ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 141 and 142

[EPA–HQ–OW–2017–0300; FRL–10001–16–OW]

RIN 2040–AF15

National Primary Drinking Water Regulations: Proposed Lead and Copper Rule Revisions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule, request for public comment.

SUMMARY: The Environmental Protection Agency (EPA) proposes regulatory revisions to the National Primary Drinking Water Regulation (NPDWR) for lead and copper under the authority of the Safe Drinking Water Act (SDWA). This proposed rule provides more effective protection of public health by reducing exposure to lead and copper in drinking water. This proposed rule also strengthens procedures and requirements related to health protection and the implementation of the existing Lead and Copper Rule (LCR) in the following areas: Lead tap sampling; corrosion control treatment; lead service line replacement; consumer awareness; and public education. This proposal does not include revisions to the copper requirements of the existing LCR. In addition, this proposal includes new requirements for community water systems to conduct lead in drinking water testing and public education in schools and child care facilities.

DATES: Comments must be received on or before January 13, 2020. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before December 13, 2019.

ADDRESSES: Submit your comments identified by Docket ID No. EPA–HQ–OW–2017–0300, at *http://www.regulations.gov*. Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or removed from *http://www.regulations.gov*. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose 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. The 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). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *https://www.epa.gov/dockets/commenting-epa-dockets*. 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 FURTHER INFORMATION CONTACT: Erik Helm, 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) 566–1049 (TTY 800–877–8339); email address: *Helm.Erik@EPA.gov*. For more information visit *https://www.epa.gov/dwreginfo/lead-and-copper-rule*.

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I. General Information

The United States has made tremendous progress in lowering children's blood lead levels. As a result of multiple Federal laws and regulations, including the 1973 phase-out of lead in automobile gasoline (40 CFR part 80, subpart B), the 1978 Federal regulation banning lead paint for residential and consumer use (16 CFR part 1303), the 1991 LCR (40 CFR part 141, subpart I), and the 1995 ban on lead in solder in food cans (21 CFR 189.240), the median concentration of lead in the blood of children aged 1 to 5 years dropped from 15 micrograms per deciliter in 1976–1980 to 0.7 micrograms per deciliter in 2013–2014, a decrease of 95 percent.

Although childhood blood lead levels have been substantially reduced as a result of these actions, data evaluated by the National Toxicology Program (NTP), 2012 demonstrates that there is sufficient evidence to conclude that there are adverse health effects associated with low-level lead exposure. Sources of lead include lead-based paint, drinking water, and soil contaminated by historical sources. The Federal Action Plan (Action Plan) to Reduce Childhood Lead Exposures and Associated Health Impacts, issued in December 2018, provides a blueprint for reducing further lead exposure and associated harm through collaboration among Federal agencies and with a range of stakeholders, including States, tribes, and local communities, along with businesses, property owners, and parents. The Action Plan is the product of the President's Task Force on Environmental Health Risks and Safety Risks to Children (Task Force). The Task Force is comprised of 17 Federal departments and offices including the Department of Health and Human Services (HHS) and the Department of Housing and Urban Development, which co-chaired the development of the Action Plan with EPA.

Through this plan, the EPA committed to reducing lead exposures from multiple sources including: Paint, ambient air, and soil and dust contamination, especially children who are among the most vulnerable to the effects of lead. To reduce exposure to lead in paint, the EPA published new, tighter standards for lead in dust on floors and windowsills to protect children from the harmful effects of lead exposure (84 FR 32632). These revised, strengthened standards will reduce the amount of lead in dust that causes adverse health effects and that may warrant measures to reduce risks. To address lead in soil, the EPA will continue to remove, remediate, and take corrective actions at contaminated sites, expand the use of Soil Screening, Health, Outreach and Partnership (SoilSHOP) health education events, and manage lead contamination at Superfund, a Resource Conservation and Recovery Act (RCRA) Corrective Action, and other sites. The EPA will also continue to work with State and tribal air agencies to implement the National Ambient Air Quality Standards and evaluate the impacts of lead emissions from aviation fuel. The EPA is also focused on conducting critical research and improving public awareness by consolidating and streamlining Federal messaging.

Lead and copper enter drinking water mainly from corrosion of lead and copper containing plumbing materials. Lead was widely used in plumbing materials until Congress banned its use in 1986, and there are an estimated 6.3 to 9.3 million homes served by lead service lines (LSLs) in thousands of communities nationwide, in addition to millions of older buildings with lead solder, and brass/bronze fittings and faucets across the U.S. To reduce exposure to lead through drinking water, the Action Plan highlights several key actions, including the EPA's commitment to making regulatory changes to the definition of lead-free plumbing products and assisting schools and childcare centers with the 3Ts approach (Training, Testing and Taking Action) for lead in drinking water. The Action Plan also highlights the EPA's continued support to States and communities by providing funding opportunities through the Drinking Water State Revolving Fund and the Water Infrastructure Finance and Innovation Act loan program for updating and replacing drinking water infrastructure. In addition, the Action Plan highlights three newly authorized grant programs under the Water Infrastructure Improvements for the Nation Act, for which Congress appropriated $50 million in FY2018, to fund grants to small and disadvantaged communities for developing and maintaining infrastructure, for lead reduction projects, and to support the voluntary testing of drinking water in schools and child care centers. The Action Plan also highlights the importance of preventing lead exposure from drinking water by working with States, tribes, and local stakeholders to share best practices and tools to better implement the NPDWR for Lead and Copper. For more information about the Federal Lead Action Plan see *https://www.epa.gov/sites/production/files/2018-12/documents/fedactionplan_lead_final.pdf.*

Since the implementation of the Lead and Copper Rule (LCR), drinking water exposures have declined significantly, resulting in major improvements in public health. For example, the number of the nation's large drinking water systems that have exceeded the LCR action level of 15 parts per billion has decreased by over 90 percent and over 95 percent of the all water systems have not reported an action level exceedance in the last three years (EPA–815–F–19–007). Despite this progress, there is a compelling need to modernize and improve the rule by strengthening its public health protections and clarifying its implementation requirements to make it more effective and more readily enforceable. Also, due to the financial and practical challenges of wide-spread replacement of lead pipes around the country, it is important to use our nation's resources wisely, and thus target actions where they are most needed and can provide the most good.

The LCR is a more complicated drinking water treatment technique regulation due to the need to control corrosivity of treated drinking water as

it travels through often antiquated distribution and plumbing systems on the way to the consumer's tap. States and public water systems require expertise and resources to identify the sampling locations and to work with customers to collect samples for analysis. Even greater expertise is needed for systems and states to identify the optimal corrosion control treatment and water quality parameter monitoring to assure that lead and copper levels are reduced to the extent feasible. The current structure of the rule compels additional protective actions on the part of a water system only after a potential problem has been identified (*i.e.,* the lead action level is exceeded), which may result in periods where the public is exposed to elevated levels of lead while the system evaluates and implements the actions required.

Water systems cannot unilaterally implement the actions that are needed to reduce levels of lead in drinking water. Homeowners must be engaged to assure successful lead service line replacement because in most communities, LSLs are partially owned by the water system and partially owned by the homeowner. Water systems must also engage with consumers to encourage actions such as flushing that reduce their exposure to lead in drinking water. The ability of water systems to successfully engage with consumers to reduce lead exposure can pose challenges to achieving the goals of the LCR.

The EPA has sought input over an extended period on ways in which the Agency could address the challenges to achieving the goals for the LCR. Section VIII of this notice describes the engagements the Agency has had with small water systems, state and local officials, the Science Advisory Board and the National Drinking Water Advisory Council (NDWAC). The Science Advisory Board provided their recommendations in 2012 (SAB, 2012). The NDWAC provided extensive recommendations on potential LCR revisions to the EPA in December 2015 (NDWAC, 2015).

This notice's proposal includes a suite of actions that approach the problem of lead contamination in drinking water from different perspectives but that taken together can further reduce lead exposure in drinking water. This approach focuses on six key areas:

1. *Identifying areas most impacted.* To help identify areas most in need of remediation, the EPA is proposing that all water systems complete and maintain a lead service line (LSL) inventory and collect tap samples from homes with LSLs if present in the distribution system. To reduce elevated levels of lead in certain locations, the EPA proposes to require water systems to "find-and-fix" the causes of these elevated levels (see Section III.K. of this notice).

2. *Strengthening treatment requirements.* The EPA is proposing to revise requirements for corrosion control treatment (CCT) based on the tap sampling results. The EPA's proposal also establishes a new trigger level of 10 µg/L. At this trigger level, systems that currently treat for corrosion would be required to re-optimize their existing treatment. Systems that do not currently treat for corrosion would be required to conduct a corrosion control study.

3. *Replacing Lead Service Lines.* The EPA is proposing to require water systems to replace the water system-owned portion of an LSL when a customer chooses to replace their customer-owned portion of the line. The EPA is also proposing to require water systems to initiate full lead service line replacement programs where tap sampling shows that lead levels in tap water exceed the existing action level and the proposed trigger level. The proposal requires systems that are above the trigger level but at or below the lead action level to set an annual goal for conducting replacements and for systems that are above the action level to annually replace a minimum of three percent of the number of known or potential LSLs in the inventory at the time the action level exceedance occurs. The proposal also prevents systems from avoiding LSLR by "testing out" with an LSL sample as is allowed in the current LCR.

4. *Increasing sampling reliability.* The EPA is proposing to prohibit tap sampling instructions that call for pre-stagnation flushing, the cleaning or removing of faucet aerators, and a requirement that tap samples be collected in bottles with a wide-mouth configuration. The EPA is also changing the criteria for selecting homes with LSLs when collecting tap samples. For example, the EPA is proposing tap sample site selection focus on sites with LSLs rather than copper pipe with lead solder.

5. *Improving risk communication.* The EPA is proposing to require systems to notify customers of an action level exceedance within 24 hours. It also requires systems to conduct regular outreach to the homeowners with LSLs. The EPA is also proposing to require that the LSL inventory, which would include location identifiers, be made publicly available.

6. *Protecting children in schools.* Since children risk the most significant harm from lead exposure, the EPA is proposing that community water systems (CWS) sample drinking water outlets at each school and each child care facility served by the system. The system would be required to provide the results to the school or child care facility and to provide information about the actions the school or child care facility can take to reduce lead in drinking water.

Through strengthened treatment procedures, expanded sampling, and improved protocols for identifying lead, the EPA's proposed revisions will require more water systems to progressively take more actions to reduce lead levels at the tap. Additionally, by improving transparency and communication, the proposed rule is expected to increase community awareness and further reduce sources of lead through enhanced LSLR. By taking the collective actions discussed throughout the proposal, the EPA, States, and water systems will be implementing a proactive holistic approach to more aggressively manage lead in drinking water.

A. What is the EPA proposing?

The EPA is proposing revisions to the LCR that strengthen public health protection and improve implementation of the regulation in the following areas: Lead tap sampling; CCT; LSLR; consumer awareness; and public education (PE). This proposal adopts a regulatory framework recommended in part by State co-regulators through the Association of State Drinking Water Administrators (ASDWA) and incorporates many recommendations provided to the EPA by the National Drinking Water Advisory Council (NDWAC). NDWAC is a *Federal Advisory Committee* that provides EPA with advice and recommendations related to the national drinking water program. The Council was established under the *Safe Drinking Water Act of 1974.* The EPA is proposing revisions to the LCR that would require water systems to take actions at lower lead tap water levels than currently required to reduce lead in drinking water and better protect public health. The agency is proposing to establish a new lead "trigger level" of 10 µg/L in addition to the 15 µg/L lead action level in the current LCR. Public health improvements would be achieved by requiring more water systems to take a progressive set of actions to reduce lead levels at the tap. These proposed actions are designed to reduce lead and copper exposure by ensuring effective CCT and re-optimization of CCT when water

quality declines; enhanced water quality parameter WQP) monitoring; establishment of a ''find-and-fix'' provision to evaluate and remediate elevated lead at a site where the individual tap sample exceeds the lead action level requiring water systems to create an LSL inventory to ensure tap sampling pools are targeted to the sites with elevated lead, and making consumers aware of the presence of a LSL, if applicable, and to facilitate replacement of LSLs. The LCR proposed revisions are expected to improve tap sampling by better targeting higher risk sites for lead contamination, *i.e.,* sites with lead service lines or lead containing plumbing materials and improving the sampling protocol. The EPA also proposes revisions to the LCR PE and Consumer Confidence Report (CCR) requirements to improve communication with consumers. In addition, this proposal includes requirements for community water systems (CWSs) to conduct lead in drinking water testing and PE in schools and child care facilities.

Together, these proposed revisions to the framework and specific requirements of the current LCR would result in greater public health protection at all sizes CWSs and non-transient non-community water systems (NTNCWSs). Implementation of the proposed revisions would better identify when and where lead contamination occurs, or has the potential to occur, and require systems to take actions to address it more effectively and sooner than required under the current rule.

The following table compares the major differences between the current Lead and Copper Rule (LCR) and proposed Lead and Copper Rule revisions (LCRR). In general, requirements that are unchanged are not listed. Comparison of current LCR and proposed LCR revisions (LCRR).

Current LCR	Proposed LCRR
Action Level (AL) and Trigger Level (TL)	
• 90th percentile (P90) level above lead AL of 15 µg/L or copper AL of 1.3 mg/L requires additional actions.	• 90th percentile (P90) level above lead AL of 15 µg/L or copper AL of 1.3 mg/L requires more actions than the current rule. • Defines trigger level (TL) of P90 >10 and ≤15 µg/L that triggers additional planning, monitoring, and treatment requirements.
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 but before the State ban on lead pipes and/or lead service lines (LSLs). • Systems must collect 50% of samples from LSLs, if available.	*Sample Site Selection:* • Changes priorities for collection of samples with a greater focus on lead service lines. • Prioritizes collecting samples from sites served by LSLs. • No distinction in prioritization of copper pipes with lead solder by installation date. • Systems must collect all samples from sites served by LSLs, if available.
Collection Procedure: • Requires collection of a one liter sample after water has sat stagnant for a minimum of 6 hours.	*Collection Procedure:* • Adds requirement that samples must be collected in wide-mouth bottles. • Prohibits sampling instructions that include 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. Schedule based on number of consecutive years meeting the following criteria: ○ Serves ≤50,000 people and ≤ lead & copper ALs. ○ Serves any population size, meets State-specified optimal water quality parameters (OWQPs), and ≤ lead AL. • Triennial monitoring also applies to any system with lead and copper 90th percentile levels ≤0.005 mg/L and ≤0.65 mg/L, respectively, for 2 consecutive 6-month monitoring periods. • 9-year monitoring waiver available to systems serving ≤3,300.	*Monitoring Frequency:* • Some samples may be analyzed for lead only when lead monitoring is conducted more frequently than copper. • Copper follows the same criteria as the current rule. • Lead monitoring schedule is based on P90 level for all systems as follows: ○ *P90 >15 µg/L:* Semi-annually at the standard number of sites. ○ *P90 >10 to 15 µg/L:* Annually at the standard number of sites. ○ *P90 ≤10 µg/L:* ▪ Annually and triennially at reduced number of sites using same criteria as current rule except copper 90th percentile level is not considered. ▪ Every 9 years based on current rule requirements for a 9-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 AL are subject to CCT requirements (*e.g.*, CCT recommendation, study if required by Primacy Agency, CCT installation). They can discontinue CCT steps if no longer exceed both ALs for two consecutive 6-month monitoring periods. • Systems must operate CCT to meet any Primacy Agency-designated OWQPs that define optimal CCT. • There is no requirement for systems to re-optimize.	*CCT:* • Specifies CCT requirements for systems with P90 level >10 to ≤15 µg/L: ○ *No CCT:* Must conduct a CCT study if required by Primacy Agency. ○ *With CCT:* Must follow the steps for re-optimizing CCT, as specified in the rule. • Systems with P90 level >15 µg/L: ○ *No CCT:* Must complete CCT installation regardless of their subsequent P90 levels. ○ *With CCT:* Must re-optimize CCT.

Current LCR	Proposed LCRR
	• Community water systems (CWSs) serving ≤10,000 people and non-transient water systems (NTNCWSs) can select an option other than CCT to address lead. *See Small System Flexibility.*
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.
Regulated 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.	*Regulated WQPs:* • Eliminates WQPs related to calcium hardness (*i.e.*, calcium, conductivity, and temperature).
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 AL. • 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 AL for two consecutive 6-month monitoring periods. • To qualify for reduced WQP distribution monitoring, P90 must be ≤10 µg/L and the system must meet its OWQPs.
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.
Find and Fix: No required follow-up samples or additional actions if an individual sample exceeds 15 µg/L.	*Find and Fix:* If individual tap sample >15 µg/L, systems must: • Collect a follow-up sample at each location >15 µg/L. • Conduct WQP monitoring at or near the site >15 µg/L. • Perform needed corrective action.
LSL Inventory and LSLR Plan	
Initial LSL Program Activities: • Systems were required to complete a materials evaluation by the time of initial sampling. No requirement to update materials evaluation. • No LSLR plan is required.	*Initial LSL Program Activities:* • All systems must develop an LSL inventory or demonstrate absence of LSLs within first 3 years of final rule publication. • LSL inventory must be updated annually. • All systems with known or possible LSLs must develop an LSLR plan.
LSLR: • Systems with LSLs with P90 >15 µg/L after CCT installation must annually replace ≥7% of number of LSLs in their distribution system when the lead 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. • Full LSLR, partial LSLR, and LSLs with lead sample results ≤15 µg/L ("test-outs") count toward the 7% replacement rate. • Systems can discontinue LSLR after 2 consecutive 6-month monitoring periods ≤ lead AL.	*LSLR:* • Rule specifies replacement programs based on P90 level for CWSs serving >10,000 people: ○ *If P90 >15 µg/L:* Must fully replace 3% of LSLs per year (mandatory replacement) for 4 consecutive 6-month monitoring periods. ○ *If P90 >10 to 15 µg/L:* Implement an LSLR program with replacement goals in consultation with the Primacy Agency for 2 consecutive 1-year monitoring periods. • Small CWSs and NTNCWSs that select LSLR as their compliance option must complete LSLR within 15 years if P90 >15 µg/L *See Small System Flexibility.* • Annual LSLR rate is based on number of LSLs when the system first exceeds the action level plus the current number of service lines of unknown materials. • Only full LSLR (both customer-owned and system-owned portion) count toward mandatory rate or goal-based rate. • All systems must replace their portion of an LSL if notified by consumer of private side replacement within 3 months of the private replacement. • Following each LSLR, systems must: ○ Provide pitcher filters/cartridges to each customer for 3 months after replacement. Must be provided within 24 hours for full and partial LSLRs. ○ Collect a lead tap sample at locations served by replaced line within 3 to 6 months after replacement.
LSL-Related Outreach: • When water system plans to replace the portion it owns, it must offer to replace customer-owned portion at owner's expense. • If 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.	*LSL-Related Outreach:* • Inform consumers annually that they are served by LSL or service line of unknown material. • 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 include information on LSLR program in public education (PE) materials that are provided in response to P90 > AL.

Current LCR	Proposed LCRR
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 P90 >10 µg/L to elect their approach to address lead with Primacy Agency approval: • Systems can choose CCT, LSLR, or provision and maintenance of point-of-use devices. • NTNCWSs can also elect to replace all lead-bearing materials.
Public Education and Outreach	
• All CWSs must provide education material in the annual Consumer Confidence Report (CCR). • Systems with P90 > AL must provide PE to customers about lead sources, health effects, measures to reduce lead exposure, and additional information sources • Systems must provide lead consumer notice to individuals served at tested taps within 30 days of learning results.	• CWSs must provide updated health effects language and information regarding LSLR program in the CCR. • If P90 > AL: ○ Current PE requirements apply. ○ Systems must notify customers of P90 > AL within 24 hours. • In addition, CWSs must: ○ Improve public access to lead information including LSL locations and respond to requests for LSL information. ○ Deliver notice and educational materials to customers during water-related work that could disturb LSLs. ○ Provide increased information to healthcare providers. ○ Provide lead consumer notice to customers whose individual tap sample is >15 µg/L within 24 hours. • *Also see LSL-Related Outreach in LSLR section of table.*
Change in Source or Treatment	
Systems on a reduced tap monitoring schedule must obtain prior Primacy Agency approval before changing their source or treatment.	Systems on any tap monitoring schedule must obtain prior Primacy Agency approval before changing their source or treatment.
Source Water Monitoring and Treatment	
• Periodic source water monitoring is required for systems with: ○ Source water treatment; or ○ P90 > AL and no source water treatment.	• Primacy Agencies can waive continued source water monitoring if the: ○ System has already conducted source water monitoring for a previous P90 > AL; ○ Primacy Agency has determined that source water treatment is not required; *and* ○ System has not added any new water sources.
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 cares that are classified as NTNCWSs must sample for lead and copper.	• CWSs must conduct lead in drinking water testing and PE at 20% of K–12 schools and licensed child cares in service area every year. • Sample results and PE must be provided to each sampled school/child care, Primacy Agency and local or State health department. • Excludes facilities built after January 1, 2014.
Primacy Agency Reporting	
Primacy Agencies must report information to EPA that includes but is not limited to: • All P90 levels for systems serving >3,300 people, and only levels >15 µg/L for smaller systems. • Systems that are required to initiate LSLR and the date replacement must begin. • Systems for which optimal corrosion control treatment (OCCT) has been designated.	Expands current requirements to include: • All P90 values for all system sizes. • The current number of LSLs and service lines of unknown material for every water system. • OCCT status of all systems including Primacy Agency-specified OWQPs.

B. Does this action apply to me?

Entities that could potentially be affected include the following:

Category	Examples of potentially affected entities
Public water systems	Community water systems (CWSs) (a public water system that (A) serves at least 15 service connections used by year-round residents of the area served by the system; or (B) regularly serves at least 25 year-round residents).

Category	Examples of potentially affected entities
	Non-transient, non-community water systems (NTNCWSs) (a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year).
State and tribal agencies	Agencies responsible for drinking water regulatory development and enforcement.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities that could be affected by this action. To determine whether your facility or activities could be affected by this action, you should carefully examine this proposed rule.

As part of this notice for the proposed rule, "State" refers to the agency of the State or tribal government which 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 the Safe Drinking Water Act (SDWA), the term "State" means the Regional Administrator, U.S. Environmental Protection Agency. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

II. Background

A. Health Effects of Lead and Copper

Exposure to lead is known to present serious health risks to the brain and nervous system of children. 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. Lead has acute and chronic impacts on the body. The most robustly studied and most susceptible subpopulations are the developing fetus, infants, and young children. Even low level lead exposure is of particular concern to children because their growing bodies absorb more lead than adults do, and their brains and nervous systems are more sensitive to the damaging effects of lead. The EPA estimates that drinking water can make up 20 percent or more of a person's total exposure to lead (56 FR 26548, June 7, 1991). Infants who consume mostly mixed formula made from tap water can, depending on the level of lead in the system and other sources of lead in the home, receive 40 percent to 60 percent of their exposure to lead from drinking water used in the formula. Scientists have linked lead's effects on the brain with lowered IQ and attention disorders in children. During pregnancy, lead exposure may affect prenatal brain development. Lead is stored in the bones and it can be released later in life. Even at low levels of lead in blood, there is an increased risk of health effects in children (*e.g.,* <5 micrograms per deciliter) and adults (*e.g.,* <10 micrograms per deciliter).

The 2013 Integrated Science Assessment for Lead (USEPA, 2013) and the U.S. Department of Health and Human Services' National Toxicology Program Monograph on Health Effects of Low-Level Lead (National Toxicology Program, 2012) have both documented the association between lead and adverse cardiovascular effects, renal effects, reproductive effects, immunological effects, neurological effects, and cancer. The EPA's Integrated Risk Information System (IRIS) Chemical Assessment Summary provides additional health effects information on lead (USEPA, 2004a). For a more detailed explanation of the health effects associated with lead for children and adults see Appendix D of the Economic Analysis (reference EA).

Acute copper exposure causes gastrointestinal distress. Chronic exposure to copper is particularly a concern for people with Wilson's disease because they are prone to copper accumulation in body tissue, which can lead to liver damage, neurological, and/or psychiatric symptoms.

B. Statutory Authority

The EPA is publishing these proposed revisions to the LCR under the authority of the Safe Drinking Water Act (SDWA), including sections 1412, 1413, 1414, 1417, 1445, and 1450 of the SDWA. 42 U.S.C. 300f *et seq.*

Section 1412(b)(7)(A) of the SDWA authorizes the EPA to promulgate a treatment technique "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). Section 1412(b)(9) provides that "[T]he Administrator shall, not less often than every six 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). In promulgating a revised NPDWR, the EPA follows the applicable procedures and requirements described in section 1412 of the SDWA, including those related to (1) the use of the best available, peer-reviewed science and supporting studies; (2) presentation of information on public health effects; and (3) a health risk reduction and cost analysis of the rule in 1412(b)((3)(A), B), (C) of the SDWA, 42 U.S.C. 300g–1(b)(3)(A)–(C).

Section 1414(c) of the SDWA, as amended by the Water Infrastructure Improvements for the Nation 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). The SDWA section 1414(c)(2) provides that the Administrator "shall, by regulation . . . prescribe the manner, frequency, form, and content for giving notice" under section 1414(c). 42 U.S.C. 300g–3(c)(2). The SDWA section 1414(c)(2)(C) specifies additional requirements for those regulations related to public notification of a lead action level exceedance "that has the potential to have serious adverse effects on human health as a result of short-term exposure," including requirements for providing notification to the EPA.

Section 1417(a)(2) of the SDWA provides that public water systems "shall identify and provide notice to persons that may be affected by lead contamination of their drinking water where such 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).

Section 1445(a) of the SDWA authorizes the Administrator to establish monitoring, recordkeeping, and reporting regulations, to assist the Administrator in establishing regulations under the SDWA, determining compliance with the SDWA, and in advising the public of the risks of unregulated contaminants. 42 U.S.C. 300j–4(a). In requiring a public water system to monitor under section 1445(a) of the SDWA, the Administrator may take into consideration the water system size and the contaminants likely to be found in the system's drinking water. 42 U.S.C. 300j–4(a). The SDWA section 1445(a)(1)(C) of the SDWA provides that "every person who is subject to a national primary drinking water regulation" under the SDWA, section 1412 must provide such

information as the Administrator may reasonably require to assist the Administrator in establishing regulations under section 1412. 42 U.S.C. 300j–4(a)(1)(C).

Under section 1413(a)(1) of the SDWA a State may exercise primary enforcement responsibility ("primacy") for NPDWRs when the EPA has determined that the State has adopted regulations that are no less stringent than the EPA's. 42 U.S.C. 300g–2(a)(1). To obtain primacy for this rule, States must adopt comparable regulations within two years of the EPA's promulgation of the final rule, unless the EPA grants the State a two-year extension. State primacy requires, among other things, adequate enforcement (including monitoring and inspections) and reporting. The EPA must approve or deny State primacy applications within 90 days of submission to the 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 the new regulation while the EPA's decision on the revision is pending. 42 U.S.C. 300g–2(c).

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

C. Regulatory History

The EPA published the LCR on June 7, 1991, to control lead and copper in drinking water at the consumer's tap. The rule established a NPDWR for lead and copper consisting of treatment technique requirements that include CCT, source water treatment, LSLR, and PE. The rule established an action level of 0.015 mg/L or 15 µg/L for lead and 1.3 mg/L or 1,300 µg/L for copper. The action level is a concentration of lead or copper in the water that determines, in some cases, whether a water system must install CCT, monitor source water, replace LSLs, and undertake a PE program. The action level is exceeded if the concentration in more than 10 percent of tap water samples collected during any monitoring period is greater than the action level (*i.e.,* if the 90th percentile level is greater than the action level). If the 90th percentile value for tap water samples is above the action level, it is not a violation, but rather compels actions, such as WQP monitoring, CCT, source water monitoring/treatment, PE, and LSLR. Failure to take these actions results in the water system being in violation of the treatment technique or monitoring and reporting requirements.

In 2000, the EPA promulgated the Lead and Copper Rule Minor Revisions or LCRMR, which streamlined requirements, promoted consistent national implementation, and in many cases, reduced burden for water systems. One of the provisions of the LCRMR required States to report the lead 90th percentile to the EPA's Safe Drinking Water Information System (SDWIS) database for all water systems serving greater than 3,300 persons. States must report the lead 90th percentile 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. In 2004, the EPA published minor corrections to the LCR to reinstate text that was inadvertently dropped from the rule during the previous revision.

In 2004, the EPA undertook a national review of the LCR and performed a number of activities to help identify needed actions to improve implementation of the LCR. The EPA collected and analyzed lead concentration data and other information required by the LCR, carried out review of implementation by States, held four expert workshops to further discuss elements of the LCR, and worked to better understand local and State efforts to test for lead in school drinking water, including a national meeting to discuss challenges and needs. The EPA used the information collected during the national review to identify needed short-term and long-term regulatory revisions to the LCR.

In 2007, the EPA promulgated a set of short-term regulatory revisions and clarifications to strengthen implementation of the LCR in the areas of monitoring, treatment, customer awareness, LSLR, and improve compliance with the PE requirements to ensure drinking water consumers receive meaningful, timely, and useful information needed to help them limit their exposure to lead in drinking water. Long-term issues, requiring additional research and input, were identified for a subsequent set of rule revisions. In this proposed rule, the EPA is addressing those longer-term revisions to further improve public health protection.

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

A. Lead Trigger Level

The EPA is proposing to establish a new lead "trigger level" of 10 µg/L and retain the 15 µg/L lead action level in the current LCR. The EPA established the lead action level in the 1991 based on feasibility and not based on impact on public health. The proposed trigger level is also not a health based standard. The EPA is not revising the 1991 determination that achieving the action level of 15 µg/L is feasible. The EPA is proposing the lead trigger level because the Agency has determined that meaningful reductions in drinking water lead exposure could be achieved by requiring water systems to take a progressive set of certain actions to reduce lead levels at the tap. The EPA proposes that 10 µg/L is a reasonable threshold to require water system to undertake actions. The concept of including additional thresholds to compel actions before an action level exceedance was suggested by the ASDWA during the federalism consultation process (USEPA, 2018). This regulatory framework is similar to other national primary drinking water regulations (NPDWRs), such as the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), which requires increasing levels of remedial action based on the concentration of the contaminant. The proposed LCRR sets the fewest requirements for systems at or below the TL and the most stringent requirements for systems above the lead AL. The Agency is requesting comment on the appropriate level and other aspects relating to the trigger level in Section VII.

In the event of a trigger level exceedance, the actions water systems would be required to take vary based on characteristics of the system. For example, small CWSs serving populations of 10,000 or fewer persons and all sizes of NTNCWS that exceed the lead trigger level, but not the lead action level, would evaluate the small system flexibilities described in Section III.E. of this notice. Under this proposal, medium and large CWSs that exceed the trigger level, but do not exceed the action level, would be required to implement requirements based on their CCT and LSL status as described below.

Water systems with CCT in place and with no LSLs or service lines of unknown materials would be required to: Re-optimize CCT (see Section III.B.2); and conduct annual tap sampling (no reduced monitoring (see Section III.G.2)).

Water systems without CCT in place and with no LSLs or service lines of unknown materials would be required to: Conduct a CCT study and obtain State approval for designated CCT (see Section III.B.2); and conduct annual tap sampling (no reduced monitoring (see Section III.G.2)).

Water systems with CCT in place and with LSLs or service lines of unknown

materials would be required to: Re-optimize CCT (see Section III.B.2); notify customers with LSLs or unknowns (see Section III.F.1); implement goal based LSLR program (see Section III.D.3); and conduct annual tap sampling (no reduced monitoring (see Section III.G.2)).

Water systems without CCT in place and with LSLs or service lines of unknown materials would be required to: Conduct a CCT study and obtain State approval for designated CCT (see Section III.B.2. of this notice) notify customers with an LSL or unknowns (see Section III.F.1); implement goal based LSLR program (see Section III.D.3. of this notice); and conduct annual tap sampling (no reduced monitoring (see Section III.G.2 of this notice)).

B. Corrosion Control Treatment

Corrosion in water systems is defined as the electrochemical interaction between a metal surface such as pipe wall or solder and water. During this interaction, metal is oxidized and transferred to the water. Metal release is a function of the reactions that occur between the metal ions released due to corrosion, and the physical, chemical, and biological characteristics of the water and the metal surface (USEPA, 2016c). Corrosion control treatment involves changing water quality characteristics including alkalinity, pH, and dissolved inorganic carbon or addition of a corrosion inhibitor such as orthophosphate to reduce the rate of metal release into the water.

Under the current LCR, all water systems serving more than 50,000 people were required to install corrosion control treatment (CCT) soon after the LCR went into effect, unless they were deemed to have optimized corrosion control. Water systems serving fewer than 50,000 people are not required to install CCT under the current rule unless the water system exceeds the lead or copper action level. Water systems serving 50,000 or fewer people that exceed the action level and have not yet installed CCT must begin working with their State to monitor water quality parameters (WQPs) and install and maintain CCT. Those systems may stop the process of identifying and installing CCT if they meet both the lead and copper action levels during each of two consecutive 6-month monitoring periods. Given the critical role of CCT in reducing lead in drinking water and protecting the health of all water system consumers, the EPA is proposing several revisions to the LCR to reflect current understanding of the efficacy of various corrosion control treatments and to assure robust evaluation of corrosion control treatment effectiveness at each system.

1. Corrosion Control Evaluation During Sanitary Surveys

The EPA is proposing changes to the current sanitary survey to include requirements for states to include an evaluation of CCT as part of the survey. States are required to regularly perform sanitary surveys of public water systems in accordance with the Interim Enhanced Surface Water Treatment Rule (§ 141.723) and the Ground Water Rule (§ 141.401). The requirements for the sanitary survey may include an evaluation of the drinking water source, operation and maintenance of water system equipment, and compliance with local and national drinking water standards. There are eight elements addressed during a sanitary survey. These elements include: Source; treatment; distribution system; finished water storage; pumps, pump facilities and controls; monitoring, reporting, data verification; system management and operation; and operator compliance with State requirements. These sanitary surveys do not currently contain requirements specific to the LCR.

