

# Lead and Copper Rule

Sample Site Selection

September 17, 2020



OFFICE OF GROUND WATER  
AND DRINKING WATER

# Disclaimer



**The examples included in this presentation are intended for discussion purposes only. Throughout this presentation, the terms “state” or “states” are used to refer to all types of primacy agencies including U.S. territories, Indian tribes, and EPA Regions. The statutory provisions and EPA regulations described in this document contain legally binding requirements. This presentation is not a regulation itself, nor does it change or substitute for those provisions and regulations. Thus, it does not impose legally binding requirements on EPA, states, or public water systems. This guidance does not confer legal rights or impose legal obligations upon any member of the public. While EPA has made every effort to ensure the accuracy of the discussion in this presentation, the obligations of the regulated community are determined by statutes, regulations, or other legally binding requirements. In the event of a conflict between the discussion in this presentation and any statute or regulation, this presentation would not be controlling.**

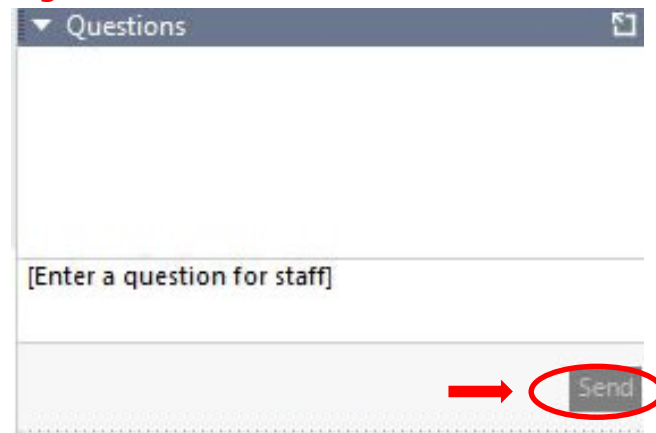
# Participating by Webinar

- Attendees are in listen-only mode
- To ask a question:
  - Click the arrow next to “Questions” in the control panel (**Figure 1**)
  - Type a question in the box and click send (**Figure 2**)
- Questions will be answered at the end, as time permits

**Figure 1**



**Figure 2**



# Polling Question #1



How many people  
are in the room?

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5 or greater

## Polling Question #2

Is your home or residence served by a lead service line?

Yes

No

Do Not  
Know

## Polling Question #3

Do you have lead pipes or copper pipes with lead solder in your home or residence?

Yes

No

Do Not  
Know

# Today's Presenters



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# Presentation Overview



- Lead and Copper Rule (LCR) Overview
- LCR Sample Site Requirements
  - Lead Service Lines
  - Lead Pipes or Copper Pipes with Lead Solder
- Site Selection
- Site Verification





# **LEAD AND COPPER RULE OVERVIEW**

## Health Effects of Lead and Copper

- Lead health effects:
  - Greatest risk to infants, young children, and fetuses
  - Damage to nervous system, brain, red blood cells, and kidneys
- Copper health effects:
  - Stomach and intestinal distress
  - Liver or kidney damage
  - Complications of Wilson's disease

