6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 141 and 142

[EPA-HQ-OW-2022-0801; FRL-5423.2-01-OW]

RIN 2040-AG16

National Primary Drinking Water Regulations for Lead and Copper: Improvements (LCRI)

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; request for public comment; notice of public hearing.

SUMMARY: The U.S. Environmental Protection Agency (EPA) is proposing revisions to the National Primary Drinking Water Regulation (NPDWR) for lead and copper under the authority of the Safe Drinking Water Act (SDWA). In this document, EPA is proposing to require water systems to replace lead service lines, remove the lead trigger level, reduce the lead action level to 0.010 mg/L, and strengthen tap sampling procedures, among other changes that would improve public health protection and simplify the rule relative to the 2021 Lead and Copper Rule Revisions (LCRR). This proposed rule provides improvements in the additional following areas: corrosion control treatment, public education and consumer awareness, requirements for small

systems, and sampling in schools and child care facilities. EPA's proposed rule aims to address potential disproportionate impacts of lead in drinking water in communities, including through proposed lead service line replacement and public education, among other areas of the proposed rule.

DATES: Comments must be received on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Comments on the information collection provisions submitted to the Office of Management and Budget (OMB) under the Paperwork Reduction Act (PRA) are best assured of consideration by OMB if OMB receives a copy of your comments on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Public hearing: EPA will hold a virtual public hearing on January 16, 2023, information is available at https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements. Please refer to the **SUPPLEMENTARY INFORMATION** section for additional information on the public hearing.

ADDRESSES: You may send comments, identified by Docket ID No. EPA-HQ-OW-2022-0801, by any of the following methods:

- Federal eRulemaking Portal: https://www.regulations.gov/ (our preferred method). Follow the online instructions for submitting comments.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Office of Ground Water and Drinking Water Docket, Mail Code 28221T, 1200 Pennsylvania Avenue NW, Washington, DC 20460.
- Hand Delivery or Courier: EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operations are 8:30 a.m. to 4:30 p.m., Monday through Friday (except Federal Holidays).

Instructions: All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to https://www.regulations.gov/, including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the "Public Participation" heading of the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: Michael Goldberg, Standards and Risk Management Division, Office of Ground Water and Drinking Water, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Mail Code 4607M, Washington, DC 20460; telephone number: (202) 564-1379; email address: LCRI@epa.gov. For more information visit https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements. Individuals who have speech or other communication disabilities may use a relay service to reach the phone number above. To learn more about how to make an accessible telephone call, visit the webpage for the Federal Communications Commission's Telecommunications Relay Service, https://www.fcc.gov/consumers/guides/telecommunications-relay-service-trs.

SUPPLEMENTARY INFORMATION:

I. Executive Summary

The United States Environmental Protection Agency's (EPA) mission is to protect human health and the environment. There is no known safe level of lead exposure. Exposure to drinking water contaminated with lead can cause serious human health impacts including neurodevelopmental problems in children and heart disease in adults. Young children and pregnant people are especially susceptible to the impacts of lead exposures. Reduction in lead in drinking water will reduce negative neurodevelopmental outcomes for children as well as reducing a range of health risk to adults. EPA is proposing the Lead and Copper Rule Improvements (LCRI) to significantly reduce exposure to lead through drinking water. The proposal builds on the 2021 Lead and Copper Rule Revisions (LCRR) and the original 1991 Lead and Copper Rule (LCR). In accordance with 5 U.S.C. 553(b)(4), a summary of this rule may be found at Docket ID No. EPA-HQ-OW-2022-0801 at https://www.regulations.gov/.

EPA conducted a review of the LCRR in accordance with Executive Order 13990[1] and announced its intention to strengthen the LCRR with a new rulemaking, the LCRI, to address key issues and opportunities identified in the review. The proposed LCRI addresses the priorities EPA identified in the LCRR review by proposing to equitably replace all lead service lines (LSLs) in the nation, better identify where LSLs are and act in communities most at risk of lead exposure, and streamline and improve implementation of the rule. This proposed LCRI is the culmination of numerous meaningful consultations with stakeholders and the public during the LCRR review and development of the proposed LCRI.

EPA has found based upon its evaluation of available data and stakeholder input that although the LCRR would improve public health protection in comparison to the previous version of the rule, there are significant opportunities to further improve upon it to achieve increased protection of communities from lead exposure through drinking water. The proposed LCRI strengthens key elements of the rule in three main focus areas: Replacing All Lead Service Lines, Reducing Complexity for Public Health Protection, and Increasing Transparency and Informing the Public. The proposal also includes an updated benefits and costs analysis, updates the compliance dates, and outlines the public participation process.

Replacing All Lead Service Lines

Historically, lead pipes[2], as well as lead-bearing fixtures and solder, were commonly used in water distribution systems and home plumbing. Previous efforts to reduce lead in

---

[1] Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (86 FR 7037, January 20, 2021).

[2] EPA does not believe that there are lead water mains in the United States and if they do occur it is extremely rare. The poor structural integrity of lead pipes that are more than two inches in diameter means that lead was primarily used in pipes of smaller diameter such as service lines. Conversely, the water mains that distribute water throughout a city or town tend to be six inches or larger in diameter. The common water main materials include ductile iron, PVC, asbestos cement, HDPE, and concrete steel. The oldest water mains are cast iron and asbestos cement (Folkman, 2018).

drinking water prioritized corrosion control to reduce lead levels at the tap. Following corrosion control, some water systems would be required to take additional actions, including service line replacement and public education. Replacing the lead service lines does not eliminate lead from tap water because plumbing systems inside homes and buildings (i.e., premise plumbing) can also contain lead components. Buildings and homes older than 1986 can still have LSLs connecting the building's plumbing system to the main water supply line under the street. These lines can deteriorate or corrode, releasing lead particles into the drinking water (Sandvig et al., 2008). The science is clear that there is no known safe level of exposure to lead in drinking water, especially for children. Among other effects, lead exposure can cause damage to the brain and kidneys and can interfere with the production of red blood cells that carry oxygen to all parts of the body. In children, even at low levels, lead exposure can cause health effects like lower intelligence quotient (IQ), learning and behavioral problems. In adults, health effects include risk of heart disease, high blood pressure, kidney or nervous system problems, and cancer. When LSLs are present, they represent the greatest lead exposure source through drinking water (Sandvig et al., 2008)[3]. Based on over 30 years of implementing the LCR, EPA has determined that requiring lead service line replacements based on 90th percentile lead levels is insufficient to protect public health.

As a result, EPA is proposing the elimination of all LSLs and certain galvanized service lines from water systems in 10 years or less. The proposed LCRI provides, in limited circumstances, additional time for some systems to complete system-wide full service line replacement. EPA proposes that water systems must replace LSLs and certain galvanized service

[3] Sandvig et al. (2008) found that LSLs contributed an average of approximately 50 to 75 percent of the total lead mass measured at the tap, while premise piping and the faucet contributed approximately 20 to 35 percent and 1 to 3 percent, respectively. At sites with no LSL, premise piping and the faucet contributed a greater percentage of lead mass to the total lead mass measured at the tap (approximately 55 percent and 12 percent, respectively), while main samples ranged from approximately 3 to 15 percent.

lines regardless of the lead levels occurring in tap or other drinking water samples. This proposal would significantly reduce the potential for lead releases into drinking water. In addition, while corrosion control is generally effective at reducing lead to low levels, elimination of LSLs can result in even greater public health protection by eliminating a lead exposure source and minimizes the opportunities for error that have often occurred over the years.

Knowing where lead pipes are is critical to replacing them efficiently and equitably. Under the proposed LCRI, all water systems would be required to regularly update their service line inventories, create a service line replacement plan, and identify all service lines of unknown material by the replacement deadline. EPA is proposing that water systems use a validation process to ensure the service line inventory is accurate. Water systems would also be required to track lead connectors in their inventories and replace them as they are encountered. LSLs in communities throughout the United States can often be found in lower-income and underserved neighborhoods. Under the proposed LCRI, water systems are encouraged to prioritize service line replacement in the most efficient, effective, and equitable way to eliminate exposure to lead and protect public health.

Reducing Complexity and Improving Public Health Protection

The proposed LCRI reduces the complexity of the rule and includes provisions that support more efficient implementation by water systems while reducing lead exposure in more communities. EPA is proposing to lower the lead action level to 0.010 mg/L and eliminate the lead trigger level to simplify the rule and require water systems to act earlier. Water systems with continually high levels of lead determined by having multiple lead action level exceedances would be required to conduct additional outreach to consumers about lead in the drinking water and make filters certified to reduce lead available for consumers.

EPA also proposes an updated tap sampling protocol that would require systems to collect first liter and fifth liter samples at sites with LSLs. This new method would better represent water that has been stagnant within the service line and the plumbing, helping water systems better understand the effectiveness of their corrosion control treatment. EPA is also proposing to further streamline the rule by deferring the optimal corrosion control treatment and re-optimized optimal corrosion control treatment processes for systems that can remove 100 percent of lead and galvanized requiring replacement (GRR) service lines within five years of the date the system is triggered into the corrosion control treatment steps.

The LCRI proposal retains flexibilities for small systems serving 3,300 persons or fewer, allowing them to choose among three options if they exceed the lead action level: installing optimized corrosion control treatment, installing and maintaining point-of-use devices, or replacing all lead-bearing plumbing. Lead service line replacement would no longer be available as a remedial action when small systems exceed the lead action level since the proposed LCRI requires all systems to conduct mandatory service line replacement.

To reduce duplicative sampling efforts, EPA is proposing to expand the allowable waivers for water systems to conduct sampling and public education in schools and child care facilities to include some sampling efforts conducted prior to the rule compliance date, such as sampling conducted through the Water Infrastructure Improvements for the Nation (WIIN) Act grant program.

Increasing Transparency and Informing the Public

To increase transparency and better inform the public of lead exposure and health risks, EPA is proposing to improve the public education requirements by updating the content and delivery frequency for more proactive messaging about lead in drinking water. The proposal also introduces new public education requirements for lead and copper.

The proposed rule would require systems to provide additional information when notifying consumers who are served by a lead, GRR, or unknown service line annually. In addition, when a system samples for lead or copper at a residence, it must deliver to residents the results within three days, regardless of the lead or copper levels in the sample. Water systems that exceed the lead action level would be required to provide public education no later than 60 days after the end of a sampling period and continue providing public education with this same frequency until the system no longer exceeds the action level. This public education is in addition to the requirement for water systems to provide public notification of a lead action level exceedance within 24 hours.

Water systems would also be required to deliver public education and notice materials to residents when water-related work is conducted that could disturb lead, galvanized requiring replacement, or unknown service lines, including disturbances caused when systems are conducting inventories. When systems are working to replace LSLs, they would be required to encourage customers to allow full replacement of their lead lines. Systems would be required to reach out four times using at least two different methods to contact customers.

The annual Consumer Confidence Reports are one important way that customers learn about the quality of their drinking water. As part of the LCRI rulemaking, EPA also proposes to revise the Consumer Confidence Report requirements to include an informational statement about lead that has been updated to improve risk communication, updated lead health effects language, information about the system's efforts to sample in schools and child care facilities, and how to access the community's service line replacement plan.

Benefits and Costs Analysis

The Safe Drinking Water Act (SDWA) [4] requires that EPA determine whether the benefits of the proposed rule justify the costs. As part of its Health Risk Reduction and Cost Analysis (HRRCA), EPA must evaluate quantifiable and nonquantifiable health risk reduction benefits and costs of compliance with the proposed treatment techniques. In accordance with these requirements, the EPA Administrator has determined that the quantified and nonquantifiable benefits of the proposed LCRI justify the costs (see section VIII. of this document for additional discussion on EPA's HRRCA).

To evaluate these benefits and costs, EPA determined which entities would be affected by the LCRI, quantified costs using available data, and described nonquantifiable costs. EPA quantified benefits by estimating and monetizing avoided reductions in IQ, cases of attention-deficit/hyperactivity disorder (ADHD) in children, lower birth weights in children, and cases of cardiovascular disease premature mortality in adults associated with LSL and GRR service line replacement, corrosion control treatment (CCT) installation and re-optimization, and the temporary use of point-of-use devices and water filters in systems with multiple action level exceedances. Prior efforts to quantify benefits associated reductions of lead in drinking water have focused on neurodevelopmental outcomes in children because of the lifelong impact on their ability to thrive. The current benefits assessment also incorporates recent scientific analyses that allow better quantifying benefits to adults. Because existing techniques for quantifying cardiovascular disease premature mortality yield larger benefits per person than for neurological impacts on children, the total benefits are driven by the cardiovascular disease premature mortality benefits. The larger monetized benefit to adults is not intended to distract from EPA's focus on reducing children's exposure to lead.

[4] Pub. L. 93-523, as amended (42 U.S.C. 300f *et seq*.).

In addition, EPA qualitatively assessed the potential for the proposed rule's additional lead public education and service line inventory lead connector and public access requirements that target consumers directly, schools and child care facilities, health agencies, and people living in homes with LSLs and GRR service lines to promote averting behavior on the part of the exposed public, including LSL and GRR service line replacement, resulting in reductions in the negative health impacts of lead. Health benefits qualitatively evaluated include cardiovascular morbidity effects, renal effects, reproductive and developmental effects (apart from ADHD), immunological effects, neurological effects (apart from children's IQ), and cancer. In addition, people served by systems required to install or re-optimize CCT under the proposed LCRI and living in homes with premise plumbing containing lead, but not an LSL or GRR service line, will receive health benefits from reduced lead exposure which were not quantified in the analysis of the proposed rule. Increased use of CCT resulting from the proposed rule's lead requirements may reduce the negative health impacts of copper such as acute gastrointestinal conditions and health effects associated with Wilson's Disease. Other unquantifiable co-benefits associated with the increased use of corrosion inhibitors by systems include extending the useful life of plumbing components and appliances (e.g., water heaters), reduced plumbing maintenance costs, reduced treated water loss from the distribution system due to leaks, and reduced potential liability and damages from broken pipes in buildings.

To support eliminating LSLs, the Infrastructure Investment and Jobs Act (Pub. L. 117-58), also referred to as the Bipartisan Infrastructure Law (BIL), included $15 billion specifically appropriated for lead service line replacement (LSLR) projects and associated activities directly connected to the identification of LSL and planning for the replacement of LSLs.

Compliance and Public Process

SDWA requires EPA to establish and enforce drinking water regulations. EPA delegates primary enforcement responsibility (called primacy) for public water systems to States and Indian Tribes if they meet certain requirements. Currently, primacy agencies are enforcing the Lead and Copper Rule. Water systems must comply with the LCRR beginning October 16, 2024. EPA intends to promulgate the LCRI prior to that date; in addition to proposing new and improved requirements, EPA is proposing to revise the compliance dates for most of the LCRR's requirements.

EPA conducted a review of the LCRR in accordance with Executive Order 13990 and announced its intention to strengthen the LCRR with a new rulemaking, the LCRI, to address key issues and opportunities identified in the review. This proposed LCRI is the culmination of numerous meaningful consultations with stakeholders and the public during the LCRR review and development of the proposed LCRI. Public participation and consultations with key stakeholders are critical in developing an implementable rule that protects public health to the extent feasible. Throughout the review of the LCRR and the engagements and consultations conducted in the development of the proposed LCRI, EPA engaged with many stakeholders and received valuable feedback that the Agency considered to develop this proposed rule (see section IV.C. and section X. of this document on EPA's LCRR review engagements and EPA's Statutory and Executive Order Reviews).

The Agency is requesting comment on this action and has identified specific areas where public input will be especially helpful for EPA in developing the final rule (see section IX. of this document on specific topics highlighted for public comment). In addition to seeking written input, EPA will be holding a public hearing on January 16, 2023. Details on participating in the public hearing are provided in section II.B. of this document.

II. Public Participation

A. Written Comments

Submit your comments, identified by Docket ID No. EPA-HQ-OW-2022-0801, at https://www.regulations.gov (EPA's preferred method), or the other methods identified in the **ADDRESSES** section. Once submitted, comments cannot be edited or removed from the docket. EPA may publish any comment received to its public docket. Do not submit to EPA's docket at https://www.regulations.gov any information you consider to be Confidential Business Information (CBI), Proprietary Business Information (PBI), or other information where disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. EPA will generally not consider comments or comment contents located outside of the primary submission (i.e., on the web, cloud, or other file sharing system). Please visit https://www.epa.gov/dockets/commenting-epa-dockets for additional submission methods; the full EPA public comment policy; information about CBI, PBI, or multimedia submissions; and general guidance on providing effective comments.

B. Participation in a Virtual Public Hearing

EPA is hosting a virtual public hearing on January 16, 2023, to receive public comment and will present the proposed requirements of the draft National Primary Drinking Water Regulation (NPDWR). The hearing will be held virtually from approximately 11 a.m. until approximately 7 p.m. eastern time. EPA will begin pre-registering speakers and attendees for the virtual hearing upon publication of this document in the *Federal Register*. To attend and/or register to speak at the virtual hearing, please use the online registration form available at: https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements.

The last day to pre-register to speak at the hearing will be January 9, 2023. On January 12, 2023, EPA will post a general agenda for the hearing that will list pre-registered speakers in approximate, sequential order at: https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements. The number of online connections available for the hearing is limited and will be offered on a first come, first-serve basis. To submit visual aids to support your oral comment, please contact LCRI@epa.gov for guidelines and instructions by January 12, 2023.

Registration will remain open for the duration of the hearing itself for those wishing to provide oral comment during unscheduled testimony; however, early registration is strongly encouraged to ensure proper accommodations and adequate timing. EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule. Please note that the public hearing may close early if all business is finished.

EPA encourages commenters to provide EPA with a copy of their oral testimony electronically by submitting it to the public docket at https://www.regulations.gov, Docket ID: EPA-HQ-OW-2022-0801. Oral comments will be time limited to maximize participation, which may result in the full statement not being given during the virtual hearing itself. Therefore, EPA also recommends submitting the text of oral comments as written comments to the rulemaking docket. EPA will also accept written comments submitted to the public docket, as provided above, from persons not making an oral comment. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral comments and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing will be posted online at: https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements. While EPA expects the hearing to go forward as set forth above, please monitor the Agency's website or contact LCRI@epa.gov to determine if there are any updates. EPA does not intend to publish a document in the *Federal Register* announcing updates about the public virtual hearing.

If you require any accommodations for the day of the hearing, such as language translation, captioning, or special accommodations, please indicate this and describe your needs when you register. All requests for accommodations should be submitted by January 9, 2023. Without this one-week advance notice, EPA may not be able to arrange for accommodations. Please contact LCRI@epa.gov with any questions related to the virtual public hearing.

C. Previous Opportunities for Public Engagement

EPA provided numerous opportunities for public engagement and input on these proposed regulations. EPA conducted a series of virtual meetings with stakeholders, States, communities impacted by lead exposure, and the public and obtained verbal and written feedback on the LCRR and the proposed LCRI. A summary of the LCRR review and stakeholder engagements is described in section IV.C. of this document, and a summary of the external engagements for the proposed LCRI is described in section X. of this document. The input received during these exchanges was considered in developing the proposed LCRI requirements as described in the subsequent sections of this document.

III. General Information

The proposed LCRI builds upon the previous lead and copper rules. This proposal would revise the most recent lead and copper rule, the LCRR, which was promulgated on January 15, 2021 (86 FR 4198, USEPA, 2021a). Key revisions in this proposed LCRI address the opportunities identified in the Review of the National Primary Drinking Water Regulation: Lead and Copper Rule Revisions (or LCRR review) including proactive and equitable replacement of all LSLs, strengthening compliance with tap sampling to better identify communities most at risk of elevated lead in drinking water to better compel actions to reduce health risks, and reducing the complexity of the regulation from the action and trigger level construct and ensuring that the rule is more easily understandable (86 FR 71574; USEPA, 2021b). The proposed LCRI was developed considering the input received in numerous meaningful consultations and engagements over several years, including during LCRR review and in stakeholder outreach conducted to inform the development of this proposal.

A. What is EPA proposing?

EPA is proposing revisions to require mandatory full service line replacement of LSLs and GRR service lines under the control of the water system regardless of the system's 90th percentile lead level. Water systems would be required to complete replacements within ten years, with limited exceptions. EPA is proposing to revise the requirements for updates to the service line inventories under the LCRR to require systems to categorize all unknown service lines in order to identify all LSLs and GRR service lines by the replacement deadline. Systems would also be required to track lead connectors in their inventories and replace them whenever encountered. All water systems with known or potential LSLs or GRR service lines would need to prepare a service line replacement plan that would help to ensure an equitable replacement of all LSLs or GRR service lines by the replacement deadline. EPA is also proposing to lower the lead action level from 0.015 mg/L to 0.010 mg/L, which would result in more water systems controlling corrosion and providing public education to reduce drinking water lead exposure. Systems that exceed the lead action level three or more times in a five-year period would be required to take additional actions to provide public education and make filters available. EPA is also proposing an updated tap sampling protocol that would require the use of the higher of the first- or fifth-liter values at LSL sites to be used when calculating the system's 90th percentile at sites with LSLs. The first- and fifth-liter values represent water that has been stagnant in premise plumbing (plumbing within buildings) and within the service line as well as more accurately identify where higher lead levels might be present.

EPA is proposing that States set optimal water quality parameters for medium systems (serving greater than 10,000 persons and less than or equal to 50,000 persons) with corrosion control treatment and that these systems meet those parameters for the system to demonstrate that optimal corrosion control treatment (OCCT) is being maintained. EPA is proposing to defer OCCT or re-optimized OCCT for systems that can replace all LSLs and GRR service lines within five years of the date they are triggered into CCT steps at a 20 percent annual replacement rate. EPA is also proposing that systems with OCCT meeting their optimal water quality parameters are not required to re-optimize their CCT more than once following a lead action level exceedance, unless required to do so by the State upon finding that it is necessary.

EPA is proposing to update the public education requirements, instituting changes to content and delivery frequency for more proactive messaging about lead in drinking water and introducing new public education requirements for lead and copper.

EPA is proposing to revise the small system compliance flexibility provision to eliminate LSLR as a compliance option, as all systems would conduct mandatory service line replacement regardless of their 90th percentile lead level. EPA is also proposing to change the eligibility threshold for the flexibility for community water systems (CWSs) to those serving 3,300 or fewer persons.

EPA is proposing to retain the requirements for CWSs to conduct sampling and public education in schools and child care facilities but to expand the available waivers to include sampling efforts conducted prior to the rule compliance date, including sampling conducted through the WIIN Act grant program. EPA is also proposing to restructure and clarify areas of the rule where requirements would not change in an effort to increase the clarity of the rule and increase systems' ability to implement the rule.

Exhibit 1 compares the major differences among the pre-2021 LCR (promulgated in 1991 and last revised in 2007), the LCRR, and the proposed LCRI. In general, only the changes between each rulemaking are shown in Exhibit 1. Asterisks (*) in the pre-2021 LCR and LCRR columns denote requirements that would be retained in the proposed LCRI.

Exhibit 1—Comparison of Pre-2021 LCR, LCRR, and the Proposed LCRI Revised Requirements

Pre-2021 LCR	LCRR	Proposed LCRI
Service Line Inventory		
• Systems were required to complete a materials evaluation by the time of initial sampling. • No requirement to update materials evaluation.	• All systems must develop an initial LSL inventory within 3 years of final rule publication. • The inventory must include a location identifier for each LSL and GRR service line. • The inventory must be made publicly accessible; and available online for systems serving >50,000 people.* • The LSL inventory must be updated based on the system's tap sampling frequency but no more than annually.	• All systems must review records for information on connector materials and include lead connectors in the baseline inventory by the compliance date. • The inventory must include a street address with each service line and connector. • Service line inventory must be updated annually. • Systems must respond to customer inquiries on incorrect material categorizations within 60 days. • Systems must validate the accuracy of the non-lead service line category in their inventory no later than 7 years after the compliance date unless on a shortened or deferred deadline. • Systems must identify all unknown service lines by the

Pre-2021 LCR	LCRR	Proposed LCRI
		applicable mandatory replacement deadline.
	Service Line Replacement	
Replacement Plan • No requirement.	**Replacement Plan** • All systems with at least one lead, GRR, or unknown service line must develop an LSLR plan. • The plan must include an LSLR prioritization strategy.	**Replacement Plan** • All systems with at least one lead, GRR, or unknown service line must develop the service line replacement plan (as required in LCRR), but also include additional plan elements including a strategy to inform customers and consumers about the plan and replacement program and an identification of any legal requirements or water tariff agreement provisions that affect a system's ability to gain access to conduct full service line replacement. • Updates the language on the replacement prioritization strategy. • Service line replacement plan must be made publicly accessible; and available online for systems serving > 50,000 people.
LSLR • Replacement programs are based on the lead 90th percentile (P90) level, CCT installation, and/or source water treatment. • Systems with LSLs with P90 lead > 0.015 mg/L after CCT installation must annually replace at least 7 percent of number of LSLs in their distribution system when the lead	**LSLR** • Replacement programs are based on P90 lead level for CWSs serving > 10,000 people: o If P90 > 0.015 mg/L: Must fully replace 3 percent of LSLs and GRR service lines per year based upon a 2-year rolling average (mandatory replacement) for at least 4 consecutive 6-month monitoring periods.	**Service Line Replacement** • Mandatory full service line replacement program, not based on P90 level. • All CWSs and NTNCWSs with one or more lead, GRR, or unknown service line in their inventory must replace LSLs and GRR service lines under their control in 10 years. Systems required to replace >10,000 lines per year or systems exceeding 0.039 replacements per household per year would be eligible for deferred deadlines beyond the 10-year replacement deadline.

Pre-2021 LCR	LCRR	Proposed LCRI
action level is first exceeded. • Systems must replace the LSL portion they own and offer to replace the private portion at the owner's expense.[a] • Full LSLR, partial LSLR, and LSLs with lead sample results ≤ 0.015 mg/L ("test-outs") count toward the 7 percent replacement rate. • Systems can discontinue LSLR after 2 consecutive 6-month monitoring periods at or below the lead action level. • Requires replacement of LSLs only.	◦ If 0.010 mg/L < P90 ≤ 0.015 mg/L: Implement a goal-based LSLR program and consult the primacy agency (or State) on replacement goals for 2 consecutive 1-year monitoring periods. • CWSs serving ≤ 10,000 people and all non-transient, non-community water systems (NTNCWSs) that select LSLR as their compliance option must complete LSLR within 15 years if P90 > 0.015 mg/L. See the *Small System Flexibility* section of this exhibit. • Annual LSLR rate is applied to the number of LSLs and GRR service lines when the system first exceeds the trigger or action level plus the number of unknown service lines at the beginning of the year. • Only full LSLR (replacement of the entire length of the service line) counts toward mandatory rate and goal-based rate. • All systems replace their portion of an LSL if notified by consumer of private side replacement within 45 days of notification of the private replacement.	Systems must replace service lines by a shortened deadline if determined feasible by the State. • Systems must replace service lines at a minimum average annual rate of 10 percent calculated across a rolling 3-year period, unless subject to a shortened or deferred deadline. • Average annual replacement rate is applied to the number of LSLs and GRR service lines in the baseline inventory submitted by the compliance date plus the number of unknown service lines updated annually. • Systems must conduct reasonable efforts (at least 4 attempts) to engage property owners about full service line replacement, when applicable. • LCRR requirements remain for counting only full service line replacements towards replacement rate, completing customer-initiated replacements, providing a filter and offer tap sampling following replacements, and replacing lead connectors when encountered. • Systems conducting partial service line replacement must offer to replace the remaining portion of the service line not under their control (within 45 days for emergencies).[a]

Pre-2021 LCR	LCRR	Proposed LCRI
	If the system cannot replace the system's portion within 45 days, it must notify the State and replace the system's portion within 180 days.* • Following each LSLR, systems must:* o Provide pitcher filters and cartridges to each customer for 6 months after replacement. Provide pitcher filters and cartridges before the affected portion of the line or the fully replaced service line is returned to service. o Collect a lead tap sample at locations served by the replaced line within 3 to 6 months after replacement. • Requires replacement of lead connectors when encountered.* • Systems must make 2 good faith efforts to engage customers about LSLR. • Systems conducting partial LSLR must offer to replace the remaining portion of the service line.[a]	
LSL-Related Outreach • When a water system plans to replace the portion it owns, it must offer to replace the customer-owned	**LSL-Related Outreach** • Notify consumers annually if they are served by a lead, GRR, or unknown service line.*	**Service Line Related Outreach** • Deliver notice and educational materials to consumers during water-related work that could disturb lead, GRR, or unknown service lines, including

Pre-2021 LCR	LCRR	Proposed LCRI

portion at the owner's expense.[a]
• If a system replaces its portion only:
  ○ Provide notification to affected residences within 45 days prior to replacement on possible elevated short-term lead levels and measures to minimize exposure.*
  ○ Include offer to collect lead tap sample within 72 hours of replacement.
  ○ Provide test results within 3 business days after receiving results.
	• Deliver notice and educational materials to consumers during water-related work that could disturb LSLs.
	• Systems subject to goal-based program must:
	  ○ Conduct targeted outreach that encourages consumers with LSLs to participate in the LSLR program.
	  ○ Conduct an additional outreach activity if they fail to meet their goal.
	• Systems subject to mandatory LSLR must include information about the LSLR program in public education (PE) materials that are provided in response to P90 > action level.
		disturbances due to inventorying efforts.
		• If the system fails to meet the mandatory service line replacement rate, conduct public outreach activities to encourage consumers with lead, GRR, and unknown service lines to participate in the service line replacement program.
		• Removes goal-based program outreach activities.

	Action Level and Trigger Level	
• P90 level above lead action level of 0.015 mg/L or copper action level of 1.3 mg/L requires additional actions. • Lead action level exceedance requires 7 percent LSLR (includes partial replacements), CCT recommendation and possible study and installation, and PE within 60 days after the end of the monitoring period.	• P90 level above lead action level of 0.015 mg/L or copper action level of 1.3 mg/L requires more actions than the previous rule. • Defines lead trigger level of 0.010 < P90 ≤ 0.015 mg/L that triggers additional planning, monitoring, and treatment requirements. • Lead action level exceedance requires 3 percent LSLR (no partial replacements), CCT installation or re-	• Removes the lead trigger level. • P90 level above lead action level of 0.010 mg/L or copper action level of 1.3 mg/L requires actions including installation or re-optimization of CCT, and PE and 24-hour PN (for lead action level exceedances). • Mandatory full service line replacement of LSLs and GRR service lines is independent of P90 lead levels.

Pre-2021 LCR	LCRR	Proposed LCRI
	optimization, PE, and public notification (PN) within 24 hours. • Trigger level exceedance requires goal-based LSLR and steps taken towards CCT installation or re-optimization.	
Lead and Copper Tap Monitoring		
Sample Site Selection • Prioritizes collection of samples from sites with sources of lead in contact with drinking water. • Highest priority given to sites served by copper pipes with lead solder installed after 1982 or containing lead pipes and sites served by LSLs. • Systems must collect 50 percent of samples from LSLs, if available.	**Sample Site Selection** • Changes priorities for collection of samples with a greater focus on LSLs. • Prioritizes collecting samples from sites served by LSLs. All samples must be collected from sites served by LSLs, if available.* • No distinction in prioritization of copper pipes with lead solder by installation date. • Adds 2 tiers to focus tap sample site selection tiering criteria on LSLs first.	**Sample Site Selection** • Combines the tap sample site selection tiering criteria for CWSs and NTNCWSs. • Revises Tier 3 sites to include sites served by a lead connector as well as sites served by a galvanized service line or containing galvanized premise plumbing that are identified as ever being downstream of an LSL or lead connector in the past.
Collection Procedure • Requires collection of the first-liter sample after water has sat stagnant for a minimum of 6 hours.	**Collection Procedure** • Requires collection of the fifth-liter sample in homes with LSLs after water has sat stagnant for a minimum of 6 hours. Maintains first-liter sampling protocol in homes without LSLs. • Adds requirement that samples must be collected in wide-mouth bottles.* • Prohibits sampling instructions that include	**Collection Procedure** • Requires collection of the first- and fifth-liter samples in homes with LSLs after water has sat stagnant for a minimum of 6 hours. • Requires the higher value of the first- and fifth-liter lead concentration in homes with LSLs to be used to calculate the 90th percentile value for lead. • Clarifies the definition of a wide-mouth bottle.

Pre-2021 LCR	LCRR	Proposed LCRI
	recommendations for aerator cleaning/removal and pre-stagnation flushing prior to sample collection.*	

Monitoring Frequency
• Samples are analyzed for both lead and copper.
• Systems must collect standard number of samples based on population; semi-annually unless they qualify for reduced monitoring.
• Systems can qualify for annual or triennial monitoring at reduced number of sites. Monitoring schedule based on the number of consecutive years meeting the following criteria:
  o Serves ≤ 50,000 people and P90 is at or below the lead and copper action levels.
  o Serves any population size, meets State-specified optimized water quality parameters (OWQPs), and P90 ≤ lead action level.
o applies to any system
g/L and copper P90 ≤ 0.65
6-month monitoring
	Monitoring Frequency
	• Samples are analyzed for lead and copper, only copper, or only lead. This occurs when lead monitoring is conducted more frequently or at more sites than copper, and at LSL sites where a fifth-liter sample is only analyzed for lead.
	• Lead monitoring schedule is based on the P90 level for all systems as follows:
	  o P90 > 0.015 mg/L: Semi-annually at the standard number of sites.
	  o 0.010 mg/L < P90 ≤ 0.015 mg/L: Annually at the standard number of sites.
	  o P90 ≤ 0.010 mg/L: Annually at the standard number of sites and triennially at reduced number of sites using same criteria as the LCR except copper P90 level is not considered.
	• Based on rule criteria, systems serving ≤ 3,300 people can apply for a 9-year monitoring waiver.
		Monitoring Frequency
		Monitoring schedule is based on both lead and copper P90 levels for all systems as follows:
		• All water systems with lead, GRR, and/or unknown service lines must begin by collecting a standard number of samples semi-annually.
		• Systems may retain or qualify for reduced monitoring based on the number of consecutive monitoring periods:
		  o P90 ≤ action level for 2 consecutive 6-month periods: Annual monitoring at standard number of sites for lead and reduced number of sites for copper.
		  o P90 < practical quantitation limit (PQL) for 2 consecutive 6-month periods: Triennial monitoring at the reduced number of sites.
		• Additional criteria for small and medium systems to qualify for triennial monitoring.
		• Based on rule criteria, systems serving ≤ 3,300 people can apply for a 9-year monitoring waiver.

Pre-2021 LCR	LCRR	Proposed LCRI
ystems serving ≤ 3,300 -year monitoring waiver.		
Corrosion Control Treatment (CCT) and Water Quality Parameters (WQPs)		

CCT
• Systems serving > 50,000 people were required to install treatment by January 1, 1997, with limited exception.
• Systems serving ≤ 50,000 that exceed lead and/or copper action level(s) are subject to CCT requirements (e.g., CCT recommendation, study if required by the State, CCT installation). They can discontinue CCT steps if no longer exceed both action levels for 2 consecutive 6-month monitoring periods.
• Systems must operate CCT to meet any OWQPs designated by the State that define optimal CCT.
• There is no requirement for systems to re-optimize.
	CCT
	• Specifies CCT requirements for systems with 0.010 < P90 lead level ≤ 0.015 mg/L:
	  ○ No CCT: Must conduct a CCT study if required by the State.
	  ○ With CCT: Must follow the steps for re-optimizing CCT, as specified in the rule.
	• Systems with P90 lead level > 0.015 mg/L:
	  ○ No CCT: Must complete CCT installation regardless of subsequent P90 levels if system has started to install CCT.
	  ○ With CCT: Must re-optimize CCT.
	• CWSs serving ≤ 10,000 people and all NTNCWSs can select an option other than CCT to address lead. See the *Small System Flexibility* section of this exhibit.
		CCT
		• Systems with P90 lead level > 0.010 mg/L:
		  ○ No CCT: Must complete CCT installation regardless of their subsequent P90 levels if system has started to install CCT.
		  ○ With CCT: Must re-optimize CCT.
		  ○ Systems with OCCT meeting OWQPs need only re-optimize OCCT once, unless required to do so by the State.
		• CWSs serving ≤ 3,300 people and all NTNCWSs can select an option other than CCT to address lead. See the *Small System Flexibility* section of this exhibit.
		• Deferred OCCT or re-optimized OCCT for systems that can complete removal of 100 percent LSLs and GRR service lines within 5 years of the date they are triggered into CCT steps at a 20 percent annual replacement rate. Systems with CCT must maintain CCT during the 5-year service line replacement program.

CCT Options Includes alkalinity and pH adjustment, calcium hardness adjustment, and phosphate or silicate-based corrosion inhibitor.	**CCT Options** Removes calcium hardness as an option and specifies any phosphate inhibitor must be orthophosphate.	**CCT Options** No changes from the LCRR.

Pre-2021 LCR	LCRR	Proposed LCRI
WQPs • No CCT: pH, alkalinity, calcium, conductivity, temperature, orthophosphate (if phosphate-based inhibitor is used), silica (if silica-based inhibitor is used). • With CCT: pH, alkalinity, and based on type of CCT either orthophosphate, silica, or calcium.	**WQPs** • Eliminates WQPs related to calcium hardness (i.e., calcium, conductivity, and temperature). • All other parameters are the same as in the LCR.	**WQPs** No changes from the LCRR.
WQP Monitoring • Systems serving > 50,000 people must conduct regular WQP monitoring at entry points and within the distribution system. • Systems serving ≤ 50,000 people conduct monitoring only in those periods > lead or copper action level. • Contains provisions to sample at reduced number of sites in distribution system less frequency for all systems meeting their OWQPs.	**WQP Monitoring** • Systems serving > 50,000 people must conduct regular WQP monitoring at entry points and within the distribution system. • Systems serving ≤ 50,000 people must continue WQP monitoring until they no longer > lead and/or copper action level(s) for 2 consecutive 6-month monitoring periods. • To qualify for reduced WQP distribution monitoring, P90 lead level must be ≤ 0.010 mg/L and the system must meet its OWQPs.*	**WQP Monitoring** • Systems with CCT (unless deemed optimized) serving ≥ 10,000 people must conduct regular WQP monitoring at entry points and within the distribution system. • Systems serving <10,000 people and systems without CCT serving ≤ 50,000 people that exceed the lead and/or copper action level(s) must conduct WQP monitoring until they no longer exceed lead and/or copper action level(s) for 2 consecutive 6-month monitoring periods. • Systems without CCT serving > 10,000 but ≤ 50,000 people that exceed the lead action level that are required to install CCT, must continue to conduct WQP monitoring.
Sanitary Survey Review Treatment must be reviewed during sanitary surveys; no specific requirement to assess CCT or WQPs.	**Sanitary Survey Review** CCT and WQP data must be reviewed during sanitary surveys against most recent CCT guidance issued by EPA.	**Sanitary Survey Review** No changes from the LCRR.

Pre-2021 LCR	LCRR	Proposed LCRI

Find-and-Fix
No required follow-up samples or additional actions if an individual sample exceeds the lead action level.
	Find-and-Fix
	If individual tap samples > 0.015 mg/L lead, find-and-fix steps include:
	• Conduct WQP monitoring at or near the site > 0.015 mg/L.
	• Collect tap sample at the same tap sample site within 30 days.
	   ○ For LSL, collect any liter or sample volume.
	   ○ If LSL is not present, collect 1-liter first draw after stagnation.
	• Perform needed corrective action.
	• Document customer refusal or non-response after 2 attempts.
	• Provide information to local and State health officials.
		Distribution System and Site Assessment
		• Change the name from "Find-and-Fix" to "Distribution System and Site Assessment" to describe this requirement more precisely.
		• Requirements from the LCRR affect systems with individual tap samples > 0.010 mg/L lead.
		• Clarifies that the distribution system sample location must be within a half mile radius of each site with a result > 0.010 mg/L.

	Small System Flexibility	
No provisions for systems to elect an alternative treatment approach but sets specific requirements for CCT and LSLR.	Allows CWSs serving ≤ 10,000 people and all NTNCWSs with lead P90 > 0.010 mg/L to select their compliance option to address lead with State approval: • Systems can choose CCT, LSLR, provision and maintenance of point-of-use (POU) devices, or replacement of all lead-bearing plumbing materials. • If the system's P90 lead level > 0.015 mg/L, the system must implement the compliance option.	Allows CWSs serving ≤ 3,300 people and all NTNCWSs with P90 levels > lead action level and ≤ copper action level to conduct the following actions in lieu of CCT requirements to address lead with State approval: • Choose a compliance option: (1) provision and maintenance of POU devices or (2) replacement of all lead-bearing plumbing materials. • Removes the compliance option to conduct LSLR in 15 years. Maintains option for systems following CCT requirements: • With CCT: Collect WQPs and evaluate compliance options and OCCT.

Pre-2021 LCR	LCRR	Proposed LCRI
		• No CCT: Evaluate compliance options and CCT.
	Public Education and Outreach	

• Systems with P90 > lead action level must provide PE to customers about lead sources, health effects, measures to reduce lead exposure, and additional information sources.
• Systems with P90 > lead action level must offer lead tap sampling to customers who request it.
• Systems must provide lead consumer notice to individuals served at tested taps within 30 days of learning results.
• For water systems serving a large proportion of consumers with limited English proficiency, consumers can contact the system to get PE materials translated in other languages.
	• Water systems must provide updated lead health effects language in PN and PE materials. CWSs must provide updated health effects language in the Consumer Confidence Report (CCR).
	• For water systems serving a large proportion of consumers with limited English proficiency, consumers can contact the system to get PE materials translated in other languages.
	• If P90 > lead action level:
	  ○ LCR PE requirements apply.
	• Water systems must provide the lead consumer notice to consumers whose individual tap sample is > 0.015 mg/L lead as soon as practicable but no later than 3 days.
	• Water systems must deliver notice and educational materials to consumers during water-related work that could disturb LSLs.*
	• CWSs must provide information to local and State health agencies.*
	Also see the *Public Notification, Consumer Confidence Report, and*
		• Revises the mandatory lead health effects language to improve completeness and clarity.
		• Water systems must provide the updated health effects language in PN and all PE materials. CWSs must provide updated health effects language in the CCR.
		• For water systems serving a large proportion of consumers with limited English proficiency, all PE materials must include a translated statement regarding the importance of the materials and consumers can contact the system to get the materials translated in other languages.
		• Water systems must deliver consumer notice of lead and copper tap sampling results to consumers whose tap was sampled as soon as practicable but no later than 3 days after receiving the results.
		• If P90 > lead action level:
		  ○ LCRR PN requirements apply.
		  ○ Water systems must conduct PE no later than 60 days after the end of the tap sampling period until the system no longer exceeds the action level unless the State approves an extension.
		• Water systems with multiple lead action level exceedances (at least 3 action level exceedances in a 5-year period)

Pre-2021 LCR	LCRR	Proposed LCRI
	LSL-Related Outreach sections of this exhibit.	must conduct additional public outreach activities and make filters available. • Water systems must offer to sample the tap for lead for any customer with an LSL, GRR service line, or unknown service line who requests it. Also see the *Public Notification, Consumer Confidence Report, and Service Line Related Outreach* sections of this exhibit.
	Public Notification	
• If P90 > action level: ○ No PN required for P90 > action level. • Tier 2 PN required for violations to § 141.80 through § 141.85. • Tier 3 PN required for violations to § 141.86 through § 141.89. Also see the *Public Education and Outreach* section of this exhibit.	• If P90 > lead action level: ○ Systems must notify consumers of P90 >action level within 24 hours (Tier 1 PN). • Tier 2 PN required for violations to § 141.80 (except § 141.80(c)) through § 141.84, § 141.85(a) through (c) and (h), and § 141.93. • Tier 3 PN required for violations to § 141.86 through § 141.90. Also see the *Public Education and Outreach* section of this exhibit.	• If P90 > lead action level: ○ LCRR Tier 1 PN requirements apply. • Tier 2 PN required for violations to § 141.80 (except § 141.80(c)) through § 141.84, § 141.85(a) through (c) (except § 141.85(c)(3)) and (h) and (j), and § 141.93. • Tier 3 PN required for violations to § 141.86 through § 141.90 and § 141.92. • Water systems must provide updated lead health effects language in PN. Also see the *Public Education and Outreach* section of this exhibit.
	Consumer Confidence Report	
• All CWSs must provide educational material in the annual CCR.	• CWSs must provide updated health effects language in the CCR. • All CWSs are required to include information on how to access the LSL inventory and how to access the results of all tap sampling in the CCR. • Revises the mandatory health effects language	• Revises the mandatory lead health effects language and informational statement about lead in the CCR to improve completeness and clarity. • CWSs must provide updated health effects language in the CCR. • CWSs must provide an updated informational statement about lead in the CCR. • CWSs must include a statement in the CCR about the system

Pre-2021 LCR	LCRR	Proposed LCRI
	to improve accuracy and clarity.	sampling for lead in schools and child care facilities and may direct the public to contact their school or child care facility for further information. • CWSs with lead, GRR, or unknown service lines must include a statement in the CCR about how to access the service line inventory and replacement plan. Also see the *Public Education and Outreach* section of this exhibit.
Change in Source of Treatment		
Systems on a **reduced** tap monitoring schedule must obtain prior State approval before changing their source or treatment.	Systems on **any** tap monitoring schedule must obtain prior State approval before changing their source or treatment. These systems must also conduct tap monitoring biannually.	No changes from the LCRR.
Source Water Monitoring and Treatment		
Periodic source water monitoring for lead and copper is required for systems with: • Source water treatment; or • P90 > action level and no source water treatment.	States can waive continued source water monitoring for lead and copper if the: • System has already conducted source water monitoring for a previous P90 > action level; • State has determined that source water treatment is not required; and • System has not added any new water sources.	No changes from the LCRR.
Lead in Drinking Water at Schools and Child Care Facilities		
• Does not include separate testing and education program for CWSs at schools and child care facilities. • Schools and child care facilities that are classified as	• CWSs must conduct sampling at 20 percent of elementary schools and 20 percent of child care facilities per year and conduct sampling at secondary schools on request for first testing	Expands on LCRR requirements to include: • Waivers for CWSs to sample in schools and child care facilities during the first 5-year testing cycle if the facility has been sampled between January 1,

Pre-2021 LCR	LCRR	Proposed LCRI
NTNCWSs must sample for lead and copper.	cycle (5 years) and conduct sampling on request of all schools and child care facilities thereafter. • Sample results and PE must be provided to each sampled school/child care facility, State, and local or State health department. • Excludes facilities constructed on or after January 1, 2014. • Waives schools and child care facilities that were sampled under a State or other program after October 16, 2024.	2021, and the LCRI compliance date. • Requires CWSs to include a statement about the opportunity for schools and child care facilities to be sampled in the CCR. • Excludes facilities constructed or had full plumbing replacement on or after January 1, 2014.
Primacy Agency (or State) Reporting		
States must report information to EPA that includes, but is not limited to: • All P90 levels for systems serving > 3,300 people, and only levels > 0.015 mg/L for smaller systems. • Systems that are required to initiate LSLR and the date replacement must begin. • Systems for which OCCT has been designated.	Expands on LCR requirements to include: • All P90 values for all system sizes. • The number of lead, GRR, and unknown service lines for every water system. • The goal-based or mandatory replacement rate and the date each system must begin LSLR. • OCCT status of all systems including OWQPs specified by the State. • For systems triggered into source water treatment, the State-designated date or determination for no treatment required.	Revises and expands on LCRR special primacy requirements. States must report information to EPA that includes, but is not limited to: • The current numbers of lead, GRR, unknown, and non-lead service lines, and lead connectors in each system's inventory. • The numbers and types of service lines replaced and the replacement rate for every system conducting mandatory service line replacement. • The deadline for the system to complete replacement of all lead and GRR service lines. • The expected date of completion of service line replacement. • The P90 values of systems with an action level exceedance within 15 days of the end of the

Pre-2021 LCR	LCRR	Proposed LCRI
		monitoring period or, if earlier, within 24 hours of receiving the notice from the system.

[a] Note: See section V.B.4. for further information on cost sharing.

B. Does this action apply to me?

Entities that could potentially be affected by the proposed LCRI include the following:

Category	Examples of potentially affected entities
Public water systems	Community water systems (CWSs); Non-transient, non-community water systems (NTNCWSs).
State and Tribal government agencies	Agencies responsible for developing, ensuring compliance with, and enforcing NPDWRs.

This Exhibit is not intended to be exhaustive, but rather provides a guide for readers regarding entities that could be affected by this action if promulgated. To determine whether a facility or activities could be affected by this action, please read the full preamble and proposed rule.

As part of this notice for the proposed rule, "State" refers to the agency of the State, Tribal, or territorial government that has jurisdiction over public water systems consistent with the definition of "State" in 40 CFR 141.2. During any period when a State or Tribal government does not have primary enforcement responsibility pursuant to section 1413 of SDWA, the term "State" means the relevant Regional Administrator of the EPA. For questions regarding the applicability of this action to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

C. Dates for Compliance

EPA is proposing that water systems begin to comply with the LCRI three years after promulgation of the final rule. In accordance with SDWA section 1412(b)(10), the

Administrator, or a State (in the case of an individual system), may allow up to two additional years to comply with a treatment technique if the Administrator or State (in the case of an individual system) determines that additional time is necessary for capital improvements. Where a State, or EPA where it has primacy, chooses to provide such an extension, the system would have up to five years from the rule's promulgation date to begin compliance with the treatment technique. EPA is not proposing to provide a two-year extension nationwide because EPA has not determined that an additional two years is necessary for water systems nationwide to make capital improvements to begin compliance with the LCRI. Systems have been subject to more stringent requirements for lead service line replacement and corrosion control treatment since the promulgation of the LCRR that allowed time to prepare and obtain funding for any necessary capital improvements. Moreover, there is significant funding available through the Bipartisan Infrastructure Law and other sources for LSL identification and replacement. Finally, EPA notes that the requirements in the proposed LCRI for which capital improvements may be necessary would not be required to be completed by the compliance date for the rule. Instead, the compliance date marks the beginning of an extended time period for systems to conduct lead service line replacement and install new or re-optimized corrosion control treatment under the revised requirements. EPA does not believe that systems nationwide need an additional two years to comply with the rule as proposed.

Under SDWA section 1416, States may exempt water systems from any treatment technique requirement for no more than three years after the otherwise applicable compliance date. For a small system that does not serve more than 3,300 persons and which needs financial assistance for the necessary improvements, an exemption may be renewed for one or more two-year periods, but not to exceed a total of six years. No exemption may be granted without a finding that:

• Due to compelling factors (which may include economic factors, including qualification of the public water system as a system serving a disadvantaged community pursuant to SDWA section 1452(d))[5], the public water system is unable to comply with such contaminant level or treatment technique requirement, or to implement measures to develop an alternative source of water supply;

• The public water system was in operation on the effective date of such contaminant level or treatment technique requirement, or, for a system that was not in operation by that date, only if no reasonable alternative source of drinking water is available to such new system;

• The granting of the exemption will not result in an unreasonable risk to health; and

• Management or restructuring changes (or both) cannot reasonably be made that will result in compliance with this title, or if compliance cannot be achieved, improve the quality of the drinking water.

IV. Background

A. Overview of Lead and Lead Exposures through Drinking Water

Lead is toxic to humans and animals, causing harmful health effects. Lead is a naturally occurring element found in small amounts in the Earth's crust. Lead and lead compounds have been used in a wide variety of products found in and around homes, including paint, ceramics,

[5] The term "disadvantaged community" used in SDWA section 1416 here refers to the statutory definition of "disadvantaged community" provided at SDWA section 1452(d)(3): "[T]he term 'disadvantaged community' means the service area of a public water system that meets affordability criteria established after public review and comment by the State in which the public water system is located. The Administrator may publish information to assist States in establishing affordability criteria."

pipes and plumbing materials, solders, gasoline, batteries, ammunition, and cosmetics. Lead can enter drinking water when plumbing materials that contain lead corrode, especially where the water is highly acidic or has a low mineral content that corrodes pipes and fixtures. The most common sources of lead in drinking water are lead pipes, faucets, and fixtures. In homes with lead pipes that connect the home to the water main, also known as lead service lines or LSLs, these pipes are typically the most significant source of lead in water. Lead pipes are more likely to be found in older cities and homes built before 1986. Among homes without LSLs, the most common source of lead in drinking water is from brass or chrome-plated brass faucets and plumbing with lead solder.

B. Human Health Effects of Lead and Copper

1. Lead

Exposure to lead can cause harmful health effects for people of all ages, especially pregnant people, infants, and young children (CDC, 2022a; CDC, 2022b; CDC, 2023). Lead has acute and chronic impacts on the body. Lead exposure causes damage to the brain and kidneys and can interfere with the production of red blood cells that carry oxygen to all parts of the body (ATSDR, 2020).

Developing fetuses, infants, and young children are most susceptible to the harmful health effects of lead (ATSDR, 2020). Exposure to lead is known to present serious health risks to the brain and nervous system of children (USEPA, 2013). Young children and infants are particularly vulnerable to the physical, cognitive, and behavioral effects of lead due to their sensitive developmental stages. There is no known safe level of exposure to lead. Scientific studies have demonstrated that there is an increased risk of health effects in children even when their blood lead levels are less than 3.5 micrograms per deciliter) (CDC, 2022c) and in adults even when blood lead levels are less than 10 micrograms per deciliter) (NTP, 2012). Low-level lead exposure is of particular concern for children because their growing bodies absorb more lead per pound than adults do, and their developing brains and nervous systems are more sensitive to the damaging effects of lead (ATSDR, 2020).

EPA estimates that drinking water can make up at least 20 percent of a person’s total exposure to lead (56 FR 26548, USEPA, 1991). When a child is not routinely exposed to other sources of lead (e.g., dust from legacy lead paint or legacy contaminated soils), most of their exposure may come from drinking water. Infants who consume mostly formula mixed with tap water can, depending on the level of lead in the water system and other sources of lead in the home, receive 40 to 60 percent of their exposure to lead from drinking water used in the formula (53 FR 31516, USEPA, 1988; Stanek et al., 2020). Scientists have linked lead's effects on the brain with lowered IQ and attention disorders in children, among other health impacts (USEPA, 2013; Lanphear et al., 2019; Ji et al., 2018). In 1991, EPA established a maximum contaminant level goal (MCLG) for lead of zero. SDWA requires EPA to set MCLGs at the level at which no known or anticipated adverse effects on the health of persons would occur, allowing for a margin of safety. EPA established the MCLG of zero in part due to there being no clear threshold for some non-carcinogenic health effects and due to lead being a probable carcinogen (USEPA, 1991).

Blood lead levels are an indication of current exposure. Over time, lead can accumulate in the body. Lead is stored in a person’s bones, binding to calcium, and it can be released later in life. For example, when calcium is mobilized in the mother’s body during pregnancy, lead that is released from the pregnant person’s bones and can pass to the fetus. Lead can also be passed through breastmilk to the nursing infant or child. Lead exposure can result in serious health effects to the developing fetus and infant. Studies document increased risk of miscarriage, low birth weight, and reduced gestation time (USEPA, 2013). In utero and early childhood exposure to lead is associated with increased risk to the baby's brain and/or nervous system, manifesting as, for instance, an increased risk of learning or behavioral problems in life (USEPA, 2013). Some studies also suggest lead exposure is associated with risk to the developing renal (kidney) system (USEPA, 2013).

As noted above, studies also have documented an association between adult blood lead levels and increased risk of cardiovascular disease, manifesting as an increase in risk of cardiovascular disease premature mortality. Occupational exposure to lead is also associated with a number of significant health effects in adults as well, particularly renal and gastrointestinal. The 2013 Integrated Science Assessment for Lead (USEPA, 2013), the U.S. Department of Health and Human Services (HHS) National Toxicology Program (NTP) Monograph on Health Effects of Low-Level Lead (NTP, 2012), the Agency for Toxic Substances and Disease Registry (ATSDR) 2020 Toxicological Profile for Lead (ATSDR, 2020), and peer-reviewed studies have documented associations between lead and cancer (Wei and Zhu, 2020) as well as lead and adverse cardiovascular (Park and Han, 2021), renal (Harari et al., 2018), reproductive (Shi et al., 2021; Lee et al., 2020), immunological (Krueger and Wade, 2016), and neurological effects (Andrew et al., 2022). EPA's Integrated Risk Information System (IRIS) Chemical Assessment Summary provides additional health effects information on lead (USEPA, 2004a). EPA is currently updating the Integrated Science Assessment for Lead (USEPA, 2023a). For a more detailed explanation of the health effects associated with lead for children and adults, see Appendix D of the Economic Analysis (USEPA, 2023b).

2. Copper

Copper is an essential trace element required for several metabolic processes; however, excess copper intake is toxic and linked to various adverse health effects. Acute gastrointestinal conditions are the most common adverse health effects observed among adults and children.

Chronic exposure to copper is particularly a concern for people with Wilson's disease, an autosomal recessive genetic disorder of copper metabolism affecting 1 in 30,000 individuals (Ala et al., 2007). These individuals are prone to copper accumulation in body tissue, which can lead to liver damage, neurological, and/or psychiatric symptoms (Dorsey and Ingerman, 2004). Additional information on the health effects associated with copper are available in Appendix E of the Economic Analysis (USEPA, 2023b).

C. Regulatory History

Exercising its longstanding authority under the SDWA, on June 7, 1991, EPA promulgated the LCR with the goal of improving public health by reducing lead and copper levels at consumer taps (56 FR 26460, USEPA, 1991). The LCR established maximum contaminant level goals (MCLGs) of 0 mg/L for lead and 1.3 mg/L for copper. In addition, the LCR established an NPDWR consisting of treatment technique requirements that include LSLR, CCT, source water treatment, and public education. The LCR established requirements for CWSs and NTNCWSs to conduct monitoring at consumer taps. The rule established action levels of 0.015 mg/L for lead and 1.3 mg/L for copper. If more than 10 percent of tap sample results (i.e., the 90th percentile value of tap sample concentrations), collected during any monitoring period, exceed the action level, water systems must take actions including installing and/or re-optimizing CCT, conducting public education, treating source water if it contributes to lead and copper levels at the tap, and replacing lead service lines if the system continues to exceed the action level after completing CCT steps and installing CCT. An action level exceedance is not a violation of the rule; however, failure to take the subsequent required actions (e.g., LSLR, CCT, PE) results in a violation of the treatment technique or monitoring and reporting requirements.

On January 12, 2000, EPA promulgated minor revisions to the LCR (LCRMR) (65 FR 1950, USEPA, 2000a). These minor revisions streamlined the LCR, promoted consistent national implementation, and reduced the reporting burden on affected entities. The LCRMR did not change the MCLGs or action levels for lead and copper or change the rule's basic requirements. One of the provisions of the LCRMR required States to report the 90th percentile lead value to EPA's Safe Drinking Water Information System (SDWIS) database for all water systems serving greater than 3,300 persons. States must report the 90th percentile lead value for water systems serving 3,300 or fewer persons only if the water system exceeds the action level. The new reporting requirements became effective in 2002.[6]

From 2000 to 2004, the District of Columbia experienced incidences of elevated drinking water lead levels, prompting EPA to undertake a review of the LCR to determine "whether elevated drinking water lead levels were a national problem" and to identify actions to improve rule implementation (72 FR 57784, USEPA, 2007a; USEPA, 2007b; Brown et al., 2011). EPA specifically considered the number of systems that failed to meet the lead action level, if a significant percentage of the population received water that exceeded the action level, how well the LCR worked to reduce drinking water lead levels, and if the rule was being effectively implemented, particularly with respect to monitoring and public education requirements. As part of the national review, EPA held four expert workshops to discuss elements of the LCR, collected and evaluated lead concentration data and other information required under the LCR, and evaluated State implementation efforts to better understand challenges and needs experienced by States and water systems. In March 2005, EPA released a Drinking Water Lead Reduction Plan, outlining a series of short- and long-term goals to improve implementation of

[6] In 2004, EPA published minor corrections to the LCR to reinstate text that was inadvertently removed from the rule during the previous revision (69 FR 38850, USEPA, 2004c).

the LCR, including revisions to the LCR (USEPA, 2005). On October 10, 2007, EPA promulgated a set of short-term regulatory revisions and clarifications (72 FR 57782, USEPA, 2007a). The short-term revisions strengthened implementation of the LCR in the areas of monitoring, treatment, customer awareness, LSLR, and improving compliance with the public education requirements.

Long-term issues, requiring additional research and input, were identified for a subsequent set of rule revisions. EPA conducted extensive engagement with stakeholders to inform subsequent rule development, including a 2011 Scientific Advisory Board (SAB) consultation on the science of partial LSLR and the formation of a National Drinking Water Advisory Council (NDWAC) Working Group in 2014 to provide recommendations (USEPA, 2011; NDWAC, 2015). In 2016, EPA released a white paper summarizing NDWAC recommendations and identifying key areas for rule development, noting that "lead crises in Washington, D.C., and in Flint, Michigan, and the subsequent national attention focused on lead in drinking water in other communities, have underscored significant challenges in the implementation of the current rule, including a rule structure that for many systems only compels protective actions after public health threats have been identified" (USEPA, 2016a). Notably, the white paper discussed the issue of mandatory, proactive LSLR as an opportunity to eliminate a primary source of lead in drinking water rather than only replacing LSLs after a lead action level exceedance, and how to address lead exposure risks resulting from partial LSLR. Other identified issues included the need for stronger CCT requirements, including re-evaluation after source water or treatment changes, improved tap sampling procedures to address concerns about practices used to avoid action level exceedances, and increased public transparency such as access to information about LSLs and sharing of data.

These long-term issues were intended to be addressed in the LCRR which was promulgated on January 15, 2021 (86 FR 4198, USEPA, 2021a). The LCRR focused on six key areas for revision: identifying sites with significant sources of lead in drinking water, strengthening CCT requirements, closing loopholes in LSLR requirements, increasing sampling reliability, improving risk communication, and introducing a new lead sampling requirement at schools and child care facilities as part of public education. Specifically, the LCRR included new requirements for water systems to develop, and make publicly accessible, LSL inventories and annually notify consumers if they are served by an LSL, GRR service line, or service line of unknown material. Additionally, the LCRR removed provisions allowing partial service line replacement or "test-outs" (i.e., where a service line sample measures below the lead action level) to count towards LSLR requirements. The rule also revised monitoring requirements to prioritize sampling at sites most likely to contain lead sources, require a fifth-liter sample be taken at LSL sites, and prohibit the use of language in sampling instructions that may result in samples that underestimate lead levels.

The LCRR also established a lead trigger level at 0.010 mg/L to require systems to take actions before an action level exceedance, including taking steps to plan for CCT installation, re-optimizing CCT if the system already installed CCT, establishing a goal-based LSLR program, and increasing monitoring frequency. The LCRR made several changes to the CCT requirements and established a requirement for water systems to conduct follow-up actions at sites with individual compliance sample concentrations exceeding 0.015 mg/L.

In the LCRR, EPA also revised its Public Notification Rule in 40 CFR part 141, subpart Q and made changes to the reporting requirements for action level exceedances to implement 2016 amendments to section 1414 of SDWA to require public notification within 24 hours if the system exceeds the lead action level.

The LCRR added new public education requirements, including requirements to notify persons served by a known or suspected LSL, and timely notify individuals when their lead tap sampling results exceed the lead action level of 0.015 mg/L. Under the LCRR, systems that exceed the lead trigger level of 0.010 mg/L not only had to conduct goal-based LSLR but also are required to conduct additional public outreach activities about lead in drinking water and opportunities to replace LSLs if the system fails to meet the goal replacement rate.

The LCRR also added a new small system flexibility provision that allowed CWSs serving 10,000 or fewer persons and all NTNCWSs that exceeded the trigger level to choose and implement one out of four compliance options (i.e., CCT, LSLR, point-of-use devices, replacement of lead-bearing plumbing) if the system exceeds the lead action level.

On January 20, 2021, President Joseph R. Biden issued Executive Order 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (86 FR 7037, January 20, 2021). Executive Order 13990 required Federal agencies to "review and . . . take action to address the promulgation of Federal regulations and other actions during the last 4 years that conflict with" the "national objectives," as provided in the executive order, including to "be guided by the best science and be protected by processes that ensure the integrity of Federal decision-making" by listening to the science, to promote and protect public health and advance environmental justice, among others. EPA was required to review the LCRR because EPA promulgated the LCRR within the time frame specified by the executive order, and the LCRR addresses public health through drinking water.

Additionally, after promulgation of the LCRR, EPA heard from stakeholders on a range of concerns about the LCRR, including the lack of requirements or incentives to replace all LSLs, the inclusion of the trigger level made the rule unnecessarily complicated, and the implementation burdens on systems and States.

To allow EPA to engage with stakeholders and review the LCRR before it took effect, on March 12, 2021, EPA published the National Primary Drinking Water Regulations: Lead and Copper Rule Revisions; Delay of Effective Date (86 FR 14003, USEPA, 2021c), which delayed the effective date of the LCRR from March 16, 2021, to June 17, 2021. On the same day, EPA published the National Primary Drinking Water Regulations: Lead and Copper Rule Revisions; Delay of Effective and Compliance Dates (86 FR 14063, USEPA, 2021d), which proposed further delaying the effective date of LCRR to December 16, 2021 to allow EPA to "conduct a review of the LCRR and consult with stakeholders, including those who have been historically underserved by, or subject to discrimination in, Federal policies and programs prior to the LCRR going into effect" (86 FR 14063, USEPA, 2021d). On June 16, 2021, EPA issued a final rule delaying the LCRR effective date to December 16, 2021, and the compliance date from January 16, 2024 to October 16, 2024 "to maintain the same time period between the effective date and the compliance date in the LCRR" (86 FR 31941, USEPA, 2021e).

As part of the LCRR review, EPA held a series of virtual engagements from April to August 2021 to obtain public input on the LCRR. Consistent with Executive Order 13990, EPA engaged with States, Tribes, and water utilities as well as people who have been underrepresented in past rulemaking efforts. EPA also sought input from community stakeholders in places that have concerns due to lead in drinking water, particularly from individuals and communities that are most at-risk of exposure to lead in drinking water.

Throughout this process, EPA hosted a series of 10 virtual community roundtables with stakeholders in: Pittsburgh, PA; Newark, NJ; Malden, MA; Washington, DC; Newburgh, NY; Benton Harbor and Highland Park, MI; Flint and Detroit, MI; Memphis, TN; Chicago, IL; and Milwaukee, WI. Each roundtable included a range of participants representing local governments, community organizations, environmental groups, local public water utilities, and public officials. Participants shared their experiences with lead in their communities and provided EPA with verbal and written comments on the LCRR. EPA also held a roundtable with representatives from Tribes and Tribal communities, a national stakeholder association roundtable, a national co-regulator meeting, two public listening sessions, and a meeting with organizations representing elected officials. Summaries of the meetings and written comments from the public can be found in the docket, EPA-HQ-OW-2021-0255 at https://regulations.gov/.

On December 17, 2021, EPA published the results of the LCRR review (86 FR 71574, USEPA, 2021b). EPA described the comments received as part of the public engagement efforts conducted as part of the LCRR review and determined that there are regulatory and non-regulatory actions the Agency can take to reduce drinking water lead exposure. While EPA found that the LCRR improved public health protection relative to the LCR, the Agency also concluded that there are significant opportunities to further improve the rule to support the goal of proactively removing LSLs and protecting public health more equitably (86 FR 71574, USEPA, 2021b). EPA also announced in the review notice that the LCRR would go into effect to support near-term development of actions to reduce lead in drinking water. At the same time, EPA committed to developing a new proposed rule, the LCRI, to strengthen key elements of the rule. EPA identified the following policy objectives informed by the LCRR review: "Replacing 100 percent of lead service lines is an urgently needed action to protect all Americans from the most significant source of lead in drinking water systems; equitably improving public health protection for those who cannot afford to replace the customer-owned portions of their LSLs; improving the methods to identify and trigger action in communities that are most at risk of elevated drinking water lead levels; and exploring ways to reduce the complexity of the regulations" (86 FR 71574; USEPA, 2021b). EPA also stated that it does not expect to propose changes to the requirements for information to be submitted in the initial LSL inventory or the associated October 16, 2024 compliance date. EPA described the importance of maintaining this date, stating that "continued progress to identify LSLs is integral to lead reduction efforts regardless of potential revisions to the rule. The inventory provides critical information on the locations of potentially high drinking water lead exposure within and across public water systems, which will allow for quick action to reduce exposure" (86 FR 71579, USEPA, 2021b). Specifically, EPA noted that development of inventories nationwide over the near-term would assist water systems, States, Tribes, and the Federal Government in determining the prevalence of these lead sources and would, among other things, enable water systems to begin planning for LSLR and apply for funding.

D. Statutory Authority

Establishment and Review of National Primary Drinking Water Regulations

EPA is publishing these proposed improvements to the LCRR under the authority of SDWA, including sections 1412, 1413, 1414, 1417, 1445, and 1450 of the SDWA. 42 U.S.C. 300f *et seq*.

Congress passed SDWA in 1974, responding to "accumulating evidence that our drinking water contains unsafe levels of a large variety of contaminants." *Envtl. Def. Fund, Inc. v. Costle,* 578 F.2d 337, 339 (D.C. Cir. 1978). In passing SDWA, Congress intended to ensure "that water supply systems serving the public meet minimum national standards for protection of public health." H.R. Rep. No. 93-1185, at 1 (1974), reprinted in 1974 U.S.C.C.A.N. 6454. SDWA is the primary Federal law that protects the tap water provided to consumers by water systems across the country. The primary regulatory tool for this protection is section 1412 of SDWA under which EPA is authorized to issue standards for drinking water served by water systems. These standards – entitled "national primary drinking water regulations" (NPDWRs) – are accompanied by the setting of a "maximum contaminant level goal" (MCLG), which is set at a level at which there are no known or anticipated adverse human health effects with an adequate margin of safety. 42 USC 300g-1((a)(3) and (b)(4). Lead and copper are subject to existing NPDWRs. Based on the health effects described above, in 1991, EPA established the MCLG for lead at 0 mg/L, and the MCLG for copper at 1.3 mg/L.

SDWA section 1412(b)(9) states that "The Administrator shall, not less often than every 6 years, review and revise, as appropriate, each national primary drinking water regulation promulgated under this subchapter. Any revision of a national primary drinking water regulation shall be promulgated in accordance with this section, except that each revision shall maintain, or provide for greater, protection of the health of persons." 42 U.S.C. 300g-1(b)(9). When EPA promulgates a revised NPDWR, the Agency follows the applicable procedures and requirements in section 1412 of SDWA, including those related to (1) the use of best available, peer-reviewed science and supporting studies; (2) presentation of information on public health effects that is comprehensive, informative, and understandable; and (3) a health risk reduction benefits and cost analysis of the rule in sections 1412(b)(3)(A), (B), and (C) of SDWA, 42 U.S.C. 300g – 1(b)(3)(A)-(C).

Establishment of the Lead and Copper Rule as a Treatment Technique

In 1991, EPA promulgated the LCR, which established a treatment technique in lieu of a maximum contaminant level (MCL) for lead and copper (56 FR 26460, USEPA, 1991). This proposed rule, LCRI, would revise the LCRR, which maintained the NPDWR as a treatment technique. Section 1412(b)(7)(A) of SDWA authorizes EPA to "promulgate a national primary drinking water regulation that requires the use of a treatment technique in lieu of establishing a maximum contaminant level, if the Administrator makes a finding that it is not economically or technologically feasible to ascertain the level of the contaminant." 42 U.S.C. 300g-1(b)(7)(A). EPA's decision to promulgate a treatment technique rule for lead instead of a MCL in 1991 has been upheld by the United States Court of Appeals for the District of Columbia Circuit. *American Water Works Association v. EPA*, 40 F.3d 1266, 1270–71 (D.C. Cir. 1994). See section V.A. for discussion on EPA's findings and rationale supporting a treatment technique determination.

Statutory Requirements Related to the Prevention of Adverse Health Effects to the Extent Feasible

In establishing treatment technique requirements, the Administrator is required to identify those treatment techniques "which, in the Administrator's judgment, would prevent known or anticipated adverse effects on the health of persons to the extent feasible." 42 U.S.C. 300g-1(b)(7)(A). "Feasible" is defined in section 1412(b)(4)(D) of SDWA as "feasible with the use of the best technology, treatment techniques and other means which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration)". Specifically, EPA must assess the "best technology," as opposed to generally available technology, that has been tested beyond the laboratory under full-scale conditions; however, the technology need not be in widespread, full-scale use (SDWA section 1412(b)(4)(D)). The legislative history of this provision makes it clear that "feasibility" is to be defined relative to "what may reasonably be afforded by large metropolitan or regional public water systems" (H.R. Rep. No. 93-1185 (1974), reprinted in 1974 U.S.C.C.A.N. 6454, 6471). See also S. Rep. No. 104-169, at 3 (1995) (feasibility is based on best available technology affordable to "large" systems) and *City of Portland* v. *EPA*, 507 F.3d 706 (D.C. Cir. 2007) (upholding EPA's treatment technique for *Cryptosporidium* and the Agency's interpretation that "feasible" means technically possible and affordable, and does not include a cost/benefit determination). As a result, EPA may not set different standards based solely on what is reasonably afforded by small and medium systems. However, if EPA cannot identify any affordable technologies for a particular category of small systems, EPA must identify variance technologies that "achieve the maximum reduction or inactivation efficiency that is affordable" and protect public health (SDWA section 1412(b)(15)(A) and (B)).

SDWA provides for two exceptions to the requirement that a treatment technique "prevent known or anticipated adverse effects on the health of persons to the extent feasible". First, under SDWA section 1412(b)(5), EPA is authorized to require the use of a treatment technique to achieve a contaminant level other than the feasible level if the feasible level would result in an increase in the health risk of drinking water by increasing the concentration of other contaminants or interfere with the efficacy of drinking water treatment techniques or processes that are used to comply with other NPDWRs. Second, under SDWA section 1412(b)(6)(A), if EPA determines that the benefits of a treatment technique would not justify the costs of compliance, EPA may promulgate a treatment technique for the contaminant that maximizes health risk reduction benefits at a cost that is justified by the benefits.

Notice and Recordkeeping Requirements

Section 1414(c) of SDWA, as amended by the WIIN Act, requires public water systems to provide notice to the public if the water system exceeds the lead action level. 42 U.S.C. 300g-3(c)(1)(D). SDWA section 1414(c)(2) states that the Administrator "shall by regulation…prescribe the manner, frequency, form, and content for giving notice". 42 U.S.C. 300g-3(c)(2). Section 1414(c)(2)(C) of SDWA specifies additional requirements related to the public notice if the action level exceedance has the potential to have serious adverse effects on human health as a result of short-term exposure, including that it must "be distributed as soon as practicable, but not later than 24 hours" after the water system learns of the action level exceedance, and that the system must report the exceedance to both the State and the Administrator within that same time period (42 U.S.C. 300g-3(c)(2)(C)(i) and (iii)). If a water system or State does not issue the required public notice, SDWA section 1414(c)(2)(D) directs EPA to issue the required public notice "not later than 24 hours after the Administrator is notified of the exceedance." EPA interprets section 1414(c)(2)(C)(iii) of SDWA to require systems to report only lead action level exceedances to the Administrator because the requirements under section 1414 (c)(2)(D) are only triggered in the event of an action level exceedance and not any violation of an NPDWR.

Section 1417(a)(2) of SDWA states that public water systems "shall identify and provide notice to persons that may be affected by lead contamination of their drinking water" where the contamination results from the lead content of the construction materials of the public water distribution system and/or corrosivity of the water supply sufficient to cause leaching of lead. 42 U.S.C. 300g-6(a)(2)(A)(i) and (ii).

Section 1445(a) of SDWA provides that every person subject to a requirement of SDWA or grantee shall establish and maintain records, make reports, conduct monitoring, and provide information to the Administrator as reasonably required by regulation to assist the Administrator in establishing regulations under SDWA, determining compliance with SDWA, administering any program of financial assistance under SDWA, evaluating the health risks of unregulated contaminants, and advising the public of such risks. 42 U.S.C. 300j-4(a).

Primacy Enforcement of National Primary Drinking Water Regulations

While EPA always retains its independent enforcement authority, the Agency may authorize States, territories, and Tribes for primary enforcement responsibility ("primacy"; primacy agencies are also referred to as "States" in this preamble) to implement the NPDWRs under SDWA section 1413(a)(1) when EPA has determined, among other conditions, that the State has adopted regulations that are no less stringent than the promulgated NPDWR. 42 U.S.C. 300g-2(a)(1). Conditions for State primacy include, among other things, adequate enforcement, including monitoring, inspections, recordkeeping, and reporting. To obtain primacy for this rule, States must adopt regulations no less stringent than the NPDWR within two years of promulgation unless EPA grants the State a two-year extension. EPA must approve or deny State primacy applications within 90 days of submission to EPA. 42 U.S.C. 300g-2(b)(2). In some cases, a State submitting revisions to adopt an NPDWR has primary enforcement authority for a new regulation while EPA's decision on the primacy application is pending. 42 U.S.C. 300g-2(c). Section 1413(b)(1) of SDWA requires EPA to establish regulations governing the primacy application and review process "with such modifications as the Administrator deems appropriate." In addition to proposed revisions to the LCRR that are more stringent, this notice includes proposed changes to the primacy requirements related to this rule.

Section 1450 of SDWA authorizes the Administrator to prescribe such regulations as are necessary or appropriate to carry out their functions under the Act. 42 U.S.C. 300j-9.

E. Anti-backsliding Analysis

Backsliding Analysis of LCRI Relative to LCR and LCRR

Section 1412(b)(9) of SDWA is known as the anti-backsliding provision. Under this provision, EPA is required to ensure that "each revision" of an NPDWR "shall maintain, or provide for greater, protection of the health of persons". EPA has adopted a holistic framework that gives meaning to the text, structure, and purpose of the anti-backsliding provision based on the best reading of the statutory provision. EPA has interpreted the term "each revision" to refer to a revision of an NPDWR, meaning that each new rule that revises a current regulation, shall maintain, or provide for greater health protection. The plain meaning of "revision" is broad in scope and may contain multiple parts. A treatment technique rule is an integrated set of actions designed to reduce the level of exposure to a contaminant. As such, in assessing whether a treatment technique rule maintains or provides for greater health protection, EPA evaluates the entire treatment technique rule as a whole, not on a component-by-component basis.

As described in the LCRR rulemaking, EPA has interpreted the backsliding analysis for a treatment technique rule to be "based on an assessment of public health protection as a result of implementation of a rule as a whole, rather than a comparison of numerical benchmarks within the treatment technique rule" (86 FR 4216, USEPA, 2021a). Therefore, when analyzing each revision against the anti-backsliding standard, EPA has compared the whole of the proposed LCRI (i.e., the "revision"), along with components of the LCRR that EPA is not revising, against the whole of the LCRR to assess whether the new rule would maintain or improve public health protection. Further, EPA compared the whole of the proposed LCRI to the whole of the LCRR because the LCRR is the most recent revision to the NPDWR for lead and copper.

Recognizing that water systems and States are not yet required to comply with the LCRR until October 16, 2024, EPA has also assessed the improved public health protection of the proposed LCRI, along with elements of LCRR not proposed for revision, relative to the LCR as currently implemented. Therefore, EPA compared the whole of the proposed LCRI to the whole of the LCR, in addition to the LCRR.

EPA anticipates the proposed LCRI would improve public health protection more than either the LCR or LCRR in accordance with section 1412(b)(9) of SDWA. Below, EPA has evaluated and provided a more detailed breakdown of some of the most significant components that would make the proposed LCRI, as a whole, more protective compared to the LCR and LCRR. Specifically, EPA compared the proposed LCRI to the LCRR because the LCRR is the most recent revision to the NPDWR for lead and copper. Also, EPA compared the proposed LCRI to the LCR because that is the NPDWR that water systems are currently implementing; at present, water systems do not have to comply with the LCRR until October 16, 2024.

The central feature of the proposed LCRI is the mandatory replacement of LSLs and GRR service lines regardless of a lead action level exceedance; this is a more preventive approach than under either the LCR or LCRR. Replacement of LSLs and GRR service lines has been shown to significantly reduce lead levels in drinking water (Camara et al., 2013; Deshommes et al., 2018; Trueman et al., 2016), which can improve public health by reducing the associated health impacts from lead exposures. The LCR only required water systems to replace LSLs systemwide if a system exceeded the lead action level and allowed them to stop once lead levels were reduced below the lead action level. The LCRR requires that systems replace LSLs if they exceed the lead action level and initiate a goal-based replacement program if they exceed the lead trigger level. The proposed LCRI would result in mandatory systemwide replacement of LSLs and GRR service lines regardless of 90th percentile lead levels and at a faster replacement rate, leading to significant public health benefits resulting from the elimination of these major lead sources. While EPA projected that 339,000 to 555,000 LSLs under control of the system would be expected to be replaced under the LCRR of a 35-year period, the proposed LCRI requirements would require replacement of all LSLs and GRR service lines under control of the system (USEPA, 2020e, Exhibit C-1). This is a key element of the proposed LCRI and is intended to provide both broader and more certain lead risk reduction than any of the prior lead rules.

In the LCRI, EPA is proposing to remove the lead trigger level and reduce the lead action level to 0.010 mg/L, which would require water systems to take actions sooner than under the LCR and LCRR and at lower lead levels while also simplifying rule requirements to enhance effective implementation. This change would maintain or provide greater health protection at all systems including those without LSLs or GRR service lines as a result of the actions required of a system after an action level exceedance (e.g., installation or re-optimization of corrosion control treatment, public education). Similarly, EPA's proposal to require use of the higher result of the first and fifth liter tap sample at LSL sites is expected to result in more systems that are required to install or re-optimize corrosion control and provide notification and public education. While EPA is also proposing to revise the OCCT requirements to not require systems that exceed the action level to re-optimize their OCCT if they re-optimized once after the compliance date for LCRI and are meeting their optimal water quality parameters, the proposed LCRI would maintain or improve public health protection for those systems. This is because resources would be better devoted to other mitigation activities rather than repeating the same steps, as well as the proposed LCRI would require those systems that continue to exceed the action level to conduct additional public education activities and make filters available upon meeting the proposed criterial for having "multiple lead action level exceedances" (see section V.I.). Also, if there have been no significant source water or treatment changes (actions which themselves can require a CCT study) a re-optimization study may yield the same result as its previous study.

In addition, the LCRR allows small systems serving 10,000 persons or fewer to choose between four compliance options if they exceed the lead action level: LSLR, CCT installation, full lead-bearing plumbing replacement, and use of point-of-use devices. The proposed LCRI would require small water systems with LSLs or GRR service lines to conduct mandatory service line replacement regardless of lead levels instead of choosing between service line replacement and the other compliance options. Accordingly, under the proposed LCRI, small water systems with LSLs would be required to remove a significant source of lead and protect against corrosion with either OCCT, point-of-use devices, or plumbing replacement. Thus, the proposed LCRI would provide greater protection of public health than the LCRR for systems with LSLs or GRR service lines. For small systems, specifically those serving 3,300 or fewer persons (for which EPA is proposing to lower the threshold from 10,000 under the LCRR), without LSLs or GRR service lines that exceed the lead action level, they could choose and implement lead-bearing plumbing replacement or point-of-use device installation and maintenance in lieu of CCT if approved by the State.

EPA is proposing additional improvements across other rule areas that will result in more actions taken at lower lead levels to better protect public health. Exhibit 1 in section III.A. summarizes these changes and illustrates comparisons among the pre-2021 LCR, LCRR, and proposed LCRI requirements.

As a whole, the proposed LCRI would improve public health protection relative to the LCR and LCRR for the reasons described above. This is supported by a comparison of the monetized benefits. See Chapter 5, section 5.6.1 of the proposed LCRI Economic Analysis (USEPA, 2023b) for LCRR to LCRI monetized estimated health benefits comparisons and Appendix C, of the proposed LCRI Economic Analysis for pre-2021 LCR to LCRI monetized estimated health benefits comparisons. Through this revision of the NPDWR for lead and copper, EPA is proposing a more stringent and comprehensive set of lead reduction requirements compared to the LCR or LCRR, including mandatory service line replacement; a reduced action level for CCT, which would, among other things, serve as a screen for small and medium water systems based on lead levels that are generally representative of OCCT; and more robust and meaningful public education. Further, EPA is aiming to improve public health protections in communities facing the greatest risks from lead in drinking water, particularly in areas facing cumulative environmental justice impacts, through equity-driven proposed requirements for public education and a strategy to prioritize service line replacement in parts of communities based on factors including but not limited to local communities, such as those disproportionately impacted by lead and populations most sensitive to the effects of lead. Therefore, EPA anticipates that the proposed LCRI, as a whole, would improve public health protections relative to the LCR and LCRR in accordance with SDWA section 1412(b)(9).

As part of the anti-backsliding analysis that the proposed LCRI, as a whole, would improve public health protection relative to the LCR and LCRR, EPA is also considering the proposed change to the LCRR compliance dates for actions other than the service line inventory, associated notification and reporting requirements, and the 24-hour public notification requirement in 40 CFR part 141, subpart Q. EPA began reviewing the LCRR in 2021. Through the consultations EPA conducted as part of the LCRR review and the engagements and consultations EPA held to support the development of the proposed LCRI, many stakeholders, including States and water systems, provided feedback on the challenge of implementing successive changes to the LCR over a short period of time. Because of these challenges, as explained further below, EPA is proposing that water systems continue to implement the LCR requirements and the LCRR inventory requirements between promulgation of the LCRI and the proposed compliance date of three years after promulgation.

EPA previously recognized that the LCRR is an improvement in public health protection over the LCR, especially in light of the inventory requirements of the LCRR. The improvement of public health attributable to the LCRR compared to the LCR is based primarily on the changes to the treatment technique requirements of LSLR, OCCT, and public education – actions that occur over extended periods of time in response to tap sampling results that exceed certain thresholds. EPA does not expect those projected improvements from the LCRR to be realized if EPA promulgates yet another new regulatory framework for controlling lead just as compliance with the LCRR is required. Moreover, EPA expects that, if compliance with the entire LCRR is required starting October 16, 2024, it would negatively affect water systems' abilities to realize the greater health risk reduction benefits of the proposed LCRI.

If the LCRI is promulgated as proposed, and LCRI compliance is required in the third year of LCRR implementation, systems and States would be simultaneously tasked with implementation of two different rules at the same time they are engaged in the startup activities for the LCRI. The startup activities for water systems include reading and training on the rule to understand its new requirements, creating a staffing plan, and securing funds for compliance. The startup activities for a State include adopting State regulations, modifying data systems, and conducting internal and external training. Compounding that challenge is the fact that systems and States would be catching up on the LCRR startup activities that they may have postponed in response to EPA's announcement of the proposed LCRI rulemaking. If water systems are required to simultaneously implement the LCRR for the first time and prepare for LCRI compliance, EPA expects that it would be beyond the capacity of both water systems and States and therefore, the expected benefits of one or both rules would not be realized.

Allowing water systems to transition from compliance with the LCR to compliance with the LCRI, while requiring systems to comply with the LCRR inventory requirements in the interim, would result in more full service line replacements and thus, broader and faster health risk reduction than if adequate planning for LCRI compliance did not take place because of the diversion of scarce system and State resources towards short-term implementation of the LCRR.

F. White House Lead Pipe and Paint Action Plan and EPA's Strategy to Reduce Lead Exposures and Disparities in U.S. Communities

The development of a proposed NPDWR, the LCRI, is a key action of the Lead Pipe and Paint Action Plan, released by the Biden-Harris Administration in 2021 (The White House, 2021). The aim of the plan is to mobilize resources from across the Federal Government through funding made available from the Infrastructure Investment and Jobs Act, also referred to as the

Bipartisan Infrastructure Law (BIL), to reduce lead exposure from pipes and paint containing lead. The plan includes a goal of eliminating all LSLs and remediating lead paint.

In October 2022, EPA published the Strategy to Reduce Lead Exposures and Disparities in U.S. Communities (or "Lead Strategy") to "advance EPA's work to protect all people from lead with an emphasis on high-risk communities" (USEPA, 2022a). This Agency-wide Lead Strategy promotes environmental justice in communities challenged with lead and includes four key goals: (1) reduce community exposures to lead sources; (2) identify communities with high lead exposures and improve their health outcomes; (3) communicate more effectively with stakeholders; and (4) support and conduct critical research to inform efforts to reduce lead exposures and related health risks. The development of the LCRI is a key action within EPA's Lead Strategy and "reflects EPA's commitment to fulfilling the Biden-Harris Administration's historic commitment of resources to replace lead pipes and support lead paint removal under the Lead Pipe and Paint Action Plan" (USEPA, 2022a).

G. Bipartisan Infrastructure Law and Other Financial Resources

There are a number of pathways for systems to receive support for LSLR and related activities, including low- to no-cost financing through the Drinking Water State Revolving Fund (DWSRF), lead remediation grants established by the WIIN Act and incorporated into SDWA at sections 1459A, 1459B, and 1464 and low-cost financing from the Water Infrastructure Finance and Innovation Act (WIFIA) program. EPA strongly encourages water systems to evaluate these available funding opportunities to support LCRI implementation and full service line replacement.

The BIL appropriated $30.7 billion in supplemental DWSRF funding and reemphasized the importance of LSLR under the DWSRF program by including $15 billion specifically appropriated for "lead service line replacement projects and associated activities directly connected to the identification, planning, design, and replacement of lead service lines." The dedicated LSLR appropriation and the General Supplemental appropriation under the BIL as well as annual base appropriations for the DWSRF can pay for LSLR and related activities. Full service line replacement is an eligible cost under the DWSRF regardless of the ownership of the property on which the service line is located. The BIL requires that States provide 49 percent of their LSLR and General Supplemental capitalization grant amounts as additional subsidization in the form of principal forgiveness and/or grants to disadvantaged communities, as defined under SDWA 1452(d)(3). This 49 percent additional subsidization requirement in the BIL is greater than the additional subsidization requirement under SDWA section 1452(d)(2) for annual base DWSRF appropriations, and as such, the BIL makes available additional DWSRF funding for LSLR and associated activities that does not need to be repaid.

Corrosion control planning and design as well as associated capital infrastructure projects are also eligible for DWSRF funding under the DWSRF General Supplemental appropriation under the BIL as well as the DWSRF annual base appropriations. However, corrosion control treatment is not an eligible activity for DWSRF funding from the $15 billion specifically appropriated in BIL for LSLR and associated activities. States may use set-aside funds to assist water systems' development of corrosion control strategies and LSL inventories and replacement plans. In addition, States can also use DWSRF set-aside funds to provide operators with ongoing educational opportunities, such as how to perform lead monitoring and testing (USEPA, 2019a). Water systems are encouraged to contact their State's DWSRF program to learn about project eligibilities and requirements.

The WIIN Act established three drinking water grant programs that are available to support activities to reduce lead exposures in drinking water. The Reducing Lead in Drinking Water grant program awards funding for the reduction of lead in drinking water in disadvantaged communities as defined under SDWA section 1452(d)(3). This grant program focuses on two priority areas: (1) reduction of lead exposures in the nation's drinking water systems through water infrastructure and treatment improvements; and (2) reduction of children's exposure to lead in drinking water at schools and child care facilities (USEPA, 2023c). The Voluntary School and Child Care Lead Testing and Reduction grant program awards funding to States, territories, and Tribes to assist local and Tribal educational agencies in voluntary testing and remediation for lead contamination in drinking water at schools and child care facilities (USEPA and USHHS, 2023). The Small, Underserved, and Disadvantaged Communities grant program awards funding to States, territories, and Tribes to assist certain public water systems in meeting SDWA requirements, including the lead and copper National Primary Drinking Water Regulations (USEPA, 2021f).

EPA administers the WIFIA program, a Federal credit program, to accelerate investment in the nation's water infrastructure by providing long-term, low-cost supplemental loans for regionally and nationally significant projects, including those eligible for funding through DWSRFs (USEPA, 2023d). Similar to DWSRF, WIFIA also provides financial assistance for full service line replacement unless a portion has already been replaced or is being concurrently replaced with another funding source.

EPA also provides water technical assistance (WaterTA) to support communities in identifying lead sources, developing removal and remediation plans, and applying for water infrastructure funding. EPA collaborates with States, Tribes, territories, community partners, and other key stakeholders to implement WaterTA efforts. For example, the administration and expenses funds appropriated under BIL enabled the establishment of numerous Environmental Finance Centers (EFCs) that help underserved communities that have historically struggled to access Federal funding, such as DWSRF, receive the support they need to access resources for water infrastructure improvements, including LSLR.

In January 2023, EPA announced the "Lead Service Line Replacement Accelerators" initiative (USEPA, 2023e). This major initiative will provide targeted technical assistance services to help underserved communities access funds from the BIL and replace lead pipes that pose risks to the health of children and families. The initiative involves the U.S. Department of Labor and four States (i.e., Connecticut, Pennsylvania, New Jersey, and Wisconsin), and the initiative will work with 40 communities across those States in 2023. The Accelerators initiative will support these States in strategically deploying funding from the BIL for LSLR while developing best practices that can serve as a roadmap for the rest of the country. EPA will provide hands-on support to guide communities through the process of LSLR, including support in developing LSLR plans, conducting inventories to identify lead pipes, increasing community outreach and education efforts, and supporting applications for Federal funding. For additional information on EPA funding, see: https://www.epa.gov/ground-water-and-drinking-water/funding-lead-service-line-replacement. For additional information on technical assistance, see: https://www.epa.gov/water-infrastructure/water-technical-assistance-waterta.

In addition to the EPA-administered funding for service line replacement and other lead reduction actions, other Federal programs outside of EPA offer significant opportunities to further support these actions. Examples include Federal and State funds from the American Rescue Plan (ARP), Community Development Block Grant (CDBG) programs through the U.S. Department of Housing and Urban Development (HUD), Rural Development through the U.S. Department of Agriculture (USDA), and the Public Works Program through the U.S. Department of Commerce Economic Development Administration (EDA).

ARP funds are eligible to fund LSLR as well as replacement of internal plumbing and faucets and fixtures in schools and daycare centers. Recipients of ARP funds budgeted over $345 million for lead remediation projects as of September 30, 2022 (The White House, 2023). For example, Washington, D.C., budgeted $30 million to increase funding available to assist residents in replacing lead water service lines to their homes. Additionally, Buffalo, New York, will use $10 million to expand its existing program to remove LSLs in 1,000 additional homes (Department of the Treasury, n.d.).

HUD CDBG programs support community development through activities that address needs, such as infrastructure, economic development projects, public facilities installation, and community centers (USHUD, 2020). In 2017, North Providence, Rhode Island, utilized CDBG funding from HUD to replace customer-owned LSLs (USEPA, 2023p). HUD's Healthy Homes Production grant program and Healthy Homes Supplements to HUD's Lead Hazard Reduction grant programs are available to address a wide range of housing-related hazards including LSLR (USHUD, 2023).

USDA Rural Development provides a variety of grant and loan programs to rural communities, organizations, businesses, and individuals to finance infrastructure repair and replacement, including LSLR (USEPA, 2020a).

The EDA Public Works Program supports physical infrastructure improvements in economically distressed communities (USEPA, 2020a). With the creation of the Low-Income Household Water Assistance Program (LIHWAP) in 2021, States have an additional funding source to assist low-income households with water and wastewater bills and reduce the financial burden of water systems. In 2021, over $1.1 billion was appropriated for LIHWAP.[7]

[7] Consolidated Appropriations Act, 2021 (Pub. L. 116-260), Div. H, Sec. 533, and American Rescue Plan Act (Pub. L. 117-2), Sec. 2912.

States are using the available Federal funding sources as well as providing their own funding to support LSLR. As of February 2023, Illinois EPA has provided almost $89 million for LSLR (IEPA, 2023). Illinois EPA's DWSRF is providing funding to numerous systems' LSLR projects, including over $4 million in funding for the City of Sycamore and $3.9 million for the City of Batavia (IEPA, 2023). Other States are also providing funding for LSLR. New York's Lead Service Line Replacement Program received $20 million in State funding in 2017 and an additional $10 million in 2019 for communities meeting specific eligibility characteristics, including income, measured blood lead levels, and age of homes (NYDOH, 2021). The State of Minnesota approved $240 million for replacing LSLs, mapping and inventory activities, and informing residents about the benefits of LSLR. The State of Minnesota established an LSLR grant program, where the awarded grants must cover 100 percent of the cost of replacing the customer's portion of an LSL and prioritize replacing LSLs that are an imminent threat to public health and safety, areas with children, lower-income residents, and where replacements will provide the most efficient use of the grant funding (such as in coordination with main replacement) (State of Minnesota, 2023). The funding will be available in 2024 until June 30, 2033, which corresponds to the year the State has set as their official goal for replacing all LSLs (State of Minnesota, 2023). Regional authorities, like the Massachusetts Water Resources Authority (MWRA), are also providing funding to support LSLR. MWRA provided $100 million in loan funds for LSL investigation and replacement projects in their metropolitan Boston communities (MWRA, 2023).

EPA developed "Strategies to Achieve Full Lead Service Line Replacement," which is a guidance document that discusses funding sources including additional ways systems have financed full service line replacement (USEPA, 2019a). For example, the City of Green Bay, WI, used funding from a stadium tax to fund customer-side LSLR (USEPA, 2019a). EPA also developed “Funding and Technical Resources for Lead Service Line Replacement in Small and Disadvantaged Communities,” which is a guide to help small and disadvantaged communities identify potential Federal funding sources and technical assistance for LSLR (USEPA, 2020a).

H. Lead Exposure and Environmental Justice, Equity, and Federal Civil Rights

Environmental Justice

Stakeholder feedback and EPA’s environmental justice analysis informed the Agency’s understanding of how the proposed LCRI could benefit communities with environmental justice concerns. As described in section IV.C., EPA developed these proposed revisions after engaging with community stakeholders in cities with concerns about lead in drinking water during the LCRR review by holding two public listening sessions on the topic of environmental justice to support the proposed LCRI rulemaking. EPA also prepared an environmental justice analysis for this proposed rule to inform EPA’s understanding of how the proposed LCRI could impact communities with environmental justice concerns (USEPA, 2023f). EPA is proposing requirements that would achieve more equitable outcomes, especially in how service line replacement programs are planned and implemented. EPA is proposing requirements that would help to ensure that communication about the replacement program and the risks of lead in drinking water are more accessible to all consumers including individuals with limited English proficiency. Specific proposed requirements, and their anticipated impacts on equity, are described in full in section V. For example, EPA is proposing a requirement for water systems to make their service line replacement plans accessible and publicly available to inform the public of how full service line replacement will be prioritized (see section V.B.7.). Section V.B.5. includes a discussion on proposed requirements as incentives to overcome access issues and section V.5.9. describes environmental justice concerns and how the proposed rule may impact those concerns. In addition, as discussed in the previous section, Federal funds are available to support equity including BIL funds that require that States provide 49 percent of their LSLR and General Supplemental capitalization grant amounts as additional subsidization in the form of principal forgiveness and/or grants to disadvantaged communities, as defined under SDWA 1452(d)(3) (see section IV.G.).

Applicability of Federal Civil Rights Laws

EPA ensures compliance with Federal civil rights laws that together prohibit discrimination on the bases of race, color, national origin (including limited-English proficiency), disability, sex and age, respectively Title VI of the Civil Rights Act of 1964 (Title VI), Section 504 of the Rehabilitation Act of 1973 (Section 504), Title IX of the Education Amendments of 1972 (Title IX), Section 13 of the Federal Water Pollution Control Act Amendments of 1972 (Section 13) and the Age Discrimination Act of 1975. EPA's nondiscrimination regulations at 40 CFR parts 5 and 7 implement these Federal civil rights statutes and contain important civil rights baseline elements that are legally required for applicants and recipients of EPA financial assistance.

All applicants for and recipients of EPA financial assistance have an affirmative obligation to comply with these laws, as do any subrecipients of the primary recipient, and any successor, assignee, or transferee of a recipient, but excluding the ultimate beneficiary of the assistance.

The civil rights laws prohibit any program or activity receiving EPA financial assistance from discrimination based on race, color, national origin (including limited-English proficiency), disability, sex, and age. Accordingly, water systems must take reasonable steps to provide meaningful access to their programs and activities to individuals with limited-English proficiency. Recipients must provide individuals with disabilities an equal opportunity to participate in or benefit from their programs and activities.

When developing service line replacement plans, water systems that are recipients or subrecipients of EPA financial assistance should ensure compliance with Federal civil rights laws. As a best practice, one component of such a plan may be the analysis of the demographic data that recipients of EPA financial assistance are required to collect under 40 CFR 7.85(a). EPA encourages water systems to engage with local community-based organizations and community members about the service line replacement process and in the development of the service line replacement plan. EPA also encourages States to consider if any State law or regulation may create barriers that could lead to challenges for water systems to meet their obligations under Federal civil rights laws. To support this effort, EPA is proposing a special primacy requirement for States to identify any potential barriers to full service line replacement, which is discussed further in section VII.C.

V. Proposed Revisions to 40 CFR Subpart I Control of Lead and Copper

A. Regulatory Approach

Section 1412(b)(7)(A) of SDWA authorizes the EPA Administrator "to promulgate a national primary drinking water regulation that requires the use of a treatment technique in lieu of establishing an MCL, if the Administrator makes a finding that it is not economically or technologically feasible to ascertain the level of the contaminant" (42 U.S.C. 300g-1(b)(7)(A)). In the 1991 LCR, EPA evaluated the best information available at the time consistent with the statutory standard and determined that lead and copper met the criteria for establishing a treatment technique rule. For the proposed LCRI, EPA is finding, as it did in 1991, that an MCL for lead is not feasible to ascertain the level of the contaminant within the meaning of the Act and in a way that would achieve the basic purposes of the statute. Specifically, as described in more detail below, EPA considered whether the level of lead and copper can be ascertained at the tap, whether it was possible to determine single national numerical standards for lead and copper at the tap that is reflective of the effectiveness of treatment applied by water systems, and whether the fact that lead and copper are both present in water systems' distribution system and building premise plumbing, make it infeasible for EPA to establish MCLs for lead and copper. In making this finding, EPA conducted a new analysis of the issue by re-evaluating the information and data and analyses underlying EPA's conclusion in the 1991 LCR and evaluating the new information and data available since LCR was promulgated.

The primary rationale for promulgating the LCR as a treatment technique rule was due to the nature of lead and copper contamination. As EPA described in 1991, and is still accurate today, lead and copper do not generally occur in source water, but instead are introduced in drinking water by the corrosive action of water in contact with plumbing materials containing lead and copper. These sources of lead and copper were and continue to be present in both the water system's distribution system and in plumbing materials in homes. In 1991, EPA explained that lead and copper levels at the tap can be highly variable "due to many factors including the amount of lead and copper in the resident's plumbing or in the PWS's distribution system…temperature, age of plumbing components, chemical and physical characteristics of distributed water, and the length of time water is in contact with those materials" (56 FR 26473, USEPA, 1991). EPA noted that while it is feasible to accurately measure the level of lead or copper in an individual sample, the inherent variability across sites and systems makes it "technologically infeasible to ascertain whether the lead or copper level at a tap at a single point in time represents effective application of the best available treatment technology" (53 FR 31527, USEPA, 1988). EPA discussed how if EPA were to select an MCL, it must be "as close as feasible" to the MCLG in accordance with the statutory standard. EPA analyzed lead and copper tap sampling data to determine if there is a "precise level [of lead] at the tap" that could be feasibly met by large water systems if they were to apply treatments representing best available technology to the water systems themselves (56 FR 26473, USEPA, 1991). EPA found that even when minimizing some of the sources of variability (e.g., the time the water is in contact with the plumbing materials, age and type of plumbing material), lead and copper levels still varied considerably. Lead and copper levels varied at the same system both before and after the application of corrosion control treatment, between different systems, and between individual homes within the same system (56 FR 26473 – 26475, USEPA, 1991). EPA concluded that because of the sources of variability described above, there is no precise level that would be generally considered "feasible" based upon application of best available treatment in all water systems and further found that the level that is as close as "feasible" to an MCLG would vary in systems throughout the country based on the sources of lead and copper, the corrosivity of the water, and how the water chemistry responds to corrosion control treatment (56 FR 26473, USEPA, 1991).

Second, EPA explained an additional challenge for establishing MCLs for lead and copper was because much of the lead and copper sources are privately owned and/or are outside of the control of the public water system. At the time, EPA received comments stating that by "only establish[ing] MCLs for lead and copper for the water as it leaves the control of the public water system" (56 FR 26472), and therefore monitoring for compliance in the distribution system, EPA could reduce some of the variability associated with lead and copper levels and address the problem of water system responsibility for conditions outside of their control. The Agency determined that setting an MCL for lead and copper at the point the water leaves the control of the public water system would be inconsistent with the SDWA definition of an MCL as "the maximum level allowed of a contaminant in water which is delivered to any user of a public water system". Specifically, EPA reasoned that MCLs for lead and copper would have to be assessed with monitoring at customers' taps to accurately represent the level of the contaminants in drinking water delivered to the user, noting that, "EPA has established monitoring requirements for inorganic and organic contaminants that require monitoring in the distribution system because this is easier and provides just as accurate an assessment of tap levels as tap sampling itself" (56 FR 26478, USEPA, 1991). EPA determined that monitoring for lead and copper in the distribution system for compliance with MCLs "would not adequately protect the public from lead and copper introduced by the interaction of corrosive water delivered by the public water system with lead and copper-bearing materials in the homeowners' plumbing" (56 FR 26472 – 26473, USEPA, 1991). Despite the fact that lead and copper sources may be outside the control of the water system, EPA determined that "public water systems can affect, at least to some degree, water tap lead and copper levels through adjustment of the corrosivity of water delivered by the water system" (56 FR 26473, USEPA, 1991). However, as explained in the 1991 rulemaking, due to the factors described above (e.g., variability of lead and copper in drinking water, treatment effectiveness, and sources of lead and copper), water systems can affect drinking water corrosivity, but not in a way that is technically feasible to set MCLs.

Third, EPA reasoned in the 1991 rulemaking that the definition of a public water system under SDWA precludes the Agency from promulgating a "regulation that holds a [public water system] liable for conditions that are beyond its control" (56 FR 26476, USEPA, 1991). EPA posited that an MCL would not be considered "feasible" if a significant number of water systems would be in noncompliance due to conditions outside of their control. EPA contemplated an alternative approach of establishing MCLs that would meet the statutory standard for an MCL in SDWA section 1412(b)(4)(B) and 1412(b)(4)(D) — "as close to the maximum contaminant level goal as is feasible" — i.e., "feasible with the use of the best available technology, treatment techniques and other means which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration)". The resulting MCLs would need to be high enough to enable most systems to meet them after installing treatment (accounting for the variability of lead and copper levels that would persist after treatment installation, given the sources of lead and copper). However, EPA found that such an approach would lead "to unnecessarily high exposures of significant segments of the population" and noted that systems below this higher MCL "would not be required to install any treatment to be in compliance" (56 FR 26477, USEPA, 1991). Therefore, EPA concluded that such an approach would be inconsistent with the objective of the statute to prevent "known or anticipated adverse effects on the health of persons to the extent feasible" (SDWA 1412 (b)(7)(A)).

Considering the above facts, analyses, and statutory requirements, EPA concluded that it was not feasible to set MCLs for lead and copper and promulgated a rule comprised of four treatment techniques: corrosion control treatment, source water treatment, lead service line replacement, and public education. As described in section I.C. of this preamble, EPA introduced action levels for lead and copper to implement the treatment technique requirements in the rule. The action levels are compared to the 90th percentile of lead and copper samples collected from consumer taps to determine if the water system must take actions under the rule. In 1991, EPA explained how the action levels are not MCLs, and they do not function as MCLs. For more information about action levels, including the lead action level EPA is proposing for the LCRI and EPA's determination about why and action level was not an MCL under the LCR and would still not be an MCL under the proposed LCRI, see section V.E.2. of this document.

EPA's 1991 decision to promulgate a treatment technique rule for lead was challenged and upheld by the D.C. Circuit Court of Appeals (*American Water Works Association v. EPA*

("*AWWA*"), 40 F.3d 1266, 1270-71 (D.C. Cir. 1994)). Because the Court agreed with EPA's analysis, described above, that it is not feasible to ascertain the level of lead in drinking water, the Court upheld EPA's decision not to implement an MCL for lead (*AWWA,* F.3d 1266, 1270-71).

For the proposed LCRI, EPA has re-evaluated whether a treatment technique rule in lieu of an MCL is consistent with the statute. As part of the Agency's analysis, EPA re-evaluated the information considered and conclusions made in promulgating the LCR in 1991, in addition to the best information and data available in more than thirty years since the LCR was promulgated, including from stakeholder feedback received during the LCRR review. Based on the analysis being conducted for the proposed LCRI, EPA is proposing to determine that information and factors consistent with the Act that cause lead and copper variation identified in the 1991 LCR and supported in the LCRR continue to apply today. Therefore, it is not feasible to establish MCLs for lead and copper consistent with the SDWA.

New information available since the 1991 LCR continues to show that the variability of lead and copper levels make it infeasible to ascertain the level of the contaminant and does not meet the statutory standard for an MCL under SDWA. Several reasons contribute to EPA's determination on lead and copper variation supporting the use of a treatment technique. First, as noted in the LCR, "lead release can be unpredictable over time and across households, can originate from many sources owned by the water system and the customer, can vary based on the sample technique used, and can be affected by customer water use habits" (53 FR 31527, USEPA, 1988). Studies continue to show that the levels of lead and copper measured at the tap after treatment is variable due to several factors including, but not limited to, the amount of lead in any individual site's plumbing, the age of plumbing components, the physical and chemical characteristics of the water, the length of time water is in contact with material, and consumer water use patterns (Triantafyllidou et al., 2021). Studies show that lead levels can widely vary at a single site depending on the sampling protocol (Del Toral et al., 2013; Lytle et al., 2019; Lytle et al., 2021; Masters et al., 2021; Triantafyllidou et al., 2015). For example, Del Toral et al. (2013) showed that there was significant variability in lead concentrations from water samples collected at the same site as well as among different LSL sites across Chicago, Illinois. EPA's analysis of 2019 State of Michigan Lead Tap Monitoring Data as part of the LCRR (see docket item no. EPA-HQ-OW-2017-0300-1617) also demonstrated variability among collected water samples grouped by combinations of LSL status, CCT status, and liter sampled (USEPA, 2020c, Exhibit F-4). Even when using the same sampling protocol, variation in lead at a single site can still occur due to water use patterns and highly variable release of particulate lead (Clark et al., 2014; Masters et al., 2016; Xie and Giammar, 2011).