EPA believes that the sanitary survey is a fitting opportunity for states to review the system's implementation of OCCT and to assure there are not deficiencies that could interfere with the capability of the drinking water system to consistently and reliably deliver an adequate quality and quantity of safe drinking water to the consumer. The NDWAC (NDWAC, 2015) and ASDWA (USEPA, 2018) recommended a periodic evaluation of CCT as a part of the sanitary survey.

States would be required to review CCT and to assess WQPs during sanitary surveys for water systems that have installed CCT. The review must consider any updated EPA guidance on CCT during the sanitary survey. Reviewing updated EPA CCT guidance is consistent with the National Drinking Water Advisory Council's (NDWAC, 2015) recommendations to reevaluate CCT and WQP based upon updated EPA guidance and as best practices continue to evolve as new information and science emerges. This proposed revision will promote regular review of CCT and WQPs by states and will enhance consistency and efficacy by allowing states to consider new information and CCT guidance, as appropriate, during sanitary surveys. By combining the review of the CCT with the existing sanitary survey requirement of the Public Water System Supervision program, states and water systems can cost effectively assure regular review of the treatment technique.

2. Corrosion Control Treatment Requirements Based on Lead 90th Percentile

The EPA is proposing revisions to the LCR provisions by requiring the installation of CCT or optimization of CCT based on the lead 90th percentile level. The current rule provisions for CCT are based primarily on the water system size, and only require small and medium-sized water systems (serving 50,000 or fewer people) to meet CCT requirements if they exceed the lead or copper action level. Before installing CCT, water systems must make an optimized CCT recommendation to the state or conduct a CCT study, if required to do so. However, these water systems can discontinue CCT steps if their 90th percentile levels are at or below the lead and copper action levels for two consecutive 6-month monitoring periods. The CCT steps are only commenced after a subsequent lead action level exceedance. Under the current rule, once a water system has optimized CCT, there are no requirements for water systems to adjust or re-evaluate CCT, even after an action level exceedance or a failure to meet optimal water quality parameters (OWQPs), unless directed to do so by the State. Under the current LCR, States may, but are not required to, modify the designated CCT on its own initiative or in response to a request by a water system or other interested party, when it concludes that a change is necessary to ensure the system continues to optimize corrosion control treatment.

The EPA is proposing to mandate additional CCT requirements based on the water system's lead 90th percentile level and CCT status. All water systems with CCT that have a lead trigger level exceedance (>10 μg/L but ≤15 μg/L) or a lead action level exceedance (≥15 μg/L) will be required to re-optimize their CCT. Water systems would be required to make a re-optimization recommendation and receive state approval following the procedures described in proposed § 141.82(a). The state may require the water system to conduct a CCT study.

This proposal would require water systems without CCT that exceed the lead trigger level (10 μg/L) to conduct a CCT study and make a CCT recommendation in accordance with proposed revisions in § 141.82(a). The CCT recommendation would be implemented if the water system exceeds the lead action level in subsequent tap sampling. Water systems without CCT that have previously

conducted a CCT study and made CCT recommendations would not be required to prepare a new CCT study if they exceed the trigger level again unless the state determines that a new study is required due to changed circumstances, such as addition of a new water source or changes in treatment or if revised CCT guidance has been issued by the EPA since the study was conducted. The state may also determine that a new CCT study is needed due to other significant information becoming available.

The EPA is proposing changes to the CCT options that water systems must consider and the methods by which water systems would evaluate those options. As described later in this section, the EPA is proposing to remove calcium carbonate stabilization as a CCT option. The EPA is also proposing to require water systems to evaluate two additional options for orthophosphate-based corrosion control. The current requirement for evaluating orthophosphate-based corrosion inhibitor specifies that systems must evaluate maintaining an "effective residual concentration in all test tap samples." The EPA has determined, based upon experience in implementing these requirements, that systems may not be evaluating a full range of orthophosphate residual concentrations to achieve optimal corrosion control. Therefore, the EPA is proposing to add two new treatment options for evaluation as a part of corrosion control studies: Maintaining a 1 mg/L orthophosphate residual concentration and maintaining a 3 mg/L orthophosphate residual concentration.

The EPA is also proposing changes to the methodologies by which systems evaluate CCT options. The EPA is proposing to clarify that metal coupon tests can only be used as a screen to reduce the number of options that are evaluated using pipe rig/loops. Metal coupon tests would no longer be able to be used as the basis for determining the optimal corrosion control treatment (OCCT). The EPA is proposing this change based upon experience with implementing the rule and the concern that metal coupons are not representative of the existing condition of the lead service lines (LSLs) or leaded plumbing materials that are present in the distribution system and which have scales that have formed as a result of being exposed to the drinking water over a number of years (Ministry of Ontario, 2009).

The EPA is also clarifying cases when systems choose to conduct coupon studies to screen potential options and/or pipe rig/loop studies; these systems cannot exclude a treatment option from the study based upon potential effects on other water quality treatment processes. Systems that are conducting coupon screening studies and/or pipe loop/rig studies should identify potential constraints, such as the impact of CCT options or treatment chemicals may have on other water quality treatment processes. Those impacts should be noted and considered as part of the CCT study design. For example, water systems conducting a corrosion control study would be required to consider pH and alkalinity adjustment but must also consider how adjustment of pH could affect compliance with other NPDWRs. Increased pH may result in increased formation of total trihalomethanes and result in an exceedance of the maximum contaminant level for those contaminants. Conversely, decreases in pH may result in increased formation of haloacetic acids and result in an exceedance of the maximum contaminant level for those contaminants. Rather than rule out pH and alkalinity adjustment as a CCT strategy because of simultaneous compliance concerns, systems should determine an upper bound pH, where the increase in pH would create increased trihalomethanes and incorporate that into the corrosion control study design.

Similarly, the use of orthophosphate for corrosion control can increase the phosphorus loading to wastewater treatment facilities. Increased phosphorus loading may be a concern for wastewater systems with phosphorus discharge limits or for systems that discharge into water bodies where phosphorus is a limiting nutrient. However, the EPA is proposing that water systems conducting corrosion control studies would not be able to rule out orthophosphate simply based on the increase in loading to wastewater treatment facilities. In designing the CCT studies, water systems would evaluate the orthophosphate treatment options in the coupon screening and/or pipe loop/rig studies. When selecting the optimal CCT, States and water systems would consider phosphorus removal treatment that may be needed by the receiving wastewater treatment system to meet any phosphorus discharge limits or otherwise prevent impacts to water quality. The EPA has examined the potential costs of additional phosphorus usage on wastewater treatment systems as described in section VI.C.9 of this notice. The EPA is proposing that a water system that exceeds the lead action level (15 μg/L), that has previously not exceeded the lead trigger level and does not have CCT installed, would be required to conduct a CCT study, make a treatment recommendation, and obtain State approval for the treatment recommendation. The EPA proposes that systems be required to complete these steps even if the system meets the lead action level in two subsequent, consecutive 6-month monitoring periods over the course of this process. Water systems that meet the action level for two consecutive 6-month monitoring periods before installing the State-approved treatment would be required to install that CCT upon any subsequent action level exceedance. The EPA proposes to retain the current LCR provision that allows a State to waive the requirement for a CCT study. This proposal includes flexibilities for small systems related to CCT (see section III.E. of this notice).

3. Calcium Carbonate Stabilization

The EPA is proposing to remove calcium carbonate stabilization as a potential CCT technique and thus calcium as a regulated WQP. The EPA is proposing to eliminate the option of calcium carbonate stabilization as a CCT because literature indicates that calcium carbonate does not form a film on lead and copper pipes to a level that makes it effective as a CCT option (AwwaRF and DVGW—Technologiezentrum Wasser, 1996; Schock and Lytle, 2011; Hill and Cantor, 2011). The EPA proposes the removal of WQP monitoring related to calcium hardness in the current rule, which includes monitoring for calcium, conductivity, and water temperature. Under this proposal, water systems would also not be required to analyze effects of calcium hardness adjustments during their CCT evaluations. All other CCT options, including alkalinity and pH adjustment and the addition of a phosphate- or silicate-based corrosion inhibitor, will be maintained from the current rule. The best available science has identified these as the most effective treatment options at this time (USEPA, 2003; Wilczak et al., 2010; Schock and Lytle, 2011). These changes are being proposed to assure the efficacy of CCT, to the extent feasible, based upon best available peer-reviewed science.

C. Lead Service Line Inventory

The EPA is proposing revisions to the current lead service line inventory requirements of the LCR because the Agency believes that better information regarding the number and locations of lead service lines is critical to a water

system's ability to inform the public about the potential risks of lead in drinking water and to assure reductions in drinking water lead exposure. Numerous studies have evaluated the contribution of lead in drinking water from different sources (*e.g.,* service lines, faucets, meters). A study published by American Water Works Association (AWWA) Water Research Foundation (2008) "Contributions of Service Line and Plumbing Fixtures to Lead and Copper Rule Compliance Issues" (Sandvig et al., 2008) estimates that 50 percent–75 percent of lead in drinking water comes from LSLs, while the remainder comes from leaded solder, brass/bronze fittings, galvanized piping, faucets, and water meters. Given that LSLs are the greatest contributor of lead in drinking water, identifying the locations and, where necessary, removing this source of lead from drinking water, is a critical component of this proposed rule.

Under the current regulations, water systems are required to identify construction materials of their drinking water distribution system including lead and galvanized piping and to conduct a materials evaluation to locate the requisite number of sampling sites, and to seek to collect information on service line materials, where possible, during normal operation such as reading water meters or performing maintenance activities. In practice, many water systems have only identified service line materials to fulfill the tap sampling tiering requirement and have not done a full accounting of service line materials throughout their entire distribution system. This has led to uncertainty regarding local and national estimates of locations and numbers of LSL. This uncertainty creates compliance challenges for water systems that exceed the lead action level after installing CCT because water systems are forced to concurrently determine the total number of LSLs in the distribution system while replacing seven percent of their LSLs, all within one year. Without an LSL inventory, water systems also face challenges communicating the risk of lead in drinking water to the public at large as well as to individual customers, who may seek information about their own service line so they can take measures to protect themselves and their family. Lack of an LSL inventory also results in a lost opportunity to improve the cost efficiency of LSLR by conducting replacements in tandem with main replacement activities or in neighborhoods where LSLs are most prevalent, or in accordance to policy goals, such as prioritizing LSLR at schools, childcare facilities, and homes with children. For example, the city of Galesburg, IL prioritizes LSLR at homes of low- to moderate-income with children under the age of six (Galesburg, 2016).

In addition, even those systems that have made efforts to identify their LSLs do not always make the information publicly available. Informed customers are better able to take actions to limit exposure to lead in drinking water and make decisions regarding replacement of their portion of an LSL. For water systems publicly available information is ". . . important for successful, proactive outreach to customers who are most likely to have a LSL" (NDWAC, 2015). Making the LSL inventories publicly available, including the total number of LSLs in the distribution system and their general locations, would increase water system transparency so customers can better understand the prevalence of lead sources in drinking water.

Incomplete or non-existent LSL inventories also lead to uncertainty in developing a national estimate, which could range from 6.3 million (Cornwell et. al., 2016) to 9.3 million (USEPA, 1991) LSLs in place. Information about the numbers of LSLs in public water systems is critical to supporting various actions focused on reducing exposure to lead in drinking water. For example, the EPA is targeting funding and financing programs such as the Water Infrastructure Improvements for the Nation Act (United States, 2016) grant programs, the Drinking Water State Revolving Fund (DWSRF), and the Water Infrastructure Finance and Innovation Act (WIFIA) program to reduce lead exposure through infrastructure projects that include full LSLR. Water systems that have prepared an LSL inventory will be better able to demonstrate their priority for infrastructure financing assistance. In America's Water Infrastructure Act (United States, 2018), Congress recognized the importance of increasing the understanding about the extent of LSLs in the nation by mandating the EPA include an assessment of costs to replace all LSLs, including the customer-owned portion of the LSL to the extent practicable, in the Drinking Water Infrastructure Needs Survey and Assessment (DWINSA). Moreover, an LSL inventory will lead to increased awareness of consumers regarding whether they are served by an LSL, which could improve public health protection if affected consumers take action to reduce their exposure to lead in drinking water.

Other organizations have recognized the benefits of LSL inventories and expressed support for a requirement that water systems create a LSL inventory. The Association of Drinking Water Administrators (ASDWA) published a white paper titled "Developing Lead Service Line Inventories Presented by the Association of State Drinking Water Administrators" with recommendations for developing LSL inventories and examples of States that already have implemented mandatory and voluntary LSL inventory programs (Association of State Drinking Water Administrators, 2019). The Government Accountability Office (GAO) recommended that EPA "require states to report available information about lead pipes to EPA's SDWIS/Fed (or a future redesign such as SDWIS Prime)", in its revision of the LCR (GAO–18–620, 2018). The National Drinking Water Advisory Council (NDWAC) recommended that water systems create and update LSL inventories and "establish a clear mechanism for customers to access information on LSL locations (at a minimum)" (NDWAC, 2015).

The EPA is proposing that all water systems create an inventory of all water system-owned and customer-owned LSLs in its distribution system. The inventory could be submitted in one of a variety of formats, for example a list, table, or map with a corresponding LSL status (*i.e.,* LSL, non-LSL, unknown) with a location identifier of the LSL (*e.g.,* street, intersection, landmark). The EPA is not proposing that addresses be used in making the LSL inventory publicly available however, the Agency is requesting comment on this issue in Section VII. A water system would not be precluded by the proposed regulation, from choosing to include specific addresses served by LSLs in their inventory. An example of this is DC Water's LSL map (DC Water, 2016). Large systems, serving greater than 100,000 persons, would be required to post the inventory to a publicly-accessible site on the internet to facilitate easier access for their customers. This is consistent with requirements for community water systems related to their annual Consumer Confidence Report (40 CFR 141.155(f)). All other systems (*i.e.* those serving 100,000 persons or fewer), would simply be required to make the inventory available to the public (*e.g.,* available for review at the water system's headquarters).

Under this proposal, a water system would submit an initial inventory to their Primacy Agency by three years after the final rule publication date. To create the initial LSL inventory water

systems would review plumbing codes, permits, and records in the files of the building department(s) that indicate the plumbing materials that are installed within publicly and privately-owned structures. In addition, inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system would be utilized. Because water systems may not have complete records to enable them to identify the material for every service line, the EPA is proposing that systems identify the service lines of unknown material and update the inventory on an annual basis to reflect LSLRs that have occurred, or verifications of service lines of unknown material through the course of normal operations or targeted inventorying efforts. In addition to updating the inventory on an annual basis, EPA recommends, but does not require, that water systems update the inventory as new information becomes available. Improving the inventory over time in tandem with other infrastructure work will minimize the cost of inventory completion, since projects like main replacement require excavation of the street and exposure of service lines underneath. The water system could choose to speed inventory development by devoting resources to determine service line materials independent of other water system work. The EPA recommends, but does not require, that the material of non-LSLs be identified, such as plastic or copper. While not required, water systems could benefit from recording the material of all service lines to improve its accounting of water system assets and help plan for capital improvement activities.

These proposed requirements are consistent with the ASDWA white paper on LSL inventories. ASDWA recommends that a "one-time, preliminary inventory report [be] followed by a comprehensive inventory report a few years later". "The preliminary report would be completed in three years, and the water system would update its inventory each year to work towards a comprehensive inventory by verifying service lines of unknown material." ASDWA also recommends that reports should be made publicly available through a user-friendly, online portal, with the option to download all inventory reports in a single file. The EPA is proposing this requirement while allowing additional flexibilities to smaller systems who wish to submit the inventory in paper format. Water systems using a paper format would still be required to make the inventory available to the public. The EPA is proposing the initial inventory be completed by the rule compliance date, three years after promulgation, so that other proposed rule requirements, such as tap sample site selection, PE delivery, and LSLR requirements, can be implemented on the final rule compliance date.

The EPA has determined it is feasible for water systems to prepare LSL inventories because the current regulations required water systems to identify these construction materials in their distribution system to identify tap sampling sites, and to collect information on service line materials where possible in the course of normal operation, such as reading water meters or performing maintenance activities. In addition, any water system that was required to begin LSLR under the current rule would also have been required to identify the initial number of LSLs in its distribution system at the time the replacement program begins pursuant to § 141.84(b)(1). However, the Agency requests comment in Section VII of this notice on the proposed inventory.

ASDWA's white paper lists several examples of states that have mandatory or voluntary LSL inventory programs, and notes that even voluntary LSL inventory programs have had response rates that cover over 90% of service lines (Association of State Drinking Water Administrators, 2019). Many states have already begun requiring water systems to create and maintain LSL inventories. In particular, Illinois, Ohio, and Michigan have such requirements and are estimated to rank first, second, and third, respectively, of States with the highest number of LSLs in the nation (Cornwell et. al., 2016).

Illinois CWSs were required to create their LSL inventory in one year and report a count of all known water system-owned and customer-owned LSLs. Water systems in Illinois are required by the State of Illinois to update their inventory annually until it is complete (State of Illinois, 2017). Ohio CWSs and NTNCWSs with LSLs had six months to map their LSLs and are required to update it every five years. If a water system in Ohio certifies it has no LSLs, it is not required to create a map (State of Ohio, 2016). Michigan's updated LCR promulgated in June 2018 requires water systems to create an inventory of all materials in their distribution system by January 1, 2020, based on existing information. The inventory includes both the water system-owned and customer-owned portions of the LSL and requires service lines of unknown material to be designated as such. The inventory must also identify lead materials present in "piping, storage structure, pumps, and controls used to deliver water to the public, including service lines" (State of Michigan, 2017), the scope of which could cover goosenecks and several other sources of lead. By January 1, 2025, water systems must submit a complete inventory, along with material verification methodology, including any instances of customer denial to access private property to inspect the customer-owned service line. The inventory must be updated every five years (State of Michigan, 2017). Other States with LSL inventory requirements include Wisconsin and California. Since 2004, Wisconsin has required annual reporting of the number of service lines of each material (grouped by pipe diameter) owned by the water system. In 2018, the requirement was changed to include the customer-owned portion of the service line (Association of State Drinking Water Administrators, 2019). California water systems were required to inventory known LSLs and areas that may contain LSLs in their distribution systems (State of California, 2016).

As recommended by the Government Accountability Office (GAO–18–620, 2018), the EPA has identified several techniques that can be used to identify lead and galvanized service lines. The current rule lists several sources of information that may indicate or confirm the presence of an LSL, including plumbing codes; permits and records; inspections and records of distribution system materials; existing water quality information to indicate locations that are most likely to have higher lead levels; and relevant legal authorities (*i.e.,* contracts and local ordinances). Under this proposal, the EPA expects water systems to create their initial inventory using these available information sources and to update LSL inventories with information on service line materials discovered in the course of normal operation, such as maintaining water meters.

Under this proposal, a State could establish additional inventory development methods, such as allowing consumers to self-identify and report their service line material, using sequential tap sampling to identify LSLs, or using other techniques such as physical inspection or scratch tests, hydrovacing, or trenching (ANSI C810–17 Replacement and Flushing of Lead Service Lines, 2017).

The EPA is proposing that water systems designate any service line whose material cannot be confirmed by

the rule compliance date as unknown. The EPA believes that water systems need accurate information about the number and locations of lead service lines in order to effectively implement actions to reduce drinking water lead exposure. The Agency also recognizes that many systems do not have complete records and that excavating test pits can be expensive and may disturb lines, resulting in lead release. The Agency believes that treating unknown lines as lead will provide an incentive for water systems to collect information on the composition of service lines through their normal maintenance activities such as meter calibration, because doing so would reduce the burden associated with other aspects of the rule, such as LSLR and notification to LSL customers. If a service line of unknown material is determined to be non-lead, it would reduce the number of LSLs required to be replaced each year should the water system exceed the action level. Fewer service lines of unknown material would also result in reduced burden associated with delivery of customer LSL notification and fewer goal-based or mandatory LSLR should the water system exceed the lead trigger level or action level, if the unknowns are identified as non-lead. If any service lines originally inventoried as non-lead are later discovered to be LSLs, these service lines would be included for establishing replacement rates and for conducting outreach to customers with LSLs. This requirement follows the recommendation provided to the EPA by the NDWAC, to grant water systems the flexibility to create an inventory that allows for the uncertainty of service line materials that cannot be verified by records or other means within three years, while at the same time ensuring that consumers potentially served by an LSL are provided adequate protections. For example, water systems would provide targeted public education to consumers served by a service line of unknown material, informing them that their service line may be an LSL and advising them about actions they can take to reduce their exposure to lead in drinking water. Without this public education, consumers drinking water delivered by a service line of unknown material may not have any awareness of the potential risk of lead exposure from their drinking water or how to reduce their risk.

Under this proposal, while water systems would assume unknown service lines are LSLs for purposes of establishing replacement rates and for conducting outreach to customers with LSLs, they would not include these sites in their Tier 1 tap sampling pool. The proposed tap sample tiering requirements designate sites served by an LSL as Tier 1 to assure prioritization of sites that are the most likely to yield elevated lead levels in drinking water, therefore the EPA is proposing to exclude service lines of unknown material from Tier 1 classification to prevent the dilution of the Tier 1 sample pool with potential non-LSL sites. ASDWA's white paper on LSL inventories summarizes how service lines of unknown material are treated in inventories around the country. Illinois, California, and Michigan allow water systems to designate service lines as "unknown" in their inventories. In California, water systems must include service lines of unknown material in their LSLR plan "to encourage water systems to investigate their unknown lines." (Association of State Drinking Water Administrators, 2019). Michigan water systems can include service lines of unknown material in their initial inventory due January 1, 2020, however by January 1, 2025, they must have verified all service line materials, with the option to document any instances of customer denial to access private property to inspect the customer-owned service line (State of Michigan, 2017). The EPA requests comment in Section VII of this notice on the appropriate treatment of unknown lines in an inventory.

Galvanized service lines can contribute to lead in drinking water due to lead in the zinc coating, or absorption of lead particles in corrosion scales if they are or have ever been downstream of an LSL (McFadden et. al., 2011; HDR, 2009). The proposed rule would define galvanized service lines that are currently or were formerly downstream of an LSL, as an LSL. Therefore, these lines would be listed in the LSL inventory, counted in the replacement rate calculation, and included in the notifications delivered to consumers of LSLs. Michigan's updated LCR takes a similar approach, requiring replacement of galvanized service lines "if the service line is or was downstream of lead piping" (State of Michigan, 2017). The proposed tap sample tiering requirements would not allow these galvanized service lines to be considered LSLs for purposes of collecting tap samples to assure prioritization of sites that are the most likely to yield elevated lead levels in drinking water, such as those made of one hundred percent lead.

D. Lead Service Line Replacement

The current rule requires water systems with optimized corrosion control treatment (OCCT) to replace LSLs after exceeding the lead action level. Although the water system must meet an annual LSLR rate of seven percent, the current rule allows for water systems to meet the requirement without conducting any full LSLRs because a water system can count an LSL as replaced if the service line is "tested out" or partially replaced. LSLs are "tested out" when sampling shows lead concentrations at or below 15 µg/L throughout the entire profile of the service line. Additionally, many communities around the country split ownership of the service line between the water system and the customer, which can often result in a partial LSLR being conducted when the customer does not agree to have his or her portion removed. "Test outs" and partial LSLR both count as replacements under the current rule, but neither are as effective at reducing lead in drinking water as full LSLR.

Additionally, the current rule does not require the water system to plan for its LSLR program before it is required to conduct mandatory LSLR. Water systems must work out the technical, financial, customer coordination, and other logistics of starting a LSLR program in the same period they must begin replacement of LSLs. This approach can create challenges for the water system because planning for LSLR takes time, which jeopardizes the system's ability to meet the seven percent replacement rate. It could also render LSLR more expensive if the water system has not evaluated and optimized the operational and financial aspects of LSLR.

1. Lead Service Line Replacement Plan

The EPA is proposing that all water systems with LSLs or service lines of unknown material, and regardless of their 90th percentile lead level, must prepare an LSLR plan. Under this proposal, a water system would submit the plan by three years after the final rule publication date. Developing an LSLR plan while creating an LSL inventory provides efficiencies in the planning process and will prepare water systems to quickly commence a goal-based, or mandatory full LSLR program should they exceed the lead trigger or action level, or to coordinate a replacement with an emergency repair or a customer initiating a replacement of their line.

Under this proposal, the plan would include procedures to conduct full LSLR and to alert and inform consumers before a full or partial lead service line replacement. It must also include a lead service line replacement goal rate,

developed in coordination with the State, should the water system exceed the lead trigger level. To address short term increases in lead levels following LSLR, the plan must include a pitcher filter tracking and maintenance system and flushing procedures for the service line and premise plumbing inside the home. Water system organizations, such as AWWA, have developed guidance and procedures for LSLR and flushing that a water system could use or reference in its LSLR plan. The plan must also include a funding strategy for conducting lead service line replacements.

In the plan's funding strategy, the water system would identify how it will pay for the replacement of the water system-owned portion of the LSL, such as through its capital improvement fund or the use of a low-interest rate loan from the DWSRF. Although water systems are not required to pay for replacement of customer owned lead service lines, the EPA encourages water systems to develop programs to financially assist these customers in replacing their lead service lines. The EPA has identified several types of assistance, such as loans and grants from the federal government or funded by rate revenue, as well as private funding partnerships (Strategies for Achieving Full LSLR, docket EPA–HQ–OW–2017–0300).

The LSLR plan would include a procedure for customers to flush service lines and premise plumbing of particulate lead. Flushing reduces particulate lead that may have been released into drinking water after LSL disturbance or replacement. For purposes of the flushing requirements in the proposed rule, the EPA considers a service line disturbance as planned work or an emergency repair that requires water service to the consumer be shut off. Water shutoffs can disturb lead pipes due to hydraulic scouring as the water is turned back on, and if shut off for an extended period of time, can cause the lead scales on the pipe interior to dry and flake off. Under this proposed rule, these disturbances would require consumer flushing instructions to be delivered to the consumer before their water is turned back on. Although other types of pipe disturbances may occur, such as vibration from the work of other utilities (for example, gas and electric utilities), the water system may not always be aware of the other utilities' activities. Defining pipe disturbance based on when water service is temporarily shut off ensures the water system is aware of the disturbance and can execute the proposed flushing requirement. For disturbances caused by other utilities, the EPA encourages water systems to inform other utilities of the potential for LSL disturbance to cause elevated lead levels in drinking water and attempt to coordinate with them on development and implementation of measures to reduce disturbances and mitigate impacts.

The replacement of a meter, gooseneck, pigtail, or connector entails disconnecting and reconnecting the LSL, it is expected to be a more significant disturbance of the LSL than when the water service is temporarily shut off. Therefore, the EPA is proposing additional risk mitigation measures for these disturbances. Under this proposal the water system would be required to provide flushing instructions, as well as deliver the consumer a pitcher filter certified to remove lead along with three months of replacement cartridges for risk mitigation.

The EPA is proposing that regardless of their 90th percentile lead level, water systems must replace lead goosenecks, pigtails, and connectors owned by the water system as they are encountered in the course of planned or emergency infrastructure work, such as main replacement. This proposed requirement was recommended by the National Drinking Water Advisory Council (NDWAC, 2015). Water systems that replace lead goosenecks, pigtails and connectors would be required within 24 hours to notify consumers of the replacement and provide flushing instructions and a pitcher filter and replacement cartridges to last for three months. Water systems would be required to collect a follow up tap sample after three months but no later than six months after the gooseneck, pigtails, or connector is replaced. In many cases, routine infrastructure work involves the excavation of the water main under the street and exposure of the goosenecks, which then undergo reconnection to the new main. The EPA expects that mandatory replacement of these connectors as they are encountered would provide a beneficial and lower burden opportunity for the water system to remove a lead source from its distribution system. The water system is encouraged but not required to engage with the customer to coordinate replacement of a customer-owned lead gooseneck, pigtail, or connector; however, the water system would not be required to bear the cost of replacement of the customer-owned materials under this proposal. Replacement of a lead gooseneck, pigtail, or connector regardless of ownership would not count towards goal-based or mandatory LSLR rates.

2. Partial Lead Service Line Replacement

The EPA sought an evaluation by the Science Advisory Board (SAB) of current scientific data to assess the effectiveness of partial LSLRs in reducing water lead levels. The SAB determined that the quality and quantity of data was inadequate to fully evaluate the effectiveness of partial LSLR in reducing drinking water lead concentrations. However, the SAB concluded that partial LSLRs have not been shown to reliably reduce drinking water lead levels and may even increase lead exposure in the short-term of days to months, and potentially even longer. The NDWAC recommended requiring full LSLR except during emergency repairs or infrastructure improvement projects when a customer is unable or unwilling to replace their portion of the LSL (NDWAC, 2015).

Based upon the SAB's and the NDWAC's recommendations, the EPA is proposing to eliminate current requirements for water systems to only replace the portion of the LSL that is owned by the water system, if any, in situations where customers do not choose to replace the portion of the line that is owned by the customer. Typically, if a water system owns a portion of the service line, it is the portion that connects the water main under the street to the customer-owned portion of the service line, which often begins at the curb-box or water meter. The proposed changes to the LSLR requirements would remove the compliance incentive to conduct partial LSLR that is inherent in the current rule. The EPA recognizes that certain activities, such as emergency repairs (*i.e.,* a water main break that must quickly be repaired) or planned infrastructure improvements (*i.e.,* a water main replacement program) may still need to proceed regardless of customer participation and may result in unavoidable pipe disturbances and at times, partial LSLR. For example, a water system replacing a water main as part of its capital improvement program may encounter LSLs on both the water system- and customer-owned portions of the service line. If a single customer served by an LSL does not accept the water system's offer to replace the customer-owned portion (the water system is not required to bear the cost of replacement), the water system may proceed to conduct a partial LSLR at that location in order to complete the main replacement project. In another scenario, a water system-owned portion

of an LSL could fail, requiring emergency replacement. In this case, the water system would be allowed to replace just the water system-owned portion should the customer refuse or is unable to have his or her portion replaced.

Whenever a water system conducts partial LSLR, it would be required to notify the affected consumers and follow the risk mitigation procedures in their LSLR plan to ensure that customers are promptly alerted and informed of the actions they can take to reduce their exposure to lead following the partial LSLR, when concentrations of lead in drinking water are expected to be the highest. These proposed risk mitigation steps required after partial LSLR include customer notification, delivering flushing guidance to remove particulate lead, providing a pitcher filter certified to remove lead in accordance with applicable standards established by the American National Standards Institute, as well as replacement cartridges to last no less than three months, and taking a tap sample after three months, but no more than six months after the partial LSLR. Tap sample results would be provided to the consumer within 30 days, unless the tap sample exceeds the lead action level, in which case the EPA proposes notifying the customer within 24 hours. The same mitigation steps would also be required if a water system undertook a full lead service line replacement (see section III.D.3 of this notice).

The EPA is proposing that all water systems with LSLs, regardless of their 90th percentile level, must replace the water system-owned portion of the LSL when a customer replaces their portion of the LSL. Water systems would have to include information about this requirement in their annual notification to LSL customers. In those cases where a customer notifies the system in advance of replacing the customer portion of an LSL, the EPA is proposing that the water system make a good faith effort to coordinate replacement with the customer to minimize disturbances that may result in particulate lead release and to prevent a partially replaced LSL from being left in place. The water system would also have 45 days from learning of the customer's replacement or intention to replace his or her-owned portion of the LSL to replace the portion owned by the water system. Given that water systems routinely perform construction involving installation and replacement of water mains and service lines, and that the logistics of LSLR have been established in its LSLR plan, the EPA believes that it is feasible for water systems to replace their portion of a lead service line within 45 days of notification of the customer-initiated replacement, however the Agency requests comment in Section VII of this notices on whether a longer or shorter time frame is appropriate. In cases where the water system learns that a customer has replaced the customer-owned portion of LSL and the replacement has occurred more than three months in the past, the water system is not required to complete the lead service line replacement.

After a LSLR, the EPA proposes that water systems deliver flushing instructions to the customer, provide a pitcher filter certified to remove lead with replacement cartridges to last three months (the expected timeframe for lead levels to decrease following a lead service line replacement), and collect a follow-up tap sample after three months, but no later than six months after the LSLR.

The EPA is proposing that any water system that becomes aware that a customer has already replaced his or her portion of the LSL in the last three months be required to provide a filter to the home within 24 hours to mitigate the elevated lead levels associated with customer-initiated partial LSLR. Additionally, the water system would have 45 days after learning of the customer-owned LSLR to replace its portion of the LSL. If a water system is conducting goal-based or mandatory LSLR in the period which these replacements occur, the water system would count these replacements towards its goal or mandatory replacement rate. If the water system is notified of the customer-initiated replacement more than three months after the replacement occurred, it would not be required to replace its portion or provide a pitcher filter and replacement cartridges because the elevated lead levels associated with partial LSLR would be expected to have subdued.

3. Lead Service Line Replacement After a Lead Trigger Level Exceedance

The EPA is proposing that, in addition to any requirements relating to CCT under 141.82(d) or 141.81(e) discussed above, CWSs serving more than 10,000 persons that exceed the trigger level for lead (10 μg/L) but do not exceed the action level for lead (15 μg/L) would be required to implement a full LSLR program with an annual replacement goal rate approved by the State, as stated in its LSLR plan. The goal rate would be established to require actions that will promote the elimination of a significant source of lead in those water systems with 90th percentile concentrations that are approaching the action level. This provision is designed to require water systems with higher lead levels to take steps to reduce lead exposure and upgrade their infrastructure.

There is widespread support at all levels for upgrading American's water infrastructure, including lead service line replacement. President Trump's 2020 budget proposes significant investment in infrastructure, directing $200 billion for priorities such as water infrastructure (The White House, 2019a). Lead service line replacement represents an opportunity to replace water infrastructure which can be over one hundred years old, constructed with material specifications not lawful for use in new plumbing products today, which can create risk of lead exposure to Americans. EPA Administrator Andrew Wheeler signaled the Agency support of water infrastructure projects and their ability to create jobs, noting that since 2017 the EPA water infrastructure loans have totaled over $2 billion and will create 6,000 jobs (The White House, 2019b). In a policy statement, the American Water Works Association encouraged communities to "develop a lead reduction strategy that includes identifying and removing all lead service lines over time" and supported the NDWAC's recommendations for the "complete removal of lead service lines while ensuring optimal corrosion control measures" (AWWA, 2017). The EPA is also aware of many communities and water systems across the country that are choosing to conduct LSLR proactively. The proposed LCR incorporates actions that water systems can take to encourage full LSLR irrespective of the lead action level, helping to spur removal of lead sources rather than waiting to act only after consumers have already been exposed to greater levels of lead.

