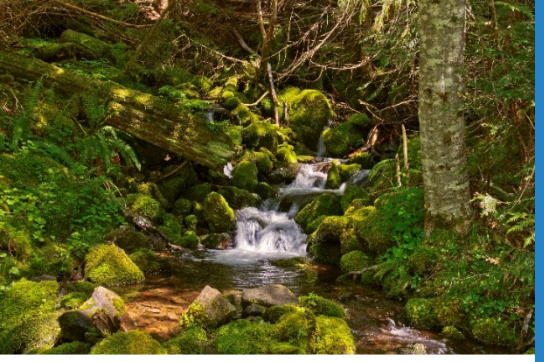


PORTLAND WATER BUREAU
Corrosion Control Improvements Project Update

Portland Utility Board
August 1, 2017

Gabriel Solmer, Deputy Director
Michelle Cheek, Senior Engineer

PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

Presentation Outline

- Recent and Future Project Activities
- Water Quality Corrosion Study
- Corrosion Control Treatment Pilot
- Questions

RECENT and FUTURE PROJECT ACTIVITIES

Progress Since February PUB Meeting

2017

Feb. 7	• PWB raises entry point pH from 8.0 to 8.1
Mar. 8	• City Council approves contract for Corrosion Control Treatment Pilot
Mar. 9	• Kick-off Workshop for Corrosion Control Treatment Pilot
Apr. 5	• Final Water Quality Corrosion Study Report
Apr. 14	• Released RFQ for design consultant
Apr. 19	• Submitted Interim Lead Reduction Plan 90 Day Update to OHA
May 15	• OHA approval of PWB's modified schedule for improved corrosion control treatment
Jun. 6	• PWB raises entry point pH from 8.1 to 8.2
Jun. 30	• Submitted Pilot Study Plan to OHA

Future Project Activities

2017

Sep.

- City Council consideration of PTE Design Contract and CM/GC Alternative Procurement Method

Nov.

- Begin Corrosion Control Treatment Early Design Tasks

Dec. 31

- Implement Improvements to LHRP

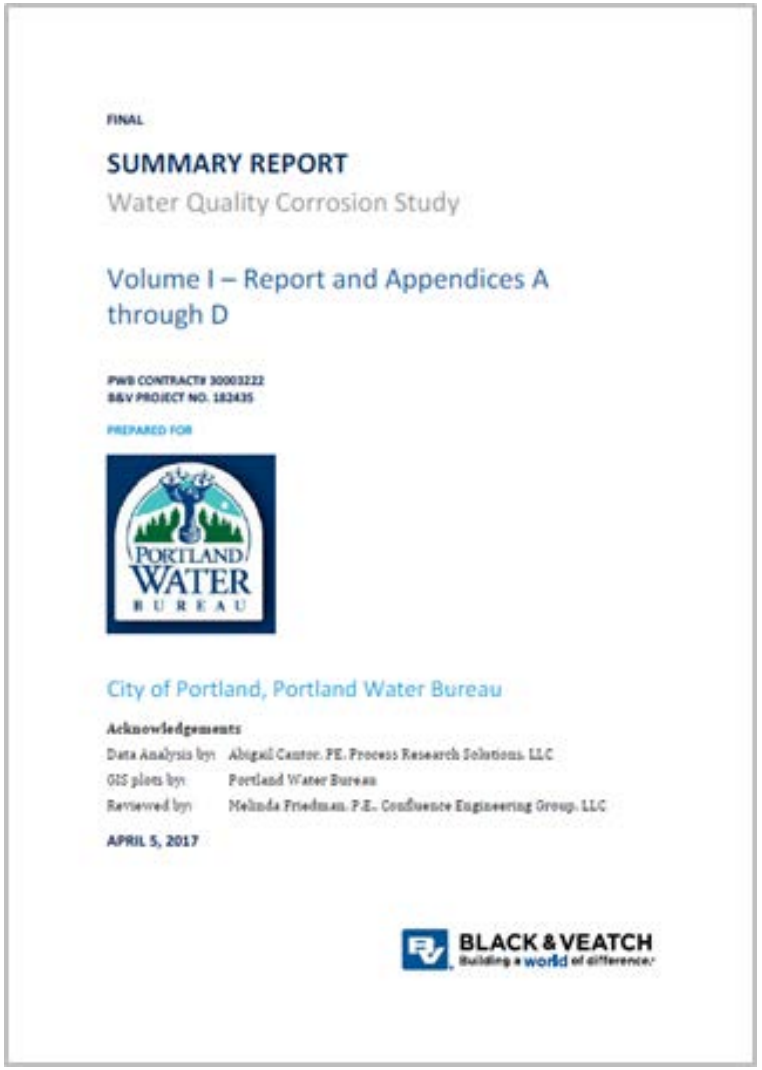
Future Project Activities

2018	Jul. 31	• Corrosion Control Treatment Pilot Study Results and Recommendation to OHA
	Aug. 1	• Begin Improved Corrosion Control Treatment Facility Detailed Design
2020	Apr. 30	• Submit Improved Corrosion Control Treatment Plans and Specifications to OHA
	Aug. 1	• Begin Improved Corrosion Control Treatment Facility Construction
2022	Apr. 30	• Complete Improved Corrosion Control Treatment Facility Construction

