulatory Changes, Corrosion Chemistry, and Stakeholder Communication”

*Registration available on WRF website
Get Involved!

Sign up for the Webcast!

Controlling Lead in Drinking Water

Web Report #4409

Subject Area: Infrastructure
Comments or questions, please contact: jcuppett@waterrf.org

For more information visit: www.waterrf.org

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