



Public Utilities Commission

Providence Water History of Lead Compliance and Various Measures to Rectify the Issue to The Present and Future Proposal Contained in this Case

October 8, 2013

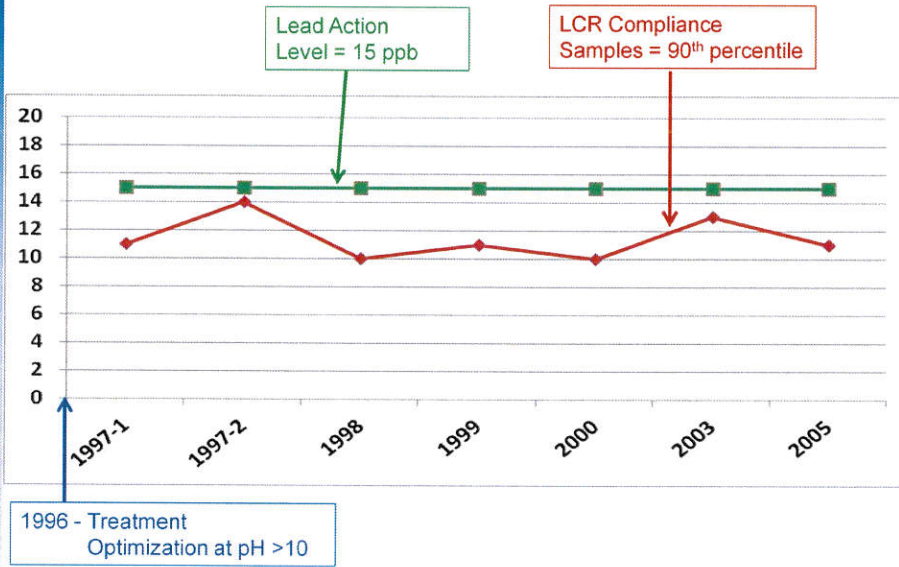
Presentation Overview

- History of Lead and Copper Rule (LCR)
- Providence Water Compliance with LCR
- Lead Service Line Replacement
- Rhode Island Department of Health Consent Agreements
- Main Rehabilitation
- Unidirectional Flushing
- Takeaways

Lead and Copper Rule (LCR)

- Federal Law Enacted in 1991 (EPA); testing required to begin in 1997
- No more than 10% of samples can exceed Lead Action Level of 15 parts per billion (ppb)
- Established monitoring periods – 100 customer samples to be analyzed per period
- Required water systems to treat water for Optimized Corrosion Control

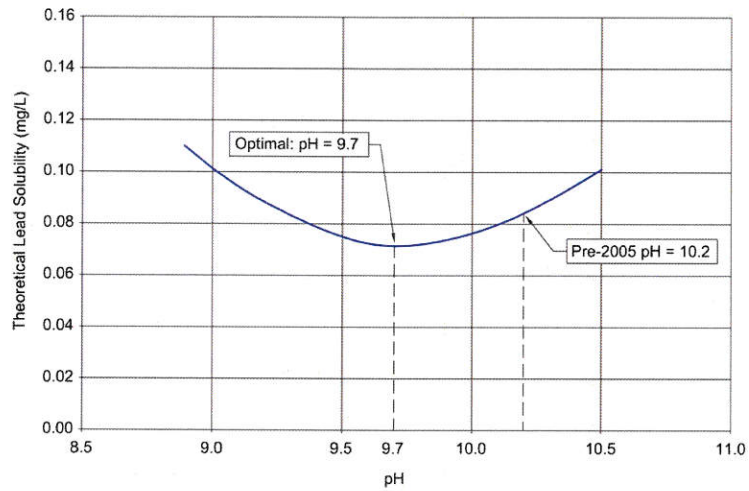
History of Lead Compliance (1997 – 2005)



Corrosion Control Re-assessment

- 1997 → 2004 - No exceedance of Lead Action Level
- Remained below 15 ppb - but uncomfortably close
- Commissioned study to further assess Corrosion Control
- Study recommended reducing pH from 10.2 → 9.7
- Recommendation based on EPA research findings

