LCRI Service Line Inventories – Tips August 2026

Background

In 2024, water systems were required to complete an initial inventory to identify the material types of their service lines. Material types identified could include lead, non-lead, or galvanized requiring replacement (GRR). In the initial inventory, systems may have also identified a service line as "unknown" if they did not know the line material to be a lead, GRR, or a non-lead service line.

Important Dates[7]
Initial Inventory: October 16, 2024

Baseline Inventory: November 1, 2027

Updated Inventory: January 30, 2029 (annually)

Building on the initial inventory, water systems must prepare and submit a Baseline Inventory by November 1, 2027 that updates the initial inventory.[1] Systems must then update their inventory annually.[2] Most water systems have up to ten years, until December 31, 2037, to identify all unknown service lines.[3] Some water systems may qualify for a later deadline.[4] Please see the appendix to this Tips document for strategies and case studies for identifying unknowns. Because service lines are connected to the water system's distribution system, they are accessible at the juncture for investigation. Further, as described below and in the appendix to this tips document, there are methods to identify unknowns which do not rely on visual inspection of the pipe exterior. If physical access to private property is necessary to complete the inventory validation requirements and the water system is unable to gain access, water systems must randomly select another site for validation.

This document describes ways to determine service line material that can save inventory costs and reduce disruptions. The EPA recommends that water systems work with their primacy agency to identify and use effective, evidence-based inventory techniques. The EPA also recommends that water systems discuss with their primacy agency the validation steps they will need to take.

What's an "unknown" line? A "lead status unknown service line" means a service line where the pipe material is not known to be a lead service line, galvanized requiring replacement service line, or a non-lead service line.[6]

Information Sources

To identify service line materials, water systems are required to use records including construction and plumbing codes, water system records, and distribution system inspection records. If approved by the primacy agency, water systems may use other evidence-based sources of information to determine that a service line is non-lead.[5]

Water System Personnel Experience: Water system personnel often have a deep knowledge of their distribution system, especially those with many years of experience. Water systems may use this knowledge as an

[1] 40 C.F.R. 141.84(a)(2)
[2] 40 C.F.R. 141.84(b)(1) and (2), and 40 C.F.R. 141.90(e)(4)(i)
[3] 40 C.F.R. 141.84(b)(1)(i)
[4] 40 C.F.R. 141.84(d)(5)(vi)
[5] 40 C.F.R. 141.84(b)(2) and 141.84(a)(3)(iii)
[6] 40 C.F.R. 141.84(a)(3)(iv)
[7] 40 C.F.R. 141.90(e)

information source for their inventories. It is important to understand your primacy agency direction on how to document this knowledge. Documentation from water system personnel can be used by water systems to support service line material classification if approved by the primacy agency. The EPA recommends any documentation include supporting information for the classification. For example, some water systems have provided multiple signed statements from independent sources (*e.g.,* plumbing code inspectors) to increase their confidence in this type of evidence. Supporting information can help the primacy agency assess the reliability of water system personnel experience to classify service line materials (*e.g.*, job title, years of service, and job responsibilities, etc.).

Example 1

John Smith is the operator of Sunny View Water System, which serves 2,800 people. The Sunny View Water System's records do not contain information about service line material. However, Mr. Smith has never encountered a LSL in his 23 years of experience working at the water system. After consultation with the state drinking water primacy agency, documentation from water system personnel can be used to support service line material classification, along with additional validation. Based on Mr. Smith's experience examining service lines that were installed or excavated for repairs at numerous service locations across the distribution system (including service lines built in different decades), Mr. Smith prepares and signs the following statement:

I, John Smith declare the following statements to be true and correct to the best of my knowledge and belief based upon my personal knowledge and information supplied to me by current or former Sunny View Water System employees.

1. *I am the Chief Operator of the Sunny View Water System. I have served in this position since January 15, 2003. I am responsible for the operation and maintenance of the Sunny View Water System including the distribution system. I oversee the programs to connect new buildings to the distribution system and to maintain existing connections to the distribution system. I am a Grade III Certified Operator.*
2. *I estimate that I have examined over 200 service lines when these lines were excavated for repairs or maintenance including meter replacements. I have examined service lines in all portions of the Sunny View Water System's connecting homes that range in age from 100 years to recently constructed homes. No service line I examined were made of lead.*
3. *I have asked three other past and current employees of the Sunny View Water System who were present for the repair or maintenance of approximately 300 service lines connected to buildings ranging from 100 years old to recently constructed and none of these employees reported ever encountering a lead service line.*

Signed John Smith

Based upon the signed statement from John Smith, the Primacy Agency allows the Sunny View Water System to consider all the service lines in the system to be non-lead but they must still complete a validation in accordance with the LCRI. To validate, the system randomly selects 20% of their service lines from locations throughout their distribution system and visually inspects each line at two locations. The Sunny View Water System did not find any lead service lines, confirming that the system has only non-lead service lines.