For the proposed LCRI, EPA analyzed lead data from the dataset collected for the Six-Year Review 4 (2012 to 2019) for systems with different characteristics (e.g., CCT and LSL status) to further evaluate how lead and copper levels at the tap can vary. Six-Year Review 4 data were voluntarily provided to EPA from 46 States, Washington, D.C., and 10 Tribal programs and territories and includes the LCR compliance data reported to the State. EPA used Safe Drinking Water Information System Federal Reporting Services (SDWIS/FED) (2012 to 2020) data and information on LSL status to select a subset of 7,161 systems with identified CCT and LSL status (USEPA, 2023b). Similar to an analysis conducted for the LCR, EPA evaluated the magnitude of difference between two points in the distribution as a measure of variability (56 FR 26474, USEPA, 1991). Because the 90th percentile is used to require actions under the LCR, EPA used a ratio of the 90th percentile (P90) and the 50th percentile or median (P50) for lead and copper values for each system in each year of data in the dataset (2012 to 2019). For example, if there are 100 samples, the 50th percentile is the 50th highest concentration and the

90th percentile is the 90th highest concentration. If the P90/P50 ratio is close to one, it means that the values are similar and there is low variability among the measured lead levels at that system in a given year. Prior to calculating percentiles, EPA assigned a numerical value for non-detects. The true value of the non-detect could be anywhere between zero and the minimum reporting level (MRL) reported with a sample result. As a conservative estimate, EPA substituted one-half of the reported MRL associated with each sample result. For sample results without a reported MRL value, EPA substituted one-half of the most commonly reported MRL for lead or copper in the State the system is located in, or nationally (0.005 mg/L for lead and 0.01 mg/L for copper) if State-level MRL data was not available. This approach is commonly used for evaluating Six-Year Review data (USEPA, 2016b). EPA also applied full MRL substitution to show the range of possible results. The results in Exhibit 2 show the P90/P50 ratios calculated for selected systems representing different sizes, CCT, and LSL status. Exhibit 3 shows the results for copper. The results show high variability across systems as well as instances where a system has low variability in samples for one year and high variability in another. Systems with CCT and systems without LSLs also experience variability in lead levels both within a single sample collection year and between collection years. Higher ratios (e.g., >10) in Exhibits 2 and 3 are often due to the P50 value being a non-detectable concentration In other words, these systems had some tap samples with high levels of lead or copper and others where lead or copper was not detected. Additional details and full results for all systems analyzed, including results using full MRL substitutions, are found in the data file “Lead and Copper Variability Analysis” in docket no. EPA-HQ-OW-2022-0801.

Exhibit 2: System Variability in First Liter Lead Samples

System Size	CCT	LSL	**P90/P50 Lead Levels**							
			2012	2013	2014	2015	2016	2017	2018	2019
> 50,000	Yes	Yes	1.0	3.2	3.7	7.4	15.5	5.0	2.9	4.8

> 50,000	Yes	Yes	3.8	4.3	4.7	4.0	4.0	4.7	4.5	4.9
> 50,000	Yes	Yes	7.2	8.9	8.8	5.9	15.4	15.0	13.5	16.1
> 50,000	Yes	Yes	ND[1]	6.0	ND	1.0	5.4	6.0	5.6	4.0
> 50,000	Yes	Yes	--	--	10.6	3.3	3.0	2.7	2.9	3.4
10,000 to 50,000	No	Yes	--	--	4.9	4.3	6.5	4.1	4.2	5.0
10,000 to 50,000	Yes	Yes	--	--	9.9	5.9	3.8	2.4	3.1	2.1
≤3,300	Yes	No	1.0	2.0	1.0	4.2	4.4	6.0	1.0	3.6
≤3,330	No	No	12.4	13.0	1.7	1.5	14.8	6.4	10.8	8.0

Source: "Lead and copper variability analysis.xlsx" in EPA-HQ-OW-2022-0801.
Notes:
[1]ND indicates that all collected samples had non-detectable concentrations of lead. Non-detect values were substituted with ½ the MRL for lead prior to calculating quantiles.

Exhibit 3: System Variability in First Liter Copper Samples

System Size	CCT	LSL	P90/P50 Copper Levels							
			2012	2013	2014	2015	2016	2017	2018	2019
> 50,000	Yes	Yes	2.0	2.0	2.6	2.6	2.8	3.6	2.5	2.5
> 50,000	Yes	Yes	2.0	2.3	2.5	2.3	2.5	2.6	3.5	2.3
> 50,000	Yes	Yes	2.1	2.0	2.0	2.3	2.5	2.3	2.6	2.2
> 50,000	Yes	Yes	ND[1]	5.2	5.0	2.0	2.4	2.8	3.1	3.5
> 50,000	Yes	Yes	--	--	5.1	10.9	6.5	5.9	5.4	7.2
10,000 to 50,000	No	Yes	--	--	1.8	2.0	1.5	1.9	1.7	3.3
10,000 to 50,000	Yes	Yes	--	--	3.7	3.2	2.5	2.3	2.5	2.2
≤3,300	Yes	No	2.8	1.8	2.3	1.8	1.9	1.7	2.0	1.3
≤3,330	No	No	38.2	30.8	1.0	1.0	23.5	18.4	4.6	14.0

Source: "Lead and copper variability analysis.xlsx" in EPA-HQ-OW-2022-0801.
Notes:
[1]ND indicates that all collected samples had non-detectable concentrations of lead. Non-detect values were substituted with ½ the MRL for copper prior to calculating quantiles.

Second, the conditions of plumbing materials also continue to vary from water system to water system, and from site to site within a water system, such that lead in drinking water continues to be subject to high levels of variability. Studies have shown that LSLs are the predominant contributor of lead in drinking water where they are present. A study published by the AWWA Research Foundation (2008) found that LSLs contribute an estimated 50 to 70 percent of the mass of lead at the tap for sites served by LSLs (Sandvig et al., 2008). Another study found that removal of LSLs resulted in an average reduction of lead content at the tap by

86 percent (Lytle et al., 2019). However, while removal of LSLs is critical to reducing lead in drinking water, premise plumbing materials also continue to be a source of lead in drinking water (Elfland, 2010; Kimbrough, 2007; Rockey et al., 2021). In addition, premise plumbing materials can be a source of particulate lead. For example, brass particles and lead solder particles were identified as the cause of severe tap water contaminations during three field investigations in North Carolina and Washington, D.C. (Triantafyllidou and Edwards, 2012). The Agency notes that even where systems remove all LSLs, it will not sufficiently allow for the discontinuation of CCT because of the presence of other lead and copper sources that will remain in the plumbing of consumers' homes and other buildings (USEPA, 2020c). Accordingly, EPA is aware that systems without LSLs can exceed the lead action level, for example, due to the corrosion of premise plumbing containing lead. Under the LCRR, EPA estimated between 2.3 and 4.7 percent of CWSs without LSLs will exceed the current lead action level of 0.015 mg/L (USEPA, 2023b, Chapter 3, Exhibit 3-25). Thus, the factors that cause lead and copper variation will continue to exist.

Third, despite changes to the allowable amount of lead in "lead free" plumbing, many older buildings can still be a source of lead. SDWA section 1417 prohibits the use of any pipe, any pipe or plumbing fitting or fixture, solder, or flux in the installation or repair of any public water systems or in plumbing in a residential or nonresidential facility that provides water for human consumption that is not "lead free" as defined in section 1417(d). The 2011 Reduction of Lead in Drinking Water Act revised the definition of "lead free" in SDWA section 1417(d) from eight percent to a weighted average of 0.25 percent,[8] lowering the amount of lead that may be in

[8] The term "lead free" provided here is defined under SDWA section 1417(d) as follows: "[T]he term 'lead free' means—(A) not containing more than 0.2 percent lead when used with respect to solder and flux; and (B) not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures."

plumbing materials used in repairs or new installations starting in 2014.The Lead Free Rule (85 FR 54236, USEPA, 2020d) requires third-party certification for new plumbing products as of September 1, 2023. However, SDWA section 1417 does not require anyone to replace previously installed plumbing materials that are not "lead free" as currently defined, and many buildings in the U.S. were constructed prior to 2014. Further, even products that meet the new definition of "lead free" may contain trace amounts of lead that can leach into drinking water (42 U.S.C. 300g-6(d)(1)). Therefore, premise plumbing in these buildings will continue to be a source of lead in drinking water. As illustrated both in peer-reviewed studies and through reported compliance data, lead levels vary at single sites over time, between sites within a system, and between systems, both for systems with and without LSLs and CCT.

EPA heard from stakeholders that the Agency's reasons for not setting an MCL for lead are inconsistent, stating that EPA's primary rationale is based on not holding water systems responsible for sources of lead not owned by the water system while including provisions in the LCRR for LSLs that apply regardless of water system ownership. This argument misconstrues the comprehensive set of reasons for EPA's decision to not set an MCL for lead. In deciding whether to set an MCL for a particular contaminant or set a treatment technique rule, the primary focus of the statutory analysis is not on who is "responsible" for lead in drinking water, but whether it is feasible to ascertain the level of lead in drinking water. As described above, the variability of lead and copper levels make it "technologically infeasible to ascertain whether the lead or copper level at a tap at a single point in time represents effective application of the best available treatment technology" (53 FR 31527, USEPA, 1988). While premise plumbing is a contributor to lead and copper at the tap, EPA found, and continues to find, that the quality of water delivered to customers can be controlled by systems and that "water systems can affect, at least to some degree, water tap lead and copper levels through adjustment of the corrosivity of water delivered by the system" (56 FR 26473, USEPA, 1991). For example, studies indicate that CCT can reduce drinking water lead levels at the tap (Cardew, 2009; Hayes et al., 2008; Tully et al., 2019).

In addition to the above points, stakeholders have claimed that EPA has established MCLs for other drinking water contaminants, such as disinfection byproducts (71 FR 388, USEPA, 2006), and stated that such contaminants are similarly prone to sampling variability. However, the preamble for the Stage 2 Disinfectants and Disinfection Byproducts Rule does not suggest that disinfection byproduct sampling is subject to the same level of sampling variability as lead sampling or that disinfection byproducts are as affected by sampling variability that it impacts the ability of water systems to accurately ascertain disinfection byproduct contamination from water samples (71 FR 388, 394, USEPA, 2006). The variability in lead and copper materials from site to site is one difference between the lead and copper and the disinfection byproduct rules. While both rules require systems to evaluate water quality within the distribution system, due to the reasons stated above, the LCR also requires sampling at consumer taps, which is variable across sites. Put simply, there is no indication that the level of purported sampling "variability" associated with disinfection byproducts can be reasonably compared to that of lead contamination in drinking water.

Another critical distinction between the lead and copper rules and the disinfection byproduct rules is that, unlike for lead, water systems disinfecting the water supply are the source of disinfection byproducts. Water systems introduce disinfectants, such as chlorine and chloramine, into the drinking water supply (71 FR 394, USEPA, 2006). These disinfectants interact with organic and inorganic material in source waters to form disinfection byproducts. Water systems have the ability to control and account for the formation of disinfection byproducts, such as through source water treatment. On the other hand, lead is rarely found in source water (86 FR 4231, USEPA, 2021a) and is instead introduced into the drinking water supply through corrosion in lead pipes and fixtures, sometimes from lead pipes and fixtures outside the direct control of the water system. As such, there is no inconsistency between regulating disinfection byproducts through an MCL while finding that a treatment technique is necessary for lead.

Considering the above information and analysis, EPA is determining that the same conditions that prompted EPA to promulgate a treatment technique rule for lead and copper in 1991, still exist today and justify continued use of a treatment technique rule for regulating lead and copper. This includes the nature of lead contamination, where much of the lead in drinking water continues to originate in the distribution system and from sources outside the control of water systems, the condition of water systems' plumbing and distribution system varying from system to system, and the variability of lead and copper levels at the tap. In addition to finding that it is not feasible to set an MCL for lead and copper at the tap, EPA also notes the benefit of a treatment technique. EPA can set requirements that compel the system to take various actions to reduce lead in drinking water, while an MCL would not compel action until, and unless, the MCL is exceeded (USEPA, 2020b). EPA is not authorized to require a specific treatment when promulgating an MCL (see SDWA sections 1412(b)(4)(E) and 1412(b)(7)(A)).

EPA has reasoned that the conditions that led the Agency to make the findings necessary to promulgate a treatment technique rule for lead and copper in 1991still apply and are supported by an evaluation of the best information and data available since the LCR was promulgated. For these reasons, the Agency is proposing to continue to regulate lead and copper through four treatment techniques: (1) service line replacement, (2) CCT, (3) public education, and (4) source water treatment.

B. Service Line Replacement

1. Mandatory Full Service Line Replacement and SDWA Requirements

This proposal marks a fundamental improvement in the lead service line replacement program, which reflects EPA's experience in implementing the lead rule over 30 years, new evidence and data, and is supported by the extraordinary commitment of funds for this program under the BIL. EPA is proposing mandatory full service line replacement of all LSLs and GRR service lines under a water system's control. In the LCRR review, EPA recognized the "urgency of fully removing all lead service lines" and the need to consider an LSLR mandate in an improved regulation (i.e., the LCRI) as well as through non-regulatory actions (86 FR 71577, USEPA, 2021b). In the LCRR review, EPA noted that under the LCRR, millions of LSLs would be left in place and would result in "generations of Americans being at risk of significant lead exposure through their drinking water" (86 FR 71577 USEPA, 2021b).

The LCRR requires water systems to replace lead and GRR service lines after exceeding the lead action level or the LCRR-established lead trigger level. Systems that exceed the lead action level and serve more than 10,000 people must fully replace three percent of lead, GRR, and unknown service lines per year on a two-year rolling basis for at least two years. The State must require systems to replace LSLs on a shorter schedule if determined to be feasible. A system may cease mandatory LSLR on the date the system's 90th percentile lead level has been calculated to be at or below the lead action level during each of the four consecutive six-month tap sampling monitoring periods. Systems that exceed the lead trigger level, but stay at or below the lead action level, and serve more than 10,000 people must consult with the State on replacement goals and implement a goal-based LSLR program for two consecutive one-year monitoring periods.

Any small CWS (serving 10,000 or fewer people) or NTNCWS that exceeds the lead action level and selects lead service line replacement as its compliance option under the LCRR small system flexibilities must implement a full lead service line replacement program on a schedule approved by the State that does not exceed 15 years. The LCRR also requires systems, regardless of their 90th percentile lead level, to replace the system-owned portion of an LSL when customers choose to replace their portion of the line; full LSLR is required in such cases because of the risks associated with partial LSLR.

EPA projected that, under the LCRR, only 854,000 to 1.3 million LSLs would be replaced over the 35-year period of analysis for the rulemaking (USEPA, 2023b, Exhibit 4-135). Under this projection, millions of LSLs that generally account for 50 to 75 percent of lead contamination at the drinking water tap (Sandvig et al., 2008) would remain in active use in systems both with and without OCCT. Removing this significant source of lead exposure for millions of people is vital to protect public health. During the proposed LCRI external engagements, many stakeholders voiced strong support for mandatory replacement of all the nation's LSLs through the LCRI, regardless of lead levels or CCT status (USEPA, 2023h; USEPA, 2023i; USEPA, 2023j). Some stakeholders did not support a service line replacement mandate by a deadline, citing competing demands for water systems (USEPA, 2023j).

The proposed LCRI lead service line replacement approach is built on the experience of systems that are working proactively to replace LSLs, the significant funding available for service line replacement (including $15 billion for identifying and replacing LSLs from BIL), and the four States (Illinois, Michigan, New Jersey, and Rhode Island) that currently require systems to replace LSLs by specific deadlines. These proactive measures alone cannot achieve the goal of replacing 100 percent of lead and GRR service lines. A nationwide service line replacement mandate would ensure coverage for customers served by lead and GRR service lines in States that do not require mandatory replacement or where systems are not proactively replacing lead and GRR service lines. Mandatory service line replacement provides additional public health protection beyond the benefits of CCT, source water treatment, and public education alone.

Lead Exposures from Drinking Water

Where LSLs and GRR service lines remain in place, they continue to present risks of lead exposure, especially from particulate lead releases. As discussed in section V.B.2. of this document, EPA determined that mandatory service line replacement is feasible, and a requirement that systems replace all LSLs and GRR service lines over a 10-year period would ensure that the proposed LCRI "prevents known or anticipated adverse effects on the health of persons to the extent feasible" (SDWA 1412(b)(7)(A)). The LCR and LCRR relied on replacing LSLs initiated by a series of process steps following periodic tap sampling results. Over the 30 years of implementing the LCR, EPA has found that the sampling and process steps of that rule created implementation uncertainties, difficulties, and errors that, in some cases, resulted in significant lead exposures. Improper implementation of the sampling and corrosion control treatment process has been the cause, or one of the primary causes, of significant lead exposures in multiple water systems. Moreover, disturbances of LSLs can potentially cause lead particulates to be released into drinking water, causing higher lead levels at those sites. Although the proposed LCRI includes risk mitigation requirements for water systems if they disturb the service line, other utilities or heavy traffic may also disturb the line (Del Toral et al., 2013; Roy and Edwards, 2019), events which would be unknown to the water system and not subject to risk mitigation steps. In addition, particulate lead can be released sporadically (i.e., not associated with a disturbance), even in systems that have OCCT and have measured generally low lead levels (Triantafyllidou et al., 2007). Research has also shown that lead exposure is not fully eliminated by CCT due to a variety of factors including individual home and service line characteristics, water quality, water use (including water stagnation following extended periods without water use), treatment, infrastructure, and disturbances to service lines (e.g., meter installation, road repair, and freezing of the ground that can have unintended and unpredictable effects), causing lead releases in the water when LSLs or GRR service lines are present (Del Toral et al., 2013; Masters et al., 2021; Proctor et al., 2020; Roy and Edwards, 2019; Schock et al., 2014; Triantafyllidou et al., 2007). Examples of isolated cases of lead poisoning in children have been documented and attributed to drinking water in communities whose systemwide lead levels remained below the action level of 0.015 mg/L (Triantafyllidou et al., 2007; Triantafyllidou and Edwards, 2012).

New Evidence and Data to Support the Feasibility of Mandatory Service Line Replacement for All Systems

Although the LCR and LCRR required water systems that exceeded the lead action or trigger levels to conduct LSLR, neither rule required all systems in the nation with LSLs and GRR service lines to simultaneously replace these service lines at a rapid rate. By mandating full service line replacement of all lead and GRR service lines in the nation separate from tap sampling and monitoring requirements, the proposed LCRI would better protect public health by removing a significant source of lead in drinking water (where present) and further reducing known or anticipated adverse health effects beyond what is able to be tested due to the sporadic nature of particulate lead spikes that can make their detection challenging. Furthermore, there had been a lack of data regarding the number of LSLs and GRR service lines in systems as well as no direct implementation of a broad service line replacement mandate in a large geographic region, or State laws requiring such, to demonstrate the feasibility of this requirement. New and higher quality evidence and data are available to assess the feasibility of this proposed requirement more accurately. EPA has found this evidence and these data indicate that such a requirement for LSLR is feasible as well as likely technically possible. For example, four States (Illinois, Michigan, New Jersey, and Rhode Island) have now required LSLR through State law, where New Jersey and Rhode Island both require all LSLs and all galvanized service lines (irrespective of whether there is or was an upstream LSL) to be replaced in ten years unless granted an extension by the State (State of New Jersey, 2021; State of Rhode Island, 2023). During the development of the LCRR, EPA was only aware of individual systems that had or were proactively conducting service line replacement. However, the four state service line replacement laws suggest that States expect such a requirement to be technically possible given hundreds of systems required to conduct service line replacement simultaneously within and across these States. EPA notes that these States are estimated to have approximately one-fifth of the LSLs in the country (1.8 out of 9.2 million estimated LSLs) and have among the most LSLs in the country (USEPA, 2023k). Specifically, Illinois and Rhode Island are estimated to have 28 percent and 25 percent of all their service lines requiring replacement, the two highest proportions in the United States. Additionally, New Jersey and Michigan have an estimated 14 percent and 11 percent of their lines requiring replacement, both above the national average of 8 percent (USEPA, 2023k). These laws suggest that these States anticipate that a broad service line replacement mandate is technically possible. Michigan and New Jersey have implemented their service line replacement laws since 2021, providing even more support that the States' expectations that their replacement requirements are in fact technically possible. In addition, BIL and other funding is now available to support service line replacement, a primary driver of the proposed rule costs. Also, as mentioned in section IV.C. of this document, several water systems have had implementation challenges associated with the LCR, including the CCT requirements. NDWAC recommendations noted the opportunity provided by proactive replacement of LSLs to protect public health before systems experience higher lead levels" (USEPA, 2016a).

Additionally, new data from the 7th Drinking Water Infrastructure Needs Survey and Assessment (referred to as "Needs Survey"), which was conducted in 2021 and whose results were published in 2023 (USEPA, 2023k), allowed for more precise estimates of the number of lead, GRR, and unknown service lines in individual systems and nationwide than were previously available during the development of the LCRR. These data allowed EPA to better estimate the impacts of a broad and rapid mandatory service line replacement requirement to ensure such a requirement meets SDWA standards for a treatment technique. It also allowed EPA to estimate with more precision the systems eligible for deferred service line replacement, which EPA is proposing to be available to systems for which a 10-year replacement deadline is infeasible. Finally, BIL and other funding is now available to support service line replacement, which is a primary driver of the rule costs.

For the reasons discussed in this section, mandatory service line replacement programs initiated by 90th percentile lead levels are now known not to be sufficient to prevent known or anticipated adverse health effects from lead exposure in drinking water to the extent feasible. As discussed above, improper implementation of corrosion control treatment can result in significant lead exposures and there is new data and evidence that support EPA's finding in this proposal that a mandatory service line replacement requirement applicable to all community water systems is feasible. For more information about EPA's feasibility assessment of mandatory service line replacement, see section V.B.2. of this document. For more information about available funding, see section IV.G. of this document.

2. Feasibility of Proposed Service Line Replacement Requirement and Deferred Deadlines

The proposed LCRI service line replacement requirements are consistent with the SDWA requirements for the rule to "prevent known or anticipated adverse effects on the health of persons to the extent feasible" (SDWA 1412(b)(7)(A)). EPA determined that neither of the statutory exceptions in SDWA section 1412 (b)(5)(A) for establishing a treatment technique at a level other than the feasible level apply since the proposed mandatory service line replacement requirement does not (1) increase concentrations of other (non-LCR) contaminants or (2) interfere with the efficacy of drinking water treatment techniques or processes used to comply with other NPDWRs. EPA also determined that the statutory authorization in SDWA section 1412(b)(6) to establish a treatment technique that maximizes benefits at a level justified by the cost does not apply here because the benefits of the proposed LCRI service line replacement requirements justify the costs (refer to section VIII. of this document).

EPA finds that a minimum average annual replacement rate of 10 percent, calculated across a rolling three-year period and corresponding to a 10-year replacement deadline, is feasible as defined in SDWA section 1412(b)(4)(D) because it is technically possible for systems of all sizes and affordable relative to large water systems. EPA estimates that a 10-year replacement deadline is feasible for 96 to 99 percent of CWSs nationwide (USEPA, 2023g). In addition, because EPA is proposing to retain the requirement that States set a faster rate where feasible for systems, the proposed mandatory full service line replacement provision would prevent known or anticipated adverse health effects of lead "to the extent feasible" (SDWA 1412(b)(7)(A)).

Examples of Systems Replacing All LSLs in 10 Years or Less

EPA is aware of several systems of various sizes and LSL prevalence that have proactively replaced all LSLs in 10 years or less. Some large systems completed their service line inventory and replacement programs in less than 10 years. For example, both Tucson, Arizona (City of Tucson, 2022), and Spokane, Washington (City of Spokane, 2018), replaced all their LSLs in approximately two years. Although these systems had a relatively low number of LSLs (<1,000), EPA notes that, according to projections from Needs Survey responses, this number is representative of the majority of systems—only approximately 1,700 out of nearly 50,000 CWSs nationwide (3.5 percent) are expected to have more than 1,000 LSLs and GRR service lines (USEPA, 2023g). Some smaller systems were also able to complete their service line inventory and replacement programs on relatively short timelines. Both Stoughton and Mayville, Wisconsin, completed their programs in a single year (City of Stoughton Utilities Committee, 2022).

In the cases of the large systems in Flint, Michigan, and Newark, New Jersey, these systems were able to complete or nearly complete their service line replacement programs well ahead of the proposed LCRI's 10-year deadline. Newark took four years to complete replacement (City of Newark, n.d.a). As of July 2023 (the date EPA evaluated this information), Flint had identified and replaced over 97 percent of LSLs, and the city estimates completing all replacements by 2023, seven years after the start of the program (City of Flint, n.d.). Notably, both Newark and Flint received substantial funding and technical expertise. Newark also passed an ordinance in 2019 that allowed entry to private property to evaluate service line materials and replace LSLs (City of Newark, 2019), which likely contributed to faster replacement rates. Flint, however, was known to have service line material records in a logistically challenging paper format with unreliable accuracy (BlueConduit, 2020), which EPA expects slowed their replacement progress relative to other systems that did not have these recordkeeping challenges. Nevertheless, Flint is expected to complete their service line replacement program in less than the proposed ten years.

Regarding NTNCWSs, Needs Survey responses from 147 NTNCWSs showed LSLs are rarely used in these systems since 132 of them did not report any lead, GRR, or unknown service lines (USEPA, 2023g). Of the NTNCWSs listed in SDWIS, only 12 out of more than 17,000 NTNCWSs have more than 1,000 service connections (USEPA, 2023g); therefore, the overwhelming majority of NTNCWSs that do have LSLs and GRR service lines are expected to have relatively few of these service lines requiring replacement over the proposed 10-year deadline.

While EPA is aware that some systems completed their service line replacement programs in more than 10 years, EPA does not interpret these examples as conclusive or dispositive evidence that a 10-year deadline is infeasible. For example, Madison, Wisconsin, completed its LSLR program in just over 11 years (Madison Water Utility, 2014), while Lansing, Michigan completed removal of over 12,000 LSLs in 12 years (EDF, n.d.a). Additionally, these systems developed their inventories and replaced LSLs simultaneously in a shorter period of time than provided under the LCRR and proposed LCRI combined. The LCRR initial inventory deadline of October 16, 2024, combined with the three-year period between promulgation of the LCRI and the start of the 10-year deadline for full service line replacement gives systems more time to complete the service line inventory and replacement requirements than either the Madison or Lansing program. In addition, substantial funding from the BIL and other sources have already advanced many systems' efforts to identify and replace LSLs.

Feasibility of Service Line Replacement Conducted by All Systems Simultaneously

Stakeholders cited concerns about limited workforce and shortages of materials and supplies as factors that could impede service line replacement progress, especially when all systems in a geographic region are conducting replacement simultaneously (USEPA, 2023m). As mentioned previously, four States (Illinois, Michigan, New Jersey, and Rhode Island) are already or soon to be requiring systems to conduct mandatory service line replacement, which suggests that States expect that it is feasible for an individual system to replace LSLs, even when a broad service line replacement mandate is in effect across a large geographic region. The prevalence of LSLs in these States strengthens the evidence for the feasibility of widespread service line replacement, with Illinois, New Jersey, and Michigan all having greater than 300,000 estimated lead and GRR service lines statewide and Rhode Island with an estimated 75,700 LSLs (USEPA, 2023k). According to the estimates from the Needs Survey, Illinois is among the States with the most lead and GRR service lines in the nation (2nd), while New Jersey and Michigan are ranked 9th and 11th respectively, and Rhode Island is ranked 24th (USEPA, 2023k). Based on available inventory information, an estimated 187 to 331 out of 567 New Jersey systems have at least one lead or GRR service line and are thus subject to the 10-year deadline (see "New Jersey LSLR Analysis.xls" in EPA-HQ-OW-2022-0801). Similarly, 415 to 1,028 out of over 1,700 Illinois systems and 222 to 647 out of 1,300 Michigan systems have at least one LSL or GRR service line, further demonstrating the magnitude of systems that are simultaneously replacing LSLs and GRR service lines across large geographic regions (USEPA, 2023g, "Illinois LSLR Analysis.xls" and "Michigan LSLR Analysis.xls" in EPA-HQ-OW-2022-0801).

Deferred Deadlines for Mandatory Service Line Replacement

One of the goals of EPA's proposed rule is to replace all the nation's LSLs and GRR service lines as quickly as is feasible. EPA estimates that a 10-year replacement deadline is feasible for 96 to 99 percent of CWSs nationwide (USEPA, 2023g). For the limited number of systems for which EPA estimates this deadline is infeasible, EPA is proposing two eligibility criteria for systems to defer their service line replacement deadline past 10 years in accordance with a schedule that is feasible and prevents known or anticipated adverse health effects of lead to the extent feasible. To be eligible for a deferred replacement deadline, systems must meet either criterion or both criteria as described below. EPA notes that systems eligible for deferred replacement under the proposed rule may not need the additional time to replace all LSLs and GRR service lines; therefore, as discussed below, EPA is proposing to retain the provision in the LCR and LCRR that States must set a faster rate where feasible for a system. This proposed requirement would apply irrespective of whether a system is eligible for a deferred replacement deadline under the proposed rule.

The first eligibility criterion for deferred service line replacement is proposed for systems with a high proportion of LSLs and GRR service lines in their distribution system relative to their total number of households served. EPA does not have evidence to support that, for systems meeting this criterion, replacement of all LSLs and GRR service lines in 10 years would be affordable relative to a large system; therefore, EPA cannot conclude that the 10-year timeframe would be "feasible" as defined by section 1412(b)(4)(D) of SDWA. EPA is using the number of LSLs and GRR service lines per household because the household metric can be considered as a proxy for the number of individual ratepaying customers or households that can contribute to the overall replacement program costs through rate revenue.

EPA is proposing that systems would be eligible to defer their replacement deadline if they exceed a threshold identified in the rule. The proposed thresholds were calculated to identify the fastest feasible rate for the estimated one to four percent of systems for which the 10-year replacement deadline is not expected to be feasible. Systems would only be able to defer their service line replacement programs for as many years as necessary to ensure systems are replacing all LSLs and GRR service lines as quickly as feasible.

For this analysis, EPA investigated replacement rates achieved by 30 large systems (serving more than 50,000 people) with service line replacement programs (USEPA, 2023g). EPA assumed that the achieved service line replacement rates were affordable and feasible. EPA normalized the achieved replacement rate data by the estimated number of households served to estimate a per-household replacement rate. EPA considers the 95th percentile normalized rate (0.039 replacements per household per year) as the affordability threshold because it avoids setting the rate at the maximum recorded replacements per year rates, which were achieved by systems known to have received technical and financial assistance to support their replacement program that is unlikely to be broadly available when there is a national requirement to replace LSLs and GRR service lines. A stakeholder during the proposed LCRI external engagements recommended evaluating a typical system and avoiding the outlier cases when setting the pace and scope of a replacement program (USEPA, 2023j). Based on estimates developed from the number and type of service lines reported in the Needs Survey, EPA projects that a total of 663 to 2,134 systems (1.3 to 4.3 percent of all systems) would exceed this threshold (USEPA, 2023g) and be eligible for the proposed deferred replacement deadline. EPA is proposing that systems would be permitted to count only known LSLs and GRR service lines reported in their baseline LCRI inventory (the service line inventory submitted at the LCRI compliance date). The purpose of this limitation is to prevent systems from overestimating LSLs and GRR service lines with the number of unknown service lines and to avoid incentivizing systems to delay identifying unknown service lines to be eligible for the proposed deferred deadline provision. The proposed approach would incentivize systems to prioritize identifying unknown lines before the rule compliance date and prior to the start of their replacement programs (i.e., in the three years before compliance begins), creating public health and transparency benefits. EPA is seeking additional data on service line replacement rates achieved by systems in proactive programs (i.e., while any service line replacement rates achieved by systems is helpful, data provided on replacement programs that go beyond service line replacement in coordination with main replacement or emergency repair are especially useful for evaluating a system's capability to replace service lines at a rate that protects public health "to the extent feasible").

The second eligibility criterion for deferred service line replacement is proposed for systems that would be required to replace greater than 10,000 service lines per year under the proposed 10-year replacement requirement. Similar to the per-household deadline deferral option described above, systems would be permitted to count only known LSLs and GRR service lines reported in their baseline inventory to be eligible for this deferral. EPA selected 10,000 as the proposed upper threshold for what is technically possible because of potential system capacity to replace up to 10,000 LSLs per year. For example, Detroit's water system that announced they intend to replace 10,000 LSLs per year (City of Detroit, 2023), which suggests that Detroit's water system expects that this many annual replacements is technically possible. Another example includes the rates achieved by Newark, New Jersey, between January and March 2020 (CDM Smith, 2022). During this period, Newark replaced as many as 100 LSLs per day and maintained this rate 4 to 5 days per week. Due to the COVID pandemic, replacement rates dropped substantially in after March 2020. If this rate of 100 LSLs per day had been maintained for 20 weeks of the year, it would have resulted in between 8,000 and 12,000 replacements (CDM Smith, 2022). This indicates that 10,000 annual replacements could be technically possible for systems.

Based on the Needs Survey, EPA projects that only three to four systems nationally may be eligible for this deferral option (USEPA, 2023g). EPA expects that these atypical systems may not be able to feasibly replace all LSLs and GRR service lines in 10 years because an average annual 10 percent rate across a rolling three-year period would correspond to an atypically high number of required annual replacements, which EPA does not have evidence to support is “feasible” as defined in SDWA because it is not “technically possible.”

There are many possible factors that influence the number of annual replacements that are technically possible, some of which EPA heard during the LCRI external engagements, including seasonal weather changes that shorten the construction season in cold weather climates and contractor shortages in regions with many LSLs and GRR service lines (USEPA, 2023l; USEPA, 2023m). EPA also expects there to be other practical limitations in communities with atypically high numbers of required annual replacements, such as widespread service line replacements and significant street closures interfering with other water system operations. Service line replacement deferrals for a high number of required annual replacements could also reduce labor shortages by preventing larger urban centers from using all the contractors in the region.

EPA is seeking comment on an alternate annual service line replacement threshold of 8,000 replacements. One example of a system achieving this rate is Newark, New Jersey in phase II of their replacement program. This replacement threshold indicates the number of annual service line replacements nationwide that a system has successfully implemented of which EPA is aware. Additional evidence that indicates 8,000 replacements may be technically possible is that under Illinois's Lead Service Line Replacement and Notification Act, Chicago would be required to replace just under 8,000 LSLs per year (see "Illinois LSLR Analysis" in EPA-HQ-OW-2022-0801), considering only LSLs and excluding unknown lines. Based on the Needs Survey, EPA projects that only six to seven systems nationally may be eligible for this alternative deferral option (USEPA, 2023g). EPA is seeking comment on its overall deferred deadlines approach and the two eligibility criteria for offering service line replacement deferrals to systems with a high rate of replacement per households and systems with atypically high numbers of LSLs and GRR service lines. EPA is requesting comment on whether to require the State, as a condition of primacy, to approve the use of the deferred deadline provision where the water system qualifies for it and/or whether to require the primacy agency, as a condition of primacy, to assess whether it would be feasible for a system to meet the 10-year deadline or a shorter deadline even if they system meets the regulatory criteria for the deferred deadline. EPA is requesting additional data that indicate which threshold represents the maximum that is technically possible. EPA also anticipates that after ten years, when most systems have completed their service line replacement programs, there will be less competition for workers as well as supplies to conduct replacements. Additionally, EPA anticipates that following ten years, supply chains will have expanded significantly to meet increased demand and that service line replacement efficiency will increase following a decade of system experience and the potential availability of new technologies or procedures to expedite service line replacement. EPA is also seeking comment on whether data are available that would inform if the identified maximum replacement rate threshold could increase after ten years, such as if the threshold could double from 10,000 annual replacements to 20,000. See section IX. of this document for more information.

EPA is not proposing that systems should be able to defer service line replacement for other reasons. Allowing opportunities for systems to delay service line replacement based on other reasons could create loopholes that would impede the achievement of 100 percent replacement of LSLs and GRR service lines as quickly as feasible. Although stakeholders raised concerns during the proposed LCRI external engagements that unforeseen factors, such as supply chain delays and labor shortages, might create temporary delays in a system's replacement program (USEPA, 2023l), EPA's proposed three-year rolling average would provide flexibility when temporary shortages impede a system's ability to replace service lines in a given year (see section V.B.3.).

EPA also assumes that market forces will largely correct for shortages in labor or supplies, especially because the proposed compliance date for the final rule would allow three years for market corrections to occur before the 10-year service line replacement requirements even begin. In making this assumption for the proposed LCRI, EPA considered other examples of markets that are correcting in the context of drinking water requirements because they could be informative here. For example, with respect to the market availability of filters, EPA notes that some systems are already implementing widespread filter programs (Denver Water, 2023a). EPA is requesting comment on the ability of the market to correct for potential shortages in workers and materials to conduct service line replacement, as well to provide sufficient quantities of filters to comply with the service line replacement and other relevant provisions in the proposal. See section IX. for more information.

EPA also expects that system planning efforts can overcome these shortages. For example, to increase contractor capacity to accelerate their replacement rate, the City of Detroit actively engaged with potential contractors in 15 meetings that represented more than 50 organizations (City of Detroit, 2023). The meetings provided an overview of the procurement process and allowed contractors to ask questions. These contractors are being solicited to augment Detroit Water and Sewer Department's 17 new field service technicians who will also be conducting service line replacement. This City is also hiring and training local Detroit citizens as field service technicians to replace service lines, which will increase worker capacity for service line replacement (City of Detroit, 2023).

In another instance, Newark created a lead service line replacement apprenticeship program to increase worker capacity in the construction trade. As a result of the apprenticeship program, Newark hired 35 people from the community, most of whom were unemployed prior to the program. The apprenticeship program is cited as producing economic and employment benefits, with many of the participants still working with their company even after certain LSLR contracts have ended. While Newark has completed its LSLR program, these workers can contribute to LSLR in other parts of the State under New Jersey's law to replace LSLs in 10 years (Jersey Water Works, 2020; State of New Jersey, 2021). Furthermore, a local collaborative, Jersey Water Works, thinks this apprenticeship program can be replicated in other cities in New Jersey and other States nationally. With the promulgation of the 2023 Lead Poisoning Prevention Act in Rhode Island, any water suppliers and their associated contractors that receive an award of $1 million dollars or greater for an LSLR program from the State infrastructure bank is required to participate in an approved apprenticeship program for all apprenticeable crafts or trades that will be employed on the project at the time of bid (State of Rhode Island, 2023).

3. Service Line Replacement Rate

Rate Construct

In the 1991 LCR, EPA first noted the difficulty in determining a uniform, national LSLR rate to apply to all PWSs following a lead action level exceedance, considering that the number of LSLs and the population size served can vary substantially between systems (56 FR 26508, USEPA, 1991). The Agency had considered alternate rate constructs, such as a binning system, to assign different replacement rates based on different system characteristics but identified difficulties in designing a practical system (56 FR 26508, USEPA, 1991). EPA promulgated a uniform, national minimum LSLR rate of seven percent, corresponding to a 15-year deadline to replace all LSLs, where States must set a faster rate where feasible for systems that exceed the lead action level. The rule allowed for partial replacement and test-outs to count towards the replacement rate. In the LCRR, EPA also promulgated a uniform, national minimum LSLR rate, set at three percent following a lead action level exceedance and at a goal rate determined by the State following a trigger level exceedance, where systems calculate compliance using a two-year rolling average. The LCRR does not allow partial service line replacements or test-outs to count towards the replacement rate.

For the LCRI, EPA is proposing a national minimum average annual service line replacement rate of at least 10 percent, with compliance assessed in accordance with a three-year rolling average, equating to a 10-year replacement deadline. A single, default replacement deadline that would apply to all systems, except for systems required by the State to replace lines by a shortened deadline or estimated to be eligible for a deferred deadline, helps ensure a less complex rule for both systems and States, which was identified as a key priority for the LCRI in the LCRR review.

EPA recognizes that some systems can replace their service lines on a faster schedule than the default 10-year deadline, so, as noted earlier in this section, the Agency proposes to maintain the LCR and LCRR requirement that States set a shortened deadline for an individual system to complete service line replacement where feasible. EPA maintains the reasoning from the 1991 LCR record that "States will be in the best position to assess the factual circumstances of each individual system to determine the schedule which the system can feasibly meet" and should be the authority to decide whether individual systems can replace lead and GRR service lines on faster schedules (56 FR 26508, USEPA, 1991). EPA also maintained this finding in the LCRR (USEPA, 2020b). EPA expects this finding is even more true today, given that the implementation of many proactive and mandatory service line replacement programs nationwide has in recent years provided States with additional experience with systems' replacement programs. The proposed requirement that States must set a faster rate where feasible for individual systems helps ensure that the rule will require the replacement of all LSLs and GRR service lines as quickly as feasible, consistent with the SDWA requirement that a treatment technique rule "prevent[s] known or anticipated adverse health effects on the health of persons to the extent feasible" (SDWA 1412(b)(7)(A)).

EPA is proposing that States must set a shortened replacement deadline where feasible at any time throughout a system's replacement program and notify the system of the determination in writing, such as when the State determines a shorter deadline is feasible at the beginning of the replacement program or at some point further along the replacement program. For example, new information obtained during the replacement period through inventory investigations may inform the State's decision to require a shorter deadline. This proposed requirement would ensure systems are replacing service lines as quickly as feasible, such as where the conditions relevant to the feasibility of a system's replacement program change. EPA is taking comment on whether States should be required as a condition of primacy to set initial shortened deadlines by a certain timeframe, such as no later than 60 days after the compliance date (for more information, see section IX. of this document).

EPA is proposing a minimum average annual replacement rate that is calculated across a rolling three-year period (i.e., a three-year rolling average). Systems would first assess their average annual replacement rate at the end of the third year of mandatory service line replacement program by taking the average of the annual replacement rate percentages from years one, two, and three. The average annual replacement rate would be assessed on an annual basis thereafter starting at the end of the fourth year of mandatory service line replacement to calculate the average across a three-year period. The replacement rate construct would ensure that systems are making regular progress to replace these service lines while also allowing for flexibility for temporary disruptions to the system's service line replacement program. Establishing a minimum replacement rate allows States to enforce necessary actions sooner rather than later to ensure systems are making regular progress towards service line replacement, versus requiring only a single deadline that would not allow for such enforcement to take place before the deadline.

EPA is proposing to use a rolling average because the Agency recognizes the potential for annual variability in a system's annual replacement program that can affect the percent of service lines replaced each year. During the proposed LCRI external engagements, EPA heard many stakeholders highlight the potential for temporary disruptions to affect the number of service lines a system can replace annually, such as supply chain disruptions, workforce limitations, natural disaster incidents, and factors related to a system's access to conduct full service line replacements like customer consent (USEPA, 2023l; USEPA, 2023m).

EPA is also proposing to extend the two-year rolling average used in the LCRR to a three-year rolling average. Starting the rolling average at the end of the third year of mandatory service line replacement program would allow systems flexibility during the initial years of their replacement programs to identify unknown service lines, create and manage a replacement program, adjust for market corrections in labor and supplies, and obtain funding for service line replacement. It would also provide the system and community served with more time to advocate for or propose changes to water service agreements, State and local laws, ordinances, or regulations, to facilitate full service line replacement, as well as more time for those changes to take effect. For more information about potential changes to water service agreements, laws, ordinances, and regulations, please see section V.B.8. of this document.

A three-year rolling average also addresses stakeholder recommendations for the end of a replacement program, where stakeholders said additional flexibility is needed if there is declining interest in the replacement program, which may require systems to conduct more outreach for customers to consent to replacement (USEPA, 2023j). For example, the rolling average could provide flexibility, so the system remains in compliance if declining customer interest (such as towards the end of a replacement program) or temporary disruptions prevent the system from meeting the minimum annual rate in a single year, so long as the system had achieved higher replacement rates in the previous two years of its replacement program, such that the average of the rate across three years is at least ten percent. The system could then identify and implement strategies to increase their replacement rate in the future. The rolling average could also better allow systems to conduct replacements at prioritized sites, as this approach may take additional time relative to replacing service lines considering only replacement efficiency (e.g., focusing on areas with high LSL density).

Minimum Replacement Rate

In the LCRR, systems serving more than 10,000 people are required to conduct full service line replacement of LSLs and GRR service lines after exceeding the trigger level under a goal-based program at a rate approved by the State as well as to replace service lines under a mandatory replacement program after exceeding the lead action level at a minimum rate of three percent over a two-year period. To calculate the number of service lines requiring replacement in the LCRR, systems add the number of LSLs and GRR service lines in the initial inventory when the system first exceeds the trigger or action level plus the number of unknown lines in the beginning of each year of a system's annual goal or mandatory LSLR program.

EPA has found that its proposed minimum average annual rate of 10 percent calculated across a three-year rolling period is feasible as defined in section 1412(b)(4)(D) of SDWA. See section V.B.2. for a discussion on feasibility of the proposed service line replacement requirements. During the LCRR review and proposed LCRI external engagements, some stakeholders recommended that all LSLs should be replaced as soon as possible but not in more than 10 years, given the benefits of replacement to lower lead exposure from drinking water (USEPA, 2023h; USEPA, 2023i; USEPA, 2023j). Other stakeholders recommended retaining the three-percent rate because a higher rate is more challenging to meet when partial replacements and test-outs do not count as full service line replacements (USEPA, 2023j). Some stakeholders said that the LCRI should maintain the LCR's minimum seven percent replacement rate because the LCRR's three-percent replacement rate was too slow to protect public health, not counting partial replacement or test-outs (see docket no. EPA-HQ-OW-2021-0255; USEPA, 2023j). Other stakeholders said that replacing all LSLs in less than 10 years may not be feasible for many systems that have a large number of LSLs (USEPA, 2023j), and that any timeline should be balanced with other competing activities the system is required to conduct (USEPA, 2023j). While EPA determined that a 10-year replacement deadline is feasible in accordance with SDWA requirements (see section V.B.2.), EPA is also proposing service line replacement deferral options for systems meeting specific criteria because the 10-year replacement may be infeasible, as described in section V.B.2.

EPA is proposing that a system's "replacement pool" be calculated and updated annually in a similar way as the LCRR's number of service lines requiring replacement: the sum of the LSLs and GRR service lines in the baseline inventory (the inventory submitted by the LCRI compliance date), any non-lead service lines discovered as lead or GRR service lines, and the current number of unknown service lines in the inventory. The proposal details how a system calculates the annual number of replacements needed for a given program year by dividing the number of lines in the replacement pool by the number of years of the system's replacement deadline (e.g., 10 years, or an alternative deadline for a State-set shortened deadline or a deferred deadline). EPA is proposing the replacement pool be updated annually to subtract unknown service lines identified as non-lead lines as well as to add any non-lead lines found to be LSLs or GRR service lines. Unknown service lines identified to be LSLs or GRR service lines would be recategorized in the replacement pool; although, this recategorization would not change the number of lines in the replacement pool nor would it affect the replacement rate because they would already have been counted as LSLs or GRRs in determining the replacement pool and rate. EPA is also proposing the replacement pool be updated annually to subtract unknown service lines identified as non-lead lines as well as to add any non-lead lines found to be LSLs or

GRR service lines. This approach incentivizes systems to investigate unknown service lines at a faster rate to reduce their replacement pool and, therefore, the annual number of replacements they must conduct. Faster identification of unknown lines, including prior to the rule compliance date, would both improve public health protection and transparency with the community.

EPA is seeking comment on its proposed minimum average annual replacement rate and proposed replacement deadline of ten years. EPA is seeking comment on whether it is feasible or systems across the nation to complete service line replacement in a shorter timeframe than ten years, such as in six, seven, or eight years. EPA also is seeking comment on the rate construct approach, including how to calculate compliance with a given service line replacement deadline and average annual rate calculated across a rolling three-year period. EPA also seeks comment on whether systems should be required to meet a given minimum replacement rate in the first three years to give States an opportunity to enforce replacement rate progress sooner than three years after the compliance date. Lastly, EPA seeks comment on the complexity of the rate construct (see section IX. of this document).

4. Scope of Mandatory Service Line Replacement Requirement

Full Service Line Replacement

EPA is proposing to specify which replacements would count as a full service line replacement in § 141.84(d)(6)(iii)(B) and (C) and which do not count in § 141.84(d)(6)(iii)(D), as described below. While the LCRR used the definition of "full lead service line replacement" in subpart A of part 141 to specify full replacement criteria, these are substantive provisions that are integral to the requirements in § 141.84 (the service line inventory and replacement section). Including these substantive requirements in the service line replacement section of subpart I of part 141 instead of the definitions section of subpart A of part 141 should help water systems and States in implementation of these regulatory requirements.

EPA is proposing to modify the requirement in the LCRR definition of full lead service line replacement, which specified that the line had to meet the SDWA section 1417 definition of lead free that is applicable at the time of the full replacement. As raised by stakeholders in the proposed LCRI external engagements, the previous requirement could have required systems to prove that all solder or fittings meet the latest lead free definition in order to count as a full service line replacement (USEPA, 2023m), which was not EPA's intent. EPA recommends removing all sources of lead from drinking water; however, a requirement for the water system to document the material composition of each fitting and all solder in the service line would not be practicable and would divert resources from replacing LSLs and GRR service lines as quickly as feasible as well as likely result in the unnecessary replacement of lead free fittings and solder where documentation of their material is unable to be obtained. EPA is therefore changing the criteria for full service line replacement to require that the new service line (replacing the old line) must meet the proposed LCRI definition for the "non-lead" service line material categorization. To meet the definition of "non-lead," a service line must be determined through an evidence-based record, method, or technique not to be an LSL or GRR service line.

EPA is proposing to allow systems to physically disconnect the service line (such as by cutting the pipe) and count the disconnection as a full service line replacement if the service line is not in active use (such as at abandoned properties) and there is a State or local law in place or a system policy documented in writing that prohibits disconnected LSLs and GRR service lines from being put back into service. This proposed flexibility is in response to input heard during the proposed LCRI consultations, where a stakeholder recommended mandatory service line replacement account for cities that are sometimes home to tens of thousands of vacant housing units, which are not in active use and do not pose a risk of lead exposure in drinking water (USEPA, 2023j). This approach would address these lead sources more quickly and at a lower cost than a full service line replacement, which could likely increase the annual number of replacements a system may conduct, reduce costs by avoiding full replacement of lines that are not expected to be used again or by deferring the cost of replacement until the building is used again or the property is redeveloped. These costs savings could benefit the entire community by lowering the costs of the entire replacement program, potentially stretching external funding to conduct replacement of more lines and provide greater health protection to more individual customers. EPA notes that a potential downside of this approach is that allowing these disconnections to count as full service line replacements, which do not generate public health benefits, may delay public health benefits to consumers if these disconnections are conducted before full service line replacements of occupied residences.

EPA is seeking comment on allowing this practice to count towards a full service line replacement under the mandatory service line replacement program, whether the Agency should prohibit reconnection of these disconnected LSL or GRR service lines, and any alternative approaches to this practice. See section IX. of this document for more information.

EPA is also proposing to count full service line replacements where a non-lead service line is installed for use and the lead or GRR service line is disconnected from the water main or other service line. EPA is also proposing that when the lead or GRR service line is disconnected from the water main or system-owned portion of the service line but not removed, the water system must be subject to a State or local law or have a written policy to preclude the water system from reconnecting the lead or galvanized requiring replacement service line to the water main or other service line. EPA is seeking comment on EPA's approach to counting these lines as full replacements.

The proposed LCRI also would not permit lining or coating technologies to count as full service line replacement. Central to this rule is the goal of permanently removing from service all LSLs and GRR service lines in the nation. Lining and coating technologies do not permanently remove these lead sources from service. In addition, the uncertainty of the performance of these technologies over time would potentially require additional monitoring to ensure lead levels at the tap remain low. The added costs of site-specific evaluation to determine if this technology is appropriate, continued site monitoring to evaluate performance, and eventual re-lining or replacement of the service line when it reaches the end of its useful life, may reduce any potential cost savings associated with lining and coating technologies relative to full service line replacement, especially when compared to less expensive replacement methods (i.e., trenchless replacement technologies).

Partial Service Line Replacement

While the LCRR eliminates any requirement for water systems to conduct partial replacements to comply with the rule's mandatory and goal-based LSLR requirements, the rule does not explicitly restrict or ban partial replacements because partial replacements may be necessary to maintain water service in certain cases (e.g., following an emergency repair where the water system does not have access to conduct full service line replacement). The LCRR requires that, when conducting a partial LSLR, systems must provide advance notification to customers along with an offer to replace the customer-owned portion of the LSL and take risk mitigation measures after a partial replacement to reduce lead exposure that may result from the partial replacement, including providing public education and a pitcher filter or point-of-use device. The proposed LCRI, like the LCRR, would continue to prohibit both partial service line replacements and "test-outs" (i.e., where a tap sample from the service line tests at or below the lead action level following a minimum six-hour stagnation and is therefore considered "replaced") from counting towards the required average annual replacement rate, permitting only full service line replacements to count towards the replacement rate. Research has found that partial LSLR has not been shown to reliably reduce lead levels in the short term and may temporarily increase lead levels due to disruptions of established scales or galvanic corrosion (USEPA, 2011; see sections V.B.6. and V.B.9.), while service lines that have been sampled and have tested-out may contribute to lead at a later date (Del Toral et al., 2013).

In the LCRI, EPA is proposing to prohibit partial service line replacements unless it is conducted as part of an emergency repair or in coordination with planned infrastructure work, excluding planned infrastructure work solely for the purposes of LSL or GRR service line replacement. The exclusion clause would ensure that the rule itself does not cause additional partial replacements to be conducted solely for the purpose of LSL or GRR service line replacement. Planned infrastructure work would include water infrastructure or capital improvement projects that do not solely replace lead and GRR service lines as part of a service line replacement program. EPA discourages partial service line replacement due to its potential to temporarily increase lead levels in drinking water; however, the Agency anticipates an outright ban on the practice could be infeasible (USEPA, 2020b). For example, water systems conducting emergency main replacement may require the removal of at least a portion of the LSL due to the alignment or spacing requirements to connect the new main with existing service lines (USEPA, 2020b; USEPA, 2023j). Although EPA views planned and emergency infrastructure work as an opportunity for coordination with full service line replacement, barriers to access to the customer-owned service line may occur. EPA seeks any supporting or contrary views, any data or analyses about this exclusion of planned infrastructure work from the prohibition on partial service line replacement, and whether there are any additional limitations that could be added to ensure that partial service line replacements are only performed when necessary to avoid greater harms as a result of the emergency or inability to conduct planned infrastructure work for purposes other than solely to replace LSLs and GRR service lines. EPA strongly encourages water systems to conduct full service line replacement in coordination with planned infrastructure work to realize the efficiencies that can be gained (see section V.B.7. of this notice for additional information on service line replacement plans).

EPA considered requests from stakeholders to ban all partial replacements in all circumstances. However, as stated above, the Agency anticipates an outright ban on the practice could be infeasible (USEPA, 2020b). In the case of some emergency repairs, a partial replacement may be necessary to ensure prompt restoration of water service to the customer. Water service is critical to public health as it provides water for drinking, cooking, and sanitation.

LSLs and GRR service lines are likely to undergo significant disturbance as a result of planned infrastructure work or emergency repairs, increasing the risk from all lead sources that remain following the infrastructure work including partial, customer-side LSLs. To address the increased risk as a result of the disturbance, EPA is proposing that the system implements additional risk mitigation actions (see section V.B.6.). Proposed risk mitigation measures would take place immediately following the partial replacement and extend for up to six months after the partial replacement to protect public health. Coordinating replacements with existing infrastructure work may also result in lower costs of the overall replacement program and lower cost impacts to households where the program is funded through rate revenue. A stakeholder noted that this can also benefit low-income customers, who may be paying a larger percentage of their income towards their water bill (USEPA, 2023j). Proposed risk mitigation measures would take place prior to, during, and immediately following the partial replacement and extend for up to six months after the partial replacement to protect public health.

The proposed requirement to prohibit partial replacements, except during the limited circumstances described above, would improve public health protection by further limiting instances of partial service line replacements that pose risks to public health. EPA anticipates it will also strengthen environmental justice outcomes by eliminating partial replacements for lower-income customers solely for the purpose of service line replacement, given the greater costs of full replacement. In cases where partial replacement is planned to occur in coordination with non-emergency infrastructure work, EPA is proposing that systems must offer to replace the customer-owned portion at least 45 days prior to the replacement. The system would not be required to complete the full service line replacement where it does not have access to the customer-owned portion of the line. For more information about EPA's proposed requirements related to access, see section V.B.5. of this document. In the cases where the system is unable to gain access to complete the full service line replacement, it must take the proposed risk mitigation and notification protocols to reduce lead exposure to the consumer(s). The proposed rule also would require systems to include a dielectric coupling separating the remaining service line and the new service line to prevent galvanic corrosion unless the new service line is made of plastic (see section V.B.6. of this document for more information).

EPA is seeking comment on its approach to prohibit partial service line replacement unless the replacement is conducted in coordination with an emergency repair or planned infrastructure work (excluding planned infrastructure work that solely replaces LSLs and GRR service lines as part of a service line replacement program). See section IX. of this document for more information.

Lead Sources Subject to Replacement

Galvanized service lines that are or ever were downstream of an LSL can adsorb upstream lead particulates and contribute to lead in drinking water even after the original lead source has been removed (Deshommes et al., 2010; McFadden et al., 2011). EPA's proposed rule, like the LCRR, refers to these lines as "galvanized requiring replacement" or "GRR" service lines. Lead particles released from upstream LSLs can adsorb onto exposed iron scales, resulting in a buildup of lead particles in GRR service lines, which can persist even after the upstream LSL is removed (Wasserstrom, 2017). Lead can release from these scales contributing to lead occurrence in drinking water (Deshommes et al., 2010; Pieper, 2017; Sandvig et al., 2008). The co-occurrence of lead with iron was documented in a study in Washington, D.C., that found at least 10 homes with galvanized iron premise plumbing that, after full or partial LSLR, still had tap samples exceeding 0.015 mg/L lead, which was attributed to continued release of lead particles from exposed iron scales (McFadden et al., 2011). This study also conducted laboratory experiments on harvested galvanized iron pipes that had been downstream of LSLs specifically and showed elevated lead release over the entire 21 weeks of experiments. Due to the depth of lead scales in these iron pipes, the authors concluded that lead release could be triggered over the remaining pipe lifetime, acknowledging that changes in flow patterns or other site-specific circumstances could impact whether or not such releases occur (McFadden et al., 2011). While one stakeholder recommended that galvanized lines that were downstream of an LSL should be classified as non-lead after a period of time, stating that these lines eventually stop being a lead source (USEPA, 2023j), EPA disagrees with this stakeholder because the scientific literature does not support a timeline for these GRR service lines to cease contributing lead into drinking water.

These factors are why the LCRR service line replacement requirements include GRR service lines. It is also why the proposed LCRI retains the inclusion of GRR service lines in the mandatory service line replacement program. Where systems are unable to demonstrate that a galvanized service line never was downstream of an LSL, it must be categorized as a GRR service line and be subject to the proposed rule's service line replacement requirement to ensure that all potential GRR service lines are eliminated from the system. By downstream, EPA means that the galvanized service line was located after the LSL and in the direction of flow. For example, a customer's galvanized line would be downstream of an LSL if the LSL was installed in between the galvanized line and the water main.

The LCRR does not include lead connectors in the mandatory or goal-based LSLR program requirements. Lead connectors are short segments of lead pipe that are used for connections, usually between the service line and the water main. These connectors were excluded from the LCRR inventory requirements, and the LCRR did not require connectors to be replaced to meet the mandatory or goal-based LSLR requirements because in many cases connector material records are not available, and field investigating all connector material in the absence of records "would not be feasible or practical for most systems" as material identification would generally require disturbing pavement and repaving (86 FR 4213, USEPA, 2021a). The LCRR requires connectors to be replaced when the connector is encountered by the water system during planned or unplanned infrastructure work, which would include the required service line replacement program if encountered. Therefore, even without an affirmative requirement to locate, inventory, and replace a percentage of lead connectors, the LCRR requires the removal of some of these lead sources over time as they are encountered by the water system.

EPA is proposing to retain the LCRR requirement that systems must replace lead connectors as they are encountered, consistent with some stakeholder feedback EPA received during the proposed LCRI external engagements (USEPA, 2023m). While other stakeholders recommended that EPA go farther and require all lead connectors to be inventoried and included in the mandatory service line replacement requirement (USEPA, 2023j; USEPA, 2023l), the proposed rule does not include those requirements because it would reduce the resources available for service line identification and replacement. The approach of the proposal ensures regular progress towards lead connector replacement is made in coordination with other activities, such as planned infrastructure work, while resources are prioritized for replacement of all LSLs and GRR service lines as quickly as feasible. EPA notes that, where lead connectors are encountered during replacement of an LSL, they would be required to be replaced. Thus, all lead connectors that are attached to a lead or GRR service line would be replaced by the end of the mandatory service line replacement program. EPA also expects that many lead connectors may be connected to aging water mains and likely to undergo replacement with routine main replacement activities in coming years. Given the Federal lead piping ban in 1986, any lead connector is expected to be a minimum of 41 years old by the LCRI compliance date in 2027. The average service life of cast iron, ductile iron, and asbestos-cement pipe is 40 years (Florida Department of State, 2010). A recent survey determined that 82 percent of all cast iron mains and 27 percent of all cement mains are over 50 years old (Folkman, 2018). Correspondingly, overall leak rates have increased almost 30 percent between 2012 and 2018, with even greater increases in iron and cement mains (Folkman, 2018). Thus, many aging mains may likely be replaced in the coming years, either because they are at the end of their useful life or because they are leaking, resulting in the replacement of additional lead connectors attached to those aging mains. Main replacement involves cutting pavement, digging, and reconnecting service lines to the new main; therefore, lead connectors replaced in coordination with main replacement can be more efficient and a better use of time and resources. Additionally, as discussed in section V.D.4., EPA is proposing to require lead connectors to be inventoried where records are available as well as where lead connectors are replaced and for that inventory information to be made available to the public. Including in the inventory where lead connectors have been replaced can provide additional information to the public on potential sources of lead in drinking water, which can be especially informative for customers with galvanized service lines or premise plumbing, since these galvanized pipes previously downstream of a lead connector could be a source of lead as further discussed below. These additional requirements increase transparency about this potential source of lead exposure. EPA is also proposing a definition for lead connectors to not exceed two feet to ensure all LSLs are captured in the mandatory replacement requirement (see section V.L.3.) and not improperly categorized as connectors.

Some stakeholders have recommended that EPA require replacement of galvanized service lines downstream of lead connectors because these lines may adsorb lead by the same mechanism as galvanized service lines downstream of LSLs. EPA supports water system efforts to remove any potential source of lead in drinking water, including galvanized service lines that are or were downstream of lead connectors. EPA notes that these service lines are eligible for funding under the $15 billion BIL DWSRF LSLR appropriation along with service line identification and replacement of LSLs, GRR service lines, and lead connectors as well as planning, design, and other pre-project costs directly connected to LSLR. EPA is proposing that the LCRI service line replacement requirements focus on eliminating the most significant sources of lead in drinking water, which are lead and GRR service lines where present, from the system as quickly as is feasible. This approach would not delay the public health benefits associated with replacing these more significant lead sources for customers served by these service lines. It is hypothesized that galvanized service lines that are or were downstream of an LSL may be a more significant lead source than those that are or were downstream of a lead connector, given that previous research has suggested that the length and diameter of LSLs are likely to be key factors in the amount of lead released (Deshommes, 2016; Sandvig et al., 2008). Given that LSLs are tens of feet long, while EPA's proposed definition of connectors does not exceed two feet, EPA expects that galvanized lines downstream of lead connectors may contribute less lead into drinking water than those that were downstream of much longer LSLs.

Additionally, EPA expects that some systems may voluntarily replace galvanized service lines that are or ever were downstream of a lead connector when encountered during main replacement, given the age and likely poor condition of these service lines. The average service life (i.e., the period of service that can be reasonably expected) of a galvanized steel pipe is 35 years (Florida Department of State, 2010). By the proposed LCRI compliance date in 2027, most galvanized service lines that are or were attached to a lead connector will be a minimum of 41 years old, as lead piping was banned at the Federal level in 1986. An examination of the galvanized pipe and related products certified by NSF to NSF 61 revealed only one manufacturer of galvanized water pipes (National Sanitation Foundation, 2023), so EPA does not expect that it would be common for new galvanized service lines to be installed. Because both the system-owned and customer-owned portions of a galvanized service line would be beyond their useful life, and because it is more cost efficient to simultaneously replace both portions of the service line, EPA expects that some systems may fully replace these galvanized service lines. It is also possible that due to the significant rusting and likely poor condition of these lines, service lines at or past their physical life may break during construction or burst following re-pressurization following a main replacement or following a partial service line replacement, necessitating their replacement to allow for continued water service. EPA expects that some replacement of these galvanized service lines that are or were downstream of a lead connector may occur in coming years with planned or emergency main replacement as well as when these service lines fail. Focusing the proposed service line replacement requirements on LSLs and galvanized service lines that are or were downstream of an LSL will allow these more significant lead sources to be eliminated as quickly as feasible, and with lower overall replacement program costs.

EPA has found limited information of the existence of lead-lined galvanized service lines and little information about their prevalence (MWRA, 2023; Sedimentary Ores, n.d.). A lead-lined galvanized service line is covered by the definition of an LSL under the LCRR (USEPA, 2022b), and this remains true under the proposed LCRI. Therefore, any lead-lined pipe would be required to be categorized as an LSL in the inventory and would be subject to the same proposed LCRI requirements as other LSLs in the inventory, such as mandatory service line replacement, public education, tap sample tiering, and risk mitigation. As EPA notes in its "Guidance for Developing and Maintaining a Service Line Inventory" (or the LCRR Inventory Guidance, USEPA (2022b)), systems that attempt to identify lead-lined pipes by visual observation (such as excavation) may not see an interior lead lining, and the guidance contains recommendations for systems to consider information available that indicates the possible presence of lead-lined service lines when categorizing their service lines and choosing material investigation techniques (USEPA, 2022b).

EPA is requesting comment on all aspects of its proposed scope of the replacement requirements, including what constitutes a full service line replacement and which lead sources are subject to replacement under the mandatory service line replacement program. For more information, see section IX. of this document.

5. Water System Access to Full Service Line

EPA is authorized by SDWA to regulate PWSs to include any "distribution facilities under control of the operator of such system and used primarily in connection with such system" (SDWA 1401(4)(A)). In the LCRR, EPA permits only full lead service line replacement to count towards a system's replacement rate, but allows the system to remain in compliance if they were unable to meet the mandatory replacement rate because a customer refuses to participate in the replacement program or does not respond to the system after two good faith efforts to reach the customer.

The proposed LCRI would require water systems to replace all lead and GRR service lines, and any lead connectors encountered, that are "under control of" the water system. EPA is proposing to treat a service line as under the system's control wherever a water system has adequate access (e.g., legal access, physical access) to conduct full service line replacement. This means that a water system would be in violation of the rule if the system fails to replace a service line in accordance with the proposed requirements even though it has adequate access to conduct a full service line replacement. EPA is proposing to treat a connector as under the system's control wherever a water system has adequate access (e.g., legal access, physical access) to conduct replacement of the connector. EPA is not proposing to delineate the prerequisites or elements of "access" that a system would need to conduct full service line or connector replacement because of the wide variation of relevant State and local laws and water tariff agreements as well as the potential for these to change over time. Instead, EPA emphasizes the many requirements proposed in the LCRI, in addition to funding and non-regulatory actions, that can increase a system's access to full service line replacement. EPA is aware of data and anecdotes from water systems demonstrating the ability to increase access for full service line replacement, such as where customer consent or payment is required for access. EPA included in the proposed LCRI requirements and flexibilities to increase access and expedite full service line replacement and are described in detail in the following sections.

Service Line Replacement Plan

As described in section V.B.8. on the service line replacement plan, EPA is proposing that systems include in their plans identification of any State or local laws or water tariff agreement provisions that govern the water system's access to conduct full service line replacement. States would be required to identify any State laws, including statutes and constitutional provisions, that pertain to a water system's access to conduct full service line replacement and notify water systems in writing whether any such laws exist or not by the LCRI compliance date. States must also notify systems within six months of the enactment of any new or revised State law impacting access to full service line replacement. Based on EPA's evaluation of full service line replacement programs, EPA is aware that there are laws and water tariff agreements relevant to whether a water system has access to conduct full service line replacement (USEPA, 2019a; USEPA, 2023g). These include laws governing the water system's physical access to private property to conduct the replacement and the water system's ability to conduct full service line replacement without the expressed consent of the customer and, in some places, without the customer's agreement to pay for all or a portion of the replacement costs.

These proposed service line replacement plan requirements would support and encourage water systems to comply with the proposed rule to conduct full service line replacement when the service line is under control of the system. This is especially important where the water system's self-identified elements of "control" of the service line determine whether the water system must conduct the replacement. In some cases, identification of applicable laws and tariffs may help systems to realize they already have access to the full service line for replacement. The requirement to make these potential access barriers publicly available in the service line replacement plan would also facilitate public engagement on the effect existing State or local laws or water tariff agreements have on a system's access for full service line replacement. Examples of systems and States that have changed existing State or local laws or water tariff agreements to overcome barriers to full service line replacement are described in section V.B.8.

Public Education and Engagement

As described in Section V.H., the proposed LCRI includes additional requirements, along with public education requirements maintained from LCRR, for water systems to better inform customers of the risks of lead in drinking water and the benefits of full lead and GRR service line replacement, which could increase the number of customers willing to provide any necessary physical access where customer consent is required. For example, customers must be notified annually if they have an LSL, GRR service line, or unknown service line, including information about service line replacement, and must also be given notice whenever these lines are disturbed by the water system. EPA is proposing in the LCRI that systems would make a "reasonable attempt" to engage the property owner about service line replacement, which entails at least four outreach attempts using at least two different communication methods. Systems must attempt to gain access for full replacement again upon any change in property ownership, even after the systems' replacement deadline has passed. Systems that fail to meet their service line replacement rate are subject to proposed requirements to conduct at least one of a prescribed list of public education activities to discuss their mandatory service line replacement program and opportunities for replacement. With the proposed requirements for systems to provide customer-requested sampling and as well as the requirement to provide prompt notice of consumers' lead sample results, EPA expects some customers might be more willing to provide access based on sampling results. Where compliance sampling tests above the lead action level and is subject to the proposed distribution system and site assessment requirements, a system could identify the presence of a lead or GRR service line as the probable cause for the higher lead levels, which could increase the likelihood that customers provide access for service line replacement. The community as a whole will be better informed of the service line replacement program through their system's publicly accessible inventory that includes proposed requirements for increased transparency and publicly accessible service line replacement plan, in addition to proposed requirements for information about them to be included in the annual Consumer Confidence Report. Systems that exceed the lead action level, in accordance with the LCRR, are required to provide public notice within 24 hours as well as public education within 60 days, the latter of which must include information about service line replacement. Additional public education requirements are proposed after a system has multiple lead action level exceedances, which could further educate customers about lead in drinking water and the benefits of service line replacement. The increased notification and public education, especially after water systems report higher lead levels could increase customer willingness to provide access for service line replacement. For water systems serving a large proportion of consumers with limited English proficiency, the proposal requires public education materials to include information about where consumers can obtain a translated copy of the materials or translation assistance.

EPA is aware of anecdotes supporting the notion that robust public education can increase customer participation in systems' replacement programs. Many of these customer engagement best practices have been incorporated into this proposed rule to facilitate systems reaching the goal of replacing 100 percent of LSLs and GRR service lines in the nation (see above and section V.H.). These anecdotes are summarized below.

Frequent customer communication and engagement using multiple outreach methods was cited as important to obtaining customer consent for full service line replacement. For example, the Lansing Board of Water and Light in Michigan replaced 100 percent of their LSLs over a 12-year period and noted that the system had not sought easements to conduct replacements, relying instead on "good customer interaction and follow-through" (AWWA, 2016). Lansing emphasized their engagement strategies, such as brochures and bill stuffers, open houses at local schools and community centers, customer education in their water quality report, letters sent to homes with LSLs, and in-person follow up with the customer prior to the date of the service line replacement to explain the replacement process. A "comprehensive community outreach effort" in Detroit, Michigan, is credited as one of the main factors allowing the City to achieve 100 percent homeowner participation to conduct private side replacements in accordance with main replacements (City of Detroit, 2023). The engagement process, which started approximately 40 days in advance of construction, included "extensive outreach" that included community meetings in nearby parks or public areas, information packets hand-delivered to each residence, and provision of pitcher filters (City of Detroit, 2023). Officials from Stoughton, Wisconsin, a small system that replaced all of the city's nearly 700 LSLs in 2021, cited phone calls, social media, local newspapers, and an LSLR program website as key to keeping citizens engaged and informed (City of Stoughton Utilities Committee, 2022). Quincy, Massachusetts, another small system, cited use of multiple communication mediums to inform customers about their LSLR program, such as community meetings, a public-facing website, public displays, letters to targeted homes, translated informational letters, and certified mail (MWRA, 2023). The Halifax, Canada water system recognized the importance of customer engagement and recommended the use of communications consultants prior to launching a replacement program. Halifax also recommended sending customers multiple notifications, including targeted communications for those who are scheduled for imminent replacement (AWWA, 2022). Green Bay, who replaced all their LSLs in 2021 (AWWA, 2020) hired consultants to evaluate their communication needs and ultimately decided to hire a full-time staff to lead that effort. They also noted that many customers did not respond on the first notification attempt and recommended diversifying by using all available channels and communication types (AWWA, 2022). Denver Water similarly emphasized the importance of using multiple communication methods and making multiple attempts to reach customers, requiring a customer be contacted twice by mail and once in-person before being added to the “non-responsive” list (Denver Water, 2023b). Even upon being added to this list, additional contact attempts when city contractors are in the area are permitted, and an additional outreach approach was developed for those who initially refused contact. Further, if a property on the “non-responsive” or “refusal” list changes ownership, the outreach process was automatically restarted. This organized outreach approach resulted in acceptance of full service line replacement in approximately 90 percent of homes, with partial replacements only conducted in one to two percent of homes between 2020 and 2022 (Denver Water, 2023b). Another strategy employed in both Denver and Chicago was conducting a pilot-program in targeted neighborhoods to receive feedback and learn best practices prior to beginning their full-scale programs (Rockefeller Foundation, n.d.).

Partnerships with organizations outside the water system were also cited as increasing customer participation in several service line replacement programs. Denver Water specifically identified and enacted paid partnerships with community organizations who had connections with marginalized communities to build trust in these areas (Wilking et al., 2022). Denver also worked with local administrators of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) who provided geographic data to better understand where homes with people most sensitive to the adverse health effects of lead (i.e., infants and pregnant women) were located. Green Bay's water system employed similar partnerships with local organizations, working with both the local WIC program and pediatricians in the area to better identify high risk populations (AWWA, 2022). Similarly, Toledo's water system partnered with Freshwater Future, an environmental organization already working in the area, to gather input and host lead educational events about the occurrence and risks of lead in drinking water (Rockefeller Foundation, n.d.). Some systems have used designated ambassadors to ensure their message is reached by specific communities. Newark's water system, who has replaced 100 percent of their LSLs, coordinated closely with existing community partners that became ambassadors for the LSLR program (AWWA, 2022). In Philadelphia, following a survey showing that 42 percent of residents drink bottled water instead of tap water, ambassadors were recruited from populations who reported high bottled water use to educate those communities about the activities of the drinking water system and were tasked with engaging community members at events sponsored by the ambassador organization (Drink Philly Tap, n.d.).

In addition to individual customer communication, some water systems conducted community events to promote their service line replacement programs to the public. The previous examples mention systems hosting open houses at local schools and community centers and community meetings to inform the public about service line replacement. Pittsburgh Water and Sewer Authority also used community events, hosting multiple events around the city to hear customer concerns, answer questions, and describe plans for their service line replacement program (PGH2O, n.d.). These events, along with individual outreach efforts prior to starting any construction, helped secure approval for full service line replacement from approximately 90 percent of residents when an LSL was discovered on their property.

Funding and Non-Regulatory Actions Supporting Service Line Replacement

Significant funding is available for covering the cost to replace the customer's portion of the service line, such as the $15 billion from BIL. Section IV.G. of this document summarizes the many funding sources available for service line replacement.

EPA also supports water systems with service line replacement through its water technical assistance (WaterTA) and "Lead Service Line Replacement Accelerators" initiatives (see section IV.G. of this document). EPA's assistance may contribute to increased system access to full service lines given the Agency's experience working with many systems and identifying best practices that can inform other water system's replacement programs. In addition. EPA guidance documents "Strategies to Achieve Full Lead Service Line Replacement" (USEPA, 2019a) and "Guidance for Developing and Maintaining a Service Line Inventory" (USEPA (2022b) contain information and case study examples which may assist water systems in identifying ways to increase their access to identify service line materials and fully replace service lines.

Additional Incentives to Overcome Customer Access Barriers

The proposal contains several additional requirements and flexibilities for water systems to overcome potential customer access barriers and expedite service line replacements. For example, the proposal allows systems to defer CCT steps, including costly and complex pipe loop optimization/re-optimization studies, if they can replace all lead and GRR service lines in their system within five years at a rate of a minimum of 20 percent of lines per year. To take advantage of this proposed pathway, systems are incentivized to find ways to obtain access to each lead and GRR service line to replace 100% of lead and GRR service lines within five years.

Systems are also incentivized to find ways to access each lead and GRR service line for replacement because replacement of these significant lead sources can reduce the system's 90th percentile lead level, decreasing the likelihood of a lead action level exceedance and the subsequent need to install (and maintain) or re-optimize OCCT (that could involve costly CCT studies), replace lead-bearing plumbing or install point-of-use filters (for small systems that choose not to install or re-optimize CCT), and make filters available if the system meets the definition for multiple lead action level exceedances. In addition, for systems without lead and GRR service lines that exceed the action level due to other sources of lead (i.e., premise plumbing), they would be able to conduct less costly, less complex, and less time-consuming CCT studies, such as coupon studies, should they be required to initiate OCCT steps. Other proposed requirements, such as the more rigorous sampling of the first and fifth liter at LSL sites, could also be avoided where systems accessed and replaced all lead and GRR service lines.

In addition, systems that have replaced all their lead and GRR service lines would have to meet fewer public education requirements. For example, systems without lead, GRR, or unknown service lines would not have to meet the proposed notification and risk mitigation requirements after a service line disturbance, as well as the annual notification of service line material type to these consumers. Additionally, systems would not have to meet the proposed requirements for system outreach to individual customers to attempt to gain access for the full replacement if there is a change in the ownership of the property. With the most significant lead sources replaced, systems would also have a lower likelihood of measuring higher lead levels, which are tied to the 24-hour notification requirements after a lead action level exceedance and distribution system and site assessment requirements.

Proposed Requirements When a System is Unable to Obtain Access

EPA expects that, in cases where customer consent is required by State or local laws to complete full service line replacement, some customers may not consent to replace the full service line. This concern was raised in the proposed LCRI external engagements (USEPA, 2023m). EPA is proposing that, where customer consent is required by State or local law or water tariff agreement, the system would be required to make a reasonable effort to obtain property owner consent. EPA is proposing that a reasonable effort includes a minimum of at least four attempts to engage the customer using at least two different methods, which is double the outreach as compared to the LCRR and incorporates the best practice of using multiple communication methods to reach the customer. EPA is proposing to explicitly provide that States may require systems to conduct additional attempts and may require specific outreach methods to be used. If customer consent is required by State or local laws and the water system is unable to obtain consent, the water system would not be required to conduct a full service line replacement because, under those circumstances, the full service line would not be "under the control" of the operator of the system. EPA is requesting comment as to whether a reasonable effort to obtain property owner consent should be more than four times (e.g., five, six, or seven times).

This proposed requirement is also responsive to some stakeholders who, during the proposed LCRI external engagements, sought a clearer definition of a "good faith effort" to contact the homeowner regarding service line replacement and stated that systems should not be held responsible when customers refuse access for replacement of their portion of the line (USEPA, 2023j). In the proposed LCRI, water systems would be required to continue annual outreach at sites where customer consent is required by law or water tariff agreement, but the customer refused to provide consent for replacement and the LSL or GRR service line remains in place. In addition, whenever there is a change in ownership, even after the mandatory service line replacement deadline has passed, the system would be required to offer to conduct the replacement.

During the LCRR review and proposed LCRI external engagements, EPA heard anecdotes of customers refusing replacement, even if it was offered for free, for reasons including mistrust of the water system or government, not believing the replacement is important, or to avoid the disruption to landscaping that may result from a replacement (USEPA, 2023j). A system's existing authority to access the service line and complete the full service line replacement might provide the system with the legal authority to conduct the service line replacement over the objection of the property owner or resident. However, as some stakeholders noted, requiring service line replacement at properties where customers object to their replacement could create potential safety concerns for utility staff. EPA is seeking comment on whether the proposed LCRI should either allow systems to treat those service lines as not under the control of the system and forego replacement of the lines or require systems to conduct full service line replacement in situations where the system has legal access to conduct the full replacement but property owners or residents deny physical access.

Assessment of Service Line Replacement Cost-Sharing Prohibition

Some stakeholders have argued that EPA "can require full LSLR through the authority granted by the SDWA to regulate 'distribution facilities under the *control* of the operator' of a public water system" and that "PWSs exert control over the entire service line, including the part located under private property, in various ways, as recognized by both EPA and water systems themselves." These stakeholders argue that full service line replacement is the "best available technology" based on the records for the 1991 LCR and the LCRR, the legislative history on the definition of "feasibility" in SDWA (See "NRDC and Earthjustice 2023 Letter.pdf" in EPA-HQ-OW-2022-0801), and the City of Newark's service line replacement program (City of Newark, n.d.a).

These stakeholders assert that "full LSLR as a treatment technique and BAT [best available technologies] necessitates the prohibition of cost-sharing" (i.e., requiring customers to pay for the replacement of their portion of the line). They reason that "[w]hen utilities rely upon cost-sharing, low-income communities and communities of color are less likely to benefit from full service line replacement. Thus, cost-sharing fails to carry out the statutory mandate to use the best feasible technology or technique available to reduce lead levels across the distribution system controlled by the public water system." Therefore, the stakeholders conclude, "to reduce lead in drinking water and comply with the SDWA and LCR, EPA must prohibit cost-sharing by water systems. Without such a prohibition, either no replacement or only partial replacement will continue to take place in vulnerable communities, with lead levels either remaining the same or increasing, respectively" (see "2023-04-28 Authority Letter Final" in EPA-HQ-OW-2022-0801).

In developing the proposed rule, EPA considered this perspective, but ultimately chose not to ban cost-sharing. EPA is not aware of a factual basis to support the stakeholders' assertion that PWSs control all portions of all service lines. To the contrary, EPA is aware that in some cases, public water systems do not control all portions of all service lines (LSLR Collaborative, n.d.a). EPA is also aware that water systems have conducted systemwide full service line replacement with cost-sharing (e.g., Madison, Wisconsin) (Madison Water Utility, 2014).

Moreover, EPA is concerned that such a prohibition would result in the further delay of full service line replacement. EPA has not used its section 1412 authority under SDWA to direct how a water system covers the costs of compliance with a national primary drinking water rule, which is, at its core, a matter of State and local law. There is no explicit statutory authority for EPA to do so; State and local governments regulate how water systems provide and charge for services to their customers. EPA expects that any attempt to assert Federal authority over how water systems charge for their services would be met with a protracted legal challenge that would delay implementation of the rule.

At the same time, EPA recognizes that the LCR and LCRR include statements that address the question of who pays to replace the portion of the LSL that is not "owned" by a water system, asserting that "[t]he water system is not required to bear the cost of replacement of the portion of the lead service line not owned by the water system" (see 40 CFR 141.84(e) and (g)(7) in the LCRR and 141.84(d)(1) in the LCR). Consistent with the lack of authority to determine how water systems charge for services, EPA proposes to remove from the LCRI any statements from the LCR and LCRR that address how a water system should or should not cover the cost of replacing services lines under the control of the system as well as statements on whether a water system is or is not responsible for the cost of full service line replacement. Instead, the proposed LCRI remains neutral on this matter of State and local law.

EPA does, however, strongly encourage customer-side service line replacement to be offered at no direct cost to the customer wherever possible to achieve higher customer participation rates and reduce potential environmental justice impacts that may result where customers cannot afford to replace their portion of the line. EPA anticipates the proposed requirements and flexibilities to incentivize systems obtaining access, as described above in section V.B.5., would also incentivize water systems to fund customer-side service line replacement. Furthermore, significant Federal funding is available for service line replacement (discussed in section IV.G.), some of which is directed to disadvantaged communities least likely to afford full service line replacement. Additionally, Federal civil rights laws, including Title VI as described in sections IV.H. and V.B.9., incentivize systems to achieve full replacement outcomes that do not discriminate on the basis of race, color, or national origin.

6. Risk Mitigation Activities to Reduce Lead Exposures

The LCRR requires systems to take specific risk mitigation actions after various types of disturbances and replacements because of their potential to temporarily increase lead levels in drinking water. The LCRR requires water systems to provide pitcher filters or point-of-use devices certified by an American National Standards Institute accredited certifier to reduce lead in drinking water (along with public education materials and six months of filter replacement cartridges) following partial and full LSLR, replacement of a lead connector, and some disturbances before the affected service line is returned to service. The LCRR also requires that water systems include information for customers to flush service lines and premise plumbing of particulate lead in their LSLR plan.

EPA is maintaining the LCRR requirement that water systems provide pitcher filters or point-of-use devices certified by an American National Standards Institute accredited certifier to reduce lead in drinking water following full and partial replacement of lead and GRR service lines and after replacement of a lead connector, inline water meter, and water meter setter.

Research shows that, while flushing can be effective at reducing lead levels, particulate lead spikes are still possible in the short term while the service line reaches stabilization following service line replacement. A study conducted sequential sampling following LSLR at 14 sites across the United States and Canada, where each site was flushed for 15 minutes, both immediately following LSLR and again the day after replacement (Sandvig et al., 2008). The authors noted that many sites registered high lead concentrations, primarily from particulate lead, and that the flushing protocol "did not adequately reduce these high lead levels." While most detected particulate releases took place in the first several days following LSLR, data from one site suggested the potential for lead accumulated in the system to be released for months afterwards (Sandvig et al., 2008). In a more recent study, Brown and Cornwell (2015) examined three more rigorous high-velocity flushing protocols in three communities following LSLR. In all three communities, lead levels above 0.015 mg/L were still observed in at least one sample after flushing, and no flushing protocol tested was able to entirely prevent such lead releases from occurring. Additionally, in the only community examined with pre-LSLR lead data available, lead levels improved or remained below the detection limit in seven homes after LSLR, while there were short-term increases in the remaining five homes (Brown and Cornwell, 2015). Because of the shortcomings of flushing alone, the proposed LCRI would maintain and strengthen the LCRR requirements to provide pitcher filters or point-of-use devices following full and partial replacement of LSLs and GRR service lines and after replacement of a lead connector, inline water meter, and water meter setter.

To further strengthen these risk mitigation requirements, EPA is proposing to revise the regulatory language regarding filter distribution to clarify that water systems are required to provide filters and replacement cartridges to every occupancy, rather than residence, as required in the LCRR, to ensure that non-residence building occupants, such as businesses, also receive filters following replacement or disturbances. While some stakeholders raised concerns during the proposed LCRI engagements about the availability of sufficient filter quantities in the market to meet new demand created by additional rule requirements (USEPA, 2023j), EPA assumes the market will respond to meet the needs of the final LCRI requirements (see discussion in section V.B.2. of this document).

EPA is proposing to maintain the requirement that filter replacement cartridges be provided for six months. Many stakeholders recommended the use of filters for six months following service line replacement (USEPA, 2023h; USEPA, 2023i). The six-month timeframe would allow consumers to continue drinking filtered water while waiting for the results of their follow up tap sample, which EPA proposes that water systems take between three and six months following replacement. EPA also notes that some filters are certified to reduce lead in drinking water with one cartridge lasting six months, depending on water usage. For water systems using these filters, only one filter cartridge may be needed when assuming typical water use.

In addition, EPA is proposing a new mitigation requirement that, following partial service line replacement, water systems would be required to install a dielectric coupling separating the remaining LSL or GRR service line and the replaced service line unless the replaced service line (i.e. new service line) is made of plastic. This requirement aims to reduce the risks of galvanic corrosion between lead and other metallic pipes because resulting lead release has been documented in previous lab-scale studies (DeSantis et al., 2018; Triantafyllidou and Edwards, 2011; Wang et al., 2012). Multiple laboratory experiments using harvested pipes have shown substantial decreases in lead release when the electric connection is broken or dielectric couplings are inserted (Clark et al., 2013; St. Clair et al., 2016; Wang et al., 2013), lending credence to the value of requiring the insertion of such couplings. Additionally, the Science Advisory Board noted in 2011 that "[i]nsertion of a lead-free dielectric eliminates galvanic corrosion at the new pipe junction by breaking the electrical circuit between the new and old pipes," concluding that "insertion of a dielectric will likely reduce lead levels in tap water, but it cannot confidently estimate the magnitude of the reductions because the contribution of galvanic corrosion and depositional corrosion to drinking water lead levels has not been quantified" (USEPA, 2011). EPA is requesting comment on the requirement to include a dielectric coupling and request comment on other risk mitigation steps water systems could take.

The proposed LCRI clarifies the type of tap sample (e.g., first liter, paired first and fifth liter) water systems would be required to offer to customers following full and partial service line replacement to conform with proposed requirements under tap sampling (see section V.C. of this document). Following a full service line replacement, the proposed rule would require a first-liter sample to be taken, as higher lead levels are not expected in the fifth liter, which has stagnated in contact with the new, non-lead service line. Following a partial service line replacement, systems would be required to take a first- and fifth-liter sample to screen for lead in the service line as well as premise plumbing.

EPA is proposing to retain the requirement that water systems conduct risk mitigation steps following disturbance of a lead, GRR, or unknown service line. Following operations that cause the water to be shut off or bypassed, EPA is proposing that systems must provide customers with flushing instructions before the affected line is returned to service. Following more significant disturbances, such as those that result in the pipe being cut, EPA is proposing to also add the requirement that the customer be provided with a filter. EPA is proposing to require risk mitigation actions following disturbances resulting from physical action or vibration (e.g., mechanical or vacuum excavation during service line material investigations). For more information, see section V.H.2. EPA is proposing that risk mitigation actions after a disturbance apply to lead status unknown service lines, given the possibility they might be LSLs or GRR service lines. For example, in the case of significant disturbances, EPA is proposing that systems must provide filters to their customers with unknown service lines, just as EPA is proposing for LSLs or GRR service lines.

7. Service Line Replacement Plan

The LCRR introduced the requirement for systems to develop an LSLR plan to allow them (1) to quickly commence a systemwide replacement program following a lead trigger level or action level exceedance and (2) to be ready to complete customer-initiated LSLR requests regardless of their 90th percentile lead level. Additional plan elements were included to advance public health protection, efficiencies, and equity in the overall replacement program. The required plan elements included:

- A strategy for determining the composition of lead status unknown service lines in the system's inventory;
- A procedure for conducting full LSLR;
- A strategy for informing customers before a full or partial LSLR;
- For systems that serve more than 10,000 persons, an LSLR goal rate recommended by the system in the event of a lead trigger level exceedance;
- A procedure for customers to flush service lines and premise plumbing of particulate lead;

- An LSLR prioritization strategy based on factors including but not limited to the targeting of known LSLs, LSLR for disadvantaged consumers and populations most sensitive to the effects of lead; and
- A funding strategy for conducting LSLRs that considers ways to accommodate customers that are unable to pay to replace the portion they own.

The proposed LCRI updates and expands on the LCRR's LSLR plan requirements. The service line replacement plan is important because a well-developed plan can facilitate timely compliance with the proposed mandatory service line replacement requirements and, therefore, provide greater public health protection and replacement program efficiency. First, EPA is proposing that systems must identify any State and local laws and water tariff agreements relevant to the water system's ability to gain access to conduct full lead and GRR service line replacement as well as a citation to the source of the requirement (such as any specific State or local law or water tariff agreement provision that requires property owner consent for replacement or cost-sharing). Should these laws or agreements change in the duration of the replacement period, the proposed rule would not require systems to update the plan to reflect those changes. EPA is seeking comment on whether a requirement to update the plan is necessary to fulfill the purpose of the plan or whether a recommendation from EPA for systems to update this component of the service line replacement plan would be adequate. See section IX. of this document.

Second, EPA is proposing that water systems must create a communication strategy to inform customers and consumers (e.g., property owners, renters, and tenants) served by the system about the service line replacement plan and program. This proposed plan element assures that both the consumers and owners of rental properties are aware of the water system's program to replace lead and GRR service lines and ensures that both tenants and their landlords have information about the program. This proposed requirement is responsive to stakeholder feedback about renters not having the authority to approve full service line replacement (USEPA, 2023h; USEPA, 2023i), ensuring that the proposal at least includes a provision to keep renters informed about the system's planned activities.

In addition, the LCRI proposes to remove the requirement that systems recommend a goal replacement rate in their plan because the proposal eliminates the goal-based LSLR program. The proposed LCRI maintains LCRR plan elements that remain relevant to achieving timely compliance with the replacement requirements, such as strategies for inventory development, procedures for full service line replacement, a customer communication strategy to take place before the replacement occurs, flushing instructions to reduce particulates following service line disturbances or replacements, a replacement prioritization strategy (including but not limited to local communities particularly or disproportionately impacted by lead, populations most sensitive to the effects of lead, and high-risk areas identified through lead data), and a funding strategy for conducting replacements. EPA is aware of a system that developed and completed an LSLR prioritization program that identified and replaced LSLs at daycare facilities and sites where lead previously tested high (PGH2O, 2023).

EPA is proposing that water systems must develop, submit to the State, and publish a service line replacement plan by the proposed LCRI compliance date, three years following promulgation of the final rule. Providing three years allows time for meaningful plan development. For example, EPA strongly recommends water systems engage their community in the development of the service line replacement plan. EPA expects that some plans may continue to be refined until full service line replacement requirements begin. EPA is also proposing to require the plan to be made publicly available, which would increase transparency about the service line replacement process and ensure the community is informed about all aspects of the system's replacement program. Increasing the transparency of the process provides an opportunity to get the community more involved in the replacement process and support the success of the program. EPA is proposing that systems serving over 50,000 people make the plan available online, which is the same proposed size threshold for systems that must make their inventory available online. EPA is seeking comment on whether this size threshold for publishing the inventory and replacement plan online should be lowered (See section IX. of this document).

8. Impact of State and Local Laws on Service Line Replacement

There are several possible approaches water systems could use to overcome barriers to full service line replacement, some of which may be unique to the CWS. Specific State and local factors (e.g., State laws, local ordinances, and available funding) can affect how a water system achieves 100 percent replacement of LSLs and GRR service lines as quickly as feasible (LSLR Collaborative, n.d.f). For example, in many communities, a significant barrier to achieving higher rates of customer participation in a service line replacement program is lack of adequate financial resources combined with a requirement that the customer pays to replace all or a portion of the service line (USEPA, 2023h; USEPA, 2023i; USEPA, 2023j; USEPA, 2023m). A system might not require customer cost-sharing for a replacement where it has external funding that either allows or requires the system to use the funds to replace the customer's portion of the service line: such an approach would mitigate or eliminate any barrier to full service line replacement as a result of customer cost-sharing. Achieving 100 percent customer participation through a single strategy, such as securing funding for customer-side replacements, may obviate the need for using an additional approach. Below EPA has provided examples of a range of strategies that systems, municipalities, and States have used to overcome both financial and non-financial barriers to full service line replacement.

Examples of Systems and Municipalities Overcoming Access Barriers

EPA's guidance document titled, "Strategies to Achieve Full Lead Service Line Replacement" (USEPA, 2019a), highlights water systems that have amended water service agreements to facilitate service line replacement. The document highlights the Milford Water Company (Milford, MA), who amended their service agreement to temporarily allow the system to replace customer-owned LSLs at the system's expense. EPA expects that many water systems could similarly consider, depending on the exact language of the agreement and the process to change it, temporarily or permanently revising service agreements to overcome access barriers to facilitate full service line replacement.

Several communities have changed local ordinances to facilitate full service line replacement. For example, in 1986, the City of Woonsocket, Rhode Island, "adopted a policy that builders must replace LSLs when a building is sold, demolished or replaced" (LSLR Collaborative, n.d.a). Other local ordinances require customers to replace their portion of the LSL in coordination with other water infrastructure work, such as during main replacement or emergency repair, or in accordance with a system's proactive service line replacement program, such as the ordinances adopted in the Cities of Appleton and Madison in Wisconsin (City of Appleton, 2022; Madison Water Utility, 2014). With its ordinance, Madison was able to replace all LSLs in the distribution system (Madison Water Utility, 2014). In Milwaukee, Wisconsin an ordinance requiring full service line replacement allows customers to find their own contractor or to authorize the city contractor to replace the customer portion of the line. The ordinance applies when the system-owned portion is being removed on a planned or emergency basis and requires the city to notify the customer before the commencement of a planned water system-owned LSLR (City of Milwaukee, 2023). The Wisconsin Department of Natural Resources includes information on their website to facilitate planning for replacement programs, including the decision of whether to mandate customer replacement by ordinance (WI DNR, 2022), and includes several example ordinances that Wisconsin municipalities have passed to require service line replacement to assist communities in drafting their own ordinances (WI DNR, 2020). This action provides examples to communities that choose to use ordinances to overcome access barriers. Other examples of system or local actions to overcome access barriers have been highlighted by the Lead Service Line Replacement Collaborative (LSLR Collaborative, n.d.a).

Examples of States Overcoming Access Barriers

Several States have changed laws or ordinances to facilitate full service line replacement. A 2019 report from Harvard and the Environmental Defense Fund found that six States (Indiana, Michigan, Missouri, New Jersey, Pennsylvania, and Wisconsin) have expressly authorized the use of ratepayer funds for LSLR on private property. Further, customers in those States except Wisconsin are not required to contribute funding toward replacement of their side (Wisconsin allows the utility to provide up to 50 percent of the cost as a grant and the remainder as a loan to alleviate the financial impact) (Goho, Saenz, and Neltner, 2019). The States generally justified using ratepayer revenue for replacements on private property by citing the benefits of full LSLR to public health and the economic efficiency of replacing both portions simultaneously. Specific examples of State actions to facilitate LSLR are summarized below.

Michigan is one of the most notable examples, where in 2018 the State's Lead and Copper Rule was updated to require water systems to replace the entire service line it controls at the expense of the water system, and where the system does not own the entire service line, it must notify the property owner (or their authorized agent) that the system will replace the owner's portion at the system's expense. This change makes full service line replacements available to all customers, regardless of their income (Michigan Administrative Rules, 2020).

Wisconsin also changed the State law to facilitate full LSLR, allowing a utility or municipality to seek approval from the State Public Service Commission to provide customers with financial assistance to replace their portion of the service line (Cowles et al., 2017). Indiana passed a similar law in 2017, where the Indiana Utility Regulatory Commission was granted authority to allow water rates at investor-owned utilities to fund LSLR, provided the system submits a plan and demonstrates it is in the public's interest (Indiana Senate Republicans, 2017). Allowing water rates from all customers to contribute towards customer-owned service line replacements can reduce or eliminate the direct financial impact of replacement on individual customers, making full service line replacement more accessible to lower-income customers.

Pennsylvania passed two laws to allow rate funds to be used in certain conditions to replace LSLs on private property. For municipally owned systems, a 2017 law authorizes municipalities to replace or remediate private water and sewer laterals using public funds and municipal employees to conduct the work, should the system determine the work will benefit public health or the system. The law does not change ownership of the lateral or impose any other duties following system funding or replacement of the service line, unless determined to be necessary by the system (Pennsylvania General Assembly, 2017). For investor-owned utilities, a 2018 law creates a pathway for these systems to recoup the costs of customer-owned LSLR using rates paid by all customers, if approved by the State Public Utility Commission (Pennsylvania General Assembly, 2018). This law followed a Commission decision allowing an investor-owned water system to use rate revenue to fund customer-owned replacements after it was required to conduct LSLR following a lead action level exceedance. The Commission found that it was in the public interest to prevent risky partial replacements from occurring and to avoid relying on property owners to replace their portion (EDF, n.d.b).

New Jersey passed two laws facilitating full service line replacement both financially and with respect to private property access. In January 2020, a law was passed that grants municipalities the authority to adopt an ordinance allowing water systems to enter private property to conduct LSLR (Ruiz, 2019). The law allows private property access without the property owners permission, provided that the owner was given at least 72 hours prior notice. This law was cited as especially benefitting communities with renters, allowing LSLR to occur "to protect families and individuals living in homes with unresponsive landlords" (State of New Jersey, 2020). Newark, whose population of renters comprises 75 percent of city residents, had already passed such an ordinance, which had allowed the city to "[replace] lead service lines faster, more houses at a time, and at lower cost" (State of New Jersey, 2020). This law followed 2018 legislation authorizing municipalities to replace LSLs on private property if the work is an environmental infrastructure project and funded either by loans from the New Jersey Infrastructure Bank or by loans issued through the Department of Environmental Protection (Senate and General Assembly of New Jersey, 2018).

In 2023, the State of Rhode Island passed a law requiring all LSLs and service lines with galvanized steel or iron in the State to be replaced within 10 years (contingent upon available funding) (State of Rhode Island, 2023). Rhode Island has an estimated 75,749 LSLs in the State, ranking 24th in the nation with respect to their projected number of LSLs (USEPA, 2023k). This law includes several provisions to facilitate equitable full service line replacement, including requirements that building owners inform their tenants of the presence of lead. Additionally, the law requires the property owner to disclose the presence of an LSL upon transfer of ownership. The law mandates the Rhode Island Infrastructure Bank to prioritize allocation of funding for customer-side service line replacement based on factors including, but not limited to, disadvantaged water suppliers and populations most sensitive to the effects of lead. Systems may also submit requests to the State to reimburse customers for costs incurred during replacement of the customer-owned portion at any time after January 1, 2018 (State of Rhode Island, 2023).

Other States have provided funding to cover the cost of replacing the customer's portion of the service line and set official goals and directives to prioritize identification and replacement of LSLs and GRR service lines. As mentioned in section IV.G. of this document, the State of Minnesota approved $240 million for these efforts and has established a LSLR grant program that must cover 100 percent of the cost of replacing the customer's portion. The funding will be available in 2024 until June 30, 2033, which corresponds to the year the State has set as their official goal for replacing all LSLs (State of Minnesota, 2023). In the State of Washington, the governor issued a directive in 2016 to the State Department of Health and other agencies with a goal of identifying all LSLs and lead components in two years and replacing them within 15 years (State of Washington, 2016). The governor ordered the State Department of Health to prioritize the removal of LSLs and other lead components in water distribution systems when considering funding proposed through the DWSRF. A Washington State Department of Health survey informed the State of ongoing proactive system efforts, helped "align, compile, and accelerate ongoing efforts," allowed them to follow up about survey responses and provide technical assistance, and drew media attention to community efforts to address lead in drinking water (LSLR Collaborative, n.d.b).

Perceived Barriers

EPA has heard that some water systems will not use rate revenue to pay for service line replacement on private property because they think that they lack legal authority to do so. The Harvard and Environmental Defense Fund report mentioned above found no explicit barriers to using water rates to fund LSLR on private property in the State laws and policies of the 13 States with the most LSLs (representing 4.2 million LSLs) (Goho, Saenz, and Neltner, 2019). EPA's "Strategies to Achieve Lead Service Line Replacement" guidance document contains examples from two States where public funds are authorized for repair or replacement of water and/or sewer laterals on private property in some cases (USEPA, 2019a). EPA expects the proposed LCRI requirements that systems and States to identify these kinds of barriers to accessing full service line replacement, including the source of the barrier, would help to alleviate misunderstandings about perceived barriers where they may exist.

9. Environmental Justice Concerns

The LCRR included requirements to result in increased beneficial equity impacts relative to the LCR requirements in several ways. To reduce the number of partial replacements and test-outs conducted, only full LSLRs are permitted to count towards the goal and mandatory replacement rates in the LCRR. The LCRR also requires systems to develop a funding strategy to conduct LSLR where the customer may not be able to afford to replace their portion of a line and to create a replacement prioritization strategy in their LSLR plan based on factors "including but not limited to the targeting of known lead service lines, lead service line replacement for disadvantaged consumers and populations most sensitive to the effects of lead" (40 CFR 141.84(b)(6); USEPA, 2021a).

In the LCRR review, EPA concluded that a new rulemaking informed by information and data about the impacts of LSLR requirements on communities, should prioritize increased "public health protection for those who cannot afford to replace the customer-owned portions of their LSLs" (86 FR 71574, USEPA, 2021b). Many stakeholders during the proposed LCRI external engagements also voiced concern about the environmental justice impacts of the LCRI, especially given disproportionate exposure to lead from other sources in overburdened communities (USEPA, 2023h; USEPA, 2023i; USEPA, 2023l).

EPA conducted an environmental justice analysis to inform the Agency's understanding of how the proposed LCRI could impact communities with environmental justice concerns. As part of the analysis, EPA evaluated potential environmental justice concerns associated with lead in drinking water in the baseline and the proposed LCRI, including consideration of whether potential environmental justice concerns are created or mitigated by the proposed LCRI relative to the baseline (USEPA, 2023f). For the environmental justice analysis, EPA compiled recent peer-reviewed research on the relationship between lead exposure and socioeconomic status and found that Black, Indigenous, People of Color (BIPOC) and/or low-income populations are at higher risk of lead exposure and associated health risks. EPA also conducted an analysis of seven case study cities and found a range of outcomes with respect to the sociodemographic and housing unit variables in areas served by LSLs in the cities investigated. The baseline primarily provides for systems-level observations for the seven cities studied relative to LCRI, given the present lack of nationwide data available on LSL presence. However, as indicated below, EPA may be able to draw likely broader observations due to the literature review and common findings across multiple case study cities. In its case study analysis, EPA found that block groups with LSLs often had higher percentages of low-income residents, renters, and People of Color (specifically, Black, Hispanic, or linguistically isolated individuals) compared to block groups without LSLs, however there was little evidence that the number of LSLs per capita was positively correlated with block group demographic characteristics for these seven case studies. However, block groups with the highest number of LSLs per capita (top quartile) had a notably larger percent of Black residents than the service area as a whole for five case studies. Measures included to capture the possibility of other sources of lead – traffic density and pre-1960 housing – were also notably higher in block groups with LSLs compared to those without. The percent of housing built prior to 1960 was also positively correlated with the number of LSLs per capita for every case study and was also elevated in the top quartile compared to the service area as a whole. A study presented by USEPA Office of Research and Development researchers shows strong correlations between LSL prevalence and children's elevated blood lead level prevalence (%EBLL) for two cities, both individually and combined, by Census tract (Tornero-Velez et al., 2023). Regression analysis revealed that LSL prevalence was a stronger predictor of elevated blood lead level prevalence compared with two lead indices for paint (U.S.EPA's EJSCREEN 2017 Pb Paint EJ Index or U.S. Department of Housing and Urban Development's (HUD) Deteriorated Paint Index).

The small number of case studies included in the analysis do not permit generalizing the findings beyond these individual systems. The heterogeneity in socioeconomic and housing characteristics within service areas and relative to the prevalence of LSLs across systems highlights the importance of individual system characteristics on potential environmental justice concerns associated with baseline LSL presence. Service line inventory information at the State or national level is generally limited at this time recognizing the initial LSL inventory required under the LCRR is not due until October 16, 2024. As more systems continue to develop and publish inventories under the LCRI, this LSL location data will become more readily available and may allow for broader study of the distributional impacts of LSL presence. EPA also notes that while LSLs are the greatest source of lead in drinking water where present, several factors can affect lead levels, such as the presence of other lead sources in contact with water, localized water chemistry, the presence of systemwide corrosion control treatment, consumer water use behavior, service line disturbances, and sporadic release of lead particulates.

In summary, EPA found in its literature review that there are environmental justice concerns associated with lead exposure in the baseline. With respect to EPA's case study analysis, the data indicate a range of environmental justice concerns associated with baseline LSL presence. It is important to note that results obtained from these case studies only represent the environmental justice issues of seven cities throughout the U.S. and cannot be extrapolated to determine national trends. Nevertheless, considering both the results of the literature and the case studies, other cities that contain LSLs likely face these or other environmental justice concerns related to LSL presence. In addition, systems that do not incorporate equity into their service line replacement planning and program design may inadvertently create or exacerbate disproportionate impacts in communities with environmental justice concerns. The next paragraph summarizes several proposed LCRI requirements that could result in benefits for communities with environmental justice concerns. EPA expects that these provisions included in the proposal, such as service line replacement prioritization, would reduce baseline differential impacts associated with lead exposure from drinking water.

EPA's proposed service line replacement plan contains several elements that could improve the equitable outcomes of replacement, which informed EPA's understanding of the impacts of the proposed LCRI. EPA is proposing to retain the LSLR plan elements under the

LCRR requiring water systems to identify a replacement prioritization strategy and a funding strategy for conducting full service line replacement. Where the water system intends to charge customers for the cost to replace all or a portion of the service line because it is authorized or required to do so under State or local law or water tariff agreement, the funding strategy must include a description of whether and how the water system intends to assist customers who are unable to pay to replace the portion of the service line they own. The proposed LCRI also adds several new requirements to the LSLR plan to further facilitate proactive planning as well as to improve accountability in implementation. One would require systems to create a strategy to achieve full LSLR at rental properties to reduce instances where LSLs or GRR service lines are left in place at these locations, which may create disparities where tenants want the full replacement performed but the property owner refuses access. This could also potentially increase participation at non-owner-occupied investment properties, where EPA is aware of customer participation being lower than at owner-occupied properties (MWRA, 2023). EPA is also proposing to require systems to make the service line replacement plan publicly available. This requirement would allow the community to hold the water system accountable for the design and implementation of their plan.

The plan would also include a new proposed element requiring systems to identify potential barriers to access for full replacement in local ordinances and water service agreements. States would also be required to identify potential barriers to full service line replacement in State laws, including statutes and constitutional provisions, in their application for primacy for the LCRI. The proposed LCRI would not change State or local laws, ordinances, or service agreements. However, by identifying these potential barriers and making the information publicly accessible in the replacement plan, these proposed requirements can better support a community discussion about where barriers exist and how best to address them as part of the replacement program. For examples of how system, municipal, and State actions have facilitated full service line replacement, see section V.B.8. of this document.

Proposed increased flexibility relative to the LCRR with the replacement rate construct can also facilitate the system implementing its prioritization strategies while maintaining compliance with the proposed 10-year replacement deadline. EPA is proposing that systems calculate compliance with service line replacement on a three-year rolling average. This can provide systems with additional time that may be needed to replace service lines at prioritized sites, such as schools and child care facilities throughout the service area or areas with higher lead exposure, as opposed to focusing only on areas with a high LSL density, where replacement may be more efficient.

As discussed previously, EPA is also proposing to ban partial replacements unless conducted in response to emergency repairs or planned infrastructure work (excluding service line replacement programs). Partial replacements are often associated with elevated drinking water lead levels in the short-term, from days to months and potentially longer, and have not been shown to reliably reduce lead levels in the long-term (USEPA, 2011; St. Clair et al., 2016; Triantafyllidou and Edwards, 2011; Brown et al., 2011). Where partial replacements will occur, EPA is proposing that systems must give customers the chance to participate in the full replacement as well as provide notification and risk mitigation prior to infrastructure work and during emergency repair (if before is not possible). These proposed requirements would prevent systems from creating harmful partial replacements, likely disproportionately at low-income households, as a result of the rule's replacement requirements. For more information about this proposed requirement, please see section V.B.4. of this document.