pH versus Theoretical Lead Solubility



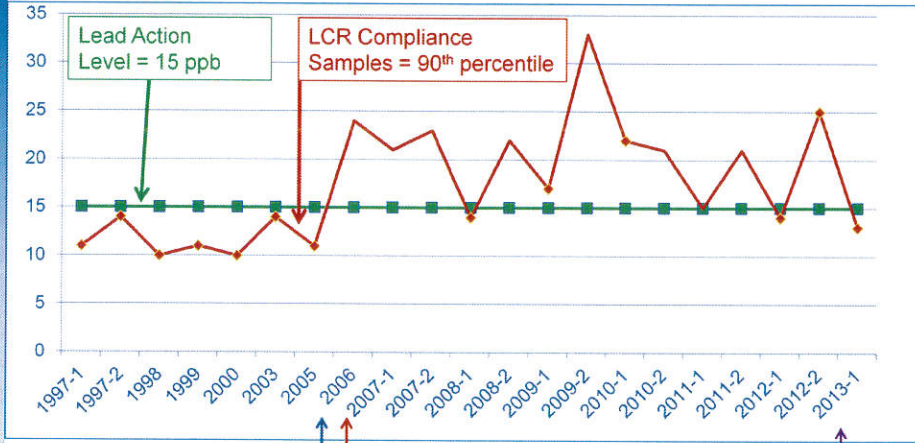
pH versus Theoretical Lead Solubility

(from EPA Research Findings)

pH Adjustment to 9.7

- Rhode Island Department of Health (RIDOH) approves treatment change
- November 2005 - pH lowered from 10.2 to 9.7
- 2006 - Exceeded 15 ppb Action Level – for the first time
- Expectations were that lowered pH would take time to produce benefits
- 2006 → 2011 - Lead Action Level was exceeded in 9 out of 11 sampling periods

pH Adjustment to 9.7

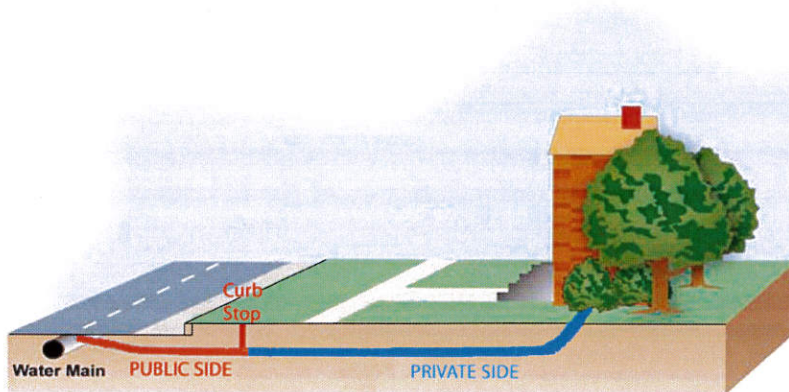


Providence
Water

Regulatory Consequences of Lead Level Exceedance

- Customer notification and education program
- Must begin replacing 7% of lead services annually
- Initial inventory of 25,600 lead services
- Mandatory replacement of 1,792 services per year
- Began replacements in 2007
- Replaced ~10,000 services from 2007 through 2010
- Annual Cost ~ \$8 Million

Typical Cross-Section From Street Main → Curb Stop → House



LSR Program Summary

Initial Lead Service Line Inventory (2006)

- 25,600 Lead Services Lines Baseline Inventory

LSR Replacements (2007-2010)

- 9,955 Public Side LSRs (39% of total)
- 162 Private Side LSRs (1.6%)
- 15,645 Public Side Lead Services Remain

Private Side Replacement Encouragements

- PW LSR Contractor made available for Private Sides
- PW Policy – will freely replace any Public Side when owner replaces Private Side
- 1 year payment plan (interest free)