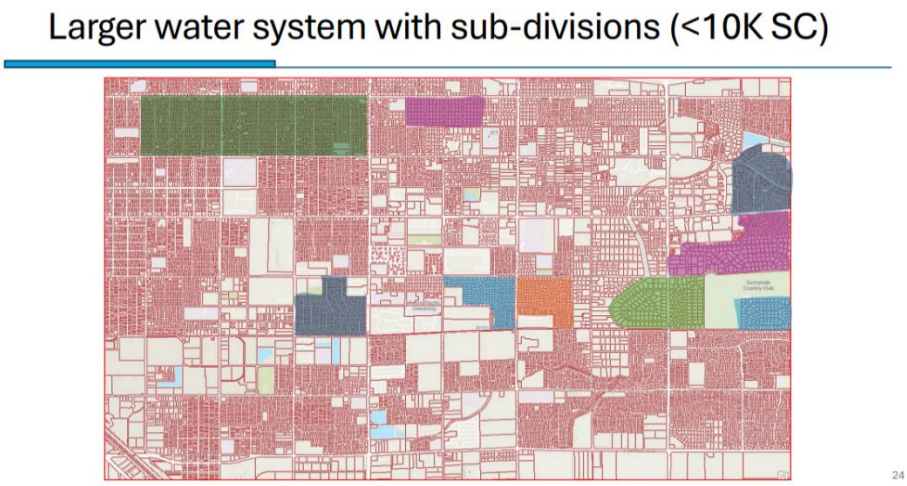
Artificial Intelligence, Statistical Modeling, and Other Predictive Modeling: A key pillar in the EPA's Powering the Great American Comeback Initiative is to make the United States the Artificial Intelligence (AI) capital of the world. The EPA encourages water systems to use, and primacy agencies to allow the use of predictive modeling techniques approved by the primacy agency to identify service line materials. This includes models that use AI. Models can be a common-sense, low-burden, and scientifically sound way to develop inventories without having to perform costly and disruptive excavations at every home. The EPA recommends that water systems work with their primacy agency on the use of modeling as an evidence-based inventory technique to predict the material of unknown service lines.

While some models may be complex, others can use simple statistics. For example, rather than inspecting every service line, a viable model could be one where a system visually inspects a smaller random sample of unknown lines across the distribution system as the basis for a statistical model to represent and characterize the rest of the service line materials in part or all of the distribution system. The number of unknown service lines requiring visual inspection will depend on the primacy agency's direction on confidence level and margin of error and by the number of unknown service lines in the system. If the system finds that all of the examined service lines are non-lead lines, the system would be allowed to, with primacy agency approval, categorize the remaining unknown lines as non-lead. If lead service lines (including partial lead service lines) are found during this process, the water system may need to model different portions of their system (see below), or rely on alternative methods to classify the remaining unknown lines.

Primacy agencies may require a system to submit details about their model or analysis, including their process for selecting unknown service lines and how to do visual inspections. Primacy agencies may allow systems to separately identify neighborhoods or subdivisions within the distribution system and use modeling to show that those neighborhoods do not have lead service lines. For this approach, the water system would identify the various neighborhoods or subdivisions of the distribution system that share common characteristics, such as areas that were built at the same time by the same builder.

Figure 1 provides an example of how portions of a water system might be divided into separate neighborhoods when using a statistical model. The red areas represent the general water system and the other colors represent sub-divisions with similar characteristics (*e.g.*, built during the same period or by the same builder). After identifying neighborhoods, the water system could randomly select unknown service lines in each neighborhood for visual inspection as the basis for separate statistical models to characterize the rest of the service line materials in each neighborhood (if approved by the primacy agency). For example, the system could visually inspect a random subset of service lines in the orange neighborhood to assign characteristics to the remaining unknowns in the orange neighborhood.

Figure 1: Example water system map showing different distribution system areas with similar characteristics.



