Locating the Lead in Pittsburgh

PWSA’s Strategy to Find and Replace Lead Service Lines

Sarah Bolenbaugh, P.E., Mott MacDonald
Will Pickering, Pittsburgh Water and Sewer Authority

Pittsburgh Water and Sewer Authority, Pittsburgh, PA
Locating the Lead in Pittsburgh

- Background
- Timeline
- Lead Service Line Inventory
- Lead Service Line Identification Program
- Lead Service Line Replacement Program
- Post-Construction Sampling
Pittsburgh Water and Sewer Authority

Background

• Water Utility with ~80,000 Connections (71,000 Residential)

• Traditional corrosion control technology employed has been pH adjustment to 8.2 using lime/soda ash.

• Open reservoir precluded phosphate use.

• Three main pressure districts with fourteen sub-districts.

• Infrastructure dates to pre-1900s

• June 30, 2016: Exceeded Lead Action Level
Timeline

February 2016: LSLR Tracking

April 26, 2016: PA DEP Administrative Order

June 30, 2016: Exceed Lead Action Level

January 2017: Curb Box Inspection Program

June 2017: LSLR Program Halted

September 30, 2016: Materials Inventory

May 2017: City-Wide LSLR Program

Fall 2017: Historical Record Digitization

November 2017: Consent Order

January 2017: Curb Box Inspection Program

May 2017: City-Wide LSLR Program

June 2017: LSLR Program Halted

September 30, 2016: Materials Inventory

April 26, 2016: PA DEP Administrative Order

February 2016: LSLR Tracking

April 2018: PWSA-funded full line LSLR

March 2018: Updated Materials Inventory

Fall 2017: Historical Record Digitization

November 2017: Consent Order

May 2017: City-Wide LSLR Program

September 30, 2016: Materials Inventory

June 30, 2016: Exceed Lead Action Level

April 26, 2016: PA DEP Administrative Order

February 2016: LSLR Tracking
Service Line Ownership

- **PWSA Owned – Main to Curb Stop**
  - Residential Service: 1” Diameter and Less
  - Single Unit

- **Property Owner Responsibility**
  - Curb Box to Property – Residential
  - Entire line – Commercial, Multi-Unit

Residential
Locating the Lead in Pittsburgh

Lead Service Line Identification
Service Line Material Identification

<table>
<thead>
<tr>
<th>Historical Record</th>
<th>Service Record</th>
<th>Curb Box Inspection</th>
<th>Reported Material</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>None</td>
<td>Lead</td>
<td>Lead</td>
<td>Replace</td>
</tr>
<tr>
<td>Lead</td>
<td>None</td>
<td>Unknown</td>
<td>Possible Lead</td>
<td>Verify</td>
</tr>
<tr>
<td>Lead</td>
<td>Repair</td>
<td>NonLead</td>
<td>Possible Lead</td>
<td>Verify</td>
</tr>
<tr>
<td>No Data</td>
<td>None</td>
<td>Lead</td>
<td>Lead</td>
<td>Replace</td>
</tr>
<tr>
<td>No Data</td>
<td>None</td>
<td>Nonlead</td>
<td>Likely Nonlead</td>
<td>Verify (2018)</td>
</tr>
<tr>
<td>No Data</td>
<td>None</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Verify</td>
</tr>
</tbody>
</table>
Historical Record Digitization

• Over 120,000 records
• Each Record Contains 1 to 8 half size (4”x5.5”) Sheets
• Labor Intensive Data Entry and QA/QC
• Public Side Complete December 2017
• Private Side Complete May 2018
• $13/Record
Historical Record Digitization

- Positive Identification of Non-lead
- Historical Presence of Lead
- Indicator for Lead Tailpiece

<table>
<thead>
<tr>
<th>Total Current Customer Records</th>
<th>42,214</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Lead</td>
<td>18,896</td>
</tr>
<tr>
<td>Public NonLead</td>
<td>29,162</td>
</tr>
<tr>
<td>No Data</td>
<td>512</td>
</tr>
</tbody>
</table>
Historical Record Digitization

