PORTLAND WATER BUREAU: Water Quality Update

Portland City Council Work Session
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Presentation Outline

• Introduction
• System Overview
• Why Now?
• Portland’s Compliance History
• Lead Hazard Reduction Program
• Our Work with Community Partners
• Water Quality Corrosion Study
• Next Steps
Service Area and Water Sources

- 588,000 retail customers
- 370,400 wholesale customers
- 19 wholesale water districts
- 101 million gallons per day average
Supply System Overview

1. Disinfection
   - Chlorine

2. Chloramination
   - Ammonia

3. pH Adjustment
   - Sodium Hydroxide

Columbia South Shore
Well Field

Groundwater is treated to match Bull Run water. Chlorine, ammonia, and sodium hydroxide are added at the Groundwater Pump Station.

Bull Run Watershed

Headworks Treatment Facility

Lusted Hill Treatment Facility

Reservoirs and Storage Tanks

Your Faucet
Water Quality Report

• Monitor for more than 200 regulated and unregulated contaminants in drinking water

• Collect and analyze over 11,000 samples each year

• Annual Report contains information about our water
Water Quality Overview

• In compliance with all state and federal regulations, including the Lead and Copper Rule

• Portland has never used lead service lines and does not have lead pipes in our distribution system

• Removed all known lead pigtails/goosenecks
Environmental Exposure

• Copper pipes and lead solder - most common in homes plumbed or built from 1970 – 1985 (banned by Oregon in 1985)

• Home plumbing fixtures installed prior to 1985 can also contribute to lead in water (limited by Oregon in 1985, reduced significantly by Congress in 2014)

• In Portland lead paint is the greatest source of exposure to lead (banned by Congress in 1978)
Water System Improvements

• Solder
  • Worked with Oregon to ban lead-based solder in water systems in 1985

• Pigtails
  • Removed all known lead pigtails (>10,000) in the distribution system by 1998

• Meters
  • Replaced 364 large lead-component meters serving schools, hospitals, childcare facilities, community centers, public housing, and large apartment buildings from 2001-2008.
Compliance History

• EPA enacts Lead and Copper Rule, requires corrosion control in public water systems (1992)

• City develops a comprehensive approach; State approves program as optimized treatment (1997)

• Technical Advisory Committee recommends long-term water chemistry changes (2002)

• Water Bureau begins Water Quality Corrosion Study (2014)
Lead Hazard Reduction Program

• State Approved Compliance Program (1997)
• 4-part program meets federal regulatory requirements

Water Treatment & Monitoring

Education & Testing

Public Education & Community Outreach

Lead Paint Removal Grants
Sampling History

Portland Joint Monitoring 90th Percentile Lead Levels

90th Percentile Lead (ppb)

Sampling Period

Pre-treatment  Post-treatment

Action Level (15 ppb)
What is an Action Level Exceedance?

- Action level is measurement of treatment effectiveness – not a violation

- Actions to take with an exceedance (within 60 days):
  - Notify public
  - Notify sensitive populations
  - Test source water
Customer Samples Requested and Analyzed

- 2009: 369
- 2010: 346
- 2011: 264
- 2012: 230
- 2013: 138
- 2014: 539
- 2015: 1,859
- 2016: 4,745

- 2009: 819
- 2010: 1,159
- 2011: 901
- 2012: 771
- 2013: 819
- 2014: 1,859
- 2015: 989
- 2016: 1,126

Total 2016: 11,367
Community Partners: Schools

Portland Public Schools (PPS)
  • Provided analysis of 1,814 samples from PPS
  • Offering assistance in follow-up testing

Other Schools
  • Offered technical assistance and free sample analysis to all public and private schools in PWB service area
Community Partners: Daycares

In-home daycares
• 612 emails and letters sent
• Offered free lead-in-water test kit

Daycare centers
• 261 emails and letters sent
• Offered analysis and technical assistance in sampling per EPA’s guidance
Community Partners: City Facilities

Prioritized sites based on:

1. Primarily serve infants, children, pregnant women
2. Primarily serve the public
3. Built or plumbed before 1985
4. All other

More than 750 facilities, requiring up to 2 years to test
Water Quality Corrosion Study

- Authorized by Council in 2014
- Data gathering over entire year to see seasonal variations (Nov. 2015 – Jan. 2017)
- Goal is to better understand the role of water quality on release of metals
- Panel of utility, consultant, and academic experts are assisting
- This is not a treatment study
  - Any significant changes to treatment would require pilot testing and Council approval
Corrosion Study: What are we testing?

Field
- pH
- Temperature
- ORP
- Chlorine residual
- Monochloramine
- Free ammonia
- Turbidity
- Conductivity
- ATP

Lab
- Total and dissolved metals
  - lead, copper, aluminum, arsenic, cadmium, calcium, chromium, cobalt, iron, magnesium, manganese, nickel, zinc
- Total organic carbon
- Dissolved organic carbon
- Total phosphorus
- Alkalinity
- Hardness
- Chloride
- Sulfate
- Nitrate
- Nitrite
- TDS
Decision Tree

Corrosion Study

Improved Treatment?

Yes

Improved Corrosion Treatment Study

Pilot test (1 yr seasonal data) Distribution Impacts

3 years

Improved Corrosion Treatment Design

2 years

Improved Corrosion Treatment Construction

No

Distribution System Optimization Implementation

Continue LHRP Optimize Program

Review Optimization

Portland City Council Decision

3 years

Optimize Program

Continue LHRP

Review Optimization

Portland City Council Decision

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Considerations

- Meet federal requirements
- Reduce corrosiveness to reduce lead and copper and extend the useful life of our pipes
- Make our water more stable
- Avoid unintended water quality effects like red water or increased Disinfection By-Products
- Identify continued funding for reduction of other sources of lead
- Comply with discharge permit requirements
- Address capital and operational costs
- Maintain an expeditious schedule
Next Steps

• Water Quality Corrosion Study – complete Spring 2017
  • Understand mechanisms of lead release
  • Inform treatment decision

• Water Bureau develops recommendation for lead exposure reduction – 2017

• Council consideration – Summer 2017
Questions?