Source: This example map is taken from a service line identification training developed by California Water Boards. In this example, CA depicts different neighborhoods sharing similar characteristics in blue, orange, and green, in a water system with fewer than 10,000 service connections (SC). This full training is available at: https://water.waterboards.ca.gov/lead-copper-rule/docs/lcrr-lsli-training-overview.pdf. Inclusion of this image is only intended to show an example of subdivisions in a real system. This process, and the exact number of inspections required and how results are used to classify service lines, are up to primacy agency discretion.

Determining a Galvanized Service Line is Non-Lead (i.e., not a GRR): Water systems are required to identify galvanized service lines as galvanized requiring replacement (GRR) if they are currently or were previously downstream of a lead service line (LSL). If the system cannot show that it was never downstream of a lead line, then it is a galvanized requiring replacement line.[8]

What's a GRR? A GRR is a galvanized service line that currently is or ever was downstream of a lead service line; or is currently downstream of an unknown service line. For this definition, downstream means in the direction of flow through the service line. If the water system is unable to demonstrate that the galvanized service line was never downstream of a lead service line, it is a galvanized requiring replacement service line for purposes of the service line inventory and replacement requirements.[8]

To demonstrate that a galvanized service line *never* was downstream of an LSL and is therefore non-lead, water systems may use predictive modeling or other methods, with the approval of the primacy agency, to determine that there never were LSLs in all or portions of the distribution system and therefore determine that any galvanized service lines in those areas are not GRR service lines.

There are other ways to make a GRR determination. For example, a system may have a record, such as a local ordinance that required the installation of only copper or galvanized pipes. There may also be a record showing that only copper or galvanized service lines were ever installed in a certain neighborhood. In either case, any galvanized service lines in these areas could be classified as non-lead because evidence demonstrates that LSLs were never used. The EPA recommends that systems use this evidence-based, common-sense approach of using system- or neighborhood-level records to demonstrate that LSLs were not used and thus, any galvanized lines are not GRR.

[8] 40 C.F.R. 141.2

Example 2

Lakeside Water System serves a neighborhood with 100 homes built from 1971-1973, after the local plumbing code prohibited the installation of lead service lines. All 100 homes are served by galvanized service lines, but the system only has the original tap cards for 70 homes demonstrating they are not GRR service lines.

The remaining 30 homes in this development were constructed in the same time period. The system determined the 30 galvanized service lines would not be considered GRR service lines because records show the use of only galvanized service lines during the build period after the local lead ban, even though individual records, such as tap cards, were not available for each public side service line. The system inventoried those service lines as non-lead. Since all sites in this neighborhood were identified as installed after the local plumbing code prohibiting lead service lines, these sites would be excluded from the system's validation pool.

Validation Flexibility Using Waivers: Water systems using models to identify unknown service lines conducted prior to the LCRI compliance date (November 1, 2027) may seek primacy agency approval to use flexibilities available for inventory validation under the LCRI. Some inventory modeling procedures to determine service line material of unknowns use visual inspections at a subset of sites to test model predictions, which can be nearly identical to the procedures required by the LCRI validation process. If a system identified all or some of its non-lead service lines through modeling and completed visual inspections that were at least as stringent as the LCRI validation requirements before November 2027, then the system could seek a validation waiver[9]. This flexibility could significantly reduce water system burden by designing inventory modeling procedures that avoid a duplicative validation effort.

Which service lines must be in the validation pool? Any non-lead service line that was not identified as non-lead based upon a two-point visual inspection, installation date records, or previously replaced lead or GRR service lines.[9]

Disclaimer: This document is being provided for informational purposes only to assist members of the public, States, Tribes, and/or public water systems in understanding the Lead and Copper Rule Improvements (LCRI). It includes summary descriptions of regulatory requirements. Although the EPA has made every effort to ensure the accuracy of the discussion in this document, the legally binding requirements applicable to public water systems are determined by statutes and regulations. In the event of a conflict between the discussion in this document and any applicable statute or regulation, this document would not be controlling. This document does not impose any legally binding requirements on the EPA, States, Tribes, or the regulated community. Further, this document does not confer legal rights or impose legal obligations on any member of the public. Note that the water systems named in the Examples 1 and 2 given refer to hypothetical water systems and are not real, regulated PWSs. Any resemblance to a real water system is purely coincidental.

[9] 40 C.F.R. 141.84(b)(5)(vi)