The flexibility of the goal based LSLR provision allows water systems with higher lead levels make manageable progress in reducing lead exposure and upgrading their infrastructure. The State could take multiple factors into account when setting the goal rate, such as the number of LSLs in the distribution system, planned infrastructure improvement programs, as well as the financial circumstances of the water system and its customers. The EPA believes that as communities conduct projects to replace aging infrastructure, they can replace lead service lines as part of these projects. This will reduce costs and minimize the disruption to their customers. Madison, WI stated in its Federalism letter to the EPA that it

"achieved cost-saving efficiencies through effective planning that concentrated capital improvement projects in the lead service area. Lead service replacement costs never exceeded 20% of our annual capital budget. In addition, the compressed schedule and coordination with local plumbing contractors led to reduced mobilization costs." The EPA expects that systems that exceed the trigger level will consider integrating lead service line replacements into their planned infrastructure replacement activities.

The EPA is proposing that a water system may discontinue its goal-based LSLR program after two consecutive annual monitoring periods at or below the lead trigger level, which equates to two years where the lead 90th percentile is consistently at or below the trigger level. The EPA is also proposing that a water system that does not meet its annual LSLR goal must conduct proposed outreach activities as described in 141.85(g). (See Section III.F.2. of this notice). The proposed rule also provides the EPA authority to determine a different goal-based replacement rate, if appropriate.

4. Lead Service Line Replacement After a Lead Action Level Exceedance

The EPA is proposing that CWSs serving more than 10,000 persons that exceed the lead action level would be required to conduct mandatory full LSLR at a minimum rate of three percent annually. Small CWSs serving 10,000 persons or fewer people as well as Non-Transient, Non-Community Water Systems (NTNCWSs) of all sizes have compliance alternatives, outlined in Section C below. The mandatory replacement rate would be applied to the number of inventoried LSLs at the time the action level is first exceeded plus the number of service lines of unknown material.

The EPA is proposing to reduce the mandatory minimum LSLR rate from seven percent to three percent, but to allow only full LSLRs to count towards the replacement rate. This differs from the current rule, which allows for "test-outs" and partial LSLR to count as "replaced." Partial LSLR removes only a portion of the LSL, usually the water system-owned portion and may, in the short-term, increase lead concentrations at the tap (USEPA, 2011). Test-outs allow an individual LSL to remain in place but be counted as "replaced" if the lead concentration in all service line samples from that line are less than or equal to 15 µg/L. Studies have shown that LSLs which have been "tested-out" may contribute to lead release in drinking water at a later date (Del Toral et. al., 2013). Due to concerns that the practices of both "test-outs" and partial LSLR contribute to lead exposure, the EPA is proposing to eliminate these practices. While the current rule requires seven percent LSLR after a lead ALE, the EPA is aware that compliance is not necessarily achieved by conducting full LSLR. A Black and Veach survey of water systems found that LSLR was comprised of 72 percent partial replacements (USEPA, 2004b). The EPA best professional judgement used in the proposed rule's economic analysis assumes that due to the cost-savings of test-outs over LSLR, that 25 percent of CWSs serving more than 10,000 people would take an LSL sample before replacing the LSL, and that 80 percent of LSLs would meet the test-out criteria. Given these assumptions, the proposed rule requirement of three percent full replacement would likely result in a greater number of full LSLR in comparison to the current rule's seven percent replacement. Similar to the current rule, the State would be required to set a shorter LSLR schedule, taking into account the number of LSLs in the system, where such a shorter replacement schedule is feasible. For example, if the water system has a very low number of LSLs compared to its total number of service lines, the State would determine it is feasible for the water system to replace greater than three percent of full LSLs per year and require the water system to do so.

The mandatory LSLR rate would be applied to the number of inventoried LSLs when the water system first exceeds the action level, plus the number of service lines of unknown material. Should the water system subsequently exceed the lead action level again, the water system would continue to use the original number of LSLs and unknowns, used following the first exceedance of the lead action level, for the LSLR rate calculation. In other words, the water system would not revise the LSLR rate using the number of LSLs at the time of the subsequent lead action level exceedance. The minimum mandatory three percent LSLR rate is intended to eliminate LSLs within approximately 33 years of exceeding the action level. If the water system updated the LSLR rate based on its current number of LSLs whenever it exceeded the lead action level, the replacement timeframe would reset to an additional 33 years each time, significantly delaying LSLR. Service lines of unknown material discovered to be non-lead would not be considered replaced nor contribute to the LSLR rate. Verifying that a service line of unknown material is non-lead would, however, reduce the total number of replacements required per year by adjusting the initial number of LSLs in the distribution system. If verifying a service line of unknown material as non-lead was counted as a LSLR, the water system could effectively remove less than three percent of its actual number of LSLs per year. It could also incentivize water systems against creating a thorough LSL inventory upfront, because should they exceed the lead action level, they could achieve compliance with the less costly service line verification as opposed to full LSLR. For these reasons, the proposed rule would not count verifying service lines of unknown material as non-lead as a LSLR. The proposed rule allows flexibility for water systems to include service lines of unknown materials in their inventory and verify them at their own pace, while avoiding disincentivizing or discouraging full LSLR.

The EPA is aware of several full LSLR programs throughout the nation that have been largely successful (EDF, 2019), sometimes achieving a significant number of full LSLR at replacement rates well above three percent. Even when LSLR is coupled with the pace of a water system's capital improvement work, communities are conducting LSLR rates between 1 and 17 percent annually (USEPA, 2019a).The State of Michigan's revised LCR requires all water systems to fully remove LSLs proactively at the rate of five percent, and at the rate of seven percent when the lead action level is exceeded (State of Michigan, 2017).

Under this proposal, a water system that has exceeded the action level may cease its mandatory LSLR program after four consecutive six-month monitoring periods below the lead action level. This equates to two years of six-month monitoring with 90th percentile values consistently at or below the lead action level, which provides the water system assurance that distribution system chemistry has stabilized, especially if CCT was installed or re-optimized after the exceedance. The water system would be in violation of the LCR treatment technique if it fails to meet the annual three percent full replacement rate unless the water system obtains documented refusals from all customers served by an LSL to participate in the replacement program. This mechanism is intended to be used towards the end of a LSLR program, where a small number of customers remain who do not consent to have the customer-owned portion of the LSL

replaced. The EPA is proposing this provision to allow for situations where customers' decisions are outside of the system's control but is not meant as a substitute for the water system making a meaningful effort to engage with customers to meet the three percent full replacement rate.

Although this proposal lowers the required LSLR rate from seven percent to three percent, the elimination of "test-outs" and partial LSLRs and the requirement for full LSLR will result in greater reductions in exposure to lead in drinking water. The EPA estimates that the proposed mandatory three percent and the goal-based LSLR requirements of the rule would result in an incremental increase of 205,452 to 261,701 full LSLRs over a 35-year period compared to the current rule (see Appendix C, Exhibit C.1 of the Economic Analysis for the Lead and Copper Rule Revisions (USEPA, 2019)). The EPA is also requesting comment in Section VII of this notice on an alternative sampling technique for sampling locations with lead service lines. As indicated in section VI.F.2 of this notice, this alternative would increase the numbers of systems that would be required to take actions including LSLR. The EPA has estimated that other proposed rule provisions may also influence LSLR. For example, consumers will learn from their water system if they are served by an LSL, about the risks of lead in drinking water, and about the actions they can take to reduce lead in drinking water and remove their LSL. Some of these customers are expected to voluntarily initiate LSLR, regardless of the water system's 90th percentile lead level. These provisions are expected to result in approximately 214,000 to 350,000 LSLRs over the next 35 years. The EPA has not evaluated to what extent these anticipated voluntary LSLRs may be additional to the LSLRs undertaken in systems with 3% or goal-based LSLR requirements. The EPA also estimates that the availability of DWSRF program loans and subsidies to fund customer-side LSLRs is expected to result in an estimated 149,200 full LSLRs over 35 years with approximately 91% of the funds used for proactive LSLR as opposed to mandatory LSLR that is required after exceeding the lead action level (USEPA, 2019d). As the proposed requirements in this section require the water system to complete any consumer-initiated LSLR, these replacements are expected to result in full replacements.

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

Under the current LCR, small and medium water systems (*i.e.,* systems serving 50,000 or fewer people) are not required to implement CCT unless the water system exceeds the lead action level. The EPA has determined that greater flexibility is needed for small Community Water Systems (CWSs) and all Non-Transient, Non-Community Water Systems (NTNCWSs) because they tend to have more limited technical, financial, and managerial capacity to implement complex treatment techniques. Many small public water systems face challenges in reliably providing safe drinking water to their customers and consistently meeting the requirements of the SDWA and the National Primary Drinking Water Regulations (NPDWRs). These challenges include, but are not limited to: (1) Lack of adequate revenue or access to financing; (2) aging infrastructure; (3) retirement of experienced system operators and the inability to recruit new operators to replace them; (4) managers and operators who lack the requisite financial, technical or managerial skills; (5) lack of planning for infrastructure upgrades or the ability to respond to and recover from natural disasters (*e.g.,* floods or tornadoes); and (6) lack of understanding of existing or new regulatory requirements and treatment technologies. As a result, some small systems may experience frequent or long-term compliance challenges in reliably providing safe water to their customers while others may be in compliance now but lack the technical capacity to maintain compliance (OIG, 2006).

The EPA is proposing three compliance alternatives for a lead action level exceedance to allow increased flexibility for small CWS that serve 10,000 or fewer people and four compliance alternatives for NTNCWS of any size. The proposed rule would allow these water systems to choose among options, which would allow them to select the most financially and technologically viable strategy that is effective in reducing lead in drinking water. The EPA is proposing the following compliance alternatives for small CWSs: (1) Full LSLR, (2) installation and maintenance of OCCT, or (3) installation and maintenance of point-of-use (POU) devices. The EPA is proposing the above three flexibilities for NTNCWS and an additional option of replacement of all lead bearing plumbing fixtures at every tap where water could be used for human consumption. The NTNCWS must have control of all plumbing materials to select this option.

Under this proposal, small CWSs and any NTNCWS that exceeds the lead trigger level but do not exceed the lead and copper action levels would need to evaluate the compliance alternatives and make a recommendation to the State within six months on which compliance alternative the water system would implement if the water system exceeds the lead action level. The State would need to approve the recommendation within six months of submittal. In the event these water systems exceed the lead action level, they must implement the State-approved compliance option.

Small CWSs and NTNCWSs that select and are approved for implementation of optimized CCT and subsequently exceed the lead action level would be required to implement the State-approved option for CCT in accordance with proposed requirements in § 141.81(e). Small CWSs and NTNCWSs that select and are approved for the POU option and subsequently exceed the lead action level, would be required to implement a POU program on a schedule specified by the State, but not-to-exceed three months. Small water systems that select and are approved for LSLR and subsequently exceed the lead action level would be required to replace all LSLs on a schedule specified by the State, not-to-exceed 15 years.

Any small CWSs and any NTNCWS that exceeds the lead action level but not the copper action level, had not previously exceeded the trigger level, would need to evaluate the compliance alternatives and make a recommendation to the State within six months. The State must approve the system's recommendations within six months; these water systems would then implement the State-approved compliance option on a schedule specified by the State.

1. Lead Service Line Replacement

The EPA is proposing that NTNCWSs and small CWSs with LSLs that exceed the lead action level of 15 μg/L may choose to fully replace all of their LSLs until none remain. Those that choose this compliance alternative would need to ensure they have the authority or consent to remove the customer-owned portion of every LSL in its distribution system. If the water system's 90th percentile drops below the lead action level, the water system must continue to replace LSLs until none remain. This

option is projected to be a practical choice for small systems that have few LSLs that could be removed within a few years, thus potentially avoiding the need to add a CCT process that would need to be continually operated and maintained. Rather than split resources between installing CCT and conducting LSLR, this proposal allows resources to be focused on LSLR to accelerate completion of the program and permanently remove a significant potential source of lead in drinking water. Water systems would have to replace LSLs on a schedule approved by the State not to exceed 15 years. The EPA has determined in its analysis that water systems with a small number of LSLs may find that removing relatively few LSLs is more cost effective than installing and maintaining optimized CCT indefinitely, and logistically less burdensome than installing and maintaining POU devices (see section VI.C.4 of this notice).

2. Corrosion Control Treatment

The EPA is proposing to allow NTNCWSs and small CWSs to install and maintain optimized CCT as a compliance alternative after exceeding the lead action level. The EPA has determined in its analysis that some water systems may choose this alternative as the most effective and viable strategy for reducing lead in drinking water (*e.g.,* small water systems with many LSLs to replace or a large number of households that would make installation and maintenance of POU devices logistically challenging) (see section VI.C.4 of this notice). The EPA is proposing to require water systems, including small water systems, that have already installed CCT and subsequently exceed the lead action level to re-optimize CCT.

3. Point-of-Use Devices

The EPA is proposing to allow NTNCWSs and small CWSs to install and maintain POU devices certified to remove lead as a compliance alternative to a lead action level exceedance in lieu of CCT and LSLR. The EPA proposes to require small CWSs to provide a minimum of one POU device per household, regardless of whether that household is served by an LSL, to ensure the residents can access filtered water from at least one tap. Since system-wide CCT is not being provided under this option, even homes without LSLs would need to be provided with a POU device to address lead leaching from old lead solder or brass plumbing fittings and fixtures. The EPA proposes to require NTNCWSs to provide a POU device for every tap intended for drinking or cooking to ensure all building users can easily access filtered water. The water system would be responsible for maintenance of the device, including changing filter cartridges and resolving operational issues experienced by the customer. Small CWSs that serve relatively few households, or NTNCWSs that are responsible for the facility's plumbing, may find this to be the most effective and viable compliance alternative (see section VI.C.4 of this notice). Small CWSs would need to ensure water system personnel have access to the homes of the residents to install and maintain the POU devices, including changing the filters.

4. Replacement of Lead Bearing Plumbing Materials

The EPA is proposing to provide an additional compliance alternative for NTNCWS. Under this proposal, a NTNCWS that has control over all plumbing in its buildings may choose to replace all lead bearing plumbing in response to a lead action level exceedance. Research has shown that corrosion of lead bearing premise plumbing has the potential to leach higher levels of lead in drinking water (Elfland et. al., 2010). Lead from premise plumbing contributes on average 20–35 percent of lead in drinking water where an LSL is present (AwwaRF, 2008), and could potentially represent an even greater percentage where no LSL is present. The EPA proposes that the replacement of all lead bearing plumbing occur on a schedule set by the State which must not exceed one year. The EPA is proposing this compliance alternative only apply to NTNCWS, because it is highly unlikely that a small CWS has access to every residence and building it serves or that the CWS has the authority to inspect and require replacement of all lead-bearing plumbing materials in these locations.

F. Public Education

Under the current LCR, water systems that exceed the lead action level must initiate a public education program within 60 days of the end of the monitoring period in which the action level exceedance occurred. The purpose of public education is to inform consumers that the water system has exceeded the action level, provide information about the health effects of lead, the sources of lead in drinking water, actions consumers can take to reduce exposure, and explain why there are elevated levels of lead and actions the water system is taking. Targeted public education for customers with an LSL or a service line of unknown material is intended to raise awareness of people in a household that may have higher lead exposures so that consumers may take actions to reduce exposure to lead and participate in LSLR programs.

The EPA is proposing to revise the mandatory health effects language required for public education materials as follows.

Exposure to lead can cause serious health effects in all age groups. Infants and children who drink water containing lead could have decreases in IQ and attention span and increases in learning and behavior problems. Lead exposure among women who are pregnant increases prenatal risks. Lead exposure among women who later become pregnant has similar risks if lead stored in the mother's bones is released during pregnancy. Recent science suggests that adults who drink water containing lead have increased risks of heart disease, high blood pressure, kidney or nervous system problems.

The EPA is also proposing enhancements to improve consumer awareness and collaboration efforts with community organizations to communicate lead risks. Proposed enhancements include a requirement for systems to update public education materials with revised mandatory health effects language and for systems with lead service lines to include information about lead service line replacement programs and opportunities available to customers for replacement. In addition, the EPA is proposing to modify requirements to provide customers with their tap sample results within 24 hours if the sample is greater than the action level of 15 μg/L, while maintaining the current rule requirement to provide tap sample results within 30 days for samples less than or equal to the action level. The EPA is proposing these additional actions while retaining the current rule requirements for public education following a lead action level exceedance.

1. Notification for Customers With a Lead Service Line

The EPA is proposing to require water systems to conduct an LSL inventory and provide public access to the inventory information (see section III.C.1 of this notice). The EPA is proposing a new requirement for water systems with LSLs to provide notification to households served by an LSL and with unknown service line material, to include information on: The health effects and sources of lead in drinking water (including LSLs), how to have water tested for lead, actions

customers can take to reduce exposure to lead, and information about the opportunities for LSLR, including the water system's requirement to replace its portion of an LSL when notified by a customer that they intend to replace the customer-owned portion of the LSL. The EPA is proposing that a water system provide this notification to existing customers served by an LSL and service lines of unknown material within 30 days of completing its LSL inventory and for new customers that initiate new water service from a home or building with an LSL or a service line of unknown material at the time service (*i.e.,* billing) is initiated. This proposal would require CWSs to send a notification on an annual basis to customers until the LSL is replaced or the unknown service line is determined not be an LSL. This notification must include a section describing programs that provide innovative financing solutions for customers seeking to replace their portion of a lead service line. Small systems may wish to refer to a national information source, such as one provided by EPA; large systems may wish to tailor such information to their circumstances. This section must also include a clear explanation of how the water system defines ownerships of lead service lines, who has financial responsibility for the replacement, and the legal basis for that determination. Additionally, the EPA proposes that CWSs provide notification to LSL and unknowns service line customers informing them of actions consumers can take to reduce their exposure including replacing their lead service line when they exceed the lead trigger level of 10 µg/L but do not exceed the lead action level of 15 µg/L. The EPA believes that these proposed notification requirements have value for both occupants of rental properties as well as homeowners. Information regarding the existence of an LSL will provide important information for renters on potential lead exposure in their home and could prompt a communication with their landlord regarding lead service line replacement. Occupants of rental properties will also benefit from the information on other actions they can take to reduce lead exposure in drinking water. The CWS must provide the same information noted above and include an invitation to participate in the LSLR program and repeat the notice annually until it is at or below the lead trigger level.

2. Outreach Activities After Failing To Meet a Lead Service Line Replacement Goal

The EPA is proposing to require CWSs serving more than 10,000 persons that fail to meet their annual LSLR goal to conduct public outreach activities. Failure to meet the LSLR goal would not be a violation, however, failure to conduct public outreach activities would result in a treatment technique violation. To increase customer awareness of the potential higher exposure to lead from a LSLR and advance customer interest in participating in the goal based LSLR program, the EPA proposes that water systems conduct annual public outreach activities until the water system meets its replacement goal. Water systems can stop their goal LSLR program when tap sampling shows that the 90th percentile of lead is at or below the trigger level for two consecutive monitoring periods. To enhance community engagement and allow water system flexibility as suggested by the NDWAC, the EPA is proposing to provide options to meet this requirement, so water systems can conduct effective community engagement. A water system that does not meet its LSLR goal rate would select one of the proposed outreach activities that would be most appropriate for that community. Outreach activities include one or more of the following activities: (1) A social media campaign (*e.g.,* face book, twitter), (2) outreach to organizations representing plumbers and contractors to discuss identification of LSLs during home repair, (3) certified mail to LSL customers inviting them to participate in the LSLR program, (4) conduct a town hall meeting or participate in a community event to provide information on the LSLR program, (5) direct contact (by phone or in person) to customers to discuss LSLR program and opportunities for LSLR, or (6) obtain written refusal from all LSL customers to participate in the LSLR program. Water systems would be required to complete at least one activity in the year following failure to meet the replacement goal. If the water system continues to fail to meet the annual replacement goal in the following year, the EPA is proposing that the number of efforts be increased to two per year to promote participation in the LSLR program. The NDWAC recommended this approach to enhance engagement with homeowners and promote their participation in LSLR programs. Water systems would provide written certification to the State that they have conducted the required outreach activities under this proposal.

3. Notification of Tap Sample Results and Other Outreach

The EPA proposes for any individual tap sample that exceeds the lead action level of 15 µg/L, the water system would notify consumers at the site within 24 hours of learning of the lead tap sampling result. This is in addition to the current LCR requirement to provide a notice of the individual tap sample results from lead testing to persons served at the sampling site, which must be sent within 30 days of receiving results. For tap samples that do not exceed the lead action level, the 30-day notice will remain in effect. Under this proposal, water systems that have individual tap samples greater than 15 µg/L would also be required to implement the "find-and-fix" provisions as described in section III.K. of this notice.

In addition, the EPA is proposing that community water systems conduct annual outreach to State and local health agencies to explain the sources of lead in drinking water, discuss health effects of lead, and explore collaborative efforts. This annual outreach would help to ensure that caregivers and health providers hear and respond appropriately to information about lead in drinking water and for water utilities to participate in joint communication efforts, led by state health departments, state lead poisoning prevention agencies, and/or state drinking water primacy agencies (NDWAC, 2015).

G. Monitoring Requirements for Lead and Copper in Tap Water Sampling

Unlike most contaminants that are found in sources of drinking water, lead and copper enter drinking water as it moves through the distribution system and comes into contact with leaded materials, such as lead service lines, leaded solder, brass/bronze fittings, galvanized piping, faucets, and water meters. Therefore, measurements of lead and copper are taken at the consumers tap. Tap sampling is a fundamental part of the LCR designed to target sites expected to have the highest lead levels and is used to assess the effectiveness of corrosion control treatment and/or source water treatment in the water system. This is done through targeted site selection (*i.e.,* sampling locations with lead service lines) and the use of a tap sample collection protocol.

All CWSs and NTNCWSs must collect lead and copper tap samples. The water system may choose to have staff collect the samples if feasible, or have residents collect the samples. Due to the required six hour stagnation period prior to sample collection, it is often less

disruptive for the customer to collect the tap sample themselves. The frequency of monitoring and number of samples to be collected and analyzed is based primarily on how many people the water system serves and previous tap water monitoring results. If residents are collecting tap samples, the water system must recruit volunteers at the sites that are most likely to have elevated lead based on the tiering criteria described in the section below.

To the extent feasible, water systems should use the same tap sample sites each monitoring period. If a resident decides to discontinue participation in tap sampling, the water system must select a similarly "tiered" site. Due to potential non response from resident volunteers, the EPA recommends including more sampling sites in the pool of targeted sampling sites than the minimum number of tap samples required be identified. Under the proposed rule, water systems would be required to provide resident volunteers must be provided with a wide-mouth collection bottle each time and a tap sample collection protocol, including instructions on how the water system will pick up samples for laboratory analysis, which must be done within two weeks after the tap sample is drawn. The water system would then be required to calculate a 90th percentile separately for lead and copper at the end of each monitoring period. This 90th percentile value would be reported to the State and is used to determine whether the system must comply with other requirements of the rule, such as corrosion control treatment, public education and LSLR.

This proposal describes several revisions to the current LCR to improve tap sampling requirements in the areas of site selection tiering criteria, sample collection, and frequency provisions based on the lead 90th percentile level. The current LCR requires water systems to obtain samples from consumer's taps and use these samples to calculate their 90th percentile value. The EPA is proposing revisions to tap sampling procedures to increase the likelihood of capturing elevated lead levels by revising tap sample site selection criteria, *i.e.,* tiering, and ensuring tap sample protocols contain accurate instructions that will capture elevated lead levels at the tap. In addition, to improve transparency and raise consumer awareness, the EPA proposes to require water systems to make the results of all tap samples collected in accordance with 141.86(b) publicly available within 60 days of the end of the monitoring period.

1. Tiering of Tap Sample Collection Sites

The LCR requires water systems to select sites for tap sampling based on certain characteristics (*i.e.,* single family home, multi-family residence) and material of the service line (*i.e.,* lead, copper pipes with lead solder). Tiers establish the priority of sites selected for tap sampling, with tier 1 being the highest priority, or highest potential for elevated lead and tier 3 being the lowest priority. The EPA is proposing to revise the tiering criteria for selection of tap sampling sites to better target locations most likely to have higher levels of lead in drinking water.

The EPA is proposing that Tier 1 sampling sites for CWSs consist of single-family structures (SFS) that are served by an LSL. When multiple-family residences (MFRs) comprise at least 20 percent of the structures served by a water system, the water system may include these types of structures in its sampling pool as Tier 1 sampling sites, as provided in the current LCR. The EPA is proposing that Tier 2 sampling sites for CWSs are buildings, including MFRs that are served by an LSL. The EPA also proposes that Tier 3 sampling sites for CWSs consist of single SFSs that contain copper pipes with lead solder installed before the effective date of the applicable State's lead ban. The EPA is proposing that NTNCWS Tier 1 sampling sites consist of buildings that are served by an LSL and the remaining tap samples be taken at buildings with copper pipe and lead solder installed before the effective date of the applicable State's lead ban (Tier 3 sites). The EPA is not modifying the definition of a "representative site" but is referring to it as a "Tier 4" site. The revised tiering structure is outlined below.

EXHIBIT 1—REVISED LEAD AND COPPER SITE SELECTION CRITERIA

Tier	CWSs	NTNCWSs
Tier 1	Collect samples from SFSs served by LSLs. Tier 1 samples can be collected from MFRs if they represent at least 20 percent of structures served by the water system.	Collect samples from building.
Tier 2	Collect samples from buildings and MFRs served by LSLs	N/A.
Tier 3	Collect samples from SFSs with copper pipes with lead solder installed before *the effective date of the State's lead ban.*	Collect samples from buildings with copper pipe and lead solder installed before *the effective date of the State's lead ban.*
Tier 4	Representative sample where the plumbing is similar to that used at other sites served.	Representative sample where the plumbing is similar to that used at other sites served.

Acronyms: CWS = community water system; LSL = lead service line; MFR = multi-family residence; N/A = not applicable; NTNCWS = non-transient non-community water system; SFS = single family structure.

The 1991 LCR made a clear distinction between the copper pipes with lead solder installed after 1982, but before the effective date of applicable state lead ban and designated these sites as Tier 1. However, copper pipe with lead solder installed before 1983 are designated as Tier 3 sites. In the 1991 LCR, the EPA based this distinction on studies in which lead leaching from solder was found to decrease with age (USEPA, 1990; Oliphant, 1982) and, as a result, samples from copper pipes with lead solder installed before 1983 were expected to have lower lead levels.

The EPA is basing its current proposal to revise the tiering criteria for lead solder on the increased understanding of corrosion mechanisms and sources of lead, in particular, lead from solder, as a result of the studies conducted since the 1991 rulemaking (for example, De Rosa and Williams, 1992; Edwards and Triantafyllidou, 2007; Nguyen et al., 2010). Additionally, given that it has been over 30 years since lead solder was banned in all jurisdictions, and considering lead solder's ability to leach lead is reduced by age (USEPA, 1990), lead levels in samples collected from sites containing copper pipe with lead solder installed between 1983 and 1988 no longer present as significant a source of lead as assumed in 1991. Based on the most recent science, the EPA is proposing the above revisions to the tap sample site selection tiering criteria to assure prioritization of sites that are

currently the most likely to yield elevated lead levels in drinking water.

2. Number of Tap Samples and Frequency of Sampling

The EPA is proposing additional requirements for LSL water systems to enable prioritization of LSL sites in tap sampling. All water systems with LSLs or potential LSLs must re-evaluate their lead sampling sites based on their LSL inventory, prepared in accordance with this proposal. These water systems would also be required to update their inventory annually and ensure tap sampling sites are served by an LSL. Under the current LCR, water systems with LSLs must collect at least half of their tap samples from sites with known LSLs. However, in this proposal, water systems with LSLs must collect all tap samples from sites with known LSLs if possible, increasing the likelihood of detecting elevated lead levels in the water system. The EPA is proposing that water systems use the most up-to-date information to select their tap sampling sites and prioritize sites with a higher likelihood of elevated lead. Under this proposal, water systems with an adequate number of LSL sites to meet the required minimum number of tap sampling sites outlined in exhibit 2 below, must calculate their lead 90th percentile using only tap samples from LSL sites (100 percent LSLs), as opposed to the current rule which allows water systems to use samples from at least half LSL sites.

EXHIBIT 2—MINIMUM NUMBER OF LEAD AND COPPER TAP SAMPLES BY WATER SYSTEM SIZE, 40 CFR 141.86(c)

System size (number of people served)	Number of sites (standard monitoring)	Number of sites (reduced monitoring)
>100,000	100	50
10,001 to 100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
<=100	5	5

The EPA is proposing that if a water system does not have an adequate number of LSL sites to meet the minimum number of tap samples to calculate the 90th percentile level, outlined in § 141.86(c), it may collect the remainder of the samples from non-LSL sites after all the LSL tap sampling sites are utilized. If the water system conducts tap sampling at non-LSL sites beyond what is required under § 141.86(c), the water system must include only the tap samples with the highest lead concentrations to meet the number of sites required for the 90th percentile calculation. This provision would ensure that additional tap samples collected above the minimum required, at sites that are less likely to detect lead at similar levels as LSL sites, cannot be used to "dilute" the lead 90th percentile level. Studies demonstrate that when present, LSLs represents the largest source of lead in tap water (Sandvig et al., 2008). Requiring use of only the highest lead levels from non-LSL sites for the 90th percentile calculation would increase the likelihood that sites with other major sources of lead, such as lead-bearing brass or bronze fixtures and galvanized service lines formerly downstream of an LSL, are captured in the calculation. Using non-LSL sites as part of the 90th percentile calculation is proposed to be utilized solely by water systems with fewer LSL tap sample sites than the number required under § 141.86(c). The EPA proposes that tap samples collected that are not used in the lead 90th percentile calculation must still be reported to the State.

The EPA is proposing to permit the use of grandfathered data to meet initial lead monitoring requirements if the data are from sites that meet the proposed tiering requirements. Water systems that collect lead tap samples after the publication date of the final rule, but before the rule compliance date (three years after final rule publication), in accordance with the proposed revised tap sample site selection criteria, may use these data to satisfy the initial monitoring requirement. Initial tap sampling establishes the water system's sampling schedule and the number of tap samples it is required to collect. The EPA is proposing to permit grandfathered data for an LSL water system only if the data are from sites that meet the proposed tiering requirements (*i.e.*, all samples collected from LSL sites, if available). Any water system that is conducting tap monitoring every six months and intends to use these data for purposes of grandfathering, must use the higher lead 90th percentile level to establish the monitoring frequency and number of tap samples. The EPA is proposing that water systems that do not have qualifying grandfathered data must use the lead 90th percentile results from the first tap sampling period after the compliance date of the final rule. Following the establishment of the initial sampling schedule and number of tap samples (based on either grandfathered data or data collected during the first tap sampling period after the rule compliance date), the system would be required to commence the appropriate tap sampling schedule. The proposed criteria for using grandfathered data would ensure that historical data are used only if they are from samples with the highest potential lead concentrations.

No changes are being proposed to the copper sampling requirements in the current LCR. However, due to proposed increased tap sampling requirements for lead, each tap sample collected may not be required to be analyzed for both lead and copper. This is a result of the lead and copper tap sampling schedules diverging for some water systems. Under the current rule, any water system that exceeds either the lead or copper action level (15 μg/L or 1.3 mg/L, respectively), would conduct tap monitoring every six months for both lead and copper. Once a water system measures 90th percentile tap concentrations at or below the lead and copper action levels for two consecutive rounds of monitoring, the water system may reduce to annual monitoring for lead and copper. Water systems that meet the lead and copper action levels for three consecutive rounds of annual monitoring may reduce to triennial sampling at a reduced number of sites.

As discussed above, the EPA is proposing to establish a lead trigger level of 10 μg/L that would affect the tap sampling frequency. Under this proposal, water systems that exceed the lead trigger level of 10 μg/L but do not exceed the copper and lead action levels and that are conducting tap sampling on a triennial basis, would be required to begin annual tap sampling at the standard number of sites for lead but may remain on triennial sampling for copper at the reduced number of sites. Water systems that meet the lead trigger level for three consecutive years of annual monitoring and have also met the copper action level, may reduce their lead and copper tap sampling to a triennial basis at the reduced number of sites. Water systems that exceed the lead trigger level and are on annual monitoring would not be eligible for triennial monitoring for lead at a reduced number of sites until the lead 90th percentile result is at or below the lead trigger level for three consecutive years.

In this proposal, changes to reduced monitoring are contingent upon several factors, including but not limited to: Results of lead and copper tap sampling, the size of the water system (*i.e.*, small water system flexibilities), and maintaining water quality parameters (WQPs) if CCT is installed. The schedule for tap sampling may be affected when these factors change.

Opportunities for reduction in tap sampling frequency and number of sites are more stringent under this proposal compared to the current rule. A water system must not exceed the trigger level of 10 µg/L to move into a triennial monitoring schedule at the reduced number of tap sample sites for lead. The proposed revisions to tap sampling frequency and locations are meant to ensure more frequent tap sampling is occurring at the most representative sites to identify elevated lead levels.