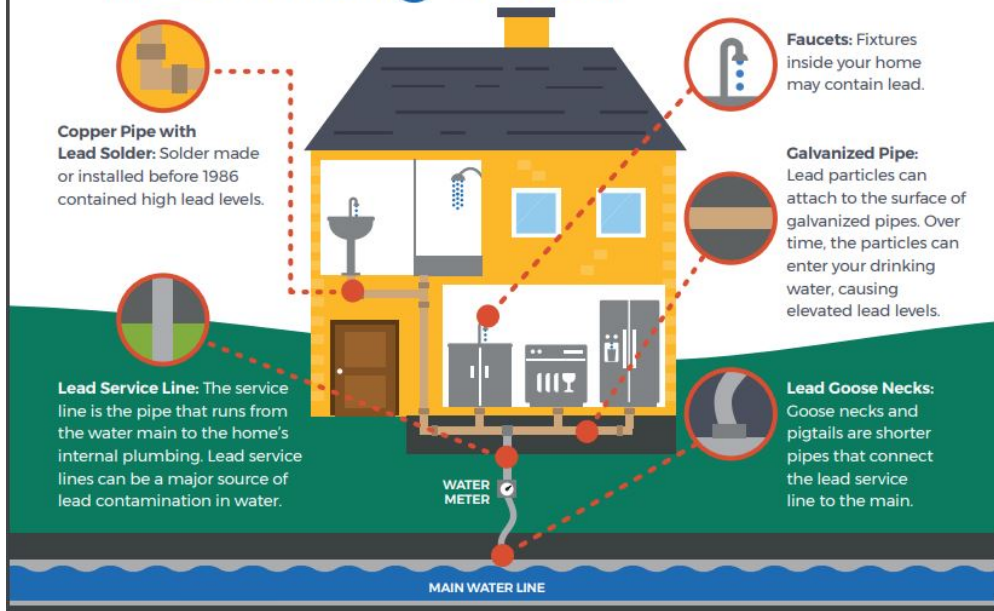
# Sources of Lead and Copper

- Lead and copper enter drinking water through the corrosion of materials in the distribution system and household plumbing.
- Common sources of lead and copper include service lines, solder, pipes, faucets, and fixtures.
- The LCR reduces exposure risks primarily by reducing water's corrosivity.



CONCERNED ABOUT LEAD IN YOUR DRINKING WATER?

## Sources of LEAD in Drinking Water



## LCR Applicability

- Public water systems regulated under the LCR:
  - Community water systems (CWSs)
  - Non-transient, non-community water systems (NTNCWs)
- Three size categories:
  - Large: > 50,000 people
  - Medium: 3,301 to 50,000 people
  - Small:  $\leq$  3,300 people



# For Lead and Copper, the LCR Established. . .



- **Maximum Contaminant Level Goals (MCLGs)** (see table)

- **Treatment technique requirements**

- Corrosion control treatment
- Source water treatment
- Lead service line replacement
- Public education

	Lead mg/L	Copper mg/L
MCLG	0	1.3
AL	0.015	1.3

- **Action levels (ALs).** An exceedance:

- Occurs when 10% or more of tap samples (i.e., 90<sup>th</sup> percentile) exceeds an AL (see table)
- Triggers treatment techniques and biannual monitoring
- Is not a violation

# Required Minimum Number of Tap Samples



System Size (population served)	Minimum Number of Sampling Sites	
	Standard Monitoring <sup>1</sup>	Reduced Monitoring <sup>2</sup>
>100,000	100	50
10,001 – 100,000	60	30
3,301 – 10,000	40	20
501 – 3,300	20	10
101 – 500	10	5
≤100	5	5

<sup>1</sup> Standard monitoring – conducted every six months (Jan-Jun and Jul-Dec)