WATER QUALITY CORROSION STUDY

Water Quality Corrosion Study

- Authorized by Council in 2014
- Data gathered over entire year to see seasonal variations
- Goal: better understand role of water quality on metals release
- Panel of utility, consultant, and academic experts



FINAL

SUMMARY REPORT

Water Quality Corrosion Study

Volume I – Report and Appendices A through D

PWB CONTRACT# 30003222
B&V PROJECT NO. 182435

PREPARED FOR

PORTLAND WATER BUREAU

City of Portland, Portland Water Bureau

Acknowledgements

Data Analysis by: Abigail Cantor, PE, Process Research Solutions, LLC
GIS plots by: Portland Water Bureau
Reviewed by: Melinda Friedman, P.E., Confluence Engineering Group, LLC

APRIL 5, 2017

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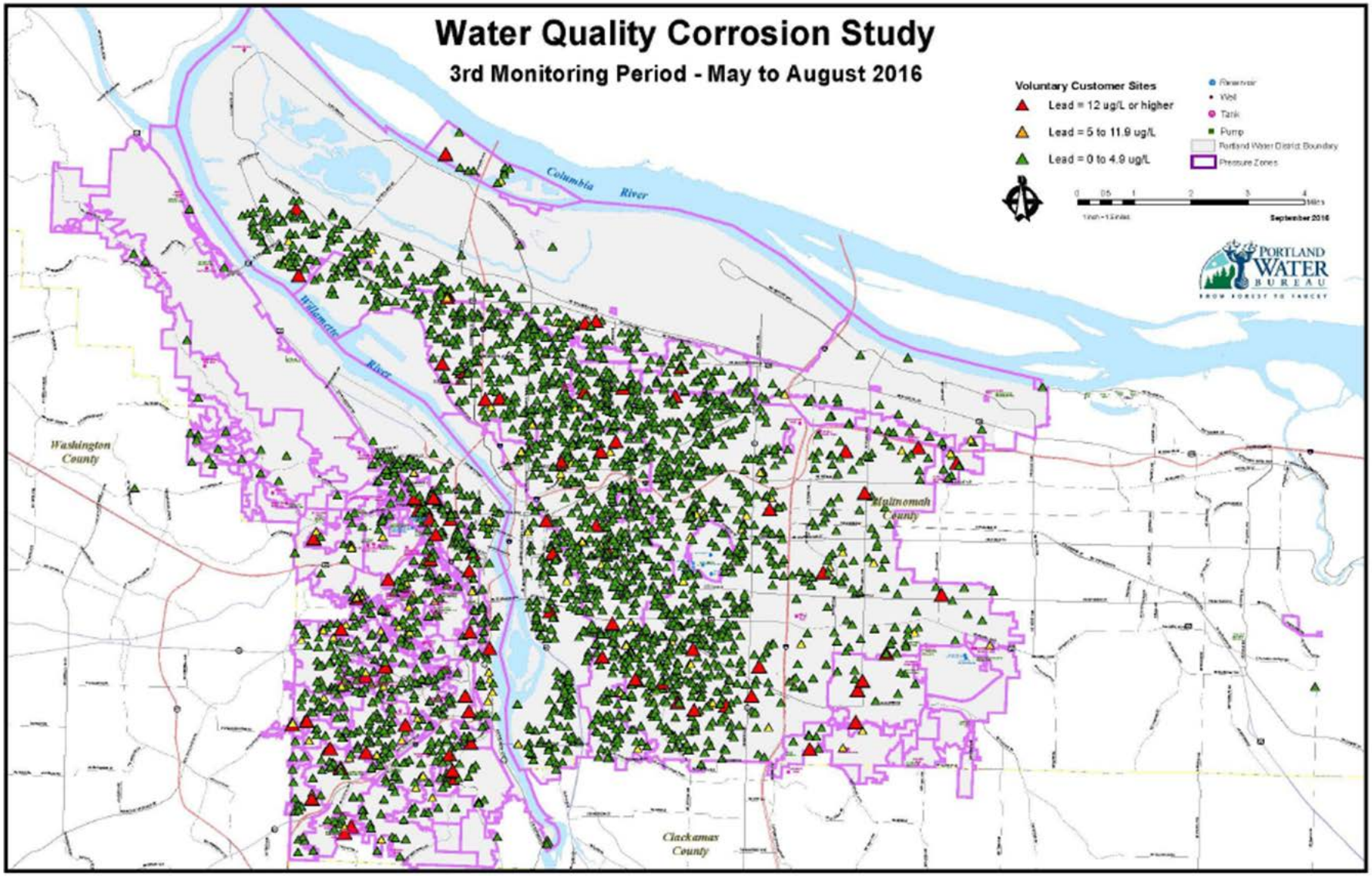
Water Quality Corrosion Study Conclusions