3. Sample Collection Methods

The EPA is proposing several changes to the tap sampling protocol, consistent with the Agency's February 2016 memorandum (USEPA, 2016d). Under the current LCR, a one-liter sample is collected from the tap after the water has stood motionless in the plumbing system for at least six hours (*i.e.,* stagnation). This is a called a first-draw sample. Water systems provide residents with a protocol for carrying out tap sampling in accordance with the LCR, if the water system itself is not collecting the tap samples. The EPA is aware that some water systems have provided sampling procedures to residents that included recommendations that may inadvertently reduce the lead levels detected, including a recommendation to run water from the tap, called flushing, prior to initiating the required minimum 6-hour stagnation time. This practice is referred to as pre-stagnation flushing. With pre-stagnation flushing, the water from the tap is run until water from the LSL is flushed out, then the water is turned off for at least six hours prior to sample collection. Based on historical data and more recent studies (*e.g.,* Katner, et al. 2018; Del Toral et al., 2013), it is evident that pre-stagnation flushing may reduce measured lead levels at the tap compared to when it is not practiced. Flushing, or running taps, has long been understood to decrease water lead levels overall, and thus has been a recommendation by Federal, State and local authorities as a way to reduce lead exposure prior to water use, especially in residences of higher risk (*e.g.,* houses containing LSLs). In addition, flushing removes water that may be in contact with LSLs for extended periods of time, which is when lead typically leaches into drinking water (USEPA, 2016). As a general matter, the EPA recommends consumers flush taps as a regular public health protective practice to reduce household exposure to lead in drinking water. However, in the case of collecting samples to determine water system compliance with the LCR, this practice may mask potential higher lead exposure that may be representative of exposure in households that do not regularly flush taps before use. Therefore, EPA is proposing to prohibit pre-stagnation flushing in tap sampling protocols.

The EPA is also aware that some tap sampling protocols contain a recommendation to remove or clean the faucet aerator prior to sampling. The taps used for monitoring likely contain an aerator as part of the faucet assembly, and particulate matter, including lead, may accumulate within these aerators. Thus, removing and/or cleaning these aerators prior to or during sample collection could mask the contribution of particulate lead. It is advisable to regularly remove and clean faucet aerators to avoid particulate matter build-up. However, if customers only remove and clean the aerators prior to or during sample collection, the sample results will not be representative of household use, given residents are not cleaning or removing their aerators before every use. The EPA proposes to prohibit the recommendation to remove and/or clean the faucet aerator prior to or during the collection of lead and copper tap samples.

Based on current information, the EPA endorses best practices to optimize the tap sampling protocol, so that sample results represent the highest lead levels occurring at high risk locations. The EPA is proposing to require tap samples be collected in wide-mouth bottles. Wide-mouth bottles are advantageous for lead and copper tap samples because they allow for a higher water flow rate compared to a narrow-necked bottle. Collection of tap samples using a wide-mouth bottle is more characteristic of faucet water flow when filling a glass of water, therefore, water systems will be responsible for providing those conducting sampling with wide-mouth, one-liter sample bottles.

In summary, the EPA is proposing to prohibit the inclusion of pre-stagnation flushing in all tap sampling protocols, thereby preventing the systematic running of water from taps or faucets prior to beginning the minimum 6-hour stagnation time needed for sample collection. The EPA also proposes the prohibition of cleaning or removing of the faucet aerator in the tap sampling protocol, and a requirement that tap samples be collected in bottles with a wide-mouth configuration. The inclusion of a pre-stagnation flushing step, cleaning or removal of the faucet aerator, and/or using a narrow-necked bottle for collection, is inconsistent with the purpose of lead tap sampling, which is to target sites and collect tap samples in a manner the is likely to capture the highest lead levels. The EPA is also proposing that all water systems submit their sampling protocol to the State for approval prior to the compliance date. In addition, the EPA is also requesting comment on alternative changes to the sampling technique for sampling locations with lead service lines in section VII of this notice.

H. Water Quality Parameter Monitoring

Under the current LCR, water systems that have CCT must monitor water quality parameters (WQPs) to ensure effective CCT. WQP samples must be collected at taps every six months and at entry points to the distribution system every six months prior to CCT installation and every two weeks thereafter.

1. Calcium Carbonate Stabilization

The EPA is proposing several revisions to the WQP monitoring requirements of the current rule. Because the EPA is proposing to eliminate calcium carbonate stabilization as a potential option for CCT (see section III.B.3. of this notice), the WQPs associated directly with this CCT option will also be removed. These include all parameters related to calcium hardness (calcium, conductivity, and water temperature). The remaining WQP monitoring requirements from the current rule will be maintained. This change is due to recent evidence demonstrating that calcium carbonate stabilization is ineffective at preventing corrosion in lead and copper pipes (see section III.B.3.). The EPA is proposing to remove the three WQPs related to calcium hardness (calcium, conductivity, and water temperature) because the EPA is proposing to no longer allow calcium carbonate stabilization as a potential CCT option. In the current rule, after the water system selects their CCT choice, the State designates OWQPs and the water system must maintain these levels in the ranges determined by the State. In this proposal, the EPA is prioritizing the most effective CCT options and the associated WQPs. Thus, the less effective CCT option currently available, calcium carbonate stabilization, is proposed to be eliminated, together with the associated WQPs.

2. Find-and-Fix Water Quality Parameter Monitoring

The EPA is proposing that additional WQP monitoring samples be collected by water systems that have CCT and that have any individual tap sample(s) with

lead results exceeding 15 µg/L. The additional WQP monitoring is a part of proposed revisions described under "find-and-fix" (see section III.K. of this notice) and would require water systems to collect follow-up lead tap samples at every sampling site that has an individual lead sample greater than 15 µg/L. This is proposed to be completed within 30 days of obtaining results of the individual sample greater than 15 µg/L. The EPA is also proposing a WQP sample be collected at a location on the same size water main located within a half mile of the residence with the lead result greater than 15 µg/L. This WQP monitoring is proposed to be completed within five days of receiving results of the individual lead sample greater than 15 µg/L. Water systems with existing distribution system WQP monitoring sites that meet the main size/proximity requirements can conduct the sampling at that location.

The EPA is proposing that any water system which adds sites for the purposes of WQP monitoring specified in this paragraph includes those additional sites in future WQP monitoring. The follow-up WQP samples will aid in determining whether OWQPs set by the State are being met by the water system. If any of the WQPs are off-target, such as pH or indicators of CCT, then the water system may be able to determine how large the problem is, and if it includes the whole water system, a specific area, or the sole residence with the lead action level exceedance. The additional WQP sample taken will aid in the determination of the potential cause of elevated levels of lead so that appropriate actions can be carried out.

3. Review of Water Quality Parameters During Sanitary Surveys

The EPA is proposing that both CCT and WQPs be assessed during sanitary surveys for water systems with CCT. The EPA proposes that States conduct a periodic review of WQP results and tap sampling results to ensure the water system is maintaining the optimal CCT and to assess if there should be modifications to the CCT to further reduce lead and copper levels in tap samples.

4. Additional Water Quality Parameter Requirements

In addition to the updates for WQP requirements previously specified, the EPA is proposing several supplementary changes to the current rule. First, water systems with CCT would continue collecting one sample for each applicable WQP at each entry point in the distribution system as required in the current rule with the added requirement to do so no less frequently than once every two weeks. Water systems with CCT need to continue bi-weekly monitoring to ensure their treatment techniques are optimal for reducing lead and copper corrosion.

The EPA is also proposing revisions to the prerequisites that are required for water systems to reduce the number of sites sampled and the frequency of WQP sampling. In order to reduce the number of sites used in water quality parameter monitoring, the current rule requires the water system to maintain the range of water quality parameters for two 6-month monitoring periods. The EPA is proposing that water systems would also need to meet the lead 90th percentile trigger level for those two 6-month monitoring periods to be eligible for a reduction in the number of sites for WQP sampling. In order for the water system to reduce the frequency of monitoring for water quality parameters, under the current rule, the water system must maintain the range of WQP values for three consecutive years to reduce to annual monitoring. Under the proposal, the water system would need to also meet the lead 90th percentile trigger level for those three consecutive years in order to be eligible for yearly monitoring. Under the current rule, if the water system meets the WQP requirements determined by the State and the lead 90th percentile trigger level for three additional annual monitoring periods, it may reduce its WQP monitoring frequency to once every three years. The EPA is proposing that for every phase of potential reduced WQP monitoring, the water system would also be required to meet the lead 90th percentile trigger level in addition to the current requirements. This would ensure that the required WQP monitoring sites and frequency continue when water systems have a high lead 90th percentile level. For a water system on reduced monitoring, the use of grandfathered data may be used if collected in accordance with the proposed revisions and its 90th percentile in either grandfathered data or initial tap sampling is at or below the trigger level.

I. Source Water Monitoring

The current rule requires water systems to conduct source water monitoring following an action level exceedance. Based on the results of the source water monitoring, the State must decide whether it is necessary for the water system to install source water treatment to reduce lead and/or copper tap levels. Regardless of whether a State decides that treatment is needed or not, the water system is still required to conduct source water monitoring following the State decision. The EPA is proposing to discontinue additional source water monitoring requirements if (a) a water system has conducted source water monitoring for prior lead and/or copper action level exceedance, (b) the State has determined that source water treatment is not required, and (c) a water system has not added any new water source(s).

The EPA is proposing these changes to eliminate monitoring requirements that are not necessary to protect public health. Lead and copper are rarely found in the source water in significant quantities (USEPA, 1988b), thus, where the State has decided that source water treatment is not needed, the EPA is proposing to allow the State to waive source water monitoring for any subsequent action level exceedance under the conditions listed above and to eliminate the regular monitoring currently required for source water lead and copper.

J. Public Education and Sampling at Schools and Child Care Facilities

The EPA is proposing to require all CWSs to conduct targeted sampling and public education at schools and child care facilities that they serve. Currently the EPA does not require public water systems to conduct sampling in schools and child care facilities because the Agency established the voluntary 3T's program—Training, Testing and Taking Action (3Ts) that was designed to assist states, schools, and child care facilities with conducting their own testing program, conducting outreach, and taking action to address elevated levels of lead. The EPA is proposing these requirements because the Agency sees an opportunity for water systems to assist schools and child care facilities with sampling and testing for lead. Large buildings such as schools can have a higher potential for elevated lead levels because, even when served by a water system with well operated OCCT, may have longer periods of stagnation due to complex premise plumbing systems and inconsistent water use patterns. In such situations, there may not be technical improvements that can be made to the OCCT, but risk can be mitigated through public education and voluntary actions such as replacement of premise plumbing. Water systems have developed the technical capacity to do this work in operating their system and complying with current drinking water standards.

In addition, the EPA is proposing to expand the LCR sampling and education requirements because students and

young children spend a large portion of their day in schools and child care facilities. Lead in drinking water can be a significant contributor to overall exposure to lead, particularly for infants whose diet consists of liquids made with water, such as baby food, juice, or formula. Young children and infants are particularly vulnerable to lead because the physical and behavioral effects of lead occur at lower exposure levels in children than in adults. In children, low levels of exposure have been linked to damage to the central and peripheral nervous system, learning disabilities, shorter stature, impaired hearing, and impaired formation and function of blood cells.

Children spend on average over six hours per day at school (USDA National Center for Education Statistics), with many spending more time at on-site before- or after-school care or activities. Across the country, about 100,000 schools participate in the national school lunch program, serving daily lunch to 30 million students. Ninety thousand schools serve breakfast to 14.6 million students every day (USDA). The Healthy, Hunger-Free Kids Act of 2010, which authorizes funding and sets policy for USDA's child nutrition programs, requires schools participating in federally funded meal programs to make water available during meal periods at no cost to students (section 202 of HHFKA (42 U.S.C. 1758(a)(2)(A)). The Act also mandates that child care facilities provide free drinking water throughout the day (section 221 of HHFKA (42 U.S.C. 1766(u)(2)). The EPA is proposing a new requirement for all CWSs to provide public education on lead in drinking water and sample for lead at schools and child care facilities within its distribution system every five years. The intent of the requirement is to inform and educate targeted CWS customers and users about risks from lead in premise plumbing at schools and childcare facilities.

The EPA is proposing new public education requirements for all CWSs that provide water to schools and child care facilities. The CWS would be required to provide information about the health risks and sources of lead in drinking water, collect samples for lead at schools and child care facilities within its distribution system, and share that data with the facilities and health departments to raise awareness and increase knowledge about the risks and likelihood of the presence of lead in drinking water. Prior to conducting sampling in schools (discussed in further detail in this section), the CWS would compile a list of schools and child care facilities served by the water system. The list would contain both customers and other users to ensure inclusion of non-billed users. The CWS would then use that list to communicate with the schools and child care facilities about the health risks of lead and the specifics of the sampling program.

Prior to conducting sampling, the CWS would send information to the school and child care facilities to notify them of their plans to perform sampling and to provide them with the 3Ts for Reducing Lead in Drinking Water Toolkit (EPA 815–B–18–007), or a subsequent guidance issued by the EPA. A CWS's distribution of the 3Ts document would initiate or contribute to active communication with child care facilities and schools, who are critical customers that serve a vulnerable population. The information in the 3Ts document provides tools for the facility to consider using, including expanded sampling, stakeholder communication, and remediation options.

Under the proposal, a CWS would then be required to collect samples from five drinking water outlets at each school and two drinking water outlets at each child care facility served by the CWS. The CWS would be expected to complete sampling at all schools and child care facilities in its distribution system every five years. The samples would be first draw after at least 8 hours but not more than 18 hours stagnation of the building and be 250 ml in volume. The EPA is proposing this sampling protocol to be consistent with recommended sampling protocols under the EPA's 3Ts for Reducing Lead in Drinking Water Toolkit (EPA815–B–18–007). These sampling protocols enable school and child care facility officials to identify the outlets that may be sources of lead (*e.g.,* the fixture, interior plumbing). The smaller sample size is more representative of the amount of water consumed per serving. The results of the samples would not be used as part of the CWS's calculation of the 90th percentile value in § 141.80(c)(4) because these samples are being collected in a manner to inform whether action is needed at a specific school or child care facility and whether corrosion control is effective system-wide. The CWS would be required to provide each school and child care facility with the results of the samples taken in that facility. The CWS would be required to provide the sampling results as soon as practicable but no less than 30 days after receipt of the results. The CWS would also be required to provide the results for all samples collected in schools and child care facilities to the drinking water primacy agency and local health department where the school or child care facility is located.

CWS sampling in schools and child care facilities would be part of a targeted public education effort to educate CWS customers about risks from lead in premise plumbing and the actions customers can take to address sources of lead in their plumbing. Individual outlets, such as water fountains, can leach lead even when a water system has optimized corrosion control and/or has lead levels at or below the action level in its tap sampling. School and child care facility sampling contributes to increased public awareness of the potential for elevated levels of lead in premise plumbing independent of a water system's 90th percentile value.

The CWS would not be required under this proposed rule for taking any remedial action at the school or child care facility following the sampling and notification requirements of this proposal. The managers of these facilities have the established lines of communication with the occupants of these buildings (and their parents or guardians) and have control over the plumbing materials that may need to be addressed. The school or child care facility would be able to use the 3T's guidance and make decisions about communication of the sampling results to the parents and occupants of the facility and as well as any follow-up remedial actions.

Some State and local agencies have drinking water testing requirements for lead in schools and child care facilities. In this proposal, the EPA is including an opportunity for a State or primacy agency to waive school and child care facility sampling for individual CWSs to avoid duplication of effort. If a State has in place a program that requires CWSs to sample at all schools and child care facilities, or a program requiring schools and child care facilities to collect samples themselves, that is at least as stringent as the proposed LCR requirements, the State may use that program in lieu of the proposed requirement. If a State or other program is limited to a subset of schools and child care facilities as defined in this proposal, then the State may consider the requirement for individual CWSs whose customers or users are already included in the State or other program as being met. For example, if a State has a required program for testing lead in drinking water in public schools but not in other types of schools or in child care facilities, then a CWS serving only public schools can receive a waiver. If that CWS serves public and non-public schools, then the CWS would be required to notify and conduct testing at

the non-public schools and child care facilities and could receive a partial waiver to acknowledge that the CWS is not responsible for notifying and testing public schools. With a partial waiver, the CWS would be required to test at schools or child care facilities that are not otherwise covered by a program that requires testing and is at least as stringent as this proposal.

In section VII of this notice, the EPA is requesting comment on an alternative to the proposed requirements for public education and sampling at schools and child care facilities described in this section.

K. Find-and-Fix

The EPA is proposing an additional requirement to the current LCR, known as "find-and-fix" when an individual tap sample exceeds 15 µg/L. Under the current rule, up to 10 percent of lead tap samples used to calculate the 90th percentile may exceed the lead action level. However, if the water system's 90th percentile does not exceed the lead action level, the only action required by a water system is to provide the tap sample results to the consumer within 30 days of receiving the result. A "find-and-fix" approach requires water systems to perform additional actions (as described in this section); when an individual tap sample exceeds 15 µg/L, water systems are required to identify and remediate the source of the elevated lead at the tap sample site. Also, as part of the proposed public education requirements (described in section III.F of this notice), water systems would be required to provide notification to affected consumers within 24 hours. This proposed change will improve consumer awareness and provide information necessary to take actions to limit exposure to lead in drinking water.

Under this proposal, the "find-and-fix" approach would require the water systems to collect a follow-up sample for each tap sample site that exceeded 15 µg/L. The follow-up tap sample must be collected within 30 days of receiving the tap sample result. These follow-up samples may use different sample volumes or different sample collection procedures to assess the source of elevated lead levels based on the characteristics of the site. The results of the "find-and-fix" follow-up samples would be submitted to the State but would not be included in the 90th percentile calculation. If the water system is unable to collect a follow-up sample at a site, the water system would have to provide documentation to the State for why it was unable to collect a follow-up sample. The water system must provide the follow-up tap sample results to consumers within 30 days of receiving the result (consistent with the current rule), unless that follow-up sample also exceeds 15 µg/L, in which case, the EPA proposes the water system must notify the consumer within 24 hours of learning of the result. Water systems should anticipate the requirement that customers must be notified within 24-hours of results for many of the "find-and-fix" follow-up samples. Any water system that is unable to regain access to the same site to collect a follow-up tap sample may decide to sample at another site within close proximity of the original site and with similar structural characteristics.

As described in section III.H of this notice, the EPA is proposing that water systems with CCT that have an individual tap sample that exceeds the lead action level, would be required to collect an additional WQP sample within five days of obtaining the lead tap sample result. For a CWS, this WQP sample must be collected from a site in the same water pressure zone, on the same size or smaller water main within 0.5 miles of the residence with the tap sample exceeding the lead action level. Water systems with an existing WQP site that meets these criteria would be able to sample at that location. Since WQP sites are more accessible sites and do not require coordination with customers, this sample can be collected in a shorter timeframe. It is also important to try to sample close to when the lead tap sample with the high results was collected so that the water quality will more closely match the conditions at the site that exceeded 15 µg/L. The follow-up tap sample collected for lead can help the water system determine the potential source of lead contamination (*e.g.*, premise plumbing, LSL) and the WQP sample required for water systems with CCT will help determine if CCT is optimized, if additional WQP sites are needed, and/or WQPs set by the State are being met. Such steps will help identify the source of the elevated lead to initiate appropriate mitigation. Where the water system is unable to identify and/or mitigate the risk, it must submit a justification to the State.

Under this proposal, the water system would be required to determine if problems with the CCT are leading to elevated levels of lead in the tap samples and then implement a mitigation strategy if necessary. In addition to the follow-up tap sample and the WQP sampling, the water system can review distribution system operations or other factors to determine the cause of elevated lead level. CCT adjustment may not be necessary to address every exceedance. Water systems shall note the cause of the elevated lead level if known in their recommendation to the State.

Mitigation strategies could include a water system-wide adjustment to CCT, flushing portions of the distribution system, or other strategies to improve water quality management to reduce lead levels. Under this proposal, water systems would be required to recommend a solution to the State for approval within six months of the end of the monitoring period in which the site(s) first exceeded 15 µg/L and the State would have six months to approve the recommendation. If the water system does not have CCT and recommends installation of it, the system would be required to follow the proposed schedule in § 141.81(e). A water system with CCT that recommends re-optimization of CCT would be required to follow the steps in accordance with § 141.81(d).

A water system may identify a fix that is out of its control. For example, if the source of lead in drinking water was an old faucet owned by the customer, and the customer did not wish to replace the faucet, the water system would provide documentation to the State under this proposal. All other fixes recommended by a water system would be implemented on a schedule specified by the State.

L. Reporting and Recordkeeping

The EPA is proposing changes to water system reporting requirements in conjunction with corresponding changes to the regulatory requirements being proposed by the EPA in this rulemaking. These changes in reporting requirements will help inform State decision-making and improve implementation and oversight.

1. Reporting Requirements for Tap Sampling for Lead and Copper and for Water Quality Parameter Monitoring

In addition to the proposed tap sample revisions, as described in section III.G.3 of this notice, a water system would also be required to submit for State approval its tap sampling protocol that is provided to residents or other individuals who are conducting the tap sampling, to ensure that the sampling protocol does not include pre-stagnation flushing, instructions to clean or remove the aerator, or use narrow-mouth sample collection bottles. Under this proposal, water systems would also need to provide annual certification to the State that the approved sampling protocol has not been modified.

Additionally, calcium results would no longer be subject to reporting requirements because under the proposed rule, calcium would no longer be a CCT option or regulated WQP.

2. Lead Service Line Inventory and Replacement Reporting Requirements

The EPA is proposing to incorporate new reporting requirements in conjunction with the proposed revisions to the LSLR requirements in § 141.84. Under this proposal, by the rule's compliance date, the water system would have to submit an inventory of LSLs and service lines of unknown material to the State and would have to annually thereafter submit an updated inventory that reflects LSLs replaced and service lines of unknown material that have been evaluated in the distribution system.

3. Lead Trigger Level Notification Requirements

The EPA proposes that any water system that has LSLs with 90th percentile tap sampling data that exceed the lead trigger level would annually certify to the State that it conducted notification in accordance with proposed LSL customer notification provisions. The notification would ensure that these consumers were properly alerted about the trigger level exceedance, potential risks of lead in drinking water, and informed about the water system's goal-based LSLR program.

4. Reporting Requirements for School and Child Care Public Education and Sampling

The EPA is proposing to incorporate the following reporting requirements:

- A CWS would have to certify that it has completed the notification and sampling requirements (proposed in section III.J. of this notice) at a minimum of 20 percent of schools and child care facilities served by the water system. The certification would include the number of schools and child care facilities served by the water system, the number of schools and child care facilities sampled in the calendar year, and the number of schools and child care facilities that have refused sampling.
- A CWS would have to certify that individual sampling results were shared with the respective school and child care facility, and that all results were shared with local or State health departments. The proposed certification would include information identifying the number of attempts to gain entry for sampling that were declined by a customer.
- If a CWS does not serve any school or licensed child care facilities, the water system would have to annually certify to the State that it made a good faith effort to identify schools and child care facilities in accordance with proposed requirements in § 141.92 and confirm that no schools or child care facilities are served by the water system. The good faith effort could include reviewing customer records and requesting lists of schools and child care facilities from the State or other licensing agency.
- Certification would be sent to the State by July 1 of each year for the previous calendar year's activity.

5. What are the State record keeping requirements?

The EPA is proposing to require the State to retain all record keeping requirements from the current LCR as well as to add new requirements related to corrosion control treatment (CCT) and lead service line inventory (LSL) and replacement. The EPA proposes to require the State to maintain a record of all public water systems LSL inventories, as well as annual updates to their inventories as LSLs are verified and replaced over time. This information is necessary for the State to calculate goal and mandatory LSLR rates, as well as verify correct tap sample site selection tiering. The proposal would also require the State to maintain records on changes to source water or treatment, as these changes could affect the optimized corrosion control treatment approved by the State. The State would also be required to maintain records regarding "find-and-fix," specifically where a problem was identified, and the action taken to address it. States would review and maintain these records to ensure compliance with find-and-fix requirements, to evaluate if appropriate actions were taken by the water system, and if additional follow up is necessary by the water system. When no remedial action was taken, the State would need to keep a record of the decision for no action. For example, if the source of lead in drinking water was an old faucet owned by the customer, and the customer did not wish to replace the faucet, the State would maintain a record of that decision by the customer as justification for no remedial action taken to address a high lead sample result. Finally, under this proposal, the State would be required to maintain records of the compliance alternative the State has approved for the non-transient non-community water system (NTNCWS) and small community water systems (CWSs). This information would allow the State to track water systems' progress with corrosion control treatment, complete lead service line replacement, use of point-of-use (POU) devices, and replacement of leaded premise plumbing.

6. What are the State reporting requirements?

In addition to the reporting requirements in the current rule, the EPA is proposing that the State report several additional data elements to the EPA. The State would be required to report the OCCT status of all water systems, including the parameters that define the optimization (for example, orthophosphate residual or target pH and alkalinity values). While 90th percentile lead levels at or below the lead action level are not currently required to be reported by States for small water systems, the EPA is proposing that all water systems regardless of size and or lead levels report their lead 90th percentile value. The EPA has found that many States already voluntarily report 90th percentile lead values for all systems to the Safe Drinking Water Information System (SDWIS). The EPA also proposes that States report the current number of LSLs at every water system. National information about the numbers of LSLs in public water systems will support the EPA and other Federal agencies in targeting programs to reduce lead exposure, such as the Water Infrastructure Improvements for the Nation Act (United States, 2016) and America's Water Infrastructure Act (AWIA, 2018).

IV. Other Proposed Revisions to 40 CFR Part 141

A. Consumer Confidence Report

In 1996, Congress amended the Safe Drinking Water Act (SDWA). Among other things, this amendment added a provision requiring that all community water systems deliver to their customers a brief water quality report annually called a Consumer Confidence Report (CCR). CCRs summarize information water systems collect to comply with regulations. The CCR includes information on source water, the levels of any detected contaminants, compliance with drinking water rules (including monitoring requirements), and some educational language, including a mandatory health effects statement regarding lead.

As recommended by the NDWAC (see section VIII.L.2 of this notice), the EPA consulted with risk communication experts to revise the mandatory health effects language in the Consumer

Confidence Report (CCR). To improve clarity, the EPA is proposing to require Community Water Systems (CWSs) to include a revised mandatory health effects statement that would inform consumers that lead is harmful for all age groups and to include a mandatory statement about lead service lines (LSLs) (*e.g.,* their presence and how to replace them) for water systems with LSLs. The proposed mandatory statement is below.

Exposure to lead can cause serious health effects in all age groups. Infants and children who drink water containing lead could have decreases in IQ and attention span and increases in learning and behavior problems. Lead exposure among women who are pregnant increases prenatal risks. Lead exposure among women who later become pregnant has similar risks if lead stored in the mother's bones is released during pregnancy. Recent science suggests that adults who drink water containing lead have increased risks of heart disease, high blood pressure, kidney or nervous system problems.

To increase transparency and improve public access to information, the EPA is also proposing to require CWS to report the range of lead tap sample results in addition to the currently required 90th percentile and the number of samples that are greater than the lead action level for each monitoring period. Reporting the range of tap sample lead levels would allow consumers to understand how high tap sample levels were at individual sites.

B. Public Notification

The Public Notification Rule (PN) is part of the Safe Drinking Water Act. The rule ensures that consumers will know if there is a problem with their drinking water. These notices alert consumers if there is risk to public health. They also notify customers: If the water does not meet drinking water standards; if the water system fails to test its water; if the system has been granted a variance (use of less costly technology); or if the system has been granted an exemption (more time to comply with a new regulation). In 2000, the Environmental Protection Agency (EPA) revised the existing Public Notification Rule. The revisions matched the form, manner, and timing of the notices to the relative risk to human health. The revised rule makes notification easier and more effective for both water systems and their customers.

In 2016, section 2106 of the Water Infrastructure Improvements for the Nation Act (WIIN Act) amended section 1414 of the Safe Drinking Water Act (SDWA) to, among other things, require water systems to provide "Notice that the public water system exceeded the lead action level under section 141.80(c) of title 40, Code of Federal Regulations (or a prescribed level of lead that the Administrator establishes for public education or notification in a successor regulation promulgated pursuant to section 1412 of the SDWA)." The Act also provided that notice of violations or exceedances "with potential to have serious adverse effects on human," which are types of violations and exceedances currently categorized as "Tier 1" under the current public notification rules (see Table 2 to § 141.201), must "be distributed as soon as practicable, but not later than 24 hours, after the public water system learns of the violation or exceedance." The WIIN Act also requires that such notifications "be provided to the Administrator and the head of the State agency that has primary enforcement responsibility under section 1413 of the SDWA, as applicable, as soon as practicable, but not later than 24 hours after the public water system learns of the violation or exceedance." The EPA is proposing to incorporate these requirements for CWSs and non-transient non-community water systems (NTNCWSs) with a lead action level exceedance as part of proposed revisions to the Lead and Copper Rule (LCR). Specifically, the proposed rule incorporates the amendments to section 1414 of the SDWA in the 40 CFR 141 subpart Q-Public Notification of Drinking Water Violations (and as necessary into any provisions cross-referenced therein) and adds exceedances of the lead action level under § 141.80(c) to the list of Tier 1 violations subject to the new 24-hour notice requirements discussed above. The EPA proposes to categorize lead action level exceedances as Tier 1 based on the conclusion that such exceedances "have the potential to have serious adverse health effects on human health as a result of short-term exposure". Since exposure to lead can result in serious health effects, the EPA is proposing a lead AL exceedance result in Tier 1 public notification because the Agency cannot define the subset of lead AL exceedances that could result in serious adverse health effects due to short-term exposure, therefore the EPA proposes that a lead AL exceedance would require Tier 1, 24 hour notification. In addition, the EPA proposes to update the mandatory health effects statement as follows to be consistent with the proposed CCR revisions:

Exposure to lead can cause serious health effects in all age groups. Infants and children who drink water containing lead could have decreases in IQ and attention span and increases in learning and behavior problems. Lead exposure among women who are pregnant increases prenatal risks. Lead exposure among women who later become pregnant has similar risks if lead stored in the mother's bones is released during pregnancy. Recent science suggests that adults who drink water containing lead have increased risk of heart disease, high blood pressure, kidney or nervous system problems.

C. Definitions

The EPA is proposing new and revised definitions to clarify new and updated terminology in this proposed rule in § 141.2. Definitions for "aerator," "pre-stagnation flushing," "wide-mouth bottle," "tap sampling protocol," "monitoring period," and "sampling period" are added to correspond with proposed rule changes regarding tap sampling methodology and the monitoring period. In addition, the population size criterion have changed for the definitions of small and medium-size water systems to reflect the 1996 changes to SDWA for small-system flexibility.

Definitions have been added to ensure readers understand the criteria that identify a "child care facility," and a "school," related to additional sampling requirements for CWSs. In addition, new definitions for "trigger level," "find-and-fix," and "consumer" have also been added because "trigger level" and "find-and-fix" are new requirements for this proposal, while "consumer" refers to a defined group impacted by the rule proposal. Further, in this proposal, terms related to lead service lines, such as "galvanized service line," "gooseneck, pigtail, or connector," "potholing," "hydrovacing," and "trenching" have been defined as these are processes or objects associated with the lead service line replacement requirements of the rule proposal. Also, to ensure appropriate implementation of this rule definitions for "pitcher filter" and "point of use (POU) device" are proposed because they relate to compliance alternatives for small community water systems and non-transient non-community water systems in this proposal. Finally, analytical definitions for a "method detection limit" (MDL) and a "practical quantitation level" (PQL)" have been provided to better explain analytical methods in the current and proposed rule.

V. Rule Implementation and Enforcement

The NDWAC recommended that the EPA create an on-line portal for

guidance, templates and other tools to support implementation of the final LCRR by water systems and States. The EPA provides all applicable guidance and tools on CCT, PE, and other aspects of the rule on the Agency website at *https://www.epa.gov/dwreginfo/water-system-implementation-resources* to support implementation of the current LCR and will continue to rely on the website to implement any revisions finalized as a result of this proposed rule. The Lead Action Plan has an objective to "[c]reate an online portal to enhance, consolidate and streamline federal-wide communication to the public. Links will direct the public to the EPA and other Federal Agencies specific information. The EPA would utilize this mechanism to promote broader access to the EPA website for new and revised guidance and tools to support the LCRR.

The EPA is proposing requirements that would improve oversight and enforcement of the LCRR. For example, the GAO in its report "Drinking Water: Additional Data and Statistical Analysis May Enhance EPA's Oversight of the Lead and Copper Rule", recommended the EPA should require states to report available information about lead pipes to the EPA's SDWIS (or a future redesign) database and should require states to report all 90th percentile sample results for small water systems (GAO–17–424, 2017).

A. What are the requirements for primacy?

This section describes the regulations and other procedures and policies that States must adopt, or have in place, to implement the proposed Lead and Copper Rule (LCR), while continuing to meet all other conditions of primacy in 40 CFR part 142. Section 1413 of the Safe Drinking Water Act (SDWA) establishes requirements that primacy entities (States or Indian Tribes) must meet to maintain primary enforcement responsibility (primacy) for its public water systems. These include: (1) Adopting drinking water regulations that are no less stringent than Federal national primary drinking water regulations (NPDWRs) in effect under sections 1412(a) and 1412(b) of the Act, (2) adopting and implementing adequate procedures for enforcement, (3) keeping records and making reports available on activities that the 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, as authorized under section 1413 of the SDWA. To continue to implement the LCR, States would be required to 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). Under § 142.12(b), all primacy agencies would be required to submit a revised program to the EPA for approval within two years of promulgation of any final LCR revisions, or States may be able to request an extension of up to two years in certain circumstances.

B. What are the special primacy requirements?

The EPA is proposing to retain the existing special primacy requirements as well as to establish additional requirements. Regarding LSL inventories, States would be required to provide a description of acceptable methods for verifying service line material under this proposal. Verification methods could include consultation of existing records or the physical examination of the service line. The State would also be required to submit the criteria it would use for determining a water system's goal-based rate for the system's LSLR, which a water system must implement after a lead trigger level exceedance. The State would be required to describe how it would determine a feasible goal-based rate, which would reduce lead exposure. States could consider several relevant factors, including but not limited to the percentage of LSLs as well as the financial circumstances of the water system and its customers.

The EPA also proposes special primacy requirements regarding testing at schools for lead in drinking water. The EPA is aware of several States that have instituted their own lead in drinking water testing programs in schools. If the State has an existing testing program at schools and child care facilities, the State would be required to demonstrate that their program is at least as stringent as the testing program proposed by the EPA.

Under this proposal, the State would also need to demonstrate how it will verify compliance with "find-and-fix" requirements. For example, the State would need to determine the acceptability of the water system's corrective actions and timeliness of the corrective action implementation. Finally, the State would need to describe the approach it would take in reviewing any change in source water or treatment at a water system. Such a change could impact the optimized corrosion control treatment as well as have an impact on other national primary drinking water regulations.