EPA emphasizes that a significant amount of external funding is available for full service line replacement, which may reduce the costs of replacement for individual customers as well as impacts on household water bills to fund the broader replacement program. For example, the $15 billion from the Bipartisan Infrastructure Law directs 49 percent of the funding for LSL identification and replacement to disadvantaged communities as grants or principal forgiveness. Please see section IV.G. of this document for a full discussion of the external resources to support service line replacement.

As recommended by some stakeholders during the LCRI external engagements, EPA considered proposing specific prioritization criteria for service line replacement, such as homes with elevated blood lead levels or other health and environmental stressors (USEPA, 2023h; USEPA, 2023i; USEPA, 2023j), but given the unique characteristics and needs of each community, EPA is concerned that specific criteria included in a national rule could be overly broad or miss populations of concern. It could also create additional implementation challenges for systems to determine relevant and appropriate data required for certain prioritization, such as household level data on finances and family size, as suggested by stakeholders (USEPA, 2023m). These potential detriments of specific prioritization criteria were noted by some stakeholders (USEPA, 2023l). The proposed approach—requiring systems to develop the prioritization strategy in the service line replacement plan and make the plan publicly available—would allow systems to plan in accordance with the data available for their communities and ensure the strategies are more responsive to specific community needs and implemented effectively. EPA encourages water systems to consider locally relevant community indicators, where relevant data is available to the water system, to support the prioritization of lead service line replacement in their service line replacement plans. For example, systems could consider information on other sources of lead exposure, such as homes likely to contain lead paint (e.g., using housing age as a metric) or homes nearby lead emitting facilities. Systems could use blood lead level information collected over time to inform overexposed communities. Systems could also use available tools to support their prioritization process, such as the Climate and Economic Justice Screening Tool (CEJST) (CEQ 2022).

EPA also emphasizes the obligations that systems that are recipients of Federal financial assistance have under Title VI of the Civil Rights Act, which prohibits discrimination based on race, color, or national origin for any program or activity receiving Federal financial assistance. For more information, see section IV.H. of this document.

EPA also highlights proposed improvements to the rule's public education requirements that can address stakeholder concerns about potential inequities for customers with limited English proficiency to be informed about service line replacement as well as general information about lead in drinking water. See section V.H. for more information about these proposed requirements.

C. Tap Sampling for Lead and Copper

Tap sampling for lead and copper is required to evaluate CCT performance and serves "to identify the need for additional treatment and to ensure that adequate treatment is installed" (56 FR 26514, USEPA, 1991). Tap sampling is not intended to assess exposure to lead and copper in drinking water, but to identify situations where the water is too corrosive. A system's compliance with the treatment technique rule is determined through requirements to optimize CCT. A system's compliance with the treatment technique rule is not based solely on tap sampling results, but rather if a system complies with the required actions, such as evaluating corrosion and installing or re-optimizing OCCT. Tap sampling results identify situations where the corrosivity of water can be reduced by installing or reoptimizing CCT, and where other actions, such as public notification, can reduce lead risk.

EPA designed tap sampling requirements in the LCR primarily to evaluate the corrosion of lead and copper sources present in the distribution system. Water systems are required to sample at higher risk sites using a sampling protocol to "assess the degree to which a system has minimized corrosivity for lead and copper" (56 FR 26520, USEPA, 1991). Tap sampling under the rule is not intended to represent typical consumption; rather, it is intended to determine the effectiveness of CCT and to determine if actions are needed to reduce lead levels (USEPA, 2020b).

In addition to CCT, the LCR and LCRR use tap sampling results to determine if water systems are required to conduct LSLR and public education. Under the proposed LCRI, EPA is maintaining the use of tap sampling for some public education requirements (see section V.H.). EPA is proposing to require mandatory service line replacement regardless of system's lead tap sampling results (see section V.B.) and proposing additional improvements to the tap sampling protocol discussed further in this section.

1. Sample Collection Locations and Methods

The LCRR revised the tap sampling requirements in several ways to better detect sites with higher lead levels. The LCRR maintains the tiering structure established in the LCR for prioritized, targeted monitoring of higher-risk sites, with the highest priority tiers (Tiers 1 and 2) comprised of sites with LSLs representing the sites with the highest risk. Tier 1 sites include single-family structures served by LSLs and Tier 2 sites include multi-family residences served by LSLs. The LCRR requires water systems with LSLs to create sampling pools entirely from sites in Tiers 1 and 2, up from 50 percent in the LCR, until there are an insufficient number of LSL sites to meet the minimum number required.

The LCRR also requires water systems to collect a fifth-liter sample for lead at LSL sites. Fifth-liter samples increase the likelihood that samples capture water that has been sitting in contact with LSLs. This can allow systems to measure higher lead levels when water is in direct contact with this significant lead source. The variability of plumbing configurations does not allow for a single prescribed sample volume to capture the highest lead level at every site; however, EPA selected the fifth liter as a screen that is likely to detect higher lead levels than first-liter sampling alone (Masters et al., 2021; Del Toral et al., 2013; Deshommes et al., 2016). In addition, the LCRR prohibits pre-stagnation flushing and requires the use of wide-mouth bottles to allow samples to be taken at full flow to decrease the likelihood that sampling would miss higher lead levels.

With the addition of the trigger level in the LCRR, EPA revised tap sampling frequency requirements based on both the lead action level and the trigger level. A key priority identified in the LCRR review is to improve sampling methods to better identify elevated lead levels in drinking water and to compel more systems to take actions to reduce lead levels (86 FR 71579, USEPA, 2021b).

In the LCRI, EPA is proposing that systems must take first- and fifth-liter paired samples for lead at LSL sites and use the higher of the two values to calculate the 90th percentile lead level to improve identification of higher risk sites for lead and better determine when OCCT or re-optimized OCCT is necessary. Michigan's revised LCR requires the same first- and fifth-sample collection approach that EPA is proposing under LCRI. EPA evaluated Michigan's approach in the context of this rulemaking process. Implementation data from Michigan's revised LCR shows that some samples collected at LSL sites measure higher lead levels in the first liter than the fifth. Michigan's requirement to use the higher lead level of the two samples for calculation of the 90th percentile lead level has resulted in more systems exceeding the lead action level of 0.015 mg/L than either the first or fifth liter alone (Betanzo at al., 2021). Therefore, these data suggest that Michigan's requirements are helping systems better identify situations where the water is too corrosive. In addition to data from Michigan, EPA is aware of studies that have evaluated lead sampling data collected from various liters in cities including Washington, D.C., Flint, Michigan, and Chicago, Illinois. The data compiled in these studies similarly identifies variability in which liter contains the highest lead level. This data also suggests that using the higher of the first- and the fifth-liter lead values at LSL sites will be more effective than either value alone (Masters et al., 2021; Mishrra et al., 2021).

In addition, EPA is proposing that first and fifth-liter paired samples be collected at LSL sites because the lead released from LSLs is not reliably captured in either the first- or fifth-liter samples alone (Del Toral et al., 2013; Deshommes et al., 2016; Masters et al., 2021). In the final LCRR preamble, EPA acknowledged that the fifth liter may not correspond to the sample volume with the highest lead levels in all cases but selected it as a sample "more representative of lead concentrations in service lines than the first liter sample" and "most likely to contain the water that remained stagnant within a customer-owned portion LSL" (86 FR 4226, USEPA, 2021a). Due to the types of lead scales that can form in LSLs, as well as the mechanisms of scale formation and release, the first liter can capture higher levels of lead than the fifth liter in some conditions. Specifically, when water chemistry results in the formation of relatively fragile scales, maximum lead values have been documented in the first liter of sampling in Flint, Michigan (Lytle et al., 2019), Washington, D. C. (Clark et al., 2014), Providence, Rhode Island

(Clark et al., 2014), and Chicago, Illinois (Masters et al., 2021). The lead release captured in the first liter is attributed primarily to lead particles which have often become detached, such as from the LSL or from galvanized pipes that are or were downstream of lead pipes, and have accumulated in the premise plumbing. Another situation where scale affects lead levels in the first liter is where scale formation slows lead release from the LSL, and higher lead release can occur in the first liter due to sources in the premise plumbing (Triantafyllidou et al., 2015). EPA's proposal to keep the fifth liter sample at LSL sites while adding the first liter sample for lead would update EPA's decision in LCRR based on evaluating additional studies and available implementation data to further increase the likelihood of detecting elevated lead levels.

EPA is proposing to correct the definition for Tier 1 and Tier 2 sites to include sites with premise plumbing made of lead due to the high risk of lead exposure associated with premise plumbing made of lead. By premise plumbing made of lead, EPA means premise plumbing that consists of pure lead pipes, like the pipes used for LSLs, rather than pipes made from metal alloys which may contain lead content. When sampled, systems would follow the first liter sampling protocol at sites with lead premise plumbing, unless the site is also served by a LSL, which would require first and fifth liter sampling. Lead interior plumbing was considered a Tier 1 site under the LCR and was inadvertently deleted in the LCRR. Although EPA is not aware of the full extent of lead premise plumbing, these would be a substantial lead source similar to LSLs. Their inclusion is appropriate for Tiers 1 and 2 because it aligns with the regulatory intent to prioritize sites likely to have elevated lead levels. This proposal would also correct the inadvertent deletion under the LCRR.

The LCRR categorizes Tier 3 sites as sites that contain galvanized lines that are identified as being downstream of an LSL currently or in the past, or downstream from a known lead connector. EPA described in the LCRR preamble that sites served by galvanized service lines downstream of an LSL or known lead connector are included under Tier 3 (86 FR 4241, USEPA, 2020a). The LCRR requires first-liter samples to be collected at Tier 3 sites.

EPA is proposing in the LCRI to correct that a galvanized site currently downstream of an LSL is a site served by an LSL and would meet the criteria of a Tier 1 or 2 site. The proposal removes the term "currently" from the Tier 3 provision to implement this correction. While EPA described in the final LCRR preamble the Agency's intention for galvanized service lines to be included in Tier 3, the LCRR Tier 3 provision includes only sites which "contain galvanized lines," which refers to premise plumbing material and not service lines. As such, EPA is also proposing to clarify that sites served by galvanized service lines that ever were downstream of an LSL or a lead connector are included in Tier 3. EPA is also proposing to maintain sites with galvanized premise plumbing that are downstream from a lead connector in Tier 3. While EPA is not currently aware of the national extent of homes containing galvanized premise plumbing that are downstream of a lead source, this is consistent with the inclusion of galvanized service lines that ever were downstream of an LSL. Like galvanized service lines downstream of an LSL, galvanized premise plumbing that is downstream of a lead source can adsorb and release lead and is potentially a higher risk site than those in Tiers 4 and 5.

EPA is proposing to expand the sites included in Tier 3 to include any sites with galvanized premise plumbing or served by galvanized service lines that were ever served by a lead connector. As noted above, galvanized material can adsorb lead from an upstream source and release lead, even after the original lead source is removed. As such, EPA is proposing to include sites that were ever served by lead connectors in addition to those that currently have lead connectors. EPA is also proposing to include sites of any service line material or premise plumbing that are currently served by a lead connector. Along with EPA's proposed changes to inventory requirements, some systems will have improved knowledge of sites with lead connectors, which like LSLs, are pipes made of lead. Despite the additional information systems may have about lead connectors through the inventory, it is EPA's goal to prioritize sampling sites where the highest concentrations of lead enter drinking water. Due to the limited length of lead connectors, the amount of lead contributed is expected to be less than typically much longer LSLs, all else being equal. Therefore, EPA is proposing that sites with lead connectors are not Tier 1 or 2, but Tier 3, based on EPA's priorities for the proposed LCRI and the similar contributions of lead in drinking water compared to galvanized service lines. In the proposed LCRI, EPA is including three types of sites in Tier 3: 1) sites served by galvanized service lines that ever were downstream of an LSL or lead connector, 2) sites with galvanized premise plumbing that ever were downstream of an LSL or lead connector, and 3) other sites currently served by a lead connector (e.g., a site served by a copper service line downstream of lead connector. EPA is requesting comment on whether all of these sites should be included in Tier 3 or if some should be included in a different, lower priority tier, such as Tier 4. EPA is also requesting comment on whether sites served by a galvanized service line downstream from a lead connector in the past (e.g., previously replaced) should be included in the same tier as sites currently served by lead connectors.

EPA is proposing that first-liter samples continue to be collected at Tier 3 sites. Galvanized service lines contribute lead from corroded coatings containing lead and through the capture and release of upstream lead sources. Contributions of lead from galvanized service lines are commonly through lead particulate release, which can then be introduced as a particulate into consumed water or captured by aerators where the particulate contributes dissolved lead

(McFadden et al., 2011). Because the mobilization of particulate lead can be highly variable, depending upon changes in pressure and flow volume, velocity, and/or direction (Schock, 1990), particulate release is not captured consistently in any individual sample. EPA acknowledges that particulate lead is challenging to predict and could occur in any sample volume. However, the first liter has been documented to capture the highest fraction of particulate lead (Deshommes et. al., 2010) and presents the highest likelihood of a single sample capturing particulate lead. Additionally, first-liter samples would capture the effects of any particulates in the system which have become caught in the aerator at the tap during stagnation. Further, some galvanized service line sites may have undergone prior disturbance, such as from the partial replacement of an upstream LSL. In such cases, higher particulate lead levels would likely be present in the first draw sample as a result of accumulated lead particulates released from the disturbance event (Deshommes et al., 2010).

In addition, EPA believes that the first liter sampling protocol is more appropriate for sites with lead connectors. As lead connectors are short in length and typically installed closer to the water main, it is less likely that a single designated service line sample volume would capture water that has stagnated in the connector. Additionally, water traveling from the lead connector to the faucet will undergo dispersion, resulting in lower concentrations of lead at the tap. Detectable contributions of lead from lead connectors, like particulate contribution from LSLs, are most likely to occur as a result of particulate lead that has dislodged from the pipe and is caught in premise plumbing, such as faucet aerators (Deshommes et al., 2016; Lytle et al., 2019).

EPA is also proposing to clarify the definition for wide-mouth bottles to specify it means bottles that are one liter in volume with a mouth, the outer diameter of which measures at least 55 mm wide (see section L.3.). EPA heard stakeholder feedback that the LCRR definition of "wide-mouth bottle" is vague and significantly limits the number of available bottles that fit the rule criteria if the inner diameter is used to determine the diameter for wide-mouth bottles. As such, EPA is seeking comment on the proposed updated definition of "wide-mouth bottles," specifically on the availability of qualifying bottles.

EPA also heard stakeholder feedback about including additional invalidation criteria for lead and copper compliance samples. The LCRR allows the State to invalidate collected samples for a limited number of reasons including that samples were collected from sites that did not meet the tiering criteria. Invalidated samples are not included in the 90th percentile calculation. EPA is proposing specific language for States to invalidate samples which were collected in a manner that did not meet the sample collection criteria under § 141.86(b)(1). For example, the rule specifies collection of samples at a kitchen or bathroom sink tap. If a sample was taken at a hose bib, States could invalidate that sample because it does not meet the sample collection criteria. Some stakeholders supported the inclusion of invalidation criteria based on a maximum stagnation period (e.g., 12-hours) to the invalidation criteria because of concerns that excessive stagnation times may produce high lead or copper sampling results that are reflective of improper sampling techniques. Water systems can alleviate their concerns about excessive stagnation by using chain of custody forms that note the last time the water was used and the time/date of sample collection, withholding samples with excessive stagnation from being sent to the laboratory. The system could then direct the customer to collect another sample to be submitted for analysis, negating the need for sample invalidation criteria in the LCRI. Additionally, stakeholders did not offer data to support any suggested maximum stagnation times provided in their feedback. While EPA is not proposing to establish a maximum stagnation time in the LCRI because the Agency is concerned about samples being invalidated solely because the sample result it high, EPA is seeking comment and data, including modeling and sampling data, on potential maximum stagnation times, and specifically how stagnation times inform corrosion rates. See section IX. of this document.

2. Sample Collection Frequency

In the LCRI, EPA is proposing to update tap sampling frequency requirements to conform with the proposed elimination of the trigger level. EPA intends to maintain six-month monitoring as the standard monitoring frequency. With the proposed elimination of the trigger level, EPA is proposing that small and medium systems monitoring annually would qualify for triennial monitoring if they do not exceed the lead and copper action levels for three consecutive years, instead of meeting the lead trigger level for three consecutive years. Along with EPA's proposal to lower the action level to 0.010 mg/L and improve the tap sampling protocol at LSL sites, this pathway for reduced monitoring would be at least as stringent as that under the LCRR. In addition, EPA intends to maintain a pathway for all systems to qualify for annual monitoring if they do not exceed the lead and copper action levels for two consecutive six-month monitoring periods. Also, all systems can qualify for triennial monitoring if they measure 90th percentile levels at or below the practical quantitation limits of 0.005 mg/L for lead and 0.65 mg/L for copper in two consecutive six-month monitoring periods. Also, EPA intends to maintain the nine-year reduced monitoring waiver.

EPA's proposed approaches for compliance tap sampling are consistent with the goal of identifying sites most at risk of lead in drinking water. Stakeholders expressed support for sampling to find the locations with the highest possible lead levels, with many in favor of first and fifth liter sampling specifically (USEPA, 2020b; USEPA, 2023j). Some stakeholders raised concerns over the complexity associated with a different protocol for LSL sites, and the difficulty of maintaining customers willing to sample under a more complicated protocol. For the proposed LCRI, EPA is finding that examples from Michigan are illustrative to support this proposed change. Based on the implementation of the first- and fifth-liter protocol in Michigan, EPA believes that customers provided with clear instructions can be willing and are able to conduct tap sampling.

Others raised concerns over the specific volume of water chosen due to the wide range of plumbing configurations, recommending that the improved rule allow for sampling tailored to individual sites. EPA does not support tailoring of the sample volume collected to individual sites. EPA expects that this approach could introduce challenges by not having a standard sampling protocol, leading to a more complex rule with increased implementation and recordkeeping burdens. EPA is seeking feedback on other alternative sampling protocols, such as random daytime sampling (in which sampling sites are not predetermined and there is no minimum stagnation time), that could be used to assess CCT performance (See section IX.).

EPA is also seeking comment on whether State authority to specify sampling locations when a system is conducting reduced monitoring should apply regardless of the number of taps meeting sample site criteria. The proposal limited this State authority to where a water system has fewer than five drinking water taps meeting sample site collection criteria. See section IX. of this document.

3. 90th Percentile Lead Calculation

Under the LCRR, water systems with LSLs are required to collect samples from all LSL sites (Tier 1 and 2) and use all samples collected to calculate the 90th percentile lead calculation, even if more than the minimum number of samples are collected. If a system does not have enough Tier 1 and 2 sites to meet the minimum number of required samples, the system must use all samples collected at Tier 1 and 2 sites and only the highest results from samples collected at Tier 3, 4, and 5 sites (in that order) to meet the minimum number of samples. For example, if a system is required to collect 100 samples and the system collects 80 samples at Tier 1 and 2 sites, and 30 at Tier 3 sites, the system must use the 80 samples from Tier 1 and 2 sites and only the 20 samples with the highest lead concentration from the Tier 3 sites. EPA introduced a limit on which samples could be used in the 90th percentile calculation to prohibit systems from collecting additional samples from sites less likely to contain lead (i.e., Tiers 3, 4, and 5) in order to reduce their 90th percentile lead value. LCRR requires systems without LSLs to collect samples at Tier 3 sites and lower, and use all samples collected in the calculation, even if more than the minimum number are collected. EPA introduced these provisions to prioritize sampling at sites more likely to contain lead in order to determine the effectiveness of CCT and determine if additional actions are warranted (86 FR 4225, USEPA, 2021a).

EPA is proposing to retain this approach in the LCRI. However, a few stakeholders recommended that EPA allow systems that do not have a sufficient number of Tier 1 and 2 sites to meet the minimum number of samples, use the highest sample collected regardless of the tier, and allowing small systems to use more than the minimum number of samples when sampling at a mix of Tier 1 and 2 and lower tier sites (USEPA, 2023j; USEPA, 2023m; see docket no. EPA-HQ-OW-2021-0255). For example, a system would use any samples collected from Tier 3 through 5 sites that were higher than samples from Tiers 1 and 2, instead of using all samples from Tiers 1 and 2. EPA is unaware of situations in which large numbers of samples from non-LSL sites would have higher lead concentrations than LSL sites and is maintaining the LCRR approach to ensure that sites most likely to contain lead are prioritized for tap sampling. EPA is seeking comment about the potential inclusion of samples from lower-priority tiers (i.e., Tiers 3 through 5) that have a higher lead or copper concentration than samples from Tier 1 and 2 sites for calculation of the 90th percentile for systems that do not have a sufficient number of samples from Tier 1 and 2 sites. Additionally, EPA is seeking comment on whether to require systems to use samples with the highest lead and copper concentration regardless of sampling tiers, such as including samples from lower-priority tiers (i.e., Tier 3 through 5) in the 90^{th} percentile calculation for systems that are collecting compliance samples from all Tier 1 and 2 sites. EPA seeks any relevant data on whether including the highest sample results regardless of tier is useful for assessing CCT efficacy at LSL systems. See section IX. of this document.

Under the LCRR, water systems can qualify to reduce monitoring frequency or cease specific actions under the rule based on their 90th percentile lead and copper levels. For example, a small or medium system without CCT may stop the CCT steps once if the system is at or below the lead AL for two consecutive monitoring periods. Water systems have been advised to calculate a 90th percentile lead or copper level even if the system does not collect the minimum required number of samples (USEPA, 2004d). EPA is proposing to clarify in the LCRI that water systems cannot use sampling based on fewer than the required minimum number of samples to reduce monitoring or qualify for other reduced actions under the rule including CCT and public education related requirements. EPA is proposing this clarification to improve implementation and because the Agency is concerned that water systems may utilize provisions intended for systems with demonstrated lower lead or copper levels by failing to comply with monitoring requirements.

EPA is proposing to modify the types of non-compliance samples that may be included in the 90th percentile calculation. The LCRR requires water systems to use results of any additional monitoring (e.g., customer-requested samples) in the 90th percentile calculation if the samples meet the tiering and sample protocol requirements. The LCRR and proposed LCRI also require water systems to conduct follow-up sampling after full or partial service line replacement. EPA is concerned that water systems may include samples in the 90th percentile calculation that may not be known to meet the correct sampling tier and may not be reflective of corrosion control performance. Service line replacement can physically disturb the service line, potentially causing lead particulates to dislodge and lead to short-term elevated lead levels. EPA expects that samples collected as part of required monitoring following full or partial service line replacement may not be representative of corrosion control performance, and the Agency is therefore proposing to exclude these required samples from the 90th percentile calculation.

EPA is also proposing to maintain that samples not collected according to the sample collection criteria must be used to calculate the 90th percentile. In the LCRR, customer-requested samples are not required to be collected according to the compliance sampling protocol in § 141.86. In the LCRI, EPA is proposing to maintain this flexibility to allow samples collected in response to customer request to utilize alternative sample volumes and stagnation times but is proposing these samples must include sites representative of both premise plumbing and the service line when the customer is served by a lead, GRR, or unknown service line (see section V.H.3.). EPA is proposing that customer-requested samples be included in the 90th percentile calculation only if the sample meets the compliance sampling tiering and protocol.

D. Service Line Inventory

Complete service line inventories protect public health, improve transparency, and allow systems to be better positioned to comply with the proposed LCRI requirements. Publicly accessible inventories can facilitate community engagement and improved transparency because the public can more easily track and better understand and systems' progress on LSL identification and replacement. Inventories can also help water systems and consumers determine the source of high lead levels in drinking water at a home or building and the possible solutions for reducing exposure. Water systems with accurate and up-to-date inventory information can also inform proactive consumer risk mitigation steps if they are served by an LSL, GRR service line, unknown service line, or a lead connector (for example, replacing their LSL, using a filter certified to reduce lead, or flushing their service line).

Under the LCRR, water systems must develop an initial inventory, make it publicly available, and submit it to the State by October 16, 2024. Water systems must update their inventory annually or triennially based on their tap sampling frequency. The initial and updated inventories under the LCRR must categorize each service line connected to the public water system as lead, GRR, non-lead, or lead status unknown (also referred to as “unknown”). The LCRR did not establish a deadline for requiring water systems to determine the lead status of any unknown lines in the inventory. EPA is not proposing to change the initial inventory compliance date of October 16, 2024, to ensure that systems make continued progress towards inventory development. Depending on the inventoried service line material, water systems must also notify consumers about the potential lead risks that affect them, which can facilitate customer actions to reduce lead in drinking water, such as flushing, using filters that are certified to reduce lead, and customer-initiated service line replacement.

While EPA is not proposing changes to the initial inventories required under the LCRR, EPA is proposing to improve the requirements for systems to update their inventories for the LCRI. EPA is proposing that by the final LCRI compliance date, systems must develop a baseline inventory, which builds upon the LCRR requirements of the initial inventory. The additional requirements in the baseline inventory would improve transparency and position systems to begin mandatory service line replacement. EPA is also proposing that systems must make the number of inventoried lead, galvanized requiring replacement, and unknown service lines, and the number of known and replaced lead connectors, publicly available, and update those counts on an annual basis, to improve transparency and facilitate customer tracking of inventory progress. Similarly, EPA is also proposing that systems provide counts of the number of LSLs and GRR service lines replaced each year so the public can more easily track progress of the mandatory service line replacement program. This proposed requirement is responsive to a stakeholder comment in the LCRI external engagements which recommended continued monitoring of the system's service line replacement program over time (USEPA, 2023h). EPA is also requesting comment on whether it is feasible for systems serving 50,000 persons or fewer to make their inventories, inventory summary, and replacement data available online. See section IX. of this document for more information.

Using reliable service line material investigation records, methods, and techniques is a key step towards developing accurate inventories. EPA is proposing to retain the LCRR approach that requires systems to use only certain specified sources of information unless the State allows or requires the use of other sources of information. EPA maintains its expectation from the LCRR that States can make the best-informed judgments about the appropriateness of using other sources of information (e.g., other records, methods, or techniques for service line material categorization) in addition to those required by the LCRR. Retaining this provision will also avoid conflict with the initial inventories that systems will have created based on additional criteria allowed or required by States and potentially avoid any duplication of effort. Another benefit of retaining the LCRR approach is that it avoids implementation challenges that could be caused by changing the sources of information that can be used for the inventory. For example, the LCRR does not require systems to track the records, methods, and techniques they use to categorize individual service lines. Hence, changing the requirements in the proposed LCRI might create difficulties for systems in updating the initial inventory. Finally, if EPA were to limit the methods that can be used to conduct inventories, water systems would not be able to take advantage of ongoing and future research to develop new methods and technologies to identify service line materials.

1. Timeline to Identify All Unknown Service Lines

EPA is proposing to require that water systems categorize the material of all unknown service lines in the inventory by the system's applicable deadline for completing mandatory full service line replacement. The proposed deadline for most systems to replace all LSLs and GRR service lines is 10 years following the compliance date for the proposed LCRI; however, some systems may have deadlines that are shorter or longer than 10 years (see section V.B.3. for a discussion of the proposed service line replacement deadlines). Establishing a deadline for water systems to prepare a complete and accurate inventory will improve the information systems must develop to comply with requirements for tap sampling sites, public education, and service line replacement. A complete and accurate service line inventory is an important part of a system's asset management plan, which is recognized under SDWA section 1420 as a critical component of a system's technical, managerial, and financial capacity. Additionally, a complete and accurate service line inventory provides transparency of potential sources of lead exposure.

Feasibility of Proposed Inventory Requirements to Support Mandatory Service Line Replacement

EPA has determined that it is feasible (i.e., technically possible and reasonably affordable relative to a large system) for water systems to create a complete and accurate inventory of service line materials by the proposed service line replacement deadline to support the treatment technique for mandatory service line replacement. EPA anticipated in the 1991 LCR that systems that were triggered into an LSLR program should be able to locate their LSLs and provide this information in 8 to 10 years, even with poor records of service line materials (56 FR 26507, USEPA, 1991). EPA evaluated more recent efforts by systems to replace all their LSLs, and thus complete their inventory, in 10 years or less, and this more recent data confirms this finding from the 1991 LCR (USEPA, 2023g). First, seven States have inventory laws (i.e., California, Illinois, Michigan, New Jersey, Ohio, Rhode Island, and Wisconsin), which together comprise just below a third of the nation's estimated LSLs (32 percent; 2.9 million LSLs out of an estimated 9.2 million LSLs) (USEPA, 2023k), meaning that these systems will have made progress on their inventories beyond the LCRR requirements. These State laws indicate that an inventory requirement is feasible, and inventory data from some of these States show relatively low incidence of unknowns in some States as well as rapid progress towards identification of their unknowns' materials (USEPA, 2023g). Low incidence of unknown service lines is also indicated by survey data from the Needs Survey (USEPA, 2023g). Furthermore, four States (Illinois, Michigan, New Jersey, and Rhode Island) passed State laws that require LSLR by a specified deadline. For these systems, inventory completion is required in order to comply with the mandatory LSLR requirements. For example, the Michigan Department of Environment, Great Lakes, and Energy (EGLE) required their applicable water systems to submit a preliminary materials inventory by January 2020 and a complete materials inventory, including verification methodology and results, by January 2025, which is a five-year deadline to identify all unknown service lines (Michigan Administrative Rules, 2023). The Illinois Environmental Protection Agency (IEPA) first required their CWSs to submit an inventory by April 2018 in the repealed Public Act 099-0922 along with annual updates. Under the 2022 Lead Service Line Replacement and Notification Act, IEPA requires systems to submit a complete material inventory by April 2024 (Illinois General Assembly, 2021), which gives their systems six years to identify all unknown lines. Finally, EPA is aware of several water systems who have fully eliminated LSLs from their distribution system at a rapid pace, which would not be possible if unknown service lines remained in the system's inventory (USEPA, 2023g).

Other factors may facilitate a system's inventory development and contribute to the feasibility of completing the inventory before the replacement deadline. Additional opportunities for inventory development include material identification during routine infrastructure work as well as during emergency repairs, when service lines can potentially be visually inspected. EPA estimates that up to 60 to 80 percent of service lines could potentially be encountered by the proposed 10-year replacement deadline through the replacement of water mains and meters (USEPA, 2023g). EPA released the LCRR Inventory Guidance to support systems as they develop their inventories (USEPA, 2022b). The LCRR Inventory Guidance describes required and recommended elements to add to the inventory as well as an adaptable inventory template. EPA's guidance contains best practices and case studies that can facilitate systems' inventory development. Research and development of emerging technologies regarding identification of service line materials is ongoing (USEPA, 2022b), which EPA expects to accelerate inventory completion.

Deadline to Identify Unknown Service Lines

For the LCRI, EPA is proposing to consolidate the deadlines for identifying all lead status unknown service lines and replacing all LSLs and GRR service lines. This approach has several benefits compared to an inventory deadline that precedes the replacement deadline. This approach reduces rule complexity as well as reporting and tracking burden, a priority identified in EPA's LCRR review notice to assure that States and water systems can effectively implement the LCRI (86 FR 71574, USEPA, 2021b). It also provides systems with flexibility to plan a holistic full service line replacement program that meets local needs. For example, without a separate and earlier deadline to identify unknown service lines, systems can plan to identify service line materials in tandem with other infrastructure work, such as water main or meter replacement, as they are planned to occur in the proceeding years. This could allow water systems to identify service line materials more efficiently as they will already be onsite and, in some cases, may encounter the service line material directly as they perform other planned work. This efficiency could benefit the community by reducing the overall costs and time burden to identify service line materials, lowering the per-household impacts where water rates fund this work, or stretching the value of external funding for service line identification (such as the $15 billion for identifying and replacing LSLs from the BIL). Additionally, the proposed inventory development deadline can better allow systems to strategize and balance inventory development with replacement prioritization goals under the proposed LCRI service line replacement plan requirements.

Finally, aligning the deadlines could improve inventory information quality. For example, water systems could take additional time to develop the inventory with more emphasis on accuracy. Systems could choose to conduct additional potholing over other techniques that can be conducted more quickly but may be less accurate, such as tap sampling. Systems already using potholing to identify service line materials may choose to dig more potholes with additional time (i.e., visually inspecting three points instead of two), which could reduce the incidence of false negative LSL identification because more length of the service line is visually inspected. Systems could also choose to use multiple methods to confirm service line material.

For example, the Commonwealth of Pennsylvania requires systems to use a combination of at least two methods to identify non-lead service lines in their inventory, with the exception of "stand-alone verification options" (Pennsylvania Department of Environmental Protection, 2023). Denver Water also uses several methods to identify non-lead service lines, relying on potholing in two locations, visually inspecting the service line inside the home, and taking water samples (Denver Water, 2023b). Additionally, as a service line replacement requirement under LCRI creates a market for service line material identification technologies, EPA expects that new such technologies may be developed in the coming years and existing technologies will undergo refinement, leading to lower costs and greater accuracy. Aligning the deadline for service line replacement and complete inventories, rather than requiring all unknown service lines be identified prior to the replacement deadline, would give systems the chance to utilize these new or refined technologies on a greater proportion of their unknown lines.

A deadline for inventory completion that precedes the deadline for mandatory service line replacement could reduce the possibility of non-compliance with the replacement deadline, but it would not have the advantages of a consolidated deadline as described above. EPA seeks comment on its rationale for the consolidated deadline approach as compared to an earlier deadline for identifying unknown service lines. See section IX. of this document.

2. Inventory Validation Requirements

Accurate service line inventories are essential to ensure replacement of all LSLs and GRR service lines. To that end, EPA is proposing to require water systems to validate a subset of the non-lead service lines in their inventory. The validation process would facilitate action to remedy any discrepancies that may be discovered as a result of the validation, and provide systems, States, and consumers with additional confidence in the accuracy of the inventory.

The proposed validation requirement would test the reliability of any alternative sources of information, which may include investigation methods, approved by the State (e.g., tap sampling, modeling methods, etc.), as well as service lines categorized as non-lead where the water system has no record of the identification method or technique used for an individual non-lead categorization. The "validation pool" would consist of service lines identified as non-lead using methods other than records review or visual inspection of at least two points on the line. This pool would prioritize validation of these alternative investigation methods. EPA proposes to treat service lines based on visual inspections at two points as sufficient criterion to exclude these service lines from the proposed validation pool. As maintained in the proposed LCRI, the State retains the authority to determine which sources of information are acceptable for purposes of categorizing service line materials. While EPA has heard anecdotally that some records are not reliable, EPA is proposing that this validation requirement prioritize service lines investigated by other sources of information approved by the State. EPA notes that in cases where systems have good recordkeeping practices, records might be more accurate and reduce the need to validate service lines identified by alternative methods.

EPA notes that the proposal requires water systems to submit the results of the inventory validation to the State. The proposal also includes a pathway for systems' inventories to be reviewed by the State to improve their accuracy. The proposed rule would require systems validating the non-lead categorizations of the inventory to list the locations of any non-lead lines identified to be a LSL or GRR service line as well as the method(s) used to categorize the service lines, if available, as a result of the assessment. Although not specifically stated in the proposed rule, a State could require the system to take action to improve inventory accuracy. However, EPA solicits any data or information on whether lines identified as non-lead should be subject to a validation process in all circumstances or in certain circumstances (e.g., records older than a certain number of years).

The proposed validation process would require systems to confirm through visual inspection the service line material of a random sample of service lines from their validation pool and validate, at a minimum, the number of service lines necessary to achieve a 95 percent confidence level. Visual inspection of the pipe exterior could be conducted by excavation (such as potholing), viewing the service line material in the meter pit or stop box, or viewing the service line entering the building. To achieve the 95 percent confidence level, EPA is proposing that systems with more than 1,500 non-lead service lines in their validation pool check the material at a number of sites between 322 and 384 sites, as specified in the rule, that is dependent on the size of the validation pool. This range corresponds to the number of sites that systems would need to validate in order to achieve a 95 percent confidence level USEPA (2023g). EPA is also proposing that systems with 1,500 or fewer non-lead service lines in their validation pools validate at least 20 percent of lines in the pool to provide flexibility for systems with fewer identified non-lead service lines, such as smaller water systems.

EPA is proposing to require that systems complete the validation by year seven of the replacement program. This timeline would allow systems time to develop the inventory using field investigation techniques and alternative sources of information approved by the State and would also allow three years for the water system to address potential issues identified by the validation process and to complete any remaining replacements by their replacement deadline. Where States have required systems to replace service lines on a shortened deadline, the State would also be required to set an earlier deadline for the validation. EPA did not propose a date for a system to begin its validation to provide systems with flexibility to use their experience to adjust their inventory evaluation techniques over time and to allow time for systems to adopt new field investigation techniques, such as those identified in the LCRR Inventory Guidance (USEPA, 2022b), or other new techniques that could be created. Allowing the water system flexibility as to when it begins its validation would allow the system to balance the benefits of delaying the validation to include more non-lead service lines and increasing the validation pool to ensure a more accurate inventory (potentially capturing non-leads identified by more alternative methods that would benefit from the validation process) versus the time the system expects it will need to complete the validation and remaining replacements.

EPA is proposing to require systems notify the State and prepare an updated inventory after they identify a LSL or GRR service line that was previously inventoried as non-lead. Systems would then comply with any additional actions if required by the State to address the inventory inaccuracy, which could include the State requiring non-lead service lines identified by specific records or investigation methods to be recategorized as unknown lines if the State determines those records or methods are not sufficiently accurate. The State could also determine that the categorization error is not reflective of a broader accuracy issue and not require any remedial action. This proposed requirement to notify the State and update the inventory would continue to apply even after a system completes its replacement program because of the potential for inventory discrepancies to be discovered at any time.

EPA is also proposing that systems must offer to inspect a customer's service lines when the customer notifies the system that they suspect the inventory incorrectly categorized their service line material. Systems would be required to offer to inspect the customer service line within 60 days of receiving the notice. This proposed requirement provides yet another opportunity for the water system to assess the accuracy of its inventory to inform potential actions to remedy discrepancies at the individual site as well as throughout the distribution system more broadly.

While EPA is seeking comment on all aspects of the proposed inventory validation approach, EPA is especially interested in the following feedback: the scope of the validation pool (i.e., which lines should be subject to validation); the proposed seven-year deadline to complete the validation; the proposed 95 percent confidence level approach used to develop the size of the validation pool; whether non-lead service lines categorized based on records should be subject to the validation process; and the role of the State in reviewing the inventory including the results of the validation process. See section IX. of this document.

3. Service Line Addresses

The LCRR requires water systems to create and maintain an inventory that includes the exact address associated with each service line connected to the public water system, but the LCRR does not require the publicly accessible inventory to include the specific address of LSL and GRR service line. Instead, systems must use a location identifier (e.g., street address, block, intersection, or landmark) for any LSLs and GRR service lines. For the LCRI, EPA is proposing to require water systems to include the street addresses of service lines and connectors in the publicly accessible inventory. By providing an address for each service line in the inventory, systems can increase transparency with their consumers about the locations and materials of service lines connected to their residences or other buildings they may occupy. EPA emphasizes that including addresses in the publicly accessible inventory is critical to make more people aware of their risk to lead in drinking water. Although the LCRR requires water systems to notify persons served by an LSL, GRR service line, or unknown service line, compliance with the requirements for the notice may not be sufficient to reach all persons at or who use that site (e.g., where the persons served are short-term residents in non-owner occupied buildings, parents and guardians of children at in-home day care facilities, residents of long-term care facilities). Also, this requirement would allow the public to better understand how the water system is prioritizing service line replacement in accordance with the water system's service line replacement plan.

EPA heard feedback during the LCRR review that the publicly accessible inventory should require service line materials to be attributed to specific addresses to increase transparency (see docket no. EPA-HQ-OW-2021-0255). There are many examples of public-facing service line inventories that contain addresses, including: Washington, D.C. (DC Water, n.d.); Cincinnati, Ohio (Greater Cincinnati Water Works, n.d.); Milwaukee, Wisconsin (Milwaukee Water Works, 2023); Elgin, Illinois (City of Elgin, 2022); Grand Forks, North Dakota (Grand Forks, North Dakota, n.d.); and Memphis, Tennessee (Memphis Light, Gas, and Water, n.d.). Based on the many examples of public-facing service line inventories that include the address for each service line, EPA has determined for purposes of this proposal that it is feasible for water systems to share the location of lead, GRR, non-lead, and unknown service lines with the public.

4. Lead Connectors

EPA is proposing to require water systems to include connector materials in the service line inventory. These proposed requirements would provide customers with information about an additional potential lead source in their drinking water, which could prompt members of the public to take actions to reduce the lead exposure from lead connectors. Inventorying connectors would also provide systems with additional information to consider when conducting the proposed distribution system and site assessments.

EPA is proposing to require water systems to review similar records used to develop the LCRR initial inventories for connector materials and include the locations of connector materials in the proposed LCRI baseline inventory if they have not voluntarily done so based on recommendations in EPA's LCRR Inventory Guidance (USEPA, 2022b). The proposed LCRI would require water systems to conduct a records review and include connectors in their inventory by the LCRI compliance date. In addition to conducting this records review to identify the location of existing lead connectors, the proposal would also require systems to identify the locations of previously replaced lead connectors, if those records exist, and to track where lead connectors are replaced in the future. Tracking the locations of replaced lead connectors can provide additional information relevant to assess potential health risks as these lead connectors are a source of lead which may contribute lead to drinking water and downstream galvanized pipes.

EPA considered a requirement for water systems to investigate connector materials not identified by the records review but determined not to include such a requirement in this proposed rule. EPA does not have data or analyses at this time that would support finding that it is feasible for systems to categorize connectors for which records are not available. To do so would require systems to excavate the connector to visually inspect the material. EPA is also concerned about the effect such a requirement would have on a water system's capacity to comply with the proposed requirement to remove LSLs and GRR service lines. Excavation efforts to search for lead connectors would draw funding and staffing resources from the identification and replacement of LSLs and GRR service lines, likely delaying elimination of these service lines in the system as quickly as feasible. In addition, EPA is also concerned that investigations of connector materials while LSLs and GRR service lines are still in place could be disruptive to these downstream service lines if they are not immediately replaced post-investigation, which might not be possible in all cases. This disturbance could cause particulate lead to be introduced into drinking water, potentially exposing consumers. EPA solicits any supporting or contrary data or analysis on the feasibility of a requirement to affirmatively identify the material of connectors throughout the distribution system.

E. Corrosion Control Treatment

Purpose and Need for CCT

CCT refers to methods (e.g., alkalinity/pH adjustment, addition of corrosion inhibitors) that water systems can take to reduce the leaching of lead and copper into drinking water from drinking water infrastructure, such as service lines and premise plumbing. CCT is one of the four treatment techniques EPA promulgated in the LCR. In the LCRR, Optimal Corrosion Control Treatment (OCCT) is defined as the CCT that minimizes the lead and copper concentrations at users' taps while ensuring that the treatment does not cause the water system to violate any national primary drinking water standards (§141.2). Common CCT methods include alkalinity and pH adjustment and the addition of phosphate-based corrosion inhibitors. In the LCR, EPA stated that CCT was an "important element of the final treatment technique [rule]" because "most of the lead and copper found in drinking water is caused by corrosion of materials containing lead and copper in the distribution system and in the plumbing systems of privately owned buildings" (56 FR 26479, USEPA, 1991). EPA evaluated CCT in terms of its ability to effectively reduce lead and copper levels in drinking water and its technical and economic feasibility. EPA determined that CCT was effective at reducing lead and copper levels at the tap (56 FR 26483, USEPA, 1991). In addition, EPA determined that CCT has been used in water distribution systems for many years demonstrating its efficacy under field conditions and that the treatments were generally available for use by water systems (56 FR 26485-26486, USEPA, 1991). Further, EPA determined that CCT was affordable because the costs of alkalinity adjustment, pH adjustment, and the addition of corrosion inhibitors were reasonable for large water systems (56 FR 26485-26486, USEPA, 1991). Given these findings, EPA determined that CCT was feasible within the meaning of the current SDWA sections 1412(b)(4)(D) and 1412(b)(7) (56 FR 26485-26486, USEPA, 1991).

Feasibility

Based on many years of implementation of the LCR with thousands of water systems using corrosion control strategies, EPA has determined for the proposed LCRI that these treatments are still technically and economically feasible under the current SDWA sections 1412(b)(4)(D) and 1412(b)(7). EPA has identified research studies that show effective CCT reduces lead and copper from leaching into drinking water (Hayes and Hydes, 2012; Roy and Edwards, 2020; Tam and Elefsiniotis, 2009; Vijayashanthar et al., 2023). Also, CCT continues to be generally available for use by water systems. For example, an estimated 98 percent of water systems serving more than 50,000 people currently have CCT (Chapter 3, Exhibit 36, USEPA, 2023b). Further, the costs of alkalinity adjustment, pH adjustment, and corrosion inhibitors continue to remain reasonable for large water systems with an estimated cost of $9.43 per household. Nevertheless, in section IX. of this document, EPA is requesting comment on CCT, and is especially interested in any data, analyses, and comments on proposed changes to the CCT requirements in the LCRI.

LCRR CCT Requirements

Under the LCRR, medium and large systems are required to install or re-optimize OCCT in response to a lead or copper action level exceedance. Medium and large system with LSLs that exceed the lead action level are required to harvest lead pipes from the distribution system and conduct flow-through pipe rigs to evaluate options for OCCT or re-optimized OCCT. Large systems with CCT that exceed the lead practical quantification level of 0.005 mg/L may be required to re-optimize their OCCT. Large systems without CCT that exceed the lead practical quantification level are required to complete steps to install CCT.

Under the LCRR, in the case of a trigger level exceedance for systems with or without CCT, small and medium systems must recommend CCT (except for small systems that select other compliance alternatives). However, if after two six-month monitoring periods, there is no subsequent action level exceedance, any small and medium water systems without CCT are not required to conduct a subsequent corrosion control study. In LCRR, EPA also clarified that the continued operation and maintenance of OCCT and re-optimized OCCT requirements apply to consecutive systems, including those distributing water that has been treated for corrosion control by another system.

1. LCRI Proposed CCT Changes

During the LCRI external engagements, EPA heard concerns about the complexity of the CCT requirements in LCRR, and the requirement for pipe rig/loop studies, noting that pipe loop studies are resource intensive and that many water systems and States do not have experience implementing them (USEPA, 2023j). Also, EPA heard about the uniqueness of each water system with respect to CCT and that CCT for each water system is different due to the water system's specific mix of plumbing materials and operations.

Under the LCRI, EPA is proposing to eliminate the lead trigger level and to require systems to install or re-optimize OCCT after an exceedance of the new lead action level of 0.010 mg/L. Streamlining the rule to only use an action level reduces the complexity of the proposed LCRI.

Further, the proposed LCRI would have a more rigorous tap sampling protocol for LSL systems. As a result of the elimination of the trigger level, the lower action level, and a more rigorous tap sampling protocol, EPA anticipates more systems could exceed the lead action level even when re-optimized than under the LCRR, especially in the early years of implementing the mandatory service line replacement requirements under the proposed LCRI. Thus, EPA is proposing in § 141.81(a) that systems that have re-optimized once and continuously meet optimal water quality parameters would not be required to re-optimize again if there are subsequent action level exceedances, unless required by the State. While the lead action level is intended to be generally representative of effective OCCT, EPA recognizes that there may be some instances where systems would be unable to meet the proposed lowered lead action level of 0.010 mg/L because tap water lead levels can be influenced by other factors. In section V.A. of this document, EPA noted that single site lead level variability can occur due to water use patterns and physical disturbances of pipes causing particulate release. Elevated lead levels due to these factors would not be reflective of the performance of the corrosion control treatment. For systems that have already evaluated the corrosion control treatment options under the re-optimization process, resources would be better devoted to other mitigation activities rather than repeating the same steps.

States will retain the discretion to modify previous designations of OCCT and re-optimized OCCT based on their own determination or in response to a request by a water system if the State concludes that a change is necessary to ensure the system continues to optimize corrosion control treatment. EPA is also proposing that States can require the system to conduct additional CCT studies. EPA anticipates that removing sources of lead in drinking water, such as with mandatory service line replacement, would reduce the number of systems that exceed the lead action level over time. In the meantime, water systems would be required to continue to operate and maintain their re-optimized OCCT as demonstrated through monitoring for optimal water quality parameters, and comply with other proposed mitigation measures (e.g., make filters available for systems with multiple lead action level exceedances) to reduce exposure to lead in drinking water. EPA is seeking comment on if it would be more appropriate to retain the LCRR requirement for these systems to re-optimize again following an action level exceedance regardless of whether they are meeting their optimal water quality parameters and if so, whether the rule should allow the State with the authority to waive this requirement (see section IX. of this document).

EPA is also proposing to allow a system with a lead action level exceedance to defer installing or re-optimizing OCCT if the system can replace 100 percent of its LSLs and GRR service lines within five years of the date the system first exceeds the lead action level. The purpose of this proposed requirement would be to allow systems to avoid the costly and time-consuming process of conducting a harvested LSL pipe loop CCT study and installing the corresponding OCCT when the identified treatment would not be tailored for the system's long-term distribution system conditions without LSLs. It generally takes approximately five years to complete the CCT evaluation and installation process: 30 months to construct a pipe rig and conduct a treatment study followed by 30 months to install the State-approved OCCT and an additional one year to conduct follow-up monitoring. If a system is on track to replace all its lead and GRR service lines within five years, the optimal treatment identified by a costly and time-consuming pipe loop study may no longer be the optimal treatment after all LSLs and GRR service lines are replaced. This is because the pipe loop studies are based on lead pipes in the water system and if all of those are replaced, the results of the pipe loop study would likely be no longer relevant. Following 100 percent service line replacement, a study evaluating OCCT on current conditions in the system would be more appropriate. Under this proposed option, eligible systems would only be allowed to defer optimizing or re-optimizing OCCT if water systems meet the following two requirements: 1) annually replaces at least 20 percent of their remaining service lines that require replacement (in accordance with the proposed § 141.84(d)(6)); and 2) has no LSL, GRR, or unknown service lines remaining at the end of the five-year period. Systems would need to ensure they have access to replace all lead and GRR service lines in their inventories, and have identified all unknown service lines in their inventory. During this five-year period, eligible systems would still be required to meet all other rule requirements including public notification, public education, and if applicable, public education following multiple action level exceedances, including making filters available. Systems with CCT that elect this option would be required to continue operating their existing CCT throughout those five years.

EPA anticipates that greater public health benefits could result from replacing all lead and GRR service lines within five years compared to implementing the requirement to install or optimize OCCT with a lower action level because the most significant sources of lead in drinking water, when present, would be removed from the system (Sandvig et al., 2008). Additionally, this proposed requirement would allow water systems to dedicate more staffing and financial resources to replacing lead and GRR service lines within five years rather than focusing on a pipe loop study with results that may no longer be applicable following 100 percent replacement of lead and GRR service lines.

Large and medium systems unable to replace 20 percent of their LSLs or GRRs annually and unable to replace 100 percent of their lead and GRR service lines within five years must proceed with the harvested pipe rig/loop study and install or re-optimize OCCT. The pipe loop requirements would apply to any small system required by the State to conduct a pipe rig/loop study.

Small systems unable to replace 20 percent of their LSL or GRR service lines annually and replace 100 percent within five years would be required recommend OCCT, re-optimized OCCT, or for all NTNCWSs and the subset of CWSs serving 3,300 or fewer people to recommend a small system compliance option and implement the State-approved approach. As proposed, water systems that replace 100 percent of their LSLs and GRR service lines in this five-year period but subsequently exceed the action level (or the practical quantification level for large systems without CCT) would be required to proceed with meeting the proposed CCT requirements for systems with only non-lead service lines.

In addition, EPA is proposing changes to expedite when States can approve CCT re-optimization treatment changes for systems. Under the LCRR, States can approve existing CCT re-optimization modifications without requiring a new CCT study for systems that have 90th percentile lead levels between the trigger level of 0.010 mg/L and the lead action level of 0.015 mg/L. As described in section V.E.2. of this document, EPA is proposing to eliminate the trigger level and to lower the lead action level to 0.010 mg/L. Concurrently, EPA is also proposing that States may approve, without a new CCT study, a CCT re-optimization treatment change for a system that exceeds the proposed action level for lead, but which previously conducted a CCT study. In developing the CCT change, the State must evaluate a water system's past CCT study results. EPA is proposing this update because it would expedite treatment changes, allowing the benefits of treatment modification to be realized sooner and avoiding a redundant CCT study that may not produce different results from previous studies. The treatment recommendation and CCT study process can take multiple years to complete. For water systems with existing CCT the water system may be able to alter the existing treatment (e.g., increase pH and/or orthophosphate dose) without a new CCT study on a much faster timeframe rather than waiting for study results that may indicate that same change. EPA is requesting comment on whether there are situations and/or conditions where existing treatment modifications may achieve similar lead reductions rather than delaying the new treatment for two-and-a-half years while a study is underway. For more information, see section IX. of this document.

EPA is proposing modifications to the CCT studies that may be required in the event of a lead action level exceedance for small systems with LSLs. Under the LCRR, small systems that chose CCT and exceed the action level are required to recommend a CCT treatment to the State. The State may require small systems to conduct corrosion studies using a pipe rig. For the LCRR, EPA recommended that small systems serving 10,000 people or fewer with LSLs that exceed the lead action level choose the LSLR small system flexibility option rather than CCT because the cost of the pipe rig studies would be approximately the cost of replacing 55 LSLs (USEPA, 2020b). However, as discussed in section V.G. of this document, EPA is proposing to remove the LSLR option from the small system flexibility options because LSLR would be mandatory under the proposed LCRI. Therefore, EPA is proposing under the LCRI to exclude small systems with LSLs serving 10,000 or fewer people from having to conduct a pipe rig study because these systems often lack the technical expertise required to design and construct and operate the pipe rig and they could better focus limited resources that would be dedicated to a pipe rig on replacing their LSLs. Under the proposed LCRI, the State may require a pipe rig study for a small system if the State determines that the small system has the technical capabilities to conduct such a study.

In addition, EPA is proposing to require that States designate optimal water quality parameters for medium systems that must install or re-optimize OCCT after exceeding the lead action level. EPA is also proposing that States designate optimal water quality parameters for medium systems with CCT that have not exceeded the action level. While LCRR requires the continued operation and monitoring of OCCT and re-optimized OCCT that can include maintaining optimal water quality parameters, EPA is proposing that States must establish optimal water quality parameters for medium systems with CCT and that these systems must meet their optimal water quality parameters. This proposed requirement would allow States to better assess whether these types of medium systems are maintaining their OCCT or re-optimized OCCT, as well as provide better process control since source water quality can vary both daily and seasonally. EPA is also proposing additional changes to §§ 141.81 and 141.82 to clarify requirements that EPA is not intending to change. EPA anticipates that these clarifications would help States and water systems more easily interpret and implement the corrosion control treatment requirements.

EPA is proposing to streamline some requirements in § 141.80 which resulted in EPA proposing to move an LCRR provision from § 141.81. The provision remains unchanged from the LCRR, requiring systems to notify the State before a long-term treatment change or the addition of a new source, and that States must review and approve the change or addition before implemented by the system, and allows the State to take additional actions to control corrosion.

2. Lead Action Level and Trigger Level

In the LCR, water systems calculate the 90th percentile of their lead and copper tap samples and compare these values to the lead and copper action level, respectively. EPA introduced lead and copper action levels in the LCR "as a method to limit the number of public water systems that would need to complete a detailed demonstration that they have installed corrosion control treatment to minimize lead and/or copper levels at taps" (56 FR 26488, USEPA, 1991). EPA stated that its selection of the values for the action levels "reflects EPA's assessment of a level that is generally representative of effective corrosion control treatment and [it] is therefore, useful as a tool for simplifying the implementation of the treatment technique"

(56 FR 26490, USEPA, 1991). In the LCR, EPA set the action levels for lead and copper at 0.015 mg/L and 1.3 mg/L, respectively.

Under the LCR, large systems were required to optimize CCT with a detailed demonstration unless they measured 90th percentile lead levels below the practical quantitation limit of 0.005 mg/L. Small and medium systems demonstrated optimized CCT by measuring 90th percentile lead levels at or below the action level, which is a level generally representative of effective corrosion control treatment. EPA found that using the action level as a tool to limit the need for detailed optimization demonstrations reduced the technical complexity of LCR for small and medium systems that may lack the expertise required to conduct such studies and made “implementation of the rule administratively workable” with regard to small and medium systems (56 FR 26492, USEPA, 1991). Consistent with this rationale, EPA found that large systems should and were able to conduct a more detailed demonstration to identify OCCT for their system because they have “the greatest technological capabilities and access to technical support and other resources that would enable them to perform the sophisticated treatment manipulations that might further reduce lead levels” (56 FR 26492, USEPA, 1991).

In the LCR, EPA also determined that the action level is not subject to the same standard as an MCL under SDWA section 1412(b)(4)(B). First, EPA found that the action level and an MCL have different purposes. Specifically, in the LCR, EPA provided that “exceedance of the action level(s) is merely a trigger for medium and small systems to implement optimal corrosion control (unless they can demonstrate to the State that they have already optimized corrosion control) and systems of all sizes to implement source water monitoring and possible treatment, public education, and possible lead service line replacement” (56 FR 26488, USEPA, 1991). Second, EPA found that action levels do not function the same way as MCLs because action level exceedances are not violations under SDWA compared to MCLs (56 FR 26488, USEPA, 1991). In the LCR, EPA further distinguished an MCL from an action level by elaborating that: "Under the SDWA, if a water system exceeds an MCL, it is in violation of the NPDWR (unless it has obtained a variance or exemption under section 1415 or 1416) . . . . Water systems that exceed the action levels, however, are not in violation of the treatment technique . . . . Since the compliance status of a water system depends upon whether it performs the treatment steps established in the rule, and not upon whether it meets the action levels, the action levels are not equivalent to MCLs" (56 FR 26488, USEPA, 1991).

Under LCRR, the lead and copper action levels continue to determine "in some cases, whether a water system must install CCT, monitor source water, replace LSLs, and undertake a [public education] program" (86 FR 4207, USEPA, 2021a). The LCRR maintains the LCR's lead action level of 0.015 mg/L and introduces a lead trigger level. Under the LCRR, the trigger level is set at 0.010 mg/L, a "reasonable level" below the lead action level and above the practical quantification limit (86 FR 4208, USEPA, 2021a). If systems exceed the lead and/or copper action level, they must take certain actions including optimizing or re-optimizing OCCT, replacing LSLs, and educating or notifying the public. If systems exceed the lead trigger level, they must take proactive actions including conducting CCT studies, re-optimizing OCCT, conducting goal-based LSLR and related public education activities, and preparing for a more rapid response should they later exceed the lead action level.

For the LCRI, EPA is proposing to eliminate the lead trigger level and lower the lead action level to 0.010 mg/L. These changes address priorities identified in the LCRR review and feedback EPA heard in the proposed LCRI external engagements. The Agency evaluated the trigger level with regards to the complexity, implementation issues, and public communication challenges associated with two lead levels, as well as in the context of other proposed changes in the LCRI, including proposed mandatory full service line replacement and proposed improvements to the tap sampling protocol at LSL sites, that "address lead contamination at lower levels and improve sampling methods to provide better health protection" (86 FR 71579, USEPA, 2021b).

EPA anticipates that eliminating the trigger level and establishing a single, lowered action level would help simplify the rule and improve implementation. Many stakeholders recommended eliminating the trigger level because it would simplify both implementation and understanding of the rule (USEPA, 2023h; USEPA, 2023i; USEPA, 2023j). In 2020, the Science Advisory Board noted that the trigger level added "unnecessary complexity" (USEPA, 2020f). However, a few stakeholders recommended EPA maintain the trigger level and not lower the action level by noting the benefit of the trigger level to prompt actions that would help a system avoid an action level exceedance, and the requirements associated with an exceedance, such as public notification (USEPA, 2023j; USEPA, 2023m).

Evaluation of a Revised Action Level as a Screen for OCCT Demonstration Based on Recent, Higher-Quality Data

EPA considered several factors when selecting its proposed lower lead action level of 0.010 mg/L. EPA's primary consideration was the finding that an action level at 0.010 mg/L is supported by past CCT performance data as being generally representative of OCCT. As generally representative of OCCT, the action level is a 90th percentile lead level that most systems that have installed OCCT can meet. The action level would still serve as a screen for small and medium systems such that they would not need to conduct a detailed demonstration of OCCT because they would be deemed to have optimized CCT based on the sampling results. More recent and higher quality lead data are available from years of LCR implementation. This allowed EPA to re-assess which action level is generally representative of a level that systems with CCT can achieve. EPA conducted this analysis and found that the ability of systems to limit the corrosivity of water in the distribution system has greatly improved over the past 30 years and that many systems are able to achieve lower levels of lead (USEPA, 2023g); therefore, a lower lead action level would be a more appropriate screen for determining which small and medium systems are required to conduct a detailed OCCT demonstration. EPA's analysis is summarized below.

EPA examined 90th percentile lead levels reported to EPA's Safe Drinking Water Information System (SDWIS) over the years 2012–2020 for 6,529 community water systems of all sizes with known LSL and CCT status (i.e., whether a system contains LSL sites and whether a system has installed CCT) (USEPA, 2023b, Chapter 3, sections 3.3.3 – 3.3.4).

Because EPA is identifying a level generally representative of OCCT, EPA is primarily considering data from systems that have CCT installed. Available lead 90th percentile data were collected using the tap sampling protocol and tiering criteria in the LCR. However, changes to the tap sampling protocol and sample site tiering criteria in the LCRR and the proposed LCRI are expected to impact 90th percentile lead levels (see section V.C. of this document). To account for differences in the sampling protocol under the LCR and proposed LCRI, EPA developed adjustment ratios using data from the State of Michigan collected with a similar protocol and site selection criteria to the proposed LCRI (USEPA, 2023b, Chapter 3, section 3.2.5). Reported 90th percentile lead values were multiplied with the adjustment ratios to estimate what the 90th percentile values would be if they were collected according to the proposed LCRI sampling protocol. This multiplier approach, and the associated uncertainties, are further described in the proposed LCRI Economic Analysis (USEPA, 2023b).

The resulting data are relevant to EPA's evaluation of what level is generally representative of OCCT under the proposed LCRI. Based on this information, EPA categorized the systems with known LSL and CCT status using the highest 90th percentile lead level (adjusted for the proposed sampling protocol) reported over the 2012 to 2020 analysis period to estimate the percent of the systems that would have lead levels at or below the potential lower action level thresholds under the proposed LCRI "Analysis of reported 90th percentile values from 2012-2020.xlsx" in EPA-HQ-OW-2022-0801). These estimates are presented in Exhibit 4 below by LSL and CCT status.

Exhibit 4. Percent of Systems By LSL and CCT Status With Lead Levels At or Below Potential Lead Action Levels Adjusted for the Proposed LCRI Sampling Protocol (2012 – 2020)

LSL and CCT Status (Number of Systems)[1]	P90[2] ≤ 0.015 mg/L	P90[2] ≤ 0.010 mg/L	P90[2] ≤ 0.005 mg/L
No LSLs/CCT (2,105)	95%	92%	82%
LSLs/CCT (1,224)	73%	59%	37%
No LSLs/No CCT (2,730)	95%	91%	78%
LSLs / No CCT (470)	80%	65%	37%

Notes:
[1] Data from 6,529 community water systems with known CCT and LSL status. See "Analysis of reported 90th percentile values from 2012-2020.xlsx" in EPA-HQ-OW-2022-0801.
[2]Systems categorized based on their highest P90 value reported (SDWIS 2012–2020).

As shown in Exhibit 4, EPA estimates that, when accounting for the proposed LCRI sampling protocol, 95 percent of the evaluated non-LSL systems with CCT and 73 percent of LSL systems with CCT are estimated to be at or below the current lead action level of 0.015 mg/L. At 0.010 mg/L, the percentage of systems at or below that threshold is 92 percent and 59 percent, respectively. These results indicate that almost all non-LSL systems with CCT evaluated can meet the 0.010 mg/L threshold, in addition to a majority of LSL systems with CCT. EPA also estimates that 82 percent of the non-LSL systems would meet an action level of 0.005 mg/L, and only 37 percent of systems with LSLs would meet this level. These results suggest that 0.005

mg/L would not be considered generally representative of optimized conditions for systems with LSLs.

In the LCR, EPA identified only a small percentage of LSL systems with CCT that would be able to meet the selected action level of 0.015 mg/L. However, the data used for that analysis was from a small number of systems. At the time, EPA acknowledged the limitations of the available data noting the challenges of "extrapolating generalized estimates of treatment performance…, which are collected from relatively few, like-sized systems operating under relatively favorable natural water quality conditions" (56 FR 26491, USEPA, 1991). Further, EPA noted that the systems were not yet attempting to minimize lead levels (56 FR 26491, USEPA, 1991). The updated data EPA is using to re-evaluate the selection of the lead action level for the proposed LCRI comprises both a larger dataset with systems of various sizes and contains 90th percentile lead values collected under the requirements of LCR, including OCCT. Therefore, this recent larger dataset is of higher quality for selection of the action level.

Based on the analysis of this dataset, 0.010 mg/L is generally representative of OCCT and is therefore useful as a screen for the detailed demonstration that a system would otherwise be required to undertake. In addition to evaluating the CCT performance of systems to identify an action level that is generally representative of OCCT to ensure the rule is implementable for small and medium systems, EPA considered additional factors in selecting 0.010 mg/L as the proposed action level for the LCRI.

Administrative Burden

For the proposed LCRI, EPA considered administrative burden with respect to a lower lead action level. EPA also considered this factor in the LCR, describing the action level as a tool to limit the number of public water systems required to complete a detailed OCCT demonstration. EPA further found that requiring small and medium water systems to install

OCCT regardless of their tap levels would impose "an unworkable administrative burden upon States." (56 FR 26492, USEPA, 1991). This is because small and medium systems place the highest burden on States with respect to CCT as they "generally will require the most extensive input from States in evaluating, selecting, and overseeing implementation of optimal corrosion control treatment" (56 FR 26492, USEPA, 1991).

For the proposed LCRI, EPA again considered the administrative burden on States and water systems required to install or re-optimize OCCT after a lead action level exceedance, as well as the administrative burden associated with meeting the other requirements in the proposed LCRI. For example, EPA is concerned about the resources States would need to review the detailed demonstrations for CCT, particularly for small and medium systems.

Small and medium systems comprise the vast majority of CWSs: out of 49,529 total CWSs, 48,513 serve populations equal to or less than 50,000 people. Further, the smallest CWSs (i.e., those serving 3,300 or fewer people) account for 40,113 systems (USEPA, 2023b, Chapter 3, Exhibit 3-2). EPA identified 6,529 water systems of all sizes with known CCT and LSL status and reported 90th percentile values in SDWIS from 2012–2020. To estimate how many CWSs are likely to exceed various potential action levels nationally, EPA used the exceedance percentages among the 6,529 identified systems adjusted for the proposed LCRI sampling protocol, to estimate exceedances among all CWSs (USEPA, 2023b, section 4.3.5). Exhibit 5 below shows the percent of systems projected to have 90th percentile lead levels exceeding 0.015 mg/L, 0.010 mg/L, and 0.005 mg/L under the proposed LCRI.

Exhibit 5. Percent of CWSs in Each Size Category Estimated to Have 90th Percentile Lead Levels Exceeding 0.015 mg/L, 0.010 mg/L, and 0.005 mg/L Under the Proposed LCRI

P90[1]	LSL and CCT Status	< 3,300 (40,113 systems)[2]	3,301–10,000 (5,026 systems)	10,001–50,000 (3,374 systems)	> 50,000 (1,016 systems)	Total (49,529 systems)

0.015 mg/L	No LSL/No CCT	3.1%	0.5%	0.2%	0.0%	1.9%
	No LSL/CCT	2.2%	1.4%	0.2%	0.6%	1.6%
	LSL/No CCT	1.1%	2.5%	2.1%	0.0%	1.4%
	LSL/CCT	1.5%	6.1%	11.4%	15.5%	5.1%
	TOTAL	**8.0%**	**10.5%**	**13.9%**	**16.1%**	**10.0%**
0.010 mg/L	No LSL/No CCT	5.9%	1.7%	0.6%	0.0%	3.8%
	No LSL/CCT	3.3%	2.5%	0.8%	0.9%	2.5%
	LSL/No CCT	1.9%	4.4%	4.2%	0.0%	2.5%
	LSL/CCT	1.9%	9.6%	18.6%	22.3%	7.6%
	TOTAL	**12.9%**	**18.3%**	**24.2%**	**23.3%**	**16.5%**
0.005 mg/L	No LSL/No CCT	13.2%	6.5%	2.6%	0.0%	9.3%
	No LSL/CCT	5.9%	7.0%	4.7%	5.7%	5.9%
	LSL/No CCT	2.9%	8.0%	9.0%	0.0%	4.6%
	LSL/CCT	2.5%	14.9%	28.0%	38.6%	11.7%
	TOTAL	**24.5%**	**36.4%**	**44.2%**	**44.3%**	**31.4%**

Notes:

[1] Systems categorized by highest 90th percentile value reported to SDWIS (2012–2020) and adjusted for proposed LCRI sampling. See USEPA, 2023b, section 4.3.5.

[2] Total number of CWSs in each size category nationally as reported to SDWIS in fourth quarter 2020. See USEPA, 2023b, Chapter 3, Exhibit 3-2.

Systems that exceed the action level are required to take actions that would likely necessitate increased State oversight. Exhibit 5 shows both the percentage of each system size category and percentage of total CWSs expected to exceed various potential action levels. For example, EPA estimates that at an action level of 0.015 mg/L, 10 percent of all CWSs and eight percent of all systems serving 3,300 people or fewer are expected to have exceedances. EPA estimates that at the potential lower action level of 0.010 mg/L, 16.5 percent of all CWSs are expected have exceedances, which represents approximately 8,200 water systems. At 0.005 mg/L, the number of systems expected to exceed increases to 31.4 percent or approximately 15,500 systems. Therefore, twice as many systems are expected to exceed 0.005 mg/L than 0.010 mg/L. At 0.005 mg/L, between 25 percent and 45 percent of community water systems in each system size category are estimated to have exceedances. For example, 24.5 percent of all community water systems serving fewer than 3,300 people, 36.4 percent of systems serving between 3,300 and 10,000 people, and 44.2 percent of systems serving between 10,000 and

50,000 people are expected to exceed 0.005 mg/L. Additionally, approximately 98 percent of all CWSs are systems that serve 50,000 people or fewer; therefore, a majority of the systems expected to exceed the action level are small and medium systems.

CCT requirements may take systems several years to complete and include multiple interactions with the State. The administrative burden for the State includes activities such as reviewing CCT study results, setting optimal water quality parameters, and reviewing optimal water quality parameter data (USEPA, 2023b, Chapter 4, section 4.4.1). Particularly for LSL systems, CCT studies can require additional time and technical expertise (e.g., conducting pipe rig studies) which in turn can require additional State oversight. As shown in Exhibit 5, EPA estimates a higher percentage of systems with LSLs and CCT in each size category to exceed any given potential action level. Thus, lowering the action level could affect the State's ability to provide meaningful input to individual systems and adequately oversee OCCT implementation statewide.

Additionally, the significant State resources required to oversee OCCT studies and implementation could affect the State's ability to oversee other proposed requirements of the LCRI, including replacing LSLs and GRR service lines as quickly as feasible. EPA is particularly concerned about the potential burden on systems and States if small and medium systems are required to take steps to determine and implement OCCT when they exceed a lead action level of 0.005 mg/L. Competing resources among rule components could impact the ability of these small and medium systems to reduce lead levels through service line replacement, which could result in less public health protection overall. Specifically, if a significant number of small and medium water systems were simultaneously required by the State to conduct CCT studies and take other actions associated with an action level exceedance, it could strain State resources to oversee requirements for full lead and galvanized service line replacements, which are the most significant source of lead in drinking water, where present. Additionally, States will have an increased level of administrative burden due to the proposed requirements for water systems to conduct mandatory service line replacement (USEPA, 2023b, Chapter 4, section 4.4.4). EPA is concerned that the combination of systems taking these actions and a large percentage of systems required to evaluate CCT at 0.005 mg/L would be administratively unworkable for States. EPA is also concerned that setting the action level lower than 0.010 mg/L could impact State rule implementation and enforcement activities, particularly for mandatory service line replacement. Therefore, to inform the proposed LCRI, EPA has reasoned that the results in Exhibit 5 support a lower action level of 0.010 mg/L. While a higher percentage of community water systems (16.5 percent) are expected to exceed the proposed lead action level of 0.010 mg/L than the current lead action level of 0.015 mg/L (10 percent) and would increase administrative burden for States, EPA believes this is a reasonable increase because it would require more systems to take actions that would reduce lead levels.

National Availability of Technical Experts

EPA is also concerned about the number of CCT experts available nationally to assist water systems in designing an OCCT study and implementing treatment. In particular, small and medium systems are unlikely to have in-house experts who could design corrosion control studies for optimization. Further, many small and medium water systems currently without CCT or OCCT may not have staff with the relevant experience to install or optimize OCCT. Instead, these systems will likely have to work with State personnel to identify a treatment recommendation and seek support for installing and operating corrosion control treatment.

Water systems can hire technical experts to provide the needed direction and historical experience about CCT; however, systems may face challenges in trying to hire from the limited pool of CCT experts nationally. EPA expects CCT expertise to be highly technical given that corrosion chemistry is complex and theoretical predictions are rarely sufficient to fully understand a system. For example, in a study of lead scales (i.e., minerals formed by CCT and accumulated on the inside of lead pipes to reduce lead release) formed in excavated pipes from 22 water systems, only 9 followed model predictions, and all but two had at least one type of scale formed that was not predicted based on classical modeling approaches (Tully et al., 2019). Thus, knowledge of relevant chemistry alone is usually not sufficient to perform comprehensive CCT studies. Instead, experts typically rely on significant practical and learned experience to evaluate each system individually. This knowledge is generally gained through practical, on-the-job experience that cannot otherwise be replicated. EPA anticipates systems and States may encounter challenges acquiring this technical expertise.

Practical Quantitation Limit

Further, EPA notes that the lead action level could not be set below the lead practical quantitation limit of 0.005 mg/L, which represents the technological limitations of reliably measuring lead levels. As defined in LCRR at 40 CFR 141.2, the practical quantification limit is "the minimum concentration of an analyte (substance) that can be measured with a high degree of confidence that the analyte is present at or above that concentration." For the proposed LCRI, EPA reconsidered the practical quantitation limit used in the LCR to see if there was evidence to support lowering it. The lead practical quantitation limit is currently set at 0.005 mg/L and is incorporated into the National Environmental Laboratory Accreditation Conference (NELAC) Institute (The NELAC Institute, 2021) accreditation process. EPA also obtained data from a company that conducts proficiency testing and did not find data to support lowering the practical quantitation limit ("Lead Drinking Water Proficiency Testing Data (2016 -2022)" available in the docket)). EPA also notes that while the minimum detection limit of lead can be as low as 0.0006 mg/L under certain EPA-approved methods (Diebler, 2013), the practical quantitation limit is set higher than the method detection limit to account for analytical variability, with EPA's practice being to add an uncertainty factor of 5–10 (53 FR 31550, USEPA, 1988). Thus, EPA finds the current practical quantification limit of 0.005 mg/L is consistent with published detection limits. Further, EPA is not aware of national-scale data evaluating lead detection limits, or on the number or percentage of labs nationwide measuring lower levels. EPA is not aware of any additional evidence to support lowering the current lead practical quantification level below 0.005 mg/L in the proposed LCRI.

Stakeholder Feedback

During the LCRR review and LCRI engagements, EPA heard stakeholder support for lowering the lead action level (USEPA, 2023h; USEPA, 2023i; see docket no. EPA-HQ-OW-2021-0255). EPA heard stakeholder support for removing the lead trigger level and lowering the action level to 0.010 mg/L (USEPA, 2023j; USEPA, 2023m). EPA heard from some States experienced in implementing the LCR that support lowering the action level to 0.010 mg/L (USEPA, 2023j). These stakeholders noted the consistency with the current lead trigger level and indicated that an action level of 0.010 mg/L would simplify the rule while aligning with LCRR CCT requirements associated with the trigger level. In contrast, other States did not support reducing the lead action level below 0.015 mg/L without more consideration of technical and economic feasibility (USEPA, 2023j). Similarly, a few stakeholders indicated support for a lower action level if supported by data, particularly from small systems (USEPA, 2023m). As described above, EPA has determined that a lower action level is supported by data (USEPA, 2023g).

Others recommended EPA maintain the lead action level at 0.015 mg/L, stating that the proposed changes to the tap sampling protocol would make it more difficult for systems to achieve the current action level. They added that simultaneously changing the sampling protocol and lowering the action level would require an even larger number of water systems to take actions, and expressed concern about rule implementation (USEPA, 2023h; USEPA, 2023i; USEPA, 2023j; USEPA, 2023m).

Some stakeholders recommended that EPA propose a revised lead action level of 0.005 mg/L or a level closer to the lead MCLG of 0 mg/L, with a few indicating the level would be more protective of human health (USEPA, 2023h; USEPA, 2023i; see docket no. EPA-HQ-OW-2021-0255). Further, these stakeholders believe that a lower action level would lead to increased public health benefits by requiring more systems to act. A consideration for using 0.005 mg/L as representative of effective CCT for small and medium systems is that it would be consistent with the screening level used in the LCR and LCRR and maintained under the proposed LCRI for large systems to be deemed to have OCCT based on tap sampling. A level of 0.005 mg/L is used in the LCR and the LCRR for this purpose because it represents the practical quantitation limit for lead. In section IX. of this document, EPA is seeking comment, data, and additional information on the anticipated benefits and tradeoffs, including for public health and administrative burden on systems and States, of requiring more small and medium systems to conduct a detailed OCCT demonstration and take other actions if they exceed the proposed action level of 0.010 mg/L or other lower values.

EPA also heard stakeholder support for replacing the lead action level with an MCL. For the proposed LCRI, EPA re-evaluated the determination made in LCR and LCRR to establish a treatment technique rule in lieu of MCLs for lead and copper. As explained above and in the LCR and LCRR, the lead action level was not developed to be an MCL and it is not an MCL. As described in the LCR, because "the compliance status of a water system depends upon whether it performs the treatment steps established in the rule, and not upon whether it meets the action levels, the action levels are not equivalent to MCLs" (56 FR 26488, USEPA, 1991). For the LCRI, EPA is not proposing to revise the purpose of the action levels for lead and copper or make them MCLs. Therefore, consistent with EPA's determinations in LCR and LCRR, the action levels proposed for LCRI cannot be evaluated against the legal standard for an MCL in SDWA section 1412.

Further, it is important to be clear that there is a difference between collecting individual samples for lead and copper at the tap for purposes of evaluating the action level to assess the effectiveness of corrosion control and why it is not feasible to ascertain the levels of lead and copper consistent within the meaning of the SDWA to establish MCLs in the proposed LCRI. Again, the action level is not an MCL. While the levels of lead and copper can be ascertained in individual samples, measurement of customer samples collected at taps to evaluate the 90th percentile lead and copper levels is not an accurate reflection of the levels of lead and copper within a water system, or the effectiveness of the treatment applied by the water system necessary for an MCL. For EPA's explanation of why it is not feasible to establish MCLs for lead and copper within the meaning of the SDWA, see section V.A. of this document.

Given the foregoing factors and considerations, EPA believes that an action level of 0.010 mg/L would ensure the treatment technique of CCT is feasible for small and medium systems and would prevent known or anticipated adverse health effects to the extent feasible. In section IX. of this document, EPA is requesting comment on its proposed lead action level of

0.010 mg/L, as well as comment and supporting data for alternate lead action levels (e.g., 0.005 mg/L).

Even though the action level was primarily developed to support the treatment technique for CCT, EPA is proposing to continue using the action level for certain provisions in treatment techniques other than CCT (i.e.*,* public education and source water monitoring) for administrative ease and to avoid confusion by establishing multiple action levels. This would also reduce the complexity of the rule and is consistent with the rationale for a single action level described in the LCR (56 FR 26507 - 09, USEPA, 1991). EPA notes that, as proposed, the service line replacement treatment technique is not impacted by the action level because EPA is proposing mandatory service line replacement irrespective of lead levels. In addition, EPA is proposing to require certain public education actions irrespective of the action level. Accordingly, it is still reasonable to establish the action level based on an assessment of the level that is generally representative of effective corrosion control treatment. See section V.H. for information on the use of the action level for public education and public notification requirements.

F. Water Quality Parameter Monitoring

1. Systems Required to Monitor for Water Quality Parameters

Water quality parameters are one component of the treatment technique for CCT because they are monitored to gauge CCT performance to ensure its effectiveness. Water quality parameters can include pH, alkalinity, orthophosphate, and silicate. Optimal water quality parameters refer to the values of the water quality parameters that are associated with optimized or re-optimized OCCT.

The LCRR requires all large systems to conduct water quality parameter monitoring and requires all small and medium water systems that exceed the lead or copper action level to monitor for water quality parameters until they no longer exceed the lead or copper action level. The LCRR also requires small and medium water systems with CCT that exceed the lead trigger level to monitor for water quality parameters. Under the LCRR, small and medium water systems can stop water quality parameter monitoring if they meet the action level for two consecutive six-month monitoring periods and the State has not required the system to meet optimal water quality parameters. The LCRR also eliminated the triennial reduced monitoring for water quality parameters because EPA determined that a three-year monitoring frequency is too infrequent to provide sufficient information to evaluate continued performance of OCCT (86 FR 4230, USEPA, 2021a).

For LCRI, EPA is proposing to require all medium systems with CCT to monitor for water quality parameters regardless of the lead and copper levels, except those medium systems whose 90th percentile lead level is at or below 0.005 mg/L, in accordance with § 141.81(b)(3). This proposed change would cover another size category of water systems and increase the number of water systems conducting water quality parameter monitoring. By extending this requirement to all medium water systems with CCT, any changes in water quality parameters could be evaluated more quickly to determine if re-optimizing OCCT is needed, therefore reducing the time it will take for medium water systems to evaluate and optimize CCT under the LCRI. During the LCRR and the LCRI external engagements, EPA heard comments addressing water quality parameter monitoring including a request to increase the number of systems and number of samples required for water quality parameter monitoring as this would help establish a better baseline for water chemistry (USEPA, 2023j, see docket no. EPA-HQ-OW-2021-0255). EPA is also proposing to clarify that any system may be required to monitor water quality parameters as determined by the State.

For the LCRI, EPA is proposing that water quality parameters in addition to those specified in the rule can be used by water systems and designated by States to determine the effectiveness of CCT. This pathway has been in the rule prior to LCRR, but the proposed LCRI changes are intended to clarify the implementation of this already available option. Under the LCR, the State could designate values for additional water quality parameters determined by the State to reflect OCCT for a water system in the concluding paragraph to § 141.82(f). Under the LCRR, this concluding paragraph was renumbered as § 141.82(f)(6). This flexibility was highlighted by creating its own distinct section (f)(6). However, matching text was not added in § 141.87. Under the proposed LCRI, the provision to require any additional parameters determined by the State to reflect OCCT have been added to the entry point and distribution system sampling in § 141.87(d). This change would enable the water system to use localized parameters, in addition to those required, that may aid in a more refined evaluation of the water chemistry specific to the water system. Additional parameters include free chlorine residual and/or oxidation/reduction potential as surrogates for lead (IV) formation or other parameters that the systems may consider helpful in determining if a CCT option is effective.

EPA is also proposing changes to the organization of § 141.87 to clarify existing requirements EPA does not intend to revise in LCRI. EPA anticipates that these clarifications would help State and water systems more easily interpret and implement the water quality parameter requirements.

2. Distribution System and Site Assessment

In the LCRR, "find-and-fix" was introduced as a provision to potentially identify the cause of localized elevated lead levels in drinking water, which could facilitate actions to address the cause. More specifically, this provision requires water systems to collect follow-up tap samples at sites where lead levels exceed 0.015 mg/L under the LCRR tap sampling. The LCRR requires water systems to collect follow-up samples no more than 30 days after they receive the results of the sample that exceeds 0.015 mg/L. Water systems must also attempt to determine the cause of the exceedance and propose an action or a "fix" and the State has six months to approve the recommended action or require an alternative action.

For the LCRI, EPA is proposing to maintain the requirement for systems to collect follow-up tap samples at sites with elevated lead levels. Recognizing that the "fix" to address the exceedance may be outside of the control of the water system, EPA is proposing in the LCRI to rename this section to "distribution system and site assessment" to reflect the requirements of this section more precisely. Consistent with the proposed change to the lead action level, under the proposed LCRI, systems would conduct the distribution system and site assessment requirements for any sampling site that exceeds 0.010 mg/L. EPA has heard concerns that the term "find-and-fix" is an inaccurate title for this section and should be changed as it implies the water system will implement the "fix" in all cases (USEPA, 2023j). For example, one stakeholder indicated that identified cause of the lead level could be a premise plumbing issue that the water system may not be authorized to "fix".

In addition, EPA is proposing a clarification in the CCT assessment under Step 1 that the distribution system water quality parameter sample location be within a half-mile radius of each site with a result above 0.010 mg/L.

G. Compliance Alternatives for a Lead Action Level Exceedance for Small Community Water Systems and Non-Transient Non-Community Water Systems

LCRR Small System Flexibility Options

The LCRR introduced provisions for small CWSs serving 10,000 people or fewer and all NTNCWSs to provide greater flexibility to comply with the rule requirements. Under the LCRR, systems that exceed the lead trigger level, but not the lead action level, must select one of four options for approval by the State and implement that option if it subsequently exceeds the lead action level. The four options are:

- Install and maintain OCCT,
- Replace all LSLs within 15 years,
- Install and maintain point-of-use treatment devices at each household or building, or
- Replace all lead-bearing plumbing materials on a schedule specified by the State but not to exceed one year.

States seeking primacy for the LCRR are not required to adopt the small system compliance flexibility provision in the LCRR. Instead, they could adopt State regulations that require small systems to continue to comply with the CCT and LSLR requirements of the rule. This is because section 1414(e) of SDWA specifies that nothing in the Act "shall diminish any authority of a State or political subdivision to adopt or enforce any law or regulation respecting drinking water regulations or public water systems" as long as such law or regulation does not "relieve any person of any requirement otherwise applicable" under SDWA. *See also* 40 CFR 142.4.

Stakeholder Feedback

Some stakeholders indicated support for the small system flexibility provisions during the LCRR engagements and LCRI external consultations because they offered possible cost-effective options for managing lead (USEPA, 2023j; USEPA, 2023m). Some stakeholders expressed concern that the provisions may result in lower health protection for small systems because they may choose either LSLR or one of the other three options (e.g., CCT), while medium and large systems must implement both LSLR and CCT. Other stakeholders asserted that the small system flexibility provision violated the anti-backsliding provision of SDWA by allowing water systems to opt out of LSLR and/or OCCT requirements that were applicable to those systems under the LCR (see docket no. EPA-HQ-OW-2021-0255). Some States indicated they did not support a standalone LSLR option for small systems, and some stated that States should be allowed to not offer specific options (e.g., point-of-use devices) or to limit their use, and some raised concerns over providing point-of-use devices indefinitely (USEPA, 2023j).

Purpose of Flexibility

The Agency recognizes that it is often difficult for small systems to find operators that have the advanced skills to implement and maintain CCT. Additionally, small systems may face challenges retaining those operators once they have acquired those advanced skills. Because CCT is an ongoing process and finding and retaining skilled operators can be especially challenging for very small systems, point-of-use filtration and plumbing replacement options may be better options for some systems. EPA also notes that operator turnover or poor oversight of CCT can reduce the effectiveness of the system's ability to prevent lead corrosion, even resulting in increases of lead in the water (USEPA, 2016c). EPA also notes that, while CCT is an affordable compliance technology, there are several reasons (e.g., practicality, cost, complexity, and availability of trained staff) why an individual system may face challenges in implementing CCT. EPA believes that point-of-use devices and plumbing replacements for small systems are effective compliance technologies in addition to CCT and systems should therefore be able to select the most appropriate compliance technology to reduce the lead risks to their consumers.

LCRI Proposed Small System Flexibility

Remove LSLR as a standalone compliance option as an alternative for OCCT. In the LCRI, EPA is proposing mandatory service line replacement for all systems including small systems (see section V.B.). Thus, EPA is proposing to remove LSLR as a standalone compliance option for small systems that exceed the action level and retain two compliance options as an alternative for OCCT, point-of-use installation and maintenance and lead-bearing plumbing replacement. These alternatives to the OCCT requirements are as effective at preventing known or anticipated adverse health effects as OCCT. Section 1412(B)(E)(iii) of SDWA requires that EPA identify affordable compliance technologies for all categories of small systems and, if none are available, identify variance technologies for compliance in accordance with SDWA section 1412(b)(15). EPA has determined that CCT is an affordable compliance technology for all categories of small systems in accordance with SDWA section 1412(b)(E)(iii) (USEPA, 1998a). Therefore, small system variance technologies remain unavailable for this rule (see section IV.D.). However, EPA added the small system flexibility provision in LCRR because the Agency recognized that "small systems tend to have more limited technical, financial, and managerial capacity to implement complex treatment techniques" (86 FR 4219, USEPA, 2021a).

Proposed change in flexibility eligibility. Under the LCRI, EPA is also proposing to change the small system flexibility eligibility threshold to CWSs serving 3,300 people or fewer and all NTNCWSs. The proposal's economic analysis estimates 5,188 active CWSs that serve populations between 3,301 and 10,000 people (USEPA, 2023b). For purposes of this proposal, EPA has determined that the CCT requirements are feasible for all size systems. However, for the smallest systems—CWSs serving 3,300 persons or fewer—and all NTNCWSs, EPA proposes to determine that allowing these systems to install point-of-use devices or conduct lead-bearing plumbing replacements is consistent with the statutory standard for a treatment technique rule (to prevent known or anticipated adverse effects on the health of persons to the extent feasible) (SDWA 1412(b)(7)(A)) because these treatment techniques are as effective at lead risk reduction for this category of systems as OCCT. In contrast, because the point-of-use or plumbing replacement compliance options are not as readily or easily implemented by systems that serve more than 3,300 persons due to the numbers of households that they serve, a systemwide point-of-use filtration or plumbing replacement program that meets the requirements of the proposed compliance options is unlikely to be as effective as OCCT. EPA is proposing to maintain the LCRR requirements for the point-of-use option flexibility, which would require water systems to install and maintain a point-of-use device in every household and at every tap used for cooking and/or drinking. This includes monitoring one-third of all the installed devices per year. For example, a system serving 3,301 people that installs faucet-mount carbon point-of-use units, would have to change filter cartridges in more than 1,000 homes three to four times per year per household. The system would also be required to sample over 300 point-of-use units per year and perform corrective actions for any samples exceeding 0.010 mg/L. For each filter maintenance and sampling event, the system would have to coordinate with the consumer to schedule an appointment to enter the household. For those systems which serve greater than 3,300 persons, the significant number of household visits presents additional logistical challenges that could impede the system's ability to comply with the proposed requirements. EPA is proposing to maintain the LCRR requirements for the replacement of lead bearing plumbing materials flexibility, which would require water systems that have control over all plumbing in its buildings to replace all lead bearing plumbing. It is highly unlikely that systems serving more than 3,300 have access to every residence and building it serves or that the water system has the authority to inspect and require replacement of all lead-bearing plumbing materials in these locations.

EPA views the proposed small system compliance options as impractical for systems serving more than 3,300 persons and is concerned that the option will not be effectively implemented as an alternative to OCCT as system size increases. Therefore, EPA is proposing to remove the point-of-use device and premise plumbing compliance options for CWSs serving greater than 3,300 persons. EPA has determined that, although small systems serving between 3,301 and 10,000 persons have greater technical, managerial, and financial capacity compared to even smaller systems, they may still face challenges in simultaneously implementing multiple treatment technique actions including CCT and the proposed mandatory service line replacement provisions in the LCRI. As described in section V.E.1., EPA is also proposing a provision to allow systems of any size with LSLs to defer action on CCT after a lead action level exceedance or other triggering event if the system conducts full service line replacement within five years. EPA anticipates that this flexibility would be used by smaller systems with technical, managerial, and financial challenges that are triggered into OCCT requirements while conducting service line replacement, thereby reducing the number of systems serving between 3,301 and 10,000 people that would have to simultaneously install OCCT and conduct service line replacement.

During the LCRR engagements and LCRI external engagements, some stakeholders requested that EPA reduce the eligibility threshold. For example, some States indicated that systems with more than 1,000 connections are unlikely to be able to implement the point-of-use flexibility (USEPA, 2023j). Systems with more than 1,000 connections will have a service population towards the upper end of the 501 to 3,300 size category, which is the proposed threshold for the point-of-use flexibility. Other States indicated that only an even smaller system size, those with 50 to 100 connections, would be likely to implement the point-of-use flexibility (USEPA, 2023j). EPA agrees that smaller water systems are more likely to find that the point-of-use device and plumbing replacement options are more practicable techniques for reducing lead exposure. However, EPA believes that some systems serving between 250 people (approximately 100 connections) and 3,300 people may find these approaches feasible and believes it is appropriate to provide these options for systems to consider and implement with State approval.

While some stakeholders have asked the Agency to retain point-of-use device installation or replacement of all lead-bearing plumbing flexibilities for larger small systems, EPA expects that these systems may not be able to effectively implement these flexibilities. EPA is requesting comment, however, on whether the Agency should maintain the small system flexibility for CWSs serving 10,000 persons or fewer (see section IX. of this document). EPA notes that the Agency is proposing to retain eligibility for all NTNCWSs given that these systems are more likely to have control over premise plumbing and are more likely to be able to implement the point-of-use filtration and plumbing replacement options regardless of population served.

Point-of-use devices, such as reverse osmosis treatment systems, could provide flexibilities to control other contaminants in addition to lead as these technologies are often certified to remove multiple drinking water contaminants. Selecting these technologies could provide small water systems with the flexibility to achieve compliance with other drinking water standards. EPA is requesting comment on the ability and practicality of point-of-use devices to address multiple contaminants.

Consolidate flexibility provisions. EPA is proposing to consolidate the small system flexibility provisions in § 141.93 and remove cross-references to § 141.93 in other rule sections. This approach comports with EPA's goal in the LCRR review notice of simplifying the rule and streamlining rule requirements. It also recognizes that States may choose to adopt standards that are more stringent than Federal standards. If a State elects to not adopt the small system flexibility provision, it will be helpful for the small system flexibility provision in the Federal rule to be separate and therefore severable from the remainder of the LCRI because it would allow those States to incorporate the LCRI by reference without the need for extensive revisions to the remainder of the LCRI. For States that elect not to adopt the small system flexibility provision, small systems would be subject to the CCT requirements in §§ 141.81 and 141.82.

The provisions in § 141.93 are distinct and unnecessary for States to adopt in order to maintain primacy.

H. Public Education

LCRR Requirements

Public education has been, and remains, a cornerstone treatment technique to reduce risks from exposure to lead in drinking water. The LCRR includes several public education requirements for water systems to inform consumers about lead in drinking water and steps to reduce their risk of exposure. These requirements include providing:

- Public education with consumers' individual lead tap sampling results;
- Notification and public education for consumers served by a lead, GRR, or lead status unknown service line;
- Public education to persons affected by a disturbance to a lead, GRR, or lead status unknown service line; and
- Public education about the system's goal-based LSLR program when a system exceeds the lead trigger level.

The LCRR also requires water systems to conduct public outreach activities if they exceed the trigger level and fail to meet their LSLR goal rate. Systems must also take several public education actions if they exceed the lead action level, including delivering public education materials to customers, public health agencies, and organizations that serve pregnant people and children, as well as other public education activities. In addition, all CWSs must conduct annual outreach to local and State health agencies about "find-and-fix" (referred to as distribution system and site assessment in the proposed activities). Small CWSs and NTNCWSs that select point-of-use devices as their compliance option in response to a lead action level exceedance must provide public education materials to inform users how to properly use point-of-use devices to maximize the units' effectiveness in reducing lead levels in drinking water.

Proposed LCRI Requirements

For the proposed LCRI, EPA is retaining the overall framework of the public education provision in the LCRR, which requires water systems to educate consumers about the risks of lead in drinking water and ways to reduce their risk. EPA is proposing changes to strengthen the public education requirements to (1) increase the likelihood that the public education activities are effective in preventing adverse effects of lead on the health of persons to the extent feasible, and (2) conform to proposed changes to other aspects of the rule such as the removal of the lead trigger level. EPA is also proposing new public education requirements for copper. These changes are described below.

1. Feasibility of Public Education Requirements

Public education is one of the treatment technique requirements EPA promulgated in the LCR, in addition to LSLR, CCT, and source water treatment. Section 1412(b)(7)(A) of SDWA authorizes EPA to promulgate a regulation that requires the use of a treatment technique in lieu of an MCL if it is not economically or technologically feasible to ascertain the level of the contaminant. In such a rule, the statute requires the Administrator to “identify those treatment techniques which, in the Administrator’s judgment, would prevent known or anticipated adverse effects on the health of persons to the extent feasible.” 42 U.S.C. 300g-1(b)(7)(A). Public education provides the community with information on ways to reduce their exposure to lead in their drinking water and thereby can prevent adverse health effects associated with exposure to lead in drinking water.

EPA is proposing revisions in the LCRI to strengthen the public education requirements to increase public health protection. EPA has determined that the public education treatment technique is feasible and prevents known or anticipated adverse health effects "to the extent feasible" (USEPA, 2023b). Public education, among other things, empowers people to make informed decisions about taking actions to reduce their exposure to lead in drinking water and thereby reduce their risk of adverse health effects. In the final LCR preamble, EPA found that public education is an effective means of preventing adverse health effects and determined that public education is feasible under sections 1412(b)(7)(A) and 1412(b)(5) of SDWA (56 FR 26500, USEPA, 1991). Since the LCR in 1991, water systems have demonstrated their ability to provide public education materials and public notification to consumers. Specifically, since the LCR, EPA has required water systems to conduct various lead public education activities, including delivering public education materials to customers and organizations that serve pregnant people, infants, and young children (e.g.*,* public schools, pediatricians, and Women, Infants, and Children programs), within 60 days after the end of the tap sampling period in which a systemwide lead action level exceedance occurs (56 FR 26555, USEPA, 1991). In 2007, EPA updated the LCR to require systems to conduct additional outreach activities after a system-wide lead action level exceedance (72 FR 57792, USEPA, 2007a), as well as to require delivery of lead tap sampling results to consumers whose taps were sampled as part of the system's monitoring program (72 FR 57789, USEPA, 2007a).

In section IX. of this document, EPA is requesting comment on this proposed feasibility determination, and is especially interested in any data, analyses, and comments on proposed changes to the public education requirements in the LCRI. In particular, EPA is requesting data, analyses, and comments on the feasibility of requiring systems to deliver all consumer notices of lead or copper tap sampling results within three days, regardless of whether the results exceed the lead or copper action level (see section V.H.3.). EPA is also seeking data, analyses, and comment on whether the proposed supplemental monitoring and notification requirement for water systems to offer lead sampling to customers with LSLs, GRR service lines, or unknown service lines is effective at reducing adverse health effects and whether it is feasible for water systems to provide the sampling results three days after the system learns of the results (see section V.H.4.). In addition, EPA is seeking any data, analyses, and comments on whether it is feasible for water systems to conduct the public education activities under § 141.85(b)(2) in a shorter time frame than 60 days after the end of the tap sampling period in which a system-wide lead action level exceedance occurs. EPA is proposing several changes that would streamline public education requirements and make it easier for States to track systems' compliance with these requirements, including requiring all consumer notices of lead or copper tap sampling results to be delivered in the same time frame, allowing systems to combine lead and copper notices of tap sampling results, requiring public education to be repeated with the same frequency after every lead action level exceedance, and allowing systems to combine required outreach activities to meet some of the proposed public education requirements. EPA is also requesting comment on additional ways to streamline public education and associated certification requirements (e.g., combine deadlines for systems to conduct public education or submit information to the State) (see section IX. of this document).

2. Service Line Related Outreach

Required public education if not achieving mandatory service line replacement rate

The LCRR requires water systems that have LSLs and exceed the lead trigger level to conduct public education activities including outreach to consumers about goal-based LSLR and when a system fails to meet the LSLR goal rate. Because EPA is proposing to eliminate goal-based LSLR requirements and require all water systems to replace their LSLs and GRR service lines (see section V.B. of this document), EPA is proposing to remove the current public education requirements related to goal-based LSLR outreach, including public education about the system's goal-based LSLR program when systems exceed the lead trigger level (§ 141.85(g) of the LCRR) and public outreach activities if a system exceeding the trigger level fails to meet the LSLR goal rate (§ 141.85(h) of the LCRR) and replace them with new public education requirements.

EPA is proposing in the LCRI to require outreach activities for systems that fail to meet the mandatory service line replacement rate. Systems that fail to meet the proposed LCRI's average annual replacement rate would be required to conduct the same kinds of outreach activities as the LCRR requires for systems that fail to meet their goal LSLR rate. EPA is proposing that under the LCRI, systems would be required to conduct the outreach at least once in the year following the failure to meet the mandatory service line replacement rate and annually thereafter until the water system meets the replacement rate or until there are no LSLs, GRR service lines, or unknown service lines remaining in the inventory, whichever occurs first. Systems serving more than 3,300 persons would be required to conduct at least one of the following activities, at least once in the following year and annually thereafter until the system meets the replacement rate or until there are no LSLs, GRR service lines, or unknown service lines, to discuss their service line replacement program and opportunities for replacement and to distribute public education materials:

- Conduct a townhall meeting;
- Participate in a community event to provide information about the service line replacement program;
- Contact customers by phone, text message, email, or door hanger; or

- Use another method approved by the State to discuss the service line replacement program and opportunities for replacement.

Alternatively, systems serving more than 3,300 persons would be required to conduct at least two of the following activities:

- Send certified mail to customers and persons served by LSLs or GRR service lines;
- Conduct a social media campaign;
- Conduct outreach via the media including newspaper, television or radio;
- Visit targeted customers (e.g., customers in areas with lower service line replacement participation rates) to discuss the service line replacement program and opportunities for replacement.

Systems serving 3,300 persons or fewer would be required to conduct at least one activity from either set of options.

Under the proposed LCRI, water systems with LSLs, GRR service lines, or unknown service lines would be required to provide information about the service line replacement program to consumers through other public education including materials provided after a lead action level exceedance and the notification of service line material; CWSs would also provide this information in the Consumer Confidence Report. EPA is proposing this requirement for additional outreach by systems that fail to meet the mandatory service line replacement rate to further help systems increase customer participation rates. AWWA's 2022 Lead Communications Guide and Toolkit notes the importance of regular outreach and providing multiple notifications to encourage customer participation in LSLR, including using postcards, letters, phone calls, text messages, and door hangers to provide public education materials to consumers (AWWA, 2022). Many of the activities EPA is proposing in the LCRI are consistent with recommendations from AWWA (AWWA, 2022) and the LSLR Collaborative, a group of national organizations representing various sectors including public health, water utility, environmental, labor, consumer, and housing, which provides recommendations and examples of LSLR outreach as part of its efforts to accelerate voluntary LSLR in communities across the United States (LSLR Collaborative, n.d.c). For example, some of the options EPA is proposing include contacting customers by phone, text message, email, or door hanger. In addition, some of EPA's proposed options for outreach include participating in a community event and visiting customers; both AWWA and the LSLR Collaborative have previously recommended direct customer and/or consumer contact and partnering with community-based organizations as particularly effective methods of communicating about LSLR (AWWA, 2022; LSLR Collaborative, n.d.d). During the National Drinking Water Advisory Council (NDWAC) consultation for the proposed LCRI, stakeholders also described the importance of engaging with community members and community groups to provide public education (USEPA, 2023l). Clean Water Fund's work with the Department of Public Works in Chelsea, MA provides an example of how community partnerships have been an effective way to increase public awareness and trust to support LSLR efforts (LSLR Collaborative, n.d.e). Clean Water Fund partnered with a community-based organization called Chelsea GreenRoots to organize LSLR public information sessions and train community members to conduct door-to-door outreach, including providing translated materials for consumers with limited English proficiency (LSLR Collaborative, n.d.e). Community outreach in Detroit, Michigan has also shown how effective public education and community engagement can be to achieve high levels of customer participation in LSLR. Detroit Water and Sewerage Department achieved 100 percent compliance with homeowners to replace full LSLs which the City of Detroit attributed primarily to a comprehensive community outreach effort, including hand delivery of informational materials about the LSLR program to homes and holding community meetings ahead of LSLR (City of Detroit, 2023).

While some forms of outreach such as written letters and communicating through news media or social media are also important elements of effective public education about drinking water (Bradford et al., 2017), they may not be effective modes of communication on their own (LSLR Collaborative, n.d.d); therefore, EPA is proposing to require water systems serving more than 3,300 persons to conduct at least two of those kinds of activities for more effective public education. During the Small Business Advocacy Review for the proposed LCRI, EPA received feedback that face-to-face contact is particularly effective for engaging smaller communities, especially those with a higher percentage of older adults (USEPA, 2023m). EPA is proposing a variety of activities for systems to choose from so that they can tailor the outreach to the community they serve. EPA is requesting comment on whether the types of activities proposed are feasible and appropriate and whether other activities should be considered (see section IX. of this document).

Notification of service line material

The LCRR requires water systems with LSLs, GRR service lines, or unknown service lines in in their inventory to notify consumers if they are served by one of these service lines. EPA is proposing to clarify these requirements in several ways. First, EPA is proposing requiring the same notification content requirements for both LSLs and GRR service lines since both increase the risk of exposure to lead. In addition, all notices (LSLs, GRR service lines, and unknown service lines) would be required to include steps consumers can take to reduce exposure to lead in drinking water. These notices would be required to meet the requirements of § 141.85(a)(1)(iv) which contains proposed content updates, including information about using a filter certified to reduce lead. During development of the proposed LCRI, EPA heard concerns that it is possible for service line material to be incorrectly identified by the water system as non-lead. Therefore, EPA is proposing to require that the public education materials include instructions for consumers to notify the water system if they think the material categorization is incorrect (e.g., if the service line is categorized as non-lead in the inventory but is actually lead). EPA is proposing that water systems follow up with consumers that notify the water system that they think the material is incorrect, verify the correct service line material, and update the inventory (see section V.D. of this document). In addition, to help ensure that customers are aware of EPA's proposed requirement in § 141.85(c) that water systems must offer to sample the tap of any customer served by an LSL, GRR service line, or unknown service line who requests it (see section V.H.4. of this document), EPA is proposing that the notice include a statement about this requirement. EPA is requesting comment in section IX. of this document on whether the Agency should also require systems to notify consumers if they are served by a lead connector (see section V.D.4. of this document for information on proposed inventory requirements on lead connectors).

Notification of a service line disturbance

The LCRR requires water systems that cause a disturbance to an LSL, GRR service line, or unknown service line to notify persons at the service connection and provide them with information to reduce their exposure to potentially elevated lead levels that could result from the disturbance. This can include disturbances resulting in the water to an individual service line being shut off or bypassed, such as operating a valve on a service line or meter setter. In this situation, water systems are also required to provide persons at the service connection with instructions for a flushing procedure to remove particulate lead. EPA is proposing revising this requirement to also include significant disturbances due to inventorying efforts, such as potholing, to conform with the recommendations in the LCRR inventory guidance (USEPA, 2022b). Disturbances requiring notification under the LCRR can also result from the replacement of an inline water meter, a water meter setter, or gooseneck, pigtail, or connector. In this case, water systems are also required to provide persons at the service connection with pitcher filters or point-of-use devices certified by an ANSI accredited certifier to reduce lead, along with instructions and filter replacement cartridges. EPA is proposing to maintain the requirement for water systems to provide pitcher filters or point-of-use devices and filter replacement cartridges to last six months as a result of these disturbances (see section V.B.6. of this document). During the Federalism consultation, EPA received feedback to reconsider the requirement for water systems to provide pitcher filters and replacement cartridges during some disturbances, such as those caused by water meter replacement, and for disturbances affecting unknown service lines (USEPA, 2023j). While water systems are required to notify consumers of disturbances resulting from water main replacement under these proposed requirements, EPA is also requesting comment on whether to require distribution of filters for this type of disturbance (see section IX. of this document).

Disturbances caused by partial or full service line replacement would require notification and mitigation; however, these requirements are under the service line inventory and replacement section of the rule (see section V.B.6. of this document).

EPA anticipates the various proposed requirements for service line related outreach and public education will encourage water systems to replace all their LSLs and GRR service lines and identify unknown service lines in ten years or less. Water systems with LSLs, GRR service lines, and unknown service lines are proposed to conduct annual notification of LSL, GRR service line, or Unknown service line; notification of disturbances to LSL, GRR service line, or Unknown service line (including provision of pitcher filters or point-of-use devices for certain disturbances); outreach activities when systems fail to meet the mandatory replacement rate;

sampling the tap of any customer served by an LSL, GRR service line, or unknown service line who requests it and notification of results within three days; and including information about LSLs, GRR service lines, and unknown service lines in public education after a lead action level exceedance (see section V.H.4. of this document) and in the annual Consumer Confidence Report (see section V.L.1. of this document). Water systems serving a large proportion of consumers with limited English proficiency would also be required to provide translations of these notices or translation support (see section V.H.5. of this document). Engaging with and informing consumers, property owners, and the community about the risks of LSLs and GRR service lines and opportunities for their replacement is expected to encourage participation in service line replacement programs. In addition, the proposed public education requirements would also serve as an incentive for water systems to remove LSLs and GRR service lines as quickly as possible. This is because systems that remove all their LSLs and GRR service lines and identify unknown service lines would have a reduced implementation burden by not having to conduct these proposed public education and outreach requirements. EPA is requesting comment on to require additional public education requirements to further encourage swift service line replacement faster than the 10-year replacement deadline. For example, should water systems that have LSLs, GRR service lines, or unknown service lines five years after the compliance date for the LCRI be required to increase the frequency of the notification of service line materials from annual to once every six months? (See section IX. of this document).

3. Individual Notification of Tap Sample Results

Lead

Under § 141.85(d) of the LCRR, water systems are required to provide consumer notice of an individual's lead tap sampling results from monitoring under § 141.86. For samples that do not exceed 0.015 mg/L (the LCRR lead action level), water systems must provide the notice to persons served at the tap as soon as practicable but no later than 30 days after the water system learns of the results. The notice must be provided by mail or by another method approved by the State. For samples that exceed 0.015 mg/L, water systems are required to provide consumer notice no later than three days after learning of the results; the notice must be provided electronically or by phone, hand delivery, by mail, or another method approved by the State.