<sup>2</sup> Reduced monitoring – if eligible, conducted annually or triennially



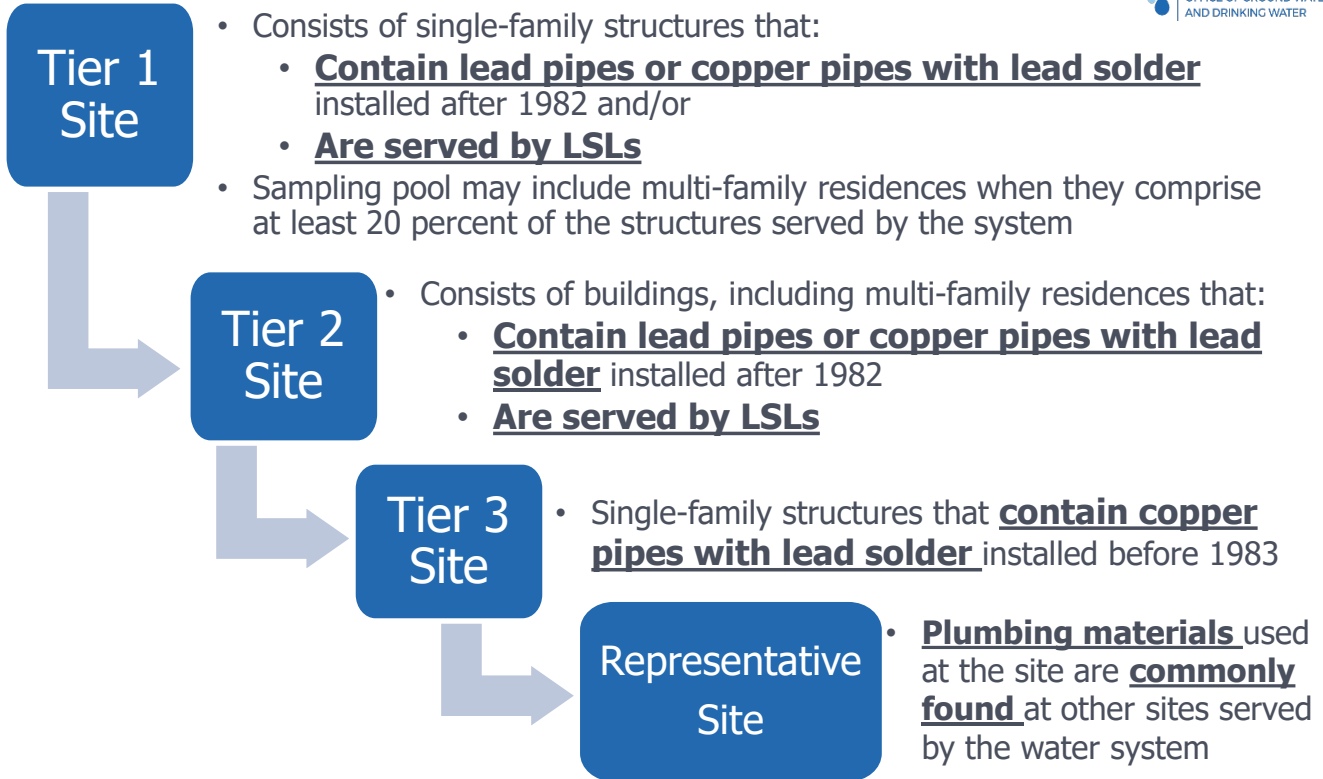
# **LCR SAMPLE SITE REQUIREMENTS**

## What are Criteria for Sites under the LCR?

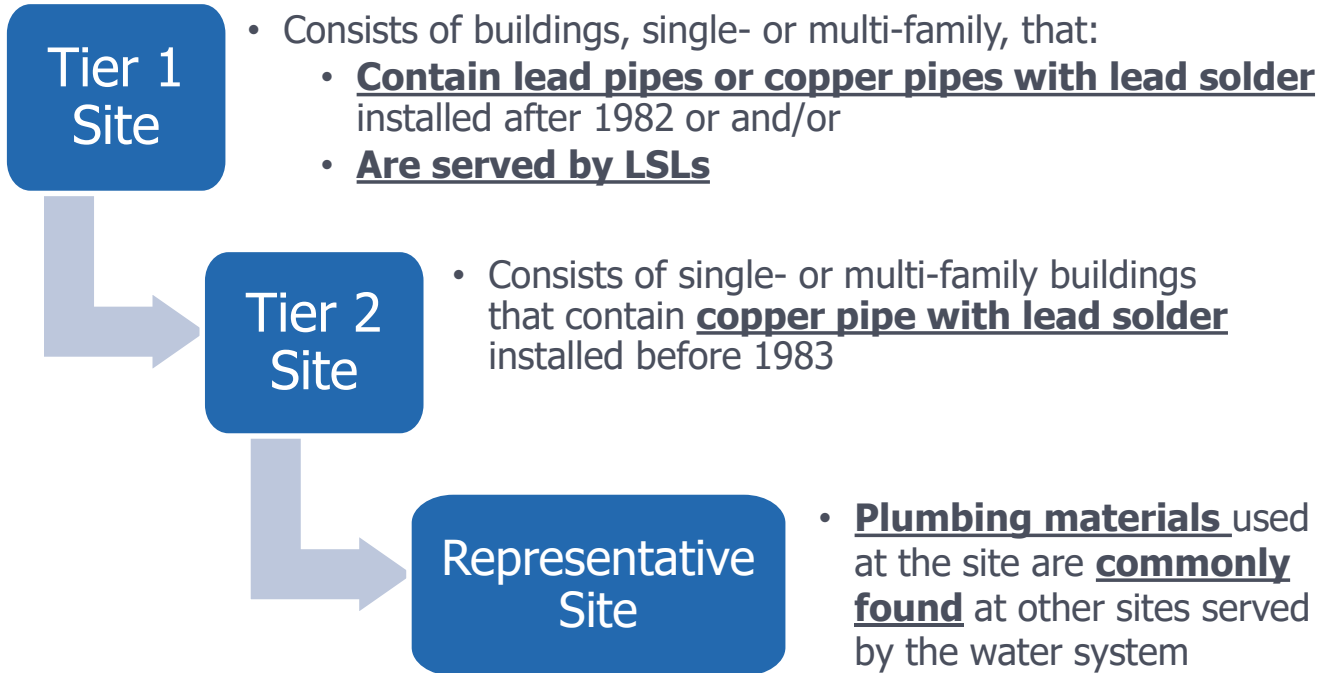
- Tiering criteria requirements intend to prioritize sampling sites according to the highest risk of lead exposure
- The tiering criteria take into account:
  - Whether the system is a CWS or NTNCWS
  - Presence of lead in service lines or premise plumbing
  - Building type (i.e., single- vs. multi-family structures)
- Compliance samples must be collected from the highest risk sites water systems identify based on this criteria.