VI. Economic Analysis

This section summarizes the Economic Analysis (EA) supporting document (USEPA, 2019a) for the proposed Lead and Copper Rule (LCR) revisions, which is written in compliance with section 1412(b)(3)(C)(ii) of the 1996 Amendments to the Safe Drinking Water Act (SDWA). This section of the Act states that when proposing a national primary drinking water regulation (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, taking into account, as appropriate, the factors required under section 1412(b)(3)(C)(i). Clause (i) lists the analytical elements required in a Health Risk Reduction and Cost Analysis (HRRCA) which is applicable to a NPDWR that includes a maximum contaminant level. The prescribed HRRCA elements include: (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.

Costs discussed in this section are presented as annualized present values

in 2016 dollars, which is consistent with the timeframe for the EPA's water system characteristic data used in the analysis. The EPA estimated the year or years in which all costs occur over a 35-year time period. Thirty-five years was selected to capture costs associated with rule implementation as well as water systems installing and operating corrosion control treatment and implementing lead service line replacement (LSLR) programs. The EPA then determined the present value of these costs using discount rates of 3 and 7 percent.

Benefits, in terms of health risk reduction for the proposed LCR revisions are characterized by 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. The EPA quantifies and monetizes some of this health risk reduction from lead exposure by estimating the decrease in lead exposure resulting to children from 0 to 7 years of age from the installation and re-optimization of corrosion control treatment (CCT), LSLRs, and the implementation of point-of-use (POU) filter devices.

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

The entities potentially affected by the proposed LCR revisions are public water systems (PWSs) that are classified as either community water systems (CWSs) or non-transient non-community water systems (NTNCWSs). These water systems can be publicly or privately owned. In the economic analysis modeling performed in support of this proposal, the EPA began with the 50,067 CWSs and 17,589 NTNCWS in the Safe Drinking Water Information System Fed Data Warehouse (SDWIS/Fed) as its foundational data set.

The EPA used a variety of data sources to develop the drinking water industry characterization for the regulatory analysis. Exhibit 6–1 lists the major data sources, describes the data used from each source, and explains how it was used in the EA. Additional detailed descriptions of these data sources and how they were used in the characterization of baseline industry conditions can be found in Chapter 4 of the EA.

EXHIBIT 6–1—DATA SOURCES USED TO DEVELOP THE BASELINE INDUSTRY CHARACTERIZATION

Data source	Baseline data derived from the source
SDWIS/Fed third quarter 2016 "frozen" dataset[1].	• Public water system inventory, including population served, number of service connections, source water type, and water system type. Also used to identify water systems 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 current LCR. • Analysis of lead 90th percentile concentrations to identify water systems at or below the TL of 10 µg/L, above the TL, and above the AL of 15 µg/L at the start of the proposed rule implementation by water system size, water system type, source water type, and CCT status.[2] • The proportion of water systems that are on various reduced monitoring schedules for lead and copper tap and WQP monitoring. • The frequency of source and treatment changes and those source changes that can result in additional source water monitoring. • Length of time that water systems replace LSLs if required under the current LCR.
2006 CWSS	• Number of distribution system entry points per system. • PWS labor rates.
Geometries and Characteristics of Public Water Systems (USEPA, 2000).	• Design and average daily flow per water system.
1988 AWWA Lead Information Survey	• LSL inventory, including the number of water systems with LSLs, and the average number of LSLs per water system, as reported in the 1991 LCR RIA (Weston and EES, 1990).
2011 and 2013 AWWA Surveys of Lead Service Line Occurrence (as summarized in Cornwell et al., 2016).	• LSL inventory, including the number of water systems with LSLs and the average number of LSLs per water system.
Six-Year Review 3 of Drinking Water Standards	• Individual lead tap sampling results used to estimate percent of samples above 15 µg/L. • Baseline distribution of pH for various CCT conditions. • Baseline orthophosphate dose for CCT.

Acronyms: AL = action level; AWWA = American Water Works Association; CCT = corrosion control treatment; CWSS = Community Water System Survey; LCR = Lead and Copper Rule; LSL = lead service line; RIA = regulatory impact assessment; SDWIS/Fed: Safe Drinking Water Information System/Federal Version; TL = trigger level; WQP = water quality parameter; USEPA = United States Environmental Protection Agency.

Note:

[1] Contains information reported through June 30, 2016.

[2] As detailed in Chapter 3 of the Economic Analysis for the Proposed Lead and Copper Rule Revisions (USEPA, 2019a), a system's lead 90th percentile level is a key factor in determining a system's requirements under the current rule and proposed LCR.

B. Overview of the Cost-Benefit Model

Under the regulatory provisions of the proposed rule, PWSs will face different compliance scenarios depending on the size, the type of water system, the presence of LSLs, and existing corrosion controls. In addition, PWSs will also face different unit costs based on water system size, type, and number of entry points (*e.g.,* labor rates and CCT capital, and operations and maintenance (O&M) unit costs). PWSs have a great deal of inherent variability across the water system characteristics that dictate both compliance activities and cost.

Because of this variability, to accurately estimate the national level compliance costs (and benefits) of the proposed LCR revisions, as well as describe how compliance costs are expected to vary across types of PWSs, the cost-benefits model creates a sample of representative "model PWSs" by combining the PWS-specific data available in SDWIS/Fed with data on baseline and compliance characteristics available at the PWS category level. In some cases, the categorical data are simple point estimates. In this case, every model PWS in a category is assigned the same value. In other cases, where more robust data representing system variability are available the

category-level data includes a distribution of potential values. In the case of distributional information, the model assigns each model PWS a value sampled from the distribution, in order to characterize the variability in this input across PWSs. The model follows each model PWS in the sample through each year of analysis—determining 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. It also tracks how other events, such as changing a water source or treatment affect the water system's compliance requirements for the next year.

The model's detailed output provides results for 36 PWS categories, or strata. Each PWS reporting category is defined by the water system type (CWS and NTNCWS), primary source water (ground and surface), and size category (there are nine). This proposal presents summarized national cost and benefit totals by regulatory categories. The detailed output across the 36 PWS categories can be found in Appendix C of the EA.

In constructing the initial model PWS sample for the cost-benefit analysis, the EPA began with the 50,067 CWSs and 17,589 NTNCWS in SDWIS/Fed. Also, from SDWIS/Fed, the EPA knows each water system's type (CWS or NTNCWS); primary water source (surface water or groundwater); population served; CCT status (yes/no); ownership (public or private); and number of connections.

The available LCR data limited the EPA's ability to quantify uncertainty in the cost-benefit model. During the development of the model, it became clear that not only were many of the inputs uncertain, but for many LCR specific inputs, the EPA only has limited midpoint, high, and low estimates available and does not have information on the relative likelihood of the available estimates. This includes major drivers of the cost of compliance including: The baseline number of systems with LSLs and the percent of connections in those system that are LSLs; the number of PWSs that will exceed the AL and/or TL under the proposed revised tap sampling requirements; the cost of LSL replacement; the cost of CCT; and the effectiveness of CCT in PWSs with LSLs. Therefore, the EPA estimated proposed LCRR compliance costs under low and high bracketing scenarios. These low and high cost scenarios are defined by the assignment of low and high values for the set of uncertain cost drivers listed above. Detailed descriptions of these five uncertain variables and the derivation of their values under the low and high cost scenarios can be found in Chapter 5, Section 5.2.3.2 of the EA (USEPA, 2019a). With the exception of the five uncertain variables which define the difference between the low and high cost scenarios the remaining baseline water system and compliance characteristics are assigned to model PWSs, as described above, and remain constant across the scenarios. This allows the EPA to define the uncertainty characterized in the cost range provided by the low and high scenarios and maintains consistency between the estimation of costs for the current and proposed rules (*e.g.,* percentage of lead tap water samples that will be invalidated). Chapters 4 and 5 of the EA describe in greater detail the baseline and major cost driving data elements, their derivation, and the inherent sources of uncertainty in the developed data elements. Section 5.2 and 5.3 of the EA discuss how each data element is used in the estimation of costs and provides examples and references to how these data were developed.

Because PWS baseline characteristics are being assigned from distributional source data to capture the variability across PWS characteristics, the EPA needed to ensure that its sample size was large enough that the results of the cost-benefit model were stable for each of the 36 PWS categories. To insure stability in modeled results, the EPA oversampled the SDWIS/Fed inventory to increase the number of water systems in each PWS category. For every PWS category, the EPA set the target minimum number of model PWSs to 5,000. To calculate the total estimated costs for each PWS category, the model weights the estimated per water system costs so that when summed the total cost is appropriate for the actual number of water systems known to be in the category.

The exception to the assignment of water system characteristics discussed above are the 21 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 cost for these systems to comply with the proposed regulatory requirements, using the methods described above to assign system attributes could result in substantial error in the estimation of the national costs. Therefore, the EPA attempted to collect information on very large water 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. The EPA gathered this information from publicly available data such as SDWIS/Fed facility-level data, Consumer Confidence Reports, and water system websites. In addition, the American Water Works Association (AWWA) provided additional data from member water systems to fill in gaps. When facility-specific data was available, the EPA used it to estimate compliance costs for the very large water systems. If data was not available, the EPA assigned baseline characteristics using the same process as previously described. See Chapter 5, Section 5.2.3.2.6 of the EA for a summary of the data the EPA collected on these very large systems (USEPA, 2019a).

The cost model estimates the incremental cost of the proposed LCR revisions over a 35-year period. In accordance with the EPA's policy, and based on guidance from the Office of Management and Budget (OMB), when calculating social costs and benefits, the EPA discounted future costs (and benefits) under two alternative social discount rates, 3 percent and 7 percent.

When evaluating the economic impacts on PWSs and households, the 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. The EPA used data from the 2006 Community Water System Survey (CWSS) to estimate the PWS cost of capital. The 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 Exhibit 5–14 of the EA. Since similar cost of capital information is not available for NTNCWS, the EPA used the CWS cost of capital when calculating the annualized cost per NTNCWS. Total estimated cost of capital may be greater than actual costs water systems bear when complying with future regulatory revisions because financing support for lead reduction efforts may be available from State and local governments, EPA programs (*e.g.,* the Drinking Water State Revolving Fund (DWSRF), the WIFIA Program, and the Water Infrastructure Improvements for the Nation Act of 2016 (WIIN Act) grant programs), and other federal agencies (*e.g.,* HUD's Community Development Block Grants).

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. See Chapters 4 and 5 of the EA for a discussion of uncertainties in the cost estimates.

The 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 rule, become familiar with its provisions, and develop training materials and train employees on the new rule. States will also incur burden hours associated with adopting the rule into State requirements, updating their LCR program policies and practices, and modifying data record keeping systems. PWSs will incur costs to comply with the lead service line materials inventory requirements and develop an initial lead service line replacement plan in years one through three of the analysis. The EPA expects that water systems will begin complying with all other proposed rule requirements three years after promulgation, or in year four of the analysis.

Some requirements of the proposed rule must be implemented by water systems regardless of their water quality and tap sampling results (*e.g.,* CWS school and child care facilities sampling programs), however, most of the major cost drivers are a function of a water systems 90th percentile lead tap sample value. The 90th percentile value, and if it exceeds the lead trigger level or action level, dictates: The tap water sampling and water quality parameter (WQP) monitoring schedules, the installation/re-optimization of CCT, ''find-and-fix'' adjustments (triggered by single lead tap sample exceedances of the 15 µg/L action level, which has an increasing likelihood in the model as 90th percentile tap sample results increase) to corrosion control treatment, the installation of point-of-use filters at water systems selecting this treatment option as part of the small water system flexibilities of the proposed rule, the goal-based or mandatory removal of lead service lines and water system and State administrative costs. Because of uncertainty in the estimation of the 90th percentile values the Agency developed low and high estimates for this cost driving variable. The EPA used both the minimum and maximum 90th percentile tap sample values from SDWIS/Fed over the period from 2007 to 2015, to assign a percentage of PWSs by size, and CCT and LSL status to each of three groups, those at the trigger level (TL) or below, those above the lead trigger but at or below the action level (AL), and those above the lead action level. These assignments represent the status of systems under the current rule. See Chapters 4 and 5 of the EA for additional information.

Because the tap sampling requirements under the proposed LCR revisions call for 100% of lead tap samples to be taken from sites with LSLs, for water systems with LSLs, the likelihood that a PWS would have a lead 90th percentile greater than the TL or AL is higher under the proposed rule compared to under the current LCR. The EPA used information from Slabaugh et al. (2015) to develop two adjustment factors, the lower being applied to the low cost scenario LSL system 90th percentile values and the greater factor being used to adjust the high cost scenario 90th percentile values for LSL systems. The EPA then reassigned the LSL system to the three 90th percentile value groups, those without a TL or AL exceedance, those with a TL but not an AL exceedance, and those with an AL exceedance. A detailed discussion of the development of the 90th percentile value group placement, the adjustment made for the LSL water systems given the proposed tap sampling requirements, and the percentages of systems assigned to the 90th percentile value groups under both the current and proposed LCRR for the low and high cost scenarios are found in Chapter 5, section 5.2.4.2.2 of the EA.

Once water systems are assigned to the groupings based on their CCT and LSL status, individual 90th percentile lead tap sample values are assigned from the distribution of 90th percentile values within each grouping.

Several proposed regulatory compliance activities are assumed to not affect a water system's 90th percentile value. These include, for example, developing an inventory of LSLs, CWS sampling at schools and child care facilities, and public education. In the model, the only compliance activities that will change a water system's 90th percentile lead tap sample are: Installation of CCT; re-optimization of existing CCT; removal of LSLs; and a water system-wide ''find-and-fix'' activity (assumed to be a system-wide increase in pH). In addition to these proposed rule compliance activities, changing a water source or treatment technology can also result in a change in a water system's 90th percentile tap sample value.

Because a water system's 90th percentile value is so important to determining regulatory requirements and cost under the proposed rule, the cost model, under both the low and high cost scenarios, tracks each water system's 90th percentile value over each annual time step in the model. Based on the initial 90th percentile values, a number of proposed rule compliance actions are triggered. With the implementation of CCT, LSLR, and ''find-and-fix'' corrections, 90th percentile tap sample values are expected to decrease. The model allows for future increases in 90th percentile values as a result of changes in source water and treatment. The likelihood of these events occuring have been derived from SDWIS/Fed data (see Chapter 4 of the EA). 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 total cost of compliance for the existing LCR, the proposed LCR revisions and the incremental cost of the proposed rule, under both the low and high cost scenarios, by the major regulatory components and discounted at 3 and 7 percent. These components include sampling costs, CCT costs, LSL inventory and replacement costs, POU costs, public education and outreach costs, and implementation and administrative costs for water systems and States. This section also quantifies the potential increase in phosphates that would result from the increased use of corrosion inhibitors under the proposed rule, the resulting cost for treating to remove the additional phosphates at downstream waste water 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. Sampling Costs

The proposed LCR revisions affect most of the LCR's sampling requirements, including: Lead tap sample monitoring, lead WQP monitoring, copper WQP monitoring, and source water monitoring. The proposed rule also includes new requirements for CWS to sample at schools and child care facilities within their distribution systems. Only the copper tap sampling requirements of the current rule are not impacted by the proposed regulatory changes and therefore do not appear in the summarized sampling costs. Additional lead WQP monitoring and lead tap

sampling that is specifically required by the current rule and proposed revisions after the installation or re-optimization of corrosion control treatment is accounted for in the CCT costs and not in the WQP monitoring or tap sampling costs.

Lead tap sampling site selection tiering requirements have been strengthened under the proposed rule, increasing the cost to water systems with lead service lines for the development of a tap sampling pool that consists of all LSL sites. The other cost components of lead tap sampling remain unchanged and generally include sample collection, analysis, and reporting cost. The frequency of required lead tap sampling will also increase based on lead tap sample 90th percentile values.

Both the lead and copper WQP monitoring cost totals represent collection and lab analysis cost of samples both at entry points and taps within the distribution system, as well as PWS reporting costs. The schedules for conducting these activities at modeled water systems are dependent on a water system's projected lead 90th percentile value, the presence of CCT, and past sampling results.

The proposed rule will require source water monitoring the first time a PWS has an action level exceedance. This monitoring will not be required again unless the water system has a change in source water.

Sampling at schools and child care facilities represents totally new requirements for CWSs under the proposed LCR revisions. Unlike the other sampling requirements of the proposed rule, school and child care facility sampling is not affected by a water system's 90th percentile lead tap sample value. The proposed rule requires that all schools and child care facilities must be sampled every five years (schools and child care facilities may refuse the sampling, but the water system must document this refusal to the State). This program's costs are reported with sampling cost, but they also represent public education costs and requirements of the proposed LCRR. The costs of complying with the proposed rule include water systems: (1) Identifying schools and child care facilities in their service area and preparing and distributing an initial letter explaining the sampling program and the 3Ts Toolkit, (2) coordinating with the school or child care facility to determine the sampling schedule and the logistics of collecting the samples, (3) conducting a walkthrough at the school or child care facility before the start of sampling, (4) sample collection from the school or child care facility, (5) sample analysis, and (6) providing sampling results to the school or child care facility, the State, and the local or State health department.

Exhibit 6–2 and 6–3 show the national annualized sampling costs for both the low and high estimate scenarios, under the current LCR, the proposed LCRR, and the incremental cost, discounted at 3 and 7 percent, respectively. Additional information on the estimation of sampling cost can be found in the Chapter 5, section 5.3.1 of the EA. An alternative option to the school and child care facility sampling program can be found in section VI.F of this notice and in Chapter 9 of the EA (USEPA, 2019a).

EXHIBIT 6.2—NATIONAL ANNUALIZED SAMPLING COSTS AT 3% DISCOUNT RATE

[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
Lead Tap Sampling Monitoring	$33,803,000	$37,672,000	$3,869,000	$33,780,000	$42,944,000	$9,164,000
Lead Water Quality Parameters Monitoring	7,396,000	7,536,000	140,000	8,823,000	9,274,000	451,000
Copper Water Quality Parameters Monitoring	163,000	179,000	16,000	158,000	178,000	20,000
Source Water Monitoring	15,000	4,321	−10,679	47,000	17,000	−30,000
School Sampling	0	28,540,000	28,540,000	0	28,540,000	28,540,000
Total Annual Sampling Costs	41,376,000	73,931,000	32,555,000	42,809,000	80,955,000	38,146,000
Lead Tap Sampling Monitoring	32,736,000	36,959,000	4,223,000	32,718,000	43,977,000	11,259,000
Lead Water Quality Parameters Monitoring	7,156,000	7,242,000	86,000	9,106,000	9,583,000	477,000
Copper Water Quality Parameters Monitoring	156,000	170,000	14,000	151,000	170,000	19,000
Lead Water Quality Parameters Monitoring	7,156,000	7,242,000	86,000	9,106,000	9,583,000	477,000
Lead Tap Sampling Monitoring	32,736,000	36,959,000	4,223,000	32,718,000	43,977,000	11,259,000
Source Water Monitoring	17,000	5,496	−11,504	64,000	25,000	−39,000
School Sampling	0	27,520,000	27,520,000	0	27,520,000	27,520,000
Total Annual Sampling Costs	40,064,000	71,897,000	31,833,000	42,039,000	81,276,000	39,237,000

2. Corrosion Control Treatment Costs

Under the proposed LCRR, drinking water systems may be required to install CCT, re-optimize their existing CCT, or perform a "find-and-fix" adjustment to their CCT based on their current level of CCT in place, if their lead tap sample 90th percentile exceeds the trigger level or action level, and/or individual lead tap samples exceed 15 µg/L. In the cost model, a 90th percentile lead tap sample exceedance can be triggered by a change in water system source water or treatment technology. Small CWSs serving 10,000 or fewer people and all NTNCWSs may also elect to conduct LSLR or implement POU filters as part of the regulatory flexibilities proposed in the LCRR. See section III.E of this notice for additional information on the compliance alternatives available to small CWSs and NTNCWSs, and section VI.C.4 for a discussion of the modeling and a summary of the number of systems selecting each alternative compliance option.

The capital and operations and maintenance (O&M) costs for water systems installing or optimizing CCT are based on the assumption that water systems will obtain the finished water characteristics of 3.2 mg/L of orthophosphate and pH at or above 7.2 (for water systems with starting pH values less than 8.2). For those water systems assigned higher initial pH values in the model, between 8.2 and 9.2, the EPA assumed the CCT optimization would require adjusting pH to meet or exceed 9.2 (no orthophosphate addition would be needed). The distributions of water system starting values for orthophosphate and pH, used in the cost model, are both drawn from SDWIS and

Six-Year Review ICR data (see Chapter 4, section 4.3.6 of the EA).

All capital cost equations are a function of design flow, and all O&M costs are a function of average daily flow. Since CCT is conducted at the water system's entry points (EPs), the cost model calculates the design flow and average daily flow of each EP. The cost model uses two different sets of unit cost functions representing the low and high capital cost scenarios developed in the engineering Work Breakdown Structure models for CCT (Chapter 5, Section 5.2.3.2.5 and Appendix A, Section 1 of the EA). Using these bracketing capital cost values is designed to characterize uncertainty in the cost model estimates and when combined with O&M costs and EP flow values, are used to calculate the low and high CCT cost estimates per model PWS. Note that optimization O&M costs are obtained through an incremental cost assessment. The cost model calculated the O&M existing cost and subtracts them from the optimized O&M cost to obtain the incremental re-optimization costs.

In the cost model, water systems are assumed to always install and optimize their CCT, to the standards described above, before making any adjustment to CCT as a result of being triggered into the "find-and-fix" requirements of the proposed rule. If a water system is required to implement "find-and-fix," one of two things are assumed to occur at a single-entry point: A water system that has orthophosphate dosing and the pH target of 7.2 or greater will increase pH to 7.5, or a water system that previously optimized to a pH value of 9.2 will increase pH to 9.4. If "find-and-fix" is triggered again after an adjustment at a single EP, a water system is assumed to adjust all EPs to the new target pHs of 7.5 or 9.4, depending on the current treatment in place.

Using O&M cost functions estimated for the "find-and-fix", see Appendix A of the EA, the cost model first calculates the total annual O&M cost for treating to the "find-and-fix" standards previously listed as if no CCT was installed, then subtracts the PWS's current CCT annual O&M cost from the new "find-and-fix" annual O&M cost, to derive the share of the PWS's annual CCT O&M costs attributable to "find-and-fix" actions. The model also calculates the capital cost to retrofit the CCT water system for additional pH adjustment under both the low and high cost model scenarios. If a water system is triggered into a second round of "find-and-fix" CCT adjustment, the 7.5 or 9.4 pH requirements will be applied to all entry points. Individual entry point costs are summed to obtain total water system costs under the low and high model runs.

In addition to the capital and O&M cost of CCT installation, re-optimization, or "find-and-fix," water systems will also face several ancillary costs associated with changes in CCT status. Before the installation or re-optimization of CCT at a water system, a CCT study would need to be conducted or revised and the water system would consult with the State on the proposed changes to CCT (these costs also apply to water systems undergoing source water or treatment changes). After the change in CCT, a water system would conduct follow-up tap sampling, WQP monitoring at entry points and at taps in the distribution system, report the results of the initial post CCT change findings to the State, and review WQP data with the State on an ongoing basis as part of the water system's sanitary surveys.

Water systems with individual lead tap samples over 15 µg/L must: Collect and analyze a follow-up tap sample from the location that exceeded the 15 µg/L value, coordinate with the State on the location for a follow-up WQP sample in proximity to the location that exceeded 15 µg/L, collect and analyze the WQP sample, and review with the State the collected data to determine "find-and-fix" CCT required changes.

Exhibits 6–4 and 6–5 show the range of estimated national costs for CCT under the current LCR, the proposed LCR revisions, and the incremental cost, discounted at 3 and 7 percent, respectively. Note that a range of CCT capital costs are used in this assessment but the total range in Exhibits 6–4 and 6–5 is impacted by all five of the uncertain variables which enter the model as low and high estimates. See Section VI.B of this notice and Chapter 5, Section 5.2.3.2 of the EA, for additional information on the variables that define the low and high cost scenarios. The CCT Operation and Maintenance (Existing) category in these exhibits are the EPA's estimate of the ongoing cost of operating corrosion control at PWS where CCT was in place at the beginning of the period of analysis. Additional information on the estimation of CCT costs can be found in Chapter 5, section 5.3.2 of the EA.

EXHIBIT 6–4—NATIONAL ANNUALIZED CORROSION CONTROL TECHNOLOGY COSTS AT 3% DISCOUNT RATE

[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
CCT Installation	$13,364,000	$6,847,000	$−6,517,000	$38,857,000	$16,566,000	$−22,291,000
CCT Installation Ancillary Activities	1,360,000	1,440,000	80,000	1,506,000	1,986,000	480,000
CCT Optimization	5,106	11,287,000	11,281,894	163,000	44,199,000	44,036,000
CCT Operations and Maintenance (Existing)	313,830,000	313,830,000	0	314,091,000	314,091,000	0
CCT Optimization Ancillary Activities	10,000	327,000	317,000	132,000	722,000	590,000
Find and Fix Installation	0	12,912,000	12,912,000	0	47,837,000	47,837,000
Find and Fix Ancillary Activities	0	5,234,000	5,234,000	0	6,465,000	6,465,000
Total Annual Corrosion Control Technology Costs	328,569,000	351,877,000	23,308,000	354,750,000	431,866,000	77,116,000

EXHIBIT 6–5—NATIONAL ANNUALIZED CORROSION CONTROL TECHNOLOGY COSTS AT 7% DISCOUNT RATE

[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
CCT Installation	$11,687,000	$5,938,000	$−5,749,000	$37,547,000	$15,739,000	$−21,808,000
CCT Installation Ancillary Activities	1,312,000	1,405,000	93,000	1,496,000	2,155,000	659,000
CCT Optimization	8,474	9,515,000	9,506,526	268,000	44,128,000	43,860,000

EXHIBIT 6–5—NATIONAL ANNUALIZED CORROSION CONTROL TECHNOLOGY COSTS AT 7% DISCOUNT RATE—Continued
[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
CCT Operations and Maintenance (Existing)	299,344,000	299,344,000	0	299,593,000	299,593,000	0
CCT Optimization Ancillary Activities	13,000	328,000	315,000	172,000	846,000	674,000
Find and Fix Installation	0	10,655,000	10,655,000	0	45,834,000	45,834,000
Find and Fix Ancillary Activities	0	5,123,000	5,123,000	0	6,672,000	6,672,000
Total Annual Corrosion Control Technology Costs	312,364,000	332,309,000	19,945,000	339,077,000	414,967,000	75,890,000

3. Lead Service Line Inventory and Replacement Costs

The proposed LCR revisions require all water systems to create an LSL materials inventory during the first three years after rule promulgation or demonstrate to the State that the water system does not have LSLs. Because many water systems have already complied with State inventory requirements (*e.g.,* Ohio, see *http://codes.ohio.gov/orc/6109.121*) that are at least as stringent as those required under the proposed LCRR, the EPA adjusted the probability of conducting an inventory downward to reflect the State requirements. Water system inventory costs also reflect the development, by all water systems with LSLs, of an initial LSLR plan. The plan would include procedures to conduct full lead service line replacement, a strategy for informing customers before a full or partial lead service line replacement, a lead service line replacement goal rate in the event of a lead trigger level exceedance, a pitcher filter tracking and maintenance system, a procedure for customers to flush service lines and premise plumbing of particulate lead, and a funding strategy for conducting lead service line replacements.

Depending on a water system's 90th percentile lead tap sample value, it may be required to initiate a LSLR program. Small CWSs, serving 10,000 or fewer people, and NTNCWSs have flexibility in the selection of a compliance option if the trigger or action levels are exceeded. These water systems may select to implement CCT or POU devices and not receive LSLR costs in the model. See section III.E of this notice for additional information on the compliance alternatives available to small CWSs and NTNCWSs. The cost model under both the low and high scenarios applies the estimated LSLR costs to those CWS serving 10,000 or fewer people and any NTNCWSs for which the LSLR option is determined to be the least cost compliance alternative. Under both the low and high cost scenarios, the model estimates the cost for implementing LSLR, CCT, and POU for each water system that meets the small water system flexibility criteria and maintains only the cost associated with the least costly option for each system. See section VI.C.4 of this notice for a discussion of the modeling and a summary of the number of systems selecting each alternative compliance option.

The EPA collected LSLR unit cost information primarily from four surveys. Given the small number of observations collected and lack of systematic sampling techniques utilized in the surveys the resultant estimates of replacement costs based on these data were highly uncertain. Therefore, the EPA develop low- and high-end LSLR cost values that are used in the cost model to provide a low/high cost range to inform the understanding of uncertainty (Note four other factors used to produce the low and high cost estimates also influence the LSLR total cost estimates). See Chapter 5, section 5.2.3.2.4 and Appendix A, Section 3 for more information on the development of the LSLR unit cost range.

LSLR cost includes not only the physical replacement of the service line but also prior notification of LSLRs as part of water system maintenance operations; contacting customers and site visits to confirm service line material and site conditions before replacement; providing customers with flushing procedures following a replacement; delivering pitcher filters and cartridges concurrent with the LSLR, and maintenance for three months; collecting and analyzing a tap sample three to six months after the replacement of a LSL; and informing the customer of the results.

Under the proposed rule, water systems with a 90th percentile lead tap sample value greater than 10 μg/L and less than or equal to 15 μg/L are considered to have a trigger level exceedance. These water systems are required to develop and implement a "goal-based" LSLR program where the annual replacement goal is set locally through a water system and State determination process. Ancillary costs incurred by these water systems include: The development and delivery of outreach materials to known and potential LSL households and submitting annual reports to the State on program activities. For water systems that do not meet the annual "goal-based" replacement rate, the proposed rule requires that additional outreach to lead service line customers be conducted. The additional outreach conducted is determined in conjunction with the State and is progressive, increasing with additional missed annual goals.

Under this proposal, water systems with 90th percentile tap sample data that exceed 15 μg/L (action level) are required to fully replace 3 percent of their LSLs per year for as long as the water system remains above the action level for any portion of a monitoring year. These water systems must also submit to the State an annual report on program activities.

In order to estimate the share of the LSLR cost that is paid by customers, the EPA made the conservative assumption that customers under the "goal-based" plan always pay for the part of the LSL belonging to them both when a full LSL is replaced and when the customer side is being replaced after a water system had completed a partial LSLR in the past. Customers do not pay for pig tail/gooseneck replacements in the model. Under mandatory replacement the EPA assumes that the system pays for all replacements both full and partial.

Exhibits 6–6 and 6–7 show the estimated annualized national cost for both the low and high cost scenarios, discounted at 3 and 7 percent, respectively, of water systems developing the LSL inventory, water systems conducting the goal-based and mandatory LSLR programs, and household removal costs for the customer-owned portion of the LSL under the current LCR, the proposed LCRR, and the incremental cost. The EPA did not estimate costs to CWSs for replacing the water system-owned

portion of an LSL in response to receiving notification that a customer-owned portion of an LSL was replaced outside of a water system replacement program. The EPA expects that a small number of these types of replacements would happen annually. Detailed information on the estimation of LSLR costs can be found in Chapter 5, section 5.3.3 of the EA.

EXHIBIT 6–6—NATIONAL ANNUALIZED LEAD SERVICE LINE REPLACEMENT COSTS AT 3% DISCOUNT RATE
[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
Lead Service Line Inventory	$0	$5,068,000	$5,068,000	$0	$8,075,000	$8,075,000
System Lead Service Line Replacement	579,000	8,235,000	7,656,000	22,399,000	68,264,000	45,865,000
Lead Service Line Replacement Ancillary Activities	59,000	3,206,000	3,147,000	715,000	4,879,000	4,164,000
Activities Triggered by Not Meeting Voluntary Target	0	4,149,000	4,149,000	0	16,138,000	16,138,000
Total Annual PWS Lead Service Replacement Costs	638,000	20,658,000	20,020,000	23,113,000	97,357,000	74,244,000
Household Lead Service Line Replacement	234,000	5,478,000	5,244,000	9,063,000	20,003,000	10,940,000
Total Annual Lead Service Replacement Costs	872,000	26,137,000	25,265,000	32,176,000	117,359,000	85,183,000

EXHIBIT 6–7—NATIONAL ANNUALIZED LEAD SERVICE LINE REPLACEMENT COSTS AT 7% DISCOUNT RATE
[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
Lead Service Line Inventory	$0	$5,633,000	$5,633,000	$0	$8,617,000	$8,617,000
System Lead Service Line Replacement	520,000	8,197,000	7,677,000	30,793,000	86,480,000	55,687,000
Lead Service Line Replacement Ancillary Activities	53,000	4,314,000	4,261,000	983,000	6,726,000	5,743,000
Activities Triggered by Not Meeting Voluntary Target	0	4,191,000	4,191,000	0	20,447,000	20,447,000
Total Annual PWS Lead Service Replacement Costs	573,000	22,335,000	21,762,000	31,776,000	122,270,000	90,494,000
Household Lead Service Line Replacement	210,000	5,290,000	5,080,000	12,459,000	22,501,000	10,042,000
Total Annual Lead Service Replacement Costs	783,000	27,625,000	26,842,000	44,234,000	144,771,000	100,537,000

4. Point-of-Use Costs

Under the proposed rule requirements, small CWSs, serving 10,000 or fewer people, and NTNCWS with a 90th percentile lead value above the action level of 15 µg/L may choose between LSLR, CCT installation, or POU device installation and maintenance. See section III.E of this notice for additional information on the compliance alternatives available to small CWSs and NTNCWSs. In addition to the cost to provide and maintain POU devices, water systems selecting the POU compliance option face additional ancillary costs in the form of: (1) POU implementation planning for installation, maintenance, and monitoring of the devices, (2) educating customers on the proper use of the POU device, (3) sampling POU devises to insure the device is working correctly, and (4) coordination and obtaining approvals from the State.

The cost model applies these POU costs to those CWS serving 10,000 or fewer people and any NTNCWSs for which the POU option is estimated to be the least cost compliance alternative. The determination of the least cost compliance alternative is computed across each representative model PWS in the cost model based on its assigned characteristics including: the number of lead service lines, cost of LSLR, the presence of corrosion control, the cost and effectiveness of CCT, the starting WQPs, the number of entry points, the unit cost of POU, and the number of households. For a larger discussion on the assignment of system characteristics, see section VI.B of this notice and Chapter 5 of the EA. These characteristics are the primary drivers in determining the costs once a water system has been triggered into CCT installation or re-optimization, lead service line replacement, or POU provision and maintenance. The model estimates the net present value for implementing each compliance alternative and selects the least cost alternative to retain in the summarized proposed rule costs.