LCRI proposal. EPA is proposing to require all consumer notices of lead tap sampling results to be delivered within the same time frame of three calendar days after the system learns of the results, regardless of whether the results exceed the lead action level. Based on public comments the Agency received on the proposed LCRR and on the fact that water systems have a long history of demonstrated ability to provide consumer notices within an even shorter time frame of 24 hours in other contexts, water systems should be capable of providing these consumer notices no later than three days after the water system learns of the results. This three-day time frame allows water systems time to review results and accommodates circumstances such as staffing shortages or holidays (USEPA, 2020b). EPA heard many stakeholders request more proactive and accessible communication about lead in drinking water during the proposed LCRI external engagements. Stakeholders also expressed concern that the lead action level is inappropriately interpreted to be a health-based level. The proposed action level is not a health-based level, and EPA agrees that households that participate in tap sampling programs should be made aware of any levels of lead found in the samples collected from their taps. EPA's proposed delivery within three days allows all consumers whose taps were sampled for lead to quickly be notified of their results and informed of steps they can take to reduce exposure.

Water systems would be required to deliver the notice either electronically (e.g., email or text message), by phone, hand delivery, by mail (postmarked within three days of the system learning of the results), or by another method approved by the State. EPA is proposing a variety of delivery options so that water systems can choose the most suitable option for the persons they serve and so that they are able to meet the three-day time frame. These are the same delivery options that the LCRR requires for water systems to deliver results that exceed the action level within three days; however, EPA is proposing that water systems that choose to deliver the notice by phone would be required to follow up with a written notice hand delivered or postmarked within 30 days of the water system learning of the results. Written follow-up would allow greater information accessibility and would allow consumers to keep a copy of their results, steps they can take to reduce exposure to lead in drinking water, and the other information provided in the notice. This written follow-up would also enable States to verify the content of the notice, which would be difficult to do if the notice were only delivered by phone. EPA acknowledges that the proposed requirements for water systems to deliver all notices of individual tap sampling results for lead regardless of concentration within three days would increase the number of notices that water systems would be required to provide in a short time frame. EPA is requesting comment on its proposed determination that water systems are capable of providing all consumer notices of individual tap sampling results within three calendar days, or if a longer time frame is appropriate (e.g., three business days, seven calendar days, etc.) (see section IX. of this document).

Copper

Under the LCRR, water systems are not required to provide customers with their copper tap sampling results from monitoring under § 141.86, only lead. EPA is proposing to require water systems to provide consumer notice of an individual's copper tap sampling results. EPA is proposing this new requirement in response to comments during the LCRI consultation and LCRR review engagements where stakeholders requested public education in response to higher copper levels (USEPA, 2023h; USEPA, 2023i; see written comments and summaries of LCRR engagements, Docket ID EPA-HQ-OW-2021-0255). Similar to the notice of lead tap sampling results, the notice of copper tap sampling results must include the results of copper tap water monitoring for the tap that was tested, an explanation of the health effects of copper as provided in Appendix B to Subpart Q of 141 – Standard Health Effects Language for Public Notification, a list of steps consumers can take to reduce exposure to copper in drinking water and contact information for the water utility. The notice must also provide the MCLG and the action level for copper, both of which are 1.3 mg/L, and the definitions for these two terms from § 141.153(c). In cases where copper samples are collected at the same time as lead, EPA is proposing to allow systems to combine the lead and copper results and required information into a single notice. EPA expects that this will simplify implementation by allowing systems to deliver both the lead and copper results and associated required information at the same time. EPA acknowledges that the proposed requirements for water systems to deliver all notices of individual tap sampling results for lead and copper regardless of concentration within three days would increase the number of notices that water systems would be required to provide in a short time frame. EPA is requesting comment on its proposed determination that water systems are capable of providing all consumer notices of individual tap sampling results within three calendar days, or if a longer time frame is appropriate (e.g., three business days, seven calendar days, etc.) (see section IX. of this document).

4. Other Public Education Materials

Supplemental monitoring and notification requirements

Under the LCRR, systems are required to offer to sample the tap water for lead for any customer who requests it when there is a systemwide lead action level exceedance. EPA is proposing to also require systems to offer to sample the tap water for lead for any customer served by an LSL, GRR service line, or unknown service line regardless of lead levels calculated based on compliance monitoring. The LCRR does not specify a sampling protocol for customer-requested sampling. EPA is proposing to maintain flexibility for water systems to determine the sampling protocol for this supplemental monitoring. For sites with an LSL or GRR service line, the sampling would be required to capture the water stagnant in the service line as well as any premise plumbing (e.g., first- and fifth-liter samples, sequential sampling, flush samples). Since LSLs and GRR service lines can increase the risk of exposure to lead in drinking water, EPA believes this proposed requirement would encourage more people who are at greater risk of lead exposure to have their tap sampled to find out if there is lead in their drinking water and what actions they can take to reduce their risk of exposure. EPA is also proposing to require the system to notify consumers of the results of this tap sampling so they are informed and can decide to take any needed steps to reduce their exposure to lead in their drinking water.

EPA is also proposing to require systems to provide consumers supplemental monitoring results within three days of the system learning of the results. Under the LCRR (§ 141.85(c)), systems were only required to notify customers of their results from samples collected under § 141.86 in three days if the sample exceeded the lead action level, while samples below the lead action level could be sent within 30 days. This proposed requirement is consistent with feedback EPA heard throughout the LCRR review and LCRI engagements. EPA heard requests for more proactive public education requirements, given there is no known safe level of lead in drinking water and because the lead action level is not health-based. EPA acknowledges that the proposed requirements for water systems to deliver all notices of individual lead tap sampling results from monitoring under § 141.86 and from supplemental monitoring under § 141.85(c) within three days would increase the number of notices that water systems would be required to provide in a short time frame. EPA is requesting comment on the proposed requirement and the feasibility of providing these results in three calendar days, or if a longer time frame is appropriate (e.g., three business days, seven calendar days, etc.) (see section IX. of this document).

Public education after a lead action level exceedance

Under the LCRR, systems that exceed the lead action level must deliver public education materials to their customers, public health agencies, and organizations that serve pregnant people and children. The information about the lead action level exceedance must be included in customers' water bills. Public education materials about the action level exceedance must also be posted online. Systems must submit press releases to media outlets and conduct activities such as public service announcements, host a public meeting, or conduct targeted customer contact. Under the LCRR, water systems that exceed the lead action level must conduct the public education activities under § 141.85(b)(2) no later than 60 days after the tap sampling period in which the exceedance occurred. If the water system exceeds the action level again in the next tap sampling period (i.e., the water system has consecutive lead action level exceedances), then the rule allows systems up to 12 months to conduct the public education requirements.

Time frames for delivering public education. EPA is proposing that systems must always conduct the public education activities under § 141.85(b)(2) within 60 days of the end of the tap sampling period in which the exceedance occurred (e.g., June 30 or December 31 for standard monitoring, or September 30 or the last day of an alternative four-month tap sampling period approved by the State for annual and reduced monitoring), regardless of whether the lead action level exceedance was consecutive. This would ensure that consumers receive information following every lead action level exceedance, instead of waiting 12 months where two lead action level exceedances were consecutive, which assures consumers receive information in a timely manner so that they can take actions to reduce their lead exposure risks. Under the LCRR, water systems may discontinue this public education when they no longer exceed the lead action level. EPA has heard concerns that water systems may discontinue public education after calculating a 90th percentile level at or below the lead action level based on fewer than the minimum number of samples required under § 141.86. Therefore, EPA is proposing a revision to clarify that the calculated 90th percentile level at or below the lead action level must be based on the minimum number of required samples under § 141.86 in order for the system to be able to discontinue public education (see section V.C.3. of this document). EPA is proposing that public education following a lead action level exceedance be sent within 60 days of the end of the tap sampling period for every lead action level exceedance. During the LCRI consultations, many stakeholders expressed concerns that a lower lead action level would result in more action level exceedances and increase public education in response to these lead action level exceedances as a result. Providing public education within 60 days of the end of the tap sampling period should be feasible for most water systems (72 FR 57794, USEPA, 2007a). In the LCRR review engagements, some commenters requested that EPA shorten this period so that public education is required either 30 or 60 days after the system receives the results, rather than 60 days after the end of the tap sampling period. EPA believes that systems need the 60 days after the end of the tap sampling period to develop public education materials, consult with the State and to identify the organizations that they need to share these materials with. However, EPA is requesting comment on whether systems are capable of conducting the public education activities under § 141.85(b)(2) in a shorter time frame (e.g., 30 days after the system receives the results or 30 days after the end of the tap sampling period in which the exceedance occurs) (see section IX. of this document).

If water systems are unable to meet the public education requirements following a lead action level exceedance, systems can apply to the State for an extension under the LCRR. The LCRR does not specify the length of the extension. When EPA introduced this extension provision, the Agency previously explained that "systems must start these activities and States must approve in writing any deadline extension within 60 days of the end of the monitoring period in which the exceedance occurred" and that "States should still make every effort to get public water systems to complete their public education activities within 60 days after the end of the monitoring period" (72 FR 57787, USEPA, 2007a). EPA is proposing to allow a State that grants an extension for a water system to conduct the public education activities, to make the deadline no more than 180 days after the end of the tap sampling period in which the lead action level exceedance occurred. In addition, EPA is proposing to restrict the extension such that it only applies to the activities in § 141.85(b)(2)(ii) through (vi), and would not apply to delivery of public education materials to consumers under § 141.85(b)(2)(i) because it is feasible for systems to distribute public education materials to consumers within 60 days. This proposed revision ensures that systems must deliver the public education materials no later than 60 days after the end of the tap sampling period in which the action level exceedance occurs, so that consumers have the information to decide to take steps to reduce their exposure to lead sooner, thereby providing greater public health protection.

Who receives public education materials. Under the LCRR, water systems must deliver these public education materials to bill paying customers. For the LCRI, EPA is proposing to require the public education materials also be delivered to every service connection address served. This proposed requirement is responsive to feedback heard during the public meetings on environmental justice considerations for the proposed LCRI and LCRR review engagements, where stakeholders expressed concerns about public education not reaching renters because they may not be the bill paying customer (USEPA, 2023h; USEPA, 2023d; see written comments and summaries of LCRR engagements, Docket ID EPA-HQ-OW-2021-0255). EPA is proposing this change to better ensure that renters receive this important information so that they can decide to take any needed steps to reduce their exposure to lead in drinking water.

Contents of public education materials. Under the LCRR, the public education materials must include mandatory language on the health effects of lead, information about sources of lead, steps consumers can take to reduce exposure to lead in drinking water, an explanation of why there are elevated levels of lead in the system's drinking water and what the system is doing about it, as well as other information. The LCRR allows water systems to change some of the mandatory language with State approval. EPA is proposing to revise this provision in the LCRI to allow States to approve changes to the content requirements of the public education materials only if the State determines the changes are more protective of human health. EPA is proposing this revision to ensure that information provided in public education materials is most protective of human health and in recognition that some water systems may need to provide more tailored information to their community in order to provide greater public health protection (e.g., systems with many LSLs, GRRs, or lead status unknown service lines). If the system has LSLs, the LCRR requires the materials to also include information about LSLs. EPA is proposing to revise this to require that systems with LSLs, GRR service lines, or unknown service lines, rather than just systems with LSLs, include information about LSLs, GRR service lines, or unknown service lines in the public education materials. In addition to the LSL-related information required in the LCRR, EPA is proposing that systems must include information about replacing GRR service lines and identifying the material of unknowns as well as information on how to access the service line replacement plan. In addition, EPA is proposing to require systems with known lead connectors and unknown connectors to include information about accessing the service line inventory. EPA is also proposing to require that the public education materials include instructions for consumers to notify the water system if they think the material classification is incorrect (e.g., if the service line is classified as non-lead in the inventory but is actually lead). EPA is proposing these revisions to make the public education materials more informative for persons served by LSLs, GRR service lines, unknown service lines, known lead connectors, or unknown connectors and thereby provide greater public health protection.

EPA is also proposing requiring public education materials to explain that using a filter certified by an American National Standards Institute accredited certifier to reduce lead is effective in reducing lead levels in drinking water. Water systems would need to include this information among the other steps the consumer can take to reduce their exposure to lead in drinking water. EPA is proposing this change to ensure that consumers are made aware that filters are an effective option for reducing lead in drinking water. This proposed addition to the public education materials is also responsive to requests from many stakeholders during the LCRI environmental justice meetings (USEPA, 2023h; USEPA, 2023i) and LCRR review (Docket ID EPA-HQ-OW-2021-0255), asking that EPA provide recommendations on the use of filters. Some participants in the LCRI environmental justice meetings asked that EPA recommend that consumers served by LSLs use filters until LSLs are replaced (USEPA, 2023h; USEPA, 2023i), while some commenters during the LCRR review stated that public education materials should encourage consumers more broadly to use filters certified to reduce lead in drinking water (Docket ID EPA-HQ-OW-2021-0255). EPA is not proposing to require public education materials to recommend that all consumers, or consumers served by LSLs, use a filter certified to reduce lead. Such a recommendation would be made regardless of system-wide lead levels or lead levels at an individual site. EPA notes that many factors can influence lead levels in drinking water, such as CCT performance, water use habits, and sources of lead in drinking water. Because of the various factors that influence lead tap water levels, EPA expects that a recommendation that all or a subset of consumers use a filter would lead to inconsistencies, confusion, and possibly a reduction in confidence in tap water even where lead is not present or remains very low. See section V.B.6. of this document for further discussion of language concerning use of filters certified to reduce lead in drinking water. EPA is proposing that water systems include this information about filters among the list of steps to reduce exposure to lead in drinking water in all the public education materials under § 141.85. EPA is also proposing that systems with multiple lead action level exceedances make filters available (see section V.I. of this document) and include information about how consumers can obtain filters.

In addition to proposing to require information about filters in public education, EPA is proposing to require water systems to include other options in the list of steps to reduce exposure to lead in drinking water. Water systems would be required to encourage regular cleaning of faucet aerators as an additional option in this list. EPA is also proposing to require water systems to emphasize additional measures to reduce exposure to lead in drinking water for pregnant people, infants, and young children since they are at higher risk of adverse health effects from lead exposure. EPA is also proposing to require that water systems provide additional information about flushing the pipes, including noting that consumers served by LSLs and GRR service lines may need to flush for longer periods. EPA is also proposing to require systems to include contact information for the State and/or local health department so that consumers can contact them for more information about lead. EPA is proposing these additions to the public education materials to make consumers aware of more actions they can take to reduce their exposure to lead in drinking water. For information on how EPA is proposing to revise the mandatory lead health effects language, see section V.H.5. below.

Under the LCRR, CWSs are required to include information about how consumers can get their water tested for lead in public education materials, but NTNCWSs are not. Similarly, the LCRR also only requires CWSs, and not NTNCWSs, to include information about lead in plumbing components in public education materials. EPA is proposing to require all water systems to include information in the public education materials about lead in plumbing components and about how consumers can get their water tested, including information about the proposed provision of supplemental monitoring and notification in § 141.85(c) that is described earlier in this section. EPA is proposing these changes to ensure that consumers, including those served by NTNCWSs, are more informed and thereby provide greater public health protection.

Many stakeholders also questioned why the public education requirements are triggered by the lead action level if it is not a health-based level. EPA requires water systems to provide public education materials to consumers after a lead action level exceedance so that people are informed about the ways to reduce their exposure to lead in their drinking water and thereby can prevent adverse health effects. EPA introduced the public education requirements in 1991 stating that while water system actions including CCT and LSLR are expected to reduce lead drinking water levels, “there are situations where elevated lead levels will persist at consumers' taps during or even after these efforts” (56 FR 26500, USEPA, 1991). EPA further noted that the public education requirements supplement the other actions water systems take to reduce lead levels after a lead action level exceedance. While EPA has since added additional public education requirements that are not based on a system’s 90th percentile lead level, public education after a lead action level exceedance is still warranted. A system-wide lead action level exceedance may be indicative of higher lead levels system-wide and prompts water systems to take actions such as installing or re-optimizing OCCT to reduce lead drinking water levels. In such cases, system-wide public education which includes a statement about the lead action level exceedance, the health risks of lead, and steps individuals can take to reduce their exposure is appropriate.

However, the Agency agrees that consumers should also be aware of the risks from lead exposure regardless of lead levels in the system. The LCRR requires many actions to educate consumers about lead in drinking water irrespective of whether or not a system has an action level exceedance for lead, such as the following: public education provided with consumers' individual lead tap sampling results; public education notifying consumers if they are served by an LSL, GRR service line, or unknown service line; and public education to persons affected by a disturbance to an LSL, GRR service line, or unknown service line. These include a statement of the health effects of lead, steps consumers can take to reduce their exposure to lead, among other information. The Consumer Confidence Report (CCR), which is distributed to all consumers of a community water system, must also include an informational statement about lead regardless of whether there is a lead action level exceedance (see section V.L.1. of this document). For the LCRI, EPA is proposing additional improvements for more proactive public education that make it clear that there is no safe level of lead in drinking water. For example, EPA is proposing requiring that the consumer notice of lead tap sampling results be delivered within three days regardless of whether the results exceed the lead action level or not (see section V.H.3. of this document). EPA is also proposing that the lead health effects language required in public education, public notification, and the Consumer Confidence Report explicitly state that there is no safe level of lead in drinking water (see section V.H.5. of this document). EPA is also proposing that water systems that fail to meet the mandatory service line replacement rate conduct public outreach activities (see section V.H.2. of this document).

Public education for small system compliance flexibility point-of-use devices

EPA is proposing moving the public education requirements for small water system compliance flexibility point-of-use devices from § 141.85 to § 141.93. EPA is proposing this change so that the small system compliance flexibility provisions are all in the same rule section (see section V.G. of this document).

5. Requirements for Language Updates and Accessibility

Lead health effects language

Under the LCRR, the following lead health effects language is required to be included in public education, public notification, and the Consumer Confidence Report (CCR).

> *Exposure to lead in drinking water can cause serious health effects in all age groups. Infants and children can have decreases in IQ and attention span. Lead exposure can lead to new learning and behavior problems or exacerbate existing learning and behavior problems. The children of women who are exposed to lead before or during pregnancy can have increased risk of these adverse health effects. Adults can have increased risks of heart disease, high blood pressure, kidney or nervous system problems.*

EPA is proposing to require the language to begin with a statement that there is no safe level of lead in drinking water. During the LCRI external engagements and LCRR review, stakeholders expressed concerns about water systems with detectable lead levels communicating that drinking water is “safe” because lead levels are below the action level. Some stakeholders have also stated that water systems downplay the urgency of lead action level exceedances by providing statements to consumers that the system meets all EPA requirements. EPA’s proposed additional language would help address these concerns by communicating clearly that there is no level of lead without health risks. EPA is also proposing revisions to clarify that the language provides some and not all the health effects of lead, and to encourage consumers to consult their health care provider for more information about their risks. Health care providers are an important, trusted source of information about lead for consumers and are influential in encouraging consumers to take actions, particularly for those at highest risk from lead in drinking water (Jennings and Duncan, 2017; Griffin and Dunwoody, 2000). EPA is proposing these changes in response to concerns stakeholders shared during the proposed LCRI external engagements and LCRR review that the language does not disclose all the known health risks of lead exposure. In addition, the current language notes the risk to all age groups and EPA is proposing adding language to highlight the risks to pregnant people, infants (both formula-fed and breastfed), and young children. This revision is being proposed in response to stakeholder recommendations that the language emphasize health risks to all age groups, especially fetuses, formula-fed infants, and young children. EPA included pregnant people to ensure that those through which the exposure is occurring to the developing fetus are highlighted so they can easily identify themselves as an at-risk group. EPA is also proposing revisions to simplify the language so that it is easier for consumers to understand. EPA is also proposing to make the language gender neutral for greater inclusivity. EPA is proposing the following revised mandatory lead health effects language and has underlined the additions to illustrate changes from the LCRR text:

> *There is no safe level of lead in drinking water. Exposure to lead in drinking water can cause serious health effects in all age groups, especially pregnant people, infants (both formula-fed and breastfed), and young children. Some of the health effects to infants and children include decreases in IQ and attention span. Lead exposure can also result in new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more information about your risks.*

The same wording would be used in the health effects portion of the public notification of a lead action level exceedance and of treatment technique violations as well as the CCR.

Translation requirements

Under the LCRR, water systems serving a large proportion of non-English speaking consumers must include in public education materials a translated statement about the importance of the materials, or they must include contact information for consumers to obtain a translated copy or translation assistance from the water system. The State determines what is considered a large proportion (§ 141.85(b)(1)).

EPA is proposing to update the current requirement in the LCRR for translation of public education materials under 40 CFR 141.85 to ensure greater protection of consumers with limited English proficiency. Individuals with limited English proficiency include those who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English. EPA is proposing to require water systems to include in all the public education materials under 40 CFR 141.85 information in the appropriate language regarding the importance of the materials. Systems would also be required to include contact information for persons served by the water system to obtain a translated copy of the materials, request assistance in the appropriate language, or the system must provide materials translated into the appropriate language. Since 1991, EPA has required public education materials under the LCR to be communicated in other languages in communities where a significant proportion of the population speaks a language other than English (56 FR 26555, USEPA, 1991). Some systems provide a translated statement of the importance of the CCR in multiple languages (e.g., Boston, Massachusetts; Dearborn, Michigan) (MWRA, 2020; City of Dearborn, 2019). There are also organizations, such as Clean Water Fund in Chelsea, Massachusetts, that have translated materials and offered translation services related to lead in drinking water for their community

(LSLR Collaborative, n.d.e). EPA is also aware of States providing resources and templates to assist water systems with translation of public education and notification: California, Illinois, and Washington (California Water Boards, 2023; IEPA, n.d.; Washington State Department of Health, n.d.). In addition, EPA intends to provide templates of public education materials that provide greater accessibility to consumers, including in multiple languages to assist water systems. EPA is also seeking further information about how water systems provide translated materials to consumers with limited English proficiency. Specifically, EPA is seeking information and data about when a system provides translated materials, what resources are used to translate materials (e.g., State resources, community organizations), and what barriers water systems may face in providing accurate translated materials (see section IX. of this document). During the public meetings on environmental justice considerations for the proposed LCRI (USEPA, 2023h; USEPA, 2023i), NDWAC consultation for the proposed LCRI (USEPA, 2023l), Small Business Advocacy Review for the proposed LCRI (USEPA, 2023m), and LCRR review (Docket ID EPA-HQ-OW-2021-0255), many stakeholders expressed concerns about the accessibility of public education about lead in drinking water to consumers with limited proficiency in English. Stakeholders have urged EPA to ensure that public education is provided in multiple languages to mitigate potential environmental justice concerns by ensuring that those consumers are informed about the potential health risks of lead in drinking water as well as actions they can take to reduce their exposure. EPA's proposed revisions would help address these concerns by increasing accessibility of public education materials for consumers with limited English proficiency.

EPA recognizes that some water systems may lack the capacity or resources to develop translated public education materials. The proposed CCR Rule Revisions include a provision for primacy agencies to provide translation support for the CCR, as a condition of primacy, when systems are unable to do so (88 FR 20009, USEPA, 2023n) for reasons described in the preamble to that rulemaking (see 88 FR 20099-100 and 20102, USEPA, 2023n).

Similar to this CCR provision, EPA is also requesting comment on whether to require that States, as a condition of primacy for the LCRI, provide translation support if water systems, not independently subject to Title VI, are unable to do so. All recipients of Federal financial assistance are subject to the requirements of Title VI to take reasonable steps to provide meaningful access to limited English proficient (LEP) consumers. To support implementation of Title VI regulations (40 CFR part 7) EPA has specified that “recipients of Federal financial assistance have an obligation to reduce language barriers that can preclude meaningful access by LEP persons to important government services” (69 FR 35604, USEPA, 2004b). Currently, all States and territories (except Wyoming and the District of Columbia) have primacy. In Fiscal Year 2021 (FY21) and 2022 (FY22), each of those Primacy Agencies received Public Water System Supervision (PWSS) grant funds (USEPA, 2021g; USEPA, 2022c), and therefore they would be subject to requirements of Title VI. Water systems that are subrecipients of Federal financial assistance to the State primacy agencies are similarly subject to the requirements of Title VI. See *Guidance to Environmental Protection Agency Financial Assistance Recipients Regarding Title VI Prohibition Against National Origin Discrimination Affecting Limited English Proficient Persons* for more information (69 FR 35602, USEPA, 2004b).

I. Additional Requirements for Systems with Multiple Lead Action Level Exceedances

Some water systems may exceed the lead action level multiple times across several tap monitoring periods. The LCRR requires water systems that exceed the lead action level to take actions to reduce lead in drinking water, such as CCT, LSLR, and public education. However, the LCRR does not address the situation where a system is taking those required actions but continues to experience higher lead levels during the period that the system completes the longer-term actions that are expected to resolve the underlying problem.

In the LCRI, EPA is proposing new requirements for water systems that have multiple lead action level exceedances. EPA is proposing that a system with "multiple lead action level exceedances" would be a system with three lead action level exceedances in a rolling five-year period. Those systems would be required to take additional actions after three lead action level exceedances because those exceedances are indicative of recurring high lead levels that warrant additional measures while OCCT and mandatory service line replacement are being implemented, or if longer-term measures are not effective at reducing lead levels to below the action level (e.g., a system that has re-optimized once and is meeting optimal water quality parameters). EPA is proposing the first five-year rolling period to determine if a system has "multiple lead action level exceedances" would start on the LCRI compliance date and end five years after. Then, the start of any potential future five-year rolling periods would be assessed beginning every six months thereafter. EPA is proposing for systems to conduct these actions upon the third action level exceedance even if the first rolling five-year period has not yet elapsed. EPA selected a five-year period because it generally takes five years to study, select, install, and operate OCCT effectively in a system. After this five-year period, OCCT would drive the lead reduction in systems that had been addressed by the shorter-term measures during that five-year period as proposed under the requirements for systems with multiple lead action level exceedances.

EPA is proposing that systems with multiple lead action level exceedances conduct at least one additional system-wide public education outreach activity to raise additional awareness of the health effects of lead in drinking water, identify steps consumers can take to reduce their exposure, and provide information about how the water system is addressing the issue. The water system would be required to repeat the selected activity every six months until the system no longer meets the proposed criteria for multiple lead action level exceedances (i.e., three or more action level exceedances within the last five years), even if the system does not exceed the lead action level in the most recent tap sampling period. For the required public education outreach activity, EPA is proposing that systems be required to perform at least one of the following activities to share public education materials with the public:

- Convening a town hall meeting,
- Participating in a community event (e.g., farmers market, town fair, sporting event),
- Contacting customers by phone, text, email, or door hanger,
- Conducting a social media campaign, or
- Use another method approved by the State.

The proposed rule notes that a State may approve additional activities not listed because there may be other present or future effective methods of meaningful outreach systems could consider using. The selected activity is in addition to the public education required after a lead action level exceedance under § 141.85(b)(2) (see section V.H.4.). However, EPA is proposing to allow water systems that also fail to meet the mandatory service line replacement rate (see section V.H.2.) to conduct the same outreach activity to fulfill both requirements under § 141.85(h) and (j).

EPA is proposing additional public education activities to ensure that the public is aware of recurring lead action level exceedances, the actions the water system is taking in response to the lead action level exceedances, and information about the health effects of lead and steps they can take to reduce their exposure. During the LCRR review, EPA heard concerns from stakeholders about how the distribution of public education materials by systems that frequently exceed the lead action level required under LCRR may not adequately raise awareness of the issue or inform consumers of the actions that they can take. To help address these concerns, EPA anticipates these proposed activities would better protect public health by providing additional information to consumers about lead risks and to prompt consumers to take voluntary actions. Additionally, EPA anticipates these activities would increase water system transparency and accountability, which is essential for building and maintaining trust between water systems and their consumers.

In addition to the proposed public education activities, EPA is proposing to require water systems with multiple action level exceedances to make filters certified to reduce lead and replacement cartridges, along with instructions for their use, available to all consumers. A system would be required to make them available to all consumers within 60 days of when it meets the criteria of having "multiple action level exceedances". Within 30 days of meeting the criteria of multiple action level exceedances for the first time, water systems would be required to submit a plan to the State describing how the system intends to make filters available. The plan would include considerations for making filters and replacement cartridges accessible to all consumers. For example, some water systems have used distribution centers, neighborhood canvassing, and request forms for mail or delivery of filters to ensure that consumers have multiple ways to obtain filters. In the plan, water systems would describe their planned method(s) of distribution and describe how the system plans to overcome any barrier(s) to access. For example, a system may decide to use more than one way to make filters available, such as operating a distribution center or providing at-home delivery as requested, to accommodate consumers with different accessibility needs based on the availability of transportation and other considerations. EPA anticipates that systems would also plan for providing filters and cartridges at no direct cost to low-income consumers, at a minimum. States would be required to review and approve the plan within 15 days of submission and water systems would be required to implement the plan.

As provided in section V.E.1. of the preamble, systems that select the proposed option to remove all their LSLs and GRR service lines in five years can defer OCCT during that five-year period. However, EPA notes that under the proposed LCRI, those systems would remain subject to the public education requirements for multiple lead action level exceedances, including the requirement to make filters available to all consumers.

This proposed requirement is responsive to stakeholder suggestions to require water systems to provide filters to some or all consumers to reduce lead exposure while the system is taking other actions as required by the rule (e.g., LSLR, CCT, public education) (USEPA, 2023l). EPA is aware of systems that have provided filters during periods of elevated lead levels to some or all consumers or as part of service line replacement programs, many of these at no direct cost to the consumer. Examples of communities that have implemented filter programs include Newark, New Jersey (City of Newark, n.d.b); Pittsburgh, Pennsylvania (City of Pittsburgh, n.d.); Kalamazoo, Michigan (City of Kalamazoo, 2023); Benton Harbor, Michigan (Berrien County Health Department, 2023); Elgin, Illinois (City of Elgin, 2023); and Denver, Colorado (City of Denver, 2023). Recent filter effectiveness studies conducted by EPA have shown that when properly installed and operated, filters certified under NSF/ANSI Standard 53 for total lead removal and NSF/ANSI Standard 42 for fine particulates (Class I) are effective at reducing lead in drinking water (Bosscher et al., 2019; Tang et al., 2023; Tully et al., 2023).

EPA is proposing to require systems to make filters available to all consumers instead of a subset of consumers, such as those served by an LSL or GRR service line. While LSLs are a significant contributor to lead in drinking water, other sources of lead may cause elevated drinking water lead levels, and both systems with and without LSLs experience lead action level exceedances (see section V.A.). Therefore, EPA is proposing to require water systems to make filters available to all consumers instead of a subset of consumers.

EPA is requesting comment in section IX. of this document on its proposed criteria for "multiple lead action level exceedances" of three action level exceedances in a five-year period, or if EPA should choose a different frequency or approach (e.g., more exceedances in a shorter time-period, consecutive exceedances). EPA is also requesting comment on whether such systems should be required to take additional actions, whether systems should be required to conduct more than one (e.g., two or three) of the public education activities proposed, the appropriateness of the public education activities proposed, and whether other activities should be considered.

EPA is requesting comment on the proposed requirement for systems to make filters certified to reduce lead and replacement cartridges, along with instructions for use, available to all consumers within 60 days of the system meeting the criteria of at least three action level exceedances in a five-year period. EPA is also requesting comment on the proposed requirement for water systems to develop a filter distribution plan and submit it to the State, and if systems should be required to take any additional actions to facilitate consumer access to filters.

EPA is also requesting comment on alternative approaches following multiple lead action level exceedances including requiring water systems to deliver a filter and replacement cartridges to every household served by the system. EPA heard concerns that because not all consumers would elect to use a provided filter, delivering filters and replacement cartridges to every household may result in wasted staff and financial resources, which a water system could direct towards other lead reduction activities, such as LSLR and CCT (USEPA, 2023j). While the proposed provision would mean that a consumer would have to take action to obtain a filter, EPA intends for water systems to make every effort to assure that filters are available to any consumer that wants one and to include such efforts in the plan to make filters available.

EPA also is requesting comment on an alternative requirement for systems to consult with the State upon meeting the criteria for multiple action level exceedances, and for States to determine the appropriate action. In the LCRI external engagements, some stakeholders stated that the LCRI should not require specific additional actions, such as providing filters for multiple action level exceedances, noting States are currently able to work with individual systems to address these situations (USEPA, 2023j; USEPA, 2023m). While this alternative would provide States with the flexibility to determine which mitigation actions are best suited for a system's situation, EPA notes that this would place additional burden on States to develop a response and could result in inconsistent responses for similar situations across water systems statewide and nationally. EPA is requesting comment if in addition to the proposed requirements, EPA should provide States discretion to determine appropriate action following a multiple action level exceedance that is tailored to meet specific system needs.

EPA is also requesting comment on whether EPA should include a provision for States to allow water systems to discontinue some or all of the proposed public education and filter requirements early if a water system implements actions, such as installing optimized or re-optimized CCT or completes the proposed mandatory service line replacement and is at or below the action level for two consecutive monitoring periods. This provision would provide discretion to States to allow a water system to discontinue some or all of the required actions prior to no longer having three action level exceedances within a five- year period if the system has taken tangible actions to reduce lead levels.

J. Lead Sampling at Schools and Child Care Facilities

The LCRR requires CWSs to conduct public education and sample for lead in the schools and licensed child care facilities they serve. EPA promulgated these requirements in the LCRR as part of the public education treatment technique in order to educate schools and child care facilities about the risk from lead in premise plumbing, the importance of sampling for lead in drinking water, provide them with experience with lead testing, and help them make decisions to mitigate lead risks, including establishing their own testing programs (86 FR 4232, USEPA, 2021a; USEPA, 2020b). This sampling effort is not a replacement for comprehensive testing as detailed in the 3Ts. In the final LCRR preamble, EPA noted that large buildings, such as schools, can have a higher potential for elevated lead levels. This is because, even when large buildings are served by a water system with well-operated OCCT, they may have lead in drinking water due to lead in premise plumbing and inconsistent water use patterns (e.g., summer, holiday, or other breaks) that can result in longer stagnation times (86 FR 4232, USEPA, 2021a). However, exposure can be mitigated through public education and voluntary remediation actions to address lead from premise plumbing within those facilities, and accordingly, EPA promulgated requirements for CWSs to conduct public education and sampling for lead in schools and licensed child care facilities. EPA is authorized under SDWA to establish NPDWRs that are legally enforceable standards that apply to public water systems as defined in SDWA section 1401(4) and 40 CFR 141.2. EPA does not have the authority under SDWA section 1412 to require schools and child care facilities that are not regulated as public water systems to act under an NPDWR.

The LCRR requires CWSs to compile a list of all the schools and licensed child care facilities they serve and to update the list at least once every five years. Annually, CWSs must provide materials on the health effects of lead to all the schools and child care facilities on the list. During each year of the first five-year cycle, CWSs must conduct outreach to at least 20 percent of the total elementary schools and child care facilities served by that system to schedule sampling and provide a copy of EPA's 3Ts for Reducing Lead in Drinking Water Toolkit (USEPA, 2018). If an elementary school or child care facility declines the offer for sampling or does not respond to at least two separate outreach attempts, the CWS may count the elementary school or child care facility as part of the minimum 20 percent of facilities sampled per year for compliance purposes. The CWSs must include the number of facilities that decline or do not respond to the offer to sample in the annual report to the State under § 141.90(i). During the first five-year cycle, CWSs must annually notify all secondary schools that they may request sampling and must sample at any secondary school that requests it. After the first five-year cycle, the CWS must sample any school or child care facility that requests sampling. The CWS is not required to sample an individual school or child care facility more than once in any five-year period.

CWSs are required to collect a minimum of five samples per school and two samples per child care facility. Results must be delivered to the sampled schools and child care facilities as soon as practicable but no later than 30 days after receipt of the results, along with information about remediation options. CWSs must also submit results to the State and to State and local health departments annually. The LCRR also includes a waiver provision for States to waive the requirements of § 141.92 for CWSs to sample in schools and child care facilities if they are sampled under an alternative State or local law or program. EPA did not include any provisions in the LCRR to allow CWSs to count sampling conducted prior to the LCRR compliance date towards the required sampling.

1. Proposed LCRI Requirements

EPA is proposing to maintain most of the LCRR requirements for CWSs to conduct public education and sample in schools and child care facilities. In addition, EPA is proposing significant changes to the organization of § 141.92 to help clarify the requirements. EPA intends for these proposed changes to ease interpretation and implementation of the requirements for both States and water systems. EPA is proposing a new section in § 141.92(a)(2) to clarify that the requirements in § 141.92 do not apply to schools and child care facilities that are regulated as NTNCWSs. The LCRR requires CWSs to fulfill the requirements of § 141.92 in schools and child care facilities that were constructed prior to January 1, 2014 or the date the State adopted standards that meet the definition of lead free in accordance with section 1417 of SDWA, whichever is earlier. EPA is clarifying in §141.92(a)(1) that CWSs are not required to sample in schools and child care facilities that underwent full plumbing replacement after the applicable date. Section 141.92(b) outlines the proposed revisions to requirements for developing a list of the schools and child care facilities served by CWSs. While the LCRR requires CWSs to develop a list of the schools and child care facilities they serve and either send an updated list to the State or certify that the list has not changed, there is no requirement in the LCRR for the initial list to be submitted to the State. Therefore, EPA is proposing to require that the initial list must also be sent to the State in § 141.92(b)(1). EPA encourages CWSs to work with local school districts, State departments of education, and child care licensing agencies to identify schools and child care facilities in their service areas.

EPA is proposing to maintain different requirements for CWS outreach to elementary schools and child care facilities compared to secondary schools because children under the age of six are at the greatest risk of adverse health effects due to lead exposure (CDC, 2022a). Prioritizing sampling in facilities serving children with the greatest risks associated with lead exposure will reduce the burden on CWSs and enable them to focus on facilities with the most susceptible populations while still maintaining an opportunity for other schools to be sampled if they request it. However, to simplify rule requirements, EPA has separated out the requirements for public education to all schools and child care facilities (§ 141.92(c)), sampling frequency for elementary schools and child care facilities (§ 141.92(d)), and sampling frequency for secondary schools (§ 141.92(e)) to clarify the different requirements, reduce cross-references, and ease implementation. EPA is also proposing in § 141.92(d)(3) for water systems to conduct the outreach required in the first five years after the rule compliance date (e.g., scheduling sampling) in any elementary school or child care facility that is identified and added to the updated list of schools or child care facilities in a subsequent sampling cycle. This would ensure water systems would consistently be held to the same outreach requirements and contact every elementary school or child care facility at least once, regardless of when the facility is identified, rather than only sampling these schools or child care facilities at the request of the school or child care facility. EPA is also proposing to remove the term “mandatory” to describe the first five-year sampling cycle that would begin on the compliance date if LCRI is finalized because § 141.92 does not impose any requirements on schools and child care facilities, and EPA has heard this term may add confusion. EPA intends for the proposed revisions to clearly describe the requirements for CWSs in plain language. EPA has also made minor changes to the sampling protocol (§ 141.92(f)) to improve readability.

EPA is maintaining the LCRR requirements for frequency and number of samples. Some stakeholders requested that EPA increase the number of required samples noting that EPA’s 3Ts recommends sampling all outlets used for cooking and drinking (USEPA, 2018). Sampling under § 141.92 provides a preliminary screen for lead risks within schools and child care facilities, and as described above, when coupled with public education materials (e.g., EPA's 3Ts), these provisions are intended to encourage schools and child care facilities to take additional actions including sampling. In response to stakeholder feedback, EPA is seeking comment on whether CWSs should be required to collect more samples and/or sample more frequently in schools and child care facilities.

Additionally, EPA is not proposing requirements for schools and child care facilities or CWSs to remediate lead in this rule. As stated previously, EPA is authorized under SDWA to establish NPDWRs that are legally enforceable standards that apply to public water systems as defined in SDWA section 1401(4) and 40 CFR 141.2. Therefore, EPA does not have the authority under SDWA section 1412 to require schools and child care facilities that are not regulated as public water systems to act under an NPDWR including to remediate lead.

Alternatively, some stakeholders stated during the LCRR review that the LCRI should include a school-specific action level and/or remediation requirements for CWSs (see docket no. EPA-HQ-OW-2021-0255). EPA does not anticipate requiring CWSs to take remediation actions because larger buildings, such as schools and child care facilities, can have a higher potential for elevated lead levels due to complex plumbing arrangements, the presence of lead in premise plumbing, and inconsistent water use patterns that can result in long stagnation times (Barn et al., 2014; Deshommes et al., 2016). Even when a school or child care facility is served by a water system with well operated OCCT, there may not be technical improvements that the system can make to OCCT (USEPA, 2020b) to further reduce lead in those settings (e.g., Dore et al., 2018). Additionally, for the aforementioned reasons, water system 90th percentile levels are not necessarily reflective of lead levels in schools (e.g., Triantafyllidou et al., 2014). Therefore, setting additional treatment requirements for corrosion control in these situations is not technically feasible. Further, EPA has determined sampling at schools and child care facilities is a component of this treatment technique rule for public education and not CCT. Accordingly, EPA determined that it is feasible for CWSs to conduct public education and sampling at these facilities to contribute to increased awareness of the potential for elevated levels of lead in premise plumbing, independent of a water system's 90th percentile value.

For these same reasons, EPA is not proposing to include a school-specific remediation action level for CWSs. However, EPA notes that CWSs are required under the LCRR to provide schools and child care facilities with the 3Ts guidance, which EPA is proposing to maintain under the proposed LCRI. The 3Ts provides information and best practices, including recurring sampling at all outlets used for cooking and drinking and remediation steps for schools and child care facilities to reduce lead in drinking water to the lowest levels possible, noting there is no known safe level of lead in drinking water (USEPA, 2018). Further, schools and child care facilities are encouraged to conduct additional sampling and take remediation actions.

EPA is aware that schools and child care facilities may be concerned about available resources to fund additional lead testing and remediation (USEPA, 2020b; USEPA, 2023i; USEPA, 2023j). The BIL authorized an additional $200 million (FY22 – FY26) in grant funding for lead testing and remediation in schools and child care facilities under SDWA section 1464(d). EPA awards funding under this program as non-competitive grants to States, territories, and Tribes. In fiscal years 2022 and 2023, Congress appropriated $58 million in additional funding under SDWA section 1464(d). EPA has also issued an implementation document for States and territories which includes information on the use of funds for remediation activities (USEPA, 2023o). As noted in the LCRR review, EPA is committed to working with other Federal agencies to make progress on reducing lead in drinking water in schools and child care facilities, including through non-regulatory efforts. On March 24, 2023, EPA and the U.S. Department of Health and Human Services (HHS) issued a joint letter to governors, encouraging

State and local governments to use Federal funding to address lead in schools and child care facilities. Additionally, the letter encourages governments to "establish or strengthen child care licensing and monitoring requirements to test for and address lead in early childhood settings along with funding to support the associated costs," and promote the use of EPA's 3Ts guidance (USEPA and USHHS, 2023).

EPA is also aware that some States have requirements for lead sampling in schools and child care facilities, including several States that have passed new laws since LCRR was promulgated. EPA notes that many of these laws require recurring sampling of all outlets used for cooking and drinking and may require remediation actions. EPA finalized waiver provisions for existing sampling programs in the LCRR to encourage such efforts. However, the Agency is also aware that some schools or child care facilities may not be tested under existing State or local requirements or other voluntary programs (USGAO, 2018; USEPA, 2023b, Chapter 3, section 3.3.10). Nationally, EPA's goal with the proposed requirements in the LCRI is to provide schools and child care facilities with the opportunity to be sampled for lead, to learn about the importance of lead testing in schools and child care facilities, and take additional actions if they choose. The requirements would also provide CWSs, States, and State and local health agencies with information to further support public education for lead in drinking water. In this way, the LCRI would allow for a baseline level of sampling information to be collected nationally, that can be supplemented by State efforts. EPA strongly encourages States to adopt lead testing requirements for schools and child care facilities, using a variety of means, including incorporating requirements in State and local licensing of schools and child care facilities. States are likely better positioned than EPA to administer lead testing and remediation programs because States can establish regulations for schools and child care facilities that would provide for greater consistency of education, testing, remediation activities, and public communication across all schools and child care facilities throughout a State. Additionally, States can directly apply for and have access to funding to support schools and child care facilities that may not be available to CWSs.

2. Proposed Waiver Requirements

The LCRR allows States to offer waivers to CWSs for sampling in the schools and child care facilities if those facilities are sampled under an alternative program, such as a State or local law. However, the LCRR only allows waivers for sampling conducted after the LCRR compliance date. EPA is proposing to allow States to waive the requirements in § 141.92 for the first five-year cycle of sampling in schools and child care facilities beginning with the compliance date of the final LCRI if they have already been tested under an existing program between January 1, 2021 and the LCRI rule compliance date. EPA is proposing to limit the cut-off date to January 1, 2021, recognizing that many facilities were closed in 2020 due to the COVID-19 related shutdowns. The Agency estimates that any data collected during COVID-19-related closures would be unrepresentative due to low water usage and longer than normal stagnation times. EPA is proposing this provision in response to stakeholder feedback. States have requested that EPA allow testing that would be conducted prior to a final LCRI compliance date to "count" towards the rule requirements, stating that many schools and child care facilities are currently being tested for lead under existing State or local requirements and through WIIN grant-funded efforts (docket no. EPA-HQ-OW-2021-0255, USEPA, 2023j).

This proposed provision would maintain LCRR requirements for CWSs to follow the requirements of § 141.92 for the schools and child care facilities that have not been sampled by the alternative program. CWSs would be required to sample at the request of any school or child care facility they serve after the first five-year cycle (i.e., starting five years after the rule compliance date) unless the State grants a waiver for an ongoing alternative program. EPA encourages States to use available Federal funding, including WIIN grants, to conduct sampling in school and child care facilities. Federally funded efforts could reduce the burden on CWSs, particularly during the first five-year cycle after the LCRI compliance date. EPA is proposing to maintain the other waiver provisions but has made edits to clarify and streamline the requirements in § 141.92(h). EPA is requesting comment on this proposed provision and whether the Agency should consider a different cut-off date (e.g., earlier or later than January 1, 2021) (see section IX. of this document).

EPA is also proposing to allow States to waive the requirements of § 141.92 for CWSs if a school or child care facility they serve installs and maintains point-of-use devices certified to reduce lead in drinking water on all outlets used to provide water for human consumption. EPA is aware that some State and local governments require schools to “filter-first,” meaning that filters certified to reduce lead are required to be installed and maintained on outlets in schools and child care facilities used for drinking and cooking. Specific requirements of these programs vary, and in some cases, filters are only required when sampling results at a tap are above a defined threshold (e.g., 0.005 mg/L). EPA considered feedback on filter-first approaches and is proposing to add a waiver eligibility for CWSs to sample in schools and child care facilities that install and maintain POU devices on all outlets used for cooking and drinking. EPA is seeking comment on whether or not to allow States to waive the requirements of § 141.92 for CWSs in schools and child care facilities that use and maintain filters certified to reduce lead, and if so, whether the waiver should only be allowed where schools and child care facilities are required by State or local law to install POU devices and maintain them. EPA is seeking comment on the minimum requirements for States to provide a waiver (e.g., should the waiver be limited to locations where the filter use is required by State or local law; should the waiver be limited to locations where State or local law requires periodic sampling or testing to ensure proper filter use).

Some stakeholders advocated for the LCRI to include a filter-first requirement while others disagree with such approaches for reasons including because filters may not be properly maintained over the long-term resulting in reduced efficacy, and the cost and burdens on water systems (docket no. EPA-HQ-OW-2022-0255, USEPA, 2023j). EPA is not proposing to require water systems to provide filters to schools and child care facilities for the same reasons EPA is not proposing CWSs to take other types of lead remediation requirements (see section V.J.1. of this document).

3. Public Information about Lead Sampling in Schools and Child Care Facilities

The LCRR requires CWSs to report the results of sampling to the school or child care facility within 30 days of receiving results, and annually to the State and both State and local health agencies. The LCRR does not include requirements for the water system to provide public notice of the results. EPA is proposing to require CWSs to include a statement in the CCR that states that schools and child care facilities are eligible to be sampled for lead and direct interested members of the public to contact their local school or child care facility for more information (see section V.L.1. for more information about the CCR).

EPA is proposing this requirement due to feedback from stakeholders. Some stakeholders raised concerns that schools and child care facilities may not share sampling results with the facility staff, parents, and the public (docket no. EPA-HQ-OW-2021-0255). EPA agrees that it is important for lead sampling results to be shared with the affected population so that parents and guardians of children that attend these facilities can be aware of lead risks in those facilities. However, EPA does not have the authority in an NPDWR under SDWA section 1412 to require schools and child care facilities that are not public water systems to take this action, but strongly encourages them to share results and other relevant information, as outlined in the 3Ts guidance (USEPA, 2018). EPA expects that many school and child care facilities have experience with sharing such information. For example, as a condition of receiving a WIIN grant for lead sampling SDWA section 1464(d)(6), requires the recipient to ensure that the entity to which funds are disbursed (e.g., school, child care facility, local education agency) make the results available to the public and notify teachers, parents, and employee organizations about the results.

Nonetheless, the Agency recognizes that the public may not be aware of the opportunity for schools and child care facilities to be sampled by CWSs under the rule. Therefore, EPA anticipates that including additional information about lead sampling in schools and child care facilities in the CCR could increase public transparency while directing interested members of the public to the facilities that are sampled. Also, EPA anticipates that this change would further strengthen and support the public education purpose of sampling in schools and child care facilities. EPA is seeking comment on whether the Agency should require CWSs to make school and child care facility sampling results publicly available, and if so, how frequently and in what manner (see section IX. of this document). In LCRI, EPA is not proposing for CWSs to make the sampling results publicly available because it would be an additional requirement on CWSs that would necessitate additional time and resources. However, EPA recognizes that such a requirement would increase public transparency.

EPA is proposing to retain the requirement for CWSs to submit sampling results to the State and both State and local health agencies but is proposing to increase the frequency from annually to 30 days after CWSs receive the results. States may voluntarily choose to disseminate sampling results to the public. EPA has reasoned that an annual reporting frequency may not be timely enough given concerns from stakeholders that a CWS, school, or child care facility may receive results within 30 days of sampling but not share those results. Under the LCRR requirement, the State and the State and local health agencies may not know about the sampling results until up to a year later. EPA is requesting comment on the proposed requirements for an additional statement in the CCR (see section V.L.1. of this document), and the increased frequency of reporting to States and State and local health agencies (see section IX. of this document).

K. Reporting and Recordkeeping

1. System Reporting Requirements

EPA is proposing to require revised system reporting requirements in accordance with other proposed changes to the LCRI. Changes proposed in other parts of the rule would affect reporting of tap sampling results for LSL sites, documentation requirements for customer refusals, reporting requirements for systems with multiple lead action level exceedances, and reporting requirements for systems with schools and child care facilities.

EPA is proposing in the LCRI to modify the compliance tap sampling reporting requirements for systems sampling at LSL sites to report both first liter and fifth liter sample results in accordance with the proposed updated tap sampling protocol. In the LCRR, systems are required to report summary numbers of lead, GRR, and unknown service lines alongside submission of its service line material inventory. EPA proposes in the LCRI to expand the inventory reporting requirements to include lead connectors (known, replaced, and unknown) and non-lead service lines, beginning with the inventory due by the LCRI compliance date. EPA is requesting comment on expanding inventory reporting to include lead connectors and non-lead service lines (see section IX. of this document).

Under LCRR, systems with lead service lines were required to begin conducting standard tap monitoring within one year of the rule compliance date, and therefore, must submit a site sample plan to the State for approval prior to the start of the first tap monitoring period. In LCRI, EPA is proposing that this requirement apply to all systems with LSLs, GRR service lines, and/or unknown service lines. EPA has heard concern over the ability of States to review all required site sample plans and provide approvals in time for the first tap monitoring period and is requesting comment on whether EPA should consider a phased approach or alternate approach to reduce the burden on States following the rule compliance date.

EPA is proposing that all systems conducting service line replacement must report information on their compliance with the proposed service line inventory and replacement requirements to the State. Each year, systems would be required to submit inventory summary information, including the current number of LSLs, GRR service lines, unknown service lines, non-lead service lines, and lead connectors. They would also be required to report information from their replacement program, including the total number and street addresses of full service line replacements, partial service line replacement, replaced GRR service lines, and replaced lead connectors. EPA is also proposing that systems report the number of unknown service lines determined to be non-lead, and the street address of any service line inventoried as non-lead that was later discovered to be an LSL or GRR service line. Systems would also be required to certify to the State the number of service lines not replaced due to customer refusals for access to conduct service line replacement. EPA is also proposing that summary information about the inventory and service line replacement program be made available to the public to facilitate community tracking of system progress. For more information, see section V.D. of this document.

EPA proposes that systems conducting public education and filter requirements following multiple lead action level exceedances, as defined in this proposal, would be required to certify to the State that they conducted at least one required outreach activity in the previous year and certify that they complied with filter distribution requirements in the previous year by providing a copy of the filter distribution plan and the number of filters provided each tap sampling period.

EPA proposes improvements to the reporting requirements for water systems with schools or child care facilities. The LCRR requires systems to submit an updated list of school and child care facilities they serve or certify that there are no changes to the initial list at least once every five years. EPA is proposing to require that systems must also submit the initial list of schools and child care facilities they serve by the rule compliance date. EPA is also proposing that systems provide analytical results to the State within 30 days of receiving them (see section V.J. of this document). The LCRR also requires water systems to submit a summary report to the State containing information about school and child care sampling during the prior calendar year, including the number of schools and child care facilities sampled, and the number of elementary schools and child care facilities that declined or did not respond to attempts for sampling. EPA is proposing in the LCRI that the report also include the names of the schools and child care facilities. EPA anticipates that this would help States identify which schools and child care facilities have not been sampled and why.

2. State Recordkeeping Requirements

EPA is proposing several changes to State recordkeeping requirements to conform with changes proposed elsewhere in the LCRI. Because EPA is proposing to eliminate the trigger level and require mandatory full service line replacement, EPA is also proposing to remove recordkeeping requirements for any State determinations of lead service line replacement goal rates. EPA is also proposing to change instances of LSLR to "service line replacement" and "lead and galvanized requiring replacement service lines" to reflect the proposed mandatory full service line replacement requirements. EPA is also proposing to clarify that the requirement for States to maintain records of system-specific determinations for some NTNCWSs and CWSs to collect non-first draw samples refer to samples that do not meet the minimum six-hour stagnation time.

EPA is also proposing changes to clarify existing requirements regarding the length of the records retention period. EPA requires each State with primacy enforcement responsibility to retain records listed under § 142.14(d) for not less than 12 years. States must maintain records of all currently applicable or most recent State determinations, including all supporting information and technical basis for each decision, under § 142.14(d)(8). Revisions to the LCR in 2000 added a requirement that if no change is made to the State determinations under § 142.14(d)(8) during the 12-year retention period, that the State must retain the record until a new decision, determination, or designation has been issued. EPA is proposing edits to § 142.14(d)(8) in the LCRI to clarify the existing record retention requirement and improve implementation. EPA is also proposing to change the order of provisions in § 141.14(d)(8) to improve readability.

EPA is also proposing to move requirements for States to maintain records of service line replacement plans, service line inventories, and compliance sampling pools to § 142.14(d)(9) with other reports and information submitted under §141.90. EPA is proposing this change to improve organization and clarity because these records are not State determinations. Because EPA is proposing to require systems to complete a baseline service line material inventory by the rule compliance date, EPA is also proposing to that States maintain records on these baseline inventories in addition to the initial service line inventory and any required updates to the inventory.

EPA is also seeking comment on whether States should be required to maintain documentation related to the distribution and site assessments conducted by water system. EPA is also seeking comment if States should be required to maintain documentation of determinations of more stringent implementation, including but not limited to conditions or approvals related to reduced compliance monitoring and additional information required to conduct a review or designate OCCT. See section IX. of this document.

3. State Reporting Requirements

EPA is proposing two changes to quarterly State reporting to conform with the changes proposed elsewhere in the LCRI. In the LCRR, States are required to report summary numbers of LSLs, GRR service lines, and unknown service lines, as reported by systems in their mandatory service line inventories. EPA proposes in the LCRI to expand the inventories to include lead connectors and non-lead service lines and proposes that States report totals for these additional categories per system. In the LCRR, goal-based LSLR was introduced in addition to mandatory LSLR upon an action level exceedance and required States to report the date that systems must begin LSLR for all systems required to do so. As the LCRI proposes mandatory service line replacement irrespective of measured lead levels, EPA is proposing that States instead report the calculated replacement deadline for each system under either the proposed mandatory 10-year deadline, shortened deadlines, or under proposed options for deferred deadlines. In addition, EPA proposes to require States to report the number and type of service lines replaced each year, as reported by systems.

EPA is also proposing to consolidate reporting requirements in § 142.15(c)(4)(i) and (iii). Under LCRR, EPA removed dates differentiating reports submitted by States to EPA prior to January 1, 2000, and those submitted after January 1, 2002, resulting in some duplicative requirements. Specifically, EPA is proposing to maintain requirements for States to report the date of CCT and source water treatment related milestones (e.g., the date CCT study results are submitted to the State, date of OCCT installation is complete) and removing duplicative requirements such as reporting the systems with action level exceedances given that States are required under LCRR to report the 90th percentile values of all water systems in addition to the first and last days of the tap monitoring period. EPA views these reporting elements as necessary for EPA enforcement and oversight.

EPA is also proposing a change to State reporting to implement section 1414(c)(2)(D) of SDWA, as amended by the WIIN Act. This provision requires EPA to issue a Tier 1 public notification of a system's lead action level exceedance if a system fails to do so; however, EPA would need to know of the action level exceedance in order to conduct the notice. Therefore, EPA proposes that States submit the 90th percentile lead level for any system with an action level exceedance within 15 days following the end of each applicable tap monitoring period or within 24 hours of receiving notification of a lead action level exceedance from a water system, whichever is earlier.

EPA acknowledges that a broader reporting requirement for compliance monitoring data in 40 CFR part 141 was proposed as part of the CCR Rule Revisions and was subject to public notice and comment (88 FR 20092, USEPA, 2023n). EPA is proposing specific State reporting requirements in the LCRI as described above because final action has not yet been taken on the proposed CCR Rule Revisions. EPA intends to consider if any of the proposed LCRI State reporting requirements are necessary pending final action on the proposed CCR Rule Revisions.

L. Other Proposed Revisions to 40 CFR Part 141

1. Consumer Confidence Report (40 CFR Part 141, Subpart O)

All CWSs are required by SDWA to provide their customers with an annual Consumer Confidence Report (CCR), a drinking water quality report that summarizes the state of their drinking water supply. The CCR must include information about the water system, sources of water, detected contaminants including lead, compliance with drinking water rules including the lead and copper rules, as well as other information. CCR requirements are described in the CCR Rule (40 CFR part 141, subpart O) which is part of the 1996 Right to Know provisions of

SDWA. On April 5, 2023, EPA published a Notice of Proposed Rulemaking to strengthen the CCR Rule (88 FR 20092, USEPA, 2023n). The CCR is currently an annual report; however, the Proposed CCR Rule Revisions include a proposed requirement for water systems serving more than 10,000 people to provide the report biannually. The Proposed CCR Rule Revisions include updates to make the CCR more accessible to consumers, among other improvements to the report. With the LCRI, EPA is proposing to revise the lead and copper related requirements of the CCR to further enhance risk communication and provide additional information about sampling in schools and child care facilities and the service line replacement plan.

Lead informational statement

All CWSs are required to include in their CCRs a short informational statement about lead in drinking water. This statement is intended to help ensure that all vulnerable populations or their caregivers receive information at least once a year on how to reduce their risk of exposure to lead in drinking water. The LCRR requires CWSs to include the following informational statement about lead in their CCR:

> *Lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. [NAME OF UTILITY] is responsible for providing high quality drinking water and removing lead pipes, but cannot control the variety of materials used in plumbing components in your home. You share the responsibility for protecting yourself and your family from the lead in your home plumbing. You can take responsibility by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Before drinking tap water, flush your pipes for several minutes by running your tap, taking a shower, doing laundry or a load of dishes. You can also use a filter certified by an American National Standards Institute accredited*

certifier to reduce lead in drinking water. If you are concerned about lead in your water and wish to have your water tested, contact [NAME OF UTILITY and CONTACT INFORMATION]. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at https://www.epa.gov/safewater/lead.

EPA is proposing to revise the statement to provide information about the risks of lead to all age groups, include additional measures consumers can take to reduce exposure to lead in drinking water, include new language recommending flushing for water used in cooking and formula feeding, emphasize proper use of filters, and simplify language. EPA is proposing the following revised informational statement about lead and has underlined the additions to illustrate changes from the LCRR text:

Lead can cause serious health effects in people of all ages, especially pregnant people, infants (both formula-fed and breastfed), and young children. Lead in drinking water is primarily from materials and parts used in service lines and home plumbing. [NAME OF UTILITY] is responsible for providing high quality drinking water and removing lead pipes, but cannot control the variety of materials used in the plumbing in your home. You can help protect yourself and your family by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Using a filter, certified by an American National Standards Institute accredited certifier to reduce lead, is effective in reducing lead exposures. Follow the instructions provided with the filter to ensure the filter is used properly. Use only cold water for drinking, cooking, and making baby formula. Boiling water does not remove lead from water. Before using tap water for drinking, cooking, or making baby formula, flush your pipes for several minutes. You can do this by running your tap, taking a shower, doing laundry or a load of dishes. If you have a lead service line or galvanized requirement replacement service line you may

<u>need to flush your pipes for a longer period.</u> If you are concerned about lead in your water and wish to have your water tested, contact [NAME OF UTILITY and CONTACT INFORMATION]. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at https://www.epa.gov/safewater/lead.

During the public meetings on environmental justice considerations for the proposed LCRI (USEPA, 2023h; USEPA, 2023i) and in written public comments submitted to the LCRI docket (Docket ID EPA-HQ-OW-2022-0801), EPA heard support for including information about the risks of lead to all age groups, instructions for flushing the tap prior to drinking or cooking to reduce lead levels as a result of stagnation in contact with lead sources, recommendations on the use of filters, and additional measures consumers can take to prevent lead exposure. Additionally, stakeholders have expressed concern that some consumers may lack the financial resources to replace leaded materials. EPA is reframing the language to provide steps that consumers can take to reduce the risk of lead exposure and help protect themselves and their family, rather than implying that they can take responsibility for controlling lead in their drinking water. EPA is also proposing to revise the statement to include additional steps consumers can take to reduce their exposure to lead in drinking water, such as using only cold water for drinking, cooking, and preparing baby formula. In addition, EPA is proposing to recommend that consumers refer to the instructions provided with their filter to ensure it is used properly. EPA has also heard concerns, in written comments submitted on the proposed CCR Rule Revisions (Docket ID EPA–HQ–OW–2022–0260), that homes with lead service lines may need to run the water for a longer period of time. In response, EPA is proposing to add new language noting that consumers served by lead or galvanized requiring replacement service lines may need to flush their pipes for longer periods.

Mandatory lead health effects language

Under the current CCR Rule, CWSs are required to include in the CCR the mandatory lead or copper health effects language listed in Appendix A to Subpart O of Part 141 when they fail to take one or more actions prescribed by §§ 141.80(d), 141.81, 141.82, 141.83 or 141.84. EPA is proposing to require CWSs to include the mandatory lead or copper health effects language when they fail to take one or more actions prescribed by §§ 141.80 through 141.93. This would expand the requirement to apply to more situations, such as failing to meet the public education requirements in § 141.85 or requirements for sampling in schools and child care facilities under § 141.93, so that consumers are more informed of the health effects of lead and copper.

Under the LCRR, the mandatory lead health effects language required in the CCR is also required to be included in lead public education and public notification (see section V.H.). The current mandatory lead health effects language is as follows:

Exposure to lead in drinking water can cause serious health effects in all age groups. Infants and children can have decreases in IQ and attention span. Lead exposure can lead to new learning and behavior problems or exacerbate existing learning and behavior problems. The children of women who are exposed to lead before or during pregnancy can have increased risk of these adverse health effects. Adults can have increased risks of heart disease, high blood pressure, kidney or nervous system problems.

EPA is proposing to revise the mandatory lead health effects language that is required in public education, public notification, and the CCR, as described in section V.H.5. and as follows. Additions are underlined to illustrate changes from the current text:

<u>There is no safe level of lead in drinking water.</u> Exposure to lead in drinking water can cause serious health effects in all age groups<u>, especially pregnant people, infants (both formula-fed and breastfed), and young children. Some of the health effects to infants and</u>

children include decreases in IQ and attention span. Lead exposure can also result in new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more information about your risks.

See section V.H.5. of this document for more information about the proposed revised mandatory lead health effects language.

Other requirements

Under the LCRR, water systems are not required to include information about sampling for lead in schools and child care facilities in the CCR. EPA is proposing to require that water systems include in the CCR a statement that the water system is required to sample for lead in schools and licensed child care facilities as requested by the facility, in accordance with §141.92 of the proposed LCRI, to encourage relevant members of the public to contact their school or child care facility for further information about potential sampling results. During the LCRR review, EPA heard concerns about the lack of a reporting requirement to publicly share results from sampling in schools and child care facilities (86 FR 71574, USEPA, 2021b). EPA does not have the authority under SDWA to require schools and child care facilities to share the results as part of an NPDWR, including the proposed LCRI. To address this feedback, the Agency is proposing to require an informational statement in the CCR that would help ensure that consumers are aware of the school and child care sampling requirements and that they can reach out to the school or child care facility about any potential sampling results. EPA is requesting comment from the public on this proposed requirement (see section IX. of this document). See section V.J. of this document for more information about lead sampling at schools and child care facilities.

Under the LCRR, water systems are required to include information about their service line inventory in the CCR; however, they are not required to include information about service line replacement. As stated in section V.B.7. of this document, EPA is proposing for the LCRI to require water systems to make the service line replacement plan publicly available. Furthermore, EPA is proposing to require that water systems with lead, galvanized requiring replacement, or lead status unknown service lines in their inventory include in the CCR information on how to obtain a copy of the service line replacement plan or for systems serving more than 50,000 people, how to view the plan on the internet. Including information about how to access the plan in the CCR would further increase transparency about the service line replacement process, accessibility of the plan, and consumer awareness about service line replacement in their community.

2. Public Notification Rule (40 CFR Part 141, Subpart Q)

EPA promulgated a Public Notification Rule in 40 CFR part 141, subpart Q in 2000 (65 FR 26035, USEPA, 2000b). This Public Notification Rule implements section 1414(c)(1) and (2) of SDWA. That rule requires water systems to provide public notification of any failure of the water system to comply with a maximum contaminant level, a prescribed treatment technique, or failure to perform required water quality monitoring, or testing procedures; if the system has been granted a variance or exemption, if the system has failed to comply with the requirements of any schedule set under a variance or exemption; and certain specified situations such as the occurrence of waterborne disease outbreak or emergency and the availability of unregulated monitoring data (see § 141.201, Table 1).

In 2016, Congress amended sections 1414(c)(1) and (2) of SDWA, in the WIIN Act to require EPA's implementing regulations to "specify notification procedures for" public notice no later than 24 hours after the water system learns of each exceedance of the action level for lead prescribed under § 141.80(c) of 40 CFR part 141, "or a prescribed level of lead that the Administrator establishes for public education or notification in a successor regulation promulgated pursuant to section 1412" if the exceedance "has the potential to have serious adverse effects on human health as a result of short term exposure" (42 U.S.C. 300g-3(c)((1)((D) and (c)(2)((C)). In the LCRR rulemaking, EPA determined that "such exceedances [of the lead action level] have the potential to have serious adverse health effects on human health as a result of short-term exposure" and therefore warranted the same treatment as other situations currently categorized as Tier 1 violations subject to the 24-hour notification requirements (86 FR 4239-4240, USEPA, 2021a). Under the LCRR, CWSs and NTNCWSs with a lead action level exceedance must provide public notice to persons served by the system within 24 hours of learning of the action level exceedance; that is, within 24 hours of the system receiving and calculating the 90th percentile value, or after the data is submitted to the State and the State calculates the 90th percentile. The notice must be in a form and manner reasonably calculated to reach all persons served, as described in the Public Notification Rule (§ 141.202(c)). A copy of the notice must also be sent to both the State and the EPA Administrator in accordance with the requirements of § 141.31(d). This notice to the Administrator for a lead action level exceedance is needed because section 1414(c)(2)(iii) of SDWA was amended by the WIIN Act to require that such notifications be provided to the Administrator in addition to the State to allow EPA to identify whether the Agency must provide notice where required in section 1414(c)(2)(D), which was also added to SDWA by the WIIN Act. It provides that if a State with primacy enforcement responsibility or the water system has not issued a notice for an action level exceedance that has the potential to have serious adverse effects as a result of short-term exposure, the Administrator is required to issue the notice. Because EPA does not have any obligation to issue a Tier 1 public notice for violations of other drinking water standards in States with primacy, there is no need for EPA to be notified in those other Tier 1 situations.

In addition to lead action level exceedances, there are violations that also require public notification for both lead and copper (see Appendix A to Subpart Q of Part 141 of the CFR). Tier 2 public notification is required for a treatment technique violation for both lead and copper no later than 30 days after the system learns of the violation. This includes violations to § 141.80 through § 141.84 which describe compliance dates of the rule, the action level, CCT, source water treatment, and service line inventory and replacement requirements; however, § 141.80(c) which describes exceedances of the lead action level is excluded from the Tier 2 public notification requirements since lead action level exceedances require Tier 1 public notification. Tier 2 public notification is also required for violations to § 141.85(a) through (c) and (h) which concern the content of public education materials and inclusion of information for non-English speaking consumers, delivery of public education after a lead action level exceedance, supplemental monitoring for lead when there is a systemwide lead action level exceedance, and outreach activities for community water systems that fail to meet the LSLR goal. In addition, Tier 2 public notification is required for violations to § 141.93 which describes flexibilities for small water systems to comply with the rule.

As described in section V.H.3. of this document, EPA is proposing to require notification of supplemental monitoring for lead under § 141.85(c)(3); EPA is proposing to exclude this from the Tier 2 public notification requirements as this pertains to notification of supplemental sampling conducted at individual tap sampling sites, rather than systemwide. In addition, as discussed in section V.H.2. of this document, EPA is proposing to revise § 141.85(h) to require outreach activities for systems that fail to meet the average annual replacement rate, instead of the goal LSLR rate as required under the LCRR. Violations to this proposed requirement would require Tier 2 public notification under the proposed LCRI. EPA is also proposing to require Tier 2 public notification for violations to the proposed additional public education and filter requirements for water systems with multiple lead action level exceedances under § 141.85(j). See section V.H. of this document for more information about the proposed public education requirements. Tier 3 public notification is required for monitoring and testing procedure violations for both lead and copper no later than one year after the system learns of the violation or begins operating under a variance or exemption. These include violations to § 141.86 through § 141.90 of the LCRR and proposed LCRI. EPA is also proposing to require Tier 3 public notification for violations to § 141.92; as with violations to other monitoring and testing requirements, EPA believes that the public should be notified when water systems fail to conduct required sampling in schools and child care facilities.

In the LCRI, EPA is not proposing to prescribe a level of lead for public education or public notification that is different from the lead action level in § 141.80(c). Nor is EPA proposing to change the conclusion made during the LCRR rulemaking that a lead action level exceedance has the potential to have a serious adverse effect on human health as a result of short-term exposure. Therefore, as required in section 1414(c)(2)(C) of SDWA, a lead action level exceedance will continue to trigger the requirement for Tier 1 public notification of a lead action level exceedance. During the LCRR review (see written comments and summaries of LCRR engagements, Docket ID EPA-HQ-OW-2021-0255) and Federalism consultation for the proposed LCRI (USEPA, 2023j), EPA received feedback on the requirement for 24-hour Tier 1 public notification of a lead action level exceedance expressing both support and opposition for this requirement. Many stakeholders expressed concern about the ability of water systems to distribute public notices within 24 hours of the system learning of the action level exceedance (USEPA, 2023j; Docket ID EPA-HQ-OW-2021-0255; Docket ID EPA-HQ-OW-2017-0300). Many stakeholders questioned whether lead could have serious adverse health effects from short-term exposure (Docket ID EPA-HQ-OW-2021-0255). As stated in the final LCRR notice, EPA has concluded that lead action level exceedances have the potential to have serious adverse effects on human health as a result of short-term exposure (86 FR 4239-40, USEPA, 2021a). SDWA mandates that notice in such a situation be distributed “as soon as practicable, but not later than 24 hours after the public water system learns of the violation or exceedance”. The feasibility analysis EPA conducts in establishing a NPDWR is not a prerequisite to implementation of this statutory mandate. Moreover, EPA notes that water systems have been complying with the Tier 1 24-hour notice requirement for other situations besides a lead action level exceedance since the May 6, 2002, compliance date of the Public Notification Rule, and therefore should also be able to do so for lead action level exceedances.

Because EPA is not proposing to prescribe a level of lead for public education or public notification that is different from the lead action level in § 141.80(c), EPA is updating the action level for lead listed in appendix A to subpart Q of part 141 to conform with the Agency’s proposed lead action level of 0.010 mg/L (see section V.E.2. of this document for more information about the proposed action level). EPA is retaining the October 16, 2024, compliance date for this provision. Beginning on that date, systems must comply with the Tier 1 PN requirement for a lead action level of 0.015 mg/L, and beginning on the final LCRI compliance date, they would comply with the revised lead action level of 0.010 mg/L (see section VII.A. of this document).

EPA is also proposing to make conforming changes to the Public Notification Rule as a result of changes EPA is proposing to make in the LCRI and the CCR related to the standard health effects language for lead in appendix B to subpart Q of part 141, to be consistent with the proposed revised lead health effects language required in public education and the CCR. See section V.H.5. of this document for more information about the proposed revised mandatory lead health effects language.

3. Definitions

In accordance with EPA's goal identified in the LCRR review notice to simplify the LCRI, EPA is proposing new definitions to conform with new proposed requirements under LCRI, as well as updating the definitions for some existing terms in LCRR to clarify them. EPA's proposed new and updated definitions for LCRI are as follows:

Action level. EPA is proposing to revise this definition so that the lead action level conforms with the proposed new lead action level of 0.010 mg/L.

Child care facility. EPA is proposing to make minor clarifications that specify the definition applies to Subpart I only and that the licenses for child care facilities must come from a State, local, or Tribal licensing agency.

Connector. EPA is proposing to revise this definition in several ways. EPA is proposing to streamline the definition to only include the word "connector" and not "goosenecks, pigtails, and connectors" because throughout the regulatory text, EPA refers to these pipes as "connectors." The definition notes that connectors are also referred to as "goosenecks" and "pigtails." EPA is also clarifying that connectors typically connect the service line to the main. EPA is also proposing that the definition for a connector states the short segment of piping does not exceed two feet.

During the LCRI engagements, some stakeholders recommended that lead connectors be added to the LSL definition, noting that separating the definitions for lead connectors and LSLs could prevent connectors from being replaced under the service line replacement program, and that consumers would not receive the same notification that they are served by a lead connector as if they were served by an LSL. EPA is proposing to keep the lead connector and LSL definitions separate because EPA views the connector and service line as distinct components. Adding connectors to the definition for LSL, such that a connector would be considered a service line under LCRI, could create confusion, which is counter to EPA's goal of simplifying the rule. Instead, EPA is proposing to keep the definitions separate and be clear about which proposed requirements apply to service lines, and which apply to connectors. For what EPA is specifically proposing with respect to connectors, please see section V.D.4. of this document.

Some stakeholders requested additional guidance on the LCRR definition of "gooseneck, pigtail, or connector," which included the phrase "typically not exceeding two feet" (USEPA, 2023j). These stakeholders said that that they are aware of lead connectors that are 10 feet in length or longer and recommended that EPA define a maximum connector length and remove the word "typically" when referring to their length in the definition (USEPA, 2023j). EPA is proposing to change the definition of "gooseneck, pigtail, or connector" to exclude any connector that exceeds two feet because EPA is not aware of anything longer than two-feet that meets the other aspects of the definition—"*short* section of piping which can be bent and *used for connections* between rigid service piping." 40 CFR 141.2 (Emphasis added.) Moreover, the primary function of piping longer than two feet is more akin to a service line than "short" piping that "can be bent and used for connections between rigid service piping." In addition, the contributions of lead into drinking water from something longer than two feet is expected to be closer to that of an LSL. Additionally, the materials that make up piping longer than two feet could potentially be identified for purposes of the inventory through similar techniques as service lines, such as potholing, given that longer connectors may extend beyond the street pavement. Therefore, EPA is proposing to regulate connectors greater than two feet in length the same way as service lines by narrowing the definition of connector. EPA is requesting comment on EPA's rationale for these changes and whether two feet is the appropriate maximum length for a lead connector (see section IX. of this document).

Distribution system and site assessment. EPA is proposing to rename the LCRR's "find-and-fix" requirement to better align with the underlying requirements of the provision. The proposed requirements apply in a narrow set of circumstances, and they do not require water systems to either "find" the cause of a lead action level exceedance or "fix" all causes found. Since promulgating the LCRR, EPA has noticed that the phrase "find-and-fix" has caused significant confusion among States, water systems, other stakeholders, and the public. The new, proposed name, distribution system and site assessment, more clearly explains what the proposed requirement for systems entails: assessing potential reasons at the system- and site-level why a lead sample tested above the lead action level. EPA is also proposing to update the definition to include the proposed revised lead action level of 0.010 mg/L.

Find-and-fix. EPA is proposing to remove the definition of "find-and-fix" given the proposed revised name of the requirement. See the proposed definition of "distribution system and site assessment."

Full service line replacement. EPA is proposing to remove the definition of "full lead service line replacement" from 141.2 and instead, specify what constitutes a full service line replacement under the mandatory replacement program within the regulatory requirements in 141.84(d)(6)(iii). By moving the substantive requirements for service line replacement out of the definition section in subpart A of part 141 and including them with the other substantive requirements of the LCRI in Subpart I of Part 141, the LCRI would be easier to understand and implement.

Galvanized requiring replacement. The LCRR includes a definition of "galvanized service line" in § 141.2 and the LCRR definition of lead service line in § 141.2 provides that "a galvanized service line is considered a lead service line if it ever was or is currently downstream of any lead service line or service line of unknown material" The definition of LSL also provided that "if the only lead piping serving the home is a lead gooseneck, pigtail, or connector, and it is not a galvanized service line that is considered a lead service line, the service line is not a lead service line." Thus, within the definition of "lead service line" EPA essentially defined a GRR service line. In contrast, a GRR service line is defined without reference to connectors in the inventory requirements in § 141.84(a). This discrepancy has caused confusion. Accordingly, EPA is proposing to add a definition of GRR service lines in § 141.2, and to reference this same definition within the inventory section. This would streamline the LSL definition by removing information about GRR service lines from the LSL definition. During the proposed LCRI external engagements, EPA heard requests from a range of stakeholders for more clarity regarding the definition of GRR service lines. EPA expects the new revised proposed definition would be clearer, especially in tandem with the proposed definition of connectors that provides that connectors are not part of the service line to make the definition for service line clearer as well.

Gooseneck, pigtail, or connector. EPA is proposing to remove the definition of "gooseneck, pigtail, or connector" and replace it with a definition for "connector," which is described above.

Lead service line. EPA is proposing to simplify the definition of a LSL, moving portions of the text to the regulatory requirements under § 141.84 and to the proposed definition of "service line." During the LCRI engagements, EPA heard the definition was confusing and cumbersome. EPA expects this new definition would be clearer.

Lead status unknown service line. EPA is proposing to revise the definition of "lead status unknown service line" to specify that the definition applies "for the purpose of subpart I of this part only" and to simplify the definition by stating that it is any line not demonstrated to be an LSL, GRR service line, or non-lead pursuant to § 141.84.

Newly regulated public water system. EPA is proposing to add a definition of "newly regulated public water system" because of the new proposed revision under § 141.84 which applies to the requirements of these systems to develop baseline inventories.

Partial lead service line replacement. EPA is proposing to eliminate the definition of "partial lead service line replacement" and replace it with the proposed definition of "partial service line replacement."

Partial service line replacement. EPA is proposing to add a definition of "partial service line replacement" which specifies that the definition applies "for the purpose of subpart I of this part only." The definition also expands the LCRR definition of "partial lead service line replacement" to include partial replacement of GRR service lines, in addition to LSLs. The definition also removes the text describing where partials are permitted and that they don't count towards the LCRR replacement rates, as the proposed LCRI includes these provisions in § 141.84.

Trigger level. EPA is proposing to remove the definition of "trigger level" because the of the proposed elimination of the trigger level.

Service line. EPA is proposing to create a definition for "service line" to clarify proposed requirements under LCRI, especially the proposed requirement that systems create an inventory "that identifies the materials and location of each service line connected to the public water distribution system."

Small water system. EPA is proposing to correct an error from LCRR to define small water systems as those serving 10,000 persons or fewer. EPA is specifying that this definition applies to Subpart I, only.

Tap monitoring period. EPA is proposing to add a definition of "tap monitoring period" to specify the period of time during which each water system must conduct lead or copper tap sampling, which can range from six months to nine years.

Tap sample monitoring period. EPA is proposing to remove the definition of "tap sampling monitoring period" and replace it with the term "tap monitoring period." The revision removes the regulatory provisions contained within the definition of "tap sample monitoring period," as the proposed provisions are now included in § 141.86.

Tap sampling period. EPA is proposing to revise the definition of "tap sampling period" to remove the regulatory provisions that were included in the definition. This revision simplifies the definition, as the proposed provisions are now included in § 141.86.

Wide-mouth bottle. In LCRR, EPA added a definition for wide-mouth bottle that requires bottles to be configured with a mouth that is at least 55 millimeters (mm) wide and one liter in size. EPA is proposing to modify the definition of wide-mouth bottle to explicitly state that 55 mm is the outer diameter measurement of the bottle. Since the promulgation of the LCRR, EPA has received several questions about this requirement and whether the width is based on the interior or exterior/cap size of a bottle, as there are few types of bottles that have a 55 mm inner diameter (USEPA, 2023m). EPA anticipates this revised definition would be clearer and provide systems with more options to accurately implement the relevant LCRI requirements.

EPA is also proposing minor revisions to select definitions. EPA is proposing to a minor revision to the definition of "elementary school" for clarity by changing the word "purposes" to "purpose." EPA is proposing to revise the definition of "galvanized service line" to clarify that the definition is intended to apply “for the purpose of subpart I of this part” only. EPA is proposing a grammatical correction to the definition of “pitcher filter” to remove an unnecessary comma. EPA is proposing a clarification to the definition of “secondary school” to include the grades which typically encompass secondary schools. EPA is proposing to eliminate the definition of “medium-sized water system” and replace it with an identical definition under “medium water system” for consistency in how the different system size categories are referred to. EPA is proposing a grammatical correction to the definition of “optimal corrosion control treatment” to change the word “insuring” to “ensuring.” EPA is proposing to revise the definition of “tap sampling protocol” to refer to the protocol required by the rule itself rather than the instructions provided to residents to conduct sampling, as residents may not conduct sampling. EPA is proposing to revise the definition of a “system without corrosion control treatment” to specify that the definition applies “for the purpose of subpart I of this part.” EPA is seeking comment on all aspects of the proposed definitions.

VI. Rule Areas for which EPA is not Proposing Revisions

EPA is not proposing revisions to the following sections: 40 CFR 141.83 Source water treatment requirements, § 141.88 Monitoring requirements for lead and copper in source water, and § 141.89 Analytical methods. The provisions in these sections are not affected by any of the changes EPA is proposing to other sections as part of this rule.

VII. Rule Implementation and Enforcement

EPA is proposing requirements that would improve oversight and enforcement of the NPDWR for lead and copper, including eliminating the trigger level, enhanced sampling for detecting corrosion control issues in LSL systems, simplifying small system flexibility, streamlining public education following elevated lead measurements, and increased reporting by both systems and States. EPA also provides applicable guidance and tools on CCT, PE, and other aspects of the rule on the Agency's website at https://www.epa.gov/dwreginfo/water-system-implementation-resources to support implementation of the LCR and the LCRR and will continue to use this website to aid implementation of revisions finalized as a result of this proposed rule.

A. What are the Rule Compliance Dates?

Section 1412(b)(10) of SDWA provides that promulgated NPDWRs shall take effect three years after the NPDWR is promulgated "unless the Administrator determines that an earlier date is practicable." EPA is proposing compliance dates for a final LCRI and seeking comment on whether it would be practicable for water systems to implement any of the proposed LCRI requirements earlier than three years from the date of final action on the proposed LCRI (see section IX. of this document). Additionally, the Agency is proposing to replace LCRR requirements with the LCRI and is describing in this section which requirements water systems will be required to follow between the current October 16, 2024 LCRR compliance date and the LCRI compliance dates.

On June 16, 2021, EPA issued a final rule delaying the LCRR compliance date from January 1, 2024 to October 16, 2024 during which time water systems must continue to comply with the provisions of the LCR (40 CFR 141.80 through 141.91, as codified on July 1, 2020) (86 FR 31939, USEPA, 2021e) and work towards compliance with the October 16, 2024 deadline for the service line inventory. While EPA expects to promulgate the final LCRI prior to October 16, 2024, the Agency also acknowledged that the announcement of the proposed LCRI "creates some uncertainty for water systems and States regarding the deadline and completion" of required actions under LCRR, including the LSLR and tap sampling plans (86 FR 71580, USEPA, 2021b). In the LCRR review notice published on December 17, 2021, the Agency stated its intention to propose revisions to the LCRR compliance deadlines "only for components of the rule that the Agency will propose to significantly revise" (86 FR 71580, USEPA, 2021b). Some stakeholders have requested that EPA further delay the LCRR compliance date for items the Agency is proposing to revise in LCRI. For example, some States believe it will be difficult for them to review all the required plans at the same time and asked that EPA consider staggering various rule deadlines. Another stakeholder indicated that EPA should require compliance with the LCRI requirements beginning no earlier than January 2026. However, other stakeholders have previously cited concerns that delaying implementation of LCRR may delay public health protection (86 FR 31943, USEPA, 2021e; *State of Arizona et al., v. EPA,* 77 4th 1126 (D.C. Cir. 2023) (dismissing petition for review of EPA's rule to delay the LCRR compliance date)). For a discussion on how the proposed compliance dates in this section address public health protection see section IV.E.

Proposed LCRI Compliance Dates

For the LCRI, EPA is proposing a compliance date of three years after promulgation of a final rule and is proposing that systems continue to comply with the LCR until that date, with the exception of the LCRR initial LSL inventory, notification of service line material, associated reporting requirements, and the requirement for Tier 1 public notification for a lead action level exceedance under subpart Q. This would provide the amount of time necessary for States to work with water systems to prepare to comply with the final LCRI requirements, which include revisions to most of the provisions of LCRR. EPA is proposing a direct transition from the LCR to the LCRI for all rule provisions with the above exceptions, so that States and water systems could focus their resources on preparing and updating service line inventories and conducting Tier 1 public notifications following lead action level exceedances, in addition to preparing for LCRI requirements, such as preparing their service line replacement plan. Water systems would not be required to comply with the other requirements of the LCRR between October 16, 2024 and the LCRI compliance date.

EPA is proposing for water systems to continue to comply with the LCR until the LCRI compliance dates, with the above exceptions, because of the significant level of effort required of water systems to plan for compliance with the LCRI, coupled with the complexity of the LCRR. Additionally, EPA is proposing significant changes in the LCRI relative to the LCRR, many of which would render various LCRR requirements obsolete in a few years. Specifically, EPA is proposing to eliminate the trigger level and the many associated rule requirements that are required after a trigger level exceedance, including reporting requirements to the States that could require significant resources. Many of the rule requirements in LCRR are so interrelated that changes in one rule area impacts other areas. For example, the various actions water systems are required to take are based on a system's 90th percentile lead level. In LCRR, provisions for CCT are based on system size; CCT and LSL status; and if the system is above, below, or between different thresholds (e.g., lead PQL, lead trigger level, lead action level). In the proposed LCRI, these compliance pathways would be simplified by the proposed elimination of the lead trigger level, but also required additional proposed changes to the CCT provisions. Likewise, the LCR requires first-liter sampling at all sites while the LCRR requires fifth-liter sampling at LSL sites. The proposed LCRI would require the highest of the first and fifth liter at LSL sites. Changing from 90th percentile values based on a sampling approach with which systems have years of experience (the LCR), to a few years of a different approach (the LCRR), before changing again to the approach proposed in the LCRI, would likely cause confusion for systems and the public, and lead to wasted resources (e.g., developing sampling instructions, sampling plans, outreach materials).

Another challenge is that the LCRR small system flexibility provision in § 141.93 allows systems serving 10,000 people or fewer to choose between the LSLR provisions or CCT provisions, which otherwise are specific to systems serving more than 10,000 people. Without the small system flexibility provision, there would be no requirements for small systems to conduct LSLR or CCT. Therefore, any changes to those sections must be considered together. Compliance with one component of the rule without compliance with other related components would cause confusion and could produce inconsistencies across different requirements.

Additionally, in one of the key features of the rule, EPA is proposing in the LCRI for all water systems to identify and replace all LSLs and GRR service lines as quickly as feasible, regardless of lead levels. In response to the historic funding provided under the Bipartisan Infrastructure Law, some systems are voluntarily initiating service line replacement programs. However, despite this progress by some systems, many other systems have not or are not conducting service line replacement. Many systems have not been required to replace LSLs due to an action level exceedance under the LCR and may not have experience developing replacement programs. EPA has received feedback from water systems about the potential challenges of implementing replacement programs including availability of equipment and supplies, difficulties in securing funding, and hiring crews to complete replacements. EPA is working with States and water systems to demonstrate best practices for overcoming or mitigating these challenges through the Lead Service Line Replacement Accelerator initiative (USEPA, 2023e) and other technical assistance programs. By focusing States' and systems' efforts on standing up these service line replacement programs rather than implementing LCRR provisions that will be changed or eliminated, the rule will result in systems removing more LSLs and GRR service lines, which, where present, are the most significant source of drinking water lead exposure. While the LCRI would not wholly eliminate the challenges of large scale, nation-wide service line replacement, EPA anticipates that systems would better use the three-year period after promulgation of a final LCRI for program planning, including hiring additional staff, soliciting bids for contractors, securing grants or other types of funding, and continuing to improve inventories to ensure that they are better positioned to conduct mandatory service line replacement. It would also provide time for the market to correct for potential shortages in resources or workers. Because of the significant level of effort required of water systems to plan for compliance with the LCRI, coupled with the complexity of the LCRR, EPA is proposing to require water systems to continue to comply with the LCR prior to the LCRI compliance deadline, with the few exceptions noted above and further discussed below. EPA also anticipates that requiring systems to simultaneously comply with LCRR while preparing for LCRI could result in delays in achieving the public health protections that will result from the proposed LCRI requirements (see section IV.E.).

LCRR Requirements and Compliance Dates that Will Be Retained

EPA is retaining the compliance date of October 16, 2024, for systems to complete their initial service line inventories and to notify customers about their service line material within 30 days of completion of the inventory. Water systems and States are aware of and should be prepared to meet this deadline in light of EPA's August 2022 issuance of *Guidance for Developing and Maintaining a Service Line Inventory* guidance and EPA's December 17, 2021 *Federal Register* document on the conclusion of EPA's review of the LCRR (86 FR 71574, 71579, USEPA, 2021b).

Inventories help systems identify the location of LSLs and GRR service lines. Inventories are critical to support lead reduction efforts because they will allow customers to know if they are served by a LSL or GRR service line, as well as evaluate the extent of these lead sources in their drinking water system as a whole. With the inventory, water systems will be able to notify all persons served by lead, GRR, and unknown service lines and provide them with information on steps they can take to reduce their lead exposure. Additionally, the inventory is integral to help water systems take actions that will facilitate compliance with the LCRI: identify sampling locations, determine the extent of LSLs and GRR service lines within their systems, and begin planning for service line replacement, including applying for grants and loans.

EPA is also retaining the October 16, 2024, compliance date for Tier 1 PN following a lead action level exceedance. This requirement, which is a revision of EPA's Public Notification Rule in 40 CFR part 141, subpart Q was established in the same rulemaking as the revisions to the LCR in 40 CFR part 141, subpart I (i.e., the LCRR), consistent with SDWA section 1414(c) as amended by the WIIN Act, based on EPA's determination that a lead action level exceedance has the potential to have serious human health effects as a result of short-term exposures (86 FR 4240, USEPA, 2021a). EPA is not proposing any changes to this requirement in the Public Notification Rule and the Agency does not anticipate that additional time would be needed for water systems to comply with this requirement given that systems must already conduct Tier 1 PN for other contaminants. EPA notes that, between October 16, 2024, and the LCRI compliance date, systems will be required to conduct this Tier 1 PN following an exceedance of the lead action level of 0.015 mg/L established under the LCR.

Alternative Proposed Compliance Dates

EPA is seeking comment from the public about its proposed compliance dates for various rule requirements, including whether it is practicable for water systems to implement any of the proposed LCRI requirements sooner than three years from the date LCRI would be finalized. In particular, EPA is seeking comment on whether it is practicable for water systems to implement notification and risk mitigation provisions after full and partial service line replacement (§ 141.84(h)), notification of a service line disturbance (§ 141.85(g)), and associated reporting requirements (§141.90(e)(6) and (f)(6)) upon the effective date of the LCRI. These provisions were introduced in the LCRR and have been revised in the LCRI to improve clarity (see sections V.B.6. and V.H.2. of this document). EPA introduced risk mitigation requirements to reduce consumer lead exposure because lead levels can temporarily increase after service line replacement and some disturbances. Although the Agency is concerned about systems implementing most provisions of LCRR while preparing to implement LCRI, EPA also anticipates that systems will continue to improve inventories, including identifying unknowns, and may conduct service line replacement either voluntarily or per regulation prior to the LCRI compliance date. EPA expects that earlier implementation of these provisions would reduce lead exposure for the subset of consumers affected by these activities. Therefore, EPA is seeking information, analyses, and comments on whether systems are capable of implementing these risk mitigation provisions sooner than the other LCRI requirements (see section IX. of this document). EPA is also seeking comment on whether earlier alternative compliance dates for LCRI requirements are practicable such that water systems transition directly from LCR to LCRI in less than three years (i.e., one or two years) based on the assumption that water systems would comply with the LCR until the LCRI compliance date (see section IX. of this document). Exhibit 6 below illustrate these alternative compliance dates.

Exhibit 6. Proposed Alternative Compliance Dates

Proposed Alternative Compliance Dates	Requirement
Effective date of the LCRI	Risk mitigation after full and partial service line replacement and service line disturbance (§§ 141.84(h), 141.85(g), 141.90(e)(6) and (f)(6))
One or two years after rule promulgation (January 2026)	All other LCRI provisions except for § 141.84(d).
Three years after rule promulgation (January 2028)	LCRI service line replacement (§ 141.84(d)).

EPA is also requesting comment on whether there are other LCRR provisions for which the October 16, 2024, compliance date should be retained. Under either of these scenarios, water systems would need to comply with some mix of the LCR and the LCRR while preparing to comply with the LCRI requirements three years (or earlier) after promulgation. EPA expects that piecemeal implementation of the treatment technique requirements for service line replacement, CCT, and public education would create a significant implementation challenge for most, if not all water systems, especially because of the interrelationship between the treatment techniques, and the role of the action and trigger levels in requiring systems to take corrective actions and provide additional public education. As a result, in assessing the impact of this approach, EPA would need to account for the strong possibility that there would be widespread non-compliance as a result of that implementation challenge. EPA seeks comments on these concerns and any ways EPA could address them if the Agency were to finalize one of these alternative approaches for compliance with the LCRR and the LCRI (see section IX. of this document).

B. What are the Requirements for Primacy?

SDWA authorizes EPA to regulate PWSs and promulgate NPDWRs that limit contaminants that may harm public health (SDWA section 1412). States may also regulate PWSs under SDWA by assuming primacy enforcement (or primacy) for PWSs in their jurisdictions (SDWA section 1413). PWSs in these Primacy States must then comply with both sets of State and Federal regulations. Generally, Primacy States monitor compliance with regulations; however, EPA can also take enforcement actions against water systems for failure to comply with NPDWRs. EPA conducts annual reviews of State programs and can also withdraw primacy (see 40 CFR 142.17).

This section also describes the regulations, procedures and, policies that primacy entities must adopt, or have in place, to implement the LCRI, when it is final. States, Territories, and

Tribes must continue to meet all other conditions of primacy in 40 CFR part 142. Section 1413 of SDWA establishes requirements that primacy entities (States or Indian Tribes) must meet to maintain primary enforcement responsibility (primacy) for its PWSs. These include: (1) adopting drinking water regulations that are no less stringent than Federal NPDWRs in effect under sections 1412(a) and 1412(b) of SDWA; (2) adopting and implementing adequate procedures for enforcement; (3) keeping records and making reports available on activities that EPA requires by regulation; (4) issuing variances and exemptions (if allowed by the State) under conditions no less stringent than allowed by SDWA sections 1415 and 1416; and (5) adopting and being capable of implementing an adequate plan for the provision of safe drinking water under emergency situations. 40 CFR part 142 sets out the specific program implementation requirements for States to obtain primacy for the Public Water Supply Supervision Program (PWSS), as authorized under SDWA section 1413.

Under 40 CFR 142.12(b), all States/territories/Tribes would be required to submit a revised program to EPA for approval within two years of promulgation of any final LCRI or request an extension of up to two years in certain circumstances. To retain primary enforcement authority for the final LCRI, States must adopt revisions at least as stringent as the proposed provisions in 40 CFR Subpart I—Control of Lead and Copper; §§ 141.153 and 141.154; §§ 141.201 and 202; Appendix A to Subpart O ([Consumer Confidence Report] Regulated contaminants); Appendix A to Subpart Q (NPDWR Violations and Other Situations Requiring Public Notice; and Appendix B to Subpart Q (Standard Health Effects Language for Public Notification).

C. What are the Special Primacy Requirements?

EPA is proposing to revise the existing special primacy requirements for the LCRR by modifying some, and establishing new, special primacy requirements for States as a condition of primacy. First, EPA is proposing to eliminate the special primacy requirement related to systems' goal-based service line replacement programs, given the proposed requirement for mandatory service line replacement in the LCRI. EPA is also proposing that States must identify any State laws, including statutes and constitutional provisions, relevant to a water system's ability to obtain access to conduct a full service line replacement and notify water systems in writing whether any such laws exist or not. Systems must provide this notification by the compliance date and within six months of the enactment of any new or revised State law that pertains to access.

Under the LCRR, States must determine if a greater mandatory lead service line replacement rate is feasible and to notify the system of its determination in writing. EPA is proposing to modify this requirement for States to determine whether a shortened service line deadline is feasible. The proposed LCRI also includes a new requirement for States to update their feasibility determination to require a shortened deadline anytime throughout the system's replacement program, such as where factors related to feasibility change and make a shortened deadline feasible. Given the proposed new inventory validation requirement, EPA is also proposing for States to establish a deadline to complete inventory validation where shortened deadlines are feasible, as these systems would be replacing LSLs in less than ten years.

EPA is also proposing modifications to special primacy requirements under the LCRR with respect to the requirement for States to set a deadline for systems to prepare an updated inventory where they find discrepancies in their inventory. The LCRR only required States to set this deadline where water systems identify an LSL that was categorized as non-lead in the inventory. In the LCRI, EPA is proposing to include GRRs because these are included in the proposed service line replacement requirements and may also be improperly identified. In addition, because EPA is proposing to include lead connectors in the inventory, and would require systems that have inventories with no lead connectors and no unknown connectors to update their inventory if a lead connector is found. Therefore, EPA is proposing to include a requirement for States to set a deadline for systems to prepare an updated inventory in these cases.

EPA is also proposing for States to describe how the State will determine if an alternative lead sampling program is as "stringent as the Federal requirements" including how the State will use the definitions of elementary schools, secondary schools, and child care facilities as defined in § 141.2 to issue waivers. EPA is proposing that States must describe how the State will review the lists of schools and child care facilities submitted by CWSs to ensure the list includes schools and child care facilities that meet the definitions of elementary school, secondary school, and child care facility in § 141.2, and that States must certify that this list of schools and child care facilities is complete. EPA received questions about the LCRR requirement for States to define schools and child care facilities. EPA is aware that which facilities meet the definition of child care facility under § 141.2 may differ among States (e.g., which facilities are licensed by the State). However, it is not the Agency's intention for States to develop new definitions for schools and child care facilities for purposes of complying with the new rule. In LCRI, EPA is proposing to clarify the "child care facility" (see section V.L.3. of this document). EPA is proposing to modify the LCRR requirement that States verify that systems have complied with follow-up requirements following a single site sampled above the action level. Under the LCRR, this requirement was part of find-and-fix. In the proposed LCRI, this requirement is relabeled as distribution system and site assessment (see section F.2. of this document).

VIII. Economic Analysis

This section summarizes the Economic Analysis (EA) supporting document (USEPA, 2023b) for the proposed LCRI, which is written in compliance with SDWA section

1412(b)(3)(C). Section 1412(b)(3)(C)(ii) of SDWA states that, when proposing an NPDWR that includes a treatment technique, the Administrator "shall publish and seek comment on an analysis of the health risk reduction benefits and costs likely to be experienced as the result of compliance with the treatment technique and the alternative treatment techniques that are being considered, taking into account, as appropriate, the factors described [under section 1412(b)(3)(C)(i)]." This analysis is commonly called the Health Risk Reduction Cost Analysis (HRRCA). SDWA section 1412(b)(3)(C)(i) lists the analytical elements of the required HRRCA as follows: (1) quantifiable and non-quantifiable health risk reduction benefits; (2) quantifiable and non-quantifiable health risk reduction benefits from reductions in co-occurring contaminants; (3) quantifiable and non-quantifiable costs that are likely to occur solely as a result of compliance; (4) incremental costs and benefits of rule options; (5) effects of the contaminant on the general population and sensitive subpopulations including infants, children, pregnant women, the elderly, and individuals with a history of serious illness; (6) any increased health risks that may occur as a result of compliance, including risks associated with co-occurring contaminants; and (7) other relevant factors such as uncertainties in the analysis and factors with respect to the degree and nature of the risk.

Based on this HRRCA analysis and pursuant to SDWA section 1412(b)(4)(C), the Administrator has determined that the estimated quantified and nonquantifiable benefits of the proposed regulation justify the quantified and nonquantifiable costs.

In this analysis, EPA assumes that the LCRI NPDWR will be promulgated in 2024. The Agency estimated the year or years in which all costs and benefit accrue over a 35-year period of analysis. The 35-year window was selected to capture costs associated with rule implementation as well as water systems conducting service line replacement and installing and operating corrosion control treatment. Note that EPA accounts for the Illinois, New Jersey, Michigan, and Rhode Island State-required service line replacement programs in the regulatory analysis baseline, so that the estimated proposed LCRI cost will not double count the service line replacement costs already required by States.

EPA annualized the estimated future streams of costs and benefits that accrue from compliance activities occurring over this same period of analysis symmetrically. EPA does not capture the effects of compliance with the proposed LCRI after the end of the period of analysis, although it does account for benefits that continue to accrue in the future from compliance activities that occur during the 35-year window. Costs and benefits are presented as annualized values in 2022 dollars. EPA determined the present value of these costs and benefits using social discount rates of three and seven percent as prescribed by the Office of Management and Budget (OMB) Circular A-4 (OMB, 2003).

Estimated benefits, in terms of health risk reduction from the proposed LCRI, result from the activities performed by water systems, which are expected to reduce risk to the public from exposure to lead and copper in drinking water at the tap. EPA quantifies and monetizes some of this health risk reduction from lead exposure by estimating the decrease in lead exposures accruing to both children and adults from the installation and re-optimization of CCT, service line replacement, the implementation of point-of-use filter devices, and the provision of pitcher filters in systems with multiple action level exceedances and by quantifying and monetizing the resulting increases in intelligence quotient (IQ) in children zero to seven years old, and reductions in incidents of low birth weight, attention-deficit/hyperactivity disorder (ADHD) in children, and adult cardiovascular disease premature mortality.

A. Affected Entities and Major Data Sources Used to Characterize the Sample Universe

The entities potentially affected by the proposed LCRI are PWSs, that are classified as either CWSs or NTNCWSs, and Primacy Agencies (States). In the economic modeling performed, EPA uses the Safe Drinking Water Information System Fed Data Warehouse (SDWIS/Fed) to derive the number of CWSs and NTNCWSs, 49,529 and 17,418, respectively. The Agency also assumed, for modeling purposes, 56 Primacy Agencies.[9]

EPA used a variety of data sources to develop the drinking water industry characterization for the regulatory analysis. Exhibit 7 (Exhibit 3-1 in Chapter 3 of the proposed LCRI Economic Analysis (USEPA, 2023b)) lists the major data sources, describes the data used from each source, and explains how it was used in the estimation of the regulatory analysis baseline, which corresponds to the LCRR[10]. Additional detailed descriptions of these data sources and how they were used in the characterization of baseline industry conditions can be found in Chapter 3 of the proposed LCRI Economic Analysis (USEPA, 2023b).

Exhibit 7: Data Sources Used to Develop the Baseline for the Proposed LCRI

Data Source	Baseline Data Derived From the Source
SDWIS/Fed fourth quarter 2020 "frozen" dataset[1]	• PWS inventory, including population served, number of service connections, source water type, and water system type. Also used to identify NTNCWSs that are schools and child care facilities. • Status of CCT, including identification of water systems with CCT and the proportion of water systems serving ≤ 50,000 people that installed CCT in response to the pre-2021 LCR. • Analysis of lead 90th percentile concentrations to identify water systems below, at, or above the lead and/or copper ALs at the start of rule implementation by LSL status, *i.e.*, presence or absence of LSLs for the pre-2021 LCR, LCRR, and proposed LCRI. Used in concert with data from Michigan described below for the proposed LCRI.[2] • The proportion of water systems that are on various reduced monitoring

[9] The 56 Primacy Agencies include 49 States (excluding Wyoming), Puerto Rico, Guam, United States Virgin Islands, American Samoa, North Mariana Islands, and Navajo Nation. For cost modeling purposes, EPA also included the District of Columbia (D.C.) as a Primacy Agency when assigning burden and costs of the rule although some of these costs are incurred by the actual Primacy Agency, EPA Region 3.

[10] Note that EPA provides an alternative regulatory analysis which assumes a pre-2021 LCR baseline during the 35-year period of analysis starting in 2024, in Appendix C of the EA (USEPA, 2023b). Because PWSs and Primacy Agencies will likely not have implemented the parts of the LCRR associated with compliance dates post October 16, 2024, the Agency is providing this alternative baseline analysis that describes LCRI incremental costs and benefits relative to a non-LCRR state of the industry.

Data Source	Baseline Data Derived From the Source
	schedules for lead tap and WQP monitoring. • The frequency of source and treatment changes and those source changes that can result in additional source water monitoring. • Number of distribution system entry points per drinking water system for systems that were not included in the UCMR 3 dataset.
2006 CWSS (USEPA, 2009)	• PWS labor rates.
UCMR 3 (2013-2015)	• Number of distribution system entry points per drinking water system.
7th DWINSA	• Service line material characterization. • Service line replacement costs.
State service line information	• Service line material characterization.
Geometries and Characteristics of Public Water Systems (USEPA, 2000)	• Design and average daily flow per system.
Six-Year Review 3 ICR Occurrence Dataset (2006-2011)	• Baseline distribution of pH for various CCT conditions. • Baseline orthophosphate dose for CCT.
State of Michigan Lead and Copper Compliance Monitoring Data (Michigan EGLE, 2019-2021)	• Analysis of the ratio of fifth- to first-liter lead tap samples to estimate the increase in lead 90th percentile levels for LSL systems based on the use of the higher of the first- or fifth-liter sample result. Ratios are applied to SDWIS/Fed lead 90th percentile data to identify systems below, at, or above the AL under the proposed LCRI by LSL status. • Percent of individual samples exceeding 10 µg/L for the proposed LCRI.

Acronyms: AL = action level; AWWA = American Water Works Association; CCT = corrosion control treatment; CWSS = Community Water System Survey; DWINSA = Drinking Water Infrastructure Needs Assessment; ICR = Information Collection Request; LCR = Lead and Copper Rule; LCRR = Lead and Copper Rule Revisions; LCRI = Lead and Copper Rule Improvements; LSL = lead service line; Michigan EGLE = Michigan Department of Environment, Great Lakes, and Energy; NTNCWS = non-transient non-community water system; public water system; SDWIS/Fed = Safe Drinking Water Information System/Federal version; UCMR 3 = Third Unregulated Contaminant Monitoring Rule; USEPA = United States Environmental Protection Agency; WQP = water quality parameter.

Note:

[1] Contains information reported through December 31, 2020.

[2] A system's lead 90th percentile level is a key factor in determining a system's requirements under the pre-2021 LCR, LCRR, and proposed LCRI.

B. Overview of the Cost-Benefit Model

EPA updated its SafeWater LCR model that was used to analyze the costs and benefits of the LCRR. For a detailed description of the model, see Chapter 5 of the *Economic Analysis for the Final Lead and Copper Rule Revisions* (USEPA, 2020c). EPA originally developed SafeWater LCR because of the need to model costs and benefits where significant variability existed in both regulated entity characteristics (i.e., baseline) and regulatory compliance scenarios, a fact that remains true of the analysis for the proposed LCRI. PWSs will face different compliance scenarios depending on the size and type of water system, the presence of lead, GRR, and unknown service lines, water quality, and existing corrosion controls. In addition, PWSs will also face different unit costs based on water system baseline characteristics including size, type, and number of entry points (e.g., labor rates, and CCT capital and operation and maintenance unit costs).

One of the strengths of the SafeWater LCR model is that it incorporates a large degree of variability across water system baseline characteristics that influence compliance and costs. For example, under the proposed LCRI, PWSs will face different compliance scenarios and costs depending on their size, primary source water type, number of entry points to the distribution system, number of lead service lines (LSLs) and galvanized requiring replacement service lines (GRRs) in their distribution system, and existing corrosion controls in place. The SafeWater LCR model also includes variability in compliance characteristics like different labor rates and number of tap and water quality parameter (WQP) samples required by system size.

One limitation of the cost-benefit analysis is that EPA does not have all of the PWS-specific data needed to fully reflect baseline and compliance variability across PWSs, therefore, the SafeWater LCR model applies a “model PWS” approach. From a set of system baseline characteristic data including system type, system size, and primary water source, EPA defined 72 PWS categories, or strata, in the SafeWater LCR model. The 72 PWS categories consist of each combination of PWS type (2), PWS population size category (9), PWS primary source water (2), and PWS ownership (2).

The SafeWater LCR model creates model PWSs representing systems in each category by combining the PWS-specific data available in SDWIS/Fed with data on baseline and compliance characteristics available at the PWS category level. When categorical data are point estimates, every model PWS in a category is assigned the same value. When EPA has probabilistic data representing system variability, SafeWater LCR model assigns each model PWS a value sampled from the distribution. Examples of the distributional data inputs that characterize variability in the SafeWater LCR model include the burden for PWS and State staff to conduct tasks like sampling and compliance documentation and review. These distributions are assumed to be independent which is a limitation of the model.