# Current Tiering Criteria for CWSs



## Current Tiering Criteria for NTNCWSs





# **SITE SELECTION PROCESS**

## Site Selection Overview

- Identify 'high-risk' lead sites
- **Residential buildings**
  - Collect samples from kitchen or bathroom taps
- **Non-residential buildings**
  - Collect samples from interior taps typically used for consumption.
  - Examples:
    - Drinking water fountains
    - Kitchen/food prep areas
- Systems are encouraged to identify more sites than the required minimum to ensure the sampling pool remains sufficiently large over time

**For lead and copper tap samples, remember...**



'Site' could mean a specific tap, not the building or address

# Site Selection Process



- 1** Determine the age of the sites in the system  
(note when the lead ban in your state became effective)
- 2** Check to see if there are any state/municipal codes  
(e.g. those that banned lead service lines)
- 3** Review data resources to identify, re-evaluate, and  
update potential sites
- 4** Confirm/Verify sites

# Data Resources

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- Building department plumbing codes, permits, and records
- Inspection and maintenance records
- Distribution maps and drawings
- Meter installation records
- Materials inventory if one exists
- Other sources





A close-up photograph of a water surface with numerous bubbles of various sizes. The water is a clear, light blue color, and the bubbles are scattered throughout the frame, with a higher concentration near the top surface. The lighting is bright, creating highlights on the water and the bubbles.

# **SITE VERIFICATION**



# Site Verification Example

## WORKSHEET #1

### MATERIALS SURVEY INVESTIGATION RESULTS (Suggested Format)

PWS ID NUMBER

POPULATION SERVED BY PWS



Type of Structure	Location	Contact Person		LSL	Home Plumbing Material	Verified	Volunteered	Selected		Received Training Material
		Name	Phone					Routine	Optional	
SFR	123 First St	Kira Smith	202-564-5511	Yes	Unk	Repair record;	Yes	X		Yes
SFR	789 Last St	Unk		Maybe	Unk	Same age home to excavated LSLs next block	No		X	No
MFR	456 Next St, Unit 1	Eddy Viveiros	202-564-4946	Unk	Lead Pipes	Scratch Test	Yes		X	Yes

Source: USEPA, 2010. *Lead and Copper Rule Monitoring and Reporting Guidance for Public Water Systems*. EPA 816-R-10-004. March 2010.

# Field Verification Practices



Basic Field Tests – scratch, magnet, swab

\$

Sampling – first-draw, fifth draw, sequential

\$ - \$\$\$

Excavation – hydro-vacuum, open cut  
(predict analogous sites)

\$\$\$ - \$\$\$\$

Source: Triantafyllidou, et al, 2019. *TOOLS TO IDENTIFY LEAD SERVICE LINES*. AWWA Water Quality Technology Conference, Dallas, TX. AWWA. Denver, CO.