The EPA is estimating low and high cost scenarios, to characterize uncertainty in the cost model results. These scenarios are functions of assigning different low and high input values to a number of the variables that affect the relative cost of the small system compliance choices (see Chapter 5 section 5.2 of the EA for additional information on uncertain variable value assignment). Therefore, as the model output shows, the choice of compliance technology is different across the low and high cost scenarios.

Exhibits 6–8 and 6–9 show the total number of CWS serving 10,000 or fewer people and NTNCWSs, the total number of systems by type and population size that would select one of the small system compliance options, the number of NTNCWSs selecting each compliance alternative in the model, and the number of CWSs by population size selecting each compliance alternative in the model, under both the low and high cost scenarios. In general, the exhibits show across both the low and high scenarios that the majority of water systems would select re-optimizing under the small system compliance options. If a system has CCT in place, the incremental costs of re-optimization are low compared to all other alternatives. The POU device implementation seems to be the least cost alternative when the number of households in the system is low as demonstrated by the decrease in the

selection of the POU option as CWS population size increases in the model. The pattern seen in the selection of LSLR between the low and high cost scenarios demonstrates that the choice of compliance by small systems is driven by relative costs. Under the low cost scenario far greater numbers of systems select LSLR given the assumed lower numbers of LSLs per system and lower cost of replacement under this scenarios. While CCT installation cost is also lower under the low cost scenario the difference in cost between the high and low scenarios is relatively small compared to the reduction in cost for LSLR between the scenarios. POU cost remains unchanged between the low cost and high cost scenarios. The installation of CCT becomes more cost effective as system population size increases, but in the larger system size categories you can also see the effect of the relative cost of LSLR in the low cost scenario.

EXHIBIT 6–8—NTNCWS AND SMALL SYSTEM COUNTS IMPACTED UNDER FLEXIBILITY OPTION—LOW COST SCENARIO

[Over 35 year period of analysis]

	NTNCWS	CWS				
	All Systems	≤100	101–500	501–1,000	1,001–3,300	3,301–10,000
Total PWS Count in System Size Category	17,589	12,046	15,307	5,396	8,035	4,974
Total PWS Count of Systems with LSLR, POU, or CCT activity	1,453	1,521	2,498	1,148	1,544	2,037
Number of PWSs with Lead Service Line Removals	34	474	975	541	608	1,535
Number of PWSs that Install CCT	15	25	438	189	288	80
Number of PWSs that Re-optimize CCT	287	398	851	410	649	423
Number of PWSs that Install POU	1,117	625	234	8	0	0

EXHIBIT 6–9—NTNCWS AND SMALL SYSTEM COUNTS IMPACTED UNDER FLEXIBILITY OPTION—HIGH COST SCENARIO

[Over 35 year period of analysis]

	NTNCWS	CWS				
	All Systems	≤100	101–500	501–1,000	1,001–3,300	3,301–10,000
Total PWS Count in System Size Category	17,589	12,046	15,307	5,396	8,035	4,974
Total PWS Count of Systems with LSLR, POU, or CCT activity	2,354	1,938	2,782	1,677	3,274	1,314
Number of PWSs with Lead Service Line Removals	94	139	118	476	1,246	86
Number of PWSs that Install CCT	14	10	491	327	477	195
Number of PWSs that Re-optimize CCT	347	368	1,319	813	1,540	1,032
Number of PWSs that Install POU	1,900	1,422	855	61	10	1

The estimated national annualized point-of-use device installation and maintenance costs for the proposed rule, under the low cost scenario, are $3,995,000 at a 3 percent discount rate and $3,492,000 at a 7 percent discount rate. The POU impacts of the proposed rule for the high cost scenario are $16,400,000 discounted at 3 percent and $15,485,000 discounted at 7 percent. Since POU costs are zero under the current LCR, the incremental costs range from $3,995,000 to $16,400,000 at a 3 percent discount rate and from $3,492,000 to $15,485,000 at a 7 percent discount rate, under the low and high cost scenarios respectively. Additional information on the estimation of POU costs can be found in Chapter 5, section 5.3.4 of the EA.

5. Public Education and Outreach Costs

In addition to the current LCR public education requirements for water systems with a lead action level exceedance, the cost model includes proposed rule requirements for ongoing lead education that applies to all water systems with LSLs, regardless of the 90th percentile level, and requirements in response to a single tap sample exceeding the 15 µg/L lead action level.

The proposed rule requires a number of updates to existing public education and additional outreach activities associated with LSLs. The public education requirements costed for all water systems, regardless of their lead 90th percentile tap sample levels, include: (1) Updating Consumer Confidence Report language, (2) developing a lead outreach plan and materials for new customers, (3) developing an approach for improved public access to lead information, (4) participating in joint communication efforts with the State to provide increased information on lead education to health care providers, and (5) providing annual documentation and certification to the State that public outreach on lead has been completed. The costed proposed LCR public education requirements applying to all water systems with lead service lines are: (1) The planning, initially implementing and maintaining customer and public access to LSL location information, and (2) the development of lead educational materials for water-related utility work and delivery of those materials to affected households during water-related work that could result in service line disturbance.

The proposed rule public education costs that are applied to water systems that exceed the 15 µg/L action level include: (1) The development of lead language for public education in response to a lead action level exceedance, (2) delivery of education materials to customers for CWSs and posting of lead information for NTNCWs, (3) water systems contacting public health agencies to obtain a list of additional community organizations that should receive PE materials, (4) water systems notifying public health agencies and other community organizations, (5) large water systems posting a lead notice on their website, (6) water system issuing a press release, (7) water systems consulting with the State on the materials development and appropriate activities while the action level is exceeded, and (8) annually

certifying public education activities have been completed.

The proposed rule also includes a requirement for water systems to notify affected customers within 24 hours of becoming aware of an individual tap sample exceeding the 15 µg/L lead action level. The model includes the development cost of the notification and education materials to be delivered to affected households and the incremental cost of expedited delivery of the notification. Note that materials costs related to follow-up testing when a sample exceeds 15 µg/L are included in the tap sampling costs in section VI.C.1 of this notice. The estimated annualized national water system public education and outreach costs for the current LCR range from $48,000 to $1,093,000 at a 3 percent discount rate under the low and high cost scenarios respectively. At a 7 percent discount rate the annualized estimated current rule PE cost range is from $65,000 to $1,513,000. Under the proposed rule low cost scenario, the estimated impacts are $29,364,000 at a 3 percent discount rate and $28,765,000 at a 7 percent discount rate. Under the high scenario the estimated annualized costs are $35,491,000 at a 3 percent discount rate and $35,525,000 at a 7 percent discount rate. Therefore, the incremental estimated public education and outreach costs for water systems range from $29,316,000 to $34,398,000 at a 3 percent discount rate and $28,700,000 to 34,012,000 at a 7 percent discount rate. See Chapter 5, section 5.3.5 of the EA for additional detailed information on the estimation of public education and outreach costs.

6. Drinking Water System Implementation and Administrative Costs

All water systems will have one-time start-up activities associated with the implementation of the proposed rule. These compliance costs include: Water system burden to read and understand the revised rule; water systems assigning personnel and resources for rule implementation; water system personnel time for attending trainings provided by the State; and clarifying regulatory requirements with the State during rule implementation. This category of cost is not impacted by the variable that define the low and high cost scenarios, therefore only one set of estimated costs exist in the category. The estimated annualized national PWS implementation and administrative costs for the proposed LCR revisions are $1,863,000 at a 3 percent discount rate and $3,092,000 at a 7 percent discount rate. Since there are no costs under the current LCR, the PWS implementation and administrative incremental costs are also $1,863,000 at a 3 percent discount rate and $3,092,000 at a 7 percent discount rate. Additional information on the estimation of water system implementation and administrative costs can be found in Chapter 5, section 5.3.6 of the EA.

7. Annualized per Household Costs

The 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 proposed LCRR. This includes CCT cost, inventory creation, system payed customer-side LSLR, tap sampling, public education, and administrative costs. Because of uncertainty in five important LCRR cost driver input variables, discussed in section VI.A. of this notice, 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 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. The EPA then adds to both these values the total consumer-side lead service line replacement cost borne by households in the system, divided by the number of households served by the system, to derive the CWS's average annual household low and high scenario cost estimates. Exhibits 6–10 and 6–11 show the distributions of incremental annualized costs for CWS households by primary water source and size category. Note, 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. Some households that pay for a customer-side LSLR will bear a much greater annual household burden. The EPA estimates the cost of removing the customer-owned side of a service line range from $1,480 to $4,440, with a central tendency of $2,960. The percentage of customers in each water system paying the higher customer-side LSL costs depends on the number of LSL in the water system, the rate of replacement, and the details of the water systems LSLR program.

EXHIBIT 10—ANNUALIZED INCREMENTAL COST PER HOUSEHOLD BY CWS CATEGORY—LOW COST SCENARIO

[2016$]

Source water	Size	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Ground	100 or Fewer	$ −5.36	$5.33	$8.61	$13.79	$23.01
Ground	101 to 500	0.85	1.43	2.62	4.20	6.85
Ground	501 to 1,000	0.28	0.35	0.47	0.67	1.57
Ground	1,001 to 3,300	0.11	0.16	0.24	0.34	0.76
Ground	3,301 to 10,000	0.19	0.26	0.39	0.52	1.00
Ground	10,001 to 50,000	0.04	0.07	0.13	0.21	0.38
Ground	50,001 to 100,000	0.08	0.10	0.20	0.25	0.30
Ground	100,001 to 1,000,000	0.07	0.14	0.23	0.34	0.48
Ground	Greater than 1,000,000	0.17	0.17	0.24	0.26	0.26
Surface	100 or Fewer	2.87	4.96	8.86	15.52	23.87
Surface	101 to 500	0.73	1.31	2.17	3.66	7.56
Surface	501 to 1,000	0.26	0.34	0.52	0.81	2.11
Surface	1,001 to 3,300	0.11	0.15	0.25	0.39	0.82
Surface	3,301 to 10,000	0.20	0.26	0.43	0.78	1.56
Surface	10,001 to 50,000	0.05	0.09	0.19	0.38	1.55
Surface	50,001 to 100,000	0.08	0.11	0.25	0.32	1.07
Surface	100,001 to 1,000,000	0.06	0.14	0.26	0.42	0.84
Surface	Greater than 1,000,000	0.09	0.18	0.21	0.29	0.32

EXHIBIT 11—ANNUALIZED INCREMENTAL COST PER HOUSEHOLD BY CWS CATEGORY—HIGH COST SCENARIO

[2016$]

Source water	Size	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Ground	100 or Fewer	$−10.22	$4.78	$8.60	$15.22	$28.73
Ground	101 to 500	−1.06	1.36	2.87	4.85	11.54
Ground	501 to 1,000	−0.19	0.36	0.55	1.30	4.72
Ground	1,001 to 3,300	0.10	0.16	0.28	0.56	2.61
Ground	3,301 to 10,000	0.19	0.28	0.45	0.91	3.53
Ground	10,001 to 50,000	0.05	0.08	0.14	0.29	2.61
Ground	50,001 to 100,000	0.07	0.09	0.13	0.27	2.44
Ground	100,001 to 1,000,000	0.12	0.17	0.29	0.59	3.17
Ground	Greater than 1,000,000	0.17	0.17	0.24	0.26	0.26
Surface	100 or Fewer	−9.24	4.09	10.29	18.82	40.74
Surface	101 to 500	−2.99	1.13	2.73	5.82	15.96
Surface	501 to 1,000	−3.18	0.33	0.89	1.62	4.98
Surface	1,001 to 3,300	−1.80	0.16	0.31	0.65	2.30
Surface	3,301 to 10,000	−0.24	0.29	0.72	1.28	4.49
Surface	10,001 to 50,000	0.05	0.11	0.24	1.25	4.61
Surface	50,001 to 100,000	0.08	0.10	0.23	0.53	2.61
Surface	100,001 to 1,000,000	0.10	0.20	0.34	1.31	3.46
Surface	Greater than 1,000,000	0.09	0.18	0.21	0.29	0.32

8. Primacy Agency Costs

For each of the drinking water cost sections previously described, primacy agencies (*i.e.,* States) have associated costs. These include start-up and implementation costs; reviewing water quality parameter, source water, and school monitoring reports; reviewing and approving lead tap sampling plans, sampling frequencies, results, and reports; consultation and reviews during CCT, LSLR, and POU device installation; and reviewing and approving the lead public education materials and consulting on specific outreach requirements. In the EPA cost model, the majority of the costs associated with States are determined on a per water system basis. State actions and costs are largely driven by the proposed rule required actions that are triggered for the individual water systems. These per water system primacy agency costs are then summed to obtain aggregate costs for this category.

The State implementation and administration costs of complying with the proposed LCR revisions include: 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 the EPA; and reporting data to SDWIS/Fed.

State activities regarding sampling include reviewing:

- PWS reports on lead and copper WQP monitoring from entry points and distribution system taps;
- Lead tap sampling plans, changes in sampling locations, sample invalidations, sampling results and 90th percentile calculations, and certification of customer notification of sampling results;
- 9-year waiver requests;
- Source water sampling results; and
- School sampling results.

The State activities associated with CCT installation, re-optimization, and "find-and-fix" rule requirements include:

- Consulting with water systems on source water and treatment changes;
- Reviewing CCT studies for installation and re-optimization;
- Reviewing post CCT installation WQP monitoring and tap sample results (including sample invalidation);
- Setting optimal water quality parameters;
- Reviewing "find-and-fix" follow-up tap and water quality parameter sampling for each individual lead tap sample greater than 15 μg/L;
- Reviewing water system's "find-and-fix" summary reports;
- Reviewing new the EPA's CCT guidance; and
- Conducting CCT water quality reviews in conjunction with sanitary surveys.

LSLR creates a number of water system/State interactions. States would be required to:

- Review water system inventory data;
- Confer with water systems with LSLs on initial planning for LSLR program activities, including standard operating procedures for conducting replacements, and outreach programs;
- Work with LSL water systems to determine a goal-based LSLR rate;
- Provide templates and targeted public education language for LSLR programs;
- Determine the additional outreach activities required if a water system fails to meet its goal-based LSLR rate; and
- Review annual LSLR program compliance reports from water systems.

State activities associated with CWSs serving 3,300 or fewer people and NTNCWSs that select POU as a treatment alternative include:

- Conferring with water systems on initial planning for POU programs;
- Reviewing public education material for POU devices; and
- Reviewing annual reports on POU programs, including POU device sampling results.

Proposed public education provisions will require a great deal of primacy agency oversight. Activities which produce primacy agency burden include:

- Providing water systems with templates to update CCR language;
- Reviewing water system information developed for new customer outreach;
- Participating in joint communication efforts for sharing lead public education with health care providers;
- Reviewing educational material developed for delivery during water-related work;
- Reviewing water system certifications of lead public education and outreach;
- Reviewing public education language submitted by water systems in response to an individual tap sample above the action level;
- Consulting with water systems on public education response to a lead

action level exceedance, including reviewing language; and

• Reviewing the water systems public education self-certification letter following a lead action level exceedance.

The cost model estimates that the Primacy Agencies will incur incremental estimated annualized costs, under the low cost scenario, totaling $14,915,000 at a 3 percent discount rate and $15,054,000 at a 7 percent discount rate. For the high cost scenario total estimated costs is $15,598,000 at a 3 percent discount rate and $15,965,000 at a 7 percent discount rate. Additional information on the estimation of primacy agency costs can be found in Chapter 5, section 5.4 of the EA.

9. Costs and Ecological Impacts Associated With Additional Phosphate Usage

Adding phosphate creates a protective inner coating on pipes that can inhibit lead leaching. However, once phosphate is added to the public water system (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.

When water systems add orthophosphate to their finished water for corrosion control purposes, some portion of the orthophosphate added will reach downstream WWTPs. To estimate the potential fate of the orthophosphate added at PWSs, the EPA developed a conceptual mass balance model. The 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 addition 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.

The EPA assumed this increase would continue as States transition from narrative to numerical nutrient criteria and set numeric permits limits, especially for impaired waters. The 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, particularly given the potential availability of alternative compliance mechanisms, such as, individual facility variance and nutrient trading programs.

The specific actions a WWTP might need to take to maintain compliance with a National Pollution Discharge Elimination System (NPDES) phosphorus limit will depend on the type of treatment present at the WWTP and the corresponding phosphorus removal provided (if any). 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 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.

The EPA derived a unit cost of $4.59 per pound of phosphorus for removing incremental phosphorus (see Chapter 5, section 5.5.1 of the EA 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 concentrations are well below their limit may not incur costs but might, under certain conditions, incur costs (for example, when phosphorus removal achieved by technology is sensitive to incremental phosphorus loading increases). Furthermore, future phosphorus limits could be more stringent than existing limits in certain watersheds.

Therefore, the EPA conservatively assumed that any WWTP with a discharge limit for phosphorus parameters could incur costs. Accordingly, in calculating costs, the 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. The EPA combined this likelihood and the unit cost (previously estimated) with incremental phosphorus loading to calculate incremental costs to WWTPs for each year of the analysis period. The incremental annualized cost that WWTPs would incur to remove additional phosphorous associated with the proposed LCRR, under the low cost scenario, ranges from $668,000 to $1,066,000 at a 3 and 7 percent discount rate, respectively. The high cost scenario produced an incremental estimated impact of $1,203,000 using a 3 percent discount rate, and $1,920,000 at a 7 percent discount rate.

The EPA estimates that WWTP treatment reduces phosphorus loads reaching water bodies by 59 percent but they are not eliminated. The proposed 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 202,000 to 460,000 pounds fifteen years after promulgation to the low/high scenario range of 461,000 to 685,000 pounds at year 35. See Chapter 5, section 5.5 of the EA 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. Unfortunately, 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, the 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 USGS SPARROW model suggest that anthropogenic sources deposit roughly 750 million pounds of total phosphorus per year (USEPA, 2019b). The total phosphorus loadings from the proposed LCRR high cost scenario would contribute about 1 percent (7 million/750 million) of total phosphorus entering receiving waterbodies in a given year, and the incremental amount of total phosphorus associated with the proposed LCRR relative to the current LCR grows only 0.09 percent (685,000/750 million). At the national level, the EPA expects total phosphorus entering waterbodies as a result of the proposed LCR revisions 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 deposits, 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 populations. Algal blooms can 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.

10. Summary of Rule Costs

The estimated annualized low and high scenario costs, discounted at 3 percent and 7 percent, that PWSs, households, and Primacy Agencies will incur in complying with the current LCR, the proposed LCRR, and incrementally are summarized in Exhibits 6–12 and 6–13. The total estimated incremental annualized cost of the proposed LCRR range from $132 to $270 million at a 3 percent discount rate, and $130 to $286 million at a 7 percent discount rate in 2016 dollars. The exhibits also detail the proportion of the annualized costs attributable to each rule component.

EXHIBIT 6–12—NATIONAL ANNUALIZED RULE COSTS AT 3% DISCOUNT RATE

[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
PWS Annual Costs:						
Sampling	$41,376,000	$73,931,000	$32,555,000	$42,809,000	$80,955,000	$38,146,000
PWS Lead Service Line Replacement	638,000	20,658,000	20,020,000	23,113,000	97,357,000	74,244,000
Corrosion Control Technology	328,569,000	351,877,000	23,308,000	354,750,000	431,866,000	77,116,000
Point-of Use Installation and Maintenance	0	3,995,000	3,995,000	0	16,400,000	16,400,000
Public Education and Outreach	48,000	29,364,000	29,316,000	1,093,000	35,491,000	34,398,000
Rule Implementation and Administration	0	1,863,000	1,863,000	0	1,863,000	1,863,000
Total Annual PWS Costs	370,631,000	481,688,000	111,057,000	421,766,000	663,931,000	242,165,000
State Rule Implementation and Administration	5,661,000	20,576,000	14,915,000	6,718,000	22,316,000	15,598,000
Household Lead Service Line Replacement	234,000	5,478,000	5,244,000	9,063,000	20,003,000	10,940,000
Wastewater Treatment Plant Costs	331,000	1,019,000	688,000	862,000	2,065,000	1,203,000
Total Annual Rule Costs	376,857,000	508,762,000	131,905,000	438,408,000	708,314,000	269,906,000

EXHIBIT 6–13—NATIONAL ANNUALIZED RULE COSTS AT 7% DISCOUNT RATE

[2016$]

	Low cost estimate			High cost estimate		
	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
PWS Annual Costs:						
Sampling	$40,064,000	$71,897,000	$31,833,000	$42,039,000	$81,276,000	$39,237,000
PWS Lead Service Line Replacement	573,000	22,335,000	21,762,000	31,776,000	122,270,000	90,494,000
Corrosion Control Technology	312,364,000	332,309,000	19,945,000	339,077,000	414,967,000	75,890,000
Point-of Use Installation and Maintenance	0	3,492,000	3,492,000	0	15,485,000	15,485,000
Public Education and Outreach	65,000	28,765,000	28,700,000	1,513,000	35,525,000	34,012,000
Rule Implementation and Administration	0	3,092,000	3,092,000	0	3,092,000	3,092,000
Total Annual PWS Costs	353,067,000	461,889,000	108,822,000	414,405,000	672,615,000	258,210,000
State Rule Implementation and Administration	5,547,000	20,601,000	15,054,000	6,993,000	22,958,000	15,965,000
Household Lead Service Line Replacement	210,000	5,290,000	5,080,000	12,459,000	22,501,000	10,042,000
Wastewater Treatment Plant Costs	407,000	1,473,000	1,066,000	1,288,000	3,208,000	1,920,000
Total Annual Rule Costs	359,230,000	489,253,000	130,023,000	435,144,000	721,282,000	286,138,000

D. Benefits Analysis

The proposed revisions to the LCR are 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. The EPA is particularly concerned about exposure experienced by children because lead can affect brain development. 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 1 year of age who drink more than double older children and adults per kg of body weight. Additionally, children absorb 2–4 times more lead than adults through the gastrointestinal tract ((Mushak, (1991); WHO, (2011) and Ziegler et al. (1978)). No safe level of lead exposure has been identified (USEPA, 2013). The EPA's health risk reduction and benefits assessment of the proposed LCR revisions concentrates on quantification and monetization of the estimated impact of reductions in lead exposure on childhood IQ. As explained in Appendix D in the Economic Assessment of the Proposed Lead and Copper Rule Revision (EA), there are additional non-quantified lead health impacts to both children and adults that will be realized as a result of this rulemaking.

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 proposed rule. See Appendix E in the EA for additional copper health impact information.

To quantify the potential impact to exposed populations of changes in lead tap water concentrations as a result of the proposed LCR revisions, the EPA:

- Estimated potential household lead tap water concentrations under various levels of corrosion control treatment, lead service line replacement, and implementation of POU devices;
- Modeled exposure using the lead tap water concentration data, information on peoples' water consumption activities, and background lead levels from other potential pathways;
- Derived the potential change in blood lead levels (BLLs) that result from the changes in drinking water lead exposure;
- Used concentration response functions, from the scientific literature, to measure changes in IQ for children given shifts in BLLs;
- Estimated the unit value of a change in childhood IQ; and
- Applied the unit values to the appropriate demographic groups experiencing changes in lead tap water concentrations as a result of the proposed regulatory changes across the period of analysis.

Subsections VI.D.1 through 4 of this notice outline the estimation of lead concentration values in drinking water used to estimate before and after rule implementation concentration scenarios, the corresponding estimated avoided IQ loss in children, and a summary of the monetized benefits of the proposed LCR Revisions.

1. Modeled Drinking Water Lead Concentrations

The EPA determined the lead concentrations in drinking water at residential locations through the collection and analysis of consecutive sampling data representing homes pre and post removal of LSLs, including partial removal of LSLs, under differing levels of water system corrosion control treatment. The data was collected from multiple sources including: Water systems, the EPA Regional Offices and the Office of Research and Development, and authors of published journal articles (Deshommes et al. 2016). This data includes lead concentrations and information regarding LSL status, location, and date of sample collection, representing 18,039 samples collected from 1,638 homes in 15 cities across the United States and Canada. The EPA grouped the samples into LSL status categories ("LSL," "Partial," "No LSL"). 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 (see EA Chapter 6, section 6.2.1 for additional detail and docket number EPA–HQ–OW–2017–0300 for the data).

The EPA fit several regression models (see EA Chapter 6, section 6.2.2 for additional detail) of tap water lead concentration as predicted by LSL presence ("LSL" or "No LSL"), LSL extent ("Partial"), CCT status, and "profile liter." Profile liter is the cumulative volume a sample represented within a consecutive sampling series at a single location and time. Models to describe the profile liter accounted for the variation among sampling events, sampling sites, and city. The 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 6–8, in Chapter 6 of the 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. CCT produces smaller effects on lead concentration than LSLs, and these effects are larger in homes with LSLs.

To statistically control for some sources of variability in the input data, the EPA did not use summary statistics from the original data directly in estimating the effects of LSL and CCT status. Instead, the EPA produced simulated mean lead concentrations for 500,000 samples, summarized in Exhibit 6–14, based on the selected regression model. The simulated sample concentrations represent estimates for new cities, sites, and sampling events not included in the original dataset. These simulations rely on estimates of variability and uncertainty from the regression model and given information on LSL and CCT status. Individual estimates are best thought of as the central tendency for a 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.

The EPA estimates that improving CCT will produce significant reductions in lead tap water concentration overall. However, for full LSLRs, the final model produced predictions of drinking water concentrations that overlapped almost completely for all CCT conditions. Therefore, the EPA used the pooled estimate of predicted drinking water concentrations for all CCT conditions in residences with no LSL in place for the main analysis in Chapter 6 of the EA. Because, the EPA in using this pooled data the mean and standard deviation values of tap water lead concentrations in Exhibit 6–14 are the same for all three "no LSLs" status rows, regardless of whether there is representative, partial, or no CCT. Effectively, in the primary analysis the EPA did not quantify the incremental benefits of CCT when LSLs are absent. On the other hand, because CCT is done on a system-wide basis, there are no incremental costs

associated with providing CCT to homes without LSL when it is being provided for the entire system. The impact of CCT for these no LSL homes likely varies by location depending on the degree to which legacy leaded plumbing materials, including leaded brass fixtures, and lead solder remain at the location.

The EPA does track the number of "no LSL" homes potentially affected by water systems increasing their corrosion control during the 35-year period of analysis. The number of no LSL homes that experience increase in CCT over the 35 years ranges from 14 million in the low cost scenario and 26 million in the high cost scenario. The EPA considered one possible approach to estimating the potential benefits to children of reducing lead water concentrations in these homes (see Appendix F of the EA) but has determined that the data are too limited and the uncertainties too significant to include in the quantified and monetized benefit estimates of this regulation. The EPA, therefore, is requesting comment and additional information about the change in lead concentrations that occur in non-LSL households that experience changes in CCT.

Because small CWSs that serve fewer than 10,000 people have flexibility in the compliance option they select in response to a lead action level exceedance, some CWSs are modeled as installing POU devices at all residences. See section III.E of this notice for additional information on the compliance alternatives available to small CWSs. For individuals in these systems the EPA assumes, in the analysis, that consumers in households with POU devises are exposed to the same lead concentration as residents with "No LSL" and "Representative" CCT in place.

EXHIBIT 6–14—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 (μg/L)
LSL	None	2.92	1.37	18.62	3.95
Partial	None	2.17	1.38	8.78	3.98
No LSL	None	−0.29	1.38	0.75	3.98
LSL	Partial	2.42	1.37	11.27	3.94
Partial	Partial	1.67	1.37	5.32	3.93
No LSL	Partial	−0.29	1.38	0.75	3.98
LSL	Representative	1.95	1.38	7.01	3.96
Partial	Representative	1.19	1.38	3.3	3.96
No LSL	Representative	−0.29	1.38	0.75	3.98

[a] Standard deviations reflect "among-sampling event" variability.

In the estimation of the costs and benefits of the proposed LCR revisions, each modeled person within a water system is assigned to one of the estimated drinking water concentrations in Exhibit 6–14, depending on the CCT, POU, and LSL status. The EPA estimated benefits under both the low cost and high cost scenarios used in the proposed LCRR which characterize uncertainty in the cost estimates. The low cost scenario and high cost scenario differ in their assumptions made about: (1) The existing number of LSLs in PWSs; (2) the number of PWS above the AL or TL under the current and proposed monitoring requirements; (3) the cost of installing and re-optimizing corrosion control treatment (CCT); (4) the effectiveness of CCT in mitigating lead concentrations; and (5) the cost of lead service line replacement (Section VI.C.3. above and Chapter 5, section 5.6 of the EA). The 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. Depending on the timing of required actions that can change CCT, POU, and LSL status under both the baseline and proposed LCRR 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 rule, improvements to CCT and the use of installed POU devices are only predicted for individuals in households with LSLs prior to the LCRR (consistent with discussion above about the limits of the data for predicting the impact of CCT when LSL are not present). In the model, LSL removals are predicted by water system, by year, and multiplied by the average number of people per household (across demographic categories) to determine the number of people shifting from one LSL status to another. To predict the changes in exposure that result from an improvement in CCT, the EPA predicts the entire LSL population of a water system will move to the new CCT status at the same time. The EPA also assumes that the entire water system moves to the drinking water lead concentration, assigned to POU when this option is implemented, which implies that everyone in households in a distribution system with LSLs is properly using the POU. See Chapter 6, section 6.3 of the EA for more detailed information on the number of people switching lead concentration categories under the low and high cost scenarios.

2. Impacts on Childhood IQ

The 2013 *Integrated Science Assessment for Lead* (USEPA 2013) States that there is a causal relationship between lead exposure and cognitive function decrements in children based on several lines of evidence, including findings from prospective studies in diverse populations supported by evidence in animals, and evidence identifying potential modes of action. The evidence from multiple high-quality studies using large cohorts of children shows an association between blood lead levels and decreased intelligence quotient (IQ). The 2012 National Toxicology Program Monograph concluded that there is sufficient evidence of association between blood lead levels <5 μg/dL and decreases in various general and specific measures of cognitive function in children from three months to 16 years of age. This conclusion is based on prospective and cross-sectional studies using a wide range of tests to assess

cognitive function (National Toxicology Program, 2012).

The EPA quantitatively assessed and monetized the benefits of avoided losses in IQ as a result of the proposed LCR revisions. Modeled lead tap water concentrations (previously discussed in this notice) are used to estimate the extent to which the proposed rule would reduce avoidable loss of IQ among children. The first step in the quantification and monetization of avoided IQ loss is to estimate the likely decrease in blood lead levels in children based on the reductions in lead in their drinking water as a result of the proposed LCRR.

The EPA estimated the distribution of current blood lead levels in children, age 0 to 7, using the EPA's Stochastic Human Exposure and Dose Simulation Multimedia (SHEDS-Multimedia) model coupled with its Integrated Exposure and Uptake Biokinetic (IEUBK) model. The coupled SHEDS–IEUBK model framework was peer reviewed by the EPA in June of 2017 as part of exploratory work into developing a health-based benchmark for lead in drinking water (ERG, 2017). For further information on SHEDS–IEUBK model development and evaluation, refer to Zartarian et al. (2017). As a first step in estimating the blood lead levels, the 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 the EPA's Consolidated Human Activity Database (CHAD) and CDC's National Health and Nutrition Examination Survey (NHANES). SHEDS-Multimedia, in this case, uses individual time-activity diaries from CDC's NHANES and the EPA's CHAD for children aged 0 to 7 to simulate longitudinal activity diaries. Information from these diaries is then combined with relevant lead input distributions (*e.g.,* outdoor air lead concentrations, inhalation rates) to estimate exposure. Drinking water tap concentrations for each of the modeled LSL 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 6, section 6.4, of the EA.

In the SHEDS–IEUBK 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 6–14 in the EA Chapter 6, section 6.4). 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, the 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 6–14 presents modeled SHEDS–IEUBK blood lead levels in children by year of life and LSL, CCT status, and POU. The blood lead levels in this exhibit represent what children's blood lead level would be if they lived under the corresponding LSL, POU, and CCT status combination for their entire lives. Note that when "No LSL" is the beginning or post-rule state, 0.75 µg/L is the assumed concentration across all levels of CCT status (none, partial, representative). The extent to which changes in CCT status make meaningful difference in lead concentrations for those without LSL cannot be determined from this Exhibit.

EXHIBIT 6–14—MODELED SHEDS–IEUBK 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	Geometric mean blood lead level (µg/dL) for specified year of life						
		0–1 [a]	1–2	2–3	3–4	4–5	5–6	6–7
LSL	None	3.75	2.60	2.73	2.59	2.56	2.72	2.45
Partial	None	2.43	1.88	1.96	1.89	1.87	1.95	1.69
No LSL	None	0.95	1.15	1.16	1.14	1.14	1.19	0.97
LSL	Partial	2.71	2.05	2.20	2.06	2.08	2.17	1.90
Partial	Partial	1.86	1.58	1.65	1.60	1.60	1.66	1.43
No LSL	Partial	0.95	1.15	1.16	1.14	1.14	1.19	0.97
LSL	Representative	2.14	1.75	1.82	1.73	1.75	1.82	1.57
Partial	Representative	1.51	1.41	1.45	1.42	1.40	1.46	1.24
No LSL	Representative	0.95	1.15	1.16	1.14	1.14	1.19	0.97
POU		0.95	1.15	1.16	1.14	1.14	1.19	0.97

[a] Due to lack of available data, blood lead levels for the first year of life are based on regression from IEUBK for 0.5- to 1-year-olds only.
These represent the blood lead for a child living with the LSL/CCT status in the columns to the left. 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 table presents modeled SHEDS–IEUBK blood lead levels in children by year of life.

The blood lead levels presented in Exhibit 6–14, are used as inputs for the benefits modeling. For each year of the analysis modeled, children are assigned blood lead levels, which correspond to a water lead concentration representing the LSL, POU and CCT status of their water system (see section 6.3 of the EA). In the proposed LCRR cost-benefit model, individual children in LSL households for each water system are tracked as they move from one LSL, CCT status, or POU to another as a result of LCRR implementation. The tracking occurs for both the low and high cost scenarios. Because the child's drinking water lead concentration can change annually in the model, the EPA chose to estimate lifetime blood lead levels by taking the average across each year of the child's life, up to age 7. With this averaging, age at implementation of the LCRR (changing LSL, CCT, or POU status), is taken into account when calculating lifetime average blood lead level.