While the model system approach allows for a good characterization of variability across PWSs, it is less exact than if EPA had full information on each PWS. For additional detail on the development of model-PWSs in the SafeWater LCR model, see Appendix B, section B.2.1 of the Economic Analysis (USEPA, 2020c). Because of this model PWS approach, SafeWater LCR does not output any results at the PWS level, but rather, outputs cost (and benefit) estimates at the PWS category, or strata. For additional information on the data sources used in the estimation of costs see Chapter 3 and Chapter 4, sections 4.2.2, 4.3, 4.4, and 4.5 of the Economic Analysis (USEPA, 2020c).

Chapter 3 of the proposed LCRI Economic Analysis (USEPA, 2023b) describes in greater detail the baseline data elements, their derivation, and the inherent sources of uncertainty in the developed data elements. Chapter 4, sections 4.3 and 4.4 of the proposed LCRI Economic Analysis discuss how each data element is used in the estimation of costs and provides examples and references to how these data were developed. Chapter 5 of the proposed LCRI Economic Analysis (USEPA, 2023b) provides detail on the water lead concentrations under baseline conditions (e.g., presence of an LSL and CCT) and the functions used to quantify benefit categories, their derivation, and the inherent sources of uncertainty associated with the use of those functions. All significant uncertainties of this economic analysis are described in the following sections of the proposed LCRI EA (USEPA, 2023c). Section 3.4 and Exhibit 3-81 outline uncertainties associated with the analytical baseline and water system compliance characteristics. SafeWater LCR model and cost uncertainty is discussed in section 4.2.2 and Exhibit 4-3. Also, for a discussion of the uncertainties in the benefits analysis, see section 5.7 and Exhibit 5-43.

SafeWater LCR follows each model PWS, which represents a cohort of systems with the same characteristics, in the sample through each year of the period of analysis and determines how the PWS will comply with each requirement of the proposed rule, estimating the yearly compliance cost and tracking the impact of the compliance actions on drinking water lead concentrations and the resultant effects on health outcomes. It also tracks how other events, such as changing a water source or treatment, effect the water system's compliance requirements for the next year. The estimated costs and benefits for each model PWS are weighted so they represent the number of actual PWSs known to have similar characteristics (e.g., population served, entry points to the distribution system, etc.), and then summary statistics are calculated, including total quantified costs of the proposed regulatory requirement, total quantified benefits of the proposed regulatory requirement, the variability in PWS-level costs (e.g., 5th and 95th percentile system costs), and the variability in household-level costs.[11]

[11] The exception to the use of model PWSs and the assignment of system characteristic data in the SafeWater LCR model are the 24 very large water systems serving more than one million people. Because of the small number of water systems in this size category, the uniqueness of their system characteristics, and the potential large impact of these systems on estimated national costs and benefits, EPA attempted to collect information on very large water

This treatment technique rulemaking, and therefore the SafeWater LCR model, is complex, incorporating multiple compliance triggers (e.g., action level exceedance, single sample exceedance, multiple action level exceedances) that require multiple and varying compliance actions (e.g., CCT installation or re-optimization, distribution system and site assessment, public education, temporary filter distribution) requiring a large number of inputs for the estimation of total compliance costs and benefits. Many of these inputs, which are specific to the assessment of the costs and benefits of the proposed LCRI, are uncertain.

EPA determined it does not have enough information to perform a probabilistic uncertainty analysis as part of the SafeWater LCR model analysis for this rule. Instead, to capture uncertainty, EPA estimated compliance costs and benefits using the SafeWater LCR model under low and high bracketing scenarios. For costs, the bracketing scenarios are defined by the following three cost drivers: the number of PWSs that will exceed the action level under the revised tap sampling requirements; the cost of service line replacement; and the cost of CCT. The low and high scenarios for benefits are driven by the number of PWSs that will exceed the action level under the revised tap sampling requirements (the same variable which is used to define the low and high cost scenarios) and the concentration-response functions that characterize how reductions in blood lead levels (caused by changes in lead exposure) translate into estimates of avoided IQ reductions, cases of ADHD, and cardiovascular disease premature mortality. These low and high scenarios are defined by the assignment of low and high values for the set of cost and benefit drivers listed above. Detailed descriptions of these variables and the

---

systems' CCT practices and chemical doses, pH measurements and pH adjustment practices, number of LSLs, service populations, and average annual flow rates for each entry point to the distribution system. When facility-specific data were available, EPA used it to estimate compliance costs and benefits for the very large water systems. If data were not available, EPA assigned baseline characteristics using the same process as previously described. See Chapter 4, section 4.2.3 of the proposed LCRI EA for a summary of the data EPA collected on these very large systems (USEPA, 2023b).

derivation of their values under the low and high scenarios can be found in Chapter 4 and Chapter 5 of the proposed LCRI Economic Analysis (USEPA, 2023b). Due to the data limitations mentioned above, with the exception of the uncertain variables which define the difference between the low and high scenarios, the remaining baseline water system and compliance characteristics are treated as certain and remain constant across the scenarios. While this limits the full description of the uncertainty in the monetized cost and benefit estimates, it does allow EPA to clearly define the uncertainty characterized in the cost-benefit range provided by the low and high scenarios and maintains consistency between the estimation of costs and benefits for the LCRR and proposed LCRI (e.g., number of systems with LSLs and percent of connections that are LSLs).

When evaluating the economic impacts on PWSs and households, EPA uses the estimated PWS cost of capital to discount future costs, as this best represents the actual costs of compliance that water systems would incur over time. EPA used data from the 2006 Community Water System Survey (CWSS) to estimate the PWS cost of capital. EPA calculated the overall weighted average cost of capital (across all funding sources and loan periods) for each size/ownership category, weighted by the percentage of funding from each source. The cost of capital for each CWS size category and ownership type is shown in Appendix B of the proposed LCRI Economic Analysis (USEPA, 2023b). Since similar cost of capital information is not available for NTNCWSs, EPA used the CWS cost of capital when calculating the annualized cost per NTNCWS. Total capital investment may be greater than costs water systems bear when complying with future regulatory requirements because financing support for lead reduction efforts is available from State and local governments, EPA programs, and other Federal agencies.

The availability of funds from government sources, while potentially reducing the cost to individual PWSs, does not reduce the social cost of capital to society.

EPA projects that rule implementation activities will begin immediately after rule promulgation. These activities will include one-time PWS and State costs for staff to read the LCRI, become familiar with its provisions, and develop training materials and train employees on the new rule requirements. States will also incur burden hours associated with adopting the rule into State requirements, updating their LCR program policies and practices, and modifying data management systems. PWSs will incur costs to comply with the service line materials inventory requirements, service line materials notification requirement, and requirement for public notification following an action level of 0.015 mg/L (LCRR action level) in years one through three of the 35-year period of analysis. EPA expects that water systems will begin complying with all other LCRI rule requirements three years after promulgation, or in year four of the analysis.

Some requirements of the proposed LCRI must be implemented by water systems regardless of their water quality and tap sampling results (e.g., service line material inventory updates, service line replacement, and CWS school and child care facilities sampling programs). However, most of the major cost drivers are a function of a water system’s 90th percentile lead tap sample value. Because a water system’s lead 90th percentile value is important to determining regulatory requirements and costs and benefits under the proposed LCRI, the SafeWater LCR model tracks each model PWS’s 90th percentile value over each annual time step in the model. The 90th percentile value, and if it exceeds the action level, dictates actions including, but not limited to, tap sampling and water quality parameter monitoring schedules, the installation or re-optimization of CCT, the installation of point-of-use devices or pitcher filters at water systems selecting this treatment option as part of the small water system flexibilities under the proposed LCRI, and public education requirements.[12] Under the proposed LCRI the SafeWater LCR model assumes a PWS's 90th percentile tap sample values will drop at or below the action level once they: (1) install or reoptimize CCT[13]; (2) install point-of-use devices or (3) remove all service lines with lead content. When the PWS no longer has a 90th percentile tap sample value above the action level, it incurs lower sampling and public education costs.

The SafeWater LCR model allows for future increases in 90th percentile lead values as a result of changes in source water and treatment. The likelihood of these events occurring has been derived from SDWIS/Fed data (see Chapter 3, section 3.3.9 of the proposed LCRI Economic Analysis (USEPA, 2023b)). When a change in source or treatment occurs in a modeled year, a new 90th percentile value is assigned to the water system. This value may be higher or lower than the current value, thus potentially triggering new corrective actions. In the model, if a water system already has "optimized" CCT in place, it is assumed that no additional action is needed and that the current treatment is adequate, therefore the 90th percentile will not change.

C. Cost Analysis

This section summarizes the cost elements and estimates the total cost of compliance for the baseline (LCRR), the proposed LCRI, and the incremental cost of the proposed LCRI, under both the low and high cost scenarios, discounted at three and seven percent. EPA presents the

---

[12] Distribution system and site assessment adjustments to CCT are required for a single lead tap sample exceedances of the action level of 0.010 mg/L. The provision of temporary pitcher filters is triggered by multiple action level exceedance violations. Both these compliance requirements are also positively associated with system level 90[th] percentile tap sample values.

[13] The SafeWater LCR model implements a required systemwide distribution system and site assessment activity as a change in pH which is equivalent to pH adjustments associated with CCT installation or preoptimization in the model.

estimated PWS proposed rule implementation costs; the calculated distributions of incremental annualized costs for CWS households by primary water source and size category; and the estimated costs to States for implementation and administration of the rule.[14] This section also quantifies the potential increase in phosphates that would result from the increased use of corrosion inhibitors under the rule, the resulting cost for treating to remove the additional phosphates at downstream wastewater treatment plants that may be constrained by nutrient discharge limits, and discusses the ecological impacts that may result from increased phosphorus loads to surface waters.

1. Drinking Water System Costs

EPA provides estimates of the proposed LCRI regulatory requirement costs that accrue to PWSs for the following cost components: rule implementation and administration, sampling, service line inventory and replacement, CCT, point-of-use program (if a small system selects this compliance option), and public education and outreach. For the purpose of developing the PWS costs for each of these rule components EPA further subdivided these groupings into sub-components and activities, to be completed by systems implementing the requirements of the proposed LCRI. For most activities, water systems will incur labor unit costs (e.g., PWS staff participate in training). Systems will also incur unit capital and operation and maintenance costs for a number of activities (e.g., installation of CCT). Exhibit 8 (Exhibit 4-6 in the proposed LCRI Economic Analysis (USEPA, 2023b)) provides an overview of the rule components, subcomponents, and activities for which EPA estimates water system unit costs for the proposed

[14] Note that reporting costs are represented in the cost totals provided in the estimates below, but a separate summary of the reporting costs, as required by the Paperwork Reduction Act, can be found in section X.C. of this document.

LCRI. Detailed information on the derivation of unit costs associated with each activity can be found in the proposed LCRI Economic Analysis sections identified in Exhibit 8.

Exhibit 8: PWS Cost Components, Subcomponents, and Activities Organized by Section[1]

Component	Subcomponents	Activities[2]
4.3.1: PWS Implementation and Administrative Costs	4.3.1.1: PWS One-Time Implementation and Administrative Costs	a) Read and understand the rule b) Assign personnel and resources for rule implementation c) Participate in training and technical assistance from the State during rule implementation d) Provide small system flexibility option recommendation to the State
4.3.2: PWS Sampling Costs	4.3.2.1: PWS Lead Tap Sampling	a) Update sampling instruction for lead tap sampling and submit to the State b) Contact homes to establish new 100 percent LSL tap sampling pool c) Report any changes in sampling location to the State d) Confer with the State on initial lead sampling data and status under the LCRI e) Obtain households for each round of lead tap sampling f) Offer incentives to households to encourage participation in lead tap sampling program g) Ship tap sampling material and instructions to participating households h) Collect lead tap samples i) Determine if sample should be rejected and not analyzed j) Analyze lead tap samples in-house or commercially k) Prepare and submit sample invalidation request to the State l) Inform customers of tap sample results m) Certify to the State that results were reported to customers n) Submit request to renew 9-year monitoring waiver to the State o) Submit sampling results and 90^{th} percentile calculation to the State p) Oversee the customer-initiated lead sampling program q) Ship tap sampling material and instructions to participating households for customer-initiated lead sampling program r) Collect lead tap samples for customer-initiated lead sampling program s) Analyze lead tap samples in-house or commercially for customer-initiated lead sampling program

Component	Subcomponents	Activities[2]
		t) Inform customers of lead tap sample results for customer-initiated lead sampling program
	4.3.2.2: PWS Lead Water Quality Parameter Monitoring	u) Collect lead WQP samples in the distribution system v) Analyze distribution system lead WQP samples w) Collect lead WQP samples from entry points x) Analyze entry point lead WQP samples y) Report lead WQP sampling data and compliance with OWQPs to the State
4.3.2: PWS Sampling Costs (Continued)	4.3.2.3: PWS Copper Water Quality Parameter Monitoring	z) Collect copper WQP samples in the distribution system aa) Analyze distribution system copper WQP samples bb) Collect copper WQP samples from entry points cc) Analyze entry point copper WQP samples dd) Report copper WQP sampling data and compliance with OWQPs to the State
	4.3.2.4: PWS Source Water Monitoring	ee) Collect source water sample ff) Analyze source water sample gg) Report source water monitoring results to the State
	4.3.2.5.1: CWS School and Child Care Facility Lead Sampling Costs – First Five-Year Cycle	hh) Create a contact list of schools and child care facilities served by CWS and submit to State ii) Develop lead outreach materials for schools and child care facilities jj) Prepare and distribute initial letter explaining the sampling program and EPA's 3Ts Toolkit kk) Contact elementary school or child care facility to determine and finalize its sampling schedule (one-time) or contact secondary school to offer sampling (annual) ll) Contact school or child care facility to coordinate sample collection logistics mm) Conduct walkthrough at school or child care facility before the start of sampling nn) Travel to collect samples oo) Collect samples pp) Analyze samples qq) Provide sampling results to tested facilities rr) Discuss sampling results with school or child care facility ss) Conduct detailed discussion of high sampling results with school and child care facilities tt) Report school and child care facility sampling results to the State uu) Prepare and provide annual report on school and child care facility sampling program to the State
	4.3.2.5.2: CWS School and Child Care Facility	vv) Update the list of schools and child care facilities and submit to the State

Component	Subcomponents	Activities[2]
	Lead Sampling Costs – Second Five-Year Cycle On	ww) Contact school and child care facilities to offer sampling xx) Contact school or child care facility to coordinate sample collection logistics yy) Conduct walkthrough at school or child care facility before the start of sampling zz) Travel to collect samples aaa) Collect samples bbb) Analyze samples ccc) Provide sampling results to tested facilities ddd) Discuss sampling results with school and child care facility eee) Conduct detailed discussion of high sampling results with school and child care facility fff) Report school and child care facility sampling results to the State ggg) Prepare and provide annual report on school and child care facility sampling program to the State
4.3.3: PWS Corrosion Control Costs	4.3.3.1: CCT Installation	a) Conduct a CCT study b) Install CCT Treatment (PO_4, PO_4 with post treatment, pH adjustment, or modify pH)
	4.3.3.2: Re-optimization of Existing Corrosion Control Treatment	c) Revise CCT study d) Reoptimize existing CCT
	4.3.3.3: DSSA Costs	e) Contact customers and collect follow-up tap sample f) Analyze follow-up lead tap sample g) Collect distribution system WQP sample h) Analyze distribution system WQP sample i) Review incidents of system-wide event and other system conditions j) Consult with the State prior to making CCT changes k) Report follow-up sample results and overall "DSSA" responses to the State
	4.3.3.4: System Lead CCT Routine Costs	l) Review CCT guidance m) Provide water quality data to the State and discuss during sanitary survey n) Notify and consult with the State on required actions in response to source water change o) Notify and consult with the State on required actions in response to treatment change
4.3.4: PWS Service Line Inventory and Replacement Costs	4.3.4.1: Service Line Inventory	a) Conduct records review for connector material b) Compile and submit updated inventory information to the State c) Identify service line material for unknowns d) Report annual inventory updates to the State e) Conduct field investigations for inventory validation f) Report validation results to the State

Component	Subcomponents	Activities[2]
	4.3.4.2: Service Line Replacement Plan	g) Develop service line replacement plan and submit to the State for review h) Conduct planning and identify financial options for service line replacements and submit to the State
	4.3.4.3: Physical Service Line Replacements	i) System replaces LSLs and GRR service lines
	4.3.4.4: Ancillary Service Line Replacement Activities	j) Contact customers and conduct site visits prior to service line replacement k) Deliver filters and cartridges at time of service line replacement and maintain them for 6 months l) Collect tap sample post-service line replacement m) Analyze post-service line replacement tap sample n) Inform customers of tap sample result o) Submit annual report on service line replacement program to the State
4.3.5: PWS POU-Related Costs (Small System Compliance Option)	4.3.5.1: POU Device Installation and Maintenance	p) Provide, monitor, and maintain POU devices
	4.3.5.2: POU Ancillary Activities	q) Develop POU plan and submit to the State r) Develop public education materials and submit to the State s) Print POU education materials t) Obtain households for POU monitoring u) Deliver POU monitoring materials and instructions to participating households v) Collect tap samples after POU installation w) Determine if sample should be rejected and not analyzed x) Analyze POU tap samples y) Prepare and submit sample invalidation request to the State z) Inform customers of POU tap sample results aa) Certify to the State that POU tap results were reported to customers bb) Prepare and submit annual report on POU program to the State
4.3.6: PWS Lead Public Education,	4.3.6.1: Consumer Notice	a) Provide a copy of the 3 calendar day notice and certification to the State

Component	Subcomponents	Activities[2]
Outreach, and Notification Costs	4.3.6.2: Activities Regardless of Lead 90th Percentile Level	b) Update CCR language c) Develop new customer outreach plan d) Develop approach for improved public access to lead health-related information and tap sample results e) Establish a process for public access to information on known or potential lead content SL locations and tap sample results f) Maintain a process for public access to lead health information, known or potential lead content SL locations, and tap sample results Respond to customer request for LSL information g) Respond to customer request for known or potential lead content SL information h) Respond to requests from realtors, home inspectors, and potential home buyers for known or potential SL information i) Develop a list of local and State health agencies j) Develop lead outreach materials for local and State health agencies k) Deliver lead outreach materials for local and State health agencies l) Develop public education materials for SL disturbances and submit to the State m) Deliver public education for SL disturbances n) Deliver filters and cartridges during disturbances of SLs and maintain them for 6 months o) Develop inventory-related outreach materials and submit to the State for review p) Distribute inventory-related outreach materials q) Provide translation services for public education materials r) Certify to the State that lead outreach was completed[3]
	4.3.6.3: Public Education Activities in Response to Lead ALE	s) Update mandatory language for lead ALE public education and submit to the State for review t) Deliver lead ALE public education materials to all customers u) Post notice to website v) Prepare press release w) Contact public health agencies to obtain additional organizations and update recipient list x) Notify public health agencies and other organizations y) Consult with State on other public education activities z) Implement other public education activities
	4.3.6.4: Public Education Activities in	aa) Develop outreach materials for systems with multiple lead ALEs and submit to the State for review

Component	Subcomponents	Activities[2]
	Response to Multiple Lead ALEs	bb) Conduct enhanced public education for systems with multiple lead ALEs cc) Consult on filter program for systems with multiple lead ALEs dd) Develop plan for making filters available and submit to the State for review ee) Administer filter program for systems with multiple lead ALEs ff) Provide filters due to multiple lead ALEs

Acronyms: 3Ts = "3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities Toolkit: A Training, Testing, and Taking Action Approach (Revised Manual)"; AL = action level; ALE = action level exceedance; CCR = consumer confidence report; CCT = corrosion control treatment; CWS = community water system; DSSA = Distribution System and Site Assessment; LCRR = Lead and Copper Rule revisions; LSL = lead service line; LSLR = lead service line replacement; OWQPs = optimal water quality parameters; PO_4 = orthophosphate; POU = point-of-use; PWS = public water system; SL = service line; WQP = water quality parameter.

Notes:

[1] Systems will also incur burden for recordkeeping activities under the LCRI, such as retaining records of decisions, supporting documentation, technical basis for decisions, and documentation submitted by the system. EPA has included burden for recordkeeping with each activity when applicable and opposed to providing separate burden estimates.

[2] EPA assigned a unique letter identification (ID) for each activity under a given rule component. Activities are generally organized with upfront, one-time activities first followed by ongoing activities.

[3] This certification is inclusive of outreach activities in sections 4.3.6.1 through 4.3.6.3.

EPA uses the derived unit costs associated with each regulatory activity from Exhibit 8 as inputs to the SafeWater LCR model which estimates low and high scenario PWS total costs for the baseline (LCRR) and the proposed LCRI.[15] Baseline total costs are then subtracted from the LCRI total costs to determine the incremental costs of the new regulatory requirements under the proposed LCRI for both the low and high cost scenarios. These incremental costs are presented as annualized values, discounted at both three and seven percent in Exhibit 9 and Exhibit 10, respectively. The estimated total PWS incremental annualized costs of the proposed LCRI range from $2.1 to $2.93 billion at a three percent discount rate, and $2.5 to $3.58 billion at a seven percent discount rate in 2022 dollars. The exhibits also detail the proportion of the annualized costs attributable to each rule component. For estimated total and incremental costs by

[15] For additional information on how the SafeWater LCR model uses unit cost date to estimate PWS costs see Chapter 4, section 4.3 of the proposed LCRI rule EA (USEPA, 2023b).

subcomponent see Chapter 4, section 4.3 of the proposed LCRI Economic Analysis (USEPA, 2023b).

Exhibit 9: Estimated National Total Monetized Annualized PWS Rule Costs - 3 Percent Discount Rate (millions of 2022 USD)

	Low Estimate			High Estimate		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$138.1	$169.6	$31.5	$151.1	$180.1	$29.0
PWS SLR*	$128.5	$1,892.0	$1,763.5	$221.7	$2,807.7	$2,586.0
Corrosion Control Technology	$543.0	$633.5	$90.5	$626.1	$767.8	$141.7
Point-of Use Installation and Maintenance	$2.6	$7.2	$4.6	$5.9	$14.5	$8.6
Public Education and Outreach	$95.1	$251.2	$156.1	$97.6	$262.0	$164.4
Rule Implementation and Administration	$0.1	$3.9	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$907.4***	***$2,957.4***	***$2,050.0***	***$1,102.6***	***$4,036.1***	***$2,933.5***

Note: *Service line replacement includes full and partial lead service lines and galvanized requiring replacement service lines.

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

EPA in the LCRR economic analysis (USEPA, 2020b) assumed that the cost of customer-side service line replacements made under the goal-based replacement requirement would be paid for by households. The Agency also assumed that system-side service line replacements under the goal-based replacement requirement and all service line replacements (both customer-side and systems-side) would be paid by the PWS under the 3 percent mandatory replacement requirement. EPA made these modeling assumptions based on the different levels of regulatory responsibility systems faced operating under a goal-based replacement requirement versus a mandatory replacement requirement. While systems would not be subject to a potential violation for not meeting the replacement target under the goal-based replacement requirement, under the 3 percent mandatory replacement requirement the possibility of a violation could motivate more systems to meet the replacement target even if they had to adopt customer incentive programs that would shift the cost of replacing customer-side service lines from customers to the system. To be consistent with these LCRR modeling assumptions, under the proposed LCRI, EPA assumed that mandatory replacement costs would fall only on systems. Therefore, the negative incremental values reported for the "Household SLR Costs" category do not represent a net cost savings to households. They represent an assumed shift of the estimated service line replacement costs from households to systems. EPA has insufficient information to estimate the actual service line replacement cost sharing relationship between customers and systems at the national level of analysis.

Acronyms: SLR = service line replacement; PWS = public water system

Exhibit 10: Estimated National Total Monetized Annualized Rule Costs – 7 Percent Discount Rate (millions of 2022 USD)

Exhibit 9: Estimated National Total Monetized Annualized PWS Rule Costs - 3 Percent Discount Rate (millions of 2022 USD)

	Low Estimate			High Estimate		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$153.6	$170.1	$16.5	$171.1	$182.8	$11.7
PWS SLR*	$172.3	$2,385.6	$2,213.3	$292.4	$3,531.7	$3,239.3
Corrosion Control Technology	$566.6	$646.8	$80.2	$660.5	$785.3	$124.8
Point-of Use Installation and Maintenance	$2.6	$6.4	$3.8	$5.9	$12.8	$6.9
Public Education and Outreach	$102.5	$287.2	$184.7	$107.3	$302.4	$195.1
Rule Implementation and Administration	$0.2	$6.4	$6.2	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$997.8***	***$3,502.5***	***$2,504.7***	***$1,237.5***	***$4,821.6***	***$3,584.1***

Note: *Service line replacement includes full and partial lead service lines and galvanized requiring replacement service lines.

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

EPA in the LCRR economic analysis (USEPA, 2020b) assumed that the cost of customer-side service line replacements made under the goal-based replacement requirement would be paid for by households. The Agency also assumed that system-side service line replacements under the goal-based replacement requirement and all service line replacements (both customer-side and systems-side) would be paid by the PWS under the 3 percent mandatory replacement requirement. EPA made these modeling assumptions based on the different levels of regulatory responsibility systems faced operating under a goal-based replacement requirement versus a mandatory replacement requirement. While systems would not be subject to a potential violation for not meeting the replacement target under the goal-based replacement requirement, under the 3 percent mandatory replacement requirement the possibility of a violation could motivate more systems to meet the replacement target even if they had to adopt customer incentive programs that would shift the cost of replacing customer-side service lines from customers to the system. To be consistent with these LCRR modeling assumptions, under the proposed LCRI, EPA assumed that mandatory replacement costs would fall only on systems. Therefore, the negative incremental values reported for the "Household SLR Costs" category do not represent a net cost savings to households. They represent an assumed shift of the estimated service line replacement costs from households to systems. EPA has insufficient information to estimate the actual service line replacement cost sharing relationship between customers and systems at the national level of analysis.

Acronyms: SLR = service line replacement; PWS = public water system

2. Annualized Per Household Costs

The SafeWater LCR cost model calculates the annualized cost per household, by first calculating the cost per gallon of water produced by the CWS. This cost per gallon represents the cost incurred by the system to comply with the requirements of the LCRI. This is a total implementation cost for the system which includes the rule implementation and administration, including, but not limited to, sampling, service line inventory and replacement, CCT, point-of-use program (if a small system selects this compliance option), and public education and outreach component costs. Because of uncertainty in three important LCRI cost input variables, discussed in section VIII.B. of this document, the Agency developed low and high cost scenarios. These scenarios produce a range in the estimated cost per gallon and two estimates for annualized per household costs.

The SafeWater LCR model multiplies this low and high scenario costs per gallon by the average annual household consumption (in gallons) to determine the cost per household per year associated with increased costs borne by the CWS. Exhibits 11 and 12 show the distributions of incremental annualized costs for CWS households by primary water source and size category. Note that the percentiles represent the distribution of average household costs across CWSs in a category, not the distribution of costs across all households in a CWS category.[16]

Exhibit 11: Estimated Annualized Incremental Cost per Household by Community Water System Category - Low Scenario (2022 USD)

Funding	*Source Water*	*Size*	*Mean*	*10th Percentile*	*25th Percentile*	*50th Percentile*	*75th Percentile*	*90th Percentile*
Private	*Ground*	*Less than 100*	$67	$28	$39	$60	$88	$119
Private	*Ground*	*100 to 500*	$23	$7	$12	$19	$28	$45
Private	*Ground*	*500 to 1,000*	$4	$1	$1	$3	$6	$9
Private	*Ground*	*1,000 to 3,300*	$3	$1	$1	$2	$4	$5
Private	*Ground*	*3,300 to 10,000*	$27	$0	$1	$20	$28	$92
Private	*Ground*	*10,000 to 50,000*	$9	$0	$1	$8	$14	$22
Private	*Ground*	*50,000 to 100,000*	$9	$0	$0	$7	$17	$25

[16] Note that although EPA assumed in the cost analysis that systems would pay for customer-side service line replacement. It is possible that in some systems individual homeowners may bear a much greater annual household burden which includes the customer-side service line replacement. EPA estimates the cost of removing the customer-owned side of a service line range from $1,920 to $5,400, with a central tendency of $3,273. The percentage of customers in each water system paying the higher customer-side service line replacement costs depends on the number of LSLs and GRR service lines in the water system, the rate of replacement, and the details of the water systems service line replacement program.

Private	*Ground*	*100,000 to 1,000,000*	$4	$0	$0	$3	$6	$9
Private	*Surface*	*Less than 100*	$58	$22	$33	$50	$79	$104
Private	*Surface*	*100 to 500*	$18	$5	$8	$15	$23	$36
Private	*Surface*	*500 to 1,000*	$5	$2	$2	$3	$6	$8
Private	*Surface*	*1,000 to 3,300*	$3	$1	$1	$2	$3	$6
Private	*Surface*	*3,300 to 10,000*	$26	$1	$1	$19	$27	$87
Private	*Surface*	*10,000 to 50,000*	$9	$0	$1	$7	$11	$21
Private	*Surface*	*50,000 to 100,000*	$9	$0	$0	$7	$15	$22
Private	*Surface*	*100,000 to 1,000,000*	$5	$0	$0	$4	$8	$11
Private	*Surface*	*Greater than 1,000,000*	$8	$1	$1	$12	$15	$15
Public	*Ground*	*Less than 100*	$53	$23	$32	$44	$70	$92
Public	*Ground*	*100 to 500*	$15	$5	$7	$12	$19	$30
Public	*Ground*	*500 to 1,000*	$4	$1	$2	$3	$5	$7
Public	*Ground*	*1,000 to 3,300*	$2	$1	$1	$1	$3	$4
Public	*Ground*	*3,300 to 10,000*	$21	$0	$1	$15	$22	$68
Public	*Ground*	*10,000 to 50,000*	$6	$0	$1	$5	$9	$16
Public	*Ground*	*50,000 to 100,000*	$7	$0	$0	$5	$13	$17
Public	*Ground*	*100,000 to 1,000,000*	$4	$0	$0	$5	$7	$8
Public	*Ground*	*Greater than 1,000,000*	$1	$1	$1	$1	$1	$1
Public	*Surface*	*Less than 100*	$54	$21	$29	$53	$68	$89
Public	*Surface*	*100 to 500*	$13	$4	$6	$10	$16	$24
Public	*Surface*	*500 to 1,000*	$4	$1	$2	$2	$4	$7
Public	*Surface*	*1,000 to 3,300*	$2	$1	$1	$1	$2	$4
Public	*Surface*	*3,300 to 10,000*	$22	$1	$1	$15	$24	$73
Public	*Surface*	*10,000 to 50,000*	$7	$0	$1	$6	$10	$18
Public	*Surface*	*50,000 to 100,000*	$8	$0	$0	$6	$14	$20
Public	*Surface*	*100,000 to 1,000,000*	$5	$0	$0	$6	$8	$10
Public	*Surface*	*Greater than 1,000,000*	$8	$0	$0	$5	$15	$22

Notes: System Category rows are not included for system categories that contain zero systems. Detail may not add exactly to total due to independent rounding.

When evaluating the economic impacts on PWSs, EPA uses the estimated PWS cost of capital to discount future costs (not the 3 or 7 percent discount rates used to evaluate social costs and benefit), as this best represents the actual costs of compliance that water systems would incur over time. For more information on cost of capital see The Economic Analysis of the proposed LCRI Chapter 4, section 4.2.3.3

Exhibit 12: Estimated Annualized Incremental Cost per Household by Community Water System Category - High Scenario (2022 USD)

Funding	Source Water	Size	Mean	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Private	Ground	Less than 100	$67	$24	$36	$58	$90	$119
Private	Ground	100 to 500	$24	$5	$10	$19	$31	$57
Private	Ground	500 to 1,000	$5	$1	$1	$3	$7	$11
Private	Ground	1,000 to 3,300	$3	$1	$1	$2	$4	$7
Private	Ground	3,300 to 10,000	$39	$0	$1	$29	$48	$136
Private	Ground	10,000 to 50,000	$12	$0	$1	$11	$19	$32
Private	Ground	50,000 to 100,000	$13	$0	$0	$10	$24	$35
Private	Ground	100,000 to 1,000,000	$5	$0	$0	$5	$9	$12
Private	Surface	Less than 100	$59	$22	$31	$51	$82	$109
Private	Surface	100 to 500	$18	$5	$7	$14	$23	$42
Private	Surface	500 to 1,000	$5	$1	$2	$3	$7	$11
Private	Surface	1,000 to 3,300	$4	$1	$1	$2	$4	$7
Private	Surface	3,300 to 10,000	$38	$1	$1	$28	$43	$133
Private	Surface	10,000 to 50,000	$12	$0	$1	$10	$18	$30
Private	Surface	50,000 to 100,000	$13	$0	$0	$10	$22	$35
Private	Surface	100,000 to 1,000,000	$7	$0	$0	$7	$12	$15
Private	Surface	Greater than 1,000,000	$12	$2	$2	$18	$23	$24
Public	Ground	Less than 100	$53	$21	$29	$46	$75	$92
Public	Ground	100 to 500	$17	$4	$6	$12	$21	$37
Public	Ground	500 to 1,000	$4	$1	$2	$3	$5	$9
Public	Ground	1,000 to 3,300	$2	$0	$1	$1	$3	$6
Public	Ground	3,300 to 10,000	$31	$0	$1	$21	$40	$103
Public	Ground	10,000 to 50,000	$8	$0	$1	$6	$13	$24
Public	Ground	50,000 to 100,000	$10	$0	$0	$8	$18	$25
Public	Ground	100,000 to 1,000,000	$6	$0	$0	$6	$9	$12
Public	Ground	Greater than 1,000,000	$1	$1	$1	$1	$1	$1
Public	Surface	Less than 100	$54	$19	$30	$57	$68	$89
Public	Surface	100 to 500	$14	$4	$6	$10	$18	$31
Public	Surface	500 to 1,000	$4	$1	$2	$2	$5	$9
Public	Surface	1,000 to 3,300	$3	$0	$1	$1	$3	$5
Public	Surface	3,300 to 10,000	$31	$1	$1	$22	$33	$110
Public	Surface	10,000 to 50,000	$10	$0	$1	$8	$15	$26

Public	*Surface*	*50,000 to 100,000*	$11	$0	$0	$8	$20	$29
Public	*Surface*	*100,000 to 1,000,000*	$8	$0	$0	$8	$12	$15
Public	*Surface*	*Greater than 1,000,000*	$12	$0	$1	$7	$23	$34

Notes: System Category rows are not included for system categories that contain zero systems. Detail may not add exactly to total due to independent rounding.

When evaluating the economic impacts on PWSs, EPA uses the estimated PWS cost of capital to discount future costs (not the 3 or 7 percent discount rates used to evaluate social costs and benefit), as this best represents the actual costs of compliance that water systems would incur over time. For more information on cost of capital see The Economic Analysis of the proposed LCRI Chapter 4, section 4.2.3.3.

3. State Costs

For each of the PWS cost components and subcomponents, previously described in section VIII.C.1., States (i.e., Primacy Agencies) have associated costs. Exhibit 13 (Exhibit 4-142 in the proposed LCRI Economic Analysis (USEPA, 2023b)) provides a list of the State activities, organized by LCRI cost component and subcomponent groups, for which EPA developed unit costs. Detailed information on the derivation of the unit costs associated with each State activity can be found in the proposed LCRI Economic Analysis sections identified in Exhibit 13.

Exhibit 13: State Cost Components, Subcomponents, and Activities Organized by Section[1]

Component	Subcomponents	Activities[2]
4.4.1: State Implementation and Administrative Costs	4.4.1.1: State Start-up Implementation and Administrative Activities	a) Adopt rule and develop program b) Modify data management systems c) Provide system training and technical assistance d) Provide staff training e) Review and approve small system flexibility option
	4.4.1.2: State Annual Implementation and Administrative Activities	f) Coordinate with EPA g) Provide ongoing technical assistance h) Report to SDWIS/Fed i) Train staff for annual administration
4.4.2: State Sampling Related Costs	4.4.2.1: State Lead Tap Sampling Costs	a) Provide templates for revised sampling instructions and conduct review b) Review updated sampling plan for LSL systems c) Review initial lead monitoring data and prepare systems for status under LCRI d) Review change in tap sample locations e) Review 9-year monitoring waiver renewal f) Review sample invalidation requests

Component	Subcomponents	Activities[2]
		g) Review customer notification certifications h) Review monitoring results and 90th percentile calculations
	4.4.2.2: State Lead WQP Sampling Costs	i) Review lead WQP sampling data and compliance with OWQPs
	4.4.2.3: State Copper WQP Monitoring Costs	j) Review copper WQP sampling data and compliance with OWQPs
	4.4.2.4: State Source Water Monitoring Costs	k) Review source water monitoring results
	4.4.2.5: State School Sampling Costs	l) Review list of schools and child care facilities m) Provide templates on school and child care facility testing program n) Review school and child care facility testing program materials o) Review school and child care facility sampling results after individual sampling events p) Review annual reports on school and child care facility lead in drinking water testing program
4.4.3: State CCT Related Costs	4.4.3.1: CCT Installation	a) Review CCT study and determine type of CCT to be installed b) Set OWQPs after CCT installation
	4.4.3.2: Re-optimization	c) Review CCT study and determine needed CCT adjustment d) Reset OWQPs after CCT re-optimization
	4.4.3.3: State DSSA Costs	e) Consult with system prior to any DSSA CCT adjustments f) Review report on DSSA responses
	4.4.3.4: State Lead CCT Routine Costs	g) Review CCT guidance and applicability to individual PWSs h) Review water quality data with PWSs during sanitary survey i) Consult on required actions in response to source water change j) Consult on required actions in response to treatment change
4.4.4: State Service Line Inventory and Replacement Related Costs	4.4.4.1: SL Inventory Costs	a) Review updated service line inventory with lead connector information b) Review service line inventory updates c) Review validation report
	4.4.4.2: SLR Plan and Annual Report	d) Review SLR plan e) Review annual SLR program report
4.4.5: State POU Related Costs	4.4.5.1: One-Time POU Program Costs	a) Review POU plan b) Provide templates for POU outreach materials c) Review POU public education materials
	4.4.5.2: Ongoing POU Program Costs	d) Review sample invalidation request for POU monitoring

Component	Subcomponents	Activities[2]
		e) Review customer notification certifications f) Review annual POU program report
4.4.6: State Public Education-Related Costs	4.4.6.1: Consumer Notice	a) Review copy of the 3 calendar day notice and certification
	4.4.6.2: Activities Regardless of the Lead 90th Percentile Level	b) Provide templates for updated CCR language c) Provide templates for local and State health department lead outreach d) Review lead outreach materials for local and State health departments e) Participate in joint communication efforts with local and State health departments f) Review public education materials for service line disturbances g) Provide templates for inventory-related outreach materials h) Review inventory-related outreach materials i) Review public education certifications
	4.4.6.3: Public Education Activities in Response to Lead ALE	j) Provide template and review revised lead language k) Consult with CWS on other public education activities in response to lead ALE
	4.4.6.4: Public Education Activities in Response to Multiple Lead ALEs	l) Provide templates for systems with multiple lead ALEs m) Review outreach materials provided by systems with multiple lead ALEs n) Consult on filter program for systems with multiple lead ALEs o) Review plan for making filters available

Acronyms: ALE = action level exceedance; CCR = consumer confidence report; CCT = corrosion control treatment; CWS = community water system; DSSA = distribution system and site assessment; LSL = lead service line; LSLR = lead service line replacement; OWQPs = optimal water quality parameters; POU = point-of-use; PWS = public water system; SDWIS/Fed = Safe Drinking Water Act Information System/federal version; SL = service line; SLR = service line replacement' WQP = water quality parameter.

Notes:

[1] States will also incur burden for recordkeeping activities under the proposed LCRI, such as retaining records of decisions, supporting documentation, technical basis for decisions, and documentation submitted by the system. EPA has included burden for recordkeeping with each activity when applicable as opposed to providing separate burden estimates.

[2] EPA assigned a unique letter ID for each activity under a given rule component. Activities are generally organized with upfront, one-time activities first followed by ongoing activities. Note that these activities are different than the activities identified for PWSs in Exhibit 8.

In the SafeWater LCR model, the majority of the costs associated with States are determined on a per water system basis. State activities and costs are largely driven by the rule required actions that are triggered for the individual water systems. The exception to this rule is the implementation and administrative costs which are tallied on a per State basis. The per water system State costs and per State costs are summed to obtain aggregate costs for this category. For additional information on how the SafeWater LCR model uses unit cost data to estimate State costs see Chapter 4, section 4.4 of the proposed LCRI economic Analysis (USEPA, 2023b).

The SafeWater LCR cost model estimates that States will incur monetized incremental estimated annualized costs, under the low cost scenario, totaling $16.1 million at a three percent discount rate and $12.6 million at a seven percent discount rate. For the high cost scenario total estimated monetized incremental cost is $15.3 million at a three percent discount rate and $11.3 million at a seven percent discount rate.

4. Costs Impacts Associated with Additional Phosphate Usage

Adding orthophosphate CCT creates a protective inner coating on pipes that can inhibit lead leaching. However, once phosphate is added to the PWS, some of this incremental loading remains in the water stream as it flows into wastewater treatment plants (WWTPs) downstream. This generates treatment costs for certain WWTPs. In addition, at those locations where treatment does not occur, water with elevated phosphorus concentrations may discharge to water bodies and induce certain ecological impacts. Due to many water systems operating both the wastewater and drinking water systems, EPA is evaluating the costs of additional phosphate usage for informational purposes. These costs are not "likely to occur solely as a result of compliance" with the proposed LCRI, and therefore are not costs considered as part of the HRRCA under SDWA, section 1412(b)(3)(C)(i)(III).

To estimate the potential fate of the orthophosphate added at PWSs, EPA developed a conceptual mass balance model. EPA applied this conceptual model to estimate the increase in loading at WWTPs, given an initial loading from corrosion control at water treatment plants. WWTPs could incur costs because of upstream orthophosphate additions if they have permit discharge limits for phosphorus parameters. The percentage of WWTPs with phosphorus limits has increased over time. From 2007 to 2016, in annual percentage rate terms, the growth rate in the percentage of WWTPs with phosphorus limits is 3.3 percent (see Chapter 4, section 4.5.1 of the proposed LCRI Economic Analysis, USEPA, 2023b).

EPA applied the growth rate observed from 2007 to 2016 to estimate the anticipated percentage of WWTPs with phosphorus limits in future years. This growth rate results in an estimated 41 percent of WWTPs with phosphorus discharge limits after 35 years. Applied as the percentage of WWTPs that need to take treatment actions, this estimate is likely conservative.

The specific actions a WWTP might need to take to maintain compliance with a National Pollution Discharge Elimination System (NPDES) phosphorus permit limit will depend on the type of treatment present at the WWTP and the corresponding phosphorus removal provided. Based on a review of NPDES data, it is likely that most of the WWTPs that already have phosphorus limits have some type of treatment to achieve the limit.

Some treatment processes can accommodate incremental increases in influent loading and still maintain their current removal efficiency. Such processes might not need significant adjustment to maintain their existing phosphorus removal efficiency, given an incremental increase. Other treatment processes may need modifications to their design or operation to maintain their removal efficiency in the face of an influent loading increase.

EPA derived a unit cost of $5.44 per pound for removing incremental phosphorus (see Chapter 4, section 4.5.1 of the proposed LCRI Economic Analysis for additional information).

This unit cost includes the cost of additional chemical consumption and the operating cost of additional sludge processing and disposal. The costs a WWTP could incur depend on the magnitude of the loading increase relative to the specific WWTP's effluent permit limit. WWTPs, whose current discharge concentrations are closer to their limit, are more likely to have to act. WWTPs whose current treated water concentrations are well below their limit are less likely to incur costs but might, under certain conditions, incur costs (for example, when phosphorus removal achieved by technology in place at a WWTP is sensitive to incremental phosphorus loading increases and must be modified to continue to meet the limit). Furthermore, future phosphorus limits could be more stringent than existing limits.

Therefore, EPA conservatively assumed that any WWTP with a discharge limit for phosphorus parameters could incur costs. Accordingly, in calculating costs, EPA used the anticipated percentage of WWTPs with phosphorus discharge limits as the likelihood that incremental orthophosphate loading from a drinking water system would reach a WWTP with a limit. EPA combined this likelihood and the unit cost (previously estimated) with incremental phosphorus loadings to calculate incremental costs to WWTPs for each year of the period of analysis. The incremental annualized cost that WWTPs would incur to remove additional phosphorous associated with the LCRI, under the low cost scenario, ranges from $4.2 million to $4.3 million at a three and seven percent discount rate, respectively. The high cost scenario produced an incremental estimated impact of $5.8 million using a three percent discount rate, and $5.9 million at a seven percent discount rate.

EPA estimates that WWTP treatment reduces phosphorus loads reaching water bodies by 59 percent, but they are not eliminated. The rule's national-level total incremental phosphorus loads reaching water bodies are projected to grow over the period of analysis from the low/high scenario range of 343,000 to 491,000 pounds fifteen years after promulgation to the low/high scenario range of 511,000 to 693,000 pounds at year 35. See Chapter 4, section 4.5.2 of the proposed LCRI Economic Analysis (USEPA, 2023b) for information on how loading estimates are calculated. The ecological impacts of these increased phosphorous loadings are highly localized: total incremental phosphorus loadings will depend on the amount and timing of the releases, characteristics of the receiving water body, effluent discharge rate, existing total phosphorus levels, and weather and climate conditions. Detailed spatially explicit information on effluents and on receiving water bodies does not exist in a form suitable for this analysis. Rather, to evaluate the potential ecological impacts of the rule, EPA evaluated the significance of the national-level phosphorus loadings compared to other phosphorous sources in the terrestrial ecosystem.

To put these phosphorus loadings in context, estimates from the U.S. Geological Survey (USGS) Spatially Referenced Regression On Watershed Attributes (SPARROW) model suggest that anthropogenic sources deposit roughly 750 million pounds of total phosphorus per year (USEPA, 2019b). The total phosphorus loadings from the LCRI high cost scenario would contribute about 0.5 percent (3.9 million/750 million) of total phosphorus entering receiving waterbodies in a given year, and the incremental amount of total phosphorus associated with the proposed LCRI relative to the LCRR grows only 0.1 percent (693,000/750 million). At the national level, EPA expects total phosphorus entering waterbodies as a result of the proposed LCRI update to be small, relative to the total phosphorus load deposited annually from all other sources. National average load impacts may obscure localized ecological impacts in some circumstances, but the existing data do not allow an assessment as to whether this incremental load will induce ecological impacts in particular areas. It is possible, however, that localized impacts may occur in certain water bodies without restrictions on phosphate influents, or in locations with existing elevated phosphate levels.

An increase in phosphorus loadings can lead to economic impacts and undesirable aesthetic impacts. Excess nutrient pollution can cause eutrophication—excessive plant and algae growth—in lakes, reservoirs, streams, and estuaries throughout the United States. Eutrophication, by inducing primary production, leads to seasonal decomposition of additional biomass, consuming oxygen and creating a state of hypoxia, or low oxygen, within the water body. In extreme cases, the low to no oxygen states can create dead zones, or areas in the water where aquatic life cannot survive. Studies indicate that eutrophication can decrease aquatic diversity for this reason (e.g., Dodds et al., 2009). Eutrophication may also stimulate the growth of harmful algal blooms (HABs), or over-abundant algae or cyanobacteria populations. Algal blooms can seriously harm the aquatic ecosystem by blocking sunlight and creating diurnal swings in oxygen levels because of overnight respiration. Such conditions can starve and deplete aquatic species. In addition, rapid photosynthesis may consume dissolved inorganic carbon and elevate pH (Chislock et al., 2013). Certain types of phosphorous-fueled cyanobacterial blooms, may produce toxins to both humans and aquatic life. These toxins include microcystins (liver toxins) and neurotoxins. This issue is particularly prevalent in lakes or other slow-flowing water bodies. HAB events have directly or indirectly contributed to fish kill events by causing the absorption or ingestion of toxins, or by creating conditions of limited sunlight and oxygen (Glibert et al., 2005).

Total Monetized Costs

The estimated annualized low and high scenario costs, discounted at three percent and seven percent, that PWSs, households[17], and States will incur in complying with the baseline LCRR, the proposed LCRI, and incrementally are summarized in Exhibits 14 and 15. The estimated total monetized incremental annualized cost of the proposed LCRI range from $2.06 to $2.92 billion at a three percent discount rate, and $2.51 to $3.56 billion at a seven percent discount rate in 2022 dollars. The exhibits also detail the proportion of the annualized costs attributable to each rule component.

Exhibit 14: Estimated National Monetized Annualized Rule Costs - 3 Percent Discount Rate (millions of 2022 USD)

	Low Estimate			High Estimate		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$138.1	$169.6	$31.5	$151.1	$180.1	$29.0
PWS SLR*	$128.5	$1,892.0	$1,763.5	$221.7	$2,807.7	$2,586.0
Corrosion Control Technology	$543.0	$633.5	$90.5	$626.1	$767.8	$141.7
Point-of Use Installation and Maintenance	$2.6	$7.2	$4.6	$5.9	$14.5	$8.6
Public Education and Outreach	$95.1	$251.2	$156.1	$97.6	$262.0	$164.4
Rule Implementation and Administration	$0.1	$3.9	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$907.4***	***$2,957.4***	***$2,050.0***	***$1,102.6***	***$4,036.1***	***$2,933.5***
Household SLR Costs**	$9.0	$0.0	-$9.0	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$37.7	$53.8	$16.1	$40.4	$55.7	$15.3
Wastewater Treatment Plant Costs***	$2.5	$6.7	$4.2	$4.3	$10.1	$5.8

[17] Note that as part of the baseline (LCRR) analysis of service line replacement costs EPA assumed that customer-side service line replacements under the goal-based service line replacement program would be paid by the household. For the estimation of proposed LCRI service line replacement costs EPA assumed that all replacement cost would be borne by the PWS. These differing costing assumptions result in the positive household costs (not accruing to PWSs) reported under the baseline (LCRR) cost estimates while no household service line replacement costs are reported under the proposed LCRI. These assumptions also result in decreased incremental costs for the LCRI under household service line replacement costs, but the cost of replacing the customer-side of service lines is now included, by assumption, in the LCRI incremental costs for PWS service line replacement.

Total Annual Rule Costs	**$956.6**	**$3,017.9**	**$2,061.3**	**$1,180.5**	**$4,101.9**	**$2,921.4**

Note: Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

*Service line replacement includes full and partial lead service lines and galvanized requiring replacement service lines.

**EPA in the LCRR economic analysis (USEPA, 2020) assumed that the cost of customer-side service line replacements made under the goal-based replacement requirement would be paid for by households. The Agency also assumed that system-side service line replacements under the goal-based replacement requirement and all service line replacements (both customer-side and systems-side) would be paid by the PWS under the 3 percent mandatory replacement requirement. EPA made these modeling assumptions based on the different levels of regulatory responsibility systems faced operating under a goal-based replacement requirement versus a mandatory replacement requirement. While systems would not be subject to a potential violation for not meeting the replacement target under the goal-based replacement requirement, under the 3 percent mandatory replacement requirement the possibility of a violation could motivate more systems to meet the replacement target even if they had to adopt customer incentive programs that would shift the cost of replacing customer-side service lines from customers to the system. To be consistent with these LCRR modeling assumptions, under the proposed LCRI, EPA assumed that mandatory replacement costs would fall only on systems. Therefore, the negative incremental values reported for the "Household SLR Costs" category do not represent a net cost savings to households. They represent an assumed shift of the estimated service line replacement costs from households to systems. EPA has insufficient information to estimate the actual service line replacement cost sharing relationship between customers and systems at the national level of analysis.

***Due to many water systems operating both the wastewater and drinking water systems, EPA is evaluating the costs of additional phosphate usage for informational purposes. These costs are not "likely to occur solely as a result of compliance" with the proposed LCRI, and therefore are not costs considered as part of the HRRCA under SDWA, section 1412(b)(3)(C)(i)(III).

Acronyms: LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 15: Estimated National Monetized Annualized Rule Costs - 7 Percent Discount Rate (millions of 2022 USD)

	Low Estimate			High Estimate		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$153.6	$170.1	$16.5	$171.1	$182.8	$11.7
PWS SLR*	$172.3	$2,385.6	$2,213.3	$292.4	$3,531.7	$3,239.3
Corrosion Control Technology	$566.6	$646.8	$80.2	$660.5	$785.3	$124.8
Point-of Use Installation and Maintenance	$2.6	$6.4	$3.8	$5.9	$12.8	$6.9
Public Education and Outreach	$102.5	$287.2	$184.7	$107.3	$302.4	$195.1
Rule Implementation and Administration	$0.2	$6.4	$6.2	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$997.8***	***$3,502.5***	***$2,504.7***	***$1,237.5***	***$4,821.6***	***$3,584.1***
Household SLR Costs**	$11.3	$0.0	-$11.3	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$42.0	$54.6	$12.6	$45.6	$56.9	$11.3

Wastewater Treatment Plant Costs***	$3.4	$7.7	$4.3	$6.1	$12.0	$5.9
Total Annual Rule Costs	**$1,054.5**	**$3,564.8**	**$2,510.3**	**$1,331.6**	**$4,890.5**	**$3,558.9**

Note: Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

*Service line replacement includes full and partial lead service lines and galvanized requiring replacement service lines.

**EPA in the LCRR economic analysis (USEPA, 2020) assumed that the cost of customer-side service line replacements made under the goal-based replacement requirement would be paid for by households. The Agency also assumed that system-side service line replacements under the goal-based replacement requirement and all service line replacements (both customer-side and systems-side) would be paid by the PWS under the 3 percent mandatory replacement requirement. EPA made these modeling assumptions based on the different levels of regulatory responsibility systems faced operating under a goal-based replacement requirement versus a mandatory replacement requirement. While systems would not be subject to a potential violation for not meeting the replacement target under the goal-based replacement requirement, under the 3 percent mandatory replacement requirement the possibility of a violation could motivate more systems to meet the replacement target even if they had to adopt customer incentive programs that would shift the cost of replacing customer-side service lines from customers to the system. To be consistent with these LCRR modeling assumptions, under the proposed LCRI, EPA assumed that mandatory replacement costs would fall only on systems. Therefore, the negative incremental values reported for the "Household SLR Costs" category do not represent a net cost savings to households. They represent an assumed shift of the estimated service line replacement costs from households to systems. EPA has insufficient information to estimate the actual service line replacement cost sharing relationship between customers and systems at the national level of analysis.

***Due to many water systems operating both the wastewater and drinking water systems, EPA is evaluating the costs of additional phosphate usage for informational purposes. These costs are not "likely to occur solely as a result of compliance" with the proposed LCRI, and therefore are not costs considered as part of the HRRCA under SDWA, section 1412(b)(3)(C)(i)(III).

Acronyms: LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

D. Benefits Analysis

The proposed LCRI is expected to result in significant health benefits, since both lead and copper are associated with adverse health effects. Lead is a highly toxic pollutant that can damage neurological, cardiovascular, immunological, developmental, and other major body systems. There is no known safe level of exposure to lead (USEPA, 2013). EPA is particularly concerned about ongoing exposure experienced by children because lead can affect brain development, which impacts lifelong level of function. Additionally, children through their physiology and water ingestion requirements may be at higher risk. Research shows that, on average, formula-fed infants and young children consume more drinking water per day on a body weight basis than adolescents. Using the USDA Continuing Survey of Food Intakes by Individuals (CSFII) data, Kahn and Stralka (2009) demonstrated this trend, is most pronounced in children under one year of age who drink more than double older children and adults per kg of body weight. Additionally, children absorb two to four times more lead than adults through the gastrointestinal tract (Mushak, 1991; WHO, 2011; and Ziegler et al., 1978). EPA's health risk reduction and benefits assessment of the LCRI revisions concentrates on quantification and monetization of the estimated impact of reductions in lead exposure on IQ values and cases of ADHD in children, lower birth weights in children of women of childbearing age, and cases of cardiovascular disease premature mortality in adults. As explained in appendix D of the proposed LCRI Economic Analysis (USEPA, 2023b), there are additional non-quantified lead health impacts to both children and adults that will be realized as a result of this rulemaking. Therefore, the quantified benefits of this rule are likely underestimated.

Although copper is an essential element for health, excess intake of copper has been associated with several adverse health effects. Most commonly, excess exposure to copper results in gastrointestinal symptoms such as nausea, vomiting, and diarrhea (National Research Council, 2000). In susceptible populations, such as children with genetic disorders or predispositions to accumulate copper, chronic exposure to excess copper can result in liver toxicity. Because household level data on the change in copper concentrations that result from changes in CCT are not available, this analysis does not quantify any potential benefits from reduced copper exposure that may result from the rule. See Appendix E in the proposed LCRI Economic Analysis for additional copper health impact information.

1. Modeled Drinking Water Lead Concentrations

In updating EPA's drinking water lead concentrations for the proposed LCRI, the Agency built upon the data and models used in the analysis of the final LCRR. Detailed information on the residential lead concentration data and modeling from the final LCRR can be found in

Chapter 6 of the final LCRR Economic Analysis (USEPA, 2020c). In the 2021 LCRR analysis, EPA collected and used data on lead concentrations and information regarding LSL and CCT status, location, and date of sample collection, representing 14 water systems across the United States and Canada. EPA updated this data for the LCRI analysis by initially identifying eight additional sampling datasets.[18] After close assessment, it was determined that seven of the datasets had data availability and study design issues and could not be included.[19] Only the 324 samples collected from the City of Clarksburg, WV in fall to winter of 2021 could be added to the lead concentration dataset, resulting in a total of 18,363 samples collected from 1,657 homes in 16 cities representing 15 city water systems. EPA grouped the samples into LSL status categories ("LSL," "Partial LSL," "No LSL"). The samples were also grouped by CCT treatment, assigning status as having "None," "Partial," or "Representative." "Partial" includes those water systems with some pH adjustment and lower doses of a phosphate corrosion inhibitor, but this treatment is not optimized. "Representative" are those water systems in the dataset that have higher doses of phosphate inhibitors, which in the model are considered optimized. For additional detail see Chapter 5, section 5.2.1 of the proposed LCRI Economic Analysis (USEPA, 2023b).

EPA fit several regression models, following the same methodology from the LCRR final benefits analysis (see Economic Analysis Chapter 6, section 6.2.2 of the final LCRR Economic Analysis (USEPA, 2020c)), of tap water lead concentration as predicted by LSL presence ("LSL" or "No LSL"), LSL extent ("Partial LSL"), CCT status, and "profile liter." Profile liter is the cumulative volume a sample represented within a consecutive sampling series at a single

---

[18] EPA identified 8 data sets from Clarksburg WV, Cleveland OH, Chicago IL, Kalamazoo MI, Parchment MI, Flint MI, Galesburg IL and Sebring OH with drinking water lead sampled collected from 2016 to 2021.
[19] For additional detail on the assessment of the lead concentration data see Chapter 5, section 5.2.1 of the proposed LCRI (USEPA, 2023b).

location and time. Models to describe the profile liter accounted for the variation among sampling events, sampling sites, and city. The water lead concentrations exhibited a right-skewed distribution; therefore, the variable was log-transformed to provide a better modeled fit of the data. EPA selected one of the regression models based on its fit and parsimony and used it to produce simulated lead concentrations for use in the benefits analysis (Exhibit 5-8, in Chapter 5 of the proposed LCRI EA). The selected model suggests that besides water system, residence, and sampling event, the largest effects on lead concentration in tap water come from the presence of LSLs and the number of liters drawn since the last stagnation period. Although CCT can reduce lead concentrations from LSLs and other sources of lead, such as residential plumbing fixtures, the presence or absence of CCT produces smaller effects on water lead concentration than the presence or absence of LSLs. Because locations with LSLs are more likely to have high lead concentrations than those without, CCT reduces water lead concentrations more in homes served by LSLs than in those not served by LSLs. See the Economic Analysis document for the proposed LCRI, Chapter 5, section 5.2.2, Exhibit 5-9 (USEPA, 2023b) for additional detail and estimated regression coefficients. The regression results indicate that although CCT can significantly reduce water lead concentrations the removal of LSLs in systems with representative CCT will still reduce water lead concentrations. The regression model results for the LCRI analysis are consistent with those conducted for the LCRR, which is not unexpected given the fact that the Agency added approximately two percent of new data to the drinking water lead concentration dataset.

To statistically control for some sources of variability in the input data, EPA, following the LCRR analysis, did not use summary statistics from the original data directly in estimating the effects of LSL and CCT status. Instead, EPA produced simulated mean lead concentrations for 500,000 samples, based on the selected regression model. The simulations were performed on the log-scale to conform to the fitted model (which used a log-transformed water lead concentration variable) and converted to the original scale to produce geometric means and geometric standard deviations. Geometric means are more representative of the central tendency of a right-skewed distribution than are arithmetic means and prevent overestimation of the impact of water lead levels on estimated blood lead levels and resulting benefits values. The simulated sample concentrations represent new estimates for the updated lead concentration dataset. These simulations rely on estimates of variability and uncertainty from the regression model described above and given information on LSL and CCT status. For more detail regarding this regression, see Chapter 5, section 5.2.2 of the proposed LCRI Economic Analysis (USEPA, 2023b). Individual estimates are best thought of as the central tendency for a lead tap sample concentration, given regression model parameters and estimated variance. The simulated samples represent, on average, the lead concentrations taken after a short flushing period of roughly 30 seconds for all combinations of LSL and CCT status. This represents a point near the average peak lead concentration for homes with full or partial LSLs, and a point slightly below the peak lead concentration for homes with no LSLs, regardless of CCT status.

EPA estimates that improving CCT will produce significant reductions in lead tap water concentration overall. However, in the case of “no LSL”, the final model produced predictions of drinking water concentrations that overlapped almost completely for all CCT conditions.[20] In the available profile data there were no statistically significant differences in measured water lead concentrations between the different CCT scenarios when LSLs were not present, likely because

[20] EPA does not believe that there are lead water mains in the country. Water mains are typically six to 16 inches in diameter whereas service lines have a smaller diameter. The common water main materials include ductile iron, PVC, asbestos cement, HDPE, and concrete steel (Folkman, 2018). Lead service lines are two inches or less in diameter (LSLR Collaborative, n.d.g.).

apart from LSLs the remaining sources of lead in residential plumbing (old solder and brass) are small, compared to the LSL, and contribute far less lead to a multi-liter sequential sampling profile. Therefore, EPA used the pooled estimate of predicted drinking water concentrations for all residences with no LSL regardless of CCT condition for the main analysis in Chapter 5 of the proposed LCRI Economic Analysis (USEPA, 2023b).[21]

Because small CWSs that serve 3,300 or fewer persons have flexibility in the compliance option they select in response to a lead action level exceedance, some CWSs are modeled as installing point-of-use devices at all residences. See section V.G. of this document for additional information on the compliance alternatives available to small CWSs. For individuals in these systems, EPA assumed in the analysis, that consumers in households with point-of-use devices are exposed to the same lead concentration as residents with "No LSL" and "Representative" CCT in place. The proposed LCRI also requires the water systems to make available to all customers pitcher filters or point-of-use devices certified to reduce lead in cases where multiple ALEs have occurred. See section V.I. of this document for additional information on the regulatory requirements associated with multiple action level exceedances. EPA assumed that households receiving pitcher filters or point-of-use devices would be exposed to the same lead concentration as residents with "No LSL" and "Representative" CCT in place. Uncertainties in

[21] Note that EPA in the economic analysis does not make restrictive assumptions in pairing specific CCT and LSL statuses. It is not improbable to have systems with CCT in place when no LSLs are present. The pre-2021 LCR requires all systems serving 50,000 or more people to install CCT. Systems may also install CCT for other reasons apart from the LCR. Also, a number of systems have had 90th percentile tap sample values above the AL requiring CCT even when LSLs are not present due to initial corrosivity of the water and secondary sources of lead like old brass and solder. Systems that have LSLs but no CCT are possible because the existing water chemistry in a system may be non-corrosive and therefore lead 90th percentile lead tap sample values may be lower than the AL. EPA combine data from two source to estimate the percent of CCT systems with LSLs, SDWIS and DWINSA data. See sections 3.3.3 and 3.3.4 for the Economic Analysis of the proposed LCRI (USEPA, 2023b) for additional detail.

the water modeling are discussed in section 5.2.5 and in Exhibit 5-43 of the proposed LCRI EA (USEPA, 2023c).

Exhibit 16: LSL and CCT Scenarios and Simulated Geometric Mean Tap Water Lead Concentrations and Standard Deviations at the Fifth Liter Drawn After Stagnation for each Combination of LSL and CCT Status

LSL Status	CCT Status	Simulated Mean of Log Lead (µg/L)	Simulated SD [a] of Log Lead (µg/L)	Simulated Geometric Mean Lead (µg/L)	Simulated Geometric SD[a] of Lead
LSL	None	2.90	1.31	18.11	3.71
Partial LSL	None	2.13	1.32	8.40	3.73
No LSL	None	**-0.21[b]**	**1.32[b]**	**0.81[b]**	**3.72[b]**
LSL	Partial	2.30	1.32	9.99	3.73
Partial LSL	Partial	1.55	1.32	4.71	3.73
No LSL	Partial	**-0.21[b]**	**1.32[b]**	**0.81[b]**	**3.72[b]**
LSL	Representative	1.68	1.32	5.38	3.74
Partial LSL	Representative	0.96	1.32	2.62	3.73
No LSL	Representative	**-0.21[b]**	**1.32[b]**	**0.81[b]**	**3.72[b]**

[a] Standard deviations reflect "among-sampling event" variability.
[b] Bolded values show how simulated results were pooled to produce a common estimate for homes with no LSL across CCT conditions.

In the estimation of the benefits of the proposed LCRI, each modeled person within a water system is assigned to one of the estimated drinking water lead concentrations in Exhibit 16, depending on CCT, point-of-use, pitcher filter, and LSL/GRR service line status. Note that EPA assumes GRR service lines are equivalent to LSLs in terms of modeled water lead concentrations. EPA estimated benefits under both the low and high scenarios used in the proposed LCRI analysis to characterize uncertainty in the estimates. With regard to benefit, the low and high scenarios differ by the number of PWSs that will exceed the action level under the revised tap sampling requirements and the concentration-response functions that characterize how reductions in blood lead levels (caused by changes in lead exposure) translate into avoided IQ reductions, reductions in lower birth weight, cases of ADHD, and cardiovascular disease premature mortality (see Chapter 4, section 4.2 and Chapter 5, section 5.1 of the proposed LCRI Economic Analysis (USEPA, 2023b). EPA predicted the status of each system under the low and high scenarios at baseline (prior to rule implementation) and in each year of rule implementation for both the LCRR and proposed LCRI. Depending on the timing of required actions that can change CCT, point-of-use, pitcher filter, and LSL/GRR service line status under both the LCRR and proposed LCRI low and high scenario model runs, changes in lead concentration and resultant blood lead are predicted every year for the total population served by the systems for the 35-year period of analysis. In the primary benefits analysis for the proposed rule, improvements to CCT and the use of installed point-of-use devices are only predicted for individuals in households with LSLs prior to implementation of the LCRR and proposed LCRI requirements (consistent with discussion above about the limits of the data for predicting the impact of CCT when LSLs/GRR service lines are not present). In the model, LSL/GRR service line removals are predicted by water system, by year, for both the LCRR and LCRI and multiplied by the average number of persons per household (across demographic categories) to determine the number of people shifting from one LSL/GRR service line status to another. To predict the changes in exposure that result from an improvement in CCT, EPA predicts the entire LSL/GRR service line population of a water system will move to the new CCT status at the same time. EPA also assumes that the entire water system moves to the drinking water lead concentration assigned to point-of-use devices when this option is implemented, which implies that everyone in households in a distribution system with LSLs/GRR service lines is properly using the point-of-use devices. As part of the multiple action level exceedances requirements under the proposed LCRI, EPA assumes that only 20 percent of a water system's population with LSL, GRR service line, and service lines of unknown material will request and receive pitcher filters or point-of-use devices and hence will move to the assigned drinking water lead concentration for pitcher filter or point-of-use device use, which implies that everyone who receives a pitcher filter or point-of-use device is using it properly. See Chapter 5, section 5.3 of the proposed LCRI Economic Analysis (USEPA, 2023b) for more detailed information on the number of people switching lead concentration categories under the low and high scenarios.

2. Blood Lead Modeling

EPA has determined that health impact functions exist in the literature so that the Agency can quantify the improvements from the decreases in water lead concentrations that result from implementation of the proposed LCRI. The four health endpoints EPA quantifies are increased IQ values and reduced cases of ADHD in children, reductions in lower birth weights in children of women of childbearing age, and reduced cases of cardiovascular disease premature mortality in adults. As a prerequisite to estimating the impact to these health endpoints, EPA must first use the drinking water lead concentration data it developed to determine the potential impact to blood lead levels from the regulatory requirements of both the LCRR (baseline) and the proposed LCRI for both children aged zero to seven years, using the coupled Stochastic Human Exposure and Dose Simulation Multimedia (SHEDS-multimedia) model and the Integrated Exposure and Uptake Biokinetic model (SHEDS-Pb, formerly known as SHEDS-IEUBK), and eight years olds through adulthood with the All Ages Lead Model (AALM).

3. Estimating Blood Lead Levels in Children (0 – 7 year olds)

Consistent with the LCRR benefits analysis, EPA estimated the distribution of blood lead levels in children, age zero to seven, using EPA's SHEDS-Multimedia model coupled with its IEUBK model. For further information on SHEDS-Pb model development and evaluation, refer to Zartarian et al. (2017). As a first step in estimating the blood lead levels, EPA utilized the SHEDS-Multimedia model, which can estimate distributions of lead exposure, using a two-stage

Monte Carlo sampling process, given input lead concentrations in various media and human behavior data from EPA's Consolidated Human Activity Database (CHAD) and the Centers for Disease Control and Prevention's (CDC) National Health and Nutrition Examination Survey (NHANES). SHEDS-Multimedia, in this case, uses individual time-activity diaries from CDC's NHANES and EPA's CHAD for children aged zero to seven to simulate longitudinal activity diaries. Information from these diaries is then combined with relevant lead input distributions (e.g., outdoor air lead concentrations) to estimate exposure. Drinking water tap concentrations for each of the modeled LSL/GRR service line and CCT scenarios, above, were used as the drinking water inputs to SHEDS-Multimedia. For more detail on the other lead exposure pathways that are held constant as background in the model, see Chapter 5, section 5.4, of the proposed LCRI Economic Analysis (USEPA, 2023b).

In the SHEDS-Pb coupled methodology, the SHEDS model takes the place of the exposure and variability components of the IEUBK model by generating a probability distribution of lead intakes across media. These intakes are multiplied by route-specific (e.g., inhalation, ingestion) absorption fractions to obtain a distribution of lead uptakes (see Exhibit 5-21 in Chapter 5, section 5.4 of the proposed LCRI EA, USEPA, 2023b). This step is consistent with the uptake estimation that would normally occur within the IEUBK model. The media-specific uptakes can be summed across exposure routes to give total lead uptake per day. Next, EPA used age-based relationships derived from IEUBK, through the use of a polynomial regression analysis, to relate these total lead uptakes to blood lead levels. Exhibit 17 presents modeled SHEDS-Pb blood lead levels in children by year of life and LSL or GRR service line, CCT status, pitcher filter and point-of-use device. The blood lead levels in this exhibit represent what children's blood lead level would be if they lived under the corresponding LSL or GRR service line, point-of-use, pitcher filter and CCT status combination for their entire lives. Note that when "No LSL" is the beginning or post-rule state, 0.81 µg/L (the simulated geometric mean) is the assumed concentration across all levels of CCT status (none, partial, representative). As previously noted, the extent to which changes in CCT status make meaningful differences in lead concentrations for those without LSLs or GRR service lines cannot be determined from the data available to EPA.

Exhibit 17: Modeled SHEDS-Pb Geometric Mean Blood Lead Levels in Children for Each Possible Drinking Water Lead Exposure Scenario for Each Year of Life

Lead Service Line Status	Corrosion Control Treatment Status	GM Blood Lead Level (µg/dL)[b] for Specified Year of Life							
		0-1[a]	1-2	2-3	3-4	4-5	5-6	6-7	Avg.[c]
LSL	None	3.48	2.43	2.61	2.46	2.44	2.57	2.29	2.61
Partial LSL	None	2.27	1.83	1.90	1.77	1.79	1.86	1.63	1.86
No LSL	None	0.96	1.13	1.16	1.15	1.13	1.19	0.98	1.10
LSL	Partial	2.49	1.89	2.00	1.92	1.92	1.99	1.76	2.00
Partial LSL	Partial	1.72	1.51	1.56	1.50	1.50	1.53	1.35	1.52
No LSL	Partial	0.96	1.13	1.16	1.15	1.13	1.19	0.98	1.10
LSL	Representative	1.80	1.56	1.64	1.57	1.57	1.62	1.41	1.60
Partial LSL	Representative	1.33	1.31	1.34	1.33	1.32	1.36	1.17	1.31
No LSL	Representative	0.96	1.13	1.16	1.15	1.13	1.19	0.98	1.10
POU		0.96	1.13	1.16	1.15	1.13	1.19	0.98	1.10
Pitcher Filter		0.96	1.13	1.16	1.15	1.13	1.19	0.98	1.10

[a] Due to lack of available data, blood lead levels for the first year of life are based on the regression from IEUBK for 0.5- to 1-year-olds only.

[b] These values represent the blood lead for a child living with the LSL/CCT status in the columns to the left.

[c] This column contains calculated average lifetime blood lead levels assuming a child lived in the corresponding LSL/CCT scenario for their entire life. Each year blood lead corresponding to actual modeled child is summed and divided by 7 in the model to estimate lifetime average blood lead.

This average includes data for age groups 0-1 through 6-7 years since IQ benefits were calculated at age 7.

4. Estimating Older Child and Adult Blood Lead Levels

In order to estimate the changes in blood lead levels in individuals from eight years old through adulthood (referred to here as adults) associated with the proposed LCRI, EPA selected the AALM. The AALM tool is primarily intended for "quantitatively relating lead (Pb) exposures from environmental media that occur over the life time to Pb levels and concentrations in blood, other body tissues, and excreta" (USEPA, c). The tool consists of a lead exposure model and a lead biokinetics model. User inputs for selected environmental media (soil, dust, water, air and food) are used in the exposure model to predict lead intake per day for a simulated individual accounting for sex and age differences. Lead absorption by inhalation or ingestion are simulated in the biokinetics model to calculate the daily total rate of lead transfer to the central compartment. The AALM tool produces an estimate of lead concentration in various tissues and excreta, including estimates of blood lead levels over a lifetime.

The water concentrations calculated for each combination of LSL and CCT status from EPA's regression modelling, Exhibit 16 above, was used to estimate the distribution of blood lead levels in males and females aged eight to 79 years using EPA's AALM. Each distinct LSL/GRR and CCT scenario was modeled and represented by water lead concentrations, and each scenario was run for females and males as the AALM requires that each sex be modeled separately. Model inputs include: water intake rates per age group, which are the same across sexes and were obtained from EPA's 2011 Exposure Factors Handbook (Table 3-1); lead intake from food for each age group, which varies by sex and was calculated using values from the AALM TSD, Appendix C; lead concentrations in soil and dust, which are consistent for all age groups and calculated as a weighted average based on data from the U.S. Department of Housing and Urban Development's (HUD) American Healthy Homes Survey (AHHS) II Lead Findings report (USHUD, 2021); soil and dust intake rates by age group up to age 21 were estimated by Ozkaynak et al. (2022), which used EPA's SHEDS Soil and Dust model; and an air lead concentration of 0.01 μg/m^3 was used for all age groups and sexes based on national air monitoring results reporting in Cavender (2013).

The AALM modeling output provides the yearly estimated blood lead level (μg/dL) by age from eight to 79 years for each combination of sex, LSL/GRR service line, CCT, point-of-use and pitcher filter combination. For additional detailed information on the AALM inputs and modeling results see Chapter 5, section 5.4 of the proposed LCRI Economic Analysis (USEPA, 2023b) A summary of the AALM results by sex are presented in Exhibit 18.

Exhibit 18: Estimates of Geometric Mean Blood Lead Levels in Older Children and Adults (Ages 8-79) for Each Possible Drinking Water Lead Exposure Scenario

Lead Service Line Status	Corrosion Control Treatment Status	Sex	Geometric Mean Blood Lead Level (μg/dL) for Specified Age Group[1] in Years from the AALM							
			8-15	16-19	20-29	30-39	40-49	50-59	60-69	70-79
LSL	None	Male	1.20	1.06	1.40	1.52	1.61	1.67	1.67	1.66
		Female	1.13	1.21	1.66	1.80	1.92	2.01	2.01	2.00
Partial LSL	None	Male	0.88	0.79	1.01	1.06	1.08	1.10	1.09	1.08
		Female	0.83	0.87	1.16	1.20	1.24	1.27	1.26	1.24
No LSL	None	Male	0.63	0.57	0.71	0.70	0.67	0.66	0.64	0.62
		Female	0.59	0.60	0.76	0.74	0.71	0.69	0.67	0.65
LSL	Partial	Male	0.93	0.83	1.08	1.13	1.17	1.20	1.19	1.17
		Female	0.88	0.93	1.24	1.30	1.36	1.39	1.38	1.37
Partial LSL	Partial	Male	0.76	0.68	0.87	0.88	0.88	0.89	0.87	0.85
		Female	0.71	0.74	0.96	0.98	0.98	0.99	0.97	0.96
No LSL	Partial	Male	0.63	0.57	0.71	0.70	0.67	0.66	0.64	0.62
		Female	0.59	0.60	0.76	0.74	0.71	0.69	0.67	0.65
LSL	Representative	Male	0.78	0.70	0.89	0.91	0.92	0.93	0.91	0.89
		Female	0.73	0.77	1.00	1.02	1.03	1.04	1.02	1.01

Lead Service Line Status	Corrosion Control Treatment Status	Sex	Geometric Mean Blood Lead Level (µg/dL) for Specified Age Group[1] in Years from the AALM							
			8-15	16-19	20-29	30-39	40-49	50-59	60-69	70-79
Partial LSL	Representative	Male	0.69	0.62	0.78	0.78	0.77	0.76	0.75	0.73
		Female	0.65	0.67	0.86	0.85	0.84	0.83	0.81	0.79
No LSL	Representative	Male	0.63	0.57	0.71	0.70	0.67	0.66	0.64	0.62
		Female	0.59	0.60	0.76	0.74	0.71	0.69	0.67	0.65
POU		Male	0.63	0.57	0.71	0.70	0.67	0.66	0.64	0.62
		Female	0.59	0.60	0.76	0.74	0.71	0.69	0.67	0.65
Pitcher Filter		Male	0.63	0.57	0.71	0.70	0.67	0.66	0.64	0.62
		Female	0.59	0.60	0.76	0.74	0.71	0.69	0.67	0.65

[1]The AALM reports daily BLL values. EPA averages the daily data to obtain yearly data which is used in the SafeWater LCR modeling. For presentation purposes the age groups represent in this Exhibit are mean BLL for the ages specified in the range.

5. Quantifying and Monetizing Health Endpoints

EPA quantified and monetized the change in four health endpoints in the economic analysis of the proposed LCRI. The endpoints are reductions: in IQ values and cases of ADHD in children, lower birth weights in children of women of childbearing age, and cases of cardiovascular disease premature mortality in adults. The subsections below outline the methods EPA used in analysis of each of these endpoints.

6. Estimating IQ Benefits

EPA uses the SHEDS-Pb estimated set of potential geometric mean blood lead levels for children zero to seven years of age, presented in Exhibit 17, as inputs in the modeling of IQ benefits for the proposed LCRI. The benefits analysis uses lifetime average blood lead values to determine estimates of avoided IQ loss that correspond to reductions in water lead concentrations resulting from changes in LSL/GRR, point-of-use, pitcher filter, and CCT status at some point in a representative child's life (between ages zero and seven), and those made prior to the child's birth for those born seven years after the LCRR (baseline) or LCRI are implemented. Therefore, the SafeWater LCR model, in each year of the analysis, calculates IQ benefits based on the cohort, or percent of the modeled population, that turns seven years of age in the year being analyzed. The SafeWater LCR model, for both the LCRR (baseline) and proposed LCRI, tracks PWS implementation over the period of analysis. This data allows the model to determine the number of children that fall within each of the 11 possible LSL/GRR service line, CCT, point-of-use, pitcher filter lead exposure scenarios for each of the seven years prior to the year being modeled. The model then calculates a set of average lifetime blood lead levels for the possible LSL/GRR service line, CCT, point-of-use, pitcher filter exposure scenarios (the set of scenarios includes not only the change in LSL/GRR service line, CCT, point-of-use and pitcher filter status but also the years, zero to seven, in which the status changes occur) and applies these values to the appropriate percentage of the seven year old cohort (the percent of seven year olds that are estimated to experience the scenarios represented by the average lifetime blood lead levels (BLLs)) for that analysis year under both the LCRR (baseline) and LCRI requirements. The change in average lifetime BLLs for the seven year old cohort is then used to determine the incremental benefit of avoided IQ losses for both the LCRR and proposed LCRI.

In order to relate the child's estimated average lifetime BLL to an estimate of avoided IQ loss, EPA selected concentration-response functions based on lifetime blood lead from two studies. For the high estimate function, the Agency used a study by Lanphear et al. (2019), and for the low estimate EPA selected the independent analysis by Crump et al. (2013), which is based on the same data used in Lanphear et al. (2019). Since the regulatory requirements are expected to reduce chronic exposures to lead, EPA selected lifetime blood lead as the most appropriate measure with which to evaluate benefits. No threshold has been identified for the neurological effects of lead (Budtz-Jørgensen et al., 2013; Crump et al., 2013; Schwartz et al., 1991; USEPA, 2013). Therefore, EPA assumes that there is no threshold for this endpoint and quantified avoided IQ loss associated with all blood lead levels.

The estimated value of an IQ point decrement is derived from USEPA's (2019d) reanalysis of Salkever (1995), which estimates that a one-point increase in IQ results in a 1.871 percent increase in lifetime earnings for males and a 3.409 percent increase in lifetime earnings for females. Lifetime earnings are estimated using the average of 10 American Community Survey (ACS) single-year samples (2008 to 2017) and projected cohort life tables from the Social Security Administration. Projected increases in lifetime earnings are then adjusted for the direct costs of additional years of education and forgone earnings while in school. USEPA's (2019d) reanalysis of Salkever (1995) estimates a change of 0.0812 years of schooling per change in IQ point resulting from a reduction in lead exposure for males and a change of 0.0917 years of schooling for females.

To estimate the uncertainty underlying the model parameters of the Salkever (1995) reanalysis, USEPA (2019d) used a bootstrap approach to estimate a distribution of model parameters over 10,000 replicates (using random sampling with replacement). For each replicate, the net monetized value of a one-point increase in IQ is subsequently estimated as the gross value of an IQ point based on a lifetime of earnings, less the value of additional education costs and foregone earnings while in school. EPA uses an IQ point value discounted to age seven. Based on EPA's reanalysis of Salkever (1995), the mean value of an IQ point in 2022 dollars, discounted to age seven, is $6,887 using a seven percent discount rate and $27,336 using a three percent discount rate.[22] See Appendix F, of the proposed LCRI Economic Analysis (USEPA, 2023b) for a sensitivity analysis of the value of avoided IQ loss benefits based on Lin et al. (2018).

EPA used the estimated changes in lifetime (age zero to seven) average blood lead levels that result from changes in LSL/GRR, CCT, point-of-use use, and/or pitcher filter status as inputs to the concentration response functions estimated by Lanphear et al. (2019) and Crump et al. (2013). The resultant annual avoided IQ decrements per change in LSL, CCT, point-of-use, and/or pitcher filter status change are then summed and multiplied by the EPA reanalyzed Salkever (1995) value per IQ point, which represents a weighted average for males and females (three or seven percent depending on the discount rate being used to annualize the stream of benefits across the period of analysis). This annual stream of benefits was annualized at three and seven percent, and further discounted to year one of the period of analysis. Note that this analysis quantifies the benefits from water quality changes that occur during the 35-year period of analysis but accounts for the fact that monetized IQ benefits continue to accrue beyond the 35-year period because they are not experienced by modeled children until they reach adulthood. See Exhibit 19 (discounted at three percent) and Exhibit 20 (discounted at seven percent), in section VIII.D.10., for the estimated benefit from avoided IQ losses from lead and GRR service line replacement, CCT installation and re-optimization, point-of-use program operation, and pitcher filter distribution as a result of the LCRR, the proposed LCRI, and the incremental

[22] It should be noted that these values are slightly different than those used in other recent rulemaking (*e.g.,* the Lead Dust Standard). This is simply due to the differences in the age of the child when the benefits are accrued in the analysis. Benefits for the LCRI are accrued at age seven and therefore the value of an IQ point is discounted back to age 7 in the LCRI analysis. This results in a slightly higher estimate than the values used for the Lead Dust Standard, which are discounted to age zero and age three, respectively. It should also be noted, and is described in Chapter 5, Section 5.4.5 of the proposed LCRI Economic Analysis (USEPA, 2023b), that the benefits in the LCRI are further discounted back to year one of the analysis and annualized within the EPA LCRI cost-benefit model.

difference between the two sets of regulatory requirements under both the low and high scenarios. For detailed information on the quantification and monetization of the IQ benefits associated with the proposed LCRI see Chapter 5, section 5.5 of the proposed LCRI Economic Analysis (USEPA, 2023b).

7. Estimated ADHD Benefits

This is the first regulation in which EPA has estimated benefits of avoided cases of ADHD associated with reductions in lead exposure; as discussed below the approach for quantifying such benefits will continue to evolve as our understanding of the potential relationship improves. The causes of ADHD are not fully understood, but research suggests a number of potential causes, including genetics, exposure to environmental toxins, prenatal cigarette smoking or alcohol intake, and brain changes, such as areas of the brain that control attention being less active in children with ADHD (Tripp et al., 2009; Pliszka et al., 2007). The EPA lead ISA states that in children, "attention was associated with biomarkers of Pb exposure representing several different lifestages and time periods. Prospective studies did not examine a detailed Pb biomarker history, and results do not identify an individual critical lifestage, time period, or duration of Pb exposure associated with attention decrements in children. Associations in prospective studies for attention decrements with tooth Pb level, early childhood average and lifetime average blood Pb levels point to an effect of cumulative Pb exposure." Therefore, additional research is needed to understand the critical exposure window (thus exposure metric), the mode of action of lead in the development of ADHD and/or related symptoms, and potential interplay with genetic factors and exposures to other substances. Symptoms of ADHD alone, while important for the child and their families, can be difficult to link to monetizable outcomes considered in benefits analysis such as reduced productivity and increased medical and educational expenditures. Therefore, EPA has chosen diagnosed cases of ADHD as an endpoint in this benefits analysis, because literature exists linking ADHD diagnosis to these monetizable outcomes. The larger body of literature on attention, impulsivity, and hyperactivity symptoms in children supports this association. EPA chose a high and low dose-response function for the estimates of avoided cases to partially address the uncertainty in the most appropriate dose-response function to use in estimating avoided cases due to the proposed rule.

The approach used to quantify ADHD here is based on review and analysis that Abt Associates (Abt Associates, 2023) conducted under contract to EPA. Specifically, the benefits analysis uses average blood lead values to determine estimates of avoided diagnosed ADHD cases that correspond to reductions in water lead concentrations resulting from changes in LSL/GRR, point-of-use, pitcher filter, and CCT status. E

PA used the concentration response functions from two studies to bracket the estimated number of ADHD cases avoided. EPA's high estimate is based on a study by Froelich et al. (2009), and the low estimate is based on a study by Ji et al. (2018). EPA utilized the AALM estimated set of potential geometric mean blood lead levels for the 8- to 15-year-old age group, presented in Exhibit 18, as inputs in the modeling of ADHD benefits when using the Froelich et al. (2009) concentration response function to estimate the high scenario. Because Ji et al. (2018) measured early childhood BLLs in their study, EPA used the estimated set of potential geometric mean blood lead levels estimated by the SHEDS-Pb model, shown in Exhibit 17, as the input values for the Ji et al. (2018) concentration response associated with the low ADHD benefits scenario.

As described above in section VIII.D.6. of this document, the SafeWater LCR model, with the strengths and limitations characterized in section VIII.B. and sections 4.2.2 and 5.7 of the Economic Analysis document for the proposed LCRI (USEPA, 2020c), is able to track the population in water systems that are affected by changes in LSL/GRR service line, point-of-use, pitcher filter, and CCT status and the resultant changes in water and blood lead concentration for each population group per year of the 35-year period of analysis. These changes in BLLs for each population group are then used to estimate the number of avoided cases of ADHD using the Froelich et al. (2009) function for the high benefits scenarios and the Ji et al. (2018) function for the low benefit scenario.

EPA uses information on ADHD costs estimated from Doshi et al. (2012) in the monetization step. The Doshi et al. (2012) costs include incremental child and adolescent costs for patient and family health care, family productivity losses, educational expenses, and justice system expenses. The cost estimate also includes incremental adult patient and family health care and justice system costs. The adult costs are adjusted downward to account for the fact that only 65 percent of ADHD cases persist into adulthood. In order to apply these avoided cost values in the benefits analysis EPA produced two net present value estimates for all avoided ADHD costs incurred through age 64, the first discounted back to age seven for use with Ji et al. in the estimation of the low benefit scenario (Ji et al. (2018) used BLLs measured in young children) and back to age 11 for use with Froelich et al. (2009) function in estimating the high benefits scenario (Froelich et al. (2009) used BLLs measured in children 8-15 years of age). The net present values of avoided costs were computed using both the three and seven percent discount rates. The costs were also adjusted to 2022 dollars. The estimated per case ADHD avoided costs under the high benefits scenario and discounted to age 11 range from $228,231 to $203,823 discounted at three and seven percent, respectively. The per case values used in the low benefits scenario and discounted to age 7 range from $202,780, at a three percent discount rate, to $155,496, at a seven percent discount rate.

The estimated number of ADHD cases avoided under the low and high benefits scenarios in each year of the 35-year period of analysis in then multiplied by the corresponding net present value to compute the avoided cost per year. This annual stream of benefits was annualized at three and seven percent over the 35-year period of analysis, and further discounted to year one of the period of analysis. See Exhibit 19 (discounted at three percent) and Exhibit 20 (discounted at seven percent), in section VIII.D.10., for the estimated benefit from avoided ADHD cases from lead and GRR service line replacement, CCT installation and re-optimization, point-of-use program operation, and pitcher filter distribution as a result of the LCRR, the proposed LCRI, and the incremental difference between the two sets of regulatory requirements under both the low and high scenarios. For detailed information on the quantification and monetization of the ADHD benefits associated with the proposed LCRI see Chapter 5, section 5.5.4 of the proposed LCRI Economic Analysis (USEPA, 2023b).

8. Estimated Low Birth Weight Benefits

This is the first regulation in which EPA has estimated benefits of avoided cases of low birth weight associated with reductions in lead exposure; as discussed below the approach for quantifying such benefits will continue to evolve as our understanding of the potential relationship improves. Blood leads from the AALM for women of childbearing age (17-45 years of age) were used in order to estimate reduced lower birth weight in infants. The concentration response function characterizing the relationship between changes in female BLL and reductions in lower birth weight in infants comes from a study by Zhu et al. (2010). The Agency used the Zhu et al. (2010) function for both the low and high benefits scenarios because EPA did not identify a second concentration response function based on a similarly high quality dataset and analysis, however, several other smaller studies were identified which support the relationship between lead exposures and reduced birth weight. The choice of Zhu et al. (2010) was peer reviewed (Versar, 2015).

The valuation of changes in birth weight is based on a review and analysis that Abt Associates (Abt Associates, 2022) conducted under contract to EPA. Their analysis of U.S. Department of Health and Human Services, Medical Expenditure Panel Survey data found that birth weight in the very low birth weight/low birth weight and normal ranges influences inpatient hospital stays. In EPA's LCRI analysis, annual average inpatient expenditures (avoided costs) by initial birth weight (2-10 pounds) are the product of: (1) the predicted probability of having at least one medical event in the period, and (2) the mean conditional expenditures (i.e., conditional on observing at least one medical event in the period). The mean conditional expenditures have been estimated based on projected initial birth weight and projected increases in weight of 0.04, 0.11, and 0.22 pounds.

Generally, as initial birth weight increases, the size of avoided expenditures deceases. Similarly, as expected increase in weight goes up, the avoided costs increase. For example, at a starting birth weight of 3.3 pounds, an increase in birth weight of 0.22 pounds results in a decrease in inpatient hospital expenditures of $1,839 (2010$), but the cost saving is less than $100 at a starting birth weight of 5.5 pounds. In applying the average inpatient avoided cost values to the LCRI case, EPA adjusted the study's 2010 cost estimates to 2022 dollars. The Agency also assumed that baseline birth weights for the affected infants are equal to the distribution of birth weights in the United States. See Exhibit 19 (discounted at three percent) and Exhibit 20 (discounted at seven percent), in section VIII.D.10., for the estimated benefit from avoided low birth weight impacts from lead and GRR service line replacement, CCT installation and re-optimization, point-of-use use program operation, and pitcher filter distribution as a result of the LCRR, the proposed LCRI, and the incremental difference between the two sets of regulatory requirements under both the low and high scenarios. For detailed information on the quantification and monetization of the low birth weight benefits associated with the proposed LCRI see Chapter 5, section 5.5.6 of the proposed LCRI Economic Analysis (USEPA, 2023b).

9. Estimated Cardiovascular Disease Premature Mortality Benefits

EPA's estimation of benefits from avoided cardiovascular disease (CVD) associated premature mortality follows a new methodology outlined in Brown et al. (2020) and Abt Associates (2023). The latter document benefited from an independent peer review (MDB Incorporated, 2019) that articulated the strengths and limitations of our understanding of the relationship between lead exposure and cardiovascular disease premature mortality, and thus the strengths and limitations of the method presented. These strengths and limitations are discussed in more detail in the proposed LCRI Economic Analysis, Chapter 5 (USEPA, 2023b). In order to bracket the reduction in CVD premature mortality risk avoided, and the calculated monetized benefits, associated with reductions in BLLs resulting from lead and GRR service line replacement, CCT installation and re-optimization, point-of-use program operation, and pitcher filter distribution accruing under the proposed LCRI, EPA selected two concentration response functions. The high scenario function is based on the BLL <5 µg/dL analysis in Lanphear et al. (2018), and the low scenario function is based on Aoki et al. (2016). While additional concentration response functions for this relationship are available as detailed in Brown et al. (2020) and Abt Associates (2023), these two functions represent, respectively, the highest and lowest changes in cardiovascular disease premature mortality associated with a given change in adult BLL available in peer-reviewed studies estimating continuous functions using high quality, nationally representative datasets.

In order to value the reduced CVD premature mortality risk, EPA uses the same approach it uses in estimating the benefits associated in reductions of particulate matter and ozone in the air pollution regulations. Specifically, EPA draws on the published academic surveys about how much people are willing to pay for small reductions in their risks of dying from adverse health conditions that may be caused by environmental pollution. In the scientific literature, these estimates of willingness to pay for small reductions in mortality risks are often referred to as the "value of a statistical life." This is because these values are typically reported in units that match the aggregate dollar amount that a large group of people would be willing to pay for a reduction in their individual risks of dying in a year, such that we would expect one fewer death among the group during that year on average. EPA's value of a statistical life was adjusted to 2022 dollars, and the resulting value of $12.98 million was applied to each avoided case, or reduction in population risk resulting in one fewer CVD death.[23] Avoided cases of cardiovascular disease premature mortality are estimated for each annual time step, over the 35-year period of analysis in the SafeWater LCR model, for all adults ages 40 to 79, using the yearly blood lead levels modeled by the AALM, and shown in Exhibit 18, for both the low and high scenarios (as defined by the estimated range PWSs that will exceed the action level under the proposed LCRI).

[23] EPA uses a value of a statistical life (VSL) of $12.98 million, which is estimated using EPA's (2014) recommended VSL of $4.8 million in 1990 dollars and EPA's (2014) recommended method for adjusting the VSL for income growth and inflation. The $4.8 value in 1990 dollars is updated to the $12.98 million in 2022 dollars by adjusting for inflation using the U.S. Bureau of Labor Statistics' (2019) Consumer Price Index and adjusting it for income growth using real GDP per capita and an income elasticity of 0.4.

Under both scenarios, the SafeWater LCR model is able to track the population in water systems that are affected by changes in LSL, point-of-use, pitcher filter, and CCT status and the resultant changes in water and blood lead concentration for each population group per year of the 35-year period of analysis. These changes in BLLs for each population group are then used to estimate the number of avoided cases of CVD premature mortality using the Lanphear et al. (2018) function in the high scenario and the Aoki et al. (2016) function for the low scenario, assuming baseline cases of cardiovascular disease premature mortality due to lead follow the same distribution of all cardiovascular mortality cases in the U.S. population.

See Exhibit 19 (discounted at three percent) and Exhibit 20 (discounted at seven percent), in section VIII.D.10., for the estimated benefit from avoided cardiovascular disease premature mortality risk from lead and GRR service line replacement, CCT installation and re-optimization, point-of-use use program operation, and pitcher filter distribution as a result of the LCRR, the proposed LCRI, and the incremental difference between the two sets of regulatory requirements under both the low and high scenarios. For detailed information on the quantification and monetization of the CVD premature mortality benefits associated with the proposed LCRI see Chapter 5, section 5.5.9 of the proposed LCRI Economic Analysis (USEPA, 2023b).

10. Total Monetized Benefits

Exhibits 19 and 20 show the estimated, monetized national annualized total benefits, under the low and high scenarios[24], associated with the baseline (LCRR), the proposed LCRI, and the increment of change between the two, discounted at three and seven percent,

[24] The low and high benefits scenarios are defined by differences in the estimated number of systems experiencing lead ALEs based on calculated lead tap sampling 90th percentile values and the concentration-response functions that characterize how reductions in blood lead levels (caused be changes in lead exposure) translate into avoided IQ reductions, cases of ADHD, and cardiovascular disease premature mortality.

respectively. The benefits from the proposed LCRI result from the activities performed by water systems which are expected to reduce risk to the public from exposure to lead in drinking water at the tap. EPA quantifies and monetizes some of this health risk reduction from lead exposure by estimating the decrease in lead exposures accruing to both children and adults from the installation and re-optimization of CCT, service line replacement, the implementation of point-of-use filter devices, and the provision of pitcher filters in systems with multiple ALEs.[25] The total and incremental benefits reported are subdivided into estimated health endpoint benefits stemming from avoided reductions in IQ and cases of ADHD in children, lower birth weights in children of women of childbearing age, and cases of CVD premature mortality in adults. The estimated monetized benefits associated with avoided premature mortality are much larger than those associated with delays in neurodevelopmental impacts in children. Still the public health impact of this regulation is important for children given the life-long impact of the early life health effects, the potential of health impacts from cumulative exposures, and the fact that there are several other avoided health impacts (See Appendix D of the EA for the proposed LCRI (USEPA. 2023b)) that were not quantified.

Exhibit 19 and 20 provide the total estimated incremental annualized monetized benefits of the proposed LCRI discounted at three and seven percent, respectively. The total annualized monetized benefits range from $17.3 to $34.8 billion at a three percent discount rate, and $9.8 to $20.9 billion at a seven percent discount rate in 2022 dollars. The exhibits also detail the proportion of the annualized benefits attributable to each health endpoint category of monetizable benefit. For additional information on estimated health endpoint benefits subdivided

[25] Noted that because of the lack of granularity in the assembled lead concentration profile data, with regard to CCT status when samples were collected (see section VI.E.1. of this document), the benefits of small improvements in CCT, like those resulting from the distribution system and site assessment rule requirements, cannot be quantified in the model.

by proposed LCRI regulatory activity see Chapter 5 of the proposed LCRI Economic Analysis (USEPA, 2023b). See section VIII.E.2. of this document for information on non-quantifiable benefits. In addition to the uncertainties in the dose response functions and the quantification of the economic impacts noted above and in Chapter 5 of the Economic Analysis of the proposed rule (USEPA, 2023b), the estimated benefits are contingent on the assumptions in the baseline – principally, whether or not the provisions of the prior LCRR to remove lead service lines have been successfully met. Therefore, EPA provides in Appendix C, of the Economic Analysis for the proposed rule (USEPA, 2023b) estimated national costs and benefits of the LCRI utilizing the pre-2021 LCR as a baseline.

Exhibit 19: Estimated National Monetized Annual Benefits - 3 Percent Discount Rate (millions of 2022 USD)

	Low Estimate			High Estimate		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$738.0	$5,335.4	$4,597.4	$2,147.3	$8,804.5	$6,657.2
Annual Low-Birth Weight Benefits	$1.2	$8.2	$7.0	$2.2	$8.6	$6.4
Annual ADHD Benefits	$53.2	$400.3	$347.1	$243.9	$998.5	$754.6
Annual Adult CVD Premature Mortality Benefits	$2,070.9	$14,467.0	$12,396.1	$9,820.1	$37,202.4	$27,382.3
Total Annual Benefits	**$2,863.3**	**$20,210.9**	**$17,347.6**	**$12,213.5**	**$47,014.0**	**$34,800.5**

Acronyms: LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 20: Estimated National Monetized Annual Benefits - 7 Percent Discount Rate (millions of 2022 USD)

	Low Estimate			High Estimate		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**

Annual IQ Benefits	$141.4	$991.2	$849.8	$412.3	$1,632.6	$1,220.3
Annual Low-Birth Weight Benefits	$1.0	$6.6	$5.6	$1.8	$6.9	$5.1
Annual ADHD Benefits	$30.7	$223.0	$192.3	$156.1	$614.5	$458.4
Annual Adult CVD Premature Mortality Benefits	$1,518.6	$10,246.3	$8,727.7	$7,232.3	$26,449.5	$19,217.2
Total Annual Benefits	**$1,691.7**	**$11,467.1**	**$9,775.4**	**$7,802.5**	**$28,703.5**	**$20,901.0**

Acronyms: LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

E. Cost-Benefit Comparison

This section summarizes and describes the numeric relationship between the monetized incremental costs and benefits of the proposed LCRI regulatory requirements. The section also discusses both the non-monetized costs and benefits of the rulemaking. Exhibits 21 and 22 compare the annualized monetized incremental costs and benefits of the proposed LCRI for the low and high scenarios. Under a three percent discount rate, the net annualized incremental monetized benefits, under the low and high scenarios, range from $15.3 to $31.9 billion. Under the low and high scenarios and a seven percent discount rate, the net annualized incremental monetized benefits range from $7.3 to $17.3 billion.

Exhibit 21: Comparison of Estimated Monetized National Annualized Incremental Costs to Benefits of the LCRI - 3 Percent Discount Rate (millions 2022 USD)

PWS Annual Costs	Low Scenario	High Scenario
Annualized Incremental Costs	$2,061.3	$2,921.4
Annualized Incremental Benefits	$17,347.7	$34,800.5
Annual Net Benefits	**$15,286.4**	**$31,879.1**

Exhibit 22: Comparison of Estimated Monetized National Annualized Incremental Costs to Benefits of the LCRI - 7 Percent Discount Rate (millions 2022 USD)

PWS Annual Costs	Low Scenario	High Scenario
Annualized Incremental Costs	$2,510.3	$3,558.9
Annualized Incremental Benefits	$9,775.5	$20,901.0
Annual Net Benefits	$7,265.2	$17,342.1

1. Non-monetized Costs

The proposed LCRI is expected to result in additional phosphate being added to drinking water to reduce the amount of lead leaching into water in the distribution system. EPA's cost model estimated that, nationwide, the proposed LCRI may result in post-WWTP total incremental phosphorus loads to receiving waterbodies increasing over the period of analysis, under the low and high scenarios, by a range of 343,000 to 491,000 pounds fifteen years after promulgation, and increasing under the low and high scenarios by a range of 511,000 to 693,000 pounds at year 35. At the national level, under the high cost scenario, this additional phosphorous loading to waterbodies is relatively small, less than 0.1 percent of the total phosphorous load deposited annually from all other anthropogenic sources. However, national average receiving waterbody load impacts may obscure significant localized ecological impacts. Impacts, such as eutrophication, may occur in water bodies without restrictions on phosphate deposits, or in locations with existing elevated phosphate levels. See Chapter 4, section 4.5.2 of the proposed LCRI Economic Analysis (USEPA, 2023b) for additional information.

2. Non-quantified Non-monetized Benefits

In addition to the benefits monetized in the proposed LCRI analysis for reductions in lead exposure, there are several other benefits that are not quantified. The risk of adverse health effects due to lead that are expected to decrease as a result of the proposed LCRI are summarized in Appendix D of the proposed LCRI Economic Analysis (USEPA, 2023b) and are expected to affect both children and adults. EPA focused its non-quantified impacts assessment on the endpoints identified using two comprehensive U.S. Government documents summarizing the literature on lead exposure health impacts. These documents are EPA's Integrated Science Assessment for Lead (ISA) (USEPA, 2013); and the Human Health Services National Toxicology Program (NTP) Monograph on Health Effects of Low-Level Lead (NTP, 2012). Both sources present comprehensive reviews of the literature as of the time of publication on the risk of adverse health effects associated with lead exposure. EPA summarized those endpoints to which either the EPA ISA or the NTP Lead Monograph assigned one of the top two tiers of confidence in the relationship between lead exposure and the risk of adverse health effects. These endpoints include cardiovascular morbidity effects, renal effects, reproductive and developmental effects (apart from ADHD), immunological effects, neurological effects (apart from children's IQ), and cancer.

There are a number of proposed LCRI requirements that reduce lead exposure to both children and adults that EPA could not quantify. The proposed rule will require additional lead public education requirements that target consumers directly, schools and child care facilities, health agencies, and people living in homes with LSLs and GRR service lines. Increased education will lead to additional averting behavior on the part of the exposed public, resulting in reductions in the negative impacts of lead. The rule also will require the development of service line inventories that include additional information on lead connectors and making the location of the lead content service lines publicly accessible. This will give potentially exposed consumers more information and will provide potential home buyers with this information as well, possibly resulting in additional service line and service line connector removals initiated by homeowners before, during, or following home sale transactions. The benefits of these additional removals are not quantified in the analysis of the proposed LCRI. Because of the lack of granularity in the lead tap water concentration data available to EPA for the regulatory analysis, the benefits of small improvements in CCT to individuals residing in homes with lead content service lines, like those modeled under distribution system and site assessment are not quantified.

EPA also did not quantify the benefits of reduced lead exposure from lead-containing plumbing components (not including from LSL/GRRs) to individuals who reside in both: 1) homes that have LSL/GRRs but also have other lead-containing plumbing components, and 2) those that do not have LSL/GRRs but do have lead-containing plumbing components. EPA has determined that the proposed LCRI requirements may result in reduced lead exposure to the occupants of both these types of buildings as a result of improved monitoring and additional actions to optimize CCT. In the analysis of the LCRI, the number of both LSL/GRR and non-LSL/GRR homes potentially affected by water systems increasing their corrosion control during the 35-year period of analysis is 16.2 million in the low scenario and 23.3 million in the high scenario. Some of these households may have leaded plumbing materials apart from LSL/GRRs, including leaded brass fixtures and lead solder. These households could potentially see reductions in tap water lead concentrations.

Some researchers have pointed to the potential for CCT cobenefits associated with reduced corrosion, or material damage, to plumbing pipes, fittings, and fixture, and appliances that use water owned by both water systems and homeowners (Levin, 2023). The corrosion inhibitors used by systems that are required to install or re-optimize CCT as a result of the proposed LCRI would result in additional benefits associated with the increased useful life of the plumbing components and appliances (e.g., water heaters), reduced maintenance costs, reduced treated water loss from the distribution system due to leaks, and reduced potential liability and damages from broken pipes in buildings that receive treated water from the system. The replacement of GRR service lines may also lead to reduced treated water loss from the distribution system due to leaks (AwwaRF and DVGW-Technologiezentrum Wasser, 1996). EPA did not have sufficient information to estimate these impacts nationally for the proposed rule analysis.

Additionally, the risk of adverse health effects associated with copper that are expected to be reduced by the proposed LCRI are summarized in Appendix E of the proposed LCRI Economic Analysis (USEPA, 2023b). These risks include acute gastrointestinal symptoms, which are the most common adverse effect observed among adults and children. In sensitive groups, there may be reductions in chronic hepatic effects, particularly for those with rare conditions such as Wilson's disease and children pre-disposed to genetic cirrhosis syndromes. These diseases disrupt copper homeostasis, leading to excessive accumulation that can be worsened by excessive copper ingestion (National Research Council, 2000).

F. Alternative Regulatory Options Considered

The Office of Management and Budget recommends careful consideration "of all appropriate alternatives for the key attributes or provisions of a rule" (OMB, 2003). Pursuant to this guidance, EPA considered alternative regulatory options when developing the proposed LCRI related to:

- Alternative lead action levels of 0.015 mg/L and 0.005 mg/L rather than the proposed LCRI lead action level of 0.010 mg/L.

- An annual service line replacement rate of 7 percent rather than the 10 percent rate under the LCRI.
- The inclusion of lead connectors and galvanized service lines previously downstream of lead connectors in the proposed rule's definition of lead content requiring replacement.
- Setting the criterion for deferred service line replacement to 8,000 lines per year instead of the 10,000 lines per year in the proposed LCRI.
- Alternative temporary filter provision requirements for systems with multiple lead action level exceedances.
- Providing the small system compliance flexibility to CWSs that serve a population of 10,000 or fewer people rather than just to CWSs that serve 3,300 or fewer people (Note: Under both scenarios NTNCWSs of all sizes are covered by the compliance flexibility).

Exhibit 23 provides a summary of the proposed LCRI requirements and other options considered.

Exhibit 23: Summary of Alternative Options Considered for the Proposed LCRI

Area	Other Option Considered	Proposed LCRI
Lead Action Level	1. Lead AL of ≤0.015 mg/L 2. Lead AL of ≤0.005 mg/L	Lead AL of ≤0.010 mg/L
Service Line Replacement Rate	Service lines are replaced at an annual rate of 7%	Service lines are replaced at an annual rate of 10%
Definition of Lead Content to be Replaced	In addition to replacing lead service lines and galvanized lines previously downstream of lead lines, systems must replace: 1. Lead connectors 2. Lead connectors and galvanized lines previously downstream of lead connectors	Systems must replace lead service lines and galvanized lines previously downstream of lead lines
SLR Deferral Threshold	Systems who must replace more than 8,000 lines per year in order to replace all lead and GRR service lines within 10 years may be given a deferred deadline for finishing all lead and GRR service line replacements	Systems who must replace more than 10,000 lines per year in order to replace all lead and GRR service lines within 10 years may be given a deferred deadline for finishing all lead and GRR service line replacements
Temporary Filter Programs	Systems with multiple ALEs must: 1. Deliver temporary filters directly to all customers 2. Deliver temporary filters directly to all customers that have service lines with known or potential lead content 3. Confer with the State but are not required to make temporary filters available	Systems with multiple ALEs must make filters available to all customers with service lines of known or potential lead content
Small System Flexibility	CWSs that serve 10,000 or fewer people, and all NTNCWSs, are provided compliance flexibility when they exceed the AL	CWSs that serve 3,300 or fewer people, and all NTNCWSs, are provided compliance flexibility when they exceed the AL

Acronyms: LCRI = Lead and Copper Rule Improvements; AL = action level; SLR = service line replacement; GRR = galvanized requiring replacement; ALE = action level exceedance; CWS = community water system; NTNCWS = non-transient, non-community water system.