## Basic: Scratch/Magnet Test

- Lead pipes and service lines are generally a dull gray color and are very soft.
- You can identify them easily by carefully scratching with a key or a coin.
- If the pipe is made of lead, the area you've scratched will turn a bright silver color.
- Do not use a knife or other sharp instrument and take care not to puncture a hole in the pipe.
- A magnet will not stick to lead or copper

# Basic: Swab Test Kit



- Surface swab kits approved for lead-based paint are a way to test for lead-based pipes and/or components
- Swab changes color after contacting lead surface
- They test what the pipe is made from on the outside—not the water inside
- Available at local hardware or home improvement stores.
- Look for an EPA recognized kit. [https://www.epa.gov/lead/lead-test-kits\\*](https://www.epa.gov/lead/lead-test-kits*).

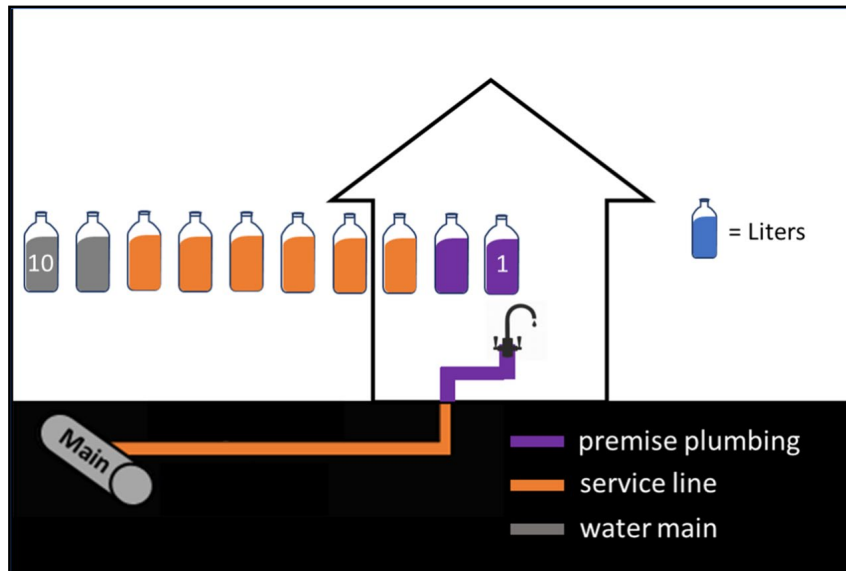
## U.S. Environmental Protection Agency Recognized Lead Paint Test Kit Fact Sheet

Test Kit	Substrate Recognized On	Availability	Contracts and/or Additional Training Information
<b>3M LeadCheck</b>	Ferrous metal (alloys that contain iron), Wood, Plaster and Drywall	Hardware stores and direct purchasing through manufacturer	<a href="http://leadcheck.com">leadcheck.com</a> 800-494-3552
<b>D-Lead (also sold as Klean-Strip D-Lead)</b>	Ferrous metal (alloys that contain iron), Wood, Plaster and Drywall	Hardware stores, home centers, authorized distributors and direct through manufacturer	<a href="http://d-leadpainttestkit.com">d-leadpainttestkit.com</a> 877-877-6590
<b>State of Massachusetts</b>	Plaster and Drywall	Available to Massachusetts state certified risk assessors and lead inspectors only	Julianne Nassif 617-983-6651

*\*Mention of trade names or commercial products does not constitute EPA endorsement or recommendation for their use.*