In order to relate the child's estimated lifetime average blood lead level to an estimate of avoided IQ loss, the EPA selected a concentration-response function based on lifetime blood lead from the independent analysis by Crump et al. (2013). This study used data from a 2005 paper by Lanphear et al., which has formed the basis of concentration-response functions used

in several EPA regulations (National Ambient Air Quality Standard, 2008; TSCA Lead Repair and Renovation Rule, 2008; and Steam Electric Effluent Limitation Guidelines Rule, 2005). The Crump et al. (2013) function was selected over the Lanphear et al. (2005) reanalysis to minimize issues with overestimating predicted IQ loss at the lowest levels of lead exposure (less than 1 μg/dL BLL), which is a result of the use of the log-linear function. The Crump et al. (2013) function avoids this issue by adding one to the estimated blood lead levels prior to log-transformation. Since the proposed revisions to the LCR are expected to reduce chronic exposures to lead, the 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, the EPA assumes that there is no threshold for this endpoint and quantified avoided IQ loss associated with all blood lead levels. The EPA, as part of its sensitivity analysis, estimated the BLL to IQ relationship using Lanphear et al. (2005) and Kirrane and Patel (2014).[1] See Chapter 6, section 6.4.3 and Appendix F of the EA for a more detailed discussion.

The estimated value of an IQ point decrement is derived from the EPA's 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 change 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. The 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, the EPA 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 decrease in IQ is subsequently estimated as the gross value of an IQ point, less the value of additional education costs and lost earnings while in school. The EPA uses an IQ point value discounted to age 7. Based on EPA's reanalysis of Salkever (1995), the mean value of an IQ point in 2016$ discounted to age 7 is $5,708 using a 7 percent discount rate and $22,503 using a 3 percent discount rate.[2] See Appendix F, of the EA for a sensitivity analysis of avoided IQ loss benefits based on Lin et al. (2018).

The EPA used the estimated changes in lifetime (age 0 to 7) average blood lead levels that result from changes in LSL, CCT, or POU status as inputs to the concentration response function from the independent analysis by Crump et al. (2013). The resultant annual avoided IQ decrement is then summed and multiplied by the EPA reanalyzed Salkever (1995) value per IQ point which represent a weighted average for males and females (3 or 7 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 3 and 7 percent over the 35-year period of analysis, and further discounted to year one of the period of analysis. See Exhibit 6–18 (discounted at 3 percent) and Exhibit 6–19 (discounted at 7 percent) for the estimated benefit from avoided IQ losses from both lead service line removals and improvements to CCT at public water system as a result of the current rule, the proposed LCR revisions, and the incremental difference between the current and proposed rule estimates under both the low and high cost scenarios.

3. Impacts on Adult Blood Lead Levels

The EPA identified the potential adverse adult health effects associated with lead utilizing information from the 2013 Integrated Science Assessment for Lead (USEPA, 2013) and the U.S. Department of Health and Human Services' National Toxicology Program Monograph on Health Effects of Low-Level Lead (National Toxicology Program, 2012). In these documents, lead has been associated with adverse cardiovascular effects (both morbidity and mortality effects), renal effects, reproductive effects, immunological effects, neurological effects, and cancer. (see Appendix D of the EA).

Although the EPA did not quantify or monetize changes in adult health benefits for the proposed LCRR, the Agency has estimated the potential changes in adult drinking water exposures and thus blood lead levels to illustrate the extent of the lead reduction to the adult population estimated as a result of the proposed LCRR. The EPA estimated blood lead levels in adults for each year of life, beginning at age 20 and ending with age 80. Males and females are assessed separately because data from the CDC's National Health and Nutrition Examination Survey (NHANES) indicate that men have higher average blood lead levels than women. To estimate the changes in blood lead levels in adults associated with the proposed rule, the EPA selected from a number of available models a modified version of its Adult Lead Methodology (ALM). The ALM "uses a simplified representation of lead biokinetics to predict quasi-steady state blood lead concentrations among adults who have relatively steady patterns of site exposures" (USEPA, 2003). The model assumes a linear slope between lead uptake and blood lead levels, which is termed the "biokinetic slope factor" and is described in more detail in Chapter 6 section 6.5 of the EA. Although the model was originally developed to estimate blood lead level impacts from lead in soil, based on the record, the EPA finds the ALM can be tailored for use in estimating blood lead concentrations in any adult exposed population and is able to consider other sources of lead exposure, such as contaminated drinking water. The biokinetic slope factor of 0.4 μg/dL per μg/day is still valid for use in the case of drinking water since it is in part derived from studies that measure both adult blood lead levels and concentrations of lead in drinking water (Pocock et al., 1983; Sherlock et al., 1982).

The EPA estimated expected BLLs for adults with the ALM using the lead tap water concentration data by LSL, CCT, and POU status derived from the profile dataset, discussed in section VI.D.1 and shown in Exhibit 6–14 of this notice. For the background blood lead levels in the model, the EPA used geometric mean blood lead levels for males and females for each year of life between

[1] Lanphear et al. (2005) published a correction in 2019 that revised the results to be consistent with the Kirrane and Patel (2014) corrections.

[2] It should be noted that these values are slightly different than those used in other recent rulemaking (*e.g.*, the Lead Dust Standard and the Perchlorate rule). This is simply due to the differences in the age of the child when the benefits are accrued in the analysis. Benefits for the LCRR are accrued at age seven and therefore the value of an IQ point is discounted back to age 7 in the LCRR analysis. This results in a slightly higher estimate than the values used for the Perchlorate Rule and the Lead Dust Standard, which are discounted to age zero and age three, respectively. It should also be noted, and is described in Section 6.4.5 of the EA, that the benefits in the LCRR are further discounted back to year one of the analysis and annualized within SafeWater LCR.

ages 20 and 80 from NHANES 2011–2016, which may result in some minor double counting of exposure from drinking water. Exhibit 6–15 displays the estimated blood lead levels for adults by each LSL, POU or CCT combination summarized by age groups (blood lead values for each year of age are used to determine average BLL). The EPA also estimated BLLs using output for other exposure pathways from SHEDS in the ALM and the All Ages Lead Model, these results are shown in Appendix F of the EA. The All Ages Lead Model results are not used in the primary analysis because an ongoing peer review of the model has not been completed.

EXHIBIT 6–15—ESTIMATES OF BLOOD LEAD LEVELS IN ADULTS ASSOCIATED WITH DRINKING WATER LEAD EXPOSURES FROM LSL/CCT OR POU STATUS COMBINATIONS

Lead service line status	Corrosion control treatment status	Sex	Geometric mean blood lead level (μg/dL) for specified age group in years					
			20–29	30–39	40–49	50–59	60–69	70–80
LSL	None	Males	1.90	2.05	2.26	2.46	2.66	2.93
		Females	1.60	1.73	1.92	2.25	2.38	2.55
Partial	None	Males	1.33	1.46	1.67	1.87	2.04	2.28
		Females	1.03	1.14	1.34	1.66	1.77	1.91
No LSL	None	Males	0.86	0.98	1.19	1.39	1.54	1.75
		Females	0.56	0.66	0.86	1.18	1.27	1.38
LSL	Partial	Males	1.47	1.61	1.82	2.02	2.20	2.44
		Females	1.17	1.29	1.48	1.81	1.92	2.07
Partial	Partial	Males	1.13	1.25	1.46	1.66	1.83	2.05
		Females	0.83	0.93	1.13	1.45	1.55	1.68
No LSL	Partial	Males	0.86	0.98	1.19	1.39	1.54	1.75
		Females	0.56	0.66	0.86	1.18	1.27	1.38
LSL	Representative	Males	1.23	1.36	1.56	1.76	1.93	2.16
		Females	0.93	1.03	1.23	1.56	1.66	1.79
Partial	Representative	Males	1.01	1.13	1.34	1.54	1.70	1.92
		Females	0.71	0.81	1.01	1.33	1.43	1.55
No LSL	Representative	Males	0.86	0.98	1.19	1.39	1.54	1.75
		Females	0.56	0.66	0.86	1.18	1.27	1.38
POU		Males	0.86	0.98	1.19	1.39	1.54	1.75
		Females	0.56	0.66	0.86	1.18	1.27	1.38

As discussed in the analysis of childhood IQ impacts section VI.D.2 of this notice), the estimated BLLs in Exhibit 6–15 are average adult annual blood lead levels given the corresponding estimated lead tap water concentrations resulting from LSL, CCT, and POU status. In the proposed LCR revisions cost-benefit model, individual males and females in LSL households for each water system are tracked as they move from one LSL, CCT, or POU status to another as a result of rule implementation. Exhibit 6–16 shows the estimated changes in average lifetime blood lead levels for adults that move from the set of initial LSL, CCT, and POU status combinations to a new status as a result of LSL removal, and/or installation of CCT or POU. Note that when "No LSL" is the beginning or post-rule state, 0.75 μg/L is the assumed concentration across all levels of CCT status (none, partial, representative). The extent to which changes in CCT status make meaningful difference in lead concentrations for those without LSL cannot be determined from this Exhibit.

EXHIBIT 6–16—ESTIMATED LIFETIME AVERAGE BLOOD LEAD CHANGE FOR ADULTS MOVING BETWEEN LSL, CCT, AND POU STATUS COMBINATIONS

Pre-rule drinking water			Post-rule drinking water			Estimated average blood lead change (in geometric means)
Lead conc. (μg/L)	LSL status	CCT status	Lead conc. (μg/L)	LSL status	CCT status	Ages 20–80 (μg/dL)
18.62	LSL	None	0.75	No LSL	None	1.09
18.62	LSL	None	7.01	LSL	Representative	0.71
18.62	LSL	None	0.75	No LSL	Representative	1.09
18.62	LSL	None	0.75	POU		1.09
8.78	Partial	None	0.75	No LSL	None	0.49
8.78	Partial	None	3.3	Partial	Representative	0.34
8.78	Partial	None	0.75	No LSL	Representative	0.49
8.78	Partial	None	0.75	POU		0.49

EXHIBIT 6–16—ESTIMATED LIFETIME AVERAGE BLOOD LEAD CHANGE FOR ADULTS MOVING BETWEEN LSL, CCT, AND POU STATUS COMBINATIONS—Continued

Pre-rule drinking water			Post-rule drinking water			Estimated average blood lead change (in geometric means)
Lead conc. (μg/L)	LSL status	CCT status	Lead conc. (μg/L)	LSL status	CCT status	Ages 20–80 (μg/dL)
0.75	No LSL	None	0.75	No LSL	Representative	0.00
0.75	No LSL	None	0.75	POU		0.00
11.27	LSL	Partial	0.75	No LSL	Partial	0.64
11.27	LSL	Partial	7.01	LSL	Representative	0.26
11.27	LSL	Partial	0.75	No LSL	Representative	0.64
11.27	LSL	Partial	0.75	POU		0.64
5.32	Partial	Partial	0.75	No LSL	Partial	0.28
5.32	Partial	Partial	3.3	Partial	Representative	0.12
5.32	Partial	Partial	0.75	No LSL	Representative	0.28
5.32	Partial	Partial	0.75	POU		0.28
0.75	No LSL	Partial	0.75	No LSL	Representative	0.00
0.75	No LSL	Partial	0.75	POU		0.00
7.01	LSL	Representative	0.75	No LSL	Representative	0.38
7.01	LSL	Representative	0.75	POU		0.38
3.3	Partial	Representative	0.75	No LSL	Representative	0.16
3.3	Partial	Representative	0.75	POU		0.16
0.75	No LSL	Representative	0.75	POU		0.00

4. Total Monetized Benefits

Exhibits 6–17 and 6–18 show the estimated, monetized national annualized total benefits, under the low and high cost scenarios, from avoided child IQ decrements associated with the current LCR, the proposed LCRR, and the increment of change between the two, for CCT improvements, LSLR, and POU devise implementation discounted at 3 and 7 percent, respectively. The potential changes in adult blood lead levels estimated from changing LSL and CCT status under the proposed LCRR can be found in section VI.D.3 of this notice and Chapter 6 of the EA. The impact of lead on the risk of attention-deficit/hyperactivity disorder and reductions in birth weight are discussed in Appendix H of the EA. It should also be 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.D.1 of this notice), the benefits of small improvements in CCT, like those modeled under the ''find-and-fix,'' cannot be quantified in the model. For additional information on non-quantified benefits see section VI.E.2 of this notice.

EXHIBIT 6–17—SUMMARY OF ESTIMATED NATIONAL ANNUAL BENEFITS, 3% DISCOUNT RATE

[2016$]

System type: All estimate	Low cost estimate			High cost estimate		
Estimated child IQ benefits	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
Number of Children Impacted (over 35 years)	71,449	1,148,110	1,076,661	1,034,170	3,431,200	2,397,030
Annual IQ Point Decrement Avoided (CCT)	431	8,764	8,333	6,875	28,127	21,252
Annual Value of IQ Impacts Avoided (CCT)	$7,300,000	$152,661,000	$145,361,000	$129,985,000	$521,356,000	$391,371,000
Annual IQ Point Decrement Avoided (LSLR/POU)	297	4,010	3,713	5,065	12,011	6,946
Annual Value of IQ Impacts Avoided (LSLR/POU)	$5,091,000	$70,811,000	$65,720,000	$99,412,000	$229,200,000	$129,788,000
Total Annual Value of IQ Impacts Avoided	$12,391,000	$223,472,000	$211,081,000	$229,397,000	$750,556,000	$521,159,000

This table summarizes the national annual children's benefit for a 3 percent discount rate under High & Low Cost assumptions. This table uses a 3% discount rate over the 35 year analysis period. Children are modeled throughout their lifetime, and their drinking water concentration and BLL can change in each year of the analysis as CCT, POU or LSL changes happen in their modeled PWS.

EXHIBIT 6–18—SUMMARY OF ESTIMATED NATIONAL ANNUAL BENEFITS, 7% DISCOUNT RATE
[2016$]

System type: All estimate	Low cost estimate			High cost estimate		
Estimated child IQ benefits	Current LCR	Proposed LCRR	Incremental	Current LCR	Proposed LCRR	Incremental
Number of Children Impacted (over 35 years)	71,449	1,148,110	1,076,661	1,034,170	3,431,200	2,397,030
Annual IQ Point Decrement Avoided (CCT)	431	8,764	8,333	6,875	28,127	21,252
Annual Value of IQ Impacts Avoided (CCT)	$1,201,000	$26,219,000	$25,018,000	$25,008,000	$97,772,000	$72,764,000
Annual IQ Point Decrement Avoided (LSLR/POU)	297	4,010	3,713	5,065	12,011	6,946
Annual Value of IQ Impacts Avoided (LSLR/POU)	$858,000	$12,453,000	$11,595,000	$20,311,000	$45,005,000	$24,694,000
Total Annual Value of IQ Impacts Avoided	$2,059,000	$38,671,000	$36,612,000	$45,319,000	$142,778,000	$97,459,000

This table summarizes the national annual children's benefit for a 7 percent discount rate under High & Low Cost assumptions. This table uses a 7% discount rate over the 35 year analysis period. Children are modeled throughout their lifetime, and their drinking water concentration and BLL can change in each year of the analysis as CCT, POU or LSL changes happen in their modeled PWS.

E. Cost-Benefit Comparison

This section summarizes and describes the numeric relationship between the monetized incremental costs and benefits of the proposed LCR revisions. The section also discusses both the non-monetized costs and benefits of the rulemaking. Exhibits 6–19 and 6–20 compare the annualized monetized incremental costs and benefits of the proposed LCRR for the low and high cost scenarios. Under a 3 percent discount rate, the net annualized incremental benefits, under the low and high cost scenarios, range from $79 to $251 million. Under the low and high cost scenarios and a 7 percent discount rate, the net annualized incremental benefits range from a negative $91 to negative $189 million.

EXHIBIT 6–19—COMPARISON OF ESTIMATED MONETIZED NATIONAL ANNUALIZED INCREMENTAL COSTS TO BENEFITS OF THE PROPOSED LCRR AT 3% DISCOUNT RATE

	Low cost scenario	High cost scenario
Annualized Incremental Costs	$131,987,000	$269,989,000
Annualized Incremental Benefits	211,081,000	521,159,000
Annual Net Benefits	79,094,000	251,170,000

EXHIBIT 6–20—COMPARISON OF ESTIMATED MONETIZED NATIONAL ANNUALIZED INCREMENTAL COSTS TO BENEFITS OF THE PROPOSED LCRR AT 7% DISCOUNT RATE

	Low cost scenario	High cost scenario
Annualized Incremental Costs	$130,104,000	$286,219,000
Annualized Incremental Benefits	36,612,000	97,459,000
Annual Net Benefits	−91,492,000	−188,760,000

1. Non-Monetized Costs

The proposed LCRR are expected to result in additional phosphate being added to drinking water to reduce the amount of lead leaching into the water in the distribution system. The EPA's cost model estimated that, nationwide, the proposed LCRR will result in total incremental phosphorus loads increasing over the period of analysis, under the low cost and high cost scenarios, by a range of 202,000 to 460,000 pounds fifteen years after promulgation, and increasing under the low cost and high cost scenarios by a range of 461,000 to 685,000 pounds at year 35. At the national level, under the high cost scenario, this additional phosphorous loading is small, less than 0.09 percent of the total phosphorous load deposited annually from all other anthropogenic sources. However, national average 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 5, section 5.5.4 of the EA for additional information.

2. Non-Quantified Non-Monetized Benefits

In addition to the benefits monetized in the proposed rule 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 LCRR are summarized in Appendix D of the EA and are expected to affect both children and adults. The EPA focused its non-quantified impacts assessment on the endpoint identified using two comprehensive U.S. Government documents summarizing the recent literature on lead exposure health impacts. These documents are the EPA's Integrated Science Assessment for Lead (ISA) (USEPA, 2013); and the U.S. Department of Health and Human Services' National Toxicology Program Monograph on Health Effects of Low-Level Lead (National Toxicology Program (NTP), 2012). Both of these sources present comprehensive reviews of the literature on the risk of adverse health effects associated with lead exposure. The 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 effects, renal effects, reproductive and developmental effects, immunological effects, neurological effects, and cancer.

There are a number of proposed rule requirements that reduce lead exposure to both children and adults that the EPA could not quantify. The proposed rule would require additional lead public education requirements that target consumers directly, schools and child care facilities, health agencies, and specifically people living in homes with lead 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 proposed rule also would require the development of lead service line inventories and making the location of lead service lines publicly accessible. This would give exposed consumers more information, and it would provide potential home buyers this information as well, possibly resulting in additional lead service line 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 LCRR. As indicated in section VI.D.4 of this notice, because of the lack of granularity in the lead tap water concentration data available to the EPA for the proposed rule analysis, the benefits of small improvements in CCT to individuals residing in homes with LSLs, like those modeled under the "find-and-fix," are not quantified.

The EPA also did not quantify the benefits of reduced lead exposure to individuals who reside in homes that do not have lead service lines. The EPA has determined that the revised LCR requirements may result in reduced lead exposure to the occupants of these buildings as a result of improved monitoring and additional actions to optimize CCT. In the analysis of the proposed LCRR, the number of non-LSL homes potentially affected by water systems increasing their corrosion control during the 35-year period of analysis is 14 million in the low cost scenario and 26 million in the high cost scenario. These households, while not having an LSL in place, may still contain leaded plumbing materials, including leaded brass fixtures, and lead solder. These households could potentially see reductions in lead tap water concentrations. The EPA has assessed the potential benefits to children of reducing lead water concentrations in these homes (see Appendix F of the EA) but has determined that the data are too limited and the uncertainties too significant to include in the quantified and monetized benefit estimates of this regulation.

Additionally, the risk of adverse health effects associated with copper that are expected to be reduced by the proposed LCRR are summarized in Appendix E of the EA. 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. Other 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 (Office of Management and Budget, 2003)." Pursuant to this guidance, the EPA considered other regulatory options when developing the proposed LCRR related to:

- The lead in drinking water sampling program at schools and licensed child care facilities,
- The lead tap sampling protocol requirements for water systems with LSLs, and
- LSL locational information to be made publicly available.
- Providing small system flexibility to CWSs that serve a population of 3,300 or less.

Exhibit 6–21 provides a summary of the proposed requirement and other option considered for these four areas.

EXHIBIT 6–21—SUMMARY OF OTHER OPTIONS CONSIDERED FOR THE PROPOSED LCRR

Area	Proposed LCRR	Other option considered
Lead in Drinking Water Sampling Program at Schools and Licensed Child Care Facilities.	Mandatory program: • 20% of schools and licensed child care facilities tested *annually*. • 5 samples per school ..... • 2 samples per licensed child care facility.	Upon request program: • Schools and licensed child care facilities would be tested *upon request*. • 5 samples per school. • 2 samples per licensed child care facility.
Lead Tap Sampling Requirements for Systems with Lead Service Lines (LSLs).	• Systems with LSLs collect 100% of their samples from LSLs sites, if available. • Samples are *first* liter, collected after 6-hour minimum stagnation time.	• Systems with LSLs collect 100% of their samples from LSLs sites, if available. • Samples are *fifth* liter, collected after 6-hour minimum stagnation time.
Publicly Available LSL Locational Information ...	Systems report a location identifier (*e.g.*, street, intersection, landmark) for customer-owned portion of LSLs.	Systems report the exact street address of customer-owned portion of LSLs
Small System Flexibility	CWSs that serve 10,000 or less people, and all NTNCWSs, are provided compliance flexibility when they exceed the AL.	CWSs that serve 3,300 or less people, and all NTNCWSs, are provided compliance flexibility when they exceed the AL.

Notes: The fifth liter sample is intended to be representative of water residing in the LSL.

1. Lead Public Education and Sampling at Schools and Child Care Facilities Option

The EPA is proposing that all CWSs conduct a mandatory sampling and public education program for schools and licensed child care facilities that they serve. The EPA is also considering an "upon request" option that would contain the same components of the mandatory program under the proposed LCR revisions but would limit the sampling program to K–12 schools or child care facilities served by the water system that request testing. CWSs would be required to annually contact these facilities about this lead sampling program.

For the "upon request" option, the EPA assumed that five percent of schools and licensed child care facilities per year would elect to participate in the sampling program and that CWSs would contact each facility annually to determine its interest in the program in lieu of developing a sampling schedule for each facility. CWSs would only be required to sample at those facilities that request this sampling. As shown in Exhibit 6–22, the "upon request" option is estimated to be less costly than the proposed option. However, the cost of the "upon request" option is highly dependent on the percentage of facilities that request to participate in the sampling program. In addition, there is a great degree of uncertainty regarding the percentage of facilities that will request this sampling and how this interest may fluctuate over time.

EXHIBIT 6–22—NATIONAL ANNUALIZED COSTS FOR SCHOOL SAMPLING OPTIONS

[2016$]

Option	Annualized cost at 3% discount rate	Annualized cost at 7% discount rate
Proposed LCRR: Mandatory Program	$28,540,000	$27,520,000
Other Option Considered: Upon Request Program	10,430,000	10,047,200

2. Lead Tap Sampling Requirements for Water Systems With Lead Service Lines

The EPA is proposing that water systems with LSLs collect all one-liter, first-draw tap samples from sites served by LSLs as opposed to a minimum of 50 percent as currently required. As noted in section III.E.1 of this notice, tap sample sites served by an LSL are at the highest risk for elevated lead levels in drinking water, therefore, the EPA is revising the tap sample site selection criteria to ensure water systems with LSLs use those sites for lead tap sampling. The EPA is proposing to retain the first draw sampling procedure because this approach has been effectively implemented by water systems and can identify when systems must take additional actions to address elevated lead exposure. However, studies have shown LSLs to be one of the greatest contributors to lead, and first-draw samples of one-liter may not capture water that has sat in the lead service line, which may contain the highest lead in drinking water levels. When the 1991 LCR was promulgated, the best available data was first draw one-liter samples. Recent studies have been conducted to identify which liter from the tap best captures the highest level of lead that could potentially be consumed by residents. The EPA has evaluated these studies and determined that a fifth liter tap sample may be a more conservative option than a first-draw sample, because it would capture water from the lead service line, and sample results would theoretically result in more protective measures, even though it is unlikely that any given person consistently drinks water at the level of the fifth liter draw. Therefore, the EPA is considering a "fifth-liter option." To take a fifth liter tap sample, the person sampling, in accordance with all proposed tap sampling revisions, would fill a one-gallon container that would not be analyzed, then immediately collect a one-liter sample for lead in a separate bottle without turning off the tap. While technically this is not the fifth liter of water, the EPA will refer to this sample as the fifth liter.

Under this proposal, copper samples would continue to be first-draw, which would necessitate collection of two tap samples using different protocols at each sampling site for systems with LSLs. Collection of tap samples for both lead and copper at a single tap sample site could not be achieved on the same day under the alternative option above. To accomplish tap sampling for both lead and copper on a single visit would require collection of five consecutive one liter tap samples without turning the tap off. The first liter would be analyzed for copper and the fifth liter would be analyzed for lead. This procedure significantly complicates tap sample collection and may introduce error, such as misidentifying the correct liter for the two different analyses. Due to this complexity, copper samples may need to be collected on a different day to meet stagnation time and first draw requirements in the current LCR. The EPA requests comment on the feasibility of the fifth liter collection option.

The EPA expects that the fifth liter sampling for LSL water systems will increase the percent of water systems with a trigger level exceedance or action level exceedance and the probability that individual tap samples would exceed 15 µg/L. The EPA estimated that the number and percentage of LSL water systems with an action level exceedance would be two to three times higher under the fifth liter option for water systems without and with CCT, respectively, than the proposed LCR revisions. The EPA also estimated a larger number and percentage of water systems would have a trigger level exceedance under the fifth liter option, while the number and percentages of LSL water systems with no trigger level exceedance or action level exceedance would be lower. Note that these numbers would not change for non-LSL water systems under the fifth liter option compared to the proposed LCR revisions since the requirement to collect a fifth liter would only apply to LSL water systems.

Exhibits 6–23 and 6–24 provide the national annualized rule costs and benefits, under the low cost scenario, discounted at 3 and 7 percent, for the current rule, proposed LCRR, and the fifth liter option. Exhibits 6–25 and 6–26 provide the high cost scenario national annualized rule costs and benefits at the 3 and 7 percent discount rates. The EPA predicts higher State oversight costs, LSLR costs assigned to households, and wastewater treatment plant costs associated with CCT under the fifth liter option than under the proposed LCRR and current rule. At a 3 percent discount rate, the EPA estimates higher total benefits under the fifth liter option ($429 to $946 million) compared to the proposed LCRR ($223 to $751 million) and current rule ($12 to $229 million) based on estimated IQ point decrement avoided benefits. The EPA estimates that the cost of the rule will be higher under the fifth liter option ($543 to $762 million) compared to the proposed LCRR ($509 to $708 million) and current rule ($377 to 438 million) because more water systems will be required to conduct additional tap sampling and treatment requirements in response to higher measured fifth liter tap sample lead levels.

At a 7 percent discount rate, the EPA estimates higher total benefits under the fifth liter option ($76 to $178 million) compared to the proposed LCRR ($39 to $143 million) and current rule ($2 to

$45 million) based on estimated IQ point decrement avoided benefits. The EPA estimates that the cost of the rule will be higher under the fifth liter option ($524 to $777 million) compared to the proposed LCRR ($489 to $721 million) and current rule ($359 to $435 million) because more water systems will be required to conduct additional tap sampling and treatment requirements in response to higher measured fifth liter tap sample lead levels.

EXHIBIT 6–23—ESTIMATED NATIONAL ANNUALIZED RULE COSTS FOR THE LOW COST SCENARIO AT 3% DISCOUNT RATE CURRENT RULE, PROPOSED LCRR, AND FIFTH LITER OPTION

[2016$]

Benefit/cost category	Current LCR total	Proposed LCRR		Fifth liter option	
		Total	Incremental	Total	Incremental
Total Annual Rule Costs	$376,857,000	$508,762,000	$131,905,000	$543,079,000	$166,222,000
Total Annual PWS Costs	370,631,000	481,688,000	111,057,000	512,176,000	141,545,000
Total Annual Benefits	12,391,000	223,472,000	211,081,000	428,597,000	416,206,000

EXHIBIT 6–24—ESTIMATED NATIONAL ANNUALIZED RULE COSTS FOR THE LOW COST SCENARIO AT 7% DISCOUNT RATE CURRENT RULE, PROPOSED LCRR, AND FIFTH LITER OPTION

[2016$]

Benefit/cost category	Current LCR total	Proposed LCRR		Fifth liter option	
		Total	Incremental	Total	Incremental
Total Annual Rule Costs	$359,230,000	$489,253,000	$130,023,000	$523,524,000	$164,294,000
Total Annual PWS Costs	353,067,000	461,889,000	108,822,000	491,005,000	137,938,000
Total Annual Benefits	2,059,000	38,671,000	36,612,000	75,895,000	73,836,000

EXHIBIT 6–25—ESTIMATED NATIONAL ANNUALIZED RULE COSTS FOR THE HIGH COST SCENARIO AT 3% DISCOUNT RATE CURRENT RULE, PROPOSED LCRR, AND FIFTH LITER OPTION

[2016$]

Benefit/cost category	Current LCR total	Proposed LCRR		Fifth liter option	
		Total	Incremental	Total	Incremental
Total Annual Rule Costs	$438,408,000	$708,314,000	$269,906,000	$762,023,000	$323,615,000
Total Annual PWS Costs	421,766,000	663,931,000	242,165,000	717,537,000	295,771,000
Total Annual Benefits	229,397,000	750,556,000	521,159,000	946,051,000	716,654,000

EXHIBIT 6–26—ESTIMATED NATIONAL ANNUALIZED RULE COSTS FOR THE HIGH COST SCENARIO AT 7% DISCOUNT RATE CURRENT RULE, PROPOSED LCRR, AND FIFTH LITER OPTION

[2016$]

Benefit/cost category	Current LCR total	Proposed LCRR		Fifth liter option	
		Total	Incremental	Total	Incremental
Total Annual Rule Costs	$435,144,000	$721,282,000	$286,138,000	$777,471,000	$342,327,000
Total Annual PWS Costs	414,405,000	672,615,000	258,210,000	728,865,000	314,460,000
Total Annual Benefits	45,319,000	142,778,000	97,459,000	178,024,000	132,705,000

3. Reporting of LSL-Related Information

The EPA is proposing to require water systems to make their LSL inventory publicly available with a locational identifier associated with each LSL. The EPA is not proposing that address-level information must be provided to protect information regarding real property (see section II.E.3 of this notice). Public disclosure of the LSL inventory would increase transparency and consumer awareness of the extent of LSLs in the distribution system. The EPA is considering an additional option in which systems with LSLs would be required to make the address associated with each LSL publicly available. Available information indicates that prospective buyers and renters value reductions in risks associated with LSLs. Public disclosure of LSL locations can create an incentive, through increased property values or home sale incentives, to replace LSLs.

The EPA anticipates that the costs between these two options would be similar because the system would use the same method for publicly providing and maintaining information regarding its LSL information and LSL locational information, *e.g.*, posting information to the water system's website. The EPA anticipates the benefits between the address-level and location identifier options would be similar.

4. Small System Flexibility

As discussed in section III.E of this notice, the proposed LCRR includes significant flexibility for CWSs that serve 10,000 or fewer people, and all

NTNCWSs. If these PWSs have an action level exceedance, they can choose from three options (modeled in the cost-benefit model) to reduce the concentration of lead in their water. These options are: (1) Replace seven percent of their baseline number of LSLs per year until all LSLs are replaced; (2) optimize existing CCT or install new CCT; (3) Provide POU devices to all customers. The EPA is proposing the above three flexibilities for NTNCWS and an additional option of replacement of all lead bearing plumbing fixtures at every tap where water could be used for human consumption.

The EPA is considering limiting small system flexibility to CWSs that serve 3,300 or fewer people and all NTNCWSs. Exhibits 6–27 and 6–28 provide the range of the estimated incremental annualized rule costs and benefits, under both the low and high cost scenarios, for the proposed LCRR and the alternative small system flexibility option at a 3% and 7% discount rate, respectively.

EXHIBIT 6–27—ESTIMATED NATIONAL ANNUALIZED INCREMENTAL RULE COSTS AT 3% DISCOUNT RATE FOR THE PROPOSED LCRR AND ALTERNATIVE SMALL SYSTEM FLEXIBILITY OPTION

Benefit/cost category	Proposed LCRR: Small system flexibility for CWSs serving <=10,000 people and all NTNCWSs		Alternative small system flexibility option: CWSs serving <=3,300 people and all NTNCWSs	
	Low cost scenario	High cost scenario	Low cost scenario	High cost scenario
Total Annual Rule Costs	$131,987,000	$269,989,000	$134,385,000	$292,863,000
Total Annual PWS Costs	111,057,000	242,165,000	112,734,000	260,053,000
Total Annual Benefits	211,081,000	521,159,000	215,070,000	548,382,000

EXHIBIT 6–28—NATIONAL ANNUALIZED INCREMENTAL RULE COSTS AT 7% DISCOUNT RATE FOR THE PROPOSED LCRR AND ALTERNATIVE SMALL SYSTEM FLEXIBILITY OPTION

Benefit/cost category	Proposed LCRR: Small system flexibility for CWSs serving <=10,000 people and all NTNCWSs		Alternative small system flexibility option: CWSs serving <=3,300 people and all NTNCWSs	
	Low cost scenario	High cost scenario	Low cost scenario	High cost scenario
Total Annual Rule Costs	$130,104,000	$286,219,000	$132,748,000	$314,163,000
Total Annual PWS Costs	108,822,000	258,210,000	110,742,000	280,731,000
Total Annual Benefits	36,612,000	97,459,000	37,310,000	102,741,000

G. Cost-Benefit Determination

The Administrator has determined that the quantified and non-quantified benefits of the proposed LCR revisions justify the costs.

