

# Lead and Copper Rule

Developing Sample Pools

September 23, 2020



OFFICE OF GROUND WATER  
AND DRINKING WATER

# Disclaimer

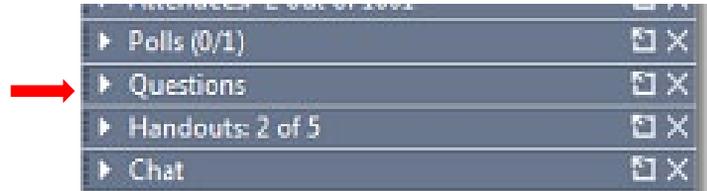


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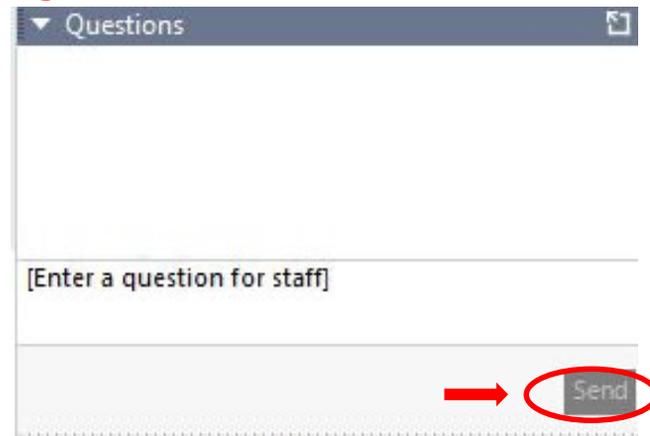
## Participating by Webinar

- 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



Have you ever prepared an LCR sample pool or plan?

Yes

No

## Polling Question #3



Have you prepared and/or reviewed a materials inventory?

Yes

No

# Polling Question Follow-Up

If you have prepared or reviewed a sample pool or materials inventory, how robust would you rate the information on a scale of 1 to 5?

- 1 Insufficient
- 2 Needs Work
- 3 Meets Minimum Expectations
- 4 Exceeds Expectations
- 5 Outstanding

# Today's Presenters



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# Presentation Overview



- LCR Overview
- Sample Pool Requirements and Recommendations
- Evaluate and Update Materials Inventory
- Confirm and Document Sample Pool
- Reporting



# **LEAD AND COPPER RULE OVERVIEW**

# Health Effects of Lead and Copper

- Lead health effects:
  - Greatest risk to infants, young children, and fetuses
  - Damage to 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

- Corroded distribution system and household plumbing materials
- Common sources 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



# The Lead and Copper Rule Establishes:



- **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

A vibrant blue water splash with numerous bubbles of various sizes, creating a sense of movement and freshness. The water is captured in a mid-air state, with a bright white highlight at the top edge of the splash. The background is a gradient of light blue, and the overall composition is clean and modern.

# **SAMPLE POOLS**

# 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

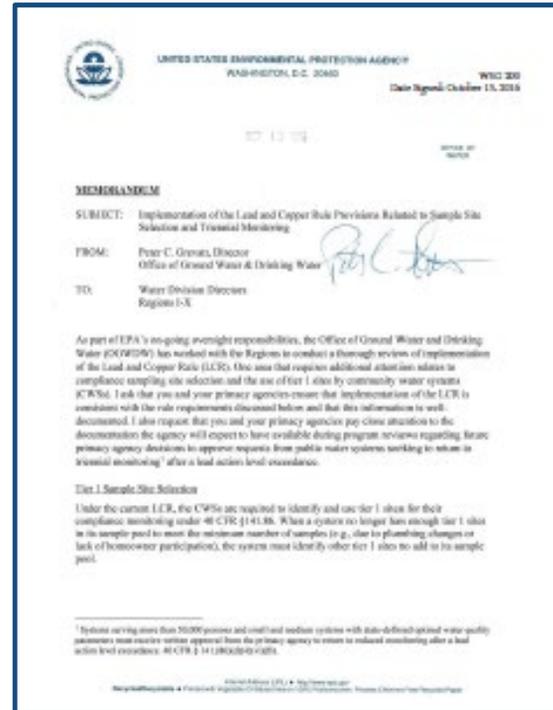
## Current Tap Sample Site Criteria

- 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 the rule criteria.

# WSG 200 Clarifications on Sample Site Selection



- Insufficient tier 1 sampling sites
  - Due to plumbing changes or homeowner participation
  - System must identify other tier 1 sites to add to sample pool
- Encourages systems to:
  - Periodically update materials evaluations
  - Capture any recent changes to available sampling sites
- **Strongly recommends** submitting to states and documenting sources used to update this information.