LSR Program Summary

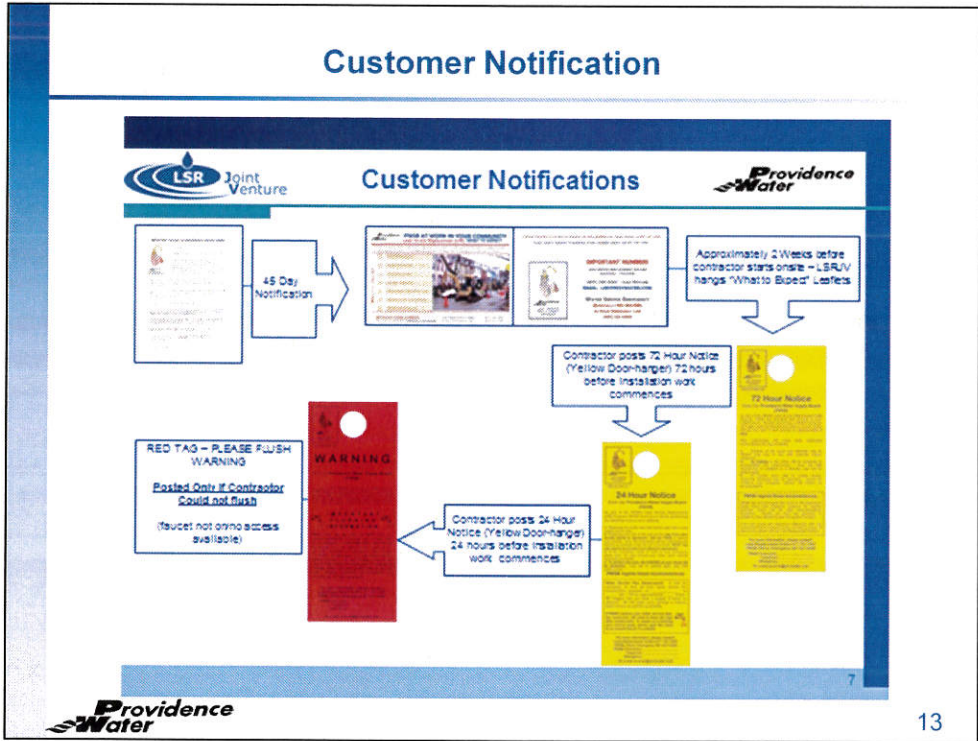
45-Day Notifications

- Mailed to all Owners having a planned Partial Lead Service Line Replacement (PLSLR)
- Includes PLSLR Advisory with short-term Lead increase noted

Customer Communication

- Lead hazard information
- 45-Day Notifications
- Private Side replacement & cost estimate offers
- 14-Day Notifications
- Issuance of post-replacement Water Sample kits
- Sample Test Results mailed or posted at properties

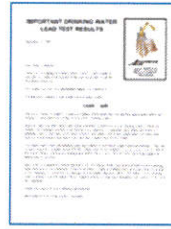
Customer Notification



Customer Notification



Customer Notifications



Final Notice
No Sample left for pickup

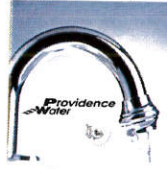
Test Result Letter

Total of Approximately 75,000 Individual Notifications



8

Customer Notification



Important Information About Lead in Your Drinking Water

Providence Water has recently detected lead in lead service lines in your drinking water. Lead can cause serious health problems, especially for pregnant women and young children. When lead gets into your drinking water, it can come from old lead pipes or solder.

For more information, visit www.providencewater.com/lead

Información Importante Acerca Del Plomo en Su Agua Potable

Providence Water ha recientemente detectado plomo en las líneas de agua potable de algunas áreas. El plomo puede causar graves problemas de salud, especialmente a las mujeres embarazadas y los niños pequeños. El plomo en su agua potable puede provenir de tuberías de plomo o soldadura.

Problems Uncovered With Partial Lead Service Line Replacements (PLSLR)

- EPA Science Advisory Board (SAB) was “asked to evaluate the current scientific data regarding the effectiveness of PLSLR”
- EPA SAB issued report on September 28, 2011 stating “The SAB finds that the quantity and quality of the available data are inadequate to fully determine the effectiveness of PLSLR in reducing drinking water lead concentrations.”
- PLSLR in many cases causes temporary spikes in lead levels to customers
- EPA is reconsidering this requirement
- Expectation that LCR Legislation will change

2012 Consent Agreement with RIDOH

- PW/RIDOH Consent Agreement executed - June 12, 2012
- Grants a stay of the lead service replacement requirement for 2012 construction season
- PW required to convene Expert Panel to study treatment options
- Panel comprised of Water Supply Professionals, Consultants, Academia
- Report from Panel required by August 31, 2012

Expert Panel

- PW convenes Expert Panel
- RIDOH approved
- Six Panel members:
 - Marc Edwards, Ph.D - Professor of Civil and Environmental Engineering, Virginia Tech
 - Daniel Giammar, Ph.D., PE - Associate Professor, Washington University at St. Louis
 - Mike Schock - Senior Researcher, Office of Research and Development, EPA
 - Abigail Cantor, PE - PRS (Process Research Solutions)
 - Steve Estes-Smargiassi , Chief of Drinking Water Quality (Director of Planning), MWRA (Massachusetts Water Resources Authority)
 - Anne Sandvig, Senior Associate, The Cadmus Group

Expert Panel Findings & Recommendations

- Return to pre-2005 treatment targets: pH = 10.2
- System Cleanup - Unidirectional Flushing (UDF) Program
- Expanded Lead Sampling Program
- Further research of optimization strategies
 - Experimental Pipe Loops
 - Orthophosphate Corrosion Inhibitor
 - Silicate based Corrosion Inhibitor
 - Dissolved Inorganic Carbon
 - Organic Matter Control