# Sampling: First-Draw [40 CFR §141.86(b)]

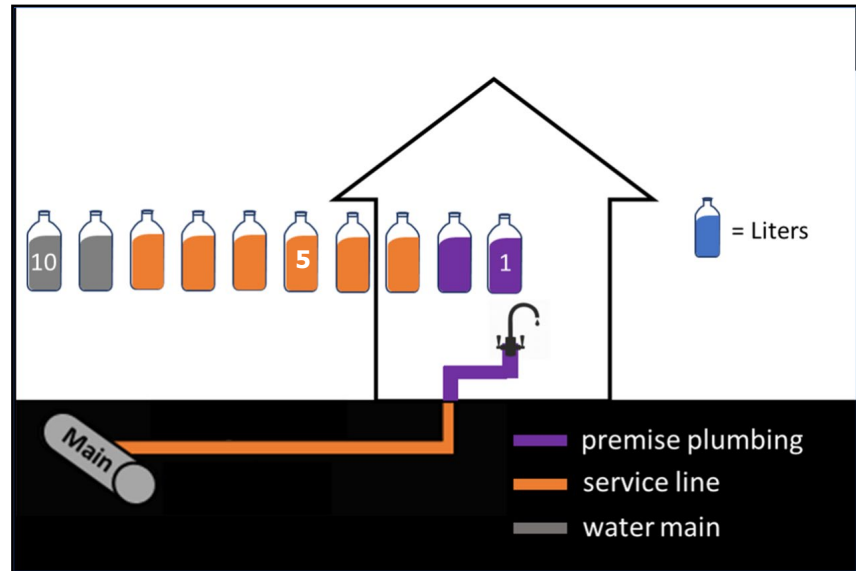
- One liter in volume
- Cold water interior tap used for consumption
- Unused for at least six hours
- Many utilities and local health departments will perform analyses
- May reveal lead or copper materials in home plumbing
- Most likely will not confirm the presence/absence of a lead service line.



Source: Triantafyllidou, et al, 2019

# Sampling Option: 5<sup>th</sup> Liter

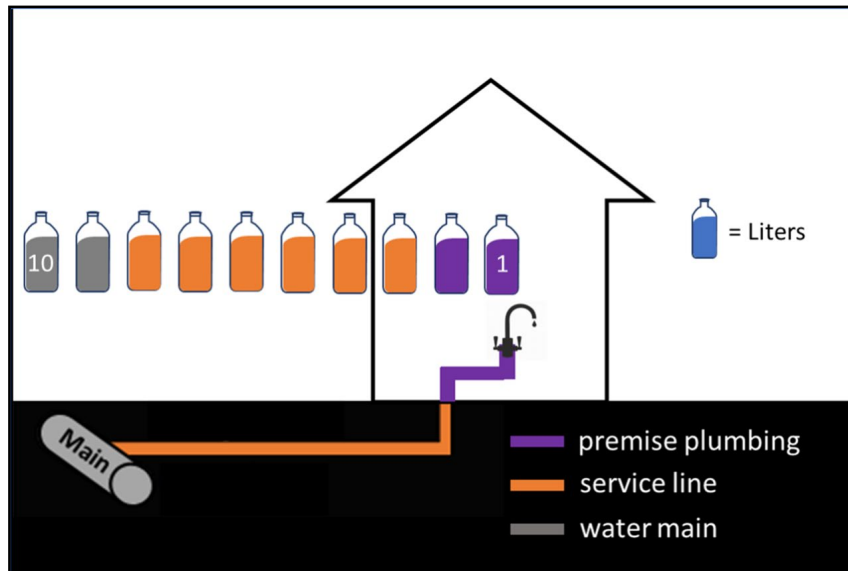
- Implemented by some Utilities
- Collected after 4 liters of water have flowed through the faucet
- Increases likelihood that tap samples are from water in contact with lead service lines instead of interior plumbing
- Depends on length and size of service line from main to meter and meter to tap



Source: Triantafyllidou, et al, 2019

# Sampling Option: Sequential

- A set of samples, collected one right after another
- Captures all the water in the plumbing from the kitchen tap to the water main
- Disruptive to resident and can be costly \$\$



Source: Triantafyllidou, et al, 2019

# Excavation: Hydro-Vacuum/Potholing

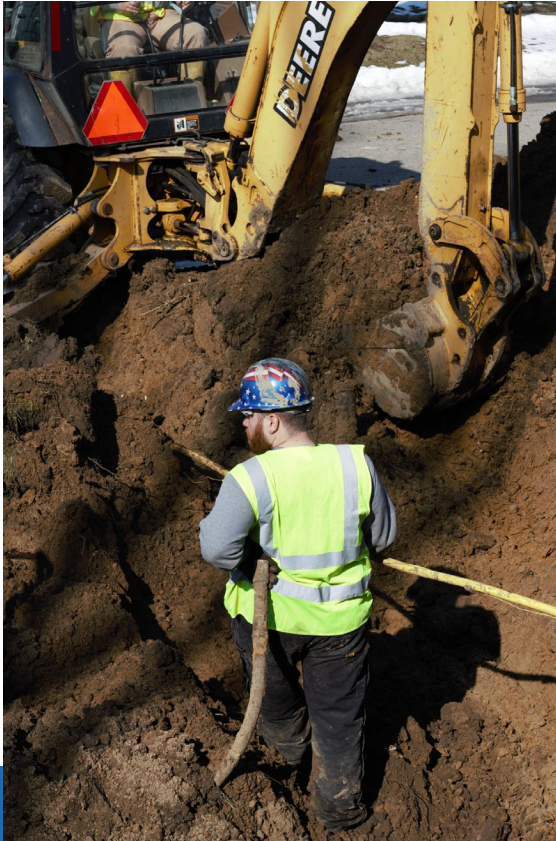
- Uses pressurized water and vacuum system to expose underground infrastructure
- May result in less disruption to homeowner than open-cut or sequential sampling
- Requires skilled crew, \$\$
- Moderately accurate