# **MATERIALS EVALUATIONS**



# Materials Evaluation Overview

- Considers:
  - Single- and multi-family residences
  - Non-residential buildings with interior taps used for consumption
- Inventories the occurrence of lead and copper in:
  - Interior plumbing
  - Service lines (full or partial)
- CWSs can leverage information gathered under 40 CFR 141.42(d), "*Special monitoring for corrosivity characteristics*"

WORKSHEET #3  
SUMMARY OF MATERIALS SURVEY RESULTS *(Suggested Format)*

PWS ID NUMBER

POPULATION SERVED BY PWS

Plumbing Material	Type of Structure		
	SFR <sup>1</sup>	MFR <sup>2</sup>	BLDG <sup>3</sup>
Number of Service Connections			
Interior Plumbing			
Lead Pipe			
Copper Pipe With Lead Solder >1982 <sup>4</sup>			
Copper Pipe With Lead Solder <1983 <sup>5</sup>			
Lead Service Lines			
Entire Line			
Partial Line			
<b>Total Available Sites</b>			

<sup>1</sup> SFR - single family residence

<sup>2</sup> MFR - multi-family residence

<sup>3</sup> BLDG - public or commercial buildings

<sup>4</sup> Refers to buildings that contain copper pipes with lead solder installed after 1982.

<sup>5</sup> Refers to buildings that contain copper pipes with lead solder installed before 1983.

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

# *“Special monitoring for corrosivity characteristics” [40 CFR §141.42]*



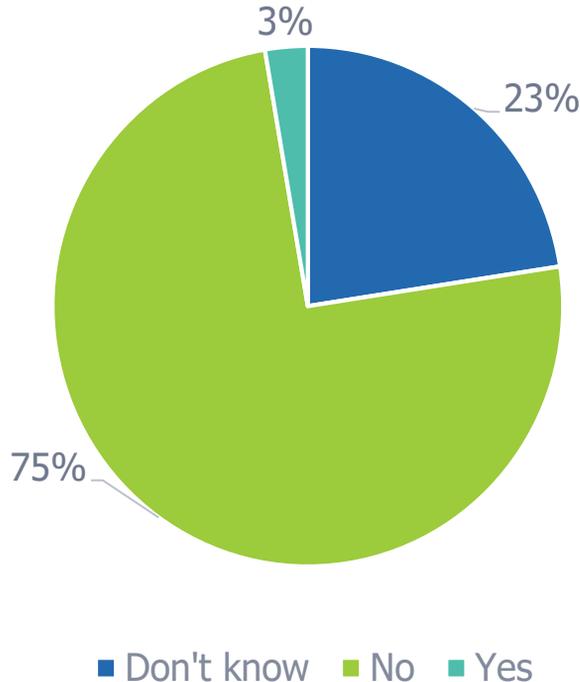
- Identify whether the following construction materials are present in their distribution system and report to the State:
  - **Lead** from piping, solder, caulking, interior lining of distribution mains, alloys and home plumbing.
  - **Copper** from piping and alloys, service lines, and home plumbing.
  - **Galvanized** piping, service lines, and home plumbing.\*
  - **Ferrous** piping materials such as cast iron and steel.
  - **Asbestos cement** pipe.
  - **Vinyl lined** asbestos cement pipe (if required by State).
  - **Coal tar lined** pipes and tanks (if required by State).
- [45 FR 57346, Aug. 27, 1980; 47 FR 10999, Mar. 12, 1982, as amended at 59 FR 62470, Dec. 5, 1994]
- \* *Some galvanized pipes are lead-lined.*

## Distribution Systems and Service Line Materials

- Utility Records
- Permit Files
- Senior Personnel & Retirees
- Community Survey
- Other sources
  - Pipe suppliers/manufacturers
  - Historical USGS maps and aerial photography records



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



Source: 9/17/20  
EPA Sample Site  
Selection Webinar  
Poll Results from  
297 Respondents

## Utility Records

- Distribution Maps and Record Drawings
- Maintenance Records
- Meter Installation Records
- Capital Improvements and Master Plans
- Standard Operating Procedures
- Operation & Maintenance Manuals