Implementation of Expert Panel Recommendations

- Providence Water begins transition to pH of 10.2 on February 6, 2013. Final transition began on March 25, 2013
- Initiated Unidirectional Flushing Program
- Initiated extensive Service Line Sequential Sampling Program

Suspected Alternative Causations of Elevated Lead Level

- Evidence suggest Link between High Iron Releases and Lead Release
- Evidence suggests Link between Microbial Activity and Lead Release
- Main replacement and unidirectional flushing reduces iron levels and microbial activity and consequently may reduce lead levels

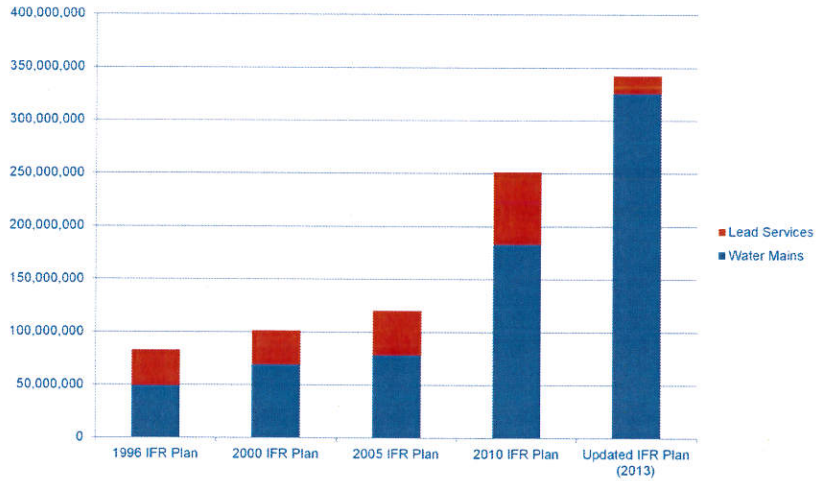
2013 Consent Agreement with RIDOH

- PW/RIDOH Consent Agreement executed – April 17, 2013
- Grants a stay of the lead service replacement requirement for 2013 construction season
- PW required to ramp up main replacement program
- PW required to institute unidirectional flushing program

Infrastructure Replacement Plans

- Rules and Regulations for Clean Water Infrastructure Plans (R46-15.6-INF) were enacted in January 1995.
- Initial 20-year Infrastructure Replacement Plan submitted in February 1996
- Infrastructure Plans to be updated every 5 years
- Rhode Island Department of Health approves Infrastructure Plan, Public Utilities Commission reviews and funds Infrastructure Plan

Providence Water Infrastructure Replacement Plan

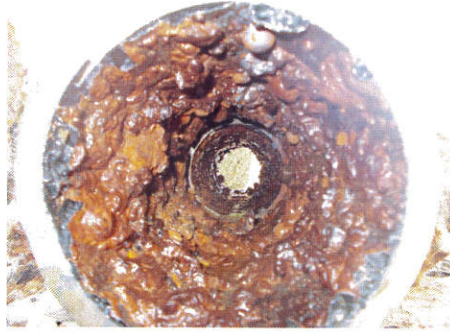


Summary of budgeted 20 year amounts for Mains and LSR

Main Rehabilitation

- RIDOH initially requested PW rehabilitate 550 miles of unlined cast iron in 10 years. This would result in an approximate cost of \$55 million per year and a doubling of Providence Water rates.
- However Providence Water successfully negotiated the following instead:
 - \$12,000,000 in main rehabilitation in FY2014
 - \$15,500,000 in main rehabilitation in FY2015
 - \$16,425,000 in main rehabilitation in FY2016

Main Rehabilitation



Unidirectional Flushing (UDF) Program

- RIDOH requested PW unidirectionally flush entire system in 2 years. PW/RIDOH negotiated the following:
 - 10% of System by 12/1/13
 - 15% of System by 12/1/14
 - 20% of System by 12/1/15

LCR Changes being Considered

- Sample Site Collection Criteria
- Lead Sampling Protocol
- Public Education for Copper
- How Optimized Corrosion Control Treatment is Defined
- Elimination or Change to Lead Service Line Replacement Requirement

Takeaways

- Main Rehabilitation is a best management practice for water systems
- Current Main Rehabilitation Program is a ramping up of existing IFR Program
- Flushing (Unidirectional or Traditional) is a best management practice for water systems
- Lead service replacement continues as mains are replaced