Source: Triantafyllidou, et al, 2019



# Excavation: Open-Cut Trench



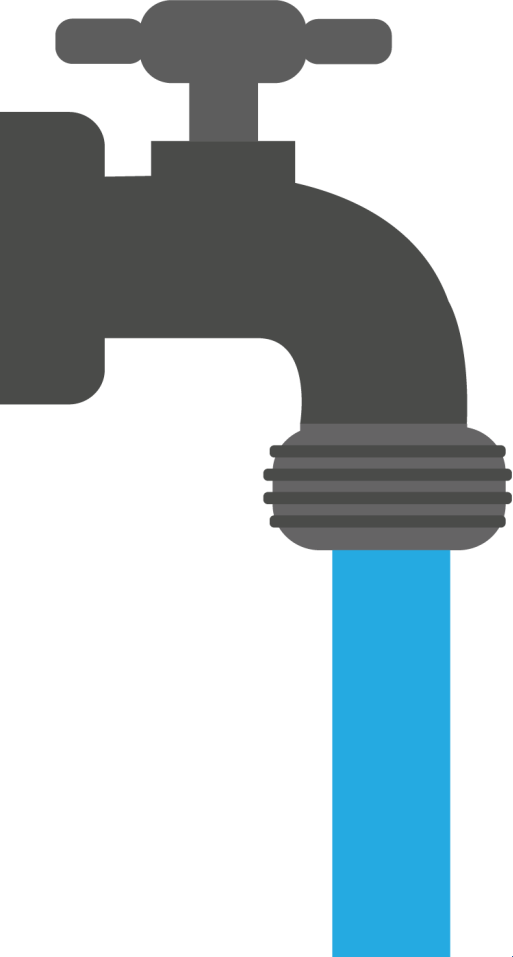
- Highly disruptive to residents
- Requires skilled crew, \$\$\$
- Typically, systems replace LSLs as they are found.
- Predict analogous locations

Source: Triantafyllidou, et al, 2019

# Summary



- Lead and copper enters drinking water through the corrosion of materials in pipes and plumbing
- Common sources of lead and copper include service lines, plumbing pipes, solder, faucets, and fixtures.
- The LCR reduces exposure risks primarily by reducing water's corrosivity
- LCR Sample Site Requirements
  - Lead Service Lines
  - Lead Pipes or Copper Pipes with Lead Solder (Interior Plumbing)



## Summary

- Site Selection
  - Age of Sites
  - Local Codes
  - Data Resources – Utility Records, Maps, etc.
- Field Verification Practices
  - Swab and/or scratch & magnet tests
  - Sampling – first draw or other options
  - Excavation (typically results in immediate replacement of LSLs)

# References

Triantafyllidou, et al, 2019. *TOOLS TO IDENTIFY LEAD SERVICE LINES*. AWWA Water Quality Technology Conference, Dallas, TX. AWWA. Denver, CO.

[https://cfpub.epa.gov/si/si\\_public\\_record\\_report.cfm?Lab=CESE&dirEntryId=347915](https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=CESE&dirEntryId=347915). View date: 9/2/2020.

USEPA, 2010. *Revised Lead and Copper Rule Monitoring and Reporting Guidance for Public Water Systems*. EPA 816-R-10-004. March 2010. <https://www.epa.gov/dwreginfo/lead-and-copper-rule-implementation-tools>. View date: 9/2/2020



**QUESTIONS?**



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