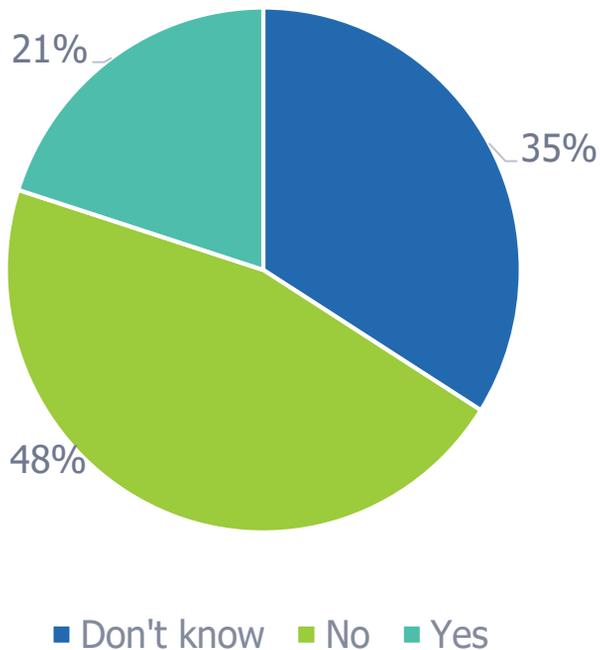




## Interior Plumbing Materials

- Plumbing Codes
- Plumbing Permits
- Existing Water Quality
- Historical Documentation of Service Area Development
- Property Appraisal Records
- Interviews with Plumbers/Building Inspectors
- Community Survey

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

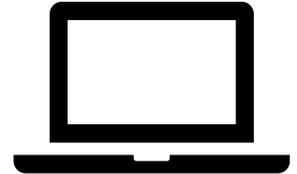


Source: 9/17/20 EPA  
Sample Site Selection  
Webinar Poll Results from  
309 Respondents

# Predictive Methods

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- Geospatial
  - Spatial patterns and proximity to known LSLs and plumbing materials
  - Predict service line and plumbing materials for unsampled sites
- Machine Learning
  - Based on system's data and records
  - Self-learning algorithm with a geospatial model



## More Resources on Material Inventories

- Lead Service Line Replacement Collaborative (<https://www.lslr-collaborative.org/plan-development.html>)
- 2019 ASDWA White Paper: Developing Lead Service Line Inventories ([https://www.asdwa.org/wp-content/uploads/2019/08/ASDWA\\_Developing-Lead-Service-Line-Inventories.pdf](https://www.asdwa.org/wp-content/uploads/2019/08/ASDWA_Developing-Lead-Service-Line-Inventories.pdf))



**CONFIRM AND DOCUMENT SITES**

# 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.

# Confirm Sites

- Do sites (still) meet tiering criteria?
  - LSL replacement and/or plumbing modifications
  - POU/POE devices designed to remove inorganics
  - Changes in residential use
    - E.g., becomes a business
- Are sites accessible?
  - Physically
  - Resident does not want to or no longer wishes to participate
- To the degree possible, are sites well-distributed throughout the service area?

# Confirm and Document Sites

**WORKSHEET #1**  
**MATERIALS SURVEY INVESTIGATION RESULTS** *(Suggested Format)*

PWS ID NUMBER

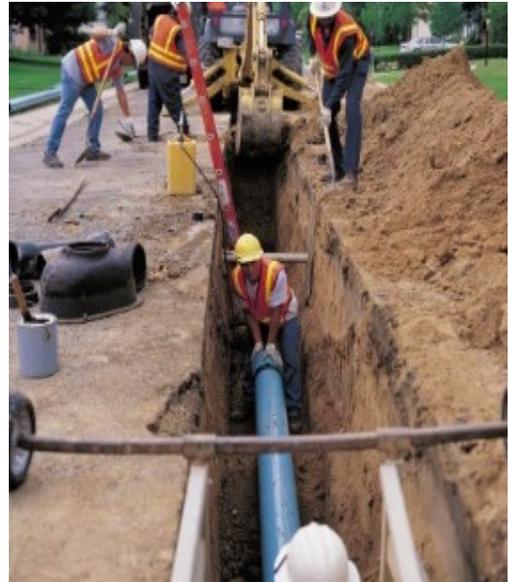
POPULATION SERVED BY PWS



Type of Structure	Location	Contact Person		LSL	Home Plumbing Material	Verified	Volunteered	Selected		Received Training Material
		Name	Phone					Routine	Optional	

# Document Sites

- System sample point ID or name
- Street address, city and zip code
- Sampling status
- Sample tap type
- Type of structure
- Date the structure was built
- Lead service line type
- Interior plumbing type
- Tier level
- Material verification method
- Date (month, day, year) that the site was last sampled for lead and copper





# **REPORTING REQUIREMENTS**

# Sample Site Reporting Requirements



- By the 10th day of the month following the end of the required monitoring period, systems must report to the state:
  - Sampling sites and rationale for choosing the sites
  - Identification of new sampling sites and reason for change

Your state may require prior notification or approval of any changes in sampling sites.

Be sure to check with your state.