- Household plumbing materials dominant source of lead
- Multiple corrosion mechanisms contributing to lead release in household plumbing
- Water chemistry influencing corrosion mechanisms
- No geographic patterns to lead release or water quality trends

Water Quality Corrosion Study



CORROSION CONTROL TREATMENT PILOT

Corrosion Control Treatment Pilot

Began March 2017

Historical Review

- Identify research and analytical advances since original pilot study
- Review CCT approaches
- Identify gaps

Bench-scale Testing

- Screening tool
- Reduce number of pilot testing scenarios
- Evaluate wider scope of materials
- Evaluate and optimize CCT doses

Pilot Testing

- Identify OCCT(s) using updated methods and scope of materials
- Carry forward successful test conditions from bench testing

OCCT Selection

- Select OCCT using scored criteria approach, considering technical and non-technical impacts

Corrosion Control Treatment Pilot Historical Review

- 1994 Corrosion Control Treatment Study
  - All CCT conditions at pH 7.5 and above showed similar results
  - Low accuracy techniques
  - Did not consider impacts from groundwater sources

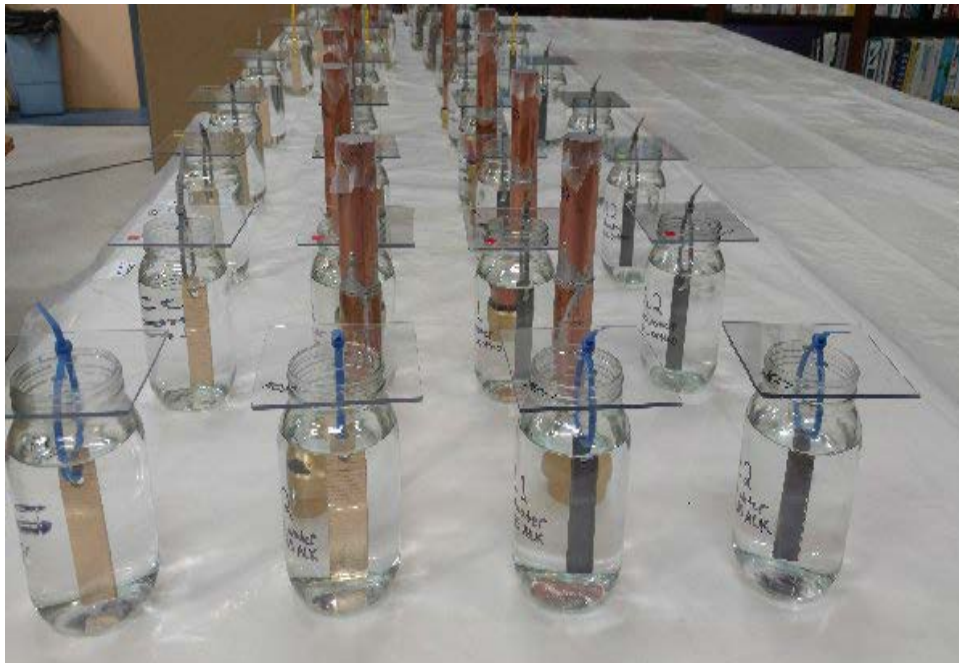
- 2017 Water Quality Corrosion Study
  - Better understanding of corrosion mechanisms
  - Adjustment of water chemistry could reduce lead release
  - Recommended corrosion control treatment pilot

Status: Complete

Recommendation: Conduct bench-scale and pilot-scale testing to fully evaluate corrosion control treatment alternatives

Corrosion Control Treatment Pilot Bench-scale Testing

- Screening tool using metal coupons
- Evaluates two types of corrosion control treatment:
  - pH/alkalinity adjustment
  - Orthophosphate
- Evaluates blends of surface water and groundwater



Status:

- On-going
- Piloting of both treatment types recommended

Corrosion Control Treatment Pilot
Pilot Testing

- Expands on results from bench-scale testing
- More representative water use conditions
- Uses harvested materials
- Treatment conditions to be tested
  - Orthophosphate
  - pH/alkalinity adjustment

Status:

- Pilot test rigs constructed
- Equilibration period began July 17

Corrosion Control Treatment Pilot
OCCT Selection

- Analysis of pilot testing results

- Multi-criteria analysis to select recommended corrosion control treatment
  - Regulatory Criteria
    - Lead reduction
    - Simultaneous regulatory compliance and water quality
    - Environmental impacts
  - Customer impacts
  - Schedule and Cost

Status:

- Begin after completion of pilot testing in Spring 2018
- OCCT Report to OHA by July 31, 2018

QUESTIONS