1. Alternative Lead Action Levels

Exhibit 24 through Exhibit 27 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits at an action level of 0.015 mg/L holding all other proposed LCRI rule requirements constant. Results in these tables are provided for the high scenario at both a three percent and seven percent discount rates.

Note the following for all cost results in this section VIII.F. Alternative Regulatory Options Considered:

EPA in the LCRR economic analysis (USEPA, 2020b) assumed that the cost of customer-side service line replacements made under the goal-based replacement requirement would be paid for by households. The Agency also assumed that system-side service line replacements under the goal-based replacement requirement and full service line replacements (both customer-side and systems-side) would be paid by the PWS under the 3 percent mandatory replacement requirement. EPA made these modeling assumptions based on the different levels of regulatory responsibility systems faced operating under a goal-based replacement requirement versus a mandatory replacement requirement. While systems would not be subject to a potential violation for not meeting the replacement target under the goal-based replacement requirement, the possibility of a violation under the 3 percent mandatory replacement requirement could motivate more systems to meet the replacement target even if they decided that it was necessary to adopt customer incentive programs that would shift the cost of replacing customer-side service lines from customers to the system. To be consistent with these LCRR modeling assumptions, under the proposed LCRI, EPA assumed that mandatory replacement costs would fall only on systems. Therefore, the negative incremental values reported for the "Household SLR Costs" category do not represent a net cost savings to households. They represent an assumed shift of the estimated service line replacement costs from households to systems. EPA has insufficient information to estimate the actual service line replacement cost sharing relationship between customers and systems at the national level of analysis.

Exhibit 24: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.015 mg/L, SLR Rate = 10%)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$172.2	$21.1
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,810.1	$2,588.4
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$671.1	$45.0
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$9.0	$3.1
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$253.9	$156.3
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$3.9	$3.7
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$3,920.2***	***$2,817.6***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$53.8	$13.4
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$6.8	$2.5
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$3,980.8**	**$2,800.3**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 25: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.015 mg/L, SLR Rate = 10%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$172.9	$1.8
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,534.3	$3,241.9
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$687.2	$26.7
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$7.8	$1.9
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$291.0	$183.7
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.4	$6.1
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$4,699.6***	***$3,462.1***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$54.6	$9.0
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$7.9	$1.8
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$4,762.1**	**$3,430.5**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 26: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.015 mg/L, SLR Rate = 10%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$8,651.9	$6,504.6
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$8.3	$6.1

Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$984.0	$740.1
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$36,332.7	$26,512.6
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$45,976.9**	**$33,763.4**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 27: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			**Alternative Option (AL = 0.015 mg/L, SLR Rate = 10%)**		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,603.4	$1,191.1
Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$6.7	$4.9
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$605.0	$448.9
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$25,824.2	$18,591.9
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$28,039.3**	**$20,236.8**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 28 through Exhibit 31 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits at an action level of 0.005 mg/L holding all other proposed LCRI rule requirements constant. Results in these tables are provided for the high scenario at both a three percent and seven percent discount rates.

Exhibit 28: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.005 mg/L, SLR Rate = 10%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$202.9	$51.8
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,803.9	$2,582.2
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$904.9	$278.8
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$18.3	$12.4
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$281.9	$184.3
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.1	$3.9
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$4,216.0***	***$3,113.4***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$60.8	$20.4
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$18.7	$14.4
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$4,295.5**	**$3,115.0**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 29: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.005 mg/L, SLR Rate = 10%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$210.1	$39.0
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,527.6	$3,235.2
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$936.2	$275.7

	Proposed Option			Alternative Option (AL = 0.005 mg/L, SLR Rate = 10%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$16.9	$11.0
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$329.4	$222.1
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.8	$6.5
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$5,027.0***	***$3,789.5***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$63.1	$17.5
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$21.5	$15.4
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$5,111.6**	**$3,780.0**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 30: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.005 mg/L, SLR Rate = 10%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$9,035.9	$6,888.6
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$9.2	$7.0
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$1,020.2	$776.3
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$38,541.1	$28,721.0
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$48,606.4**	**$36,392.9**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 31: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.005 mg/L, SLR Rate = 10%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,677.7	$1,265.4
Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$7.4	$5.6
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$629.2	$473.1
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$27,425.5	$20,193.2
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$29,739.8**	**$21,937.3**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

2. Alternative Service Line Replacement Rate

Exhibit 32 through Exhibit 35 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits of the rule with an alternative service line replacement rate of seven percent, holding all other rule requirements constant. Results are provided for the high scenario at both the three percent and seven percent discount rates.

Exhibit 32: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.010 mg/L, SLR Rate = 7%)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$180.1	$29.0
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,604.7	$2,383.0
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$767.5	$141.4

	Proposed Option			Alternative Option (AL = 0.010 mg/L, SLR Rate = 7%)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$14.6	$8.7
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$301.3	$203.7
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$3,872.2***	***$2,769.6***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$55.7	$15.3
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$10.9	$6.6
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$3,938.8**	**$2,758.3**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 33: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.010 mg/L, SLR Rate = 7%)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$182.8	$11.7
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,107.3	$2,814.9
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$785.1	$124.6
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$13.0	$7.1
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$340.1	$232.8
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$4,434.9***	***$3,197.4***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4

	Proposed Option			Alternative Option (AL = 0.010 mg/L, SLR Rate = 7%)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$56.9	$11.3
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$12.9	$6.8
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$4,504.7**	**$3,173.1**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 34: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.010 mg/L, SLR Rate = 7%)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$7,889.4	$5,742.1
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$7.8	$5.6
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$884.7	$640.8
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$33,362.5	$23,542.4
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$42,144.4**	**$29,930.9**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 35: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (AL = 0.010 mg/L, SLR Rate = 7%)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,424.2	$1,011.9

Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$6.1	$4.3
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$531.6	$375.5
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$23,135.1	$15,902.8
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$25,097.0**	**$17,294.5**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

3. Alternative Definition of Lead Content Service Lines to be Replaced

Exhibits 36 through 39 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits of requiring all lead connectors and all galvanized lines downstream from lead connectors be replaced along with lead service lines and galvanized downstream of lead lines at the 10 percents annual replacement rate. Results are provided for the high scenario at both the three percent and seven percent discount rates.

Exhibit 36: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Lead Connectors and Galvanized Lines Downstream or Previously Downstream of Lead Connectors Must be Replaced)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$180.2	$29.1
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$3,005.7	$2,784.0
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$767.6	$141.5
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$14.7	$8.8
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$264.4	$166.8
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$4,236.6***	***$3,134.0***

	Proposed Option			Alternative Option (Lead Connectors and Galvanized Lines Downstream or Previously Downstream of Lead Connectors Must be Replaced)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$55.7	$15.3
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$10.3	$6.0
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$4,302.6**	**$3,122.1**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 37: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Lead Connectors and Galvanized Lines Downstream or Previously Downstream of Lead Connectors Must be Replaced)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$182.9	$11.8
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,769.8	$3,477.4
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$785.2	$124.7
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$13.0	$7.1
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$305.2	$197.9
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$5,062.7***	***$3,825.2***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$56.9	$11.3
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$12.0	$5.9

	Proposed Option			Alternative Option (Lead Connectors and Galvanized Lines Downstream or Previously Downstream of Lead Connectors Must be Replaced)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$5,131.6**	**$3,800.0**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 38: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Lead Connectors and Galvanized Lines Downstream or Previously Downstream of Lead Connectors Must be Replaced)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$9,205.5	$7,058.2
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$8.9	$6.7
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$1,039.7	$795.8
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$38,826.8	$29,006.7
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$49,080.9**	**$36,867.4**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 39: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Lead Connectors and Galvanized Lines Downstream or Previously Downstream of Lead Connectors Must be Replaced)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,706.4	$1,294.1

Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$7.1	$5.3
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$639.7	$483.6
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$27,600.9	$20,368.6
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$29,954.1**	**$22,151.6**

Acronyms: AL = action level; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

4. Alternative Service Line Replacement Deferral Threshold

Exhibits 40 through 43 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits under an alternative service line replacement deferral threshold of 8,000 service lines requiring replacement per year, as compared to the proposed LCRI threshold of 10,000 service lines requiring replacement per year, holding all other rule requirements constant. Results are provided for the high scenario at both the three percent and seven percent discount rates.

Exhibit 40: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (SL Replacement Deferrals if PWS has > 8,000 SL to be Replace Per Year)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$180.0	$28.9
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,799.1	$2,577.4
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$767.9	$141.8
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$14.5	$8.6
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$262.2	$164.6
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.0	$3.8

	Proposed Option			Alternative Option (SL Replacement Deferrals if PWS has > 8,000 SL to be Replace Per Year)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$4,027.7***	***$2,925.1***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$55.7	$15.3
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$10.7	$6.4
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$4,094.1**	**$2,913.6**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: SL = service line; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 41: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (SL Replacement Deferrals if PWS has > 8,000 to be Replace Per Year)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$182.8	$11.7
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,521.4	$3,229.0
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$785.4	$124.9
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$12.9	$7.0
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$302.6	$195.3
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$4,811.7***	***$3,574.2***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$56.9	$11.3
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$12.6	$6.5

	Proposed Option			Alternative Option (SL Replacement Deferrals if PWS has > 8,000 to be Replace Per Year)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$4,881.2**	**$3,549.6**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: SL = service line; SLR = lead service line replacement; LCRI = Lead and Copper Rule Improvements; PWS = public water system

Exhibit 42: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (SL Replacement Deferrals if PWS has > 8,000 SL to be Replace Per Year)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$8,774.2	$6,626.9
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$8.6	$6.4
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$995.1	$751.2
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$37,078.9	$27,258.8
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$46,856.8**	**$34,643.3**

Acronyms: PWS = public water system; SL = lead service line; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 43: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (SL Replacement Deferrals if PWS has > 8,000 SL to be Replace Per Year)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,627.0	$1,214.7
Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$6.9	$5.1

	Proposed Option			Alternative Option (SL Replacement Deferrals if PWS has > 8,000 SL to be Replace Per Year)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$612.5	$456.4
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$26,362.3	$19,130.0
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$28,608.7**	**$20,806.2**

Acronyms: PWS = public water system; SL = lead service line; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

5. Alternative Temporary Filter Programs for Systems with Multiple Lead Action Level Exceedances

The proposed LCRI includes a requirement that systems with three lead action level exceedances in five years make filters available at a central location to all consumers that have services lines with known or potential lead content. EPA assessed three alternative temporary filter programs, including:

1. Systems with multiple lead action level exceedances must directly deliver filters to all customers.
2. Systems with multiple lead action level exceedances must directly deliver filters to all customers that have services lines with known or potential lead content.
3. Systems with multiple lead action level exceedances confer with the State but are not required by the rule to make temporary filters available.

Exhibits 44 through 47 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits of requiring systems with multiple lead action level exceedances to deliver filters to all customers. Results are provided for the high scenario at both the three percent and seven percent discount rates.

Exhibit 44: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Delivered to All Customers if Multiple ALEs)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$180.1	$29.0
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,807.7	$2,586.0
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$767.8	$141.7
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$14.5	$8.6
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$332.7	$235.1
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$4,106.8***	***$3,004.2***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$55.7	$15.3
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$10.1	$5.8
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$4,172.6**	**$2,992.1**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 45: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Delivered to All Customers if Multiple ALEs)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$182.8	$11.7
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,531.7	$3,239.3

	Proposed Option			Alternative Option (Temporary Filters Delivered to All Customers if Multiple ALEs)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$785.3	$124.8
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$12.8	$6.9
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$401.5	$294.2
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$4,920.7***	***$3,683.2***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$56.9	$11.3
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$12.0	$5.9
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$4,989.6**	**$3,658.0**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 46: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Delivered to All Customers if Multiple ALEs)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$8,798.3	$6,651.0
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$9.9	$7.7
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$999.5	$755.6
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$37,297.5	$27,477.4
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$47,105.2**	**$34,891.7**

	Proposed Option			Alternative Option (Temporary Filters Delivered to All Customers if Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 47: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Delivered to All Customers if Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,649.0	$1,236.7
Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$8.0	$6.2
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$621.7	$465.6
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$26,791.5	$19,559.2
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$29,070.2**	**$21,267.7**

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibits 48 through 51 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits of requiring systems with multiple ALEs to deliver filters to customers with LSL, GRR service lines, and service lines of unknown material. Results are provided for the high scenario at both the three percent and seven percent discount rates.

Exhibit 48: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Provided to All Users that have SLs with Potential Lead Content if Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$180.1	$29.0
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,807.7	$2,586.0
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$767.8	$141.7
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$14.5	$8.6
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$312.3	$214.7
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$4,086.4***	***$2,983.8***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$55.7	$15.3
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$10.1	$5.8
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$4,152.2**	**$2,971.7**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: SL = service line; ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 49: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Provided to All Users that have SLs with Potential Lead Content if Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$182.8	$11.7
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,531.7	$3,239.3

	Proposed Option			Alternative Option (Temporary Filters Provided to All Users that have SLs with Potential Lead Content if Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$785.3	$124.8
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$12.8	$6.9
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$373.0	$265.7
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$4,892.2***	***$3,654.7***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$56.9	$11.3
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$12.0	$5.9
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$4,961.1**	**$3,629.5**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: SL = service line; ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 50: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Provided to All Users that have SLs with Potential Lead Content if Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$8,846.0	$6,698.7
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$10.2	$8.0
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$1,004.0	$760.1
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$37,414.0	$27,593.9
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$47,274.2**	**$35,060.7**

Acronyms: SL = service line; ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 51: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Temporary Filters Provided to All Users that have SLs with Potential Lead Content if Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,649.3	$1,237.0
Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$8.3	$6.5
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$621.3	$465.2
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$26,741.2	$19,508.9
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$29,020.1**	**$21,217.6**

Acronyms: SL = service line; ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibits 52 through 55 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits when systems with multiple action level exceedances confer with the State but are not required by the rule to make temporary filters available. Results are provided for the high scenario at both the three percent and seven percent discount rates.

Exhibit 52: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Systems Confer with the State but are Not Required by the Rule to Make Temporary Filters Available after Multiple ALEs)		
	Baseline	LCRI	Incremental	Baseline	LCRI	Incremental
PWS Annual Costs						

Sampling	$151.1	$180.1	$29.0	$151.1	$180.1	$29.0
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,807.7	$2,586.0
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$767.5	$141.4
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$14.8	$8.9
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$252.5	$154.9
Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$4,026.6***	***$2,924.0***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$55.7	$15.3
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$11.2	$6.9
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$4,093.5**	**$2,913.0**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 53: Estimated National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			**Alternative Option (Systems Confer with the State but are Not Required by the Rule to Make Temporary Filters Available after Multiple ALEs)**		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$182.8	$11.7
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,531.7	$3,239.3
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$785.1	$124.6
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$13.1	$7.2
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$289.0	$181.7
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$4,808.3***	***$3,570.8***

Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$57.0	$11.4
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$13.0	$6.9
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$4,878.3**	**$3,546.7**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 54: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Systems Confer with the State but are Not Required by the Rule to Make Temporary Filters Available after Multiple ALEs)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$8,789.1	$6,641.8
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$8.2	$6.0
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$996.6	$752.7
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$37,134.5	$27,314.4
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$46,928.4**	**$34,714.9**

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 55: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Systems Confer with the State but are Not Required by the Rule to Make Temporary Filters Available after Multiple ALEs)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**

Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,627.9	$1,215.6
Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$6.5	$4.7
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$612.7	$456.6
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$26,373.1	$19,140.8
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$28,620.2**	**$20,817.7**

Acronyms: ALE = action level exceedance; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

6. Alternative Size Threshold for Small System Compliance Flexibility

Exhibits 56 through 59 compare the quantified costs and benefits of the proposed LCRI to the quantified costs and benefits for an alternative option where the small system compliance flexibility size threshold is equal to systems serving 10,000 or fewer people. The proposed LCRI sets the small system compliance flexibility threshold at systems serving 3,300 or fewer people. Results are provided for the high scenario at both the three percent and seven percent discount rates.

Exhibit 56: Estimated National Annualized Rule Costs - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Small System Flexibility for CWSs Serving up to 10,000 People)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$151.1	$180.1	$29.0	$151.1	$180.0	$28.9
PWS SLR	$221.7	$2,807.7	$2,586.0	$221.7	$2,807.7	$2,586.0
Corrosion Control Technology	$626.1	$767.8	$141.7	$626.1	$767.2	$141.1
Point-of Use Installation and Maintenance	$5.9	$14.5	$8.6	$5.9	$14.7	$8.8
Public Education and Outreach	$97.6	$262.0	$164.4	$97.6	$262.1	$164.5

Rule Implementation and Administration	$0.2	$4.0	$3.8	$0.2	$4.0	$3.8
Total Annual PWS Costs	***$1,102.6***	***$4,036.1***	***$2,933.5***	***$1,102.6***	***$4,035.7***	***$2,933.1***
Household SLR Costs	$33.2	$0.0	-$33.2	$33.2	$0.0	-$33.2
State Rule Implementation and Administration	$40.4	$55.7	$15.3	$40.4	$55.6	$15.2
Wastewater Treatment Plant Costs	$4.3	$10.1	$5.8	$4.3	$10.1	$5.8
Total Annual Rule Costs	**$1,180.5**	**$4,101.9**	**$2,921.4**	**$1,180.5**	**$4,101.4**	**$2,920.9**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: CWS = community water system; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 57: Estimate National Annualized Rule Costs - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			**Alternative Option (Small System Flexibility for CWSs Serving up to 10,000 People)**		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
PWS Annual Costs						
Sampling	$171.1	$182.8	$11.7	$171.1	$182.8	$11.7
PWS SLR	$292.4	$3,531.7	$3,239.3	$292.4	$3,531.7	$3,239.3
Corrosion Control Technology	$660.5	$785.3	$124.8	$660.5	$784.7	$124.2
Point-of Use Installation and Maintenance	$5.9	$12.8	$6.9	$5.9	$13.0	$7.1
Public Education and Outreach	$107.3	$302.4	$195.1	$107.3	$302.4	$195.1
Rule Implementation and Administration	$0.3	$6.6	$6.3	$0.3	$6.6	$6.3
Total Annual PWS Costs	***$1,237.5***	***$4,821.6***	***$3,584.1***	***$1,237.5***	***$4,821.2***	***$3,583.7***
Household SLR Costs	$42.4	$0.0	-$42.4	$42.4	$0.0	-$42.4
State Rule Implementation and Administration	$45.6	$56.9	$11.3	$45.6	$56.9	$11.3
Wastewater Treatment Plant Costs	$6.1	$12.0	$5.9	$6.1	$12.0	$5.9
Total Annual Rule Costs	**$1,331.6**	**$4,890.5**	**$3,558.9**	**$1,331.6**	**$4,890.1**	**$3,558.5**

Previous Baseline costs are projected over the 35-year period of analysis and are affected by EPA's assumptions on three uncertain variables which vary between the low and high cost scenarios.

Acronyms: CWS = community water system; LCRI = Lead and Copper Rule Improvements; SLR = lead service line replacement; PWS = public water system

Exhibit 58: Estimated National Annual Benefits - High Scenario - 3 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Small System Flexibility for CWSs Serving up to 10,000 People)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$2,147.3	$8,804.5	$6,657.2	$2,147.3	$8,804.1	$6,656.8
Annual Low-Birth Weight Benefits	$2.2	$8.6	$6.4	$2.2	$8.6	$6.4
Annual ADHD Benefits	$243.9	$998.5	$754.6	$243.9	$998.4	$754.5
Annual Adult CVD Premature Mortality Benefits	$9,820.1	$37,202.4	$27,382.3	$9,820.1	$37,200.5	$27,380.4
Total Annual Benefits	**$12,213.5**	**$47,014.0**	**$34,800.5**	**$12,213.5**	**$47,011.6**	**$34,798.1**

Acronyms: CWS = community water system; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

Exhibit 59: Estimated National Annual Benefits - High Scenario - 7 Percent Discount Rate (millions of 2022 USD)

	Proposed Option			Alternative Option (Small System Flexibility for CWSs Serving up to 10,000 People)		
	Baseline	**LCRI**	**Incremental**	**Baseline**	**LCRI**	**Incremental**
Annual IQ Benefits	$412.3	$1,632.6	$1,220.3	$412.3	$1,632.5	$1,220.2
Annual Low-Birth Weight Benefits	$1.8	$6.9	$5.1	$1.8	$6.9	$5.1
Annual ADHD Benefits	$156.1	$614.5	$458.4	$156.1	$614.5	$458.4
Annual Adult CVD Premature Mortality Benefits	$7,232.3	$26,449.5	$19,217.2	$7,232.3	$26,447.6	$19,215.3
Total Annual Benefits	**$7,802.5**	**$28,703.5**	**$20,901.0**	**$7,802.5**	**$28,701.5**	**$20,899.0**

Acronyms: CWS = community water system; LCRI = Lead and Copper Rule Improvements; IQ = intelligence quotient; ADHD = attention-deficit/hyperactivity disorder

EPA's analysis of the alternative regulatory options found that the following options had estimated annual positive net benefits greater than the proposed LCRI: (1) setting the action level to 0.005 mg/L; (2) including lead connectors and galvanized service lines previously downstream of lead connectors in the definition of lead content requiring replacement; (3) requiring systems with multiple action level exceedances to deliver temporary filters to all customers; and (4) requiring systems with multiple action level exceedances to deliver temporary filters to all customers that have service lines with known or potential lead content. From a purely economic efficiency standpoint that would mean these four options are preferable to the proposed LCRI. However, none of these options were selected in place of the proposed rule because of questionable technical feasibility. SDWA section 1412(b)(4)(D) says the term "feasible" means feasible with the use of the best technology, treatment techniques and other means which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available. EPA has discussed the Agency's feasibility concerns with regard to each of the options in preceding sections of this preamble. Regarding setting the action level at a level below 0.010 mg/L EPA has expressed concern associated with feasibility. See section V.E.2. for information on feasibility. When considering the inclusion of lead connectors and galvanized service lines previously downstream of lead connectors in the set of service lines that must be actively replaced. EPA was concerned about how these activities might pull resources away from the removal of LSLs and GRR service lines that pose a greater exposure risk. See section V.B.4. for a detailed discussion. In the case of both options that required the system to deliver temporary filters to customers' homes in system with multiple ALEs, EPA was again concerned about the potential use of system resources that could otherwise be used to achieve greater reductions in lead exposure system wide. The concern is founded on information received by the Agency from systems that have implemented temporary filter programs and found significant rates on nonuse among customers provided with filters. Giving EPA reason to believe that estimated benefits for large scale temporary filter programs should be discounted. For additional information on temporary filter adoption see section V.I.

Two alternative options were found to be more cost effective than the proposed LCRI: (1) setting the action level to 0.015 mg/L; (2) allowing small system compliance flexibility for CWSs serving up to 10,000 people (although the estimated cost efficiency of this option is not significantly different from the proposed LCRI). EPA chose to continue with the proposed option given the fact that the marginal benefit of the proposed rule was greater than the marginal cost thereby increasing total societal welfare above the levels provided by the more cost-efficient options considered.

G. Cost-Benefit Determination

When proposing an NPDWR, SDWA section 1412(b)(4)(C) requires the Administrator shall publish a determination as to whether the benefits of the proposed rule justify, or do not justify, the costs based on the analysis conducted under SDWA section 1412(b)(3)(C). With this proposed rule, the Administrator has determined that the quantified and nonquantifiable benefits of the proposed LCRI NPDWR justify the quantifiable and nonquantifiable costs.

Under section 1412(b)(3)(C)(ii) of SDWA, when EPA proposes a NPDWR that includes a treatment technique, the Administrator shall publish and seek public comment on an analysis of the health risk reduction benefits and costs likely to be experienced as the result of compliance with the treatment technique and alternative treatment techniques that are being considered.

Sections VIII.A. through F. of this document summarize the results of this proposed rule analysis.

As indicated in section VIII.C. and D. of this document, EPA discounted the estimated monetized cost and benefit values using both three and seven percent discount rates. In Federal regulatory analyses, EPA follows OMB Circular A-4 (OMB, 2003) guidance which recommends using both three percent and seven percent to account for the different streams of monetized benefits and costs affected by regulation. The seven percent discount rate represents the estimated rate of return on capital in the U.S. economy, to reflect the opportunity cost of capital when "the main effect of a regulation is to displace or alter the use of capital in the private sector." Regulatory effects, however, can fall on both capital and private consumption.[26] In 2003, Circular A-4 estimated the rate appropriate for discounting consumption effects at three percent. There are also a variety of considerations with respect to the capital displacement in this particular proposal. For example, a meaningful number of PWSs may not be managed as profit-maximizing private sector investments, which could impact the degree to which the rate of return on the use of capital in the private sector applies to PWS costs. Federal funding is expected to defray a significant portion of such PWS costs;[27] where that occurs, such costs are transferred to the government. Additionally, to the extent that the benefits extend over a long time period into the future, including to future generations, Circular A-4 advises agencies to consider conducting sensitivity analyses using lower discount rates. Regardless, the impacts of this rulemaking are such that costs are expected to occur in the nearer term, and in particular that larger one-time

[26] Private consumption is the consumption of goods and services by households for the direct satisfaction of individual needs (rather than for investment).
[27] The Infrastructure Investment and Jobs Act, invests $15 billion in the Drinking Water State Revolving Fund (SRF) specifically for lead content service line identification and removal along with additional sources of Federal and State funds that can be used to comply with the requirements of the proposed LCRI.

capital investments are expected to occur in the near term associated with the service line removal and installation and re-optimization of CCT at water systems; and public health benefits are expected to occur over a longer term. Discounting across an appropriate range of rates can help explore how sensitive net benefits are to assumptions about whether effects fall more to capital or more to consumption.

EPA has followed Circular A-4's default recommendations to use three and seven percent rates to represent the range of potential impacts accounting for diversity in stakeholders' time preferences. The Agency views the three to seven percent range of costs and benefits as characterizing a significant portion of the uncertainty in the discount rate and views the quantified endpoint values as demonstrating a range of monetized costs and benefits, which encompass a significant portion of the uncertainty associated with discount rates.

As indicated in section VIII.E. of this document, the monetized costs and benefits result in net annualized incremental benefits that range from $15.3 to $31.9 billion under the low and high scenarios at a three percent discount rate. Under the low and high scenarios at a seven percent discount rate, the net annualized incremental benefits range from $7.3 to $17.3 billion. EPA estimated the monetized net benefits of the proposed LCRI under low and high bracketing scenarios in order to capture the variability in system characteristics and the significant uncertainty associated with a set of lead specific data inputs which drive both the estimated costs and benefits in the SafeWater LCR model. With regard to costs, the uncertain variables which define the measurable difference between the low and high scenarios, are the number of PWSs that will exceed the lead action level under the revised tap sampling requirements, the cost of LSL and GRR service line replacement, and the cost of CCT. The difference between low and high benefits scenarios are driven by the number of PWSs that will exceed the action level under the revised tap sampling requirements and the concentration response functions that estimate the impact lead concentrations have on avoided reductions in IQ, cases of ADHD in children, and cases of cardiovascular disease premature mortality in adults.

There are also a number of potentially significant nonquantifiable and non-monetized benefits that further strengthen the determination of benefits justifying costs. The nonquantifiable harmful impacts of lead exposure include: cardiovascular morbidity effects, renal effects, reproductive and developmental effects (apart from ADHD), immunological effects, neurological effects (apart from children's IQ), and cancer. The EPA analysis has not quantified the positive impacts from increases in consumer averting behavior, such as flushing lines before drinking water is drawn, filter use, or customer-initiated service line replacement due to the proposed LCRI's additional lead public education requirements that target all potential affected consumers directly, schools and child care facilities, health agencies, and people living in homes with LSLs and GRR service lines; and the development of service line inventories that include lead connector information with the requirement for public access to the information. The analysis was also unable to quantify the potentially significant benefits of reducing lead concentrations in drinking water from: households without lead content service lines but with leaded plumbing inside the home in water systems where the proposed LCRI requires installation or re-optimization of CCT; and all households in systems implementing small improvements in CCT because of the distribution system and site assessment proposed rule requirements. Corrosion inhibitors used by systems that are required to install or re-optimize CCT as a result of the proposed LCRI would experience an additional benefit in terms of the increased useful life of the plumbing components and appliances (e.g., water heaters), reduced maintenance costs, reduced treated water loss from the distribution system due to leaks, and reduced potential liability and damages from broken pipes in buildings that receive treated water from the system.

IX. Request for Comment

EPA is requesting comment on all aspects of this notice of this proposed rulemaking. EPA solicits comments on the proposed revisions of 40 CFR part 141, subparts A, D, I, O, Q and Part 142, including EPA's rationale as described in this preamble. EPA seeks comments on issues specifically identified elsewhere in this document as well as any other issues that are not specifically addressed in this document. In particular, EPA solicits comments, information, and data on the following topics. Comments are most helpful when accompanied by specific examples and supporting data.

General Matters

EPA requests comment on the following items pertaining to the rule as a whole.

1. Whether the proposed revisions to the LCRR treatment technique are effective to prevent known or anticipated adverse health effects to the extent feasible in accordance with the SDWA.
2. Whether there are additional ways EPA could reduce the complexity of the regulatory approach used to address lead in drinking water consistent with the statutory standard for a treatment technique rule in section 1412(b)(7)(A) of SDWA. Specifically, EPA requests comment on ways that the proposed LCRI could be simplified and ways that burden, including paperwork burden, could be reduced without affecting the ability of the rule to prevent known or anticipated adverse health effects.

3. Whether the proposed requirements of the rule are enforceable and promote compliance without the need for State or Federal enforcement action. EPA also solicits comment on ways the rule could be modified to better promote compliance.
4. The revised definition of "connector," including that connectors are defined as "not exceeding two feet."

Service Line Replacement

EPA is seeking comment on several aspects of the proposed service line replacement requirements.

1. All aspects of the proposed scope of the replacement requirements, including the criteria used to define a full service line replacement (e.g., cutting the pipe at abandoned properties, replacing the entire service line) and which lead sources are subject to replacement under the mandatory program. EPA is seeking comment on whether to prohibit reconnection of any disconnected LSL or GRR service line. EPA is requesting comment on whether the Agency should include lead connectors or galvanized service lines that are or were downstream of a lead connector as part of mandatory replacement.
2. Whether a reasonable effort to obtain property owner consent should be more than four times (e.g., five, six, or seven times).
3. Whether the proposed LCRI appropriately interprets "control" for the purposes of the mandatory replacement provision (i.e., require systems to conduct full service line replacement in situations where the system has access to conduct the full replacement).
4. The proposed minimum replacement rate and replacement deadlines. EPA is seeking comment on whether it is feasible for systems across the nation to complete service line replacement in a shorter timeframe than ten years, such as in six, seven, or eight years. EPA is seeking comment on the rate construct approach, including how to calculate

compliance with a given service line replacement deadline and average annual rate calculated across a rolling three-year period. EPA also seeks comment on whether systems should be required to meet a minimum replacement rate in the first three years after the compliance date to give States an opportunity to enforce replacement rate progress sooner than three years after the compliance date. EPA also seeks comment on the complexity of the rate construct.

5. EPA is taking comment on whether States, as a condition of primacy, or EPA when it is directly implementing the program, should be required to set initial shortened deadlines by a certain timeframe, such as no later than 60 days after the compliance date.
6. The overall approach and basis to offer deferred service line replacement to systems with a high proportion of LSLs and GRR service lines in their distribution system relative to their total number of households served. EPA is requesting comment on its proposed threshold of 0.039 average annual number of replacements per household served, which is used to calculate the number of years that systems can defer.
7. Whether to require the State, as a condition of primacy, to approve the use of the deferred deadline provision where the water system qualifies for it and/or whether to require the State, as a condition of primacy, to assess whether it would be feasible for a system to meet the 10-year deadline or a shorter deadline even if the system meets the regulatory criteria for the deferred deadline.
8. Whether there are additional data on service line replacement rates achieved by systems in proactive programs (i.e., excluding programs that only replace service lines in coordination with main replacement or emergency repair).
9. The proposed use of a maximum threshold of 10,000 annual service line replacements for systems with atypically high numbers of LSLs and GRR service lines as well as seeking

comment on the alternate threshold of 8,000 annual service line replacements. EPA is also seeking feedback on other thresholds and supporting data. EPA is also seeking feedback on if there's data available that would inform if the maximum threshold for annual service line replacement could increase after ten years, such as if replacement rates could double.

10. Whether systems conducting deferred service line replacement should be subject to any additional requirements beyond those for systems that are not replacing service lines in accordance with a deferred deadline.
11. The requirement for systems to install a dielectric coupling when conducting a partial replacement of an LSL or GRR to separate the remaining LSL or GRR service line and the replaced service line unless the replaced service line is made of plastic and other recommended risk mitigation activities.
12. The proposed requirement to ban partial lead and GRR service line replacement unless it is conducted in accordance with emergency or planned infrastructure work (excluding planned infrastructure work solely for the purposes of replacing lead and GRR service lines as part of a service line replacement program). Additionally, EPA is seeking comment on whether partial service line replacement should be prohibited during "planned infrastructure work" or with certain types of planned infrastructure work.
13. The ability of the market to correct for potential shortages in workers and materials to conduct service line replacement, as well to provide sufficient quantities of filters to comply with the service line replacement and other relevant provisions in the proposal.
14. The extent to which property owner consent, if required by State or local law or water tariff agreement, might complicate full service line replacement and whether there are additional measures EPA can take to facilitate access through the LCRI.

Tap Sampling for Lead and Copper

EPA is seeking comment on several proposed revisions to compliance tap sampling for lead and copper.

1. Comment on the sites included in Tier 3 and whether all of the proposed sites should be included in Tier 3, if additional sites should be included, or if some should be included in a different, lower priority tier, such as Tier 4. Specifically, comment on whether sites served by galvanized service lines or containing galvanized premise plumbing that are identified as ever being downstream of an LSL or lead connector should be included in the same tier as other sites with a current lead connector (e.g., copper service line downstream of a lead connector).
2. Comment and available data, such as modeling or sampling data, that inform lead corrosion rates over time.
3. Comment on the applicability of alternate sampling protocols to assess CCT performance, increase customer participation, and other relevant factors.
4. Comment on the proposed updated definition of wide-mouth bottles that is "bottles that are one liter in volume with a mouth, whose outer diameter measures at least 55 mm wide," and specifically on the availability of qualifying bottles.
5. Comment and any relevant data on the number and tiering of samples used to calculate the 90th percentile lead and/or copper levels for systems with LSLs for purposes of assessing CCT efficacy. Specifically, whether samples from non-LSL sites that have higher lead concentrations than samples from LSL sites should be included and whether these higher values should replace lower values from LSL sites in the 90th percentile calculation.

6. Comment on whether State authority to specify sampling locations when a system is conducting reduced monitoring should apply regardless of the number of taps meeting sample site criteria.

Service Line Inventory and Service Line Replacement Plan

EPA is seeking comment on all aspects of the proposed service line inventory approach, and specifically the following:

1. In the LCRI, EPA is proposing a threshold of systems serving greater than 50,000 persons to host the inventory and plan online, which is the required threshold under the LCRR. EPA is seeking comment on the size threshold at which systems must host their publicly accessible inventory, inventory summary data, replacement summary data, and service line replacement plan online, and whether it should be lowered relative to the LCRR requirements.
2. In the LCRI, EPA is proposing a requirement for systems to validate the accuracy of non-lead service lines in their inventory that were categorized using methods other than records review or visual inspection of at least two points along the line. EPA is requesting comment on the number of validations required, the proposed 95 percent confidence level approach used to develop the number of validations required, the criteria for which methods used to categorize non-lead service lines should be included in the validation pool (including whether non-lead lines categorized based on records should be subject to validation), and the seven-year timeline for systems on a 10-year replacement deadline to complete the validation requirements.
3. Comment on establishing a deadline for systems to identify all unknown service lines prior to their service line replacement deadlines.

4. Comment on a requirement for systems to update their service line replacement plans if there are any changes, such as changes to laws and policies applicable to full service line replacement.

Lead Action and Trigger Levels

1. EPA is seeking comment on the proposed lead action level of 0.010 mg/L, as well as comment and supporting data on alternative action levels, such as 0.005 mg/L, with regards to generally effective corrosion control treatment and identifying systems most at risk of elevated levels of lead in drinking water.
2. EPA is also seeking comment on the use of the action level to determine when additional public education is required, and the use of the same action level for public education as for the CCT provisions.
3. EPA is seeking public comment, data, and information on the anticipated benefits and tradeoffs, including for public health and administrative burden on systems and States, if more small and medium systems are required to conduct a detailed OCCT demonstration and take other actions if they exceed the proposed action level of 0.010 mg/L or other lower values, while water systems are simultaneously required to mandatory conduct full service line replacement.

Corrosion Control Treatment

EPA is seeking comment on all aspects of the proposed CCT approach, and specifically the following:

1. The proposed determination that the CTT treatment technique is feasible and prevents known or anticipated adverse health effects to the extent feasible.
2. Comment on whether it would be more appropriate to require water systems to re-optimize again following an action level exceedance regardless of meeting their optimal

water quality parameters and to provide the State with the authority to waive this requirement.

3. The proposed option for a water system to delay OCCT until after the system has replaced all of its LSLs and GRR service lines, while the system achieves at least 20 percent removal per year and must have no LSLs, GRR service lines, or lead status unknown service lines remaining at the end of the five-year period.
4. The treatment recommendation and CCT study process can take multiple years to complete. For systems with existing corrosion control, the system may be able to alter the existing treatment (e.g., increase pH and/or orthophosphate dose) without a new CCT study on a much faster timeframe rather than waiting for study results that may recommend that same change. EPA is requesting comment on whether there are situations and/or conditions where existing treatment modifications may achieve similar lead reductions rather than delaying new treatment for two-and-a-half years while a study is underway.

Compliance Alternatives for a Lead Action Level Exceedance for Small Community Water Systems and Non-Transient, Non-Community Water Systems

1. EPA is proposing that small system flexibilities be limited to CWSs serving 3,300 persons and fewer and all NTNCWSs for the remaining compliance alternatives of point-of-use devices and plumbing replacement. EPA is seeking comment on whether the Agency should allow systems serving up to 10,000 persons (or another threshold) to be eligible to use the small system compliance flexibility provision. EPA is also seeking information, data, and analysis on whether point-of-use devices and plumbing replacement are as effective as OCCT at systems serving up to 10,000 persons (or another threshold).

2. EPA is requesting comment on the ability and practicality of point-of-use devices to address multiple contaminants.

Public Education

EPA is seeking comment on all aspects of the proposed public education, and specifically the following:

1. The proposed determination that the public education treatment technique is feasible and prevents known or anticipated adverse health effects to the extent feasible.
2. Comment and supporting data on the capacity of water systems to conduct some or all of the required public education activities in 30 days, or another period of time that is less than 30 or 60 days, after the end of the tap sampling period in which a systemwide lead action level exceedance occurs.
3. Data, analyses, and comments on the proposed determination that water systems are capable of providing consumer notices of individual tap sampling results within three calendar days of obtaining those results, regardless of whether the results exceed the lead or copper action level, or if a longer time frame is needed (e.g., three business days, seven calendar days, 14 calendar days).
4. Whether the proposed requirement for water systems to offer lead sampling to consumers with LSLs, GRR service lines, or unknown service lines in the notice of service line material is effective at reducing adverse health effects. EPA is also requesting comment on the requirement for water systems to deliver consumer-initiated test results within three days of obtaining those results.
5. Whether the types and timing of outreach activities proposed for systems failing to meet the mandatory service line replacement rate are appropriate and whether other activities should be considered.

6. Whether EPA should require systems to annually notify consumers if they are served by a lead connector, in addition to notifications for sites with lead, GRR, or lead status unknown service lines.
7. Whether EPA should require water systems to provide filters to consumers when there is a disturbance resulting from replacement of a water main.
8. Whether EPA should require additional public education requirements to further encourage swift service line replacement faster than the 10-year replacement deadline. For example, should water systems that have LSLs, GRR service lines, or unknown service lines five years after the compliance date for the LCRI be required to increase the frequency of the notification of service line materials from annual to once every six months?
9. EPA is seeking information and data on when a system provides translated materials to consumers with limited English proficiency, what resources are used to translate materials (e.g.*,* State resources, community organizations), and what barriers water systems may face in providing accurate translated materials.
10. Whether the Agency should require States, as a condition of primacy, to provide translation support to water systems that are unable to do so for public education materials to consumers with limited English proficiency.
11. EPA is also requesting comment on additional ways to streamline public education and associated certification requirements (e.g., combine deadlines for systems to conduct public education or submit information to the State).

Additional Requirements for Systems with Multiple Lead Action Level Exceedances

EPA is proposing new actions to be required of systems that exceed the lead action level multiple times, based on the proposed criteria of three action level exceedances in a five-year period. EPA is requesting comments on all aspects of this proposed requirement, and specifically the following:

1. Whether water systems should be required to take additional actions when the system exceeds the lead action level multiple times and if so, what actions are appropriate and feasible, and when these additional actions should be required under the LCRI.
2. Whether EPA should use three action level exceedances in a five-year period for identifying systems with multiple action level exceedances where additional action is warranted and, whether additional actions should be required sooner, or later, than the five-year period, or whether EPA should use a modified metric (number of consecutive action level exceedances in a set time period) or a different metric entirely (i.e., based on one or more factors other than the number of action level exceedances in a set time period).
3. The proposed public education activities after a system exceeds the lead action level multiple times. EPA is specifically seeking any information, data, or analysis on whether the proposed public education activities support preventing adverse health effects in this situation. EPA is also requesting comment on whether systems should be required to conduct more than one (e.g., two or three) of the public education activities proposed.
4. Whether EPA should require water systems to make filters certified to reduce lead and replacement cartridges, along with instructions for use, available to all consumers within 60 days of a system having multiple action level exceedances and whether there are any supporting or contrary data on whether the proposed filter requirement would be protective of public health.

5. The proposed requirements for systems to develop a filter plan and submit to the State after the system has multiple action level exceedances for the first time, and whether EPA should require systems to take additional actions to facilitate filter distribution.
6. Alternative requirements for systems with multiple action level exceedances to provide filters to their consumers, such as requiring water systems to provide filters and replacement cartridges to consumers served by an LSL, GRR service line, or unknown service line or to all consumers, or to require systems to consult with the State upon meeting the criteria for multiple action level exceedances, after which the State determines the appropriate action to reduce lead exposure.
7. An additional provision providing discretion to States to allow systems with multiple action level exceedances to discontinue the proposed required actions sooner if the system takes actions (e.g., installs optimized or re-optimized CCT, completes mandatory service line replacement) and is at or below the lead action level for two consecutive monitoring periods.
8. Whether, in addition to the proposed requirements, EPA should provide States discretion to determine appropriate action following a multiple action level exceedance that is tailored to meet specific system needs.

Lead Sampling in Schools and Child Care Facilities

EPA is seeking comment on all aspects of the proposed lead sampling in schools and child care facilities requirements, and specifically:

1. Whether CWSs should be required to collect more samples and/or to sample more frequently in schools and child care facilities.

2. The proposed provision to allow States to issue waivers to community water systems from the requirement for lead sampling in schools and child care facilities during the five-year period after the LCRI compliance date if the facility was sampled for lead after January 1, 2021 but prior to the LCRI compliance date and the sampling otherwise meets the waiver requirements of § 141.92(h).
3. Whether or not to allow States to waive the requirements of § 141.92 for CWSs in schools and child care facilities that use and maintain filters certified to reduce lead, and if so, whether the waiver should only be allowed where schools and child care facilities are required by State or local law to install POU devices and maintain them.
4. The minimum requirements for States to provide a waiver (e.g., should the waiver be limited to locations where the filter use is required by State or local law; should the waiver be limited to locations where State or local law requires periodic sampling or testing to ensure proper filter use).
5. Whether EPA should require CWSs to make school and child care facility sampling results publicly available, and if so, how frequently and in what manner.

Reporting and Recordkeeping

EPA is seeking comment on all aspects of the proposed reporting and recordkeeping, and specifically the following:

1. EPA is requesting comment on the expansion of the inventory reporting to include lead connectors and non-lead service lines.
2. EPA has heard concern over the ability of States to review all required site sample plans and provide approvals in time for the first tap monitoring period, and is requesting

comment on whether EPA should consider a phased approach or alternate approach to reduce the burden on States following the rule compliance date.

3. EPA is requesting comment on whether States should be required to maintain records related to distribution system and site assessments conducted by water systems.
4. EPA is requesting comment on whether States should be required to maintain documentation of determinations of more stringent implementation, including but not limited to conditions or approvals related to reduced compliance monitoring and additional information required to conduct a review or designate OCCT.

Compliance Dates

The proposed LCRI includes a three year implementation period following the publication of the final rule until the compliance date to allow States time to obtain primacy and work with systems to prepare to comply. It also allows systems time to plan and obtain funding for LSLR as appropriate. EPA is seeking comment on all aspects of the proposed LCRI compliance dates and whether it would be practicable for water systems to implement any of the proposed LCRI requirements earlier than three years from the date of final action on the proposed LCRI. Specifically:

1. Whether it is practicable for water systems to implement notification and risk mitigation provisions after full and partial service line replacement (§ 141.84(h)), notification of a service line disturbance (§ 141.85(g)), and associated reporting requirements (§141.90(e)(6) and (f)(6)) upon the effective date of the LCRI.
2. Whether earlier alternative compliance dates for LCRI are practicable such that water systems transition directly from LCR to LCRI in less than three years (i.e., one or two

years) based on the assumption that water systems would comply with the LCR until the LCRI compliance date.

3. Whether there are other LCRR provisions besides the initial inventory and notifications of service line material for which the October 16, 2024 compliance date should be retained.

Other Proposed Revisions to 40 CFR Part 141

1. Consumer Confidence Report
    a. EPA is requesting comment on the proposed requirement for systems to provide an informational statement in the CCR about the school sampling requirements with the information that consumers can contact the school or child care facility about any potential sampling results.
2. Definitions
    a. EPA is seeking comment on all aspects of the proposed definitions, and specifically the following:
    b. EPA is proposing to define a two-foot maximum length of connectors. EPA proposes that "connectors" that exceed two feet in length be treated as a service line. EPA is requesting comment on the defined length of a connector.

X. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at https://www.epa.gov/laws-regulations/laws-and-executive-orders.

A. Executive Order 12866 (Regulatory Planning and Review) and Executive Order 14094 (Modernizing Regulatory Review)

This action is a "significant regulatory action", as defined under section 3(f)(1) of Executive Order 12866, as amended by Executive Order 14094. Accordingly, EPA, submitted this action to the Office of Management and Budget (OMB) for Executive Order 12866 review. Documentation of any changes made in response to the Executive Order 12866 review is available in the docket. EPA prepared an analysis of the potential costs and benefits associated with this action. This analysis, the Economic Analysis of the Proposed Lead and Copper Rule Improvements (USEPA, 2023b), is also available in the docket and is summarized in section VIII. of this document.

B. Paperwork Reduction Act (PRA)

The information collection activities in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the PRA. The Information Collection Request (ICR) document that EPA prepared has been assigned EPA ICR number 2788.01 and OMB control number 2040-NEW. You can find a copy of the ICR in the docket for this rule and it is briefly summarized here. The information collection requirements are not enforceable until OMB approves them. The burden includes the time needed to conduct State and water system activities during the first three years after promulgation, as described in Chapter 7, section 7.3 of the proposed LCRI Economic Analysis (USEPA, 2023b).

Burden (as defined at 5 CFR 1320.3(b)) means the total time, effort, and financial resources required to generate, maintain, retain, disclose, or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology, and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements;

train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

The paperwork burden associated with this proposal consists of the burden imposed on systems to read and understand the LCRI as well as the burden associated with certain new or revised collections of information. Specifically, public water systems will have to assign personnel and devote resources in order to implement the rule. In addition, public water systems will need to attend training sessions and receive technical assistance from their State during implementation of the LCRI. Furthermore, public water systems will have to develop a baseline inventory with lead connector information to the State. For the public water systems that have lead, GRR, or unknown service lines, a service replacement plan will need to be developed.

Likewise, the paperwork burden for States include reading and understanding the LCRI. The State will have to adopt the rule and develop programs to implement the LCRI. This may result in the State modifying their data system while implementing the LCRI. Also, the State will have to provide staff with training and technical assistance as well as provide water systems with training and technical assistance for implementation of the LCRI. The State is also responsible for reviewing demonstrations and written statements of only non-lead service lines from systems in lieu of a publicly accessible inventory as well as reviewing service line replacement plans.

The information collected under the ICR is critical to States and other authorized entities that have been granted primacy (i.e., primary enforcement authority) for the LCRI. These authorized entities are responsible for overseeing the LCRI implementation by certain public water systems within their jurisdiction. States would utilize these data to determine compliance, designate additional treatment controls to be installed, and establish enforceable operating parameters. The collected information is also necessary for public water systems. Public water systems would use these data to demonstrate compliance, assess treatment options, operate and maintain installed treatment equipment, and communicate water quality information to consumers served by the water system. States would also be required to report a subset of these data to EPA. EPA would utilize the information to protect public health by ensuring compliance with the LCRI, measuring progress toward meeting the LCRI's goals, and evaluating the appropriateness of State implementation activities. No confidential information would be collected as a result of this ICR.

Respondents/affected entities: Data associated with this proposed ICR would be collected and maintained at the public water system, and by State and Federal governments. Respondents would include owners and operators of public water systems, who must report to their State(s).

Respondent's obligation to respond: If the proposed LCRI is finalized, then the respondent's obligation to respond would be mandatory. Section 1401(1)(D) of SDWA requires that "criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels [or treatment techniques promulgated in lieu of a maximum contaminant level]; including accepted methods for quality control and testing procedures to insure compliance with such levels and to insure proper operation and maintenance of the system…" Furthermore, section 1445(a)(1)(A) of SDWA requires that "[e]very person who is subject to any requirement of this subchapter or who is a grantee, shall establish and maintain such records, make such reports, conduct such monitoring, and provide such information as the Administrator may reasonably require by regulation to assist the Administrator in establishing regulations under this subchapter, in determining whether such person has acted or is acting in compliance with this subchapter…" In addition, section 1413(a)(3) of SDWA requires States to "keep such records and make such reports … as the Administrator may require by regulation."

Estimated number of respondents: If the proposed rule is finalized, the total number of respondents for the ICR would be 67,003. The total includes 56 Primacy Agencies and 66,947public water systems.

Frequency of response: For the first three years after the final rule is published, public water systems are expected to implement several proposed rule requirements that have associated ICR burden. The public water system activities include reading and understanding the revised rule, personnel time for attending trainings, clarifying regulatory requirements with the State during rule implementation, updating and submitting initial service line inventories, develop educational materials for customers with lead, GRR, and unknown material service lines, and developing a service line replacement plan are all one time tasks during the period covered by the ICR. Systems also conduct field investigations to annually update and submit changes to their service line inventory. PWS will distribute public education materials to customers with lead, GRR and unknown material service lines annually. Like the water systems, States are expected to engage in the following one time proposed LCRI required activities during the period covered by this ICR: reading and understanding the rule; adopting the rule and developing an implementation program; modifying data recording systems; training staff; providing water system staff with initial technical assistance and training; reviewing public water system initial inventory data; provide education templates and review education materials for LSL, GRR, and unknown material service line customers; and conferring with water systems with lead, GRR, or unknown service lines on initial planning for service line replacement program activities. States will annually review systems' updated service line inventories.

Total estimated burden: For the first three years after the final rule is published, water systems and primacy agencies will implement several proposed rule requirements. The public water systems burden will include the following activities: Reading and understanding the revised rule, personnel time for attending trainings, clarifying regulatory requirements with the State during rule implementation. Public water systems would also be required to update service line inventories and develop a service line replacement plan. The total burden hours for public water systems is estimated at 7,579,376 hours. The total estimated cost for public water systems is $1,064,246,704 in 2022 dollars. For additional information on the public water systems activity burden see section VIII. of this document.

The State burden for the first three years of proposed rule implementation would include the following: Reading and understanding the rule; adopting the rule and developing an implementation program; modifying data recording systems; training staff; providing water system staff with initial and on-going technical assistance and training; coordinating annual administration tasks with EPA; reporting data to SDWIS/Fed; reviewing public water system inventory data; and conferring with water systems with lead, GRR, or unknown service lines on initial planning for service line replacement program activities. The total burden hours for States is 850, 097 hours. The total cost for primacy agencies is $50,994,078in 2022 dollars. See section VIII. of this document for additional discussion on burden and cost to the State.

The net change in burden associated with moving from the information requirements of the LCRR to those in the proposed LCRI over the three years covered by the ICR is -4.5million hours, for an average of -1.5 million hours per year. The numbers reflect the estimates of the number of systems that need to develop service line inventories. The total net change in costs from the most recent ICR approved for the LCRR over the three-year compliance period covered by this ICR are $$201.4 million for an average of $67.1 million per year (simple average over three years). Note that the proposed LCRI ICR analysis assumes that systems will not implement the new requirements of the LCRR during the implementation period for the LCRI. Therefore, the burden for the proposed LCRI are substantially lower than the anticipated burden of the

LCRR over the same period, resulting in a negative net burden for the proposed LCRI. The costs for the activities occurring under the LCRI, however, are greater than those that would occur for the same three year period under the LCRR.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9. When OMB approves this ICR, the Agency will announce that approval in the *Federal Register* and publish a technical amendment to 40 CFR part 9 to display the OMB control number for the approved information collection activities contained in this final rule.

Submit your comments on EPA's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden to EPA using the Docket ID (EPA-HQ-OW-2022-0801). EPA will respond to any ICR-related comments in the final rule. You may also send your ICR- related comments to OMB's Office of Information and Regulatory Affairs using the interface at www.reginfo.gov/public/do/PRAMain. Find this particular information collected by selected "Currently under Review—Open for Public Comments" or by using the search function. OMB must receive comments no later than **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

C. Regulatory Flexibility Act (RFA) as Amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA)

Pursuant to section 603 of the Regulatory Flexibility Act (RFA), EPA prepared an initial regulatory flexibility analysis (IRFA) that examines the impact of the proposed rule on small entities along with regulatory alternatives that could minimize the impact. The complete IRFA is available in Chapter 7, section 7.4 of the proposed LCRI Economic Analysis (USEPA, 2023b).

For purposes of assessing the impacts of this proposed rule on small entities, EPA considered small entities to be water systems serving 10,000 people or fewer. This is the threshold specified by Congress in the 1996 Amendments to SDWA for small water system flexibility provisions. As required by the RFA, EPA proposed using this alternative definition in the *Federal Register* (FR) (63 FR 7620, USEPA, 1998b), sought public comment, consulted with the Small Business Administration (SBA), and finalized the small water system threshold in the Agency's Consumer Confidence Report regulation (63 FR 44524, USEPA, 1998c). As stated in the final Consumer Confidence Report rule (USEPA, 1998c), the alternative definition would apply to this proposed regulation.

EPA used Safe Drinking Water Information System (SDWIS)/Federal data from the fourth quarter 2020 to identify about 63,000 small public water systems that may be impacted by the proposed LCRI. A small public water system serves between 25 and 10,000 people. These water systems include over 45,000 CWSs that serve year-round residents and more than 17,000 NTNCWSs that serve the same persons at least six months per year (e.g., a water system that is an office park or church). Of the total number of small systems serving 10,000 or fewer people, 22,529 CWSs and 435 NTNCWSs are estimated to have service lines with lead content or unknown/potential lead content service lines. The percent of small systems that are estimated to exceed the proposed lead action level (0.010 mg/L) ranges from 4.3 to 39.1 percent depending on the variation between projected low and high scenario lead tap sample 90th percentile values and the presence of LSL in systems.

In the LCRI, EPA is proposing regulatory revisions to strengthen public health protection and improve implementation in the following areas: service line replacement, tap sampling, service line inventories, corrosion control treatment, water quality parameter monitoring, public education, and consumer awareness.

The proposed LCRI includes requirements that can be categorized as follows: conducting a service line inventory that is updated annually; mandatory full service line replacement; enhanced lead tap and water quality parameter monitoring; installing or re-optimizing corrosion control treatment and redefining and updating the "find-and-fix" provision as "distribution system and site assessment" to evaluate and remediate elevated lead at a site where the tap sample exceeds the lead action level; utilizing pitcher filters and POU devices; improved customer outreach; and revisions to reporting and recordkeeping requirements. The regulatory requirement categories can also be thought of as the main cost categories affecting small systems. States are required to implement operator certification (and recertification) programs per SDWA section 1419 to ensure operators of CWSs and NTNCWSs, including small water system operators, have the appropriate level of certification.

Under the proposed rule requirements, small CWSs, serving 3,300 or fewer people, and all NTNCWSs with a 90th percentile lead value above the lead action level of 0.010 mg/L may choose alternative compliance options to CCT including point-of-use device installation and maintenance or removal of all lead bearing plumbing material from the system, but lead-bearing plumbing was not analyzed in EPA's cost-benefit model. EPA is estimating low and high cost scenarios to characterize uncertainty in the cost model results. These scenarios are functions of assigning different input values (low and high) to a number of variables that affect the relative cost of the small system compliance options. The number of systems serving 3,300 or fewer people that choose to install and maintain point-of-use devices under the proposed LCRI range from 3,757 to 6,639, serving between 420,715 and 845,023 people. The total monetized annualized cost for small systems under the low scenario ranges from $490 to $554 million discounted at three and seven percent, respectively. The low scenario also produces between $3.1 and $1.8 billion in small system total monetized benefits discounted at three and seven percent, respectively. Under the high scenario small system total monetized annualized costs are $666 million using a three percent discount rate and $757 million with a seven percent discount rate. High scenario small system total monetized annualized benefits discounted at three and seven percent range from $6.2 to $3.7 billion. See Chapter 7, section 7.4.5 for a breakdown of cost and benefit estimates by small system size sub-categories. Under the proposed LCRI, the number of small CWSs that will experience incremental annual costs of more than one percent of revenues ranges from 36,720 to 37,350 (81.4 percent to 82.8 percent of all small CWSs) and the number of small CWSs that will have annual incremental costs exceeding 3 percent of revenues ranges from 28,416 to 28,598 (63.0 percent to 63.4 percent of small CWSs). See Chapter 7, section 7.4 of the proposed LCRI Economic Analysis for more information on the characterization of the impacts under the proposed rule.

EPA has considered an alternative approach to provide regulatory flexibility to small water systems. The alternative would make small system flexibility available to all NTNCWSs and CWSs serving up to 10,000 people when a system has an action level exceedance. Systems that meet the criteria may choose from among the following compliance options: (1) optimizing existing CCT or installing new CCT; (2) installing and maintaining POU devices at all locations being served; or (3) removal of all lead bearing plumbing material from the system. Note that EPA's cost-benefit model does not include an analysis of the removal of lead-bearing plumbing. The total monetized annualized cost savings under the alternative small system compliance option when compared to the proposed LCRI ranges from $500,000 at a three percent discount rate to $400,000 using a seven percent discount rate. The alternative small system compliance option also results in a decrease in monetized annualized benefits ranging from $2.4 million at a three percent discount rate to $2 million at a seven percent discount rate. Note that SafeWater LCR model cost minimization calculations producing these results likely do not capture the impact of the feasibility concerns associated with implementing POU at systems serving over 3,300 people. See Exhibits 56 through 59 in section VIII.F.6. of this *Federal Register* document for a more detailed comparison of the costs and benefits of the proposed LCRI and this alternative small system flexibility compliance requirement. Also see Chapter 7, section 7.4 and Chapter 8, section 8.7 of the proposed LCRI economic analysis for additional information on the analysis of the alternative option.

As required by section 609(b) of the RFA, EPA also convened a Small Business Advocacy Review (SBAR) Panel to obtain advice and recommendations from small entity representatives (SERs) that potentially would be subject to the rule's requirements. On November 15, 2022, EPA's Small Business Advocacy Chairperson convened this Panel, which consisted of the Chairperson, the Director of the Standards and Risk Management Division within EPA's Office of Ground Water and Drinking Water, the Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget, and the Chief Counsel for Advocacy of the Small Business Administration. Prior to convening the Panel, EPA conducted outreach with SERs that will potentially be affected by this regulation and solicited comments from them. Additionally, after the Panel was convened, the Panel provided information to the SERs and requested their input.

In light of the SERs' comments, the Panel considered the regulatory flexibility issues and elements of the IRFA specified by RFA/Small Business Regulatory Enforcement Fairness Act (SBREFA) and developed the findings and discussion summarized in the SBAR report. For example, SERs provided comment on barriers to the goal of achieving 100 percent replacement of LSLs and GRR service lines in the nation. Many comments centered around the need for Federal funding and national-level technical assistance for small systems. SERs noted the cost of LSLR as well as the challenges small systems may face with limited staff, small budgets with competing priorities, and limited resources and capacity. The Panel recognized the steps EPA has taken, and will continue to take, to ensure Federal funds are available to drinking water systems. However, the Panel also recognized that funding streams are not guaranteed to be available to all small systems, that some small systems may not pursue available funding opportunities, and that, in the absence of funding, these systems may have difficultly financing LSLR. The Panel recommended that, when developing the service line replacement requirements, EPA consider the barriers to achieving 100 percent LSL and GRR service line replacement that SERs identified that make this goal challenging. In addition, the Panel recommended that EPA clarify provisions around customer engagement and refusal for mandatory service line replacement, consider removing the lead trigger level, and evaluate available recent data and LSLR cost information to inform the economic analysis. The report includes a number of other observations and recommendations to meet the statutory obligations for achieving small-system compliance through flexible regulatory compliance options. The report was finalized on May 31, 2023, and transmitted to the EPA Administrator for consideration. A copy of the full SBAR Panel report is available in the rulemaking docket (USEPA, 2023m).

D. The Unfunded Mandates Reform Act (UMRA)

This action contains a Federal mandate under the Unfunded Mandates Reform Act (UMRA), 2 U.S.C. 1531-1538, that may result in expenditures of $100 million or more for State, local, and Tribal governments, in the aggregate, or the private sector in any one year. Accordingly, EPA prepared a written statement required under section 202 of UMRA that is included in the docket for this action (see Chapter 7. section 7.5 of the proposed LCRI Economic Analysis (USEPA, 2023b)) and is briefly summarized here. EPA notes that the Federal Government is providing potential sources of funds to offset some of those direct compliance costs of the LCRI, including $15 billion as part of the Bipartisan Infrastructure Law. However, the proposed rule's costs still exceed $174 million for a given year even when considering currently available Federal funds.

Consistent with the intergovernmental consultation provisions of UMRA section 204, EPA consulted with governmental entities affected by this rule. EPA describes the government-to-government dialogue and comments from State, local, and Tribal governments in section X.E. Executive Order 13132: Federalism and section X.F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments of this document.

Consistent with UMRA section 205, EPA identified and analyzed a reasonable number of regulatory alternatives to determine the treatment technique requirements in the proposed LCRI. Sections III. and V. of this document describe the proposed options. See section VIII.F. of this document and Chapter 8 of the proposed LCRI Economic Analysis (USEPA, 2023b)) for alternative options that were considered.

This action may significantly or uniquely affect small governments. EPA consulted with small governments concerning regulatory requirements that might significantly or uniquely affect them. EPA describes this consultation in the Regulatory Flexibility Act (RFA), section X.C. of this document.

E. Executive Order 13132 (Federalism)

EPA concluded that this action has Federalism implications because it imposes substantial direct compliance costs on State or local governments, and the Federal Government will not provide the funds necessary to pay those costs. However, EPA notes that the Federal Government is providing a potential source of funds to offset some of those direct compliance costs through the Bipartisan Infrastructure Law. EPA estimates that the net change in Primacy Agency related costs for State, local, and Tribal governments in the aggregate is between $16.1

and $15.3 million (three percent discount rate) or $12.6 and $11.3 million (seven percent discount rate) (USEPA, 2023b).

EPA provides the following federalism summary impact statement. The EPA consulted with State and local officials early in the process of developing the proposed action to permit them to have meaningful and timely input into its development. In the process of developing the proposed LCRI, EPA consulted with State and local governments early to provide opportunities for meaningful and timely input. On October 13, 2022, EPA held a federalism consultation through a virtual meeting. EPA invited the following national organizations representing State and local officials to that meeting: the National Governor's Association, the National Conference of State Legislatures, the Council of State Governments, the National League of Cities, the U.S. Conference of Mayors, the National Association of Counties, the International City/County Management Association, the National Association of Towns and Townships, the Council of State Governments, County Executives of America, and the Environmental Council of the States. EPA also invited the Association of State Drinking Water Administrators, the Association of Metropolitan Water Agencies, the National Rural Water Association, the American Water Works Association, the Association of State and Territorial Health Officials, the National Association of County and City Health Officials, the American Public Works Association, the Association of Clean Water Administrators, the Western States Water Council, the African American Mayors Association, the National Association of State Attorneys General, the Western Governors' Association, the National School Board Association, the American Association of School Administrators, and the Council of the Great City Schools to participate in the meeting. Representatives from 15 organizations participated in the meeting.

EPA also provided the members of the various associations an opportunity to provide input during follow-up meetings. EPA did not receive any requests for additional meetings.

In addition to input received during the meeting on October 13, 2022, EPA provided an opportunity to receive written input within 60 days after the date of that meeting. A summary report of the views expressed during the Federalism consultation meeting and written submissions is available in the Docket (EPA-HQ-OW-2022-0813).

F. Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments)

This action has Tribal implications, it imposes substantial direct compliance costs on Tribal governments, and the Federal Government will not provide funds necessary to pay all of those direct compliance costs. There are 996 PWSs serving Tribal communities, where 87 of them are federally-owned (USEPA, 2023b). The Economic Analysis for the proposed LCRI estimated that the total annualized incremental costs placed on all systems serving Tribal communities ranges from $9.4 to $18.8 million (USEPA, 2023b). EPA notes that these estimated impacts will not fall evenly across all Tribal systems. The proposed LCRI small system flexibility provisions does offer regulatory relief by providing flexibilities for CWSs serving 3,300 or fewer people and all NTNCWSs that choose CCT, installation and maintenance of point-of-use devices, and replacement of lead-bearing materials to address lead in drinking water. This flexibility may result in LCRI implementation cost savings for many Tribal systems since 98 percent of Tribal CWSs serve 10,000 or fewer people and 17 percent of all Tribal systems are NTNCWSs (USEPA, 2023b). Lastly, EPA notes that the Federal Government is providing a potential source of funds to offset some of those direct compliance costs through the Bipartisan Infrastructure Law.

The EPA consulted with federally recognized Tribal officials early in the process of developing this action to permit them to have meaningful and timely input into its development. Between October 6, 2022 and December 9, 2022, EPA consulted with federally recognized Indian Tribes. The consultation included two national webinars with interested Tribes on

October 27, 2022 and November 9, 2022, during which EPA provided an overview of proposed rulemaking information and requested input. A total of 11 Tribal representatives participated in the two webinars. A summary report of the views expressed during Tribal consultations is available in the Docket (EPA–HQ–OW–2022–0801).

G. Executive Order 13045 (Protection of Children From Environmental Health and Safety Risks)

Executive Order 13045 directs Federal agencies to include an evaluation of the health and safety effects of the planned regulation on children in Federal health and safety standards and explain why the regulation is preferable to potentially effective and reasonably feasible alternatives. This action is subject to Executive Order 13045 (because it is a significant regulatory action under section 3(f)(1) of Executive Order 12866, and the EPA believes that the environmental health or safety risk addressed by this action has a disproportionate effect on children. Accordingly, EPA evaluated the environmental health or safety effects of lead found in drinking water on children and estimated the risk reduction and health endpoint impacts to children associated with treatment to reduce lead in drinking water including the adoption and optimization of CCT technologies and the replacement of LSLs and GRR service lines. The results of these evaluations are included in Chapter 7, section 7.8 of the proposed LCRI Economic Analysis (USEPA, 2023b) and described in section VIII. of this document. Copies of the Economic Analysis of the Proposed Lead and Copper Rule Improvements and supporting information are available in the Docket (EPA–HQ–OW–2022–0801).

H. Executive Order 13211 (Actions That Significantly Affect Energy Supply, Distribution, or Use)

This action is not a “significant energy action,” because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The water systems affected by this action do not generally generate power. In addition, this action does not propose to regulate any aspect of energy distribution because the water systems that would be regulated by the proposed LCRI already use electrical service providers. Finally, EPA determined that the incremental energy used to implement CCT at drinking water systems and replace LSLs and GRR service lines in response to the proposed regulatory requirements is minimal. As such, EPA does not anticipate that this proposed rule would have a significant adverse effect on the supply, distribution, or use of energy.

I. National Technology Transfer and Advancement Act of 1995

This action involves technical standards. The proposed revisions under the LCRI may involve existing voluntary consensus standards because the proposed LCRI would require additional monitoring for lead and copper. EPA's monitoring and sampling methodologies generally include voluntary consensus standards developed by agencies, such as the American National Standards Institute (ANSI) and other similar types of entities wherever EPA deems these methodologies appropriate for compliance monitoring. The proposal includes requirements to use filters that are certified by an ANSI-accredited certifier. Additional information is available in section V.B.6 and V.I. of this preamble. The proposed LCRI does not, however, change any methodological requirements for monitoring or sample analysis. Additional information is available in section VI. of this preamble. EPA notes that in some cases, the proposed LCRI would revise the required frequency and number of lead tap samples.

J. Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) and Executive Order 14096 (Revitalizing Our Nation's Commitment to Environmental Justice for All)

EPA anticipates the proposed LCRI will not create disproportionate and adverse human health or environmental effects on communities with environmental justice concerns under Executive Order 14096 (88 FR 25251, April 21, 2023); see also Executive Order 12898 (59 FR

7629, February 16, 1994). The documentation for this finding, including additional details on the methodology, results, and conclusions, are included in EPA's Environmental Justice Analysis for the Proposed Lead and Copper Rule Improvements Report and is available in the public docket for this action (EPA-HQ-OW-2022-0801).

Executive Order 12898 first established Federal executive policy on environmental justice. The main provision of Executive Order 12898 directs Federal agencies, to the greatest extent practicable and permitted by law, to make achieving environmental justice part of their mission. Executive Order 12898 states "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions".

Executive Order 14096 directs the Federal Government to build upon and strengthen its commitment to deliver environmental justice to all communities across America through an approach that is informed by scientific research, high-quality data, and meaningful Federal engagement with communities with environmental justice concerns.

Consistent with the Agency's Technical Guidance for Assessing Environmental Justice in Regulatory Analysis (USEPA, 2016d), EPA conducted an environmental justice analysis for the proposed LCRI to assess impacts anticipated to result from the proposed LCRI (USEPA, 2023f). The analysis builds on and advances the analysis conducted under the LCRR, which evaluated baseline exposure to lead in drinking water. The proposed LCRI's environmental justice analysis evaluated potential environmental justice concerns associated with lead in drinking water in the baseline and the proposed LCRI, including consideration of whether potential environmental justice concerns are created or mitigated by the proposed LCRI relative to the baseline. EPA compiled recent peer-reviewed research on the relationship between lead exposure and socioeconomic status and found that Black, Indigenous, and People of Color (BIPOC) and/or low-income populations are at higher risk of lead exposure and associated health risks. EPA also conducted an analysis of seven case study cities and found a range of outcomes with respect to the sociodemographic and housing unit variables in areas served by LSLs in the cities investigated. Because updated service line inventories were not available for the environmental justice analysis for LCRR, EPA used housing age as a proxy indicator for LSL presence in the environmental justice analysis for the proposed LCRI. In the environmental justice analysis, EPA identified some trends indicating disproportionate and adverse human health risk for exposure to lead in drinking water based on LSL presence in minority populations and low-income populations, and also that populations of children in minority households and/or low-income households are disproportionately at risk of exposure to lead in drinking water because they are more likely to live in housing built when LSLs were more commonly used.

For the proposed LCRI, updated inventories are similarly not widely available yet; however, some systems have published updated inventories online. In the environmental justice analysis for the proposed LCRI, EPA evaluated service line inventories from seven water systems to estimate baseline exposure to lead in drinking water using LSL presence as a proxy for lead exposure (USEPA, 2023k). EPA found a range of outcomes with respect to the sociodemographic and housing unit variables in areas served by LSLs in the cities investigated. While EPA found that block groups with LSLs often had higher percentages of low-income residents, renters, and People of Color (specifically, Black, Hispanic, or linguistically isolated individuals) compared to block groups without LSLs, there was little evidence that the number of LSLs per capita was positively correlated with block group demographic characteristics for these seven case studies. However, block groups with the highest number of LSLs per capita (top quartile) had a notably larger percentage of Black residents than the service area as a whole for five case studies. Measures included to capture the possibility of other sources of lead – traffic density and pre-1960 housing – were also notably higher in block groups with LSLs compared to those without. The percent of housing built prior to 1960 was also positively correlated with the number of LSLs per capita for every case study and was also elevated in the top quartile compared to the service area as a whole. One of the analyses revealed that LSL prevalence was a stronger predictor of the prevalence of elevated blood lead levels compared with EPA's EJScreen 2017 Lead Paint EJ Index or the U.S. Department of Housing and Urban Development's Deteriorated Paint Index (Tornero-Velez et al., 2023).

Taken together, these findings support the concern that adverse health effects associated with lead exposure from LSLs may be inequitably distributed with respect to LSL presence. While the limited number of water systems included in the analysis do not permit conclusions to be made about environmental justice and LSL presence outside of the context of these individual systems, the analysis does point to several findings. The analysis demonstrated significant differences in socioeconomic and housing characteristics and the prevalence of LSLs across these systems. It also demonstrated the importance of considering the specific characteristics within the individual system context. Taken together, these findings support the concern that adverse health effects associated with lead exposure from LSLs may be inequitably distributed with respect to LSL presence.

Statistical analysis did not identify strong associations between LSLR and the characteristics of the Census block group in which they occurred (e.g., socioeconomic and housing characteristics) in any of the case studies. This is because, in general, either no LSLs or relatively few LSLs have been removed in these cities, which affects EPA's ability to quantify a relationship. Conversely, in the case study of the water system in Newark, New Jersey, almost all

LSLs were removed in a short period of time, similarly obscuring the relationship between removals and the socioeconomic and housing unit variables. Nevertheless, EPA recognizes the potential that even in a water system where there are no environmental justice concerns with respect to LSL presence, the sequence and timing in which LSLs and GRR service lines are replaced by a system's service line replacement program can potentially create a concern. Section V. of the preamble highlights the proposed LCRI provisions intended to facilitate water system planning to prevent or minimize environmental justice concerns from being created within the replacement program, as well as other requirements that can make full replacements and information more accessible to all customers. EPA expects that the equity provisions included in the proposal, such as service line replacement prioritization, would reduce baseline differential impacts associated with lead exposure from drinking water. In sections IV.G. and IV.H. of this document, EPA also highlights external funding available to support full service line replacement, as well as water systems' obligations under Federal Civil Rights law.

Additionally, on October 25, 2022, and November 1, 2022, EPA held public meetings related to environmental justice and the development of the proposed LCRI. The meetings provided an opportunity for EPA to share information and for individuals to offer input on environmental justice considerations related to the development of the proposed LCRI and how to more equitably address lead in drinking water issues in their communities.

During the meetings and in subsequent written comments, EPA received public comment on topics including disproportionate exposure to lead and its health effects among BIPOC and low-income communities; LSLR funding; methods to prioritize LSLR; access to LSLR for renters; filter distribution and use during LSLR; lowering the lead action level; establishing an MCL for lead; updating the lead health effects language required for public education, public notification, and the Consumer Confidence Report; ensuring that public education and public notification reaches communities that are most at risk; first and fifth liter lead tap sampling; remediating lead identified through sampling in schools and child care facilities; environmental justice concerns with corrosion control studies; community engagement; and regulatory enforcement and oversight. For more information on the public meetings, please refer to the *Public Meeting on Environmental Justice Considerations for the Development of the Proposed Lead and Copper Rule Improvements (LCRI) Meeting Summary* for each of the meeting dates in the public docket at https://www.regulations.gov/docket/EPA-HQ-OW-2022-0801. Written public comments can also be found in the docket.

K. Consultations with the Science Advisory Board (SAB) and the National Drinking Water Advisory Council (NDWAC)

In accordance with SDWA sections 1412(d) and 1412(e), EPA consulted with the National Drinking Water Advisory Council (NDWAC) (or the Council) and the EPA Science Advisory Board (SAB). The following summarizes these requirements and consultations.

1. SAB

SDWA section 1412(e) requires EPA request comments from the SAB prior to the proposal of any NPDWR. As required by SDWA section 1412(e), in 2022, EPA initiated consultation with the SAB to seek comments in advance of the publication of this document for the proposed LCRI. During this consultation, EPA sought from the SAB, an evaluation of service line inventory data at select case study locations to inform the most appropriate tools, indicators and measures, EPA could consider to best evaluate environmental justice with respect to the presence and replacement of LSLs. EPA also asked the SAB to evaluate the potential environmental justice impacts of the proposed LCRI in accordance with Executive Order 12898, which directs agencies to “identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations" (Exec. Order No. 12898, 1994).

On November 3, 2022, EPA held a consultation with the SAB regarding the Agency's draft case studies for the proposed LCRI environmental justice analysis. SAB members were asked to address the following questions:

(1.a.) Please comment on the tools/indicators/metrics, such as the recently released Environmental Justice Index (EJI) and Climate and Economic Justice Screening Tool (CEJST), that EPA should consider using when developing lead service line replacement case studies to support the development of the Lead and Copper Rule Improvements environmental justice analysis.

(1.b.) Given the identified tools and indices (i.e., EJScreen, SVI, ADI) please comment on whether there is a sub-set of variables within the indices which should be given higher weights in the Lead and Copper Rule Improvements environmental justice assessment.

(2) Please comment on the indicator/measure that is most suitable for studying the environmental justice impacts associated with lead service lines and their replacement.

(3) Please comment on whether any of the tools or indicators under consideration for use in the Lead and Copper Rule Improvements assessment of the drinking water environmental justice impacts can help to better assess lead impacts from other co-located exposure pathways (e.g., lead paint, soil, and dust) to inform EPA's understanding of lead exposures from non-drinking water sources. Materials shared with the SAB are available in the docket EPA-HQ-OW-2022-0801.

In response, EPA received a range of recommendations from SAB members. The recommendations primarily focused on the tools and indicators EPA should use in its EJ study to support LCRI. SAB members recommended using indicators from multiple tools (e.g., EJScreen, CDC's Environmental Justice Index (EJI), CDC/ATSDR Social Vulnerability Index, Area Deprivation Index (ADI) to more effectively identify communities that are disproportionately burdened by lead exposure and evaluate environmental justice impacts of LSLs and LSLR. One member suggested not using tools that use an index that is based on different indicators or composite tools (evaluating multiple indicators together) (e.g., EJScreen, CDC's Environmental Justice Index, CDC/ATSDR Social Vulnerability Index, ADI). Instead, some members advised extracting and evaluating demographic and socioeconomic factors from these tools individually. SAB members recommended using individual socioeconomic variables from the 2020 U.S. Census in conjunction with the American Community Survey (ACS), CDC's Minority Health-Social Vulnerability Index (SVI), and the University of South Carolina's Social Vulnerability Index (SoVI). One member recommended relying more heavily on tools that have finer resolution and use geographic units at the Census block group level, such as EJScreen and ADI. In addition, SAB members recommended indicators for studying LSL and LSLR environmental justice impacts including minority populations, low-income population, population under age five, pre-1960 housing, pre-1980 housing, people with disabilities, single-parent households, occupied housing units without complete plumbing, proximity to lead mines, hazardous waste proximity, superfund proximity, and particulate matter (PM) 2.5. A few members recommended including indicators that address drinking water or infrastructure vulnerabilities.

Some members suggested that EPA focus on indicators most relevant to children, such as children under age five, maternal education, birth weight, and quality of home environment, because children are most sensitive to the effects of lead. One member suggested including a subset of indicators that are children-specific and comprise relevant subgroups of persons under five years and/or 18 years, such as children belonging to non-white racial/ethnic groups, children not born in the U.S., children with disabilities, and children at or below the poverty level. Some members pointed out that race/ethnicity indicators should be disaggregated to focus on only one race/ethnicity instead of an aggregate "people of color" indicator.

Some members suggested giving higher weights to indicators that address populations disproportionately vulnerable to lead exposure and its adverse health effects, such as population under 5 years old and low-income communities, because they are more likely to consume tap water. Additional indicators suggested for weighting were location based, including residential areas near legacy pollution sites.

Some SAB members suggested individual indicators from the following tools be used to consider lead from other pathways: EJScreen, SVI, ADI, and EJI. Some SAB members recommended using proximity to traffic and pre-1960s housing, as these could indicate compound lead exposure from pathways other than drinking water. For example, proximity to traffic could correspond to elevated lead in soil due to past emissions of leaded gasoline, while pre-1960s housing is more likely to have lead paint, contributing to lead in dust and soil).

As a result of the consultation, EPA incorporated the suggestions from the SAB in a study of the Environmental Justice implications of the LCRI (USEPA, 2023f). EPA evaluated correlations between per capita LSLs (in a Census block group) and different ethnic groups including American Indian or Alaska Native, Asian or Pacific Islander, other or two races, Hispanic, Non-Hispanic Black, and Non-Hispanic white. EPA also evaluated the relationship between the presence of LSL and indicators representing the populations most at risk of lead exposure such as low income and children under age five. Indicators addressing characteristics that are associated with exposure to other lead sources were also incorporated in the study including structures built prior to 1960 and proximity to traffic. Additional information on SAB recommendations is included in the SAB report available in the docket EPA-HQ-OW-2022-0801.

2. NDWAC

SDWA section 1412(d) requires EPA to consult with NDWAC in proposing and promulgating any NPDWR. EPA met this requirement for the proposed LCRI. On November 30, 2022, EPA consulted with the NDWAC. At the November 30 consultation meeting, EPA provided background on lead in drinking water and the LCR, an overview of the LCRR published in January 2021, and a summary of the outcome of EPA's review of the LCRR published in the December 2021 *Federal Register*. EPA also discussed topics for the potential revisions in the proposed LCRI, including service line replacement, tap sampling and compliance, ways to reduce rule complexity, and small system flexibilities, to collect input and generate discussion among NDWAC members. A summary of the NDWAC consultation is available in the National Drinking Water Advisory Council, Fall 2022 Meeting Summary Report (NDWAC, 2022) and the docket for this proposed rule. EPA carefully considered NDWAC recommendations during the development of the proposed LCRI.

L. Consultation With the Department of Health and Human Services Under SDWA Section 1412(d)

On August 18, 2023, EPA consulted with the Department of Health and Human Services (HHS). EPA provided information to HHS officials on the draft proposed LCRI and considered HHS input as part of the interagency review process. (See section X.A. of this document for a discussion of Executive Order 12866: Regulatory Planning and Review).

XI. References

Abt Associates. (2023). *Selection of Concentration-Response Functions between Lead Exposure and Adverse Health Outcomes for Use in Benefits Analysis: Cardiovascular-Disease Related Mortality.* Prepared for National Center for Environmental Economics. Office of Policy. USEPA.

Abt Associates. (2022). *Development of Medical Cost Estimates for Adverse Birth Outcomes.* Prepared for: National Center for Environmental Economics. Office of Policy. USEPA.

Agency for Toxic Substances and Disease Registry (ATSDR). (2020). Toxicological Profile for Lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. August 2020. https://www.atsdr.cdc.gov/toxprofiles/tp13.pdf.

Ala, A., Walker, A.P, Ashkan, K., Dooley, J.S., Schilsky, M.L., (2007). Wilson's disease. *The Lancet.* 369 (9559), 397-408. Doi: https://doi.org/10.1016/S0140-6736(07)60196-2.

American Water Works Association (AWWA). (2016, May 18). *Lead Service Line Replacement: Vital Tips from Leading Utility Managers* [Video]. YouTube. https://www.youtube.com/watch?v=fwq4_yPjHMs.

Aoki, Y., Brody, D. J., Flegal, K. M., Fakhouri, T. H., Axelrad, D. A., & Parker, J. D. (2016). Blood Lead and Other Metal Biomarkers as Risk Factors for Cardiovascular Disease Mortality. Medicine (Baltimore), 95(1), e2223. doi:10.1097/md.0000000000002223.

AWWA. (2020, November 18). *Green Bay celebrates last lead service line removal*. Retrieved July 24, 2023, from https://www.awwa.org/AWWA-Articles/green-bay-celebrates-last-lead-service-line-removal.

AWWA. (2022). Lead Communications Guide and Toolkit. https://www.awwa.org/Portals/0/AWWA/Communications/2022LeadPageAssets/2022AWWA-LeadCommunicationsGuideAndToolkit.pdf.

AwwaRF and DVGW-Technologiezentrum Wasser. 1996. Internal Corrosion of Water Distribution Systems. 2nd edition. AwwaRF Order 90508. Project #725. AWWA Research Foundation (now Water Research Foundation) and AWWA. Denver, CO.

Andrew, A., Zhou, J., Gui, J., Harrison, A., Shi, X., Li, M., Guetti, B., Nathan, R., Tischbein, M., Pioro, E., Stommel, E., and Bradley, W. (2022). Airborne lead and polychlorinated biphenyls (PCBs) are associated with amyotrophic lateral sclerosis (ALS) risk in the U.S. *Sci Total Environ,* 819: 153096. https://dx.doi.org/10.1016/j.scitotenv.2022.153096.

Barn, P., Nicol, A., Struck, S., Dosanjh, S., Li, R., and Kosatsky, T. (2014). Investigating elevated copper and lead levels in school drinking water. *Environmental Health Review,* 56(04): 96-102. https://doi.org/10.5864/d2014-006.

Berrien County Health Department (2023). *Water Lead Response in Benton Harbor*. Retrieved July 18, 2023, from https://www.berriencounty.org/1599/City-of-Benton-Harbor.

Betanzo, E., Rhyan, C., and Hanna-Attisha, M. (2021). Lessons from the first year of compliance sampling under Michigan's revised Lead and Copper Rule and national Lead and Copper Rule Implications. *AWWA Water Science,* 3(6): e1261. https://doi.org/10.1002/aws2.1261.

BlueConduit. (2020). *Principles of Data Science for Lead Service Line Inventories and Replacement Programs*. https://www.asdwa.org/wp-content/uploads/2020/09/ASDWA-BlueConduit-White-Paper-on-Data-and-LSL.pdf.

Bosscher, V., Lytle, D. A., Schock, M., Porter, A., and Del Toral, M. (2019). POU water filters effectively reduce lead in drinking water: a demonstration field study in Flint, Michigan. *Journal of Environmental Science and Health, Part A,* 54(5): 484-493. https://pubmed.ncbi.nlm.nih.gov/31074704/.

Bradford, L. E. A., Idowu, B., Zagozewski, R., and Bharadwaj, L. A. (2017). There is no publicity like word of mouth… Lessons for communicating drinking water risks in the urban setting. *Sustainable Cities and Society,* 29: 23-40. https://doi.org/10.1016/j.scs.2016.11.008.

Brown, L., M. Lynch, A. Belova, R. Klein, and A. Chiger. 2020. Developing a Health Impact Model for Adult Lead Exposure and Cardiovascular Disease Mortality. *Environmental Health Perspectives*, 128(9):097005-1; https://doi.org/10.1289/EHP6552.

Brown, M., J., Raymond, J., Homa, D., Kennedy, C., and Sinks, T. (2011). Association between children's blood lead levels, lead service lines, and water disinfection, Washington, DC, 1998-2006. *Environmental Research,* 111(1): 67-74. https://pubmed.ncbi.nlm.nih.gov/21112052/.

Brown, R. A., and Cornwell, D. A. (2015). High-Velocity Household and Service Line Flushing Following LSL Replacement. *Journal AWWA,* 107(3): E140-E151. https://doi.org/10.5942/jawwa.2015.107.0012.

Budtz-Jørgensen, E., D. Bellinger, B. Lanphear, and P. Grandjean. 2013. An international pooled analysis for obtaining a benchmark dose for environmental lead exposure in children. Risk Analysis 33(3):450–461. doi:10.1111/j.1539-6924.2012.01882.x.

California Water Boards. (2023). Templates for Public Notification. Page last updated February 13, 2023. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Notices.html.

Camara, E., Montreuil, K. R., Knowles, A. K, and Gagnon, G. A. (2013). Role of the water main in lead service line replacement: A utility case study. *Journal AWWA,* 105(8): E423-E431. https://doi.org/10.5942/jawwa.2013.105.0102.

Cardew, P. T. (2009). Measuring the benefit of orthophosphate treatment on lead in drinking water. *Journal of Water and Health*, 7(1): 123-131. https://doi.org/10.2166/wh.2009.015.

Cavender, K.A. (2013). Memorandum from Kevin A. Cavender to Ambient Monitoring Rule Docket (EPA-HQ-OAR-2013-0619)-Supporting information for reconsideration of existing requirements to monitor lead at Urban NCore Sites.

https://www.regulations.gov/document/EPA-HQ-OAR-2013-0619-0002.

CDM Smith. (2022). Rolling Out a Successful Lead Service Line Replacement Program: Lessons Learned and Future Regulations. On-demand webinar. Recorded May 2022. Retrieved from https://www.cdmsmith.com/en/Webinar/Rolling-Out-a-Successful-LSLR-Program-Lessons-Learned-and-Future-Regulations.

Centers for Disease Control (CDC). (2022a). Health Effects of Lead Exposure. Retrieved July 19, 2023 from https://www.cdc.gov/nceh/lead/prevention/health-effects.htm.

CDC. (2022b). Breastfeeding and Special Circumstances: Environmental and Chemical Exposures: Lead. Last reviewed May 18, 2022. Retrieved from https://www.cdc.gov/breastfeeding/breastfeeding-special-circumstances/environmental-exposures/lead.html.

CDC. (2022c). CDC updates blood lead reference value to 3.5 µg/dL. Last reviewed December 16, 2022. Retrieved from https://www.cdc.gov/nceh/lead/news/cdc-updates-blood-lead-reference-value.html.

CDC. (2023). Lead in Drinking Water. Last reviewed February 28, 2023. Retrieved from https://www.cdc.gov/nceh/lead/prevention/sources/water.htm.

Chislock, M.F., E. Doster, R.A. Zitomer, and A.E. Wilson. 2013. Eutrophication: Causes, consequences, and controls in aquatic ecosystems. *Nature Education Knowledge* 4(4):10.

City of Appleton. (2022). An Ordinance Creating section 20-44 of Chapter 20 of the Municipal Code of the City of Appleton, Relating to Lead and Galvanized Water Service Line

Replacement, Municipal Code section 20-44 of Chapter 20 C.F.R. Wisconsin. Retrieved from https://www.appleton.org/home/showpublisheddocument/24584/637873462362500000.

City of Dearborn. (2019). Consumer Annual Report on Water Quality. https://cityofdearborn.org/documents/city-departments/public-works/water-and-sewerage/118-consumer-confidence-report/file.

City of Denver. (2023). Using Filters. Retrieved July 18, 2023 from https://www.denverwater.org/your-water/water-quality/lead/filter-program.

City of Detroit (2023, May 12). *Detroit to replace 5,000 lead service lines this year, ramping up to 10,000 per year starting in 2024*. Water and Sewerage Department. Retrieved July 17, 2023, from https://detroitmi.gov/news/detroit-replace-5000-lead-service-lines-year-ramping-10000-year-starting-2024.

City of Elgin. (2022). Lead Service Line Inventory Map. Retrieved July 31, 2023, from https://www.cityofelgin.org/CivicAlerts.aspx?AID=2482.

City of Elgin. (2023). Lead Testing and Filter Distribution. Retrieved July 18, 2023, from https://www.cityofelgin.org/2347/Lead-Testing.

City of Flint. (n.d.). *Progress Report on Flint Water.* Michigan. Retrieved July 25, 2023, from https://www.cityofflint.com/progress-report-on-flint-water/.

City of Kalamazoo. (2023). Request Free Water Filters. Retrieved July 18, 2023 from https://www.kalamazoocity.org/Residents/Water-Sewer-Service/Request-Free-Water-Filters.

City of Milwaukee. (2023). *Chapter 225-Plumbing and Drainage*. Milwaukee Code of Ordinances. Retrieved July 25, 2023, from https://city.milwaukee.gov/ImageLibrary/Groups/ccClerk/Ordinances/Volume-2/CH225.pdf.

City of Newark. (n.d.a). *Lead Service Line Replacement Program.* New Jersey. NewarkLeadServiceLine.com Retrieved July 25, 2023, from https://www.newarkleadserviceline.com/replacement.

City of Newark. (n.d.b) Water Filter and Replacement Cartridge Distribution Program. New Jersey. Retrieved July 18, 2023 from https://www.newarkleadserviceline.com/filters.

City of Newark. (2019). Mandatory Replacement of Lead Service Line. Title XVI Health, Sanitation and Air Pollution. Chapter 16:23. Ordinance 6PSF-M, 9-18-2019. New Jersey. Retrieved from https://ecode360.com/36709572.

City of Pittsburgh. (n.d.) The Pittsburgh Safe Water Program. Retrieved July 18, 2023 from https://pittsburghpa.gov/safepgh2o/.

City of Spokane. (2018, July 27). *City Eliminates Remaining Lead Service Lines.* News Release. Retrieved July 25, 2023 from: https://my.spokanecity.org/news/releases/2018/07/27/city-eliminates-remaining-lead-service-lines/.

City of Stoughton Utilities Committee. (2022, Aug. 15). *Official Notice and Agenda*. Meeting Agendas. Retrieved July 25, 2023, from https://www.stoughtonutilities.com/documents/ucpackets/2022-08-15-uc-packet_r.pdf.

City of Tucson. (2022, Aug. 9). Lead and Copper. Water Department. Retrieved July 25, 2023, from https://www.tucsonaz.gov/Departments/Water/About-Your-Water-Quality/Water-Quality-Monitoring/Lead-and-Copper.

Clark, B., Cartier, C., St. Clair, J., Triantafyllidou, S., Prevost, M., and Edwards, M. (2013). Effect of connection type on galvanic corrosion between lead and copper pipes. *Journal AWWA,* 105(10): E576-E586. https://doi.org/10.5942/jawwa.2013.105.0113.

Clark, B., Masters, S. V., and Edwards, M. (2014). Profile Sampling To Characterize Particulate Lead Risks in Potable Water. *Environmental Science & Technology, 48*(12): 6836-6843. https://pubs.acs.org/doi/10.1021/es501342j.

Council on Environmental Quality (CEQ). (2022). Climate and Economic Justice Screening Tool. Available online https://screeningtool.geoplatform.gov/.

Cowles et al. (2017). *2017 Senate Bill 48*. Wisconsin State Legislature. Retrieved July 25, 2023, from https://docs.legis.wisconsin.gov/2017/proposals/sb48.

Crump, K.S., C. Van Landingham, T.S. Bowers, D. Cahoy, and J.K. Chandalia. 2013. A statistical reevaluation of the data used in the Lanphear et al. (2005) pooled-analysis that related low levels of blood lead to intellectual deficits in children. Critical Reviews in Toxicology 43(9):785–799. Doi:10.3109/10408444.2013.832726.

DC Water (n.d.). DC Water Service Information. Retrieved July 31, 2023, from https://geo.dcwater.com/Lead/.

Del Toral, M. A., Porter, A., and Schock, M. R. (2013). Detection and Evaluation of Elevated Lead Release from Service Lines: A Field Study. *Environmental Science & Technology,* 47(16): 9300-9307. https://doi.org/10.1021/es4003636.

Denver Water (2023a). *Using Filters*. Lead Reduction Program. Retrieved July 18, 2023, from https://www.denverwater.org/your-water/water-quality/lead/filter-program.

Denver Water (2023b). *Annual Report-2022.* Denver Water Lead Reduction Program. Version 1.0: February 10, 2023. Retrieved July 25, 2023, from: https://www.denverwater.org/sites/default/files/lead-reduction-program-annual-report-2022.pdf.

Department of the Treasury (n.d.). American Rescue Plan: State and Local Fiscal Recovery Funds: Project Highlights. https://home.treasury.gov/system/files/136/American-Rescue-Plan-Anniversary-SLFRF-Examples.pdf.

DeSantis, M., Triantafyllidou, S., Schock, M., and Lytle, D. (2018). Mineralogical Evidence of Galvanic Corrosion in Drinking Water Lead Pipe Joints. *Environmental Science & Technology,* 52(6): 3365-3374. https://doi.org/10.1021/acs.est.7b06010.

Deshommes, E., Laroche, L., Nour, S., Cartier, C., and Prevost, M (2010). Source of occurrence of particulate lead in tap water. *Water Research,* 44(12): 3734-3744. https://doi.org/10.1016/j.watres.2010.04.019.

Deshommes, E., Bannier, A., Laroche, L., Nour, S., and Prevost, M. (2016). Monitoring-Based Framework to Detect and Manage Lead Water Service Lines. *Journal AWWA,* 108(11): E555-E570. https://doi.org/10.5942/jawwa.2016.108.0167.

Deshommes, E., Trueman, B., Douglas, I., Laroche, L., Swertfeger, J., Spielmacher, A., Gagnon, G.A., Prevost, M. (2018). Lead Levels at the Tap and Consumer Exposure form Legacy and Recent Lead Service Line Replacements in Six Utilities. *Environmental Science and Technology.* 52, 16, 9451-9459. Retrieved from: https://pubs.acs.org/doi/10.1021/acs.est.8b02388.

Diebler, K., and Basu, P. (2013). Continuing issues with *Lead: Recent Advances in Detection. European Journal of Inorganic Chemistry,* 2013(7): 1086-1096. DOI: 10.1002/ejic.201200997.

Dodds, W.K., W.W. Bouska, J.L. Eitzmann, T.J. Pilger, K.L. Pitts, A.J. Riley, J.T. Schloesser, and D.J. Thornbrugh. 2009. Eutrophication of U.S. freshwaters: Analysis of potential economic damages. *Environmental Science Technology* 43(1):12-19.

Doré, E., Deshommes, E., Andrews, R. C. Nour, S., and Prévost, M. (2018) Sampling in schools and large institutional buildings: Implications for regulations, exposure and management of lead and copper, *Water Research*, 140: 110-122. DOI: 10.1016/j.watres.2018.04.045.

Dorsey, A., and Ingerman, L. (2004). Toxicological Profile for Copper. Agency for Toxic Substances and Disease Registry. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. https://stacks.cdc.gov/view/cdc/7006/cdc_7006_DS1.pdf.

Doshi, J. A., Hodgkins, P., Kahle, J., Sikirica, V., Cangelosi, M. J., Setyawan, J., & Neumann, P. J. (2012). Economic impact of childhood and adult attention-deficit/hyperactivity disorder in the United States. Journal of the American Academy of Child & Adolescent Psychiatry, 51(10), 990-1002.

Drink Philly Tap (n.d.) *Ambassador Program Guidebook.* Retrieved July 25, 2023, from https://drinkphillytap.org/wp-content/uploads/DrinkPhillyTap-Guidebook.pdf.

Environmental Defense Fund (EDF). (n.d.a). *State efforts to support LSL replacement*. Retrieved July 17, 2023, from https://www.edf.org/health/state-efforts-support-lsl-replacement.

EDF. (n.d.b). *Recognizing efforts to replace lead service lines*. Retrieved July 24, 2023, from https://www.edf.org/health/recognizing-efforts-replace-lead-service-lines.

Elfland, C., Scardina, P., and Edwards, M. (2010). Lead-contaminated water from brass plumbing devices in new buildings. *Journal AWWA*, 102(11): 66-76. https://doi.org/10.1002/j.1551-8833.2010.tb11340.x.

Executive Order 12866. 1993. Regulatory Planning and Review. *Federal Register* 58(190):51735, October 4, 1993. Available at https://www.reginfo.gov/public/jsp/Utilities/EO_12866.pdf.

Executive Order 12898. 1994. Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations. *Federal Register* 59(32): 7629, February 16, 1994. Available at https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf.

Executive Order 13045. 1997. Protection of Children From Environmental Health Risks and Safety Risks. *Federal Register* 62(78):19885, April 23, 1997. Available at https://www.govinfo.gov/content/pkg/FR-1997-04-23/pdf/97-10695.pdf.

Executive Order 13132. 1999. Federalism. *Federal Register* 64(153):43255, August 10, 1999. Available at https://www.gpo.gov/fdsys/pkg/FR-1999-08-10/pdf/99-20729.pdf.

Executive Order 13175. 2000. Consultation and Coordination with Indian Tribal Governments. *Federal Register* 65(218):67249, November 9, 2000. Available at https://www.gpo.gov/fdsys/pkg/FR-2000-11-09/pdf/00-29003.pdf.

Executive Order 13211. 2001. Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. *Federal Register* 66(99):28355, May 22, 2001. Available at https://www.govinfo.gov/content/pkg/FR-2001-05-22/pdf/01-13116.pdf.

Executive Order 13563. 2011. Improving Regulation and Regulatory Review. *Federal Register* 76(14):3821, January 21, 2011. Available at https://www.gpo.gov/fdsys/pkg/FR-2011-01-21/pdf/2011-1385.pdf.

Executive Order 13990. Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. January 20, 2021.

https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis/.

Executive Order 14096. 2023. Revitalizing Our Nation's Commitment to Environmental Justice for All. *Federal Register* 88(80): 25251, April 26, 2023. Available at https://www.federalregister.gov/documents/2023/04/26/2023-08955/revitalizing-our-nations-commitment-to-environmental-justice-for-all.

Florida Department of State. (2010). *Rule: 25-30.140*. Florida Administrative Code & Administrative Register. Retrieved July 24, 2023, from https://www.flrules.org/gateway/ruleNo.asp?id=25-30.140.

Folkman, S. (2018). *Water Main Break Rates in the USA and Canada: A Comprehensive Study.* Utah State University-Buried Structures Laboratory. Retrieved July 25, 2023, from: https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1173&context=mae_facpub&source=post_page.

Froehlich, T.E., Lanphear, B.P, Auinger, P., Hornungh, R., Eppstein, J.N., Braun, J., Kahn, R.S. (2009). Association of Tobacco and Lead Exposures with Attention Deficit/Hyperactivity Disorder. *Pediatrics.* 124(6):e1054-1063. Doi: https://doi.org/10.1542/peds.2009-0738.

Glibert, P.M., D.M. Anderson, P. Gentien, E. Graneli, and K.G. Sellner. 2005. The global, complex phenomena of harmful algal blooms. *Oceanography* 18(2):136-147.

Goho, S. A., Saenz, M., and Neltner, T. (2019). *Rates could fund lead pipe replacement in critical states: Laws in states with the most lead service lines support the practice*. Retrieved from http://clinics.law.harvard.edu/environment/files/2019/04/Rates-Fund-LSL-Replacement-States_Harvard_EDF_2019.pdf.

Grand Forks, North Dakota (n.d.). Lead Service Line Public Viewer. Retrieved July 31, 2023 from https://gfgis.maps.arcgis.com/apps/webappviewer/index.html?id=d4ba2372dd6340c099c2898380bcbb45.

Greater Cincinnati Water Works (n.d.). Service Line Information. Retrieved July 31, 2023 from https://gcww.maps.arcgis.com/apps/webappviewer/index.html?id=0a170c268c694e46a8a4e394630df0bd.

Griffin, S. & Dunwoody, R. J. (2000). The Relation of Communication to Risk Judgment and Preventive Behavior Related to Lead in Tap Water. *Health Communication,* 12(1): 81–107. DOI: 10.1207/S15327027HC1201_05.

Harari, F., Sallsten, G., Christensson, A., Petkovic, M., Hedblad, B., Forsgard, N., Melander, O., Nilsson, P.M., Borné, Y., Engström, G., and Barregard, L. (2018). Blood Lead Levels and Decreased Kidney Function in a Population-Based Cohort. *Am J Kidney Dis,* 72: 381-389. http://dx.doi.org/10.1053/j.ajkd.2018.02.358.

Hayes, C. R., Incledion, S., and Balch, M. (2008). Experience in Wales (UK) of the optimisation of ortho-phosphate dosing for controlling lead in drinking water. *Journal of Water and Health*, 6(2): 177-185. DOI: 10.2166/wh.2008.044.

Hayes, C. R. and Hydes, O. D. (2012). UK experience in the monitoring and control of lead in drinking water. *Journal of Water and Health,* 10(3): 337-348. DOI: 10.2166/wh.2012.210.

Illinois Environmental Protection Agency (IEPA). (n.d.). Lead Informational Notice. Accessed July 17, 2023, from https://epa.illinois.gov/content/dam/soi/en/web/epa/topics/drinking-water/public-water-users/documents/lead-service-line-replacement-advisory-board/lead-informational-notice.pdf.

IEPA. Illinois EPA Announces Nearly $4 Million in Loan Forgiveness to the City of Batavia to Replace Lead Service Lines. Illinois.gov Press Releases. https://www.illinois.gov/news/press-release.26057.html.

Illinois General Assembly. (2021). HB3739 Lead Service Line Replacement. 102nd General Assembly. Retrieved July 31, 2023, from https://ilga.gov/legislation/BillStatus.asp?DocNum=3739&GAID=16&DocTypeID=HB&LegID=132788&SessionID=110&SpecSess=&Session=&GA=102.

Indiana Senate Republicans (2017, July 12). *Charbonneau: Gov Holcomb Signs Water Infrastructure Legislation.* News Releases. Retrieved July 28, 2023, from https://www.indianasenaterepublicans.com/charbonneau-gov-holcomb-signs-water-infrastructure-legislation.

Jennings, B. and Duncan, L. L. (2017). Water Safety and Lead Regulation: Physicians' Community Health Responsibilities. *AMA J Ethics,* 19(10): 1027-1035. DOI: 10.1001/journalofethics.2017.19.10.pfor1-1710.

Jersey Water Works. (2020). *Wells of Opportunity: Training Residents and Prioritizing Local Hiring for Water Infrastructure Projects in Newark*. Retrieved July 25, 2023, from https://www.jerseywaterworks.org/resources/wells-of-opportunity-training-residents-and-prioritizing-local-hiring-for-water-infrastructure-projects-in-newark/.

Ji, Y., Hong, X., Wang, G., Chatterjee, N., Riley, A.W., Lee, L.C., Surkan, P.J., Bartell, T.R., Zuckerman, B., and Wang, X. (2018). A prospective birth cohort study on early childhood lead levels and attention deficit hyperactivity disorder: New insight on sex differences. *J Pediatr*, 199: 124-131.e128. http://dx.doi.org/10.1016/j.jpeds.2018.03.076.

Kahn, H.D. and K. Stralka. 2009. Estimated daily average per capita water ingestion by child and adult age categories based on USDA's 1994–1996 and 1998 continuing survey of food intakes by individuals. Journal of Exposure Science & Environmental Epidemiology 19(4):396-404.

Kimbrough, D. E. (2007). Brass corrosion as a source of lead and copper in traditional and all-plastic distribution systems. *Journal AWWA*, 99(8): 70-76. https://doi.org/10.1002/j.1551-8833.2007.tb08008.x.

Krueger, W. S. and Wade, T. J. (2016). Elevated blood lead and cadmium levels associated with chronic infections among non-smokers in a cross-sectional analysis of NHANES data. *Environ Health*, 15: 16. http://dx.doi.org/10.1186/s12940-016-0113-4.

Lanphear, B. P., Rauch, S., Auinger, P., Allen, R. W., & Hornung, R. W. (2018). Low-level lead exposure and mortality in US adults: a population-based cohort study. Lancet Public Health, 3(4), e177-e184. doi:10.1016/s2468-2667(18)30025-2.

Lanphear, B.P., Hornung, R., Khoury, J., Yolton, K., Baghurst, P., Bellinger, D.C., Canfield, R.L., Dietrich, K.N., Bornschein, R., Greene, T., Rothenberg, S.J., Needleman, H.L., Schnaas, L., Wasserman, G., Graziano, J., and Roberts, R. (2019). Erratum: "Low-level environmental lead exposure and children's intellectual function: An international pooled analysis" [Erratum]. *Environ Health Perspect,* 127(9): 099001. http://dx.doi.org/10.1289/EHP5685.

Lee, S., Min, J. Y., and Min, K. B. (2020). Female infertility associated with blood lead and cadmium levels. *Int J Environ Res Public Health,* 17(5): 1794. https://dx.doi.org/10.3390/ijerph17051794.

Levin, R., and J. Schwartz. 2023. A better cost:benefit analysis yields better and fairer results: EPA's lead and copper rule revision. *Environmental Research*. 229:115738; https://doi.org/10.1016/j.envres.2023.115738.

Lin, D., R. Lutter, and C.J. Ruhm. 2018. Cognitive performance and labour market outcomes. Labour Economics 51:121–135.

LSLR Collaborative. (n.d.a). *Requiring LSL Replacement When Opportunities Arise*. Retrieved July 17, 2023, from https://www.lslr-collaborative.org/requiring-lsl-replacement.html.

LSLR Collaborative (n.d.b). *Case Example from Washington State Department of Health's Office of Drinking Water*. How State Agencies Can Support LSL Replacement. Retrieved July 17, 2023, from https://www.lslr-collaborative.org/uploads/9/2/0/2/92028126/how_state_agencies_can_support_lsl_replacement_case_example_washington_state--approved_formatted.pdf.

LSLR Collaborative. (n.d.c). *About the Lead Service Line Replacement Collaborative*. Retrieved July 26, 2023 from https://www.lslr-collaborative.org/about-us.html.

LSLR Collaborative. (n.d.d). *Roadmap. Effectiveness of Anticipated Communication Options*. Retrieved July 17, 2023 from https://www.lslr-collaborative.org/effectiveness-of-anticipated-communications-options.html.

LSLR Collaborative. (n.d.e). *Roles for Community Groups in LSL Replacement Efforts: Case Example from Clean Water Fund in Chelsea, Massachusetts*. Retrieved July 26, 2023, from https://www.lslr-collaborative.org/uploads/9/2/0/2/92028126/community_groups_role_in_supporting_lsl_replacement_v2_-_formatted.pdf.

LSLR Collaborative. (n.d.f). *Legal Factors*. Retrieved July 24, 2023, from https://www.lslr-collaborative.org/legal-factors.html.

LSLR Collaborative. (n.d.g.) Getting Started on an LSL Inventory. Retrieved November 11, 2023, from https://www.lslr-collaborative.org/preparing-an-inventory.html.

Lytle, D. A., Schock, M. R., Wait, K., Cahalan, K., Bosscher, V., Porter, A., and Del Toral, M. (2019). Sequential Drinking Water Sampling as a Tool for Evaluating Lead in Flint, Michigan. *Water Research,* 15(157): 40-54. DOI: 10.1016/j.watres.2019.03.042.