# SAMPLE SITE IDENTIFICATION AND CERTIFICATION

System's Name: \_\_\_\_\_

System Type:  CWS

NTNCWS

Address: \_\_\_\_\_

Number of People Served:

\_\_\_\_\_

>100,000

501 to 3,300

\_\_\_\_\_

10,001 to 100,000

101 to 500

3,301 to 10,000

≤ 100

System ID #: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Telephone number: \_\_\_\_\_

## CERTIFICATION OF COLLECTION METHODS

I certify that:

- Each first draw tap sample for lead and copper is 1 liter in volume and has stood motionless in the plumbing system of each sampling site for at least 6 hours.
- Each first draw sample collected from a single-family residence has been collected from the cold water kitchen tap or bathroom sink tap.
- Each first draw sample collected from a non-residential building has been collected at an interior tap from which water is typically drawn for consumption.
- Each first-draw sample collected during an annual or triennial monitoring period has been collected in the months of June, July, August, or September or in the alternate period specified by the State.
- Each resident who volunteered to collect tap water samples from his or her home has been properly instructed by [insert water system's name] \_\_\_\_\_ in the proper methods for collecting lead and copper samples. I do not challenge the accuracy of those sampling results. Enclosed is a copy of the material distributed to residents explaining the proper collection methods, and a list of the residents who performed sampling.

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
PRINTED NAME

\_\_\_\_\_  
TITLE

\_\_\_\_\_  
DATE



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

# SAMPLE SITE IDENTIFICATION AND CERTIFICATION

## CERTIFICATION OF SAMPLING SITES



### LEAD SERVICE LINE SITES

# of samples required to be drawn from lead service line sites \_\_\_\_\_

# of samples actually drawn from lead service line sites \_\_\_\_\_

Difference (explain differences other than zero) \_\_\_\_\_

The following sources have been explored to determine the number of lead service lines in the distribution system.

- \_\_\_\_\_ Distribution system maps and record drawings
- \_\_\_\_\_ Information collected for the presence of lead and copper as required under the Code of Federal Regulations (CFR), 40 CFR 141.42.
- \_\_\_\_\_ Capital improvement plans and/or master plans for distribution system development
- \_\_\_\_\_ Current and historical standard operating procedures and/or operation and maintenance (O&M) manuals for the type of materials used for service connections
- \_\_\_\_\_ Utility records including meter installation records, customer complaint investigations and all historical documentation which indicate and/or confirm the location of lead service connections
- \_\_\_\_\_ Existing water quality data for indications of "troubled areas"

#### Other Sources Which PWS Utilized

- \_\_\_\_\_ Interviews with senior personnel
- \_\_\_\_\_ Conduct service line sampling where lead service lines are suspected to exist but their presence is not confirmed
- \_\_\_\_\_ Review of permit files
- \_\_\_\_\_ Community survey
- \_\_\_\_\_ Review of USGS maps and records
- \_\_\_\_\_ Interviews with pipe suppliers, contractors, and/or developers

Explanation of fewer than 50% LSL sites identified (attach additional pages if necessary): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

# SAMPLE SITE IDENTIFICATION AND CERTIFICATION

## RESULTS OF MONITORING

### THE RESULTS OF LEAD AND COPPER TAP WATER SAMPLES MUST BE ATTACHED TO THIS DOCUMENT

# of samples required \_\_\_\_\_ # of samples submitted \_\_\_\_\_

90th Percentile Pb \_\_\_\_\_ 90th Percentile Cu \_\_\_\_\_

*Note: If the State has informed you that it will calculate your 90<sup>th</sup> percentile levels, you do not need to submit the 90<sup>th</sup> percentile calculations. However, you must still provide your sample results to the State by the deadline that they have specified.*

### THE RESULTS OF WATER QUALITY PARAMETER SAMPLES MUST BE ATTACHED TO THIS DOCUMENT

# of WQP tap samples required \_\_\_\_\_ # of WQP tap samples submitted \_\_\_\_\_

# of entry point samples required \_\_\_\_\_ # of entry point samples submitted \_\_\_\_\_

## CHANGE IN SAMPLING SITES

Original site address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

New site address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Distance between sites (approximately): \_\_\_\_\_

Targeting Criteria: NEW: \_\_\_\_\_ OLD: \_\_\_\_\_

Reason for change (attach additional pages if necessary) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



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



## Summary

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- Sample Pools should reflect materials evaluations
- All water systems are required to conduct a materials evaluation
- Periodic updates ensure continued monitoring of high-risk sites
- Data sources include utility records, permit files, plumbing codes, existing water quality, and property appraisal records
- Confirm participation and document sites in sample pools for accurate reporting



**QUESTIONS?**



## Contact Information

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