- Low false negative rate
  (Historical records indicate non-lead, but found to be lead)
- High false positive rate
  (Historical records indicate lead, but line has been replaced with non-lead)

<table>
<thead>
<tr>
<th>Record Material</th>
<th>Contract Excavation Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nonlead</td>
</tr>
<tr>
<td>Nonlead</td>
<td>30</td>
</tr>
<tr>
<td>Lead</td>
<td>104</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
</tr>
</tbody>
</table>
Service Line Identification

Curb Box Inspection

- Camera Inserted Down Curb Box
- 200-400 Inspections/Work Order
- Work Orders rotates around city
- Positive Identification for lead
- Not all materials can be determined
- Snap-shot of material Curb Box
- Relatively non-invasive
Service Line Identification

Curb Box Inspection

Lead Service Line

Non-Lead Service Line

Unable to Determine
Curb Box Inspection Pitfalls

When the Curb Stop was Replaced
Curb Box Inspection Pitfalls
When the Curb Stop was Replaced
# Service Line Material Identification Matrix

## When do we dig?

<table>
<thead>
<tr>
<th>Historical Record</th>
<th>Service Record</th>
<th>Curb Box Inspection</th>
<th>Reported Material</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>None</td>
<td>Lead</td>
<td>Lead</td>
<td>Replace</td>
</tr>
<tr>
<td>Lead</td>
<td>None</td>
<td>Unknown</td>
<td>Possible Lead</td>
<td>Verify</td>
</tr>
<tr>
<td>Lead</td>
<td>Repair</td>
<td>Non-Lead</td>
<td>Possible Lead</td>
<td>Verify CBI</td>
</tr>
<tr>
<td>No Data</td>
<td>None</td>
<td>Lead</td>
<td>Lead</td>
<td>Replace</td>
</tr>
<tr>
<td>No Data</td>
<td>None</td>
<td>Non-lead</td>
<td>Likely Non-lead</td>
<td>Verify CBI</td>
</tr>
<tr>
<td>No Data</td>
<td>None</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Verify</td>
</tr>
<tr>
<td>Non-lead</td>
<td>N/A</td>
<td>No Action</td>
<td>Non-Lead</td>
<td>No Action</td>
</tr>
</tbody>
</table>
Service Line Material Identification

Site Verification (Excavation)

- Dig Test Hole to Confirm Material Type
- More Conclusive than CBI
- Disruptive to Traffic
- Restoration Costs
- Could Temporarily Increase Lead in Water
- Replace if Lead is Found
Locating the Lead in Pittsburgh

Lead Service Line Replacement
Lead Service Line Replacement Timeline

- June 30, 2016: Exceed Lead Action Level
- May 2017: City-Wide LSLR Program
- June 2017: LSLR Program Halted
- April 2018: PWSA-funded full line LSLR
# Lead Service Line Replacement

## Consent Order Requirements

<table>
<thead>
<tr>
<th>DEADLINE</th>
<th>LSLR REQUIRED (PUBLIC SIDE ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 30, 2018</td>
<td>1,341</td>
</tr>
<tr>
<td>December 31, 2018</td>
<td>1,341*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,682</strong></td>
</tr>
<tr>
<td><strong>Completed to Date</strong></td>
<td><strong>820</strong></td>
</tr>
</tbody>
</table>
Private Side Lead Service Line Replacement

- 2018 – PWSA Funded
- Neighborhood Based
- Community Environmental Program
- Emergency Replacements
Private Side Lead Service Line Replacement

- 45-Day Notice for Partial Replacement
- Agreement
- No Restoration
- Trenchless
- Inspection
Communications and Post-Construction

Pre and Post Construction Notifications

72-Hour Post Construction Water Sample for Partial Replacements

Water Pitcher Filter with Replacement Cartridges for Partial Replacements
Lead Service Line Replacement Program Organization
**Summary**

**Identification**
- Understand the Accuracy of the Data
- Realistic Timelines
- Staffing
- QA/QC

**Replacement**
- Notification Requirements for Partial Replacements
- Post-Construction Sampling Requirements
- Updated Owner Contact Information
- Restoration/Agreements
- Community Involvement
Thank you