Madison Water Utility. (2014, November 7). *EPA seeks details of Madison's Lead Service Replacement Program*. https://www.cityofmadison.com/water/blog/2014-11-07/epa-seeks-details-of-madisons-lead-service-replacement-program.

Massachusetts Water Resources Authority (MWRA). (2020). Drinking Water Test Results. https://www.bwsc.org/sites/default/files/2021-06/Water%20Quality%20Report%202020.pdf.

MWRA. (2023, June 16). *Lead Service Line Replacement Loan Program or Lead Loan Program (LLP), an Enhancement to the Local Water System Assistance Program (LWSAP) for Member Communities*. MWRA Online. Retrieved July 17, 2023, from https://www.mwra.com/comsupport/llp/llpprogram.html.

Masters, S. V., Parks, J., Atassi, A., and Edwards, M. A. (2016). Inherent variability in lead and copper collected during standardized sampling. *Environmental Monitoring and Assessment,* 188(3): 177. DOI: 10.1007/s10661-016-5182-x.

Masters, S. V., Bradley, T. C., Burlingame, G. A., Seidel, C. J., Schmelling, M., and Bartrand, T. A. (2021). What Can Utilities Expect from New Lead Fifth-Liter Sampling Based on Historic

First-Draw Data? *Environmental Science & Technology, 55*(17): 11491-11500. DOI: 10.1021/acs.est.1c00421.

McFadden, M., Giani, R., Kwan, P., and Reiber, S. H. (2011). Contributions to drinking water lead from galvanized iron corrosion scales. *Journal AWWA,* 103(4): 76-89. https://doi.org/10.1002/j.1551-8833.2011.tb11437.x.

MDB Incorporated. 2019. "Selection of Concentration-Response Functions between Lead Exposure and Adverse Health Outcomes for Use in Benefits Analysis: Cardiovascular-Disease Related Mortality" Peer Review Combined Documents. https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NCEE&dirEntryId=342855.

Memphis Light, Gas, and Water (n.d.). MLGW Water Services. Retrieved July 31, 2023 from https://www.mlgw.com/leadservicedatabase.

Michigan Administrative Rules. (2020). *R 325.10101 Supplying Water to the Public*. Michigan Administrative Code for Environment, Great Lakes and Energy-Drinking Water and Environmental Health Division. Retrieved July 25, 2023 from: https://ars.apps.lara.state.mi.us/AdminCode/DeptBureauAdminCode?Department=Environment%2C%20Great%20Lakes%20and%20Energy&Bureau=Drinking%20Water%20and%20Environmental%20Health%20Division.

Michigan Administrative Rules. (2023). *R 325.11604* - Contents of general plans for all applicable systems. Michigan Administrative Code for Environment, Great Lakes and Energy-Drinking Water and Environmental Health Division. Retrieved July 31, 2023 from https://casetext.com/regulation/michigan-administrative-code/department-environmental-quality/drinking-water-and-municipal-assistance-division/supplying-water-to-the-public/part-16-general-plans/section-r-32511604-contents-of-general-plans-for-all-applicable-systems.

Milwaukee Water Works (2023). Lead Service Line Records. Retrieved July 31, 2023 from https://city.milwaukee.gov/water/WaterQuality/LeadandWater/Lead-Service-Line-Records.

Mishrra, A., Johnson, E., and Giammar, D. E. (2021). Estimating Lead Concentrations in Drinking Water after Stagnation in Lead Service Lines Using Water Quality Data from across the United States. *Environmental Science & Technology Letters,* 8(10): 878-883. https://doi.org/10.1021/acs.estlett.1c00580.

Mushak, P. 1991. Gastro-intestinal absorption of lead in children and adults: Overview of biological and biophysico-chemical aspects. Chemical Speciation and Bioavailability 3(3-4):87-104.

National Drinking Water Advisory Council (NDWAC) Lead and Copper Working Group. (2015). Report of the Lead and Copper Working Group to the National Drinking Water Advisory Council—Final. Retrieved from: https://www.epa.gov/sites/default/files/2016-01/documents/ndwaclcrwgfinalreportaug2015.pdf.

NDWAC. (2022). National Drinking Water Advisory Council Meeting Summary, November 30, 2022. Retrieved from: https://www.epa.gov/ndwac/national-drinking-water-advisory-council-meeting-summary-november-30-2022-0.

The National Environmental Laboratory Accreditation Conference (NELAC) Institute. (2021, October 1). *Fields of Proficiency Testing*. Retrieved July 25, 2023, from https://www.nelac-institute.org/content/NEPTP/fopt.php.

National Research Council (NRC). 2000. Copper in Drinking Water. Washington, D.C.: The National Academies Press.

National Sanitation Foundation (2023, August 21). NSF/ANSI/CAN 61 Drinking Water System Components - Health Effects. NSF Product and Service Listings. Retrieved August 21, 2023, from https://info.nsf.org/Certified/PwsComponents/Listings.asp?TradeName=&StandardExt=&MaterialType=GALV&ProductType=&PlantState=&PlantCountry=&PlantRegion=&Standard=061.

National Toxicology Program (NTP). (2012). NTP Monograph on Health Effects of Low-Level Lead. U.S. Department of Health and Human Services. Office of Health Assessment and Translation. Division of the National Toxicology Program. Durham, NC. https://ntp.niehs.nih.gov/sites/default/files/ntp/ohat/lead/final/monographhealtheffectslowlevellead_newissn_508.pdf.

New York State Department of Health (NYDOH). (2019). Governor Cuomo Announces $10 Million Awarded to Communities for Second Round of Replacement of Residential Drinking Water Lead Service Lines. https://www.health.ny.gov/press/releases/2019/2019-07-26_millions_awarded_to_communities_for_round_two_replacement_residential_water.htm.

Office of Management and Budget (OMB). (2003). Circular A-4. Obama White House Archives. https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/.

Ozkaynak, H., G. Glen, J. Cohen, H. Hubbard, K. Thomas, L. Phillips, and N. Tulve. 2022. Model based prediction of age-specific soil and dust ingestion rates for children. *Journal of Exposure Science & Environmental Epidemiology* 32:472–480; https://doi.org/10.1038/s41370-021-00406-5.

Park, Y., and Han, J. (2021). Blood lead levels and cardiovascular disease risk: Results from the Korean National Health and Nutrition Examination Survey. *Int J Environ Res Public Health,* 18: 10315. DOI: 10.3390/ijerph181910315.

Pennsylvania Department of Environmental Protection (2023). Sufficient Evidence for Non-Lead Designation Training Job Aid. Retrieved July 31, 2023, from https://files.dep.state.pa.us/Water/BSDW/DrinkingWaterManagement/Regulations/Sufficient-Evidence-Job.pdf.

Pennsylvania General Assembly (2017, Oct. 30). *2017 Act 44-Fiscal Code-Omnibus Amendments.* Unconsolidated Statutes. Retrieved July 28, 2023, from https://www.legis.state.pa.us/cfdocs/legis/li/uconsCheck.cfm?yr=2017&sessInd=0&act=44.

Pennsylvania General Assembly (2018, Oct. 24). *2018 Act 120-Public Utilities-Valuation and Return on the Property of Public Utility.* Unconsolidated Statutes. Retrieved July 28, 2023, from https://www.legis.state.pa.us/cfdocs/legis/li/uconsCheck.cfm?yr=2018&sessInd=0&act=120.

Pieper, K.J., Tang, M., Edwards, M.A. (2017). Flint Water Crisis Caused by Interrupted Corrosion Control: Investigating "Ground Zero" Home. *Environmental Science and Technology.* 51, 4, 2007-2014. https://doi.org/10.1021/acs.est.6b04034.

Pittsburgh Water and Sewer Authority (PGH2O). (n.d.). *Understanding Lead and Water.* Community Lead Response. Retrieved July 26, 2023, from https://lead.pgh2o.com/understanding-lead-and-water/#1531755857859-59f8664c-b91f.

PGH2O, (2023). *Priority Lead Line Replacement*. Retrieved July 26, 2023, from https://www.pgh2o.com/projects-maintenance/search-all-projects/priority-lead-line-replacement.

Pliszka, S. AACAP Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry*. 2007 Jul;46(7):894-921.

Proctor, C. R., Rhoads, W. J., Keane, T., Salehi, M., Hamilton, K., Pieper, K. J., Cwiertny, D. M, Prevost, M., and Whelton, A. J. (2020). Considerations for large building water quality after extended stagnation. *Journal AWWA,* 2(4): 1186. https://doi.org/10.1002/aws2.1186.

Rockey, N. C., Shen, Y., Haig, S. J., Wax, M., Yonts, J., Wigginton, K. R., Raskin, L., and Olson, T. M. (2021). Impact of service line replacement on lead, cadmium, and other drinking water quality parameters in Flint, Michigan. *Environmental Science: Water Research & Technology*, *7*(4): 797-808. https://doi.org/10.1039/D0EW00975J.

The Rockefeller Foundation. (n.d.). *Lead-free water for all: Making the case for rapid lead pipe removal across the U.S.* Six steps to scaling up equitable lead pipe replacement. Retrieved July 25, 2023, from https://www.rockefellerfoundation.org/wp-content/uploads/2021/10/Lead-Free-Water-for-All-Making-the-Case-for-Rapid-Lead-Pipe-Removal-Across-the-U.S..pdf.

Roy, S., and Edwards, M. A. (2019). Preventing another lead (Pb) in drinking water crisis: Lessons from the Washington DC and Flint MI contamination events. *Current Opinion in Environmental Science & Health*, 7: 34-44. https://doi.org/10.1016/j.coesh.2018.10.002.

Roy, S. and Edwards, M.A. (2020). Efficacy of corrosion control and pipe replacement in reducing citywide lead exposure during the Flint, MI water system recovery. *Environmental Science: Water Research & Technology*, 2020(6): 3024-3031. DOI: 10.1039/d0ew00583e.

Ruiz, M. T. (2019, Sept. 10). *Senate Bill 4110-Allows municipalities to adopt ordinance to enter properties to perform lead service line replacements.* New Jersey 218th Legislature. Retrieved July 28, 2023, from https://legiscan.com/NJ/text/S4110/2018.

Salkever, D.S. 1995. Updated estimates of earnings benefits from reduced exposure of children to environmental lead. Environmental Research 70:1–6. doi:0013-9351/95.

Sandvig, A., Kwan, P., Kirmeyer, G., Maynard, B., Mast, D., Trussell, R.R., Trussel, S., Cantor, A., and Prescott, A. (2008). Contribution of service line and plumbing fixtures to lead and copper rule compliance issue. *AWWA Research Foundation*, 523.

Schock, M. (1990). Causes of temporal variability of lead in domestic plumbing systems. *Environmental Monitoring and Assessment,* 15: 59-82. https://link.springer.com/article/10.1007/BF00454749.

Schock, M. R., Cantor, A. F., Triantafyllidou, S., Desantis, M. K., and Scheckel, K. G. (2014). Importance of pipe deposits to Lead and Copper Rule compliance. *Journal AWWA,* 106(7): E336-E349. https://doi.org/10.5942/jawwa.2014.106.0064.

Sedimentary Ores. (n.d.). *Lead-lined Galvanized Pipe -- A Lurking Danger for Homeowners and Utilities*. Retrieved July 24, 2023, from http://sedimentaryores.net/Pipe%20Scales/Fe%20scales/Galvanized_lead-lined.html.

Senate and General Assembly of the State of New Jersey (2018, Aug. 24). *Chapter 14-An Act concerning the replacement of lead-contaminated water service line connections and amending various parts of the statutory law.* Retrieved July 28, 2023, from https://pub.njleg.gov/bills/2018/PL18/114_.HTM.

Shi, X., Chan, C. P. S., Man, G. K. Y., Chan, D. Y. L., Wong, M. H., and Li, T. C. (2021). Associations between blood metal/ metalloid concentration and human semen quality and sperm function: A cross-sectional study in Hong Kong. *J Trace Elem Med Biol,* 65: 126735. http://dx.doi.org/10.1016/j.jtemb.2021.126735.

Stanek, L. W., Xue, J., Lay, C. R., Helm, E. C., Schock, M., Lytle, D. A., Speth, T. F., Zartarian, V. G. (2020). Modeled Impacts of Drinking Water Pb Reduction Scenarios on Children's Exposures and Blood Lead Levels. *Environmental Science and Technology*, 54, 9474-9482. doi:10.1021/acs.est.0c00479.

St. Clair, J., Cartier, C., Triantafyllidou, T., Clark, B., and Edwards, M. (2016). Long-Term Behavior of Simulated Partial Lead Service Line Replacements. *Environmental Engineering Science,* 33(1): 53-64. https://doi.org/10.1089/ees.2015.0337.

State of Minnesota (2023). *Chapter 39-H.F. No 24.* Minnesota Session Laws-2023, 93rd Legislature, Regular Session. Office of the Revisor of Statutes. Retrieved from https://www.revisor.mn.gov/laws/2023/0/Session+Law/Chapter/39/.

State of New Jersey. (2020, January 9). *Governor Murphy Signs Legislation Allowing Municipalities to Enter Properties to Perform Lead Service Line Replacements*. Retrieved July 17, 2023, from https://www.nj.gov/governor/news/news/562020/approved/20200109d.shtml.

State of New Jersey. (2021). New Jersey Legislature. Assembly Bill 5343. Regular Session 2020-2021. Pub. L. 2021 Chapter 183. Retrieved from https://legiscan.com/NJ/bill/A5343/2020. Accessed January 4, 2022.

State of Rhode Island. (2023). *Lead Poisoning Prevention Act*. General Assembly. H5007. Retrieved July 17, 2023, from https://legiscan.com/RI/bill/H5007/2023.

State of Washington. (2016, May 2). *Directive of the Governor 16-06*. Retrieved July 17, 2023, from https://doh.wa.gov/sites/default/files/legacy/Documents/4200/GovernorsDirectiveLead.pdf?uid=64b688df5c0cf.

Schwartz, J. and D. Otto. 1991. Lead and minor hearing impairment. Archives of Environmental and Occupational Health 46(5):300–305. doi:10.1080/00039896.1991.9934391.

Tam, Y. S., and Elefsiniotis, P. (2009). Corrosion control in water supply systems: Effect of pH, alkalinity, and orthophosphate on lead and copper leaching from brass plumbing. *Journal of Environmental Science and Health Part A*, 44(12): 1251-1260. DOI: 10.1080/10934520903140009.

Tang, M., Lytle, D., Achtemeier, R., and Tully, J. (2023). Reviewing performance of NSF/ANSI 53 certified water filters for lead removal. *Water Research*, 244: 120425. https://doi.org/10.1016/j.watres.2023.120425.

Tornero-Velez, R., Christian, M., Zartarian, V., and Simoneau, K.R. (2023). *Blood Lead Mapping: Methods and Tools for Lead Prioritization, Prevention, and Mitigation*. Presented at the National Environmental Health Association Annual Education Conference & Exhibition, July 31 – August 3, New Orleans.

Triantafyllidou, S., and Edwards, M. (2011). Galvanic corrosion after simulated small-scale partial lead service line replacements. *Journal AWWA,* 103(9): 85-99. https://doi.org/10.1002/j.1551-8833.2011.tb11535.x.

Triantafyllidou, S., and Edwards, M. (2012). Lead (Pb) in Tap Water and in Blood: Implications for Lead Exposure in the United States. *Critical Reviews in Environmental Science and Technology,* 42(13): 1297-1352. DOI: 10.1080/10643389.2011.556556.

Triantafyllidou, S., Parks, J., and Edwards, M. (2007). Lead Particles in Potable Water. *Journal AWWA,* 99(6): 107-117. https://doi.org/10.1002/j.1551-8833.2007.tb07959.x.

Triantafyllidou, S., Le, T., Gallagher, D., and Edwards, M. (2014). Reduced risk estimations after remediation of lead (Pb) in drinking water at two US school districts. *Science of the Total Environment,* 466-467: 1011-1021. http://dx.doi.org/10.1016/j.scitotenv.2013.07.111.

Triantafyllidou, S., Schock, M., DeSantis, M., and White, C. (2015). Low Contribution of PbO2-Coated Lead Service Lines to Water Lead Contamination at the Tap. *Environmental Science & Technology,* 49(6): 3746-3754). https://doi.org/10.1021/es505886h.

Triantafyllidou, S., Burkhardt, J., Tully, J., Cahalan, K., DeSantis, M., Lytle, D., and Schock, M. (2021). Variability and Sampling of Lead (Pb) in Drinking water: Assessing Potential Human Exposure Depends on the Sampling Protocol. *Environment International,* 146: 106259. https://doi.org/10.1016/j.envint.2020.106259.

Tripp, G., Wickens, J.R. Neurobiology of ADHD. *Neuropharmacology*. 2009 Dec;57(7-8):579-89.

Trueman, B.F., Camara, E., and Gagnon, G.A. (2016). Evaluating the Effects of Full and Partial Lead Service Line Replacement on Lead Levels in Drinking Water. *Environmental Science & Technology,* 50(14): 7389-7396. https://doi.org/10.1021/acs.est.6b01912.

Tully, J., DeSantis, M. K., and Schock, M. R. (2019). Water quality–pipe deposit relationships in Midwestern lead pipes. *AWWA Water Science,* 1(2): e1127. DOI: 10.1002/aws2.1127.

Tully, J., Schilling, S., Bosscher, V., Schock, M., and Lytle, D. (2023). Benton Harbor Drinking Water Study. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-22/269. April 2023.

U.S. Environmental Protection Agency (USEPA). (1988). Proposed National Primary Drinking Water Regulations for Lead and Copper; Proposed Rule. *Federal Register*. 53 FR 31516. August 18, 1988.

USEPA. (1991). Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper; Final Rule. *Federal Register*. 56 FR 26460. June 7, 1991.

USEPA. (1998a). Small System Compliance Technology List for the Non-Microbial Contaminants Regulated Before 1996. EPA 815-R-98-002. September 1998. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi/20002173.PDF?Dockey=20002173.PDF.

USEPA. (1998b). National Primary Drinking Water Regulations: Consumer Confidence Report. Proposed Rule. *Federal Register*. 63 FR 7606. February 13, 1998.

USEPA. (1998c). National Primary Drinking Water Regulations: Consumer Confidence Report. Final Rule. *Federal Register*. 63 FR 44512. August 19, 1998.

USEPA. (2000a). National Primary Drinking Water Regulations for Lead and Copper; Final Rule. *Federal Register*. 65 FR 1950. January 12, 2000.

USEPA. (2000b). National Primary Drinking Water Regulations: Public Notification Rule. *Federal Register*. 65 FR 25982. May 4, 2000.

USEPA. (2000c). Geometries and Characteristics of Public Water Systems. EPA 815-R-00-024. December 2000. National Service for Environmental Publications. Retrieved from https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=200137NM.txt.

USEPA. (2004a). Integrated Risk Information System (IRIS) Chemical Assessment Summary for Lead and compounds (inorganic); CASRN 7439-92-1. Retrieved from https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0277_summary.pdf.

USEPA. (2004b). Guidance to Environmental Protection Agency Financial Assistance Recipients Regarding Title VI Prohibition Against National Origin Discrimination Affecting Limited English Proficient Persons. *Federal Register*. 69 FR 35602. June 25, 2004.

USEPA. (2004c). National Primary Drinking Water Regulations: Minor Corrections and Clarification to Drinking Water Regulations; National Primary Drinking Water Regulations for Lead and Copper. *Federal Register*. 69 FR 38850. June 29, 2004.

USEPA. (2004d). WSG 174. U.S. Environmental Protection Agency. Memorandum to Water Division Directors, Regions I – X, from Benjamin H. Grumbles, Acting Assistant Administrator. Lead and Copper Rule – Clarification of Requirements for Collecting Samples and Calculating Compliance (November 23, 2004).

USEPA. (2005). *Drinking Water Lead Reduction Plan*. EPA 810-F-05-001. Washington, D.C. March 2005. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P10051WL.txt.

USEPA. (2006). National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule; Final Rule. *Federal Register*. 71 FR 388. January 4, 2006.

USEPA. (2007a). National Primary Drinking Water Regulations for Lead and Copper: Short-term Regulatory Revisions and Clarifications; Final Rule. *Federal Register*. 72 FR 57782. October 10, 2007.

USEPA. (2007b). *Elevated Lead in D.C. Drinking Water – A Study of Potential Causative Events, Final Summary Report*. EPA-815-R-07-021. Washington, D.C. August 2007.

USEPA. (2009). 2006 Community Water System Survey-Volume 1: Overview. National Service Center for Environmental Publications. https://nepis.epa.gov/Exe/ZyNET.exe/P1009JJI.txt?ZyActionD=ZyDocument&Client=EPA&Index=2006%20Thru%202010&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C06THRU10%5CTXT%5C00000023%5CP1009JJI.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=3.

USEPA. (2011). *Science Advisory Board Drinking Water Committee Augmented for the Review of the Effectiveness of Partial Lead Service Line Replacements*. EPA-SAB-11-015. Retrieved from https://www.epa.gov/sites/default/files/2015-09/documents/sab_evaluation_partial_lead_service_lines_epa-sab-11-015.pdf.

USEPA. (2013). *Integrated Science Assessment for Lead*. EPA/600/R-10/075F. Office of Research and Development. Research Triangle Park, NC.

USEPA. (2016a). Lead and Copper Rule Revisions White Paper. October 2016. Retrieved from https://www.epa.gov/sites/default/files/2016-10/documents/508_lcr_revisions_white_paper_final_10.26.16.pdf.

USEPA. (2016b). *The Analysis of Regulated Contaminant Occurrence Data from Public Water Systems in Support of the Third Six-Year Review of National Primary Drinking Water Regulations: Chemical Phase and Radionuclides Rules*. EPA-810-R-16-014. Retrieved from https://www.epa.gov/sites/default/files/2016-12/documents/810r16014.pdf.

USEPA. (2016c). *Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primacy Agencies and Public Water Systems*. EPA 816-B-16-003. Updated 2019. Retrieved from https://www.epa.gov/dwreginfo/optimal-corrosion-control-treatment-evaluation-technical-recommendations.

USEPA. (2016d). Technical Guidance for Assessing Environmental Justice in Regulatory Analysis. June 2016. Retrieved from https://www.epa.gov/sites/default/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf.

USEPA. (2018). 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities: A Training, Testing, and Taking Action Approach (Revised Manual). October 2018. Office of Water. EPA 815-B-18-007. https://www.epa.gov/ground-water-and-drinking-water/3ts-reducing-lead-drinking-water-toolkit.

USEPA. (2019a). *Strategies to Achieve Full Lead Service Line Replacement*. EPA 810-R-19-003. October 2019. Retrieved from https://www.epa.gov/sites/default/files/2019-10/documents/strategies_to_achieve_full_lead_service_line_replacement_10_09_19.pdf.

USEPA. (2019b). Estimated Total Nitrogen and Total Phosphorus Loads and Yields Generated within States. Retrieved from: https://www.epa.gov/nutrient-policy-data/estimated-total-nitrogen-and-total-phosphorus-loads-and-yields-generated-within.

USEPA. (2019c). All-Ages Model (AALM), Version 2.0 (External Review Draft, 2019). https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=343670.

USEPA. (2019d) Office of Pollution Prevention and Toxics. Economic Analysis of the Final Rule to Revise the TSCA Dust-Lead Hazard Standards. June 2019.

USEPA. (2020a). Funding and Technical Resources for Lead Service Line Replacement in Small and Disadvantaged Communities. EPA Headquarters. Office of Ground Water and Drinking Water. Washington, D.C. Retrieved from https://www.epa.gov/ground-water-and-drinking-water/funding-lead-service-line-replacement.

USEPA. (2020b). *Public Comment and Response Document for the Final Lead and Copper Rule Revisions*. December 2020. https://www.regulations.gov/document/EPA-HQ-OW-2017-0300-1622.

USEPA. (2020c). *Economic Analysis for the Final Lead and Copper Rule Revisions*. EPA 816-R-20-008. December 2020. Retrieved from https://www.regulations.gov/document/EPA-HQ-OW-2017-0300-1769.

USEPA. (2020d). Use of Lead Free Pipes, Fittings, Fixtures, Solder, and Flux for Drinking Water; Final Rule. *Federal Register*. 85 FR 54235. September 1, 2020.

USEPA. (2020e). *Economic Analysis Appendices for the Final Lead and Copper Rule Revisions*. EPA 816-R-20-008a. December 2020. Retrieved from https://www.regulations.gov/document/EPA-HQ-OW-2017-0300-1768.

USEPA. (2020f). *Science Advisory Board (SAB) Consideration of the Scientific and Technical Basis of EPA's Proposed Rule Titled National Primary Drinking Water Regulations: Proposed Lead and Copper Rule Revisions*. EPA-SAB-20-007. June 12, 2020.

USEPA. (2021a). National Primary Drinking Water Regulations: Lead and Copper Rule Revisions; Final Rule. *Federal Register*. 86 FR 4198. January 15, 2021.

USEPA. (2021b). Review of the National Primary Drinking Water Regulation: Lead and Copper Rule Revisions (LCRR). *Federal Register*. 86 FR 71574. December 17, 2021.

USEPA. (2021c). National Primary Drinking Water Regulations: Lead and Copper Rule Revisions; Delay of Effective Date; Final Rule. *Federal Register*. 86 FR 14003. March 12, 2021.

USEPA. (2021d). National Primary Drinking Water Regulations: Lead and Copper Rule Revisions; Delay of Effective and Compliance Dates; Proposed Rule. *Federal Register*. 86 FR 14063. March 12, 2021.

USEPA. (2021e). National Primary Drinking Water Regulations: Lead and Copper Rule Revisions; Delay of Effective and Compliance Dates; Final Rule. *Federal Register*. 86 FR 31939. Wed. June 16, 2021.

USEPA. (2021f). Small, Underserved, and Disadvantaged Communities (SUDC) Grant Program Grant Implementation Document. U.S. Environmental Protection Agency, Washington, D.C. Retrieved from https://www.epa.gov/system/files/documents/2021-08/updated_sudc_implementation_document_508-compliant.pdf.

USEPA. (2021g). Final Allotments for the FY2021 Public Water System Supervision (PWSS) State and Tribal Support Program Grants, from Catherine Davis, Office of Ground Water & Drinking Water. March 2, 2021.

USEPA. (2022a). *Strategy to Reduce Lead Exposures and Disparities in U.S. Communities*. EPA 540-R-22-006. October 2022. Retrieved from https://www.epa.gov/lead/final-strategy-reduce-lead-exposures-and-disparities-us-communities.

USEPA. (2022b). *Guidance for Developing and Maintaining a Service Line Inventory*. EPA 816-B-22-001. August 2022. Retrieved from https://www.epa.gov/system/files/documents/2022-08/Inventory%20Guidance_August%202022_508%20compliant.pdf.

USEPA. (2022c). Final Allotments for the FY2022 Public Water System Supervision (PWSS) State and Tribal Support Program Grants, from Anita Thompkins, Office of Ground Water & Drinking Water. April 21, 2022.

USEPA. (2023a). Integrated Science Assessment (ISA) for Lead (Pb) (External Review Draft). EPA/600/R 23/061, 2023. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=357282.

USEPA. (2023b). *Economic Analysis for the Proposed Lead and Copper Rule Improvements*.

USEPA. (2023c). WIIN Grant: Reducing Lead in Drinking Water. Press Release. EPA Headquarters. Office of Water. Washington D.C. Retrieved from https://www.epa.gov/dwcapacity/wiin-grant-reducing-lead-drinking-water.

USEPA. (2023d). Water Infrastructure Finance and Innovation Act (WIFIA)-2022 Annual Report. Publication number 830R23001. Retrieved from https://www.epa.gov/wifia/wifia-annual-report.

USEPA. (2023e). EPA Launches New Initiative to Accelerate Lead Pipe Replacement to Protect Underserved Communities. Press Release. EPA Headquarters. Office of Water. Washington, D.C. Retrieved from https://www.epa.gov/newsreleases/epa-launches-new-initiative-accelerate-lead-pipe-replacement-protect-underserved.

USEPA. (2023f). Environmental Justice Analysis for the Proposed Lead and Copper Rule Improvements.

USEPA. (2023g). *Technical Support Document for the Proposed Lead and Copper Rule Improvements.*

USEPA. (2023h). Public Meeting on Environmental Justice (EJ) Considerations for the Development of the Proposed Lead and Copper Rule Improvements (LCRI), October 25, 2022 Meeting Summary.

USEPA. (2023i). Public Meeting on Environmental Justice (EJ) Considerations for the Development of the Proposed Lead and Copper Rule Improvements (LCRI), November 1, 2022 Meeting Summary.

USEPA. (2023j). Summary Report on Federalism and Unfunded Mandates Reform Act (UMRA) Consultation for the Development of the Proposed LCRI National Primary Drinking Water Regulation.

USEPA. (2023k). *7th Drinking Water Infrastructure Needs Survey and Assessment*. Fact Sheet. Retrieved July 24, 2023, from https://www.epa.gov/system/files/documents/2023-04/Final_DWINSA%20Public%20Factsheet%204.4.23.pdf.

USEPA. (2023l). Lead and Copper Rule Improvements NDWAC Consultation Meeting.

USEPA. (2023m). Panel Report of the Small Business Advocacy Review Panel on EPA's Planned Proposed Rule: Lead and Copper Rule Improvements (LCRI) National Primary Drinking Water Regulation. May 2023.

USEPA. (2023n). National Primary Drinking Water Regulations: Consumer Confidence Report Rule Revisions; Proposed Rule. *Federal Register*. 88 FR 20092. April. 5, 2023.

USEPA. (2023o). *Voluntary School and Child Care Lead Testing & Reduction Grant Program Implementation Document for States and Territories*. EPA 815-B-23-009. July 2023. Retrieved from https://www.epa.gov/system/files/documents/2023-07/Final_FY23_ImplementationDoc_VoluntarySchoolandChildCareLeadTestingReductionGrantProgram_508.pdf.

USEPA. (2023p). *LSLR Financing Case Study: North Providence, RI.* Retrieved from https://www.epa.gov/dwreginfo/lslr-financing-case-study-north-providence-ri.

USEPA and USHHS. (2023). EPA and HHS Joint Statement to Governors on Federal Resources for Lead Testing and Remediation in Early Child Care and Education Settings. March 23, 2023. Retrieved from https://www.epa.gov/system/files/documents/2023-03/EPA%20ADM%20Regan%2BHHS%20Sec.%20Becerra%20-%20Lead.pdf.

United States Government Accountability Office (USGAO). (2018). K–12 Education: Lead Testing of School Drinking Water Would Benefit from Improved Federal Guidance. Document No GAO–18–328. Released July 17, 2018. Retrieved from https://www.gao.gov/products/gao-18-382.

United States Housing and Urban Development (USHUD) Office of Policy Development and Research. (2014). *Vacant and Abandoned Properties: Turning Liabilities Into Assets*. Evidence Matters. Retrieved July 24, 2023, from https://www.huduser.gov/portal/periodicals/em/winter14/highlight1.html.

USHUD. (2020). Community Development.

https://www.hud.gov/program_offices/comm_planning/communitydevelopment.

USHUD. (2021). American Health Homes Survey II Lead Findings. Office of Lead Hazard Control and Health Homes. https://www.hud.gov/sites/dfiles/HH/documents/AHHS_II_Lead_Findings_Report_Final_29oct21.pdf.

USHUD. (2023). Fact Sheet: HUD's Work to Address Lead-based Paint and Additional Housing-Related Hazards. hud.gov/sites/dfiles/PA/documents/Lead_Hazards_Fact_Sheet.pdf.

Versar. 2015. External Peer Review of EPA's Approach for Estimating Exposures and Incremental Health Effects from Lead Due to Renovation, Repair, and Painting Activities in Public and Commercial Buildings. Prepared for EPA under contract EP-C-12-045 Task Order 39.

Vijayashanthar, V., Small, M. J., and Van Briesen, J. M. (2023). Assessment of Lead in Drinking Water from Multiple Drinking Water Sampling Programs for a Midsize City. *Environmental Science & Technology,* 57: 842-851. https://doi.org/10.1021/acs.est.2c06614.

Wang, Y., Jing, H., Mehta, V., Welter, G.J., and Giammar, D.E. (2012). Impact of galvanic corrosion on lead release from aged lead service lines. *Water Research,* 46(16): 5049-5060. https://doi.org/10.1016/j.watres.2012.06.046.

Wang, Y., Mehta, V., Welter, G., and Giammar, D. (2013). Effect of connection methods on lead release from galvanic corrosion. *Journal AWWA,* 105(7): E337-E351. https://doi.org/10.5942/jawwa.2013.105.0088.

Washington State Department of Health. (n.d.). Translations for Public Notification. Accessed July 17, 2023. https://doh.wa.gov/community-and-environment/drinking-water/drinking-water-emergencies/public-notification/translations-public-notification.

Wasserstrom, L.W., Miller, S.A., Triantafyllidou, S., Desantis, M.K. (2017). Scale Formation Under Blended Phosphate Treatment for a Utility With Lead Pipes. *Journal AWWA.* 109(11), E464-E478. https://doi.org/10.5942/jawwa.2017.109.0121.

Wei, Y.D. and Zhu, J. M. (2020). Blood levels of endocrine-disrupting metals and prevalent breast cancer among US women. *Med Oncol,* 37: 1. https://dx.doi.org/10.1007/s12032-019-1328-3.

The White House. (2021). Fact Sheet: The Biden-Harris Lead Pipe and Paint Action Plan. December 16, 2021. https://www.whitehouse.gov/briefing-room/statements-releases/2021/12/16/fact-sheet-the-biden-harris-lead-pipe-and-paint-action-plan/.

The White House. (2023). Fact Sheet: Biden-Harris Administration Announces New Actions and Progress to Protect Communities From Lead Pipes and Paint. January 27, 2023. https://www.whitehouse.gov/briefing-room/statements-releases/2023/01/27/fact-sheet-biden-harris-administration-announces-new-actions-and-progress-to-protect-communities-from-lead-pipes-and-paint/.

WHO. (2011). Lead in Drinking Water: Background Document for Development of WHO Guidelines for Drinking-Water Quality. World Health Organization Press.

Wilking, C., Nink, E., and Cradock, A. L. (2022). *Case Study Brief: Denver Water Filter Program.* Boston, MA: Prevention Research Center on Nutrition and Physical Activity at the Harvard T.H. Chan School of Public Health. Retrieved July 25, 2023, from:

https://www.hsph.harvard.edu/prc/wp-content/uploads/sites/84/2022/06/SHW_Denver_Brief_June2022.pdf.

Wisconsin Department of Natural Resources (WI DNR). (2020, September 10). *Sample Mandatory Lead Service Line Replacement Ordinances*. Retrieved July 18, 2023, from WI DNR. Sample Mandatory Lead Service Line Replacement Ordinances. https://dnr.wisconsin.gov/sites/default/files/topic/Aid/loans/lead/LSLmandatoryOrdinances.pdf.

WI DNR. (2022). *Considerations for Setting Up a Private Lead Service Line Replacement Program*. Retrieved July 17, 2023, from https://dnr.wisconsin.gov/sites/default/files/topic/Aid/loans/pubs/CF0054.pdf.

Xie, Y., Giammar, D.E. (2011). Effects of flow and water chemistry on lead release rates from pipe scales. *Water Research.* 45(19), 6525-6534. https://doi.org/10.1016/j.watres.2011.09.050.

Xue, J., Zartarian, V., Tornero-Velez, R., Stanek, L.W., Poulakos, A., Walts, A., Triantafillou, K., Suero, M., Grokhowsky, N. (2022). A Generalizable Evaluated Approach, Applying Advanced Geospatial Statistical Methods, To Identify High Lead Exposure Locations at Census Tract Scale: Michigan Case Study. *Environmental Health Perspectives.* 130(7). Doi: https://doi.org/10.1289/EHP9705.

Zartarian, V., J. Xue, R. Tornero-Velez, J. Brown. 2017. Children's Lead Exposure: A multimedia Modeling Analysis to Guide Public Health Decision-Making. Environmental Health Perspectives. 125(9). CID 097009. Available: https://doi.org/10.1289/EHP1605.

Zhu, M., Fitzgerald, E. F., Gelberg, K. H., Lin, S., & Druschel, C. M. (2010). Maternal low-level lead exposure and fetal growth. Environmental Health Perspectives, 118(10), 1471-1475. doi:10.1289/ehp.0901561.

Ziegler, E.E., B.B. Edwards, R.L. Jensen, K.R Mahaffey, and S.J. Fomon. (1978). Absorption and retention of lead by infants. Pediatric Research 12(1):29-34.

Lytle, D.A., Formal, C., Cahalan, K., Muhlen, C., Triantafyllidou, S. (2021). The impact of sampling approach and daily water usage on lead levels at the tap. *Water Research*. Vol. 197. https://doi.org/10.1016/j.watres.2021.117071.

List of Subjects

40 CFR Part 141

Environmental protection, Copper, Indians—lands, Intergovernmental relations, Lead, Lead service line, National primary drinking water regulation, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 142

Environmental protection, Administrative practice and procedure, Copper, Indians—lands, Intergovernmental relations, Lead, Lead service line, National primary drinking water regulation, Reporting and recordkeeping requirements, Water supply.

Michael S. Regan,

Administrator.

For the reasons stated in the preamble, the Environmental Protection Agency proposes to amend 40 CFR parts 141 and 142 as follows:

PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

1. The authority citation for part 141 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

2. Amend § 141.2 by:

a. Revising the definitions of “Action level” and “Child care facility”;

b. Adding in alphabetical order definitions for “Connector” and “Distribution system and site assessment”;

c. Revising the definition of “Elementary school”;

d. Removing the definitions of “Find-and-fix” and “Full lead service line replacement”;

e. Adding in alphabetical order a definition for “Galvanized requiring replacement service line”;

f. Revising the definition “Galvanized service line”;

g. Removing the definition of “Gooseneck, pigtail, or connector”;

h. Revising the definitions of “Lead service line” and “Lead status unknown service line”;

i. Removing the definitions of “Lead trigger level” and “Medium-size water system”;

j. Adding in alphabetical order definitions for “Medium water system”, “Newly regulated public water system”, “Optimal corrosion control treatment (OCCT)”, and “Partial service line replacement”;

k. Removing the definitions of “Optimal corrosion control treatment” and “Partial lead service line replacement”;

l. Adding in alphabetical order definitions for “Optimal corrosion control treatment (OCCT)”, and “Partial service line replacement”;

m. Revising the definitions of “Pitcher filter” and “Secondary school”;

n. Adding in alphabetical order a definition for “Service line”;

o. Revising the definitions of “Small water system” and “System without corrosion control treatment”;

p. Adding in alphabetical order a definition for “Tap monitoring period”;

q. Removing the definition of “Tap sampling monitoring period”; and

r. Revising the definitions of “Tap sampling period”, “Tap sampling protocol”, and “Wide-mouth bottles”.

The revisions and additions read as follows:

§ 141.2 Definitions.

* * * * *

Action level for the purpose of subpart I of this part only means the concentrations of lead or copper in water as specified in § 141.80(c) which determines requirements under subpart I of this part. The lead action level is 0.010 mg/L and the copper action level is 1.3 mg/L.

* * * * *

Child care facility, for the purpose of subpart I of this part only, means a location that houses a provider of child care, day care, or early learning services to children, as licensed by the State, local, or Tribal licensing agency.

* * * * *

Connector, also referred to as a gooseneck or pigtail, means a short segment of piping not exceeding two feet that can be bent and is used for connections between rigid service piping, typically connecting the *service line* to the main. For purposes of subpart I, lead connectors are not considered to be part of the service line.

* * * * *

Distribution system and site assessment means the requirements under subpart I, pursuant to § 141.82(j), that water systems must perform at every tap sampling site that yields a lead result above the lead action level of 0.010 mg/L.

* * * * *

Elementary school, for the purpose of subpart I of this part only, means a *school* classified as elementary by State and local practice and composed of any span of grades (including pre-school) not above grade 8.

* * * * *

Galvanized requiring replacement service line, for the purpose of subpart I of this part only, means a *galvanized service line* that currently is or ever was downstream of a *lead service line* or is currently downstream in the direction of flow of a *lead status unknown 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 pursuant to § 141.84.

Galvanized service line, for the purpose of subpart I of this part only, means iron or steel piping that has been dipped in zinc to prevent corrosion and rusting.

* * * * *

Lead service line, for the purpose of subpart I of this part only, means a *service line* that is made of lead or where a portion of the *service line* is made of lead.

* * * * *

Lead status unknown service line, for the purpose of subpart I of this part only, means a *service line* whose pipe material has not been demonstrated to be a *lead service line*, *galvanized requiring replacement service line*, or a non-lead service line pursuant to § 141.84(a).

* * * * *

Medium water system, for the purpose of subpart I of this part only, means a water system that serves greater than 10,000 persons and less than or equal to 50,000 persons.

* * * * *

Newly regulated public water system, for the purpose of subpart I only, refers to either (1) an existing *public water system* that was not subject to national primary drinking water regulations on October 16, 2024, because the system met the requirements of section 1411 of the Safe Drinking Water Act and 40 CFR 141.3 or (2) an existing water system that did not meet the definition of a *public water system* in § 141.2 on October 16, 2024. This term does not include existing water systems under new or restructured ownership or management.

* * * * *

Optimal corrosion control treatment (OCCT), for the purpose of subpart I of this part only, means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while ensuring that the treatment does not cause the water system to violate any national primary drinking water regulations.

Partial service line replacement, for the purpose of subpart I of this part only, means replacement of any portion of a *lead service line* or *galvanized requiring replacement service line*, as defined in this section, that leaves in service any length of lead or galvanized requiring replacement service line upon completion of the work.

* * * * *

Pitcher filter means a non-plumbed water filtration device, which consists of a gravity fed water filtration cartridge and a filtered drinking water reservoir, that is certified by an American National Standards Institute accredited certifier to reduce lead in drinking water.

* * * * *

Secondary school, for the purpose of subpart I of this part only, means a school comprising any span of grades beginning with the next grade following an elementary school (usually 7, 8, or 9) and ending with grade 12. Secondary schools include both junior high schools and senior high schools and typically span grades 7 through 12.

* * * * *

Service line, for the purpose of subpart I of this part only, means a portion of pipe which connects the water main to the building inlet. Where a building is not present, the service line connects the water main to the outlet.

* * * * *

Small water system, for the purpose of subpart I of this part, means a water system that serves 10,000 persons or fewer.

* * * * *

System without corrosion control treatment, for the purpose of subpart I of this part, means a water system that does not have or purchases all of its water from a system that does not have:

(1) An optimal corrosion control treatment approved by the State; or

(2) Any pH adjustment, alkalinity adjustment, and/or corrosion inhibitor addition resulting from other water quality adjustments as part of its treatment train infrastructure.

Tap monitoring period, for the purpose of subpart I of this part, means the period of time during which each water system must conduct tap sampling for lead and copper analysis. The applicable tap monitoring period is determined by lead and copper concentrations in tap samples. The length of the tap monitoring period can range from six months to nine years.

Tap sampling period, for the purpose of subpart I of this part, means the time period, within a tap monitoring period, during which the water system is required to collect samples for lead and copper analysis.

Tap sampling protocol means the method for collecting tap samples under subpart I of this part.

* * * * *

Wide-mouth bottles, for the purpose of subpart I of this part only, means bottles one liter in volume that have a mouth with an outer diameter that measures at least 55 mm wide.

3. Amend § 141.80 by revising the section heading and paragraphs (a)(2) and (3), (a)(4)(i), (b), and (c) and removing paragraphs (d) through (l).

The revisions read as follows:

§ 141.80 General requirements and action level.

(a) * * *

(2) The requirements of this subpart are effective as of **[DATE 60 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**.

(3) Community water systems and non-transient non-community water systems must comply with the requirements of this subpart no later than **[DATE 3 YEARS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**, except where otherwise specified in §§ 141.81, 141.84, 141.85, 141.86, and 141.90, or where an exemption in accordance with 40 CFR part 142, subpart C or F, has been issued by the Administrator.

(4)(i) Between **[DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**, and **[DATE 3 YEARS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**, community water systems and non-transient non-community water systems must comply with 40 CFR 141.80 through 141.91, as codified on July 1, 2020, except systems must also comply with 40 CFR 141.84(a)(1) through 141.84(a)(10) (excluding §§ 141.84(a)(7)); 141.85(e); 141.90(e)(1) and 141.90(e)(13); 141.201(c)(3); 141.202(a)(10); and 141.31(d), as codified on July 1, 2023.

* * * * *

(b) *Scope*. The regulations in this subpart constitute a treatment technique rule that includes treatment techniques to control corrosion, treat source water, replace service lines, and provide public education. The regulations include requirements to support those treatment techniques including a service line inventory, tap sampling, and monitoring for lead in schools and child care facilities. Some of the requirements in this subpart only apply if there is an exceedance of the lead or copper action levels, specified in paragraph (c) of this section, as measured in samples collected at consumers' taps.

(c) *Lead and copper action levels and method for determining whether there is an exceedance of the action level*. Action levels must be determined based on tap water samples collected in accordance with the tap sampling monitoring requirements of § 141.86 for the purpose of calculating the 90th percentile and tested using the analytical methods specified in § 141.89. The action levels described in this paragraph (c) are applicable to all sections of subpart I of this part. Action levels for lead and copper are as follows:

(1) The lead action level is exceeded if the 90th percentile concentration of lead as specified in paragraph (c)(3) of this section is greater than 0.010 mg/L.

(2) The copper action level is exceeded if the 90th percentile concentration of copper as specified in paragraph (c)(3) of this section is greater than 1.3 mg/L.

(3) For purposes of this subpart, the 90th percentile concentration must be derived as follows:

(i) For water systems that do not have lead service line sites and only have sites identified as Tier 3, 4, or 5 under § 141.86(a):

(A) The results of all lead or copper samples taken during a tap sampling period must be placed in ascending order from the sample with the lowest concentration of lead or copper to the sample with the highest concentration of lead or copper. Each sampling result must be assigned a number, in ascending order beginning with the number 1 for the sample with the lowest concentration of lead or copper. The number assigned to the sample with the highest concentration level must be equal to the total number of samples taken.

(B) The number of samples taken during the tap sampling period must be multiplied by 0.9.

(C) The 90th percentile concentration is the concentration of lead or copper in the numbered sample yielded after multiplying the number of samples by 0.9 in paragraph (c)(3)(i)(B) of this section.

(D) For water systems that collect five samples per tap sampling period, the 90th percentile concentration is the average of the highest and second highest concentration from the results in paragraph (c)(3)(i)(A) of this section.

(E) For a water system that is allowed by the State to collect fewer than five samples in accordance with § 141.86(a)(2) or has failed or is unable to collect five samples, the sample result with the highest concentration from the results in paragraph (c)(3)(i)(A) of this section is considered the 90th percentile value.

(ii) For water systems with lead service lines with sites identified as Tier 1 or 2 under § 141.86(a) with enough Tier 1 or 2 sites to meet the minimum number of sites listed in § 141.86(c) or (d) as applicable:

(A) For lead, the system must use the higher value of the first liter and fifth liter lead sample results for each Tier 1 or 2 site during a tap sampling period in the 90th percentile concentration calculation in paragraph (c)(3)(ii)(B) through (c)(3)(ii)(D) of this section. For copper, the system must use all first liter copper samples collected at Tier 1 and 2 sites in the 90th percentile calculation. Lead or copper sample results from Tier 3, 4, or 5 sites cannot be included in this calculation.

(B) The results of the lead or copper samples identified in paragraph (c)(3)(ii)(A) of this section must be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result must be assigned a number, in ascending order beginning with the number 1 for the sample with the lowest concentration level. The number assigned to the sample with the highest concentration level must be equal to the total number of samples.

(C) The number of samples identified in paragraph (c)(3)(ii)(B) shall be multiplied by 0.9.

(D) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(3)(ii)(C) of this section is the 90th percentile concentration.

(E) For water systems that collect samples from five sites per tap sampling period, the 90th percentile concentration is the average of the highest and second highest concentration from the results in paragraph (c)(3)(ii)(B) of this section.

(F) For a water system that is allowed by the State to collect fewer than five copper samples or five paired first liter and fifth liter lead samples in accordance with § 141.86(a)(2), or has failed to collect five copper samples or five paired first liter and fifth liter lead samples, the sample result with the highest concentration from the results in paragraph (c)(3)(ii)(B) is considered the 90th percentile value.

(iii) For water systems with lead service lines with sites identified as Tier 1 or 2 under § 141.86(a) with an insufficient number of Tier 1 or 2 sites to meet the minimum number of sites listed in § 141.86(c) or (d) as applicable:

(A) For lead, the system must use the higher value of the first liter and fifth liter lead sample for each Tier 1 or 2 site and the highest lead concentration results from the next Tier (e.g., Tier 3, 4, or 5) sufficient to meet the minimum number of sites listed in § 141.86(c) or (d) sampled during a tap sampling period in the 90th percentile concentration calculation paragraphs (c)(3)(iii)(B) through (D) of this section. For copper, the system must use all first liter copper samples from Tier 1 and 2 sites and the highest first liter copper concentration results from Tier 3, 4, or 5 sites sufficient to meet the minimum number of sites in this calculation. Lead or copper sample results from any remaining Tier 3, 4, and 5 sites cannot be included in this calculation.

(B) The results of lead or copper samples identified in paragraph (c)(3)(iii)(A) of this section must be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result must be assigned a number, in ascending order beginning with the number 1 for the sample with the lowest concentration of lead or copper. The number assigned to the sample with the highest concentration level must be equal to the total minimum number of sites listed in § 141.86(c) or (d) as applicable.

(C) The number of samples identified in paragraph (c)(3)(iii)(B) must be multiplied by 0.9.

(D) The 90th percentile calculation is the concentration of lead or copper in the numbered sample yielded by the calculation in paragraph (c)(3)(iii)(C).

(E) For water systems that collect samples from five sites per tap sampling period, the 90th percentile concentration is the average of the highest and second highest concentration of lead or copper from the results in paragraph (c)(3)(iii)(B) of this section.

(F) For a water system that is allowed by the State to collect fewer than five lead or copper samples (paired first liter and fifth liter lead samples at Tier 1 and Tier 2 sites) in accordance with § 141.86(a)(2), or has failed to collect five lead or copper samples (paired first liter and fifth liter lead samples at Tier 1 and Tier 2 sites), the sample result with the highest concentration from the results in paragraph (c)(3)(iii)(B) is considered the 90th percentile value.

4. Revise § 141.81 to read as follows:

§ 141.81 Applicability of corrosion control treatment steps to small, medium, and large water systems.

(a) *Corrosion control treatment*. All water systems are required to install, optimize, or re-optimize corrosion control treatment in accordance with this section. This section sets forth when a system must complete the corrosion control treatment steps under paragraph (d) or (e) of this section based on size, whether the system has corrosion control treatment, and whether it has exceeded the lead action level and/or the copper action level.

(1) *Large water system (serving >50,000 people)*. (i) Large water systems with corrosion control treatment that exceed either the lead action level or copper action level must complete the re-optimized OCCT steps specified in paragraph (d) of this section unless the system:

(A) Has re-optimized OCCT once under paragraph (d) of this section after the compliance date in § 141.80(a)(3);

(B) Is meeting optimal water quality parameters designated by the State; and

(C) Is continuing to operate and maintain corrosion control treatment as required in § 141.82(g).

(ii) Large water systems with corrosion control treatment with 90th percentile results as calculated in accordance with § 141.80(c)(3) that exceed the lead practical quantitation limit of 0.005 mg/L but do not exceed the lead action level or the copper action level may be required by the State to complete the re-optimized OCCT steps in paragraph (d) of this section.

(iii) Large water systems without corrosion control treatment with 90th percentile results as calculated in accordance with § 141.80(c)(3) that exceed either the lead practical quantitation limit of 0.005 mg/L or the copper action level must complete steps to study and install OCCT, as specified in paragraph (e) of this section.

(2) *Medium water systems (serving >10,000 and ≤50,000 people)*. (i) Medium water systems with corrosion control treatment that exceed either the lead action level or copper action level must complete the re-optimized OCCT steps specified in paragraph (d) of this section unless the system:

(A) Has re-optimized OCCT once under paragraph (d) of this section after the compliance date in § 141.80(a)(3);

(B) Is meeting optimal water quality parameters designated by the State; and

(C) Is continuing to operate and maintain corrosion control treatment as required in § 141.82(g).

(ii) Medium water systems with corrosion control treatment that do not exceed either the lead or copper action level and do not have optimal water quality parameters designated by the State must complete the steps specified in paragraph (d) of this section starting with Step 6 under paragraph (d)(6) of this section unless the system is deemed optimized under paragraph (b)(3) of this section.

(iii) Medium water systems without corrosion control treatment that exceed either the lead or copper action level must complete the OCCT steps specified in paragraph (e) of this section.

(3) *Small water systems (serving ≤10,000 people) and non-transient non-community water systems*. (i) Small and non-transient non-community water systems with corrosion control treatment that exceed either the lead action level or the copper action level, must complete the re-optimized OCCT steps specified in paragraph (d) of this section unless the system:

(A) Has re-optimized OCCT once under paragraph (d) of this section after the compliance date in § 141.80(a)(3);

(B) Is meeting optimal water quality parameters designated by the State; and

(C) Is continuing to operate and maintain corrosion control treatment as required in § 141.82(g).

(ii) Small and non-transient non-community water systems without corrosion control treatment that exceed either the lead action level or copper action level must complete the corrosion control treatment steps specified in paragraph (e) of this section.

(b) *Systems deemed to have optimized corrosion control*. A system without corrosion control treatment is deemed to have OCCT as defined in § 141.2 if the system meets the requirement of either (b)(1) or (3). A system with corrosion control treatment is deemed to have OCCT as defined in § 141.2 or re-optimized OCCT if the system meets the requirements of either paragraphs (b)(1) and (4) or (b)(3) and (4) of this section. Systems must submit documentation of meeting the applicable requirements in accordance with § 141.90(c)(1) by the applicable deadline for submitting tap sample results under § 141.90(a)(2).

(1) A medium water system without corrosion control treatment or a small water system is deemed to have OCCT if the water system does not exceed the lead action level and copper action level during two consecutive six-month tap monitoring periods and then remains at or below the lead action level and copper action level in all tap sampling periods conducted in accordance with § 141.86.

(i) A small water system with corrosion control treatment is not eligible to be deemed to have OCCT pursuant to this paragraph (b)(1) where the State has set optimal water quality parameters (OWQPs) under paragraph (d) or (e) of this section.

(ii) If a medium water system without corrosion control treatment or a small water system deemed to have OCCT under this paragraph (b)(1) exceeds the lead action level or copper action level, the system must follow the requirements in paragraph (a) of this section.

(2) [Reserved]

(3) A water system is deemed to have optimized or re-optimized corrosion control treatment if it submits tap water sampling results in accordance with § 141.86 demonstrating that the 90th percentile tap water lead level is less than or equal to the lead practical quantitation limit of 0.005 mg/L and does not exceed the copper action level for two consecutive six-month tap monitoring periods, and does not have OWQPs set by the State under paragraph (d) or (e) of this section.

(i) A system with 90th percentile tap sampling results that later exceed the lead practical quantitation limit of 0.005 mg/L or copper action level during any tap sampling period is not eligible to be deemed to have optimized OCCT in accordance with this paragraph (b)(3) until the system has completed the treatment steps specified in paragraph (d) or (e) of this section.

(ii) A system deemed to have OCCT in accordance with this paragraph (b)(3) must continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in § 141.86(d) and collecting samples at times and locations specified in § 141.86(d)(2)(iii).

(4) A system with corrosion control treatment deemed to have OCCT under this paragraph (b) must continue to operate and maintain the corrosion control treatment and also meet any additional requirements that the State determines are appropriate to ensure OCCT is maintained.

(c) [Reserved]

(d) *Treatment steps and deadlines for water systems re-optimizing optimal corrosion control treatment*. Water systems with corrosion control treatment that are required to re-optimize corrosion control treatment under paragraph (a) of this section must complete the following steps (described in the referenced portions of §§ 141.82, 141.86, and 141.87) by the indicated time periods. Water systems must conduct tap sampling for lead and copper in accordance with the requirements of § 141.86 while the system completes the corrosion control steps in this section.

(1) *Step 1. Initiation of mandatory pipe rig or CCT study or treatment recommendation*. (i) A large or medium water system with lead service lines that exceeds the lead action level must harvest lead pipes from the distribution system and construct flowthrough pipe rigs and operate the rigs with finished water within one year after the end of the tap sampling period during which it exceeds the lead action level. These water systems must proceed to Step 3 in paragraph (d)(3) of this section and conduct the corrosion control studies for re-optimization under paragraph (d)(3)(i) of this section using the pipe rigs.

(ii) Large water systems without lead service lines that exceed the lead action level or copper action level must conduct the corrosion control studies for re-optimization under paragraph (d)(3)(ii) of this section (Step 3).

(iii) A water system other than those covered in paragraph (d)(1)(i) or (ii) of this section must recommend re-optimized optimal corrosion control treatment (§ 141.82(a)) within six months after the end of the tap sampling period during which it exceeds either the lead action level or copper action level.

(iv) Systems may make an existing corrosion control treatment modification recommendation to the State within six months after the end of the tap sampling period in which it exceeds the lead action level. The State must evaluate a system's past corrosion control treatment study results prior to approving an existing treatment modification. When a State approves existing treatment modifications, the State must specify re-optimized OCCT within 12 months after the end of the tap sampling period during which it exceeded the lead action level. The system must complete modifications to corrosion control treatment to have re-optimized OCCT installed within six months of the State specifying re-optimized OCCT. These systems must proceed to Step 6 in paragraph (d)(6) and conduct follow-up monitoring.

(2) *Step 2. State requires CCT study or State designates re-optimized OCCT*. Within one year after the end of the tap sampling period during which a medium water system without lead service lines or a small system exceeds the lead action level or copper action level, the State may require the water system to perform corrosion control studies for re-optimization (§ 141.82(c)(2)). If the State does not require the system to perform such studies, the State must specify re-optimized corrosion control treatment (§ 141.82(d)) within the timeframes specified in paragraphs (d)(2)(i) and (ii) of this section. The State must provide its determination to the system in writing:

(i) For medium water systems, within one year after the end of the tap sampling period during which such water system exceeds the lead action level or copper action level.

(ii) For small water systems, within 18 months after the end of the tap sampling period during which such water system exceeds the lead action level or copper action level.

(3) *Step 3. Study duration*. (i) Any water system with lead service lines that exceeds the lead action level, in accordance with (d)(1) of this section, must complete the pipe rig corrosion control treatment studies and recommend re-optimized OCCT within 30 months after the end of the tap sampling period during which it exceeds the lead action level.

(ii) If the water system is required to perform corrosion control studies under paragraph (d)(1)(ii) or (d)(2) of this section, the water system must complete the studies (§ 141.82(c)) and recommend re-optimized OCCT within 18 months after the end of the tap sampling period during which it exceeds the lead or copper action level or after the State requires that such studies be conducted.

(4) *Step 4. State designation of re-optimized OCCT based on CCT study results*. The State must designate re-optimized OCCT (§ 141.82(d)) within six months after completion of paragraph (d)(3)(i) or (ii) of this section (Step 3).

(5) *Step 5. Re-optimized OCCT deadlines*. Water systems must install re-optimized OCCT (§ 141.82(e)) within one year after completion of paragraph (d)(4) of this section (Step 4) or paragraph (d)(2)(i) or (ii) of this section (Step 2).

(6) *Step 6. Follow-up monitoring*. Water systems must complete follow-up sampling (§§ 141.86(c)(2)(iii)(D) and 141.87(b)(3)) within one year after completion of paragraph (d)(5) of this section (Step 5).

(7) *Step 7. State sets Optimal Water Quality Parameters (OWQPs)*. The State must review the water system's re-optimized OCCT and designate OWQPs (§ 141.82(f)) within six months after completion of paragraph (d)(6) of this section (Step 6).

(8) *Step 8. Systems meet OWQPs to demonstrate compliance*. The water system must comply with the State designated OWQP (§ 141.82(g)) and conduct tap sampling (§ 141.86(c)(2)(iii)(E)) and water quality parameter monitoring under § 141.87(b)(4).

(e) *Treatment steps and deadlines for systems without corrosion control treatment*. Except as provided in paragraph (b) of this section, water systems without corrosion control treatment must complete the following corrosion control treatment steps (described in the referenced portions of §§ 141.82, 141.86, and 141.87) by the indicated time periods. Water systems must conduct tap sampling for lead and copper in accordance with the requirements of § 141.86 while the system completes the corrosion control steps in this section.

(1) *Step 1. Initiation of mandatory pipe rig or CCT study or treatment recommendation*. (i) A medium or large water system with lead service lines that exceeds the lead action level must harvest lead pipes from the distribution system and construct flowthrough pipe rigs and operate the rigs with finished water within one year after the end of the tap sampling period during which it exceeds the lead action level. These water systems must proceed to Step 3 in paragraph (e)(3) of this section and conduct the corrosion control studies for optimization under paragraph (e)(3)(i) of this section using the pipe rigs.

(ii) Large water systems under paragraph (a)(1)(iii) of this section must conduct the corrosion control studies for optimization under paragraph (e)(3) of this section (Step 3).

(iii) A water system other than those covered in paragraph (e)(1)(i) or paragraph (e)(1)(ii) of this section must recommend optimal corrosion control treatment (OCCT) (§ 141.82(a)) within six months after the end of the tap sampling period during which it exceeds either the lead or copper action level.

(2) *Step 2. State requires CCT study or State designates OCCT.* Within one year after the end of the tap sampling period during which a water system exceeds the lead or copper action level, the State may require the water system to perform corrosion control studies (§ 141.82(b)(1)) if those studies are not otherwise required by this rule. The State must notify the system in writing of this requirement. If the State does not require the system to perform such studies, the State must specify OCCT (§ 141.82(d)) within the timeframes established in paragraphs (e)(2)(i) and (ii) of this section. The State must provide its determination to the system in writing:

(i) For medium water systems, within 18 months after the end of the tap sampling period during which such water system exceeds the lead action level or copper action level.

(ii) For small water systems, within 24 months after the end of the tap sampling period during which such water system exceeds the lead action level or copper action level.

(3) *Step 3. Study duration*. (i) Large and medium systems with lead service lines that exceed the lead action level must complete the corrosion control treatment studies and recommend OCCT within 30 months after the end of the tap sampling period during which it exceeds the lead action level.

(ii) If the water system is required to perform corrosion control studies under paragraph (e)(1)(ii) or (e)(2) of this section, the water system must complete the studies (§ 141.82(c)) and recommend OCCT within 18 months after the end of the tap sampling period during which it exceeds the lead or copper action level or the State notifies the system in writing that such studies must be conducted.

(4) *Step 4. State designation of OCCT based on CCT study results*. The State must designate OCCT (§ 141.82(d)) within six months after completion of paragraph (e)(3)(i) or (ii) of this section (Step 3).

(5) *Step 5. OCCT installation deadlines*. The water system must install OCCT (§ 141.82(e)) within 24 months after the State designates OCCT under paragraph (e)(2) or (4) of this section (Step 2 or Step 4).

(6) *Step 6. Follow-up monitoring*. The water system must complete follow-up sampling (§§ 141.86(c)(2)(iii)(D) and 141.87(b)(3)) within 12 months after completion of paragraph (e)(5) of this section (Step 5).

(7) *Step 7. State sets Optimal Water Quality Parameters (OWQPs)*. The State must review the water system's installation of treatment and designate OWQPs (§ 141.82(f)) within six months after completion of paragraph (e)(6) of this section (Step 6).

(8) *Step 8. Systems meet OWQPs to demonstrate compliance*. The water system must comply with the State designated OWQP (§ 141.82(g)) and conduct tap sampling (§ 141.86(c)(2)(iii)(E)) and water quality parameter monitoring under § 141.87(b)(4).

(f) *Systems with lead or galvanized requiring replacement service lines that can complete the service line replacement program within five years*. (1) A water system with one or more lead or galvanized requiring replacement service lines is not required to complete the steps under paragraph (d) or (e) of this section if the system meets the following requirements:

(i)(A) A water system completes the service line replacement requirements under § 141.84(d) within five years of the end of the tap sampling period in which the system first exceeds the lead action level and the applicable deadline for service line replacement is at least five years after the end of the tap sampling period in which the system first exceeds the lead action level; or

(B) A large water system without corrosion control treatment completes the service line replacement requirements under § 141.84(d) within five years of the end of the tap sampling period in which the system's 90th percentile results first exceeds the PQL for lead and the applicable deadline for service line replacement is at least five years after the end of the tap sampling period in which the system first exceeds the lead PQL; and

(ii) A system replaces a minimum of 20 percent of lead or galvanized requiring replacement service lines each year, removing all lead and galvanized requiring replacement service lines and identifying the material of all service lines of unknown material by the end of the five-year period in paragraph (f)(1)(i) of this section.

(2) Systems with corrosion control treatment must continue to operate and maintain corrosion control treatment in addition to completing the mandatory service line replacement requirements under § 141.84(d).

(3) A water system that does not replace a minimum of 20 percent of lead or galvanized requiring replacement service lines calculated in accordance with § 141.84(d)(5) each year in any one year of the five-year period in paragraph (f)(1)(i) of this section or complete the service line replacement requirements under § 141.84(d) within five years of the end of the tap sampling period that either the system first exceeds the lead action level or the 90th percentile results first

exceed the lead PQL for large systems without corrosion control treatment must meet the requirements under paragraph (d) or (e) of this section, as applicable.

(4) Water systems whose inventory contains only non-lead service lines after the five-year replacement period established in (f)(1)(i) of this section must meet the requirements under paragraph (d) or (e) of this section, as applicable, if at the end of a subsequent tap sampling period, either the system exceeds the lead action level or the 90th percentile results first exceed the lead PQL for large systems without corrosion control treatment.

(g) *Completing corrosion control steps for small and medium water systems without corrosion control treatment*. (1) Any small or medium system without corrosion control treatment required to complete the steps in paragraph (e) of this section that does not exceed the lead and copper action levels during two consecutive six-month tap monitoring periods pursuant to § 141.86 prior to the start of Step 3 in paragraph (e)(3) of this section or Step 5 in paragraph (e)(5) of this section may stop completing the steps and is not required to complete Step 3 or Step 5, respectively, except that medium systems with lead service lines must complete a corrosion control treatment study under paragraph (e)(3)(i) of this section. A calculated 90th percentile level at or below the lead or copper action level based on fewer than the minimum number of required samples under § 141.86 cannot be used to meet the requirements of this provision.

(2) Any system that starts Step 5 in accordance with paragraph (e)(5) of this section must complete all remaining steps (i.e., Steps 6 through 8) in paragraphs (e)(6) through (8) of this section and is not permitted to stop the steps.

(3) Any small or medium system under paragraph (g)(1) of this section that stopped the steps in paragraph (e) of this section and subsequently exceeds either the lead or copper action level must complete the corrosion control treatment steps in paragraph (e) beginning with the first treatment step that was not completed. Eligible systems can only use the exception in paragraph (g)(1) once.

(4) The State may require a water system to repeat treatment steps previously completed by the water system when the State determines that this is necessary to implement the treatment requirements of this section. The State must notify the system in writing of such a determination and explain the basis for its decision.

(h) *Notification requirements for upcoming long-term change in treatment or source*. Any water system shall notify the State in writing pursuant to § 141.90(a)(4) of any upcoming long-term change in treatment or addition of a new source as described in § 141.90(a)(4). The State must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The State may require any such water system to conduct additional monitoring or to take other action the State deems appropriate to ensure that such water system maintains minimal levels of corrosion control in its distribution system.

5. Revise § 141.82 to read as follows:

§ 141.82 Description of corrosion control treatment requirements.

This section provides the requirements for systems and States designating optimal corrosion control treatment (OCCT) for a system that is optimizing or re-optimizing corrosion control treatment. All systems must complete the corrosion control treatment requirements in this section as applicable under § 141.81.

(a) *System recommendation regarding corrosion control treatment for systems that do not have lead service lines and small systems with lead service lines that are not required by the State to conduct a harvested pipe rig study*. (1) Any system without corrosion control treatment that is required to recommend a treatment option in accordance with § 141.81(e) must, based on the results of lead and copper tap sampling and water quality parameter monitoring, recommend designating one or more of the corrosion control treatments listed in paragraph (c)(1) of this section. The State may require the system to conduct additional water quality parameter monitoring to assist the State in reviewing the system's recommendation.

(2) Any system with corrosion control treatment that exceeds the lead action level that is required to recommend a treatment option in accordance with § 141.81(d)(1)(iii) must recommend designating one or more of the corrosion control treatments listed in paragraph (c)(2) of this section as the optimal corrosion control treatment for that system.

(3) States may waive the requirement for a system to recommend OCCT if the State requires the system, in writing, to complete a corrosion control study within three months after the end of the tap sampling period during which the lead or copper action level exceedance occurred. These systems must proceed directly to paragraph (c) of this section and complete a corrosion control study.

(b) *State decision to require studies to identify initial OCCT under § 141.81(e)(2) and re-optimized OCCT under § 141.81(d)(2)*. (1) The State may require any small or medium system without corrosion control treatment that exceeds either the lead action level or copper action level to perform corrosion control treatment studies under paragraph (c)(1) of this section to identify OCCT for the system.

(2) The State may require any small or medium water system with corrosion control treatment exceeding either the lead action level or copper action level to perform corrosion control treatment studies under paragraph (c)(2) of this section to identify re-optimized OCCT for the system (i.e., OCCT after a re-optimization evaluation).

(c) *Performance of corrosion control studies*. (1) Systems without corrosion control treatment required to conduct corrosion control studies under § 141.81(e) must evaluate the effectiveness of each of the following treatments, and if appropriate, combinations of the following treatments, to identify OCCT for the system:

(i) Alkalinity and pH adjustment;

(ii) The addition of an orthophosphate- or a silicate-based corrosion inhibitor at a concentration sufficient to maintain an effective corrosion inhibitor residual concentration in all test samples;

(iii) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 1 mg/L (as PO_4) in all test samples; and

(iv) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 3 mg/L (as PO_4) in all test samples.

(2) Systems with corrosion control treatment required to conduct corrosion control studies under § 141.81(d) must evaluate the effectiveness of the following treatments, and if

appropriate, combinations of the following treatments, to identify re-optimized OCCT for the system:

(i) Alkalinity and/or pH adjustment or re-adjustment;

(ii) The addition of an orthophosphate- or a silicate-based corrosion inhibitor at a concentration sufficient to maintain an effective corrosion inhibitor residual concentration in all test samples if no such inhibitor is utilized;

(iii) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 1 mg/L (as PO_4) in all test samples unless the current inhibitor process already meets this residual; and

(iv) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 3 mg/L (as PO_4) in all test samples unless the current inhibitor process already meets this residual.

(3) Systems must evaluate each of the corrosion control treatments specified in paragraph (c)(1) or (2) of this section individually or, if appropriate, in combinations, using pipe rig/loop tests, metal coupon tests, partial-system tests, and/or analyses based on documented analogous treatments with similar size systems that have a similar water chemistry and similar distribution system configurations. Large and medium systems with lead service lines and other systems as required by the State, that exceed the lead action level must conduct pipe rig/loop studies using harvested lead service lines from their distribution systems to assess the effectiveness of corrosion control treatment options on the existing pipe scale. Metal coupon tests can be used as a screen to reduce the number of options evaluated in the pipe rig studies to the current water quality and at least two treatment options.

(4) Systems must measure the following water quality parameters in any tests conducted under paragraph (c)(3) of this section both before and after evaluating the corrosion control treatments listed in paragraph (c)(1) or (2) of this section:

(i) Lead;

(ii) Copper;

(iii) pH;

(iv) Alkalinity;

(v) Orthophosphate as PO_4 (when an orthophosphate-based inhibitor is used);

(vi) Silicate (when a silicate-based inhibitor is used); and

(vii) Any additional parameters needed to evaluate the effectiveness of a corrosion control treatment as determined by the State.

(5) Systems must identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document those constraints by providing either of the following:

(i) Data and documentation showing a particular corrosion control treatment has adversely affected other drinking water treatment processes when used by another water system with comparable water quality characteristics. Systems using coupon studies to screen and/or pipe rig/loop studies to evaluate treatment options cannot exclude treatment strategies from the studies based on the constraints identified in this paragraph.

(ii) Data and documentation demonstrating the water system previously attempted to evaluate a particular corrosion control treatment and found the treatment was ineffective or adversely affects other drinking water quality treatment processes. Systems using coupon studies to screen and/or pipe rig/loop studies to evaluate treatment options cannot exclude treatment strategies from the studies based on the constraints identified in this paragraph, unless the treatment was found to be ineffective in a previous pipe rig/loop study.

(6) Systems must evaluate the effect of the chemicals used for corrosion control treatment on other drinking water quality treatment processes. Systems using coupon studies to screen and/or pipe rig/loop studies to evaluate treatment options cannot exclude any of the required treatment strategies specified in paragraph (c)(1) or (2) of this section from the studies based on the effects identified in this section.

(7) Based on the data and analysis for each treatment option evaluated under paragraph (c) of this section, systems must recommend to the State, in writing, the treatment option that the corrosion control studies indicate constitutes OCCT for that system as defined in § 141.2. Systems must provide the State with a rationale for the OCCT recommendation and all supporting documentation specified in paragraphs (c)(1) or (2) and (c)(3) through (7) of this section.

(d) *State designation of OCCT and re-optimized OCCT*—(1) *Designation of OCCT or re-optimized OCCT*. Based on available information including, where applicable, studies conducted under paragraph (c)(1) or (2) of this section and/or a system's recommended corrosion control treatment option, the State must either approve the corrosion control treatment option recommended by the system or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(1) or (2) of this section. The State must notify the water system, in writing, of its designation of OCCT or re-optimized OCCT and explain the basis for this determination.

(i) When designating OCCT, the State must consider the effects that additional corrosion control treatment will have on water quality parameters and other drinking water quality treatment processes.

(ii) If the State requests additional information to aid its review, the water system must provide that information.

(2) [Reserved]

(e) *Installation of OCCT and re-optimized OCCT*. Each system must install and operate throughout its distribution system the OCCT or re-optimized OCCT designated by the State under paragraph (d) of this section.

(f) *State review of treatment and specification of optimal water quality parameters for OCCT and re-optimized OCCT*. The State must evaluate the results of all lead and copper tap and water quality parameter sampling submitted by the water system and determine whether the water system has installed and operated the OCCT designated by the State in paragraph (d) of this section. Upon reviewing the system's tap and water quality parameter sampling results, both before and after the water system installs OCCT, or re-optimizes OCCT, the State must designate each of the following:

(1) A minimum value or a range of values for pH measured at each entry point to the distribution system.

(2) A minimum pH value measured in all tap samples. This value must be equal to or greater than 7.0, unless the State determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control.

(3) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for orthophosphate (as PO_4) or silicate measured at each entry point to the distribution system.

(4) If a corrosion inhibitor is used, a minimum orthophosphate (as PO_4) or silicate concentration measured in all tap samples that the State determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system. When orthophosphate is used, for OCCT designations for systems without corrosion control treatment, the orthophosphate concentration must be equal to or greater than 0.5 mg/L (as PO_4) and for OCCT designations for systems with corrosion control treatment, the orthophosphate concentration must be equal to or greater than 1.0 mg/L, unless the State determines that meeting the applicable minimum orthophosphate residual is not technologically feasible or is not necessary for OCCT.

(5) If alkalinity is adjusted as part of OCCT, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples.

(6) The values for the applicable water quality control parameters in paragraphs (f)(1) through (5) of this section, must be the values the State determines reflect OCCT or re-optimized OCCT for the water system. The State may designate values for additional water quality control parameters the State determines reflect OCCT or re-optimized OCCT for the water system. The State must notify the system, in writing, of these determinations and explain the basis for its decisions.

(g) *Continued operation and monitoring for OCCT and re-optimized OCCT*. All systems optimizing or re-optimizing OCCT must continue to operate and maintain OCCT, including maintaining water quality parameters at or above the minimum values or within the ranges designated by the State under paragraph (f) of this section, in accordance with this paragraph (g) for all water quality parameter samples collected under § 141.87(b)(4) through (d). The requirements of this paragraph (g) apply to all systems, including consecutive systems that distribute water that has been treated to control corrosion by another system, and any water system with corrosion control treatment, OCCT, or re-optimized OCCT that is not required to monitor water quality parameters under § 141.87.

(1) Compliance with the requirements of this paragraph (g) must be determined every six months, as specified under § 141.87(b)(4). A water system is out of compliance with the requirements of this paragraph (g) for a six-month period if it has excursions for any State-specified parameter on more than nine days, cumulatively, during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the State. Daily values are calculated as set out in paragraph (g)(2) of this section. States have discretion to not include results of obvious sampling errors from this calculation. Sampling errors must still be recorded even when not included in calculations.

(2)(i) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value must be the average of all results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling, or a combination of both. If EPA has approved an alternative formula under § 142.16(d)(1)(ii) of this chapter in the State's application for a program revision submitted pursuant to § 142.12 of this chapter, the State's formula must be used to aggregate multiple measurements taken at a sampling point for the water quality parameters in lieu of the formula in this paragraph (g)(2).

(ii) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value must be the result of that measurement.

(iii) On days when no measurement is collected for the water quality parameter at the sampling location, the daily value must be the daily value calculated on the most recent day on which the water quality parameter was measured at the sampling location.

(h) *Modification of State treatment decisions for OCCT and re-optimized OCCT*. Upon its own initiative or in response to a request by a water system or other interested party, a State may modify its determination of the OCCT under paragraph (d) of this section, or optimal water quality parameters under paragraph (f) of this section. A request for modification by a system or other interested party must be in writing, explaining why the modification is appropriate, and providing supporting documentation. The State may require a system to conduct a CCT study to support modification of the determination of OCCT or re-optimized OCCT. The State may modify its determination where it concludes that such change is necessary to ensure that the water system continues to optimize corrosion control treatment. A revised determination must be made in writing, set forth the new treatment requirements and/or optimal water quality parameters, explain the basis for the State’s decision, and provide an implementation schedule for completing the treatment modifications for re-optimized corrosion control treatment.

(i) *Treatment decisions by EPA in lieu of the State on OCCT and re-optimized OCCT*. Pursuant to the procedures in § 142.19 of this chapter, the EPA Regional Administrator may review OCCT determinations made by a State under paragraph (d), (f), or (h) of this section and issue Federal corrosion control treatment determinations consistent with the requirements of paragraph (d), (f), or (h) of this section where the EPA Regional Administrator finds that:

(1) A State failed to issue a treatment determination by the applicable deadlines contained in § 141.81;

(2) A State abused its discretion; or

(3) The technical aspects of a State's determination would be indefensible in a Federal enforcement action taken against a water system.

(j) *Distribution system and site assessment for tap sample sites with lead results that exceed 0.010 mg/L*. The water system must conduct the following steps when the lead results from an individual tap sample site sampled under § 141.86 and the site is included in the site sample plan under § 141.86(a)(1) exceed 0.010 mg/L:

(1) *Step 1. Corrosion control treatment assessment*. Within five days of receiving the sampling results, the water system must sample at a water quality parameter site that is on the same size water main in the same pressure zone and located within a half mile radius of the site with the lead result exceeding 0.010 mg/L. Small water systems without corrosion control treatment may have up to 14 days to collect the new samples.

(i) The water system must measure the following parameters:

(A) pH;

(B) Alkalinity;

(C) Orthophosphate (as PO_4), when an inhibitor containing an orthophosphate compound is used; and

(D) Silica, when an inhibitor containing a silicate compound is used.

(ii) The water system must measure at the following locations:

(A) Water systems with an existing water quality parameter site that is on the same size water main in the same pressure zone and located within a half mile radius of the site with lead results exceeding 0.010 mg/L can conduct this sampling at that site.

(B) All water systems required to meet optimal water quality parameters but do not have an existing water quality parameter site that meets the requirements in paragraph (j)(1) of this section must add new sites to the minimum number of sites as described in § 141.87(b)(1)(i). Sites must be added until a system has twice the minimum number of sites listed in Table 1 to § 141.87(b)(1)(i). When a system exceeds twice the number of sites, the State has discretion to determine if these additional newer sites can better assess the effectiveness of the corrosion control treatment and whether to remove existing sites during sanitary survey evaluation of OCCT.

(2) *Step 2. Site assessment*. Within 30 days of receiving the sampling results, water systems must collect and analyze a follow-up sample for lead at any tap sample site that exceeds 0.010 mg/L. These follow-up samples may use different sample volumes or different sample collection procedures to assess the source of elevated lead levels. Samples collected under this section must be submitted to the State but cannot be included in the 90th percentile calculation for compliance monitoring under § 141.86. If the water system is unable to collect a follow-up sample at a site, the water system must provide documentation to the State, as specified in § 141.90(g)(2), explaining why it was unable to collect a follow-up sample.

(3) *Step 3. Evaluate results and system treatment recommendation*. Water systems must evaluate the results of the sampling conducted under paragraphs (j)(1) and (2) of this section to determine if either localized or centralized adjustment of the OCCT or other distribution system actions are necessary and submit the recommendation to the State within six months after the end of the tap sampling period in which the site(s) exceeded 0.010 mg/L. Corrosion control treatment modification may not be necessary to address every exceedance of the lead action level. Other distribution system actions may include flushing to reduce water age. Water systems must note the cause of the elevated lead level, if known from the site assessment, in their recommendation to the State as site-specific issues can be an important factor in why the system is not recommending any adjustment of corrosion control treatment or other distribution system actions. Systems in the process of optimizing or re-optimizing OCCT under paragraphs (a) through (f) of this section do not need to submit a treatment recommendation for distribution system and site assessment.

(4) *Step 4. State approval of treatment recommendation.* The State must approve the treatment recommendation or specify a different approach within six months of completion of Step 3 as described in paragraph (j)(3) of this section and notify the water system in writing.

(5) *Step 5. Modifications to OCCT*. If the State-approved treatment recommendation requires the water system to adjust the OCCT process, the water system must complete modifications to its corrosion control treatment within 12 months of receiving notification from the State as described in paragraph (j)(4) of this section. Systems without corrosion control treatment required to install OCCT must follow the schedule in § 141.81(e).

(6) *Step 6. Follow up sampling*. Water systems adjusting OCCT must complete follow-up sampling in accordance with §§ 141.86(c)(2)(iii)(D) and 141.87(c)(2)(iii)(D) within 12 months

after completion of Step 5 as described in paragraph (j)(5) of this section and submit sampling results to the State in accordance with §§141.86 and 141.87.

(7) *Step 7. State OWQP designation*. For water systems adjusting OCCT*,* the State must review the water system's modification of corrosion control treatment and designate optimal water quality parameters in accordance with § 141.82(f) within six months of receiving sampling result in paragraph (j)(6) of this section.

(8) *Step 8. Operate in compliance*. For a water system adjusting OCCT*,* the water system must operate in compliance with the State-designated optimal water quality parameters in accordance with § 141.82(g) and continue to conduct tap sampling in accordance with §§ 141.86(c)(2)(iii)(E) and 141.87(c)(2).

6. Revise § 141.84 to read as follows:

§ 141.84 Service line inventory and replacement requirements.

(a) *Service line and connector inventory development*. All water systems must develop a service line inventory that identifies the material and location of each service line connected to the public water distribution system. The inventory must include all service lines connected to the public water distribution system regardless of ownership status (e.g., where service line ownership is shared, the inventory includes both the portion of the service line owned by the water system and the portion of the service line owned by the customer). The inventory must meet the following requirements:

(1) All water systems are required to develop an initial inventory and submit it to the State by October 16, 2024, in accordance with § 141.90(e)(1).

(2) All water systems must develop an updated initial inventory, known as the "baseline inventory". Systems must submit the baseline inventory to the State by the compliance date in § 141.80(a)(3). Newly regulated public water systems, as defined in § 141.2, must develop a baseline inventory on a schedule established by the State that does not exceed three years from the date the system becomes subject to national primary drinking water regulations. The baseline inventory must include each service line and connector that is connected to the public water distribution system regardless of ownership status (e.g., where service line ownership is shared, the inventory includes both the portion of the service line owned by the water system and the portion of the service line owned by the customer).

(i) For the baseline inventory, water systems must conduct a review of any information listed in paragraphs (b)(2)(i) through (iii) of this section that describes connector materials and locations. Water systems must also conduct a review of any information on lead and galvanized iron or steel that they have identified pursuant to § 141.42(d) to identify connector materials and locations. The water system may use other sources of information not listed in paragraphs (b)(2)(i) through (iii) of this section if approved or required by the State.

(ii) Water systems must include each connector identified in paragraph (a)(2)(i) of this section in their baseline inventory. Connector materials must be categorized in the following manner:

(A) "Lead" where the connector is made of lead.

(B) "Replaced lead" where the connector was previously made of lead but has been removed or replaced.

(C) “Never lead” where the connector is determined through an evidence-based record, method, or technique not to be made of lead, and there was never a lead connector present.

(D) “Unknown” where connector material is not known.

(E) “No connector present” where there is no connector in use.

(iii) All water systems must include any new information on service line materials from all applicable sources described in paragraph (b)(2) of this section in the baseline inventory.

(3) Each service line, or portion of the service line where ownership is shared, must be categorized in the following manner:

(i) “Lead” where the service line is a lead service line as defined in § 141.2.

(ii) “Galvanized Requiring Replacement” where the service line is a galvanized requiring replacement service line as defined in § 141.2.

(iii) “Non-Lead” where the service line is determined through an evidence-based record, method, or technique not to be a lead or galvanized requiring replacement service line. Water systems are not required to identify the specific material of a non-lead service line; however, they may use the material (e.g.*,* plastic or copper) as an alternative to categorizing it as “Non-Lead”.

(iv) “Lead Status Unknown” or “Unknown” where the service line material is not known to be lead, galvanized requiring replacement, or non-lead, such as where there is no documented evidence or evidence reliably supporting material categorization. Water systems may elect to provide more information regarding their unknown service lines as long as the inventory clearly distinguishes unknown service lines from those where the categorization of the material is based on the categorization methods approved under paragraph (b)(2) of this section.

(4) The inventory must include a street address associated with each service line and connector. Where a street address is not available for an individual service line or connector, a unique locational identifier (e.g., a block, intersection, or landmark) may be used.

(5) The inventory must be publicly accessible.

(i) The publicly accessible inventory must include the information described in paragraphs (a)(2) through (4) of this section and be updated in accordance with paragraph (b) of this section.

(ii) Water systems serving greater than 50,000 persons must make the publicly accessible inventory available online.

(6) When a water system has no lead, galvanized requiring replacement, or lead status unknown service lines, no known lead connectors or unknown connectors, it may comply with the requirements in paragraph (a)(5) of this section using a written statement in lieu of the publicly accessible inventory, declaring that the distribution system has no lead, galvanized requiring replacement, or lead status unknown service lines, no known lead connectors or no unknown connectors. The statement must include a general description of all applicable sources used in the inventory as described in paragraphs (a)(1) and (2) and (b)(2) of this section to make this determination.

(7) Instructions to access the publicly accessible inventory (including inventories consisting only of a statement in accordance with paragraph (a)(6) of this section) must be included in the Consumer Confidence Report in accordance with § 141.153(d)(4)(xi).

(b) *Additional requirements for service line and connector inventory maintenance*. (1) All water systems must update the baseline inventory of service lines and connectors developed in paragraph (a)(2) of this section and submit the updates to the State on an annual basis in accordance with § 141.90(e). These updates begin one year after the compliance date in § 141.80(a)(3). The publicly accessible inventory must reflect any updates no later than the deadline to submit the updated inventory to the State.

(i) All water systems must identify the material of all lead status unknown service lines by the applicable mandatory service line replacement deadline in paragraph (d)(4) of this section.

(ii) Water systems whose inventories contain only non-lead service lines and never lead connectors, replaced lead connectors, or no connectors present are not required to provide updated inventories to the State or updates to the publicly accessible inventory. If, in the future, such a water system discovers a lead service line, galvanized requiring replacement service line, or lead connector within its system, the system must notify the State no later than 60 days after the discovery and prepare an updated inventory in accordance with this section on a schedule established by the State.

(2) Water systems must update the inventory annually with any new information acquired from all applicable sources described in paragraphs (b)(2) through (4) of this section and follow all applicable requirements for the inventory in paragraphs (a) and (b) of this section. The water system may update the inventory using other sources of information not listed in paragraphs (b)(2)(i) through (iii) of this section if the use of those sources is or previously has been approved or required by the State.

(i) All construction and plumbing codes, permits, and records or other documentation that indicate the service line and connector materials used to connect structures to the distribution system.

(ii) All water system records on service lines and connectors, including distribution system maps and drawings, recent or historical records on each service connection and connector, meter installation records, historical capital improvement or master plans, and standard operating procedures.

(iii) All records of inspections in the distribution system that indicate the material composition of the service connections and connectors that connect a structure to the distribution system.

(iv) Water systems must update their inventory annually based on any lead or galvanized requiring replacement service line replacements, service line material inspections, or lead connector replacements that may have been conducted. Each updated inventory and subsequent update to the publicly accessible inventory must include the following information regarding service line replacements:

(A) The number of full lead service line replacements and full galvanized requiring replacement service line replacements that have been conducted in each preceding program year; and

(B) The total number of lead, galvanized requiring replacement, and unknown service lines and the number of lead connectors in the inventory.

(v) Water systems must identify service line and connector materials and addresses as they are encountered in the course of normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities). Water systems must update the inventory annually based on the identified service line and connector materials and addresses.

(3) Water systems that discover a lead or galvanized requiring replacement service line that was previously inventoried as non-lead must update their inventory in accordance with paragraph (b)(2) of this section and complete the following requirements:

(i) If the service line is discovered during the mandatory service line replacement program as described in paragraph (d) of this section, the system must update the total number of service line replacements calculated under paragraph (d)(6) of this section.

(ii) If the service line is discovered when the system's inventory is comprised of only non-lead service lines, such as after the completion of the system's mandatory service line replacement program, the system must conduct a full service line replacement of the line within six months in accordance with paragraph (d) of this section.

(iii) Water systems must notify the State in accordance with § 141.90(e) and comply with any additional actions required by the State to address the inventory inaccuracy.

(4) If a consumer notifies the water system of a suspected incorrect categorization of their service line material in the inventory, the system must respond to the consumer with an offer to inspect the service line within 60 days of receiving the notification.

(5) All water systems must validate the accuracy of the non-lead service line category in the inventory as follows:

(i) The water system must identify a validation pool, consisting of all service lines categorized as "non-lead" excluding non-lead service lines identified by records described in paragraphs (b)(2)(i) through (iii) of this section, visual inspection of the pipe exterior at a minimum of two points (e.g., excavation, visual inspection in the meter pit or stop box, or visual inspection inside the home), or previously replaced lead or galvanized requiring replacement service lines from the validation pool. If a water system has no existing record or documentation of a two-point visual inspection that indicates how an individual non-lead service line was categorized, that service line must be included in the validation pool.

(ii) The water system must confirm the service line material of a random sample (e.g., a sample selected by use of a random number generator or lottery method) of non-lead service lines from the validation pool. Confirmation of service line material must be done by visual inspection of the pipe exterior at a minimum of two points. Where ownership is shared, the water system must visually inspect both portions of the service line. Water systems must validate at least as many service lines as are required in the table in this paragraph. The table is as follows:

Table 1 to Paragraph (b)(5)(ii)

Size of Validation Pool	Number of Validations Required
<1,500	20 percent of validation pool
1,500 to 2,000	322
2,001 to 3,000	341
3,001 to 4,000	351
4,001 to 6,000	361
6,001 to 10,000	371
10,001 to 50,000	381
>50,000	384

(iii) If physical access to private property is necessary to complete the validation and the water system is unable to gain access, the system is not required to conduct a validation at that site. The system must replace the site by randomly selecting a new service line that meets the requirements of paragraph (b)(5)(i) of this section to conduct the validation.

(iv) *Deadline for inventory validation*. The deadlines for inventory validation are:

(A) No later than seven years after the compliance date in § 141.80(a)(3) for water systems subject to the mandatory service line replacement deadline in paragraph (d)(4) of this section or who have reported only non-lead service lines in their baseline inventory,

(B) A deadline established by the State for water systems completing mandatory service line replacement on a shortened deadline for service line replacement as established by the State in accordance with paragraph (d)(5)(iv) of this section, or

(C) A deadline established by the State to be no later than three years prior to the deadline for completing mandatory service line replacement if the water system is subject to a deferred deadline under paragraph (d)(5)(v) of this section, an exemption, or a variance.

(v) Water systems that conduct inventory validation pursuant to this paragraph (b)(5) must submit the results of the validation by the applicable deadline described in paragraph (b)(5)(iv) of this section in accordance with § 141.90(e)(9).

(c) *Service line replacement plan*. All water systems with one or more lead, galvanized requiring replacement, or lead status unknown service line in their distribution system must create a service line replacement plan by the compliance date in § 141.80(a)(3) and submit a service line replacement plan to the State in accordance with § 141.90(e). The service line replacement plan must be sufficiently detailed to ensure a system is able to comply with the service line inventory and replacement requirements in this section.

(1) The service line replacement plan must include a description of:

(i) A strategy for determining the material composition of lead status unknown service lines in the service line inventory under paragraph (a) of this section;

(ii) A standard operating procedure for conducting full service line replacement (e.g., techniques to replace service lines, plans for procurement of materials, or plans for utilizing contractors);

(iii) A communication strategy to inform consumers and customers before a full or partial lead or galvanized requiring replacement service line replacement consistent with the requirements for notification and mitigation in paragraph (h) of this section;

(iv) A procedure for consumers and customers to flush service lines and premise plumbing of particulate lead following disturbance of a lead, galvanized requiring replacement, or lead status unknown service line in accordance with § 141.85(g) and following full or partial replacement of a lead or galvanized requiring replacement service line consistent with the requirements for notification and mitigation in paragraph (h) of this section;

(v) A strategy to prioritize service line replacement based on factors including but not limited to known lead and galvanized requiring replacement service lines as well as service line replacements for local communities, such as those disproportionately impacted by lead, and populations most sensitive to the effects of lead;

(vi) A funding strategy for conducting service line replacement. Where the water system intends to charge customers for the cost to replace all or a portion of the service line because it is authorized or required to do so under State or local law or water tariff agreement, the funding strategy must include a description of whether and how the water system intends to assist customers who are unable to pay to replace the portion of the service line they own;

(vii) A communication strategy to inform residential and non-residential customers and consumers (e.g., property owners, renters, and tenants) served by the water system about the service line replacement plan and program; and

(viii) Identification of any laws, regulations, and/or water tariff agreements that affect the water system's ability to gain access to conduct full lead and galvanized requiring replacement service line replacement, including the citation to the specific laws, regulations, or water tariff agreement provisions. This includes identification of any laws, regulations, and/or water tariff agreements that require customer consent and/or require or authorize customer cost-sharing.

(2) The service line replacement plan must be made available to the public. Water systems serving greater than 50,000 persons must make the plan available to the public online.

(d) *Mandatory full service line replacement*. (1) All water systems must replace all lead and galvanized requiring replacement service lines under the control of the water system unless the replacement would leave in place a partial lead service line.

(2) Where a water system has access (e.g., legal access, physical access) to conduct full service line replacement, the service line is under its control, and the water system must replace the service line. Where a water system does not have access to conduct full service line replacement, the water system is not required by this rule to replace the line, but the water system must document the reasons that the water system does not have access and include any specific laws, regulations, and/or water tariff agreements that affect the water system's ability to gain access to conduct full lead and galvanized requiring replacement service line replacement identified pursuant to paragraph (c)(1)(viii) of this section. The water system must provide this documentation to the State pursuant to § 141.90(e)(10).

(i) This rule does not establish the criteria for determining whether a system has access to conduct full service line replacement. Any State or local laws or water tariff agreement requirements to gain access to conduct full service line replacement must be identified in the service line replacement plan as described in paragraph (c) of this section and in the notification provided to persons served by lead, galvanized requiring replacement, and unknown service lines as described in § 141.85(e).

(ii) [Reserved]

(3) Where a water system has legal access to conduct full service line replacement only if property owner consent is obtained, the water system must make a "reasonable effort" to obtain property owner consent. If such a water system does not obtain consent after making a "reasonable effort" to obtain it from any property owner, then the water system is not required by this rule to replace any portion of the service line at that address.

(i) A "reasonable effort" must include at least four attempts to engage the property owner using at least two different methods of communication (e.g., in-person conversation, phone call, text message, email, written letter, postcard, or information left at the door such as a door hanger) before the applicable deadline of mandatory service line replacement as described in paragraph (d)(4) of this section. The State may require systems to conduct additional attempts and may require specific outreach methods to be used.

(ii) Within six months of any change in ownership of the property, the water system must offer full service line replacement to any new property owner and make a "reasonable effort" to obtain the property owner's consent as described in paragraph (d)(3)(i) of this section within one year of any change in property ownership. If the water system is unable to obtain consent from the current property owner after making a "reasonable effort" to obtain it, the water system is not required under this rule to replace the line. This paragraph continues to apply after a system completes its mandatory service line replacement program.

(4) *Deadline for completing mandatory service line replacement*. The deadline for water systems to replace all lead and galvanized requiring replacement service lines under the control of the water system is no later than ten years after the compliance date specified in § 141.80(a)(3) unless the system is subject to a different deadline under paragraphs (d)(5)(iv) and (v) of this section.

(5) Water systems must meet a minimum average annual replacement rate for completing mandatory service line replacement in accordance with this paragraph (d)(5):

(i) A water system must replace lead and galvanized requiring replacement service lines as described in paragraph (d)(6) of this section at an average annual replacement rate of at least 10 percent calculated across a rolling three-year period unless the system is eligible for a shortened replacement rate or deferred replacement rate in accordance with paragraphs (d)(5)(iv) and (v) of this section.

(ii) To calculate the annual percent of service lines replaced, at the end of each mandatory service line replacement program year, water systems must divide the number of service lines replaced during that program year in accordance with paragraph (d)(6)(iii) of this section by the number of service lines within the replacement pool in accordance with paragraph (d)(6)(i) of this section.

(iii) *Three-year rolling average*. Compliance with the average annual replacement rate in paragraph (d)(5)(i) of this section is assessed annually in accordance with a three-year rolling average. The average annual replacement rate of the first rolling three-year period is assessed at the end of the third year of the mandatory service line replacement program (i.e., three years after the compliance date specified in § 141.80(a)(3)) and is calculated by taking the sum of the annual percentages of service lines replaced from year one, year two, and year three, then dividing that sum by three. Annually thereafter, at the end of each replacement program year, systems must assess the average annual replacement rate across a rolling three-year period by averaging the three most recent years of the replacement program, which is calculated by taking the sum of the three most recent annual percentages of service lines replaced and dividing that sum by three. The average annual replacement rate of every rolling three-year period must be 10 percent or greater. The water system must make up any deficient percentages of the replacement rate for any rolling three-year period by the applicable deadline for completing mandatory service line replacement in accordance with paragraph (d)(4) of this section.

(iv) *Shortened deadline and associated replacement rate*. Where the State determines that a shortened replacement deadline is feasible for a water system (e.g., by considering the number of lead and galvanized requiring replacement service lines in a system's inventory), the State must require the system to replace service lines by an earlier deadline than required in paragraph (d)(4) of this section and establish a different minimum replacement rate in accordance with paragraph (d)(5)(iv)(A). The State must make this determination in writing and notify the system of its finding. The State must set a shortened deadline at any time throughout a system's replacement program if a State determines a shorter deadline is feasible. This paragraph also applies to systems eligible for a deferred deadline as specified in paragraph (d)(5)(v) of this section.

(A) Systems must replace lead and galvanized requiring replacement service lines at an average annual replacement rate calculated by dividing 100 by the number of years needed to meet the shortened deadline in paragraph (d)(5)(iv) of this section, expressed as a percentage. Systems must comply with the three-year rolling average in accordance with paragraph (d)(5)(iii) of this section unless the shortened replacement deadline is less than three years.

(B) [Reserved]

(v) *Deferred deadlines and associated replacement rates*. Subject to the State determination in paragraph (d)(5)(iv) of this section, a water system may defer service line replacement past the deadline in paragraph (d)(4) of this section if the system meets one or both of the following conditions:

(A) If 10 percent of the total number of known lead and galvanized requiring replacement service lines in a water system's replacement pool as described in paragraph (d)(6)(i) of this section is greater than 10,000 service lines, the system may complete replacement of all lead and galvanized requiring replacement service lines by a deadline that corresponds to the system replacing 10,000 lead and galvanized requiring replacement service lines annually.

(B) If a water system replacing 10 percent of the total number of known lead and galvanized requiring replacement service lines in a water system's replacement pool, on an annual basis, results in an annual number of replacements per household served by the water system that exceeds 0.039, the system may complete replacement of all lead and galvanized requiring replacement service lines by a deadline that corresponds to the system replacing 0.039 average annual replacements per household served calculated over a rolling three-year period in accordance with paragraph (d)(5)(iii) of this section. To calculate the minimum average annual replacement rate, the system must divide 100 by the number of years needed to achieve replacing 0.039 average annual replacements per household, expressed as a percentage.

(6) Calculation of the replacement pool, the annual number of replacements needed, and the number of service lines replaced to calculate a system's average annual replacement rate and achieve the replacement deadline are as follows:

(i) *Replacement pool*. To calculate the baseline replacement pool, systems must add the total number of lead, galvanized requiring replacement, and lead status unknown service lines in the baseline inventory submitted by the compliance date specified in § 141.80(a)(3). At the beginning of each program year, water systems must update the replacement pool according to the counts of specific types of recategorized service lines in the inventory annually thereafter as described this paragraph (d)(6)(i):

(A) Unknown service lines that are identified as non-lead service lines must be subtracted from the replacement pool. Unknown service lines that are identified as lead or galvanized requiring replacement service lines must be recategorized appropriately in the inventory and replacement pool, but they do not change the number of service lines in the replacement pool because recategorization does not remove these service lines from the replacement pool.

(B) Non-lead service lines discovered to be lead or galvanized requiring replacement service lines must added to the replacement pool.

(C) Each entire service line shall count only once for purposes of calculating the replacement pool.

(ii) *Annual number of replacements needed*. To calculate the number of lead and galvanized requiring replacement service lines a system needs to replace in a given program year, divide the most up-to-date replacement pool by the total number of years allowed under paragraph (d)(4) of this section to complete mandatory service line replacement (e.g., 10 years).

(iii) *Number of service lines replaced*. When calculating the average annual replacement rate, the water system may only include full service line replacements of lead or galvanized requiring replacement service lines when counting the number of service lines replaced. Wherever the system conducts a replacement of a lead or galvanized requiring replacement service line (either a portion of a service line or the entire service line), the replacement counts as a full service line replacement only if, after the replacement, the entire service line can be categorized in the inventory as non-lead under paragraph (a)(3)(iii) of this section.

(A) For purposes of mandatory service line replacement, systems must count each entire service line once, including where ownership of the service line is shared, with a single material categorization in accordance with table 2 to this paragraph (d)(6)(iii)(A).

Table 2 to Paragraph (d)(6)(iii)(A)

System-Owned Portion	Customer-Owned Portion	Categorization for Entire Service Line
Lead	Lead	Lead
Lead	Galvanized Requiring Replacement	Lead
Lead	Non-lead	Lead
Lead	Lead Status Unknown	Lead
Non-lead	Lead	Lead
Non-lead and never previously lead	Non-lead, specifically galvanized pipe material	Non-lead
Non-lead	Non-lead, material other than galvanized	Non-lead
Non-lead	Lead Status Unknown	Lead Status Unknown

Non-lead, but system is unable to demonstrate it was not previously Lead	Galvanized Requiring Replacement	Galvanized Requiring Replacement
Lead Status Unknown	Lead	Lead
Lead Status Unknown	Galvanized Requiring Replacement	Galvanized Requiring Replacement
Lead Status Unknown	Non-lead	Lead Status Unknown
Lead Status Unknown	Lead Status Unknown	Lead Status Unknown

(B) A full service line replacement is counted where a non-lead service line is installed for use and the lead or galvanized requiring replacement service line is disconnected from the water main or other service line. If the lead or galvanized requiring replacement service line is disconnected from the water main or system-owned portion of the service line but not removed, the water system must be subject to a State or local law or have a written policy to preclude the water system from reconnecting the lead or galvanized requiring replacement service line to the water main or other service line.

(C) A full service line replacement may be counted where a system physically disconnects a service line that is not in use and the water system does not install a new non-lead service line because there is no service line in use (e.g., at an abandoned property). If the disconnected lead or galvanized requiring replacement service line is not removed, the water system must be subject to a State or local law or have a written policy to preclude the water system from reconnecting the disconnected service line (i.e., a new non-lead service line must be installed if active use is to resume).

(D) Water systems must not count the following as a full service line replacement for purposes of this rule:

(*1*) Where the service line is partially replaced as defined in § 141.2.

(*2*) Where a lead, galvanized requiring replacement, or unknown service line is determined to be a non-lead service line.

(*3*) Where only a lead connector is replaced.

(*4*) Where pipe lining or coating technologies are used while the lead or galvanized requiring replacement service line remains in use.

(7) Where a water system conducts a full lead or galvanized requiring replacement service line replacement, the system must comply with the notification and mitigation requirements specified in paragraph (h)(3) of this section.

(e) *Replacement of lead connectors when encountered by a water system*. (1) The water system must replace any lead connector when encountered during planned or unplanned water system infrastructure work unless the connector is not under the control of the system (e.g., where the system does not or cannot obtain access to conduct the connector replacement).

(i) Upon replacement of any connector that is attached to a lead or galvanized requiring replacement service line, the water system must follow risk mitigation procedures for disturbances as specified in § 141.85(g)(2).

(ii) Following replacement of a lead connector, the water system must include the replaced lead connector in its inventory in accordance with paragraph (b)(2) of this section.

(2) The water system must comply with any State or local laws that require additional connectors to be replaced.

(f) *Replacement of a service line prompted by the customer*. (1) If State or local laws or water tariff agreements do not prevent customers from conducting partial lead or galvanized requiring replacement service line replacements ("customer-initiated replacements"), the water system must meet the following requirements:

(i) If the water system is notified by the customer that the customer intends to conduct a partial lead or galvanized requiring replacement service line replacement, the water system must:

(A) Replace the remaining portion of the lead or galvanized requiring replacement service line at the same time as, or as soon as practicable after, the customer-initiated replacement, but no later than 45 days from the date of the customer-conducted a partial replacement;

(B) Provide notification and risk mitigation measures in accordance with paragraph (h) of this section, as applicable, before the affected service line is returned to service; and

(C) Notify the State within 30 days if it fails to meet the deadline in paragraph (f)(1)(i)(A) of this section and complete the replacement no later than 180 days of the date of the customer-initiated replacement.

(ii) If the water system is notified or otherwise learns that a customer-initiated replacement occurred within the previous six months and left in place the system-owned portion of a lead or galvanized requirement replacement service line, the water system must:

(A) Replace any remaining portion of the affected service line within 45 days from the day of becoming aware of the customer-initiated replacement; and

(B) Provide notification and risk mitigation measures in accordance with paragraph (h) of this section within 24 hours of becoming aware of the customer replacement.

(iii) When a water system is notified or otherwise learns of a customer-initiated replacement of a lead or galvanized requiring replacement service line that occurred more than six months in the past, this rule does not require the water system to complete the lead or galvanized requiring replacement service line replacement of the system-owned portion under this paragraph (f). However, the remaining portion of the lead or galvanized requiring replacement service line must be identified in the inventory in accordance with paragraph (b) of this section and replaced in accordance with paragraph (d) of this section.

(g) *Requirements for conducting partial service line replacements*—(1) *Partial service line replacement*. This rule prohibits water systems from conducting a partial lead service line replacement or a partial galvanized requiring replacement service line replacement as defined under § 141.2 unless it is conducted as part of an emergency repair or in coordination with planned infrastructure work, excluding planned infrastructure work solely for the purposes of lead or galvanized requiring replacement service line replacement. Where a water system conducts partial service line replacement, the system must comply with the notification and mitigation requirements specified in paragraphs (h)(1) and (2) of this section.

(i) Whenever a water system conducts a partial replacement of a lead or galvanized requiring replacement service line, the system must include a dielectric coupling separating the remaining service line and the replaced service line (i.e., newly installed service line) to prevent galvanic corrosion unless the replaced service line is made of plastic.

(ii) [Reserved]

(h) *Protocols for notification and mitigation for partial and full service line replacements*. (1) Notification and mitigation requirements for partial service line replacement.

Whenever a water system plans to partially replace a lead or galvanized requiring replacement service line in coordination with planned infrastructure work, the water system must provide written notice to the owner of the affected service line, or the owner's authorized agent, as well as non-owner occupant(s) served by the affected service line at least 45 days prior to the replacement. The notice must explain that the system is planning to replace only a portion of the line (the portion of the line under control of the system) and offer to replace the remaining portion of the service line.

(i) Before the affected service line is returned to service, the water system must provide written notification that explains that consumers may experience a temporary increase of lead levels in their drinking water due to the replacement and that meets the content requirements of § 141.85(a)(1)(ii) through (iv) and contact information for the water system. In instances where multi-family dwellings or multiple non-residential occupants are served by the affected service line to be partially replaced, the water system may elect to post the information at a conspicuous location instead of providing individual written notification to all residents or non-residential occupants.

(ii) The water system must provide written information about a procedure for consumers to flush service lines and premise plumbing of particulate lead following partial replacement of a lead or galvanized requiring replacement service line before the affected service line is returned to service.

(iii) The water system must provide the consumer with a pitcher filter or point-of-use device certified by an American National Standards Institute accredited certifier to reduce lead, six months of replacement cartridges, and instructions for use before the affected service line is returned to service. If the affected service line serves more than one residence or non-residential unit (e.g., a multi-unit building), the water system must provide a pitcher filter or point-of-use device, six months of replacement cartridges and use instructions to every residential and non-residential unit in the building.

(iv) The water system must offer to collect a follow up tap sample between three months and six months after the completion of any partial replacement of a lead service line. The tap sample must be a first- and fifth-liter paired sample after at least six hours of stagnation, following the sample protocol under § 141.86(b). The water system must provide the results of the sample to the persons served by the service line in accordance with § 141.85(d).

(2) Notification and mitigation requirements for emergency partial service line replacement. Any water system that creates a partial replacement of a lead or galvanized requiring replacement service line due to an emergency repair must provide notice and risk mitigation measures to the persons served by the affected service line in accordance with paragraphs (h)(1)(i) through (iv) of this section before the affected service line is returned to service. The water system must offer to replace the partial service line created by the emergency repair within 45 days.

(3) Notification and mitigation requirements for full service line replacement. Any water system that conducts a full lead or galvanized requiring replacement service line replacement must provide written notice to the owner of the affected service line, or the owner's authorized agent, as well as non-owner resident(s) or non-residential occupant(s) served by the affected service line as soon as possible but no longer than 24 hours following completion of the replacement.

(i) The written notification must explain that consumers may experience a temporary increase of lead levels in their drinking water due to the replacement and must meet the content requirements of § 141.85(a)(1)(ii) through (iv) as well as contact information for the water system. In instances where multi-family dwellings or multiple non-residential occupants are served by the lead or galvanized requiring replacement service line to be replaced, the water system may elect to post the information at a conspicuous location instead of providing individual written notification to all persons served in residential and non-residential units.

(ii) The water system must provide written information about a procedure for customers to flush service lines and premise plumbing of particulate lead following full replacement of a lead or galvanized requiring replacement service line before the replaced service line is returned to service.

(iii) The water system must provide the consumer with a pitcher filter or point-of-use device certified by an American National Standards Institute accredited certifier to reduce lead, six months of replacement cartridges, and instructions for use before the replaced service line is returned to service. If the lead service line serves more than one residence or non-residential unit (e.g., a multi-unit building), the water system must provide a pitcher filter or point-of-use device, six months of replacement cartridges and instructions for use to every residential and non-residential unit in the building.

(iv) The water system must offer to the consumer to take a follow up tap sample between three months and six months after completion of any full replacement of a lead or galvanized requiring replacement service line. The tap sample must be a first-liter sample after at least six hours of stagnation, following the sample protocol under § 141.86(b). The water system must provide the results of the sample to the consumer in accordance with § 141.85(d).

(i) *Reporting to demonstrate compliance to the State*. To demonstrate compliance with paragraphs (a) through (h) of this section, a water system must report to the State the information specified in § 141.90(e).

7. Amend § 141.85 by:

a. Revising the introductory text, paragraph (a)(1) introductory text, and paragraphs (a)(1)(i) and (ii), (a)(1)(iii)(B), and (a)(1)(iv)(A) through (E);

b. Adding paragraphs (a)(1)(iv)(F) through (H);

c. Revising paragraphs (a)(1)(vi) through (vii);

d. Removing and reserving paragraph (a)(2);

e. Revising paragraphs (b) through (e);

f. Removing and reserving paragraph (f); and

g. Revising paragraphs (g) through (j).

The revisions and additions read as follows:

§ 141.85 Public education and supplemental monitoring and mitigation requirements.

A water system that exceeds the lead action level based on tap water samples collected in accordance with § 141.86 must distribute the public education materials contained in paragraph (a) of this section in accordance with the delivery requirements in paragraph (b) of this section. Water systems that exceed the lead action level must offer to sample the tap water of any customer who requests it in accordance with paragraph (c) of this section. Water systems must offer to sample for lead in the tap water of any person served by a lead, galvanized requiring replacement, or lead status unknown service line who requests it in accordance with paragraph

(c) of this section. All water systems must deliver a consumer notice of lead tap water monitoring results and copper tap water monitoring results to persons served by the water system at sites that are sampled, as specified in paragraph (d) of this section. A water system with lead, galvanized requiring replacement, or lead status unknown service lines must deliver public education materials to persons with a lead, galvanized requiring replacement, or lead status unknown service line as specified in paragraphs (e) through (g) of this section. All community water systems that fail to meet the minimum replacement rate for mandatory service line replacement as required under § 141.84(d) must conduct outreach activities as specified in paragraph (h) of this section. All community water systems must conduct annual outreach to local and State health agencies as outlined in paragraph (i) of this section. Water systems with multiple lead action level exceedances, as specified in paragraph (j)(1) of this section, must conduct annual public outreach and make filters certified to reduce lead available as specified in paragraphs (j)(2) through (6) of this section. For water systems serving a large proportion of consumers with limited English proficiency, as determined by the State, all public education materials required under § 141.85 must comply with the language requirements in paragraph (b)(1) of this section.

(a) *Content of written public education materials*—(1) *Community water systems and non-transient non-community water systems*. Water systems must include the following elements in written materials (e.g., brochures and pamphlets) in the same order as listed in paragraphs (a)(1)(i) through (vii) of this section. In addition, language in paragraphs (a)(1)(i), (ii), and (vii) of this section must be included in the materials, exactly as written, except for the text in brackets for which the water system must include system-specific information. States may approve changes to the content requirements if the State determines the changes are more protective of human health. Any additional information presented by a water system must be consistent with the information in paragraphs (a)(1)(i) through (vii) of this section and be in plain language that can be understood by the general public. Water systems must submit a copy of all written public education materials to the State prior to delivery. The State may require the system to obtain approval of the content of written public education materials prior to delivery.

(i) *Important information about lead in your drinking water*.

Figure 1 to Paragraph (a)(1)(i)

IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER

[INSERT NAME OF WATER SYSTEM] found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant people and young children. Please read this information closely to see what you can do to reduce lead in your drinking water.

(ii) *Health effects of lead*.

Figure 2 to Paragraph (a)(1)(ii)

There is no safe level of lead in drinking water. Exposure to lead in drinking water can cause serious health effects in all age groups, especially pregnant people, infants (both formula-fed and breastfed), and young children. Some of the health effects to infants and children include decreases in IQ and attention span. Lead exposure can also result in new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more information about your risks.

(iii) * * *

(B) Explain possible sources of lead in drinking water and how lead enters drinking water. Include information on home/building plumbing materials, service lines, and connectors that may contain lead and information about the definition of lead free as provided in Safe Drinking Water Act section 1417 of 1986 and as subsequently revised in 2011.

* * * * *

(iv) * * *

(A) Explain that using a filter, certified by an American National Standards Institute accredited certifier to reduce lead, is effective in reducing lead exposures. If the system makes filters available in accordance with paragraph (j)(2) of this section, also include information on how the consumer can obtain a filter.

(B) Encourage running the water to flush out the lead. Explain that lead levels increase over time as water sits in lead-containing plumbing materials and regular water usage in the building can reduce lead levels in drinking water. Advise consumers served by lead and galvanized requiring replacement service lines that they may need to flush the water for longer periods.

(C) Explain concerns with using hot water from the tap and specifically caution against the use of hot water for preparing baby formula.

(D) Explain that boiling water does not reduce lead levels.

(E) Encourage regular cleaning of faucet aerators.

(F) Discuss other steps consumers can take to reduce exposure to lead in drinking water, especially for pregnant persons, infants, and young children, such as using alternative sources of water.

(G) Suggest that parents have their child's blood tested for lead. Provide contact information for the State and/or local health department.

(H) Tell consumers how to get their water tested, including information in accordance with paragraph (c) of this section.

* * * * *

(vi) *Information on lead, galvanized requiring replacement, and unknown service lines.* For systems with lead, galvanized requiring replacement, or lead status unknown service lines in the system's inventory pursuant to § 141.84(a) and (b), public education materials must meet the requirements of paragraphs (a)(1)(vi)(A) through (G) of this section. For systems with known lead connectors or unknown connectors in the system's inventory pursuant to § 141.84(a) and (b), public education materials must meet the requirements of paragraph (a)(1)(vi)(C) of this section:

(A) Discuss opportunities to replace lead and galvanized requiring replacement service lines;

(B) Discuss opportunities to have the material of a lead status unknown service line identified;

(C) Include information on how to obtain a copy of the service line inventory or view the inventory on the internet if the system is required to make the inventory available online so the consumer can find out if they are served by a lead, galvanized requiring replacement, or lead status unknown service line, or known lead connector or unknown connector;

(D) Include information on how to obtain a copy of the service line replacement plan or view the plan on the internet if the system is required to make the service line replacement plan available online;

(E) Include information about programs that provide financing solutions to assist property owners with replacement of their portion of a lead or galvanized requiring replacement service line; and

(F) Include a statement that the water system is required to replace its portion of a lead or galvanized requiring replacement service line when the property owner notifies the water system that they are replacing their portion of the lead or galvanized requiring replacement service line.

(G) Include a statement that provides instructions for the customer to notify the water system if they disagree with the service line material categorization in the inventory.

(vii) *More information about lead.*

Figure 3 to Paragraph (a)(1)(vii)

For more information, call us at [INSERT WATER SYSTEM PHONE NUMBER] [(IF APPLICABLE), or visit our website at [INSERT WATER SYSTEM WEBSITE]]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's website at *https://www.epa.gov/lead* or contact your health care provider.

* * * * *

(b) *Timing, format, and delivery method of public education materials*. (1) For water systems serving a large proportion of consumers with limited English proficiency, as determined by the State, all public education materials required under this section must contain information in the appropriate language(s) regarding the importance of the materials and contain a telephone number, address, or contact information where such consumers may obtain a translated copy of the public education materials or assistance in the appropriate language, or the materials must be in the appropriate language.

(2) Each time a community water system exceeds the lead action level based on tap water samples collected in accordance with § 141.86, the system must conduct the public education tasks under this section within 60 days after the end of the tap sampling period in which the exceedance occurred. For systems that are on standard monitoring, the end of the tap sampling period is June 30 or December 31. For systems that are required to conduct monitoring annually or less frequently, the end of the tap sampling period is September 30 of the calendar year in which the sampling occurs, or, if the State has established an alternate four-month tap sampling period, the last day of that period.

(i) Deliver written materials meeting the content requirements of paragraph (a) of this section to each customer receiving a bill and to other service connections to which water is delivered by the water system. In the case of multi-family dwellings, the water system must deliver the written materials to each unit or post the information at a conspicuous location.

(ii)(A) Contact customers who are most at risk by delivering education materials that meet the content requirements of paragraph (a) of this section to local public health agencies even if they are not located within the water system's service area, along with an informational notice that encourages distribution to all of the agencies' potentially affected customers or community water system's users. The water system must contact the local public health agencies directly by phone, email, or in person. If local public health agencies provide a specific list of additional community-based organizations serving populations at greatest risk from lead exposure (e.g., pregnant people, children), including organizations outside the service area of the water system, then the system must deliver education materials that meet the content requirements of paragraph (a) of this section to all organizations on the provided lists.

(B) Contact customers who are most at risk by delivering materials that meet the content requirements of paragraph (a) of this section to the following organizations listed in paragraphs (b)(2)(ii)(B)(*1*) through (*7*) of this section that are located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users:

(*1*) Schools, child care facilities, and school boards.

(*2*) Women, Infants and Children (WIC) and Head Start programs.

(*3*) Public and private hospitals and medical clinics.

(*4*) Pediatricians.

(*5*) Family planning clinics.

(*6*) Local welfare agencies.

(*7*) Obstetricians-Gynecologists and Midwives.

(iii) No less often than quarterly, provide information with each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the statement in figure 4 to this paragraph exactly as written except for the text in brackets for which the water system must include system-specific information: The message or delivery mechanism can be modified in consultation with the State; specifically, the State may allow a separate mailing of public education materials to customers if the water system cannot place the information on water bills.

Figure 4 to Paragraph (b)(2)(iii)

[INSERT NAME OF WATER SYSTEM] found elevated levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information please call [INSERT NAME OF WATER SYSTEM] [or visit (INSERT YOUR WEBSITE)].

(iv) Post material meeting the content requirements of paragraph (a) of this section on the water system's web site if the system serves a population greater than 50,000. The system must retain material on the web site for as long as the system exceeds the action level.

(v) Submit a press release to media outlets including newspaper, television, and radio stations. The submitted press release must state the water system found elevated levels of lead in drinking water in some homes/buildings and meet the content requirements of paragraph (a) of this section.

(vi) Implement at least three additional activities from one or more categories listed below. The educational content and selection of these activities must be determined in consultation with the State.

(A) Public Service Announcements.

(B) Paid advertisements.

(C) Public Area Information Displays.

(D) E-mails to customers.

(E) Public Meetings.

(F) Household Deliveries.

(G) Targeted Individual Customer Contact.

(H) Direct material distribution to all multi-family homes and institutions.

(I) Contact organizations representing plumbers and contractors to provide information about lead in drinking water, sources of lead, and the importance of using lead free plumbing materials.

(J) Other methods approved by the State.

(vii) [Reserved]

(3) A community water system must repeat the activities in paragraph (b)(2) of this section until the system is at or below the lead action level based on tap water samples collected in accordance with § 141.86. These repeated activities must be completed within 60 days of the end of each tap sampling period. A calculated 90th percentile level at or below the lead action level based on fewer than the minimum number of required samples under § 141.86 cannot be used to meet the requirements of this provision.

(4) Within 60 days after the end of each tap sampling period in which a lead action level exceedance occurs, a non-transient non-community water system must deliver the public education materials specified by paragraph (a) of this section as follows:

(i) Post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system until the system is at or below the lead action level based on tap water samples collected in accordance with § 141.86; and

(ii) Distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The State may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

(iii) For systems that are on standard monitoring, the end of the tap sampling period is June 30 or December 31. For systems that are required to conduct monitoring annually or less frequently, the end of the tap sampling period is September 30 of the calendar year in which the sampling occurs, or, if the State has established an alternate tap sampling period, the last day of that period.

(5) A non-transient non-community water system must repeat the tasks contained in paragraph (b)(4) of this section until the system is at or below the lead action level based on tap water samples collected in accordance with § 141.86. These repeated activities must be completed within 60 days of the end of each tap sampling period. A calculated 90th percentile level at or below the lead action level based on fewer than the minimum number of required samples under § 141.86 cannot be used to meet the requirements of this provision.

(6) A water system may discontinue delivery of public education materials if the system is at or below the lead action level during the most recent six-month tap sampling period conducted pursuant to § 141.86. Such a system must recommence public education in

accordance with this section if it subsequently exceeds the lead action level during any tap sampling period.

(7) A water system may request an extension from the State, in writing, to complete the activities in paragraph (b)(2)(ii) through (vi) of this section as follows:

(i) The extension must be approved in writing by the State before the 60-day deadline;

(ii) The State may only grant the extension on a case-by-case basis if the system has demonstrated that it is not feasible to complete the activities in (b)(2)(ii) through (vi) of this section;

(iii) The activities in paragraph (b)(2) of this section must be completed no later than six months after the end of the tap sampling period in which the exceedance occurred.

(8) A community water system meeting the criteria of paragraphs (b)(8)(i) and (ii) of this section may apply to the State, in writing (unless the State has waived the requirement for prior State approval), to perform the tasks listed in paragraphs (b)(4) and (5) of this section in lieu of the tasks in paragraphs (b)(2) and (3) of this section if:

(i) The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point-of-use treatment devices; and

(ii) The system provides water as part of the cost of services provided and does not separately charge for water consumption.

(9) A community water system serving 3,300 or fewer people may limit certain aspects of their public education programs as follows:

(i) With respect to the requirements of paragraph (b)(2)(ii) of this section, a system serving 3,300 or fewer people may limit the distribution of the public education materials required under that paragraph to facilities and organizations served by the system that are most likely to be visited regularly by pregnant people and children.

(ii) With respect to the requirements of paragraph (b)(2)(v) of this section, the State may waive this requirement for systems serving 3,300 or fewer persons as long as the system distributes notices to every household served by the system.

(iii) With respect to the requirements of paragraph (b)(2)(vi) of this section, a system serving 3,300 or fewer must implement at least one of the activities listed in that paragraph.

(c) *Supplemental monitoring and notification of results*. (1) A water system that exceeds the lead action level based on tap samples collected in accordance with § 141.86 must offer to sample for lead in the tap water of any customer who requests it. At sites served by a lead, galvanized requirement replacement, or lead status unknown service line, the water system must offer to collect samples that capture both water in contact with premise plumbing and water in contact with the service line (e.g., first- and fifth-liter samples).

(2) Water systems must offer to sample for lead in the tap water of any person served by a lead, galvanized requiring replacement, or lead status unknown service line who requests it. The water system must offer to collect samples that capture both water in contact with premise plumbing and water in contact with the service line (e.g., first- and fifth-liter samples).

(3) All water systems must provide a notice of the individual tap results from supplemental tap water monitoring carried out under the requirements of paragraph (c) of this section to the persons served by the water system at the specific sampling site from which the

sample was taken (e.g., the occupants of the building where the tap was sampled). Water systems must provide the consumer notice in accordance with the requirements of paragraphs (d)(2) through (4) of this section.

(d) *Notification of results*—(1) *Notice requirement*. All water systems must provide a notice of the individual tap results from any lead and copper tap water monitoring carried out under the requirements of § 141.86 to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the building where the tap was sampled).

(2) *Timing of notification*. A water system must provide the consumer notice as soon as practicable but no later than three calendar days after the water system learns of the tap monitoring results. Notification by mail must be postmarked within three days of the system learning of the tap monitoring results.

(3) *Content*. (i) The consumer notice for lead must include the results of lead tap water monitoring for the tap that was tested, an explanation of the health effects of lead that meets the requirements of paragraph (a)(1)(ii) of this section, a list of steps consumers can take to reduce exposure to lead in drinking water that meets the requirements of paragraph (a)(1)(iv) of this section, and contact information for the water utility. The notice must also provide the maximum contaminant level goal and the action level for lead and the definitions for these two terms from § 141.153(c).

(ii) The consumer notice for copper must include the results of copper tap water monitoring for the tap that was tested, an explanation of the health effects of copper as provided in appendix B to subpart Q of this part, a list of steps consumers can take to reduce exposure to copper in drinking water, and contact information for the water utility. The notice must also provide the maximum contaminant level goal and the action level for copper and the definitions for these two terms from § 141.153(c).

(4) *Delivery*. Water systems must provide consumer notice to persons served at the tap that was sampled. The notice must be provided electronically (e.g., email or text message), by phone, hand delivery, by mail, or another method approved by the State. For example, upon approval by the State, a non-transient non-community water system could post the results in a conspicuous area, such as on a bulletin board, in the facility to allow users to review the information. Water systems that choose to deliver the notice to consumers electronically or by phone must follow up with a written notice to consumers hand delivered or postmarked within three days of the water system learning of the tap monitoring results. The notices of lead and copper tap sampling results may be combined in one notice.

(e) *Notification of service line that is known to or may potentially contain lead*—(1) *Notification requirements*. All water systems with lead, galvanized requiring replacement, or lead status unknown service lines in their inventory pursuant to § 141.84(a) and (b) must provide notification of a service line that is known to or may potentially contain lead to customers and all persons served by the water system at the service connection with a lead, galvanized requiring replacement, or lead status unknown service line.

(2) *Timing of notification*. A water system must provide notification no later than 30 days of completion of the baseline inventory required under § 141.84(a)(2) and repeat the notification no later than 30 days after the deadline for each annual update to the service line inventory under § 141.90(e)(4) until the entire service connection is no longer a lead, galvanized requiring

replacement, or lead status unknown service line. For notifications to new customers, water systems must provide the notice at the time of service initiation.

(3) *Content*—(i) *Persons served by a confirmed lead service line or galvanized requiring replacement service line*. The notice must include:

(A) A statement that the person's service line is lead or galvanized requiring replacement as applicable.

(B) An explanation of the health effects of lead that meets the requirements of paragraph (a)(1)(ii) of this section.

(C) Steps persons at the service connection can take to reduce exposure to lead in drinking water that meet the requirements of paragraph (a)(1)(iv) of this section.

(D) A statement that the customer can request to have their tap water sampled in accordance with paragraph (c) of this section.

(E) Include information on how to obtain a copy of the service line replacement plan or view the plan on the internet if the system is required to make the service line replacement plan available online.

(F) Information about opportunities to replace lead and galvanized requiring replacement service lines. Where customer payment for a portion of the replacement is required by State or local law or a water tariff agreement, the notice must include information about programs that provide financing solutions to assist property owners with replacement of their portion of a lead or galvanized requiring replacement service line.

(G) A statement that the water system is required to replace its portion of a lead or galvanized requiring replacement service line when the property owner notifies the water system that they are replacing their portion of the lead or galvanized requiring replacement service line.

(H) A statement that provides instructions for the customer to notify the water system if they disagree with the service line material categorization in the inventory.

(ii) *Persons served by a lead status unknown service line*. The notice must include a statement that the person's service line material is unknown but may be lead, the information in paragraphs (e)(3)(i)(B) through (E) of this section, and information about opportunities to verify the material of the service line.

(4) *Delivery*. The notice must be provided to customers and persons served by the water system at the service connection with a lead, galvanized requiring replacement, or lead status unknown service line, by mail or by another method approved by the State.

* * * * *

(g) *Notification due to a disturbance to a service line that is known to or may potentially contain lead*. (1) Water systems that cause disturbance to a lead, galvanized requiring replacement, or lead status unknown service line must provide customers and the persons served by the water system at the service connection with information about the potential for elevated lead levels in drinking water as a result of the disturbance. Actions taken by a water system that cause a disturbance include actions that result in a shut off or bypass of water to an individual service line or a group of service lines (e.g., operating a valve on a service line or meter setter, or reconnecting a service line to the main), or other actions that cause a disturbance to a service line or group of service lines, such as undergoing physical action or vibration that could result in pipe scale dislodging and associated release of particulate lead. The provided information must include:

(i) Public education materials that meet the content requirements in paragraphs (a)(1)(ii) through (iv) of this section and contact information for the water system; and

(ii) Instructions for a flushing procedure to remove particulate lead.

(2) If the disturbance of a lead, galvanized requiring replacement, or lead status unknown service line results from the replacement of an inline water meter, a water meter setter, or connector, the water system must provide the person served by the water system at the service connection with the information in paragraph (g)(1)(i) of this section and a pitcher filter or point-of-use device certified by an American National Standards Institute accredited certifier to reduce lead, instructions to use the filter, and six months of filter replacement cartridges.

(3) The water system must comply with the requirements in this paragraph (g) before any service line that has been shut off or bypassed is returned to service. Where there was a disturbance, but service was not shut off or bypassed, the water system must comply with the requirements in this paragraph (g) as soon as possible, but not to exceed 24 hours following the disturbance.

(4) A water system that conducts a partial or full replacement of a lead or galvanized requiring replacement service line must follow procedures in accordance with the requirements in § 141.84(h). Partial or full replacement of a lead or galvanized requiring replacement service line is not considered a "disturbance" for purposes of this paragraph (g).

(h) *Outreach activities for failure to meet the lead service line replacement rate*. (1) Water systems that do not meet the service line replacement rate calculated across a rolling three-year period as required under § 141.84(d) must conduct at least one outreach activity listed below to discuss their mandatory service line replacement program and opportunities for replacement and to distribute public education materials that meet the content requirements in paragraph (a) of this section except paragraphs (a)(1)(i) and (v) of this section. The water system must conduct the activity in the year following the deadline for calculating the rolling average and annually thereafter until the water system meets the replacement rate or until there are no lead, galvanized requirement replacement, or lead status unknown service lines remaining in the inventory, whichever occurs first.

(2) For water systems serving more than 3,300 persons, the outreach activity must be one of the activities identified in paragraphs (h)(2)(i) through (iv) of this section unless the water system conducts two activities listed in paragraphs (h)(2)(v) through (viii) of this section. If the water system serves 3,300 persons or fewer, the outreach activity must be one of the activities identified in paragraphs (h)(2)(i) through (viii) of this section.

(i) Conduct a townhall meeting.

(ii) Participate in a community event to provide information about its service line replacement program.

(iii) Contact customers by phone, text message, email, or door hanger.

(iv) Use another method approved by the State to discuss the service line replacement program and opportunities for lead and galvanized requiring replacement service line replacement.

(v) Send certified mail to customers and all persons served by the water system at the service connection with a lead or galvanized requiring replacement service line to inform them about the water system's service line replacement program and opportunities for replacement of the service line.

(vi) Conduct a social media campaign.

(vii) Conduct outreach via the media including newspaper, television, or radio.

(viii) Visit targeted customers (e.g., customers in areas with lower service line replacement participation rates) to discuss the service line replacement program and opportunities for replacement.

(i) *Public education to local and State health agencies*—(1) *Distribution System and Site Assessment results*. All community water systems must provide information to local and State health agencies about distribution system and site assessment activities conducted in accordance with § 141.82(j) including the location of the tap sample site that exceeded 0.010 mg/L, the result of the initial tap sample, the result of the follow up tap sample, the result of water quality parameter monitoring, and any distribution system management actions or corrosion control treatment adjustments made.

(2) *Timing and content*. Community water systems must annually send copies of any public education materials the system was required to provide under paragraphs (b) and (h) of this section in the previous calendar year no later than July 1 of the following year.

(3) *Delivery*. Community water systems must send public education materials and distribution system and site assessment information to local and State health agencies by mail or by another method approved by the State.

(j) *Additional requirements for water systems with multiple lead action level exceedances*. (1) A water system that exceeds the lead action level at least three times in a rolling five-year period, based on tap water samples collected in accordance with § 141.86, must conduct the activities in this section. The first rolling five-year period ends five years after the compliance date in § 141.80(a)(3) and is assessed every six months thereafter. If a water system exceeds the lead action level at least three times within the first five-year period, the system must conduct these actions upon the third action level exceedance even if the first rolling five-year period has not elapsed.

(2) No later than 60 days after the tap sampling period in which a water system meets the criteria of paragraph (j)(1) of this section, a water system must make available to all consumers pitcher filters or point-of-use devices certified by an American National Standards Institute accredited certifier to reduce lead, six months of replacement cartridges, and instructions for use. A water system must continue to make replacement cartridges available until the system may discontinue actions in accordance with paragraph (j)(6) of this section.

(3) No later than 30 days after a water system meets the criteria of paragraph (j)(1) of this section for the first time, the water system must submit a filter plan to the State, and the State must review and approve the plan within 15 days. If the water system subsequently meets the criteria of paragraph (j)(1) again, the water system is not required to submit the filter plan again unless requested by the State or if the system has made updates to the plan. The plan must include:

(i) A description of which methods the system will use to make filters and replacement cartridges available in accordance with paragraph (j)(2) of this section (e.g., operating distribution facilities, delivering filters when requested by the consumer); and

(ii) A description of how the system will address any barriers to consumers obtaining filters.

(4) A water system that meets the criteria of paragraph (j)(1) of this section must conduct a community outreach activity to discuss the multiple lead action level exceedances, steps the system is taking to reduce lead in drinking water, measures consumers can take to reduce their risk consistent with the content requirements of paragraph (a)(1)(iv) of this section, and how to obtain a filter certified to reduce lead as required in paragraph (j)(2) of this section. This activity is in addition to the public education activities required under paragraph (b)(2) of this section for community water systems, and under paragraph (b)(4) of this section for non-transient non-community water systems, that exceed the lead action level. The water system must conduct at least one activity from the following list beginning in the monitoring period after the most recent lead action level exceedance. The water system must conduct at least one activity every six months until the system no longer meets the criteria of paragraph (j)(1) of this section.

(i) Conduct a townhall meeting.

(ii) Participate in a community event where the system can make information about ongoing lead exceedances available to the public.

(iii) Contact customers by phone, text message, email, or door hanger.

(iv) Conduct a social media campaign.

(v) Use another method approved by the State.

(5) A water system that is already conducting an outreach activity listed in paragraph (j)(4) of this section in order to meet the requirements of paragraph (h) of this section may

conduct one activity that meets the requirements of both paragraphs, unless otherwise directed by the State.

(6) A water system may discontinue the requirements of this paragraph (j) when the system no longer has at least three lead action level exceedances in a rolling five-year period, based on tap water samples collected in accordance with § 141.86. A calculated 90th percentile level at or below the lead action level based on fewer than the minimum number of required samples under § 141.86 cannot be used to meet the requirements of this provision.

8. Revise § 141.86 to read as follows:

§ 141.86 Monitoring requirements for lead and copper in tap water.

All water systems must sample for lead and copper at taps used to provide water for human consumption in accordance with the requirements of this section.

(a) *Sample site location*. (1) By the start of the first tap monitoring period in which sampling for lead and copper is required under paragraphs (c) and (d) of this section, each water system must identify potential tap sampling sites and submit a site sample plan to the State as required in § 141.90(a)(1)(i). Each water system must identify a pool of tap sampling sites that allows the water system to collect the number of lead and copper tap samples required in paragraphs (c) and (d) of this section.

(i) To select sampling sites, a water system must use information on lead, copper, and galvanized iron or steel that is required to be identified under § 141.42(d) for a materials evaluation and the information on service line and connector material that is required to be collected under § 141.84.

(ii) Water systems must select sampling sites from the highest tier available, in accordance with paragraph (a)(4) of this section.

(iii) Sampling sites cannot include sites with installed point-of-entry (POE) treatment devices or taps with point-of-use (POU) devices designed to remove inorganic contaminants, except in water systems using these devices at all service connections for primary drinking water taps to meet other primary and secondary drinking water standards.

(2) A water system that has fewer than five drinking water taps that can be used for human consumption meeting the sample site criteria of this paragraph (a) to reach the required number of sample sites listed in paragraphs (c) and (d) of this section, must collect at least one sample from each tap and collect additional samples from those taps on different days during the tap sampling period to meet the required number of sites. Alternatively, the State may allow these water systems to collect a number of samples less than the number of sites specified in paragraphs (c) and (d) of this section, provided that 100 percent of all taps that can be used for human consumption are sampled. The State must approve this reduction of the minimum number of samples in writing based on a request from the system or onsite verification by the State. States may specify sampling locations when a system is conducting reduced monitoring.

(3) A water system serving sites with premise plumbing made of lead and/or that are served by a lead service line must collect all samples for monitoring under this section from sites with premise plumbing made of lead and/or are served by a lead service line. A water system that cannot identify enough sampling sites with premise plumbing made of lead and/or are served by lead service lines must still collect samples from every site containing lead pipes and/or served by a lead service line and collect the remaining samples in accordance with tiering requirements under paragraph (a)(4) of this section.

(4) Sampling sites must be selected from the highest tier available (Tier 1 is the highest tier and Tier 5 is the lowest tier). A system without a large enough number of sites from a higher tier to meet the number of sites required in paragraphs (c) and (d) of this section may include sites from the next highest tier. For water systems where Tier 2 sites comprise at least 20 percent of the residential structures served by the community water system, then Tier 2 sites may be included along with Tier 1 sites.

(i) Tier 1 sampling sites are single-family structures with premise plumbing made of lead and/or are served by a lead service line.

(ii) Tier 2 sampling sites are buildings, including multiple-family residences, with premise plumbing made of lead and/or served by a lead service line.

(iii) Tier 3 sampling sites are sites that are served by a lead connector. Tier 3 sites are also sites served by a galvanized service line or containing galvanized premise plumbing that are identified as ever being downstream of a lead service line or lead connector in the past. Tier 3 for community water systems only includes single-family structures.

(iv) Tier 4 sampling sites are sites that contain copper pipes with lead solder installed before the effective date of the State's applicable lead ban. Tier 4 for community water systems only includes single-family structures.

(v) Tier 5 sampling sites are sites that are representative of sites throughout the distribution system. For the purpose of this paragraph (a), a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(b) *Sample collection methods*. (1) With the exception of follow-up samples collected under distribution system and site assessment, all tap samples collected for analysis of lead and copper must be one liter in volume and have stood motionless in the plumbing system and/or service line of each sampling site for at least six hours. Bottles used to collect samples for analysis must be wide-mouth one-liter sample bottles. Samples from residential housing must be collected from the cold-water kitchen or bathroom sink tap. Samples from a nonresidential building must be one liter in volume and collected at a tap from which water is typically drawn for human consumption. Samples may be collected by the system, or the system may allow residents to collect samples after instructing the residents of the sampling procedures specified in this paragraph (b)(1). Sample collection instructions provided to customers cannot direct the customer to remove or clean the aerator or flush taps prior to the start of the minimum six-hour stagnation period. To protect residents from injury due to handling nitric acid, samples may be acidified up to 14 days after the sample is collected. After acidification to resolubilize the metals, the sample must stand in the original container for the time specified by the approved EPA method before analysis. If a system allows residents to perform sampling, the system cannot challenge the accuracy of sampling results based on alleged sample collection errors.

(i) The first liter sample must be analyzed for lead and copper at sample sites where both contaminants are required to be monitored. At sample sites where only lead is required to be monitored, the first liter sample may be analyzed for lead only.

(ii) For sites served by a lead service line (Tier 1 and Tier 2 sites), an additional fifth liter sample must be collected at the same time as the first liter sample and must be analyzed for lead. To collect a first liter and fifth liter paired sample, systems must collect tap water in five consecutively numbered, wide-mouth, one-liter sample bottles after the water has stood motionless in the plumbing of each sampling site, including the service line, for at least six hours without flushing the tap prior to sample collection. Systems must collect samples starting with the first sample bottle with each subsequently numbered bottle being filled until the final bottle is filled, with the water running constantly during sample collection. The first liter sample is the first sample collected in this sequence and the fifth liter sample is the final sample collected in this sequence.

(iii) State-approved samples collected pursuant to paragraph (b)(3) of this section must be one liter in volume and must be collected at an interior tap from which water is typically drawn for consumption.

(iv) Follow-up samples for distribution system and site assessment under § 141.82(j) and samples collected following customer requests under § 141.85(c) may use different sample volumes or different sample collection procedures to assess the source of elevated lead. Systems must submit these sample results to the State.

(2) In consecutive monitoring periods, a water system must collect tap samples from the same sampling sites. If a site no longer qualifies under the tiering criteria or if, for reasons beyond the control of the water system, the water system cannot gain entry to a sampling site in order to collect a tap sample, the system must collect the tap sample from another sampling site in its sampling pool that meets the same tiering criteria, and is within reasonable proximity of the original site, where such a site exists. Systems must report any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed, as required in § 141.90(a)(2)(v).

(3) A non-transient non-community water system, or a community water system that meets the criteria of § 141.85(b)(8), that does not have enough taps that can supply first liter samples or first liter and fifth liter paired samples meeting the six-hour minimum stagnation time, as defined in paragraph (b)(1) of this section, may apply to the State in writing to substitute first liter or first liter and fifth liter paired samples that do not meet the six-hour minimum stagnation time. Such systems must collect as many first liter or first liter and fifth liter paired samples from interior taps used for human consumption as possible and must identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The State has the discretion to waive the requirement for prior State approval of sites not meeting the six-hour stagnation time either through State regulation or written notification to the system.

(c) *Standard monitoring*. Standard monitoring is a six-month tap monitoring period that begins on January 1 or July 1.

(1) *Standard monitoring sites.* During a standard tap monitoring period, a water system must collect at least one sample from the number of sites in the following table 1 to this paragraph (c)(1). Standard monitoring sites must be selected in accordance with the sampling tiers identified in paragraph (a) of this section.

Table 1 to Paragraph (c)(1)

System size (number of people served)	Standard number of sites for lead and copper sampling
>100,000	100
10,001 to 100,000	60
3,301 to 10,000	40
501 to 3,300	20

101 to 500	10
≤100	5

(2) *Criteria for standard monitoring*. The following systems must conduct standard monitoring for at least two consecutive tap monitoring periods. Systems may then reduce monitoring in accordance with paragraph (d) of this section.

(i) All water systems with lead, galvanized requiring replacement, and/or lead status unknown service lines, including those deemed optimized under § 141.81(b)(3), and systems that did not conduct monitoring that meets all requirements of this section between **[DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**, and **[DATE 3 YEARS AFTER PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**, must begin its first standard tap monitoring period on January 1 or July 1 following **[DATE 3 YEARS AFTER PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**, whichever is sooner.

(ii) Systems without lead, galvanized requiring replacement, and/or lead status unknown service lines that conducted monitoring meeting all requirements of this section between **[DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]**, and **[DATE 3 YEARS AFTER PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]** must continue monitoring as follows:

(A) Systems that do not meet the reduced monitoring criteria under paragraph (d) of this section must conduct standard monitoring.

(B) Systems that meet the reduced monitoring criteria under paragraph (d) of this section must continue to monitor in accordance with the criteria in paragraph (d).

(iii) Systems meeting the following criteria must resume or continue standard monitoring in the six-month tap monitoring period beginning January 1 or July 1, whichever is sooner, following the monitoring period in which the criteria occur.

(A) Any water system that exceeds a lead or copper action level.

(B) Any system that fails to operate at or above the minimum value or within the range of values for the optimal water quality parameters specified by the State under § 141.82(f) for more than nine days in any monitoring period specified in § 141.87.

(C) Any water system that becomes a large water system without corrosion control treatment or any large water system without corrosion control treatment whose lead 90th percentile exceeds the lead practical quantitation limit of 0.005 mg/L.

(D) Any water system that installs or re-optimizes OCCT as a result of exceeding the lead or copper action level, or any water system that adjusts OCCT following a distribution system and site assessment. The system must continue standard monitoring until the State specifies new optimal water quality parameters.

(E) Any water system for which the State has specified new values for optimal water quality parameters under § 141.82.

(F) Any water system that installs source water treatment pursuant to § 141.83(a)(3).

(G) Any water system that has notified the State in writing in accordance with § 141.90(a)(4) of an upcoming addition of a new source or long-term change in treatment, unless the State determines that the addition of the new source or long-term change in treatment is not significant and, therefore, does not warrant more frequent monitoring.

(d) *Reduced monitoring based on 90th percentile levels*. Reduced monitoring refers to an annual or triennial tap monitoring period. The reduced monitoring frequency is based on the 90th percentile value for the water system.

(1) *Reduced monitoring sites*. During a reduced tap monitoring period, a water system must collect at least one sample from the number of sites specified in table 2 to this paragraph (d)(1), unless otherwise specified. Reduced monitoring sites must be selected in accordance with the sampling tiers identified in paragraph (a) of this section. Lead and copper sampling results under § 141.93(c)(1) cannot be used to meet the criteria for reduced monitoring under this section.

Table 2 to Paragraph (d)(1)

System size (number of people served)	Reduced minimum number of sites for lead and copper sampling
>100,000	50
10,001 to 100,000	30
3,301 to 10,000	20
501 to 3,300	10
101 to 500	5
≤100	5

(2) *Criteria for reduced monitoring*. Systems are eligible for reduced monitoring following two consecutive tap monitoring periods that meet all requirements of this section, including collecting at least the minimum number of required samples. The State may require that a system conduct more frequent monitoring.

(i) Any system that does not exceed the lead and copper action levels for two consecutive six-month tap monitoring periods may reduce the monitoring frequency to annual monitoring.

Systems with an annual tap monitoring period must sample at the standard number of sampling sites for lead in paragraph (c) and the reduced number of sites for copper as specified in this paragraph (d). Systems operating OCCT must also have maintained the range of optimal water quality parameters set by the State in accordance with § 141.82(f) for the same period and receive a written determination from the State approving annual monitoring based on the State's review of monitoring, treatment, and other relevant information submitted by the system as required by § 141.90. For systems that reduce to annual monitoring, the first annual tap monitoring period must begin no later than the calendar year immediately following the last calendar year in which the system sampled.

(ii) Any small or medium water system that does not exceed the lead and copper action levels during three consecutive years of monitoring (standard monitoring completed during both six-month periods of a calendar year will be considered one year of monitoring) may sample at the reduced number of sites for lead and copper in accordance with this paragraph (d) and reduce the monitoring frequency to triennial monitoring. Any such systems operating OCCT must also have maintained the range of optimal water quality parameters set by the State in accordance with § 141.82(f) for the same three-year period and receive a written determination from the State approving triennial monitoring based on the State’s review of monitoring, treatment, and other relevant information submitted by the system as required by § 141.90. For systems that reduce to triennial monitoring, the first triennial tap sampling period must begin no later than three calendar years after the last calendar year in which the system sampled.

(iii) Any water system that demonstrates for two consecutive six-month tap monitoring periods that its 90th percentile lead level, calculated under § 141.80(c)(3), is less than or equal to 0.005 mg/L and the 90th percentile copper level, calculated under § 141.80(c)(3), is less than or equal to 0.65 mg/L may sample at the reduced number of sites for lead and copper in accordance with paragraph (c) of this section and reduce the frequency of monitoring to triennial monitoring. Any such water systems operating OCCT must also have maintained the range of optimal water quality parameters set by the State in accordance with § 141.82(f) for the same period and receive a written determination from the State approving triennial monitoring based on the State's review of monitoring, treatment, and other relevant information submitted by the system as required by § 141.90. For systems that reduce to triennial monitoring, the first triennial tap sampling period must begin no later than three calendar years after the last calendar year in which the system sampled.

(3) *Tap sampling period under reduced monitoring*. Systems monitoring annually or less frequently must use a tap sampling period within the months of June, July, August, or September, unless the State has approved a different tap sampling period in accordance with paragraph (d)(3)(i) of this section. Water systems on triennial monitoring must conduct sampling under a tap sampling period no less frequently than once every three years.

(i) The State may approve a different tap sampling period for conducting the lead and copper tap sampling for systems collecting samples at a reduced frequency. Such a period must be no longer than four consecutive months, within one calendar year, and must represent a time of normal operation where the highest levels of lead are most likely to occur. For a non-transient non-community water system that does not operate during the months of June through September and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the State must designate a period that represents normal operation for the system. The tap sampling period must begin during the period approved or designated by the State in the calendar year immediately following the end of the second six-month tap monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive year of annual monitoring for systems initiating triennial monitoring.

(ii) Systems monitoring annually that have been collecting samples during the months of June through September and that receive State approval to alter their sampling period under paragraph (d)(3)(i) of this section must collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the month of June through September and receive State approval to alter their sampling period as per paragraph (d)(3)(i) of this section must collect their next round of samples during a time period that ends no later than 45 months after the previous tap sampling period. Subsequent monitoring must be conducted annually or triennially, as required by this section.

(iii) Systems with waivers granted pursuant to paragraph (g) of this section that have been collecting samples during the months of June through September and receive State approval to alter their sampling period as per paragraph (d)(3)(i) of this section must collect their next round of samples before the end of the 9-year period.

(e) *Inclusion of lead and copper tap samples for calculation of the 90th percentile*. (1) Water systems and the State must consider the results of any sampling conducted in addition to the minimum number required of this section (e.g., customer-requested sampling conducted in accordance with § 141.85(c)) in making any determinations (i.e., calculating the 90th percentile lead or copper level) under this subpart if the samples meet the requirements of this section.

(2) Water systems with lead service lines that are unable to collect the minimum number of samples from Tier 1 or 2 sites must calculate the 90th percentile using data from all the lead service lines sites and the highest lead and copper values from lower tier sites to meet the specified minimum number of samples. If the minimum number of samples is met by Tier 1 and 2 sites, systems must submit data from additional Tier 3, 4, or 5 sites to the State, but cannot use these results in the 90th percentile calculation. Water systems must include customer-requested samples from known lead service line sites in the 90th percentile calculation if the samples meet the requirements of this section.

(3) Systems cannot include samples collected as part of distribution system and site assessment under § 141.82(j) in the 90th percentile calculation.

(4) Systems cannot include follow-up samples collected as a result of monitoring after service line replacement under § 141.84(h) in the 90th percentile calculation.

(f) *Invalidation of lead and copper tap samples used in the calculation of the 90th percentile*. A sample invalidated under this paragraph (f) does not count towards determining lead or copper 90th percentile levels under § 141.80(c)(3) or towards meeting the minimum monitoring requirements of paragraph (c) or (d) of this section.

(1) The State may invalidate a lead or copper tap water sample if at least one of the following conditions is met:

(i) The laboratory establishes that improper sample analysis caused erroneous results.

(ii) The State determines that the sample was taken from a site that did not meet the site selection criteria for use in the calculation of the 90th percentile under paragraph (a)(4) of this section or was collected in a manner that did not meet the sample collection criteria under paragraph (b)(1) of this section.

(iii) The sample container was damaged in transit.

(iv) There is a substantial reason to believe that the sample was subject to tampering. The system must report the results of all samples to the State and all supporting documentation for samples the system believes should be invalidated.

(2) To invalidate a sample under paragraph (f)(1) of this section, the decision and the rationale for the decision must be documented in writing. States may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.

(3) The water system must collect replacement samples for any samples invalidated under this section if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of paragraph (c) or (d) of this section. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the State invalidates the sample or by the end of the tap sampling period, whichever occurs later. Replacement samples taken after the end of the applicable tap sampling period must not also be used to meet the monitoring requirements of a subsequent tap monitoring period. The replacement samples must be taken at the same locations as the invalidated samples, except when the sample is invalidated due to an error in meeting the site selection criteria, or it is not possible to sample at the same location. The replacement samples must then be taken at locations that meet the site selection criteria other than those locations already used for sampling during the tap monitoring period.

(g) *Monitoring waivers for systems serving 3,300 or fewer persons*. Any water system serving 3,300 or fewer persons that meets the criteria of this paragraph (g) may apply, in writing, to the State to reduce the frequency of monitoring for lead and/or copper to once every nine years if it meets the materials criteria specified in paragraph (g)(1) of this section and the monitoring criteria specified in paragraph (g)(2) of this section. Systems meeting only the criteria for lead may apply for a lead waiver, systems meeting only the criteria for copper may apply for a copper waiver, and systems meeting the criteria for both lead and copper may apply for a full waiver.

(1) *Materials criteria*. The system must demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead-containing materials and/or copper-containing materials, as those terms are defined in this paragraph, as follows:

(i) *Lead*. To qualify for a lead waiver, the water system must provide certification and provide supporting documentation to the State that the system, including the distribution system, is free of all lead-containing materials, as follows:

(A) It contains no plastic pipes which contain lead plasticizers, or plastic service lines which contain lead plasticizers; and

(B) It is free of lead service lines, lead connectors, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless such fittings and fixtures meet the specifications of any standard established pursuant to 42 U.S.C. 300g–6(e) (SDWA section 1417(e)).

(ii) *Copper*. To qualify for a copper waiver, the water system must certify and provide supporting documentation to the State that the system contains no copper premise plumbing or copper service lines.

(2) *Monitoring criteria for waiver issuance*. The system must have completed at least one six-month round of standard tap water monitoring for lead and copper at sites approved by the State and from the number of sites required by paragraph (c) of this section and demonstrate that the 90th percentile levels for any and all rounds of monitoring conducted since the system became free of all lead-containing and/or copper-containing materials, as appropriate, meet the following criteria.

(i) *Lead levels*. To qualify for a lead waiver, the system must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.

(ii) *Copper levels*. To qualify for a copper waiver, the system must demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.

(3) *State approval of waiver application*. The State must notify the system of its waiver determination, in writing, setting forth the basis of its decision and any condition of a waiver that is approved. As a condition of a waiver, the State may require the system to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installing materials that might void the waiver) to avoid lead or copper concentrations of concern in tap water. The water system must continue monitoring for lead and copper at the tap as required by paragraphs (c) and (d) of this section, as appropriate, until it receives written notification from the State that a waiver has been approved.

(4) *Monitoring frequency for systems with waivers*. (i) A system with a full waiver must conduct tap monitoring for lead and copper in accordance with paragraph (d) of this section at least once every nine years. A system with a full waiver must provide the State with the materials certification specified in paragraph (g)(1) of this section for both lead and copper when submitting their tap sample results to the State. Samples collected every nine years must be collected no later than every ninth calendar year.

(ii) A system with a lead waiver or copper waiver must conduct tap monitoring for only the waived contaminant in accordance with paragraph (d) of this section at least once every nine years. A system with a lead waiver or copper waiver must provide the State with the materials certification specified in paragraph (g)(1) of this section for only the waived contaminant when submitting their tap sample results to the State. Also, a system must continue to monitor for the non-waived contaminant in accordance with the requirements of paragraphs (c) and (d) of this section, as appropriate.

(iii) Any water system with a waiver must notify the State in writing in accordance with § 141.90(a)(3) about any upcoming long-term change in treatment or addition of a new source water, as described in that section. The State may add or modify waiver conditions (e.g., require recertification that the system is free of lead-containing and/or copper-containing materials, require additional round(s) of monitoring), if the State deems any modifications are necessary to address treatment or source water changes at the system.

(iv) If a system with a waiver becomes aware that the system is no longer free of lead-containing or copper-containing materials, as appropriate (e.g., as a result of new construction or repairs), the system must notify the State in writing no later than 60 days after becoming aware of such a change.

(5) *Discontinuation of eligibility*. A system with a waiver where any of the following conditions occurs is not allowed to continue monitoring under its waiver:

(i) A system with a full waiver or a lead waiver no longer satisfies the materials criteria of paragraph (g)(1)(i) of this section or has a 90th percentile lead level greater than 0.005 mg/L.

(ii) A system with a full waiver or a copper waiver no longer satisfies the materials criteria of paragraph (g)(1)(ii) of this section or has a 90th percentile copper level greater than 0.65 mg/L.

(iii) The State notifies the system, in writing, that the waiver has been revoked, setting forth the basis of its decision.

(6) *Requirements following waiver revocation*. A system whose waiver is revoked may re-apply for a waiver when it meets the appropriate materials and monitoring criteria of paragraphs (g)(1) and (2) of this section. A system whose waiver is revoked by the State is subject to the following corrosion control treatment and lead and copper tap water monitoring requirements:

(i) If the system exceeds the lead and/or copper action level, the system must implement or re-optimize corrosion control treatment in accordance with the deadlines specified in § 141.81, and any other applicable requirements of this subpart.

(ii) If the system meets both the lead and copper action levels, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sampling sites specified in paragraph (d) of this section.

(7) *Pre-existing waivers*. Waivers approved by the State in writing prior to April 11, 2000, are still in effect in the following instances:

(i) If the system has demonstrated that it is both free of lead-containing and copper-containing materials, as required by paragraph (g)(1) of this section and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of paragraph (g)(2) of this section, the waiver remains in effect if the system does not meet the waiver ineligibility criteria of paragraph (g)(5) of this section. The first round of tap water monitoring conducted pursuant to paragraph (g)(4) of this section must be completed no later than nine years after the last time the system monitored for lead and copper at the tap.

(ii) If the system has met the materials criteria of paragraph (g)(1) of this section but has not met the monitoring criteria of paragraph (g)(2) of this section, the system must conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of paragraph (g)(2) of this section no later than September 30, 2000. Thereafter, the waiver may remain in effect unless the system meets the discontinuation of eligibility criteria of paragraph (g)(5) of this section. The first round of monitoring conducted pursuant to paragraph (g)(4) of this section must be completed no later than nine years after the round of monitoring conducted pursuant to paragraph (g)(2) of this section.

(h) *Public availability of tap monitoring results used in the 90th percentile calculation*. Unless done so by the State, all water systems must make the tap monitoring results, including data used in the 90th percentile calculation under § 141.80(c)(3), publicly available within 60 days of the end of the tap sampling period. Under this rule, water systems are not required to make the addresses of tap sampling sites publicly available.

(1) Large water systems must make the tap monitoring results and associated data publicly available in a digital format.

(2) Small and medium water systems must make the tap monitoring results and associated data publicly available in either a written or digital format.

(3) Water systems must certify to the State, in writing, compliance with this paragraph (h) in accordance with § 141.90(a)(2)(iii) and must retain monitoring data in accordance with the recordkeeping requirements under § 141.91.

9. Revise § 141.87 to read as follows:

§ 141.87 Monitoring requirements for water quality parameters.

All large water systems and all medium water systems with corrosion control treatment (unless deemed optimized under § 141.81(b)(3)), and all small and medium water systems that exceed the lead or copper action level must sample and monitor water quality parameters in addition to lead and copper in accordance with the requirements of this section. Any system may be required to monitor water quality parameters as determined by the State, including as provided in this section.

(a) *General requirements*—(1) *Distribution system samples for water quality parameters*. (i) Distribution system samples collected at water taps must be representative of water quality throughout the distribution system, considering the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling sites under this section can be the same as or different from tap sampling sites targeted for lead and copper sampling under § 141.86(a). Systems may consider selecting sites also used for total coliform sampling under § 141.21(a)(1). Sites selected for tap samples under this section must be included in the site sample plan specified under § 141.90(a)(1). The site sample plan must be updated prior to changes to the sampling locations.

(ii) Samples collected at taps must be analyzed for the following parameters when applicable as specified:

(A) pH;

(B) Alkalinity;

(C) Orthophosphate (as PO_4), when an inhibitor containing an orthophosphate compound is used;

(D) Silica, when an inhibitor containing a silicate compound is used; and

(E) Any parameters specified by the State under § 141.82(a)(1) or (f)(6).

(2) *Entry point samples for water quality parameters*. (i) Samples collected at the entry point(s) to the distribution system must be from locations representative of each source water after treatment. If a system draws water from more than one source water and the source waters are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions when water is representative of all sources typically being used.

(ii) Except as provided in paragraph (b)(3)(ii) of this section for groundwater systems, the following parameters must be measured at each entry point to the distribution system, when applicable as specified:

(A) pH;

(B) When alkalinity is adjusted as part of corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration;

(C) When a corrosion inhibitor is used as part of corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate (as PO_4) or silica (whichever is applicable); and

(D) Any parameters specified by the State under § 141.82(a)(1) or (f)(6).

(b) *Standard monitoring for water quality parameters*—(1) *Number of samples*—(i) *Distribution system samples*. Systems must collect two distribution system samples for applicable water quality parameters during each monitoring period specified under paragraphs (b)(2) through (4) of this section from each of the minimum number of sites listed in Table 5 of this paragraph (b)(1)(i). Systems that collect distribution system samples for water quality parameters from additional sites as a result of the distribution system and site assessment requirements in § 141.82(j) must add those sites to the minimum number of sites listed in Table 5 to this paragraph (b)(1)(i) up to a maximum of not more than twice the minimum number of sites.

Table 1 to Paragraph (b)(1)(i)

System size (number of people served)	Minimum number of sites for water quality parameters
>100,000	25
10,001 to 100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

(ii) *Samples at entry points*. (A) Except as provided in paragraph (b)(3)(iii) of this section for small systems without corrosion control treatment that do not exceed the lead or copper action level, systems without installed or re-optimized OCCT and/or without State-designated optimal water quality parameters required to collect entry point samples must collect a minimum of two entry point samples for each applicable water quality parameter at each entry point to the distribution system at least once during each monitoring period specified in paragraph (b)(2) of this section.

(B) Systems with installed OCCT or re-optimized OCCT and/or State-designated optimal water quality parameters required to collect entry point samples must collect one entry point sample for each applicable water quality parameter at each entry point to the distribution system at least once every two weeks during each monitoring period the system is required to conduct sampling as specified in paragraphs (b)(3) and (4) and (c) of this section.

(2) *Initial sampling for water systems*. A large water system without corrosion control treatment must begin monitoring for water quality parameters as specified in paragraphs (b)(2)(i) and (ii) of this section during the first two six-month monitoring periods beginning no later than January 1 of the calendar year after the system either becomes a large water system or exceeds the PQL for lead. Any medium system without corrosion control treatment that exceeds the lead or copper action level must begin monitoring for applicable distribution system and entry point water quality parameters as specified in paragraphs (b)(2)(i) and (ii) of this section for two consecutive six-month periods beginning the month immediately following the end of the tap monitoring period in which the action level exceedance occurred. Any small water system that exceeds the lead or copper action level must begin monitoring for applicable distribution system and entry point water quality parameters as specified in paragraphs (b)(2)(i) and (ii) of this section for two consecutive six-month periods beginning the month immediately following the end of the tap monitoring period in which the action level exceedance occurred.

(i) At taps, collect two samples for:

(A) pH; and

(B) Alkalinity;

(ii) At each entry point to the distribution system, collect all the applicable parameters listed in paragraph (a)(2)(i) of this section.

(3) *Monitoring after installation of OCCT or re-optimized OCCT*. (i) A system that installs or modifies OCCT pursuant to § 141.81(d)(5) or (e)(5) and is required to conduct follow-up monitoring for lead or copper pursuant to § 141.81(d)(6) or (e)(6) must monitor for applicable tap and distribution system water quality parameters as specified in paragraphs (a)(1) and (2) of this section every six months until the State specifies new water quality parameter values for OCCT pursuant to paragraph (b)(4) of this section. Water systems must collect these samples at a regular frequency throughout the six-month monitoring period to reflect seasonal variability.

(ii) Any groundwater system can limit entry point sampling described in paragraph (a)(2) of this section to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated groundwater sources mixes with water from treated groundwater sources, the system must monitor for water quality parameters both at representative entry points receiving treatment and representative entry points receiving no treatment. Prior to the start of any monitoring under this paragraph, the water system must provide to the State, written information and documentation identifying the selected entry points, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(iii) States may require small systems with corrosion control treatment for which the State has not designated optimal water quality parameters that do not exceed the lead and copper action levels to conduct water quality parameter monitoring as described in paragraph (b) of this section or the State can develop its own water quality control parameter monitoring structure for these systems.

(4) *Monitoring by systems with State-designated optimal water quality parameter values for OCCT*. Monitoring must occur at a regular frequency throughout the monitoring period to reflect seasonal variability and be consistent with the requirements in paragraphs (a)(1) and (2) of this section.

(i) Medium water systems with corrosion control treatment and all large water systems must sample for the applicable water quality parameters specified by the State and determine compliance with the requirements of § 141.82(g) every six months with the first six-month period to begin on either January 1 or July 1, whichever comes first, after the State specifies the optimal values under § 141.82(f).

(ii) A small water system with corrosion control treatment that exceeds the lead and/or copper action level(s) must begin monitoring during the six-month period immediately following the tap monitoring period in which the action level exceedance(s) occurs and continue monitoring until the water system no longer exceeds the lead and/or copper action level(s) and meets the optimal water quality parameters in two consecutive six-month tap monitoring periods under § 141.86(c). For any small water system that is subject to a reduced monitoring frequency pursuant to § 141.86(d) at the time of the action level exceedance, the start of the six-month monitoring period under this paragraph must coincide with the start of the tap monitoring period under § 141.86(c).

(iii) Compliance with State-designated optimal water quality parameter values must be determined as specified under § 141.82(g).

(iv) States have the discretion to require systems described in this paragraph (b)(4)(ii) to continue to monitor optimal water quality parameters.

(c) *Reduced monitoring*. (1) A medium or large water system that maintains the range of values for the water quality parameters reflecting OCCT specified by the State under § 141.82(f) and does not exceed the lead and copper action levels in either of the two consecutive six-month monitoring periods under paragraph (b)(4) of this section must collect two distribution system samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period. These water systems must collect these samples at a regular frequency throughout the six-month monitoring period to reflect seasonal variability. A system meeting these requirements must continue to monitor at the entry point(s) to the distribution system as specified in paragraph (a)(2) of this section.

Table 2 to Paragraph (c)(1)

System size (number of people served)	Reduced minimum number of sites for water quality parameters
>100,000	10
10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

(2)(i) A water system that maintains the range of values for the water quality parameters reflecting OCCT specified by the State under § 141.82(f) and does not exceed the lead or copper action level during three consecutive years of monitoring may reduce the frequency with which it collects distribution system samples for applicable water quality parameters specified in paragraph (c)(1) of this section from every six months to annually. This sampling must begin during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs.

(ii) A water system may reduce the frequency with which it collects distribution system samples for applicable water quality parameters specified in paragraph (c)(1) of this section to every year if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the PQL for lead of 0.005 mg/L, that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L as calculated in accordance with § 141.80(c)(3), and that it also has maintained the range of values for the water quality parameters reflecting OCCT specified by the State under § 141.82(f).

(3) A water system that conducts tap sampling for water quality parameters annually must collect these samples at a regular frequency throughout the year to reflect seasonal variability.

(4) A water system monitoring at a reduced frequency that fails to operate at or within the range of values for the optimal water quality parameters specified by the State in § 141.82(f) for more than nine days in any six-month period under paragraph (b)(4) of this section must resume distribution system sampling in accordance with the number and frequency requirements in paragraph (b)(4) of this section. Such a system may resume annual monitoring for water quality parameters in the distribution system at the reduced number of sites specified in paragraph (c)(1) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of paragraph (c)(1) of this section and/or may resume annual monitoring for water quality parameters in the distribution system at the reduced number of sites after it

demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (c)(2)(i) or (ii) of this section.

(5) Any water system monitoring at a reduced frequency that exceeds the lead or copper action level must resume standard water quality parameter monitoring beginning with the six-month period immediately following the tap monitoring period in which the action level exceedance(s) occurs. When the water system no longer exceeds the lead and/or copper action level(s) and meets the optimal water quality parameters in two consecutive six-month tap monitoring periods, the system may then reduce monitoring in accordance with paragraphs (c)(1) and (2) of this section.

(d) *Additional monitoring by systems*. The results of any monitoring conducted in addition to the minimum requirements of this section must be considered by the water system and the State in determining concentrations of water quality parameters under this section or § 141.82.

10. Amend § 141.90 by:

a. Revising paragraphs (a), (b), and (c)(1) and (4);

b. Adding paragraph (c)(5);

c. Revising paragraphs (e), (f)(1) introductory text, (f)(1)(i), and (f)(3) and (4);

d. Removing and reserving paragraph (f)(5);

e. Revising paragraphs (f)(6) and (7);

f. Adding (f)(8) through (10); and

g. Revising paragraphs (g) through (i) and (j)(1) and (2).

The revisions and additions read as follows:

§ 141.90 Reporting requirements.

* * * * *

(a) *Reporting requirements for tap monitoring for lead and copper and for distribution system and entry point monitoring for water quality parameters*. (1) By the start of a system's first lead and copper tap monitoring period in § 141.86, water systems must submit the following to the State:

(i) A site sample plan, including a list of tap sample site locations for lead and copper sampling identified from the inventory in § 141.84(a), and a list of tap sampling sites for water quality parameter monitoring selected under § 141.87(a)(1) and (2). Changes to the site sample plan require submission of an updated site sample plan prior to the next tap sampling period conducted by the system. The State may require modifications to the site sample plan as necessary.

(A) Water systems with lead, galvanized requiring replacement, and/or lead status unknown service lines in the service line inventory conducted under § 141.84(a) and (b) must evaluate the tap sampling locations for lead and copper used in their sampling pool prior to each round of tap sampling, or annually, whichever is more frequent, beginning with the compliance date specified in § 141.80(a)(3). Evaluations that lead to changes in the site sample plan require submission of an updated site sample plan prior to the next tap sampling period conducted by the system.

(B) Water systems with lead or lead status unknown service lines in their inventory with insufficient lead service line sites to meet the minimum number required in § 141.86, must submit documentation in support of the conclusion that there are an insufficient number of lead service line sites meeting the criteria under § 141.86(a)(4)(i) or (ii), as applicable, prior to the next round of tap sampling;

(ii) A copy of the tap sampling protocol that is provided to individuals who are sampling. The State shall verify that wide-mouth collection bottles are used, as defined at § 141.2, and that recommendations for pre-stagnation flushing and aerator cleaning or removal prior to sample collection are not included pursuant to § 141.86(b). The tap sampling protocol shall contain instructions for correctly collecting a first liter sample for sites without lead service lines and a first liter and fifth liter paired sample for sites with lead service lines. If the water system seeks to modify its tap sampling protocol specified in this paragraph (a)(1)(ii), it must submit the updated version of the protocol to the State for review and approval no later than 60 days prior to use.

(2) Notwithstanding the requirements of § 141.31(a), a water system must report the information specified in paragraphs (a)(2)(i) through (vii) of this section, for all lead and copper tap samples specified in § 141.86 and for all water quality parameter distribution system and entry point samples specified in § 141.87, within the first 10 days following the end of each applicable sampling period specified in §§ 141.86 and 141.87, unless the State has specified an earlier reporting requirement. For tap sampling periods with a duration less than six months, the end of the sampling period is the last date samples can be collected as specified in § 141.86.

(i) The results of all tap samples for lead and copper, including results for both first liter and fifth liter samples collected at lead service line sites, the location of each site, and the site selection criteria under § 141.86(a)(3) and (4) used as the basis for which the site was selected for the water system's sampling pool;

(ii) Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to § 141.86(f)(2);

(iii) Documentation that the results of monitoring will be made publicly available, as specified in § 141.86(h);

(iv) The 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each tap monitoring period (calculated in accordance with § 141.80(c)(3)), unless the State calculates the water system's 90th percentile lead and copper levels under paragraph (h) of this section;

(v) With the exception of initial tap sampling conducted pursuant to § 141.86(c)(2)(i), the water system must identify any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

(vi) The results of all tap samples for water quality parameters that are required to be collected under § 141.87(b) through (d);

(vii) The results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under § 141.87(b) through(d);

(3) For a non-transient non-community water system, or a community water system meeting the criteria of § 141.85(b)(8), that does not have enough taps that can provide first liter

or first liter and fifth liter paired samples meeting the six-hour minimum stagnation time, the water system must either:

(i) Provide written documentation identifying standing times and locations for enough samples that do not meet the six-hour minimum stagnation time to make up its sampling pool under § 141.86(b)(3) by the start of the system's first applicable tap monitoring period under § 141.86(c) unless the State has waived prior approval of sample sites not meeting the six-hour stagnation time selected by the water system pursuant to § 141.86(b)(3); or

(ii) If the State has waived prior approval of sample sites not meeting the six-hour stagnation time selected by the system, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to § 141.86(b)(3) and include this information with the lead and copper tap sample results required to be submitted pursuant to paragraph (a)(1)(i) of this section.

(4) At a time specified by the State, or if no specific time is designated, as early as possible but no later than six months prior to the addition of a new source or any long-term change in water treatment, a water system must submit written documentation describing the addition of a new source or long-term change in treatment to the State. Systems may not implement the addition of a new source or long-term treatment change without State approval. The State may require any such water system to conduct additional monitoring or to take other action the State deems appropriate to ensure that such water system maintains minimal levels of corrosion control in its distribution system. Examples of long-term treatment changes include but are not limited to the addition of a new treatment process or modification of an existing treatment process. Long-term changes can also include dose changes to existing inhibitor concentration. They do not, however, include chemical dose fluctuations associated with daily raw water

quality changes where a new source has not been added. Examples of modifications include switching secondary disinfectants, switching coagulants (e.g., alum to ferric chloride), and switching corrosion inhibitor products (e.g., orthophosphate to blended phosphate).

(5) Any system serving 3,300 or fewer persons applying for a monitoring waiver under § 141.86(g), or subject to a waiver granted pursuant to § 141.86(g)(3), shall provide the following information to the State in writing by the specified deadline:

(i) By the start of the system's first applicable tap monitoring period in § 141.86(c), any water system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of § 141.86(g)(1) and (2).

(ii) No later than nine years after the monitoring previously conducted pursuant to § 141.86(g)(2) or (4), each system desiring to maintain its monitoring waiver shall provide the information required by § 141.86(g)(4)(i) and (ii).

(iii) No later than 60 days after it becomes aware that it is no longer free of lead-containing and/or copper-containing material, as appropriate, each system with a monitoring waiver shall provide written notification setting forth the circumstances resulting in the lead-containing and/or copper-containing materials being introduced into the system and what corrective action, if any, the system plans to take to remove these materials.

(6) Each ground water system that limits water quality parameter monitoring to a subset of entry points under § 141.87(b)(3)(ii) shall provide, by the commencement of such monitoring, written correspondence to the State that identifies the selected entry points and includes information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(b) *Source water monitoring reporting requirements*. A water system shall report the following within the first 10 days following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in § 141.88.

(1) The sampling results for all source water samples collected in accordance with § 141.88

(2) With the exception of the first round of source water sampling conducted pursuant to § 141.88(b), the system shall specify any site which was not sampled during the previous monitoring period, and include an explanation of why the sampling point has changed.

(c) * * *

(1) For water systems demonstrating that they have already optimized corrosion control without optimized water quality parameters set by the State, information required in § 141.81(b)(1) through (3).

* * * * *

(4) For systems required to install OCCT or re-optimized OCCT designated by the State under § 141.82(d), a letter certifying that the system has completed installing that treatment.

(5) For systems not required to complete the corrosion control treatment steps under § 141.81(f), a letter certifying that the system has completed the lead service line replacement program.

* * * * *

(e) *Service line inventory and replacement reporting requirements*. Water systems must report the following information to the State to demonstrate compliance with the requirements of §§ 141.84 and 141.85:

(1) No later than October 16, 2024, the water system must submit an initial inventory of service lines as required in § 141.84(a)(1), including the following:

(i) The number of lead service lines in the initial inventory;

(ii) The number of galvanized requiring replacement service lines in the initial inventory;

(iii) The number of lead status unknown service lines in the initial inventory;

(iv) Where ownership of the service line is shared, the system must report the information in paragraphs (e)(1)(i) through (iii) of this section counting each full service line only once.

(2) No later than the compliance date in § 141.80(a)(3), the water system must submit to the State a baseline inventory of service lines and connectors as required in § 141.84(a)(2).

(3) No later than the compliance date in § 141.80(a)(3), any water system that has inventoried a lead, galvanized requiring replacement, or lead status unknown service line in its distribution system must submit a service line replacement plan as specified in § 141.84(c).

(4) The water system must provide the State with an updated inventory annually, beginning no later than one year after the compliance date in § 141.80(a)(3). The updated inventory must conform with inventory requirements under § 141.84(a) and (b).

(i) When the water system has demonstrated that its inventory contains no lead, galvanized requiring replacement, or lead status unknown service lines, or known lead connectors or unknown connectors, it is no longer required to submit inventory updates to the State, except as required in paragraph (e)(4)(ii) of this section.

(ii) In the case that a water system meeting the requirements of paragraph (e)(4)(i) of this section subsequently discovers any lead or galvanized requiring replacement service lines or lead connectors in its distribution system, it must notify the State within 60 days of discovering the service line(s) and connector(s) and prepare an updated inventory in accordance with § 141.84(b) on a schedule established by the State.

(5) No later than 30 days of the end of each calendar year, the water system must certify to the State that it replaced any encountered lead connectors in accordance with § 141.84(e) or that it encountered no lead connectors during the calendar year.

(6) No later than 30 days after the end of each calendar year, the water system must certify to the State that it conducted the notification and mitigation requirements for any partial and full service line replacements in accordance with § 141.84(h) or that it conducted no replacements of lead or galvanized requiring replacement service lines during the calendar year.

(7) If the water system fails to meet the 45-day deadline to complete a customer-initiated lead or galvanized requiring replacement service line replacement pursuant to § 141.84(f), it must notify the State within 30 days of the replacement deadline to request an extension of the deadline up to 180 days of the customer-initiated service line replacement.

(i) No later than 30 days after the end of the calendar year, the water system must certify annually that it completed all customer-initiated lead and galvanized requiring replacement service line replacements in accordance with § 141.84(f).

(ii) [Reserved]

(8) No later than 30 days after the end of each program year for mandatory service line replacement pursuant to § 141.84(d), the water system must submit the following information to the State:

(i) The following information from the baseline inventory submitted in paragraph (e)(2) of this section, in accordance with the table in § 141.84(d)(6)(iii)(A):

(A) The number of lead service lines in the inventory,

(B) The number of galvanized requiring replacement service lines in the inventory,

(C) The number of lead status unknown service lines in the inventory,

(D) The number of non-lead service lines in the inventory,

(E) The number of lead connectors in the inventory,

(F) Where ownership of the service line is shared, the system must report the information in paragraphs (e)(8)(i)(A) through (D) of this section counting each full service line only once;

(ii) The number of full lead service line replacements that have been conducted in the preceding program year and the address associated with each replaced lead service line;

(iii) The number of partial lead service line replacements that have been conducted in the preceding program year and the address associated with each replaced partial lead service line;

(iv) The number of full galvanized requiring replacement service line replacements that have been conducted in the preceding program year and the address associated with each replaced service line;

(v) The number of lead connectors that have been replaced in the preceding program year and the address associated with each replaced lead connector;

(vi) The number of service lines in the replacement pool updated at the beginning of the proceeding program year in accordance with § 141.84(d)(6)(i);

(vii) The number of lead status unknown service lines remaining in the inventory;

(viii) The total number of lead status unknown service lines determined to be non-lead; and

(ix) The address of each non-lead service line discovered in the preceding program year to be a lead or galvanized requiring replacement service line and, if available, the method or methods originally used to categorize the material of the service line.

(x) The applicable deadline for completion of service line replacement and the expected date of completion of service line replacement.

(9) Systems validating service line inventories pursuant to § 141.84(b)(5) must submit a list of the locations of any non-lead service lines identified to be a lead or galvanized requiring replacement service line as well as the method(s) used to categorize the service lines, if available, as a result of the assessment. The information must be submitted no later than seven years after the compliance date in § 141.80(a)(3), unless otherwise specified by the State, in accordance with § 141.84(b)(5)(iv).

(10) No later than 30 days after the end of each program year for mandatory service line replacement pursuant to § 141.84(d), any water system that was not able to obtain property owner consent after making a reasonable effort in accordance with § 141.84(d)(3) must certify to

the State the number of service lines not replaced due to property owners not providing consent where consent is required by State or local law.

(11) [Reserved]

(12) Any system that collects samples following a partial lead or galvanized requiring replacement service line replacement required by § 141.84(h)(1)(iv) must report the results to the State within the first ten days following the month in which the system receives the laboratory results or as specified by the State. Systems must also report any additional information as specified by the State, and in a time and manner prescribed by the State, to verify that all partial lead and galvanized requiring replacement service line replacement activities have taken place.

(13) No later than the compliance date in § 141.80(a)(3), any water system eligible for either of the following deferred deadline conditions in accordance with § 141.84(d)(5)(v) must submit the following information to the State:

(i) The number of years needed to reach the deferred deadline when the system replaces 10,000 lead and galvanized requiring replacement service lines annually in accordance with § 141.84(d)(5)(v)(A); or

(ii) Documentation that shows that ten percent of the known lead and galvanized requiring replacement service lines in the inventory results in the annual number of replacements per household served by the system to exceed 0.039 as well as the number of years needed to reach the deferred deadline in accordance with § 141.84(d)(5)(v)(B).

(14) No later than 30 days after the end of each calendar year, the water system must certify to the State that it offered to inspect service lines that customers who suspected the

inventory incorrectly categorized their service line material within 60 days of receiving the customer notification in accordance with § 141.84(b)(4).

(f) *Public education program reporting requirements*. (1) Any water system that is subject to the public education requirements in § 141.85 must, within ten days after the end of each period in which the system is required to perform public education in accordance with § 141.85(b), send written documentation to the State that contains:

(i) The public education materials that were delivered, and a statement certifying that the water system has delivered the public education materials that meet the content requirements in § 141.85(a) and the delivery requirements in § 141.85(b); and

* * * * *

(3) No later than three months following the end of the tap sampling period, each water system must send a sample copy of the consumer notification of tap results to the State along with a certification that the notification has been distributed in a manner consistent with the requirements of § 141.85(d).

(4) Annually by July 1, the water system must demonstrate to the State that it delivered consumer notification and delivered service line information materials to affected consumers with a lead, galvanized requiring replacement, or lead status unknown service line in accordance with § 141.85(e) for the previous calendar year. The water system must also provide a sample copy of the notification and information materials to the State.

* * * * *

(6) Annually, by July 1, the water system must certify to the State that it delivered notification to affected customers and the persons served by the water system at the service

connection and complied with the filter requirements in § 141.85(g) after any disturbance of a service line known to contain or potentially containing lead in accordance with § 141.85(g) for the previous calendar year, or that the water system has not caused any disturbance of a service line known to contain or potentially contain lead, during the preceding year. The water system must also submit a copy of the notification to the State. Water systems that are required to provide filters under § 141.85(g) must also report the number of sites with disturbances that require filters as specified under § 141.85(g) and number of filters provided.

(7) Annually by July 1, the water system must demonstrate to the State that it conducted an outreach activity in accordance with § 141.85(h) when failing to meet the service line replacement rate as specified in § 141.84(d) for the previous calendar year. The water system must also submit a copy to the State of the outreach materials provided.

(8) Annually, by July 1, the water system must certify to the State that it delivered the required distribution system and site assessment information to the State and local health departments for the previous calendar year in accordance with § 141.85(i).

(9) No later than 30 days after a system first meets the criteria of multiple lead action level exceedances in § 141.85(j)(1), the system must submit a filter plan to the State as specified in § 141.85(j)(3). Thereafter, a system is not required to resubmit a filter plan unless requested by the State or if the system has made updates to their plan.

(10) Every six months (i.e., by January 1 or July 1), any water system that meets the criteria of multiple lead action level exceedances in § 141.85(j)(1) must:

(i) Certify compliance with the filter requirements in the previous six months in accordance with § 141.85(j)(2) and report the number of filters provided; and

(ii) Certify that the water system completed a public outreach activity in the previous six months in accordance with § 141.85(j)(4) and submit a copy of the public education materials provided to consumers.

(g) *Reporting of additional monitoring data*. (1) Any water system which collects more samples than the minimum required, must report the results to the State within the first 10 days following the end of the applicable monitoring period under §§ 141.86, 141.87, and 141.88 during which the samples are collected. This includes the monitoring data pertaining to distribution system and site assessment pursuant to §§ 141.82(j) and 141.86(b)(1)(iv).

(2) The system must certify to the State the number of customer refusals or non-responses for follow-up sampling under § 141.82(j) it received and information pertaining to the accuracy of the refusals or non-responses, within the first 10 days following the end of the applicable tap sampling period in which an individual sample exceeded the action level.

(h) *Reporting of 90th percentile lead and copper concentrations where the State calculates a water system's 90th percentile concentrations*. A water system is not required to report the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each tap sampling period, as required by paragraph (a)(2)(iv) of this section if:

(1) The State has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to paragraph (h)(2)(i) of this section, and the water system provides the results of lead and copper tap water samples no later than 10 days after the end of the applicable tap sampling period; and

(2) The system has provided the following information to the State by the date specified in paragraph (h)(1) of this section:

(i) The results of all tap samples for lead and copper including the location of each site and the site selection criteria under § 141.86(a)(4) used as the basis for which the site was selected for the water system's sampling pool; and

(ii) An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation of why sampling sites have changed; and

(3) The State has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system within 15 days of the end of the tap sampling period.

(i) *Reporting requirements for a community water system's public education and sampling in schools and child care facilities*. (1) A community water system must provide a list of the schools and child care facilities they serve to the State by the compliance date in § 141.80(a)(3) in accordance with § 141.92(b)(1). A water system that certifies that no schools or child care facilities are served by the water system is not required to report the information in paragraphs (i)(2) through (3) of this section.

(2) A community water system must report the lead analytical sampling results for schools and child care facilities within 30 days of receipt of the results in accordance with § 141.92(g)(1)(iii).

(3) A community water system must send a report to the State by July 1 of each year for the previous calendar year's activity. The report must include the following:

(i) Certification that the water system made a good faith effort to identify schools and child care facilities in accordance with § 141.92(b). The good faith effort may include reviewing customer records and requesting lists of schools and child care facilities from the State or other licensing agency. If there are changes to the list of schools and child care facilities that a water system serves, an updated list must be submitted at least once every five years in accordance with § 141.92(b)(2). If there are no changes to the list of schools or child care facilities the water system serves, the water system must certify there are no changes to the list.

(ii) Certification that the water system has delivered information about health risks from lead in drinking water to the school and child care facilities that they serve in accordance with § 141.92(c)(1).

(iii) During the first five years after the compliance date in § 141.80(a)(3), certification that the water system has completed the notification and sampling requirements in § 141.92(c)(2)(i) and (d)(1) for elementary schools and child care facilities and the information in paragraphs (i)(3)(iii)(A) through (D) of this section and certification that the water system has completed the notification and sampling requirements of § 141.92(c)(2)(ii) and (e) for secondary schools and the information in paragraphs (i)(3)(iii)(A) and (B) of this section. Starting with the sixth year after the compliance date in § 141.80(a)(3), the water system shall certify completion of the notification requirements of § 141.92(c)(3) and sampling requirements of § 141.92(d)(2) in elementary schools and child care facilities and § 141.92(e) for secondary schools and the information in paragraphs (i)(3)(iii)(A) and (B) of this section, thereafter.

(A) The number and names of schools and child care facilities served by the water system;

(B) The number and names of schools and child care facilities sampled in the calendar year;

(C) The number and names of elementary schools and child care facilities that have declined sampling

(D) The number and names of elementary schools and child care facilities that have not responded to outreach attempts for sampling;

(E) Information pertaining to outreach attempts for sampling that were declined or not responded to by the elementary school or child care facility; and

(iv) Certification that sampling results were provided to schools, child care facilities, and local and State health departments.

(j) * * *

(1) Small water systems serving 3,300 or fewer and non-transient non-community water systems implementing the point-of-use device option under § 141.93(c)(1), shall report the results from the tap sampling required under § 141.93 no later than 10 days after the end of the monitoring period. If the action level is exceeded, the water system must reach out to the homeowner and/or building management within 24 hours of receiving the tap sample results. Corrective action must be completed within 30 days. If corrective action is not completed within 30 days, the system must provide documentation to the State within 30 days explaining why it was unable to correct the issue. Upon request by the State, the water system must provide documentation to certify maintenance of the point-of-use devices.

(2) Small water systems serving 3,300 or fewer and non-transient non-community water systems implementing the small system compliance flexibility option to replace all lead-bearing

plumbing under § 141.93(c)(2) must provide certification to the State that all lead-bearing material has been replaced on the schedule established by the State, within one year of designation of the option under § 141.93(c)(2).

11. Revise § 141.92 to read as follows:

§ 141.92 Monitoring for lead in schools and child care facilities.

(a) *General requirements*. (1) All community water systems must conduct public education and lead monitoring at the schools and child care facilities they serve unless those schools or child care facilities were constructed or had full plumbing replacement on or after January 1, 2014 or the date the State adopted standards that meet the definition of lead free in accordance with section 1417 of the Safe Drinking Water Act, as amended by the Reduction of Lead in Drinking Water Act, whichever is earlier.

(2) The provisions of this section do not apply to a school or child care facility that is regulated as a public water system.

(b) *List of schools and child care facilities*. (1) All community water systems must compile a list of schools and child care facilities they serve and submit the list to the State in accordance with § 141.90(i)(1) by the compliance date specified in § 141.80(a)(3).

(2) Within five years following the compliance date in § 141.80(a)(3) and at least once every five-year period after, all community water systems must either confirm in writing to the State there have been no changes to the list of schools and child care facilities or submit a revised list to the State in accordance with § 141.90(i)(3)(i).

(c) *Public education to schools and child care facilities*. (1) At least once a year beginning with the compliance date in § 141.80(a)(3), community water systems must contact all schools and child care facilities identified by the system in paragraph (b) of this section to provide information about the health risks from lead in drinking water consistent with the content requirements of § 141.85(a)(1). Community water systems may provide this information to schools and child care facilities more frequently than once a year.

(2) Within the first five years following the compliance date in § 141.80(a)(3), community water systems must:

(i) Notify elementary schools and child care facilities, in accordance with the frequency requirements in paragraph (d)(1) of this section, that they are eligible to be sampled for lead by the water system. This notice must include:

(A) A proposed schedule for sampling at the facility; and

(B) Information about sampling for lead in schools and child care facilities (EPA's 3Ts for Reducing Lead in Drinking Water Toolkit, EPA–815–B–18–007 or subsequent EPA guidance).

(ii) Notify all secondary schools identified in paragraph (b) of this section at least once a year that they are eligible to sampled for lead by the community water system on request. The notice must provide:

(A) Information on how to request sampling for lead at the facility; and

(B) Information about sampling for lead in schools and child care facilities

(EPA's 3Ts for Reducing Lead in Drinking Water Toolkit, EPA–815–B–18–007, or subsequent EPA guidance).

(3) Starting with the sixth year after the compliance date in § 141.80(a)(3), a community water system must contact all elementary schools, secondary schools, and child care facilities identified in paragraph (b) of this section to notify them that they are eligible to be sampled for lead by the community water system on request and provide the information in paragraphs (c)(2)(ii)(A) and (B) of this section.

(4) Thirty days prior to any sampling event, community water systems must provide schools and child care facilities with instructions to identify outlets for lead sampling and prepare for a sampling event.

(d) *Frequency of sampling at elementary schools and child care facilities*. (1) Within the first five years following the compliance date in § 141.80(a)(3), community water systems must collect samples from at least 20 percent of the total of elementary schools served by the system per year and at least 20 percent of the total of child care facilities served by the system per year, or according to an alternative schedule approved by the State, until all elementary schools and child care facilities identified under paragraph (b) of this section have been sampled once or have declined to participate or are non-responsive.

(i) Community water systems must provide documentation to the State in accordance with § 141.90(i)(3) if an elementary school or child care facility is non-responsive or otherwise declines to participate in the monitoring or education requirements of this section. For the purposes of this section:

(A) A community water system may consider an elementary school or child care facility non-responsive after the community water system makes at least two separate outreach attempts to contact the facility to schedule sampling and does not receive any response on either attempt; and

(B) A community water system may count a refusal or non-response from an elementary school or child care facility as part of the minimum 20 percent of elementary schools and child care facilities sampled per year.

(ii) [Reserved]

(2) Starting with the sixth year after the compliance date in § 141.80(a)(3), community water systems must conduct sampling as specified in paragraph (f) of this section when requested by an elementary school or child care facility.

(i) A community water system is not required under this rule to sample more than 20 percent of the elementary schools and child care facilities identified in paragraph (b) of this section in any given year. A community water system is not required under this rule to sample an individual elementary school or child care facility more than once in any five-year period.

(ii) [Reserved]

(3) The first time a water system includes an elementary school or child care facility in an update to the list of schools and child care facilities required to be submitted to the State in paragraph (b)(2) of this section, the water system must conduct outreach at those elementary schools and child care facilities as specified in paragraph (c)(2) once prior to conducting sampling in accordance with paragraph (d)(2) of this section.

(i) A community water system may consider an elementary school or child care facility non-responsive after the community water system makes at least two separate outreach attempts to contact the facility to schedule sampling and does not receive any response on either attempt.

(ii) [Reserved]

(e) *Frequency of sampling at secondary schools*. (1) Starting with the compliance date in § 141.80(a)(3), community water systems must conduct sampling as specified in paragraph (f) of this section when requested by a secondary school.

(2) A community water system is not required under this rule to sample more than 20 percent of the secondary schools identified in paragraph (b) of this section in any given year. A community water system is not required under this rule to sample an individual secondary school more than once in any five-year period.

(f) *Lead sampling protocol for schools and child care facilities*. (1) Community water systems must collect five samples per school and two samples per child care facility at outlets typically used to provide water for human consumption. Except as provided in paragraphs (f)(1)(iii) through (v) of this section, the outlets cannot have point-of-use (POU) devices. The community water system must sample the following types and number of outlets:

(i) For schools: two drinking water fountains, one kitchen faucet used for drinking or cooking, one classroom faucet or other outlet used to provide water for human consumption, and one nurse's office faucet, as available.

(ii) For child care facilities: one drinking water fountain, and one of either a kitchen faucet used for drinking or cooking or one classroom faucet or other outlet used to provide water for human consumption.

(iii) If any school or child care facility has fewer than the required number of outlets, the community water system must sample all outlets used to provide water for human consumption.

(iv) The community water system may sample at outlets with POU devices if the facility has POU devices installed on all outlets typically used to provide water for human consumption.

(v) If any school or child care facility does not contain the type of outlet listed above, the community water system must collect a sample from another outlet typically used to provide water for human consumption as identified by the facility, to meet the required number of samples as provided in this paragraph (f)(1).

(2) Community water systems must collect the samples from the cold water tap subject to the following additional requirements:

(i) Each sample for lead must be a first draw sample;

(ii) The sample must be 250 ml in volume;

(iii) The water must have remained stationary in the plumbing system of the sampling site (building) for at least 8 but no more than 18 hours; and

(iv) Samples must be analyzed using acidification and the corresponding analytical methods in § 141.89.

(3) Community water system, school, or child care facility staff, or other appropriately trained individuals must collect samples in accordance with paragraphs (f)(1) and (2) of this section.

(g) *Notification of results*. (1) Community water systems must provide sampling results, regardless of lead sample concentration, as soon as practicable but no later than 30 days after receipt of the results to:

(i) The sampled school or child care facility, along with information about potential options to remediate lead in drinking water (consistent with EPA's 3Ts for Reducing Lead in Drinking Water Toolkit, EPA-815-B-18-007, or subsequent EPA guidance);

(ii) The local and State health department; and

(iii) The State in accordance with § 141.90(i).

(2) [Reserved]

(h) *Alternative school and child care lead sampling programs*. (1) If schools and child care facilities served by a community water system are sampled for lead in drinking water under a State or local law or program, the State may exempt one or more community water system(s) from the requirements of this section by issuing a written waiver:

(i) If the sampling meets the frequency requirements in paragraph (d) of this section for elementary schools and child care facilities and paragraph (e) of this section for secondary schools and the protocol requirements in paragraph (f) of this section; or

(ii) If the sampling meets the frequency requirements in paragraph (d) of this section for elementary schools and child care facilities and paragraph (e) of this section for secondary schools and the protocol requirements in paragraph (f) of this section with the exception of sample size and stagnation time in paragraphs (f)(2)(ii) and (iii) of this section and the sampling is conducted in addition to any of the following actions to remediate lead in drinking water:

(A) Disconnect affected fixtures;

(B) Replace affected fixtures with fixtures certified as lead free; and

(C) Install and maintain POU devices certified by an American National Standards Institute accredited certifier to reduce lead levels; or

(iii) If the sampling is conducted in schools and child care facilities served by the community water system less frequently than once every five years and that sampling is conducted in addition to any of the actions to remediate lead in drinking water specified in paragraph (h)(1)(ii) of this section; or

(iv) If the school or child care facility maintains POU devices as defined in § 141.2 on all outlets used to provide water for human consumption; or

(v) If the sampling is conducted under a grant awarded under section 1464(d) of the SDWA, consistent with the requirements of the grant and at least the minimum number of samples required in paragraph (f) of this section are collected.

(2) The duration of the waiver cannot exceed the time period covered by the sampling and will automatically expire at the end of any 12-month period during which sampling is not conducted at the required number of schools or child care facilities.

(3) The State must only issue a waiver to the community water system for the subset of the schools or child care facilities served by the system as designated under paragraph (b) of this section that are sampled under an alternative program as described in paragraph (h)(1) of this section.

(4) The State may issue a written waiver applicable to more than one community water system (e.g., one waiver for all community water systems subject to a statewide sampling program that meets the requirements of this paragraph (h)).

(5) The State may issue a waiver for community water systems to conduct the requirements of § 141.92 for the first five years following the compliance date in § 141.80(a)(3) in the schools and child care facilities that were sampled for lead between January 1, 2021 and the compliance date in § 141.80(a)(3) that otherwise meets the requirements of paragraph (h)(1) of this section.

12. Revise § 141.93 to read as follows:

§ 141.93 Small water system compliance flexibility.

Small community water systems serving 3,300 or fewer persons and all non-transient non-community water systems that exceed the lead action level, but do not exceed the copper action level, may elect to use this provision in lieu of the corrosion control treatment requirements otherwise applicable to small systems in § 141.81(a)(3), if approved by the State. This compliance flexibility is not available to water systems where the State has obtained primacy for this rule and the State does not adopt regulations to provide compliance flexibility consistent with this section.

(a) Small community water systems and non-transient non-community water systems that elect to use this provision must:

(1) For water systems with corrosion control: Collect water quality parameters in accordance with § 141.87 and, if the system has not re-optimized OCCT in accordance with §141.81(d), evaluate compliance options in paragraphs (c)(1) and (2) of this section and corrosion control treatment under § 141.81(d)(1). Water systems with corrosion control treatment in place must continue to operate and maintain optimal corrosion control treatment until the State determines, in writing, that it is no longer necessary, and meet any requirements

that the State determines to be appropriate before implementing a State approved alternative compliance option described in this section.

(2) For systems without corrosion control: Collect water quality parameters in accordance with § 141.87 and, if the system has not installed OCCT in accordance with § 141.81(e), evaluate compliance options in paragraphs (c)(1) and (2) of this section and corrosion control treatment under § 141.81(e)(1).

(b) The system must make a compliance option recommendation to the State within six months of the end of the tap sampling period in which the lead action level exceedance occurred. Within six months of the recommendation by the water system, the State must approve or disapprove the recommendation. If the State disapproves the recommendation, the State may designate the other compliance alternative as an option for the system. If the State does not designate the other compliance alternative as an option for the system, the system must comply with the otherwise applicable corrosion control treatment requirements under § 141.81(d) for systems with corrosion control or § 141.81(e) for systems without corrosion control treatment. Water systems must follow the schedules in § 141.81(d) or (e), beginning with Step 3 in § 141.81(d)(3) or (e)(3) unless the State specifies optimal corrosion control treatment pursuant to either § 141.81(d)(2) or (e)(2), as applicable. If the system fails to implement the approved alternative compliance option, or the State revokes approval for the alternative compliance option, then the system must follow the requirements for small and non-transient non-community water systems as described under § 141.81(a)(3).

(c) *Alternative compliance options*—(1) *Point-of-use devices*. A water system that elects this compliance option, must install, maintain, and monitor POU devices in each household and each building served by the water system.

(i)(A) A community water system must install a minimum of one POU device (at one tap) in every household and at every tap that is used for cooking and/or drinking in every non-residential building in its distribution system on a schedule specified by the State, but not to exceed one year.

(B) A non-transient non-community water system must provide a POU device to every tap that is used for cooking and/or drinking on a schedule specified by the State, but not to exceed three months.

(ii) The POU device must be independently certified by a third party to meet the American National Standards Institute standard applicable to the specific type of POU unit to reduce lead in drinking water.

(iii) The POU device must be maintained by the water system in accordance with the manufacturer's recommendations to ensure continued effective filtration, including but not limited to changing filter cartridges and resolving any operational issues. The POU device must be equipped with mechanical warnings to ensure that customers are automatically notified of operational problems. The water system must provide documentation to the State to certify maintenance of the POU devices, unless the State waives this requirement, in accordance with § 141.90(j)(1).

(iv) The water system must monitor, in accordance with this paragraph, one-third of the POU devices each year and all POU devices must be monitored within a three-year cycle. First liter tap samples collected under this section must be taken after water passes through the POU device to assess its performance. Samples must be one-liter in volume and have had a minimum 6-hour stagnation time. All samples must be at or below 0.010 mg/L. Water systems must report the results from the tap sampling no later than 10 days after the end of the tap sampling period in accordance with § 141.90(j)(1). If a sample exceeds 0.010 mg/L, the water system must notify the homeowner and/or building management no later than 24 hours of receiving the tap sample results. The system must document and take corrective action at each site where the sample result exceeds the lead action level. Corrective action must be completed within 30 days. If the corrective action is not completed within 30 days, the system must provide documentation to the State within 30 days explaining why it was unable to correct the issue.

(v) The water system must provide public education to consumers to inform them of proper use of POU devices to maximize the units' lead level reduction effectiveness.

(A) *Content*. All small community water systems and non-transient non-community water systems that elect to implement POU devices under paragraph (c)(1) must provide public education materials to inform users how to properly use POU devices to maximize the units' effectiveness in reducing lead levels in drinking water.

(B) *Timing*. Water systems must provide the public education materials at the time of POU device delivery.

(C) *Delivery*. Water systems must provide the public education materials in person, by mail, or by another method approved by the State, to persons at locations where the system has delivered POU devices.

(vi) The water system must operate and maintain the POU devices even if the system is at or below the action level in future tap monitoring periods until the system receives State approval to select the other compliance flexibility option or follow § 141.81(d) or (e) and the system has fully implemented it.

(2) *Replacement of lead-bearing plumbing*. A water system that has control over all plumbing in its buildings, and is not served by unknown, galvanized requiring replacement, or lead service lines, must replace all plumbing that does not meet the definition of "lead free" in section 1417 of the Safe Drinking Water Act, as amended by the Reduction of Lead in Drinking Water Act and any future amendments applicable at the time of replacement. The replacement of all lead-bearing plumbing must occur on a schedule established by the State but not to exceed one year. Water systems must provide certification to the State that all lead-bearing material has been replaced in accordance with § 141.90(j)(2).

13. Amend § 141.153 by:

a. Revising paragraph (d)(4)(xi);

b. Adding paragraphs (d)(4)(xiii) and (xiv); and

c. Revising paragraph (f)(3).

The revisions and additions read as follows:

§ 141.153 Content of the reports.

* * * * *

(d) * * *

(4) * * *

(xi) The report shall include a statement that a service line inventory (including inventories where the publicly accessible inventory consists of a written statement that there are no lead, galvanized requiring replacement, or lead status unknown service lines, known lead connectors or unknown connectors) has been prepared and include instructions to access the service line inventory; and

* * * * *

(xiii) For systems with lead, galvanized requiring replacement, or lead status unknown service lines in the system's inventory pursuant to § 141.84(a) and (b), the report must include information on how to obtain a copy of the service line replacement plan or view the plan on the internet if the system is required to make the service line replacement plan available online.

(xiv) The report must include a statement that the water system is required to sample for lead in schools and licensed child care facilities as requested by the facility and may direct the public to contact their school or child care facility for further information about potential sampling results.

* * * * *

(f) * * *

(3) Lead and copper control requirements prescribed by subpart I of this part. For systems that fail to take one or more actions prescribed by §§ 141.80 through 141.93, the report must include the applicable language of appendix A to this subpart for lead, copper, or both.

* * * * *

14. Amend § 141.154 by revising paragraph (d)(1) to read as follows:

§ 141.154 Required additional health information.

* * * * *

(d) * * *

(1) A short informational statement about lead in drinking water and its effects on children. The statement must include the information in figure 1 to this paragraph:

Figure 1 to Paragraph (d)(1)

Lead can cause serious health effects in people of all ages, especially pregnant people, infants (both formula-fed and breastfed), and young children. Lead in drinking water is primarily from materials and parts used in service lines and in home plumbing. [INSERT NAME OF UTILITY] is responsible for providing high quality drinking water and removing lead pipes, but cannot control the variety of materials used in the plumbing in your home. You can help protect yourself and your family by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Using a filter, certified by an American National Standards Institute accredited certifier to reduce lead, is effective in reducing lead exposures. Follow the instructions provided with the filter to ensure the filter is used properly. Use only cold water for drinking, cooking, and making baby formula. Boiling water does not remove lead from water. Before using tap water for drinking, cooking, or making baby formula, flush your pipes for several minutes. You can do this by running your tap, taking a shower, doing laundry or a load of dishes. If you have a lead service line or galvanized requirement replacement service line, you may need to flush your pipes for a longer period. If you are concerned about lead in your water and wish to have your water tested, contact

[INSERT NAME OF UTILITY and CONTACT INFORMATION].

Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at *https://www.epa.gov/safewater/lead*.

* * * * *

16. Amend appendix A to subpart O of part 141 under the heading "Inorganic contaminants" by revising the entry for "Lead" to read as follows:

Appendix A to Subpart O of Part 141—Regulated Contaminants

Contaminant (units)	**Traditional MCL in mg/L**	**To convert for CCR, multiply by**	**MCL in CCR units**	**MCLG**	**Major sources in drinking water**	**Health effects language**
* * * * * * *						
Inorganic contaminants:						
* * * * * * *						
Lead (mg/L)	AL = 0.010	1000	AL = 10	0	Corrosion of household plumbing systems and service lines connecting buildings to water mains, erosion of natural deposits.	There is no safe level of lead in drinking water. Exposure to lead in drinking water can cause serious health effects in all age groups, especially pregnant people, infants (both formula-fed

						and breastfed), and young children. Some of the health effects to infants and children include decreases in IQ and attention span. Lead exposure can also result in new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more

						information about your risks.
* * * * * * *						

* * * * *

16. Amend § 141.202 by revising paragraph (b)(1) to read as follows:

§ 141.202 Tier 1 Public Notice—Form, manner, and frequency of notice.

* * * * *

(b) * * *

(1) Provide a public notice as soon as practical but no later than 24 hours after the system learns of the violation or other situation requiring Tier 1 public notice;

* * * * *

17. Amend appendix A to subpart Q of part 141 in section I by revising the entries for "C. Lead and Copper Rule (Action Level for lead is 0.015 mg/L, for copper is 1.3 mg/L)" and "1. Lead and Copper Rule (TT)" to read as follows:

Appendix A to Subpart Q of Part 141—NPDWR Violations and Other Situations Requiring Public Notice[1]

Contaminant	**MCL/MRDL/TT violations[2]**		**Monitoring & testing procedure violations**	
	Tier of public notice required	**Citation**	**Tier of public notice required**	**Citation**
* * * * * * *				
C. Lead and Copper Rule (Action Level for lead is 0.010 mg/L, for				

copper is 1.3 mg/L)				
1. Lead and Copper Rule (TT)	2	§ 141.80 (except §§ 141.80(c))–141.84, 141.85(a)–(c) (except (c)(3)), (h), and (j), and § 141.93	3	§§ 141.86–141.90, 141.92
* * * * * * *				

Appendix A—Endnotes

* * * * *

1. Violations and other situations not listed in this table (e.g., failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the primacy agency. Primacy agencies may, at their option, also require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under § 141.202(a) and § 141.203(a).

2. MCL—Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique

* * * * *

18. Amend appendix B to subpart Q of part 141 by revising the entry for “23. Lead” and endnote 13 to read as follows:

Appendix B to Subpart Q of Part 141—Standard Health Effects Language for Public Notification

Contaminant	MCLG[1] mg/L	MCL[2] mg/L	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR)			
* * * * * * *			
D. Lead and Copper Rule			
* * * * * * *			

23. Lead	zero	TT[13]	There is no safe level of lead in drinking water. Exposure to lead in drinking water can cause serious health effects in all age groups, especially pregnant people, infants (both formula-fed and breastfed), and young children. Some of the health effects to infants and children include decreases in IQ and attention span. Lead exposure can also result in new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more information about your risks.
* * * * * * *			

Appendix B—Endnotes

* * * * *

1. MCLG—Maximum contaminant level goal

2. MCL—Maximum contaminant level

* * * * *

13. Action Level = 0.010 mg/L

* * * * *

PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION

19. The authority citation for part 142 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

20. In § 142.14, republish paragraph (d) introductory text and revise paragraphs (d)(8) and (9) and (d)(10)(ii) to read as follows:

§ 142.14 Records kept by States.

* * * * *

(d) Each State which has primary enforcement responsibility shall retain, for not less than 12 years, files which shall include for each such public water system in the State:

* * * * *

(8) Records of the currently applicable or most recent State determinations, including all supporting information and an explanation of the technical basis for each decision, made under the following provisions of 40 CFR part 141, subpart I for the control of lead and copper. If, for the records identified in paragraphs (d)(8)(i) through (d)(8)(xvii) of this section, no change is made to State determinations during a 12-year retention period, the State shall retain the record until a new decision, determination, or designation has been issued.

(i) Section 141.81(b)—for any water system deemed to be optimized under § 141.81(b) of this chapter, any conditions imposed by the State on specific water systems to ensure the continued operation and maintenance of corrosion control treatment in place;

(ii) Sections 141.81(b)(4), 141.86(c)(2)(iii)(G), and 141.86(g)(4)(iii)—determinations of additional monitoring requirements and/or other actions required to maintain optimal corrosion control by systems that change treatment or add a new source of water;

(iii) Section 141.82(b)—decisions to require a water system to conduct corrosion control treatment studies;

(iv) Section 141.82(d)—designations of optimal corrosion control treatment and any simultaneous compliance considerations that factored into the designation;

(v) Section 141.83(b)(2)—determinations of source water treatment;

(vi) Section 141.83(b)(4)—designations of maximum permissible concentrations of lead and copper in source water;

(vii) Section 141.84(d)—determinations as to whether a shortened replacement deadline is feasible for mandatory full lead and galvanized requiring replacement service line replacement;

(viii) Section 141.85—system-specific decisions regarding the content of written public education materials and/or the distribution of these materials;

(ix) Section 141.86(b)(3)—system-specific determinations regarding use of samples that do not meet the six hour minimum stagnation time at non-transient non-community water systems, and community water systems meeting the criteria of § 141.85(b)(8) of this chapter, that operate 24 hours a day;

(x) Section 141.86(d)—system-specific designations of sampling locations for systems subject to reduced monitoring;

(xi) Section 141.86(d)(3)—system-specific determinations pertaining to alternative sample collection periods for systems subject to reduced monitoring;

(xii) Section 141.86(g)—determinations of small system monitoring waivers, waiver recertifications, and waiver revocations;

(xiii) Section 141.87(b)(3)(ii)—determinations regarding representative entry point locations at ground water systems;

(xiv) Section 141.88—evaluation and approval of water system source water or treatment changes;

(xv) Section 141.90(e)(4)—system-specific determinations regarding the submission of information to demonstrate compliance with partial lead and galvanized requiring replacement service line replacement requirements;

(xvi) Section 141.90(f)—system-specific decisions regarding the resubmission of detailed documentation demonstrating completion of public education requirements, including resubmission of filter distribution plans under 141.90(f)(9); and

(xvii) Section 141.93—identification of community water systems and non-transient non-community water systems utilizing the compliance alternatives, and the compliance alternative selected by the water system and the compliance option approved by the State.

(9) Records of reports and any other information submitted by PWSs under § 141.90 of this chapter, including:

(i) Records of any 90th percentile values calculated by the State under § 141.90(h) of this chapter;

(ii) Completed initial service line inventories, baseline inventories, and required updates to inventories and information under §141.90(e) of this chapter;

(iii) Service line replacement plans under § 141.90(e)(3) of this chapter; and

(iv) Compliance sampling pools in site sample plan and any changes to sampling pools under §141.90(a)(1) of this chapter.

(10) * * *

(ii) Verify compliance with the requirements related to partial or customer-initiated lead and galvanized requiring replacement service line replacement under § 141.84(f), (g) and (h)(1) and (2) of this chapter and compliance with full service line replacement under § 141.84(h)(3) of this chapter, and compliance with lead connector replacement when encountered under § 141.84(e); and

* * * * *

21. Amend § 142.15 by:

a. Removing and reserving paragraph (c)(4)(i);

b. Revising paragraph (c)(4)(iii) introductory text;

c. Revising paragraphs (c)(4)(iii)(B) through (F); and

c. Adding paragraph (c)(4)(iii)(G).

The revisions and addition read as follows:

§ 142.15 Reports by States.

* * * * *

(c) * * *

(4) * * *

(iii) States shall report the PWS identification number of each water system identified in paragraphs (c)(4)(iii)(A) through (G) of this section.

* * * * *

(B) For each water system (regardless of size), the 90th percentile copper level calculated during each tap sampling period specified in § 141.86 of this chapter, in which the system exceeds the copper action level, and the first and last days of each tap sampling period in which an exceedance occurred;

(C) For each water system for which the State has designated optimal water quality parameters under § 141.82(f) of this chapter, the specific corrosion control treatment designated, the date of the determination and the paragraph(s) under which the State made its determination, the water system's optimal water quality parameters;

(D) For each water system the number of lead service lines, galvanized requiring replacement service lines, lead status unknown service lines, lead connectors, unknown connectors, and non-lead service lines in its inventory, reported separately;

(E) For each water system required to conduct mandatory replacement of lead and galvanized requiring replacement service lines, as specified in § 141.84(d) of this chapter, the number and type of service lines replaced, the deadline for the system to complete replacement of all lead and galvanized requiring replacement service lines, and the expected date of completion of service line replacement;

(F) For each water system that has implemented optimal corrosion control, completed applicable source water treatment requirements pursuant to § 141.83 of this chapter and/or completed service line replacement requirements pursuant to § 141.84 of this chapter, and the date of the State's determination that these requirements have been met. The date reported shall be the latest of the following events:

(*1*) The date the State received the results of corrosion control evaluations under §141.82(d) or (e) or optimal corrosion control treatment recommendation by the system.

(*2*) For systems for which the State has designated optimal corrosion control treatment under § 141.82(d), the date of the determination, and the date the system completed installation of treatment as certified under § 141.90(c)(4);

(*3*) The date the State designates optimal water quality parameters under § 141.82(f) of this chapter or deems the system to have optimized corrosion control pursuant to § 141.81(b)(1) or (3) of this chapter;

(*4*) For systems which the State has required to install source water treatment under §141.83(b)(2), the date of the determination, the date the State designates maximum permissible source water levels under § 141.83(b)(4) of this chapter or determines pursuant to § 141.83(b)(2) of this chapter that source water treatment is not required; or

(*5*) For systems required to conduct service line replacement, the date the system completes service line replacement pursuant to § 141.84(d) of this chapter.

(*6*) For systems not required to complete the corrosion control treatment steps under § 141.81(f), the date the system is required to complete service line replacement.

(G) Each State which has primary enforcement responsibility shall submit to the Administrator the 90th percentile lead concentration calculated during each tap sampling period in which the system exceeds the lead action level in § 141.80(c)(2) of this chapter within the first

15 days following the end of each tap sampling period specified in § 141.86 of this chapter or 24 hours of receiving notification of an action level exceedance from a water system, whichever is earlier.

* * * * *

22. Amend § 142.16 by revising paragraphs (d)(1)(ii) and (d)(3) through (10) and adding paragraph (d)(11) to read as follows:

§ 142.16 Special primacy requirements.

* * * * *

(d) * * *

(1) * * *

(ii) Section 141.82(g)—Designating an alternative approach for aggregating multiple measurements collected during the same day for a water quality parameter at a sampling location, if the State elects to adopt a formula other than the one specified in § 141.82(g)(2)(A) of this chapter.

* * * * *

(3) Section 141.90(e)—Verifying compliance with service line replacement schedules and completion of all partial lead and galvanized requiring replacement service line replacement activities.

(4) Section 141.86(d)(3)(i)—Designating an alternative period for sample collection for community water systems subject to reduced monitoring.

(5) Section 141.84—Providing or requiring the review of any evidence-based resource, information, or identification method for the development of the baseline inventory or inventory updates. Requiring water systems whose inventories contain no lead, galvanized requiring replacement, or lead status unknown service lines, no known lead connectors and no unknown connectors to prepare an updated inventory on a schedule determined by the State if the system subsequently finds a lead service line, galvanized requiring replacement service line, or lead connector within its system.

(6) Section 141.84(d)(5)(iv)—Determining whether a shortened service line replacement deadline is feasible for mandatory lead and galvanized requiring replacement service line replacement and notifying the system of the determination in writing at any time throughout a system's replacement program and notifying the system of the determination. For systems required to replace service lines in accordance with a shortened deadline, or for systems eligible for a deferred deadline, determining the deadline to complete inventory validation in accordance with § 141.84(b)(5) of this chapter.

(7) Section 141.82—Verifying compliance with distribution system and site assessment requirements.

(8) Section 141.84(d) —Identifying any State laws, including statutes and constitutional provisions, that pertain to a water system's access to conduct full service line replacement and notifying water systems in writing whether any such laws exist or not, by the compliance date specified in § 141.80(a) of this chapter and within six months of the enactment of any new or revised State law that pertains to a water system's access to conduct full service line replacement.

(9) Section 141.88—Reviewing any change in source water or treatment and making related determinations, including approval; establishment of additional requirements to ensure the system will operate and maintain optimal corrosion control treatment; and an evaluation of how this change may impact compliance with other national primary drinking water regulations in part 141 of this chapter.

(10) Section 141.92 – Reviewing lists of schools and child care facilities to ensure entries conform to the definitions of school and child care facility as defined in § 141.2 of this chapter and is complete.

(11) Section 141.92—Determining whether any existing State or local testing program is at least as stringent as the Federal requirements, including how the State will use the definitions of elementary school, secondary school, and childcare facility as defined in § 141.2 of this chapter to issue waivers.

* * * * *

23. In § 142.19, revise paragraph (a) introductory text and paragraph (a)(2) to read as follows:

§ 142.19 EPA review of State implementation of national primary drinking water regulations for lead and copper.

(a) Pursuant to the procedures in this section, the Regional Administrator may review State determinations establishing corrosion control or source water treatment requirements for lead or copper and may issue an order establishing Federal treatment requirements for a public water system pursuant to §§ 141.82(d) and (f) and 141.83(b)(2) and (4) of this chapter where the Regional Administrator finds that:

* * * * *

(2) A State has abused its discretion; or

* * * * *