Under section 1412(b)(3)(C)(ii) of the 1996 Amendments to the SDWA, when the 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 VI.A through F of this notice summarize the results of this proposed rule analysis. As indicated in section VI.E of this notice, the monetized costs and benefits result in net annualized incremental benefits that range from $79 to $251 million, under the low and high cost scenarios at a 3 percent discount rate. Under the low and high cost scenarios at a 7 percent discount rate, the net annualized incremental benefits range from a negative $91 to negative $189 million.

In addition to the monetized benefits of the proposed rule, a number of potentially significant non-quantified and non-monetized sources of benefit exist that further strengthen the determination of benefits justifying costs. The harmful impacts of lead exposure include: Cardiovascular effects (both morbidity and mortality effects), renal effects, reproductive and developmental effects, immunological effects, neurological effects, and cancer. The EPA has only monetized a portion of the benefits associated with neurodevelopmental endpoints. Although the EPA did estimate the reductions to adult blood lead levels that could potentially result from changes to LSL and CCT status, the Agency did not quantify or monetize the potential benefits associated with reductions in adverse cardiovascular effects, renal effects, reproductive effects, immunological effects, neurological effects, and cancer. The EPA analysis has not quantified the positive impacts from increases in consumer averting behavior and the potential for customer initiated LSLR due to the proposed rule'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 the development of LSL inventories 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 LSLs in water systems where the proposed rule triggered an installation or re-optimization of CCT; and all households in systems implementing small improvement in CCT because of the "find-and-fix" proposed rule requirements.

VII. Request for Comment

The EPA is requesting comments upon all aspects of the proposed revisions described in this notice. While all comments relevant to the LCR revisions proposed in this notice will be considered by the EPA, comments on the following issues will be especially helpful to the EPA in developing a final

rule. The EPA specifically requests comment on the following issues.

General Matters

The EPA is requesting comment on the overall framework for the proposed LCR revisions. Has the EPA developed proposed revisions that address the variability in conditions among the regulated water systems that effect the levels of lead that may be present in drinking water? Do the proposed revisions to the LCR target the appropriate treatment technique actions to prevent known or anticipated adverse health effects to the extent feasible in accordance with the Safe Drinking Water Act (SDWA)?

The EPA requests comment on the complexity of the regulatory requirements that result from targeting different actions for different types of water systems and challenges States and water systems will encounter.

The EPA requests comment on ways that the proposed LCR revisions could be simplified and burden, including paperwork burden, could be reduced while still assuring adverse health effects are prevented to the extent feasible. The EPA solicits comment on ways it can improve the ability of State or Federal government to enforce this rule. The EPA solicits comment on ways it can improve the ability of State or Federal government to assist water systems with compliance.

Trigger Level

The EPA requests comment on the proposed trigger level of 10 µg/L and the actions water systems must take if they exceed this trigger level. Does this level represent an appropriate 90th percentile level at which to require systems to initiate progressive actions to reduce drinking water lead levels? The EPA requests comment on other 90th percentile level thresholds that would be reasonable for water systems to initiate progressive actions to reduce drinking water lead levels.

Lead Service Line Requirements

The EPA requests comment on the feasibility of creating initial lead service line inventories by the compliance date, which is three years after publication of the final rule, and if a different frequency (other than annual) would be more appropriate for inventory updates. The EPA requests comment on whether additional requirements or guidance are needed relating to the content or format of inventories. The EPA also requests comment on the actions that system with limited records can take to improve their understanding of the number and location of lead service lines in their water system.

The EPA request comment on whether small water systems should be exempt from the requirement to prepare a LSLR plan concurrent with their LSL inventory, given that they may opt not to select LSLR as a compliance option if the action level is exceeded.

The EPA requests comment on including galvanized pipe in lead service line (LSL) inventories and in goal-based and mandatory lead service line replacement (LSLR) rates under the proposed LCR revisions.

The EPA requests comment on the treatment of unknown service lines in the inventory.

The EPA requests comment on whether the Agency should require water systems to distribute education materials to homes with unknown service lines to inform them of the potential for their line to be made of lead and the actions they can take to reduce their exposure to drinking water lead.

The EPA requests comment on proposed revisions to the lead service line replacement program requirements.

The EPA requests comment on the goal-based lead service line requirement for systems that exceed the trigger level. Does the goal based LSLR requirement provide adequate incentives for water systems to achieve meaningful reductions in their lead service line inventory? Does the goal based program enable systems to effectively incorporate LSLR into their infrastructure replacement programs? The EPA requests comment on what criteria must be met for the EPA to establish a federal goal rate for water system under § 142.19.

The EPA also requests comment upon the feasibility of replacing a minimum of three percent of the lead service lines a year for the systems that exceed the action level. The EPA requests comment on whether the number of lines required to be replaced should be three percent of the number of lead service lines plus the number of unknown service lines at the time the systems exceeds the action level.

The EPA requests comment on the feasibility for a water system to replace its portion of an LSL within 45 days of being notified that a customer has replaced the customer portion of an LSL. Should this time frame be longer? Should this time frame be shorter? The EPA also requests comment on whether such replacement by a water system should be mandatory or voluntary.

The EPA requests comment on how water systems that are conducting LSLR can identify and prioritize replacements at the locations that have the highest lead levels and/or the most susceptible populations. The EPA requests comment on whether to require water systems to describe in their LSLR plan, how LSLR will be prioritized or to require a prioritization plan at the time LSLR is compelled.

The EPA is requesting comment on the appropriateness of requiring two years of tap sample monitoring before water systems may stop LSLR. Under this proposal, corrosion control treatment (CCT) or re-optimization of CCT may not immediately reduce lead levels at the tap. The EPA proposes that two years of monitoring would be enough time to evaluate and ensure these measures consistently reduce lead to meet the action level.

The EPA requests comment on requiring systems with LSLs to make publicly available the exact address of the LSL in the inventory instead of a location identifier (street, intersection, landmark) as proposed. As discussed in section VI of this notice, the EPA estimates that the costs and benefits of this alternative would be similar to the proposal.

The EPA request comment on the appropriateness of pitcher filters for risk mitigation after LSLR or LSL disturbances given that the customer would be responsible for operation and maintenance.

Corrosion Control Treatment

The EPA is requesting comment on the proposed CCT re-optimization requirements. EPA requests comment upon the potential actions water systems could take to adjust their corrosion control treatment and how they should work with the State to determine if adjustments to the treatment would better optimize corrosion control.

Tap Sampling

The EPA is requesting comment on an alternative revision to the LCR's existing tap sample collection method provisions. In promulgating the LCR, the EPA noted "the rule contains other procedures to ensure that excessive lead and/or copper levels would be detected in monitoring by requiring, for example, sampling of the first liter of water from the tap after water has been standing for at least six hours, conditions under which higher than average contaminant levels are likely to occur" (58 FR 26514). The EPA continues to believe that first draw sampling following a 6-hour stagnation period is an effective technique to determine when optimal corrosion control treatment is being maintained. However, the EPA notes

that research using sequential tap sample collection techniques on homes with LSLs indicates that a first draw sample may not represent the significant contributions of LSLs (Lytle et al., 2019). The EPA evaluated the feasibility of conducting sequential sampling techniques for every tap sample site for the public water systems that are subject to the LCR. The EPA finds it is not feasible due to the complexity of the sequential sampling technique, the number of samples that must be analyzed and the difficulty of interpreting the results from multiple tap samples. However, the EPA is requesting comment on whether water systems with lead service lines should be required to collect tap samples that are representative of water that was in contact with lead service lines during the 6-hour stagnation period.

The EPA requests comment on an alternative tap sampling technique for sampling locations with LSLs. The EPA requests comment on requiring tap samplers to collect the first gallon of water from the tap following the stagnation period (referred to as the fifth liter), then to collect a one-liter sample for analysis. The sampler would be instructed to pour out the gallon container or to use it for other purposes (*e.g.,* watering plants) and to submit the one-liter tap sample for analysis. The EPA finds this approach would be more representative of lead concentrations in service lines (Del Toral, 2013) and would be more likely to identify a greater number of water systems that would be required to take action to address elevated levels of lead. The EPA has included an analysis of the costs and benefits of this option in Section VI of this notice and Chapter 9 of the Economic Analysis of the Proposed Lead and Copper Rule Revisions (USEPA, 2019a). The EPA also requests comment on how the EPA could develop tap sample protocols that would allow for collection of a first draw copper sample and a fifth liter lead tap sample during a single tap sample event. The EPA requests data that demonstrate collecting a tap sample liter (*i.e.,* 5th liter) other than a first draw is more representative of water that has been in contact with a lead service line during the six hour stagnation period.

The EPA is proposing to require that all water systems that change their source water or make significant treatment changes obtain approval from their primacy agency prior to making the change. The EPA expects that in addition to evaluating and mitigating the impacts of the source water change or treatment change on corrosion control, many primacy agencies will require the water systems to conduct more frequent tap sampling following the change in treatment or source. The EPA requests comment on whether the regulation should specify a minimum tap sampling frequency of once every six months or once per year following the source water change or significant treatment change.

Testing in Schools and Child Care Facilities

The EPA requests comment on whether it should revise the rule to require community water systems (CWSs) to offer to collect samples from schools and child care facilities every five years or to collect samples from a school or a child care facility only if requested. The CWS would still be required to provide the schools and child care facilities information on the health effects and sources of lead in drinking water, and the 3Ts guidance. Under this approach, CWS would be able to respond to requests for sampling in a way that allows the water system to spread out the cost burden over multiple years (*i.e.,* delay fulfilment of requests to future years) if the water system samples at a minimum of five percent of schools and child care facilities each year. Additionally, a facility could decline the offer. The EPA has included an analysis of the costs and benefits of this option in section VI of this notice and Chapter 9 of the Economic Analysis of the Proposed Lead and Copper Rule Revisions (USEPA, 2019a).

Small System Flexibilities

The EPA is proposing that small system flexibilities be allowed for CWSs serving 10,000 or fewer persons and all NTNCWS. The EPA request comment on whether this flexibility is needed by systems serving between 3,301 and 10,000 persons and whether a different threshold is more appropriate. EPA requests comment on whether different flexibilities would be more appropriate for small systems whether defined as water systems serving 10,000 or fewer persons or 3,300 or fewer persons.

Public Education and Outreach

The EPA requests comment on whether the Agency should require water systems to distribute education materials to homes with unknown service line types to inform them of the potential for their line to be made of lead and the actions they can take to reduce their exposure to drinking water lead.

The EPA requests comment on the appropriateness of required outreach activities a water system would conduct if they do not meet the goal LSLR rate in response to a trigger level exceedance. The EPA also requests comments on other actions or additional outreach efforts water systems could take to meet their LSLR goal rate.

The EPA requests comment on the appropriateness, frequency, and content of required outreach to State and local health agencies and whether the requirement should apply only to a subset of the country's community water systems.

Economic Analysis

The EPA is soliciting comment on all aspects of the analysis for this rule. The agency offers a fulsome discussion on assumptions, models and related uncertainties in the regulatory impact analysis. In particular, the EPA requests comment on the five drivers of costs identified including rate of LSLR in its economic analysis. EPA requests comments on whether this estimated rate of lead service lines being replaced is appropriate. The EPA also solicits comment on: (1) The existing number of LSLs in PWSs; (2) the number of PWS above the AL or TL under the current and proposed monitoring requirements; (3) the cost of installing and optimizing corrosion control treatment (CCT); (4) the effectiveness of CCT in mitigating lead concentrations; and (5) the cost of lead service line replacement cost of lead service line replacement, cost of CCT, effectiveness of CCT. In addition to these cost drivers, the EPA solicits comment on the assumptions regarding labor required to comply with this rule, including labor required to collect and analyze samples. As described in section VI.E.2 of this notice, the EPA is not estimating benefits of avoided cardiovascular mortality that may result from the proposed LCR revisions. The EPA acknowledges the scientific understanding of the relationship between lead exposure and cardiovascular mortality is evolving and scientific questions remain. The EPA intends to conduct additional analysis and conduct a peer review that includes an opportunity for public comment. In the interim, EPA solicits peer reviewed information on the evidence relevant to quantifying the incremental contribution of blood lead concentrations (especially at BLL <5 μg/dL) to cardiovascular disease (and associated mortality) relative to strong predictors such as diet, exercise, and genetics that may be useful in future benefits analysis.

As mentioned in Section VI, and detailed in Appendix F of the EA, the EPA in a secondary analysis has

estimated the changes in lead concentrations at non-LSL households that result from changes in CCT. The lead concentration values used in this assessment come from data EPA collected from 15 cities across the United States and Canada (See Chapter 6, section 6,2 of the EA for more detail). The EPA has not found additional studies to corroborate this data. The EPA, therefore, is requesting comment and additional information about the change in lead concentrations that occur in non-LSL households that experience changes in CCT.

Recordkeeping

The EPA requests comment on the utility of States maintaining records of water system actions related to find-and-fix.

VIII. Administrative Requirements

A. Executive Order 12866 Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is an economically significant regulatory action that was submitted to the Office of Management and Budget (OMB) for review. Any changes made in response to OMB recommendations have been documented in the docket. The 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 Revisions* (USEPA, XX), is available in the docket and is summarized in section VI of this notice.

B. Executive Order 13771: Reducing Regulations and Controlling Regulatory Cost

This action is expected to be an Executive Order 13771 regulatory action. Details on the estimated costs of this proposed rule can be found in the EPA's analysis of the potential costs and benefits associated with this action summarized in section VI.

C. Paperwork Reduction Act (From the Office of Mission Support's Information Collection Request Center) (PRA)

The information collection activities in this proposed rule have been submitted for approval to the OMB under the PRA. The Information Collection Request (ICR) document that the EPA prepared has been assigned the Agency's ICR number 2040–NEW. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before December 13, 2019. You can find a copy of the ICR in the docket for this rule (EPA–HQ–OW–2017–0300), and it is briefly summarized here. The burden includes the time needed to conduct Primacy Agency and public water system activities during the first three years after promulgation, as described in Chapter 8 from the Economic Analysis of the Proposed Lead and Copper Rule Revisions (USEPA, 2019a)).

Burden means the total time, effort, or financial resources expended by people 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 LCRR 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 conduct training sessions and receive technical assistance from their Primacy Agency during implementation of the LCRR. Furthermore, public water systems will have to develop a lead service line inventory or submit a demonstration to the Primacy Agency that they do not have lead service lines. For the public water systems that have lead service lines, a lead service replacement plan will need to be developed.

Likewise, the paperwork burden for primacy agencies include reading and understanding the LCRR. The primacy agencies will have to adopt the rule and develop programs to implement the LCRR. This may result in the Primacy Agency modifying their data system while implementing the LCRR. Also, the Primacy Agency will have to provide the Primacy Agency's staff with training and technical assistance during implementation of the LCRR. The Primacy Agency is also responsible for reviewing demonstration of no lead service lines from systems and reviewing lead service 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 Lead and Copper Rule (LCR). These authorized entities are responsible for overseeing the LCR implementation by certain public water systems within their jurisdiction. Primacy agencies 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. Primacy agencies would also be required to report a subset of these data to the EPA. The EPA would utilize the information to protect public health by ensuring compliance with the LCR, measuring progress toward meeting the LCR'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 primacy agency(s).

Respondent's obligation to respond: If the proposed LCR is finalized, then the respondent's obligation to respond would be mandatory. Section 1401(1)(D) of the Safe Drinking Water Act (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 the 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 the 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 67,712. The total includes 56 primacy agencies and 67,656 public water systems.

Frequency of Response: The average burden per response (*i.e.,* the amount of time needed for each activity that requires a collection of information) is 8.15 to 8.41 hours; the average cost per response is $288 to $298.

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. Since, the first three years of the rule focuses on the creation of inventories for lead service lines, households are not faced with costs. 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 Primacy Agency during rule implementation. Public water systems would also be required to create a lead service line (LSL) materials inventory and develop an initial lead service line replacement (LSLR) plan. The total burden hours for public water systems ranges from 2.24 to 2.35 million hours. The total cost for public water systems ranges from $68.3 to $72 million. For additional information on the public water systems activity burden see sections VI.C.3 and VI.C.4 of this notice.

The Primacy Agency 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 the EPA; reporting data to SDWIS/Fed; reviewing public water system (PWS) inventory data; and conferring with LSL water systems on initial planning for LSLR program activities. The total burden hours for primacy agencies is 485,821 to 508,207 hours. The total cost for primacy agencies is $27.8 to $29.1 million. See section VI.C.8 of this notice for additional discussion on burden and cost to the Primacy Agency.

The net change burden associated with moving from the information requirements of the current rule to those in the proposed LCRR over the three years covered by the ICR is 2.72 to 2.86 million hours, for an average of 0.91 to 0.95 million hours per year. The range reflects the upper- and lower-bound estimates of the number of systems that need to develop LSL inventories. The total net change in costs over the three-year clearance period are $96.2 to 101.2 million, for an average of $32.1 to $33.7 million per year (simple average over three years).

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 the EPA's regulations in 40 CFR are listed in 40 CFR part 9.

Submit your comments on the EPA's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the EPA using the Docket ID. You may also send your ICR-related comments to OMB's Office of Information and Regulatory Affairs via email to *OIRA_submission@omb.eop.gov,* Attention: Desk Officer for the EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after receipt, OMB must receive comments no later than December 13, 2019. The EPA will respond to any ICR-related comments in the final rule.

D. Regulatory Flexibility Act as Amended by the Small Business Regulatory Fairness Act (RFA)

Pursuant to section 603 of the RFA, the 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 that impact. The complete IRFA is available in Part 8.4 of the EA and is summarized here.

For purposes of assessing the impacts of this proposed rule on small entities, the 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 the SDWA for small water system flexibility provisions. As required by the RFA, the EPA proposed using this alternative definition in the **Federal Register** (FR) (63 FR 7620, February 13, 1998), sought public comment, consulted with the Small Business Administration, and finalized the small water system threshold in the Agency's Consumer Confidence Report regulation (USEPA, 1998b, 63 FR 44524, August 19, 1998). As stated in that document, the alternative definition would apply to this regulation.

The SDWA is the core statute addressing drinking water at the Federal level. Under the SDWA, the EPA sets public health goals and enforceable standards for drinking water quality. As previously described, the LCR requires water systems to minimize lead and copper in drinking water, primarily by reducing water corrosivity and preventing the leaching of these metals from the premise plumbing and drinking water distribution system components. The EPA is proposing regulatory revisions to strengthen public health protection and improve implementation in the following areas: Tap sampling, corrosion control treatment; LSLR; consumer awareness; and public education.

The EPA identified over 65,000 small public water systems that may be impacted by the proposed LCR revisions. A small public water system serves between 25 and 10,000 people. These water systems include over 45,758 community water systems that serve year-round residents and more than 17,566 non-transient non-community water systems that serve the same persons over six months per year (*e.g.,* a public water system that is an office park or church). The proposed revisions to the LCR include requirements for: Conducting an LSL inventory that is updated annually; installing or re-optimizing corrosion control treatment when water quality declines; enhanced water quality parameter monitoring; establishment of a ''find-and-fix'' provision to evaluate and remediate elevated lead at a site where the tap sample exceeds the lead action level; and improved customer outreach. These proposed revisions also include reporting and recordkeeping requirements. States are required to implement operator certification (and recertification) programs per the SDWA section 1419 to ensure operators of community water systems and non-transient non-community water systems, including small water system operators, have the appropriate level of certification.

Under the proposed rule requirements, small CWSs, serving 10,000 or fewer people, and all NTNCWS with a 90th percentile lead value above the action level of 15 μg/L may choose between LSLR, CCT installation, or POU device installation and maintenance as the compliance option. A fourth option available to NTNCWSs, is the removal of all lead bearing plumbing material from the system was not analyzed in the EPA's

cost-benefit model. The EPA is estimating low and high cost scenarios to characterize uncertainty in the cost model results. These scenarios are functions of assigning different, low and high, input values to a number of variables that affect the relative cost of the small system compliance options. Under the current LCR, the EPA estimates that, under the low cost scenario, 21,435 small CWSs will have annual total LCR related costs of more than one percent of revenues, and that 10,599 of these small CWSs will have annual total costs of three percent or greater of revenue. Under the proposed LCRR, the number of small CWSs that will experience annual total costs of more than one percent of revenues increases by 7,556 to 28,990 and the number of small CWSs that will have annual total costs exceeding three percent of revenues increases by 7,051 to 17,648. Under the high cost scenario, the EPA estimates that under the current LCR, 22,732 small CWSs will have annual total costs of more than one percent of revenues, and that 12,127 of these small CWSs will have annual total costs of three percent or greater of revenue. Under the proposed LCRR, the number of small CWSs that will experience annual total costs of more than one percent of revenues increases by 8,274 to 31,002 and the number of small CWSs that will have annual total costs of more than three percent of revenues increases by 7,749 to 19,873. See section 8.4 of the proposed LCRR Economic Analysis for more information on the characterization of the impacts under the proposed rule. The EPA has considered an alternative approach to provide regulatory flexibility to small water systems. Section 8.4 of the LCRR Economic Analysis contains an assessment of impacts for an alternative option that sets the threshold for system compliance flexibility at systems serving 3,300 or fewer people.

As required by section 609 (b) of the RFA, the EPA also convened a Small Business Advocacy Review (SBAR) Panel to obtain advice and recommendations from small entity representatives that potentially would be subject to the rule's requirements. The SBAR panel evaluated the assembled materials and small-entity comments on issues related to the elements of the IRFA. A copy of the full SBAR panel report is available in the rulemaking docket.

E. The Unfunded Mandates Reform Act (UMRA)

This action contains a Federal mandate under 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, the EPA has prepared a written statement required under section 202 of UMRA. The statement is included in the docket for this action (see Chapter 8 in the Economic Analysis of the Proposed Lead and Copper Rule Revisions (USEPA, 2019a)) and is briefly summarized here.

Consistent with the intergovernmental consultation provisions of UMRA section 204, the EPA consulted with governmental entities affected by this rule. The EPA describes the government-to-government dialogue and comments from State, local, and tribal governments in section VIII.F Executive Order 13132: Federalism and section VIII.G Executive Order 13175: Consultation and Coordination with Indian Tribal Governments of this notice.

Consistent with UMRA section 205, the EPA identified and analyzed a reasonable number of regulatory alternatives to determine the treatment technique requirements in the proposed LCR revisions. Sections III, IV, and V of this notice describe the proposed options. See section VI.F of this notice and Chapter 9 in the Economic Analysis of the Proposed Lead and Copper Rule Revisions (USEPA, 2019a)) for alternative options that were considered.

This action may significantly or uniquely affect small governments. The EPA consulted with small governments concerning the regulatory requirements that might significantly or uniquely affect them. The EPA describes this consultation above in the Regulatory Flexibility Act (RFA), section VIII.D of this notice.

F. Executive Order 13132: Federalism

The EPA has concluded that this action has Federalism implications, as specified in Executive Order 13132 (64 FR 43255, August 10, 1999), because it imposes substantial direct compliance costs on State or local governments. The EPA consulted with State and local governments early in the process of developing the proposed action to allow them to provide meaningful and timely input into its development. The EPA held Federalism consultations on November 15, 2011, and on January 8, 2018. The EPA invited the following national organizations representing State and local elected officials to a meeting on January 8, 2018, in Washington, DC: The National Governors' 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 County Executives of America, and the Environmental Council of States. Additionally, the EPA 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 American Public Works Association, the National School Board Association, the American Association of School Administrators, and the Western Governors' Association to participate in the meeting. The EPA also provided the associations' membership an opportunity to provide input during follow-up meetings. The EPA held five follow up meetings between January 8, 2018, and March 8, 2018. In addition to input received during the meetings, the EPA provided an opportunity to receive written input within 60 days after the initial meeting. A summary report of the views expressed during Federalism consultations is available in the Docket (EPA–HQ–OW–2017–0300).

G. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action has tribal implications. However, it will neither impose substantial direct compliance costs on federally recognized tribal governments, nor preempt tribal law as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). Consistent with the EPA Policy on Consultation and Coordination with Indian Tribes (May 4, 2011), the EPA consulted with Tribal officials during the development of this action to gain an understanding of Tribal views of potential revisions to key areas of the LCR. The EPA held consultations with federally-recognized Indian Tribes in 2011 and 2018. The 2018 consultations with federally-recognized Indian Tribes began on January 16, 2018 and ended March 16, 2018. The first national webinar was held January 31, 2018, while the second national webinar was held February 15, 2018. A total of 48 tribal representatives participated in the two webinars. Updates on the consultation process were provided to the National Tribal Water Council upon request at regularly scheduled monthly meetings during the consultation process. Also, upon request, informational webinars were provided to the National Tribal Toxics Council's Lead Subcommittee on

January 30, 2018, and the EPA Region 9's Regional Tribal Operations Committee (RTOC) on February 8, 2018. Additionally, the EPA received written comments from the following Tribes and Tribal organizations: The Navajo Tribal Utility Authority, the National Tribal Water Council, the United South and Eastern Tribes Sovereignty Protection Fund, and the Yukon River Inter-Tribal Watershed Council. A summary report of the views expressed during Tribal consultations is available in the Docket (EPA–HQ–OW–2017–0300).

H. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

This action is subject to Executive Order 13045 because it is an economically significant regulatory action as defined by Executive Order 12866, and, based on the record, the EPA finds that the environmental health or safety risk addressed by this action has a disproportionate effect on children. Accordingly, the EPA has 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 the adoption and optimization of corrosion control treatment technologies and the replacement of LSLs. The results of these evaluations are contained in the *Economic Analysis of the Proposed Lead and Copper Rule Revisions* (USEPA, 2019a) and described in section VI.D.2 of this notice. Copies of the *Economic Analysis of the Proposed Lead and Copper Rule Revisions* and supporting information are available in the Docket (EPA–HQ–OW–2017–0300).

I. 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 public and private water systems affected by this action do not, as a rule, generate power. This action does not regulate any aspect of energy distribution as the water systems that are regulated by the LCR already have electrical service. Finally, The EPA has determined that the incremental energy used to implement corrosion control treatment at drinking water systems in response to the proposed regulatory requirements is minimal. As such, the EPA does not anticipate that this rule will have a significant adverse effect on the supply, distribution, or use of energy.

J. National Technology Transfer and Advancement Act of 1995

The proposed revisions may involve existing voluntary consensus standards in that it requires additional monitoring for lead and copper. Monitoring and sample analysis methodologies are often based on voluntary consensus standards. However, the proposed LCR revisions does not change any methodological requirements for monitoring or sample analysis. The EPA's approved monitoring and sampling protocols generally include voluntary consensus standards developed by agencies such as the American National Standards Institute (ANSI) and other such bodies wherever the EPA deems these methodologies appropriate for compliance monitoring. The EPA notes that in some cases, the proposed LCR revises the required frequency and number of lead tap samples.

K. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Based on the record the EPA finds that this action does not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations and/or indigenous peoples, as specified in Executive Order 12898 (59 FR 7629, February 16, 1994). The documentation for this decision is contained in the Environmental Justice Analysis for the Proposed Lead and Copper Revision Rule Report, which can be found in the docket ID EPA–HQ–OW–2017–0300. Executive Order 12898 (59 FR 7629, February 16, 1994) establishes Federal executive policy on environmental justice. Its main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission. Agencies must do this by identifying and addressing as appropriate any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

In evaluating baseline exposure to lead in drinking water, data indicate that the possibility of a disproportionately high and adverse human health risk among minority populations and low-income populations exist. Higher than expected proportions of children in minority households and/or low-income households live in housing built during decades of higher LSL usage. The proposed LCR revisions seek to reduce the health risks of exposure to lead in drinking water provided by CWS and NTNCWS. Because water systems LSLs are more likely to have an action level exceedance or a trigger level exceedance and, therefore, engage in actions to reduce lead concentrations, the proposed revisions should help improve the baseline environmental justice concerns.

The proposed LCR revisions are not expected to have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The proposed revisions should result in CCT and LSLR changes at water systems with higher baseline lead concentrations. It increases the level of health protection for all affected populations. The LSLR provision may be less likely than the CCT provision to address baseline health risk disparity among low-income populations because LSLR may not be affordable for low-income households.

However, there are Federal and State programs that may be used to fund LSLR programs including the cost of LSLR for customer-owned LSLs. Financing support for lead reduction efforts may be available from State and local governments, EPA programs (*e.g.*, the Drinking Water State Revolving Fund (DWSRF), the WIFIA Program, and the Water Infrastructure Improvements for the Nation Act of 2016 (WIIN Act) grant programs), and other federal agencies (*e.g.*, HUD's Community Development Block Grants).

The benefit-cost analysis of the rule indicates that CCT changes will account for most of the benefits. Therefore, health risk reduction benefits will be more uniformly distributed among populations with high baseline health risks including minority and low-income households. Also, given the availability of Federal and State funding sources to support full LSLR, the proposed LCR revisions meet the intent of the Federal policy requiring incorporation of environmental justice into Federal agency missions.

L. Consultations With the Science Advisory Board and the National Drinking Water Advisory Council

1. Consultation With the Science Advisory Board (SAB)

As required by section 4365 of the SDWA, in 2011, the EPA sought an evaluation of current scientific data to determine whether partial LSLR effectively reduce water lead levels. When the LCR was promulgated in

1991, large water systems, serving greater than 50,000 people, were required to install CCT and small and medium water systems, serving 50,000 or fewer people if samples exceeded the action level for lead. If the action level was not met after installing CCT, water systems are required to replace 7 percent of its LSLs annually. However, in 2000, revisions to the LCR allowed water systems, if they exceeded the action level, to replace only the portion of the LSL that the water system owned and to replace the customer's portion of the LSL at the customer's expense. This practice is known as a partial LSLR.

The EPA asked the SAB to evaluate the current scientific data on the following five partial LSLR issues: (1) Associations between partial LSLR and blood lead levels in children; (2) lead tap water sampling data before and after partial LSLR; (3) comparisons between partial and full LSLR; (4) partial LSLR techniques; and (5) the impact of galvanic corrosion. The EPA identified several studies for the SAB to review while the SAB selected additional studies for their evaluation. The SAB deliberated and sought input from public meetings held on March 30 and 31, 2011, and during a public conference call on May 16, 2011. The SAB's final report, titled "SAB Evaluation of the Effectiveness of Partial Lead Service Line Replacements" was approved by the SAB on July 19, 2011, and transmitted to the EPA Administrator on September 28, 2011.

The SAB determined that the quality and quantity of data was inadequate to fully evaluate the effectiveness of partial LSLR in reducing drinking water lead concentrations. Both the small number of studies and the limitations within these studies (*i.e.,* lack of comparability between studies, small sample size) barred a comprehensive assessment of partial LSLR efficacy. However, despite the limitations, the SAB concluded that partial LSLR's have not been shown to reliably reduce drinking water lead levels in the short-term of days to months, and potentially even longer. Additionally, partial LSLR is often associated with elevated drinking water lead levels in the short-term. The available data suggested that the elevated drinking water lead levels after the partial LSLR tend to stabilize over time to lower than or to levels similar to before the partial LSLR. Therefore, the SAB concluded that available data suggest that partial LSLR's may pose a risk to the population due to short-term elevations in drinking water lead concentrations after a partial LSLR, which last for an unknown period. Considering the SAB's findings on partial LSLR, the EPA determined that partial replacements should no longer be required when water systems exceed the action level for lead, but the EPA still considers full replacement of the LSL as beneficial (USEPA, 2011).

2. Consultation With National Drinking Water Advisory Council

The National Drinking Water Advisory Council (NDWAC) is a Federal Advisory Committee that supports EPA in performing its duties and responsibilities related to the national drinking water program and was created through a provision in the SDWA in 1974. The EPA sought advice from the NDWAC as required under § 300j–5 of the SDWA. The EPA consulted with NDWAC on July 21–22, 2011, to provide updates on the proposed LCR revisions and solicit feedback on potential regulatory options under consideration. In November 2011, NDWAC held deliberations on LSLR requirements after they received the SAB's final report on the effectiveness of partial LSLR. In December 2011, a public meeting was held where NDWAC provided the EPA with major recommendations on the potential LCR regulatory revisions, which are outlined in a letter dated December 23, 2011.

In 2014, the NDWAC formed the Lead and Copper Rule Working Group (LCRWG) to provide additional advice to the EPA on potential options for long-term regulatory revisions. The EPA held meetings from March of 2014 until December 2015 where NDWAC LCRWG members discussed components of the rule and provided the EPA with advice for addressing the following issues: Sample site collection criteria, lead sampling protocols, public education for copper, and measures to ensure optimal CCT and LSLR. NDWAC provided the Agency with their final recommendations and findings in a report submitted to the Administrator in December 2015. In the report, NDWAC acknowledged that reducing lead exposure is a shared responsibility between consumers, the government, public water systems, building owners, and public health officials. In addition, they recognized that creative financing is necessary to reach the LSL removal goals, especially for disparate and vulnerable communities. The NDWAC advised the EPA to maintain the LCR as a treatment technique rule but with enhanced improvements. NDWAC qualitatively considered costs before finalizing its recommendations, emphasizing that public water systems and States should focus efforts where the greatest public health protection can be achieved, incorporating their anticipated costs in their capital improvement program or the requests for Drinking Water State Revolving Funds. The LCRWG outlined an extensive list of recommendations for the LCR revisions, including establishing a goal-based LSLR program, strengthening CCT requirements, and tailoring water quality parameters to the specific CCT plan for each water system.

The report NDWAC provided for the EPA also included recommendations for renewed collaborative commitments between government and all levels of the public from State and local agencies, to other stakeholders and consumers while recognizing the EPA's leadership role in this area. These complementary actions as well as a detailed description of the provisions for NDWAC's recommendations for the long-term revisions to the LCR can be found in the "Report of the Lead and Copper Rule Working Group to the National Drinking Water Advisory Council" (NDWAC, 2015). The EPA took into consideration NDWAC's recommendations when developing these proposed revisions to the LCR.

M. Consultation With Health and Human Services

On June 12, 2019, the EPA consulted with the Department of Health and Human Services (HHS). The EPA received and considered comments from the HHS through the inter-agency review process described in section VIII.A of this notice.

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List of Subjects

40 CFR Part 141 National Primary Drinking Water Regulations

Environmental protection, Chemicals, Indians—lands, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 142 National Primary Drinking Water Regulations Implementation

Environmental protection, Administrative practice and procedure, Chemicals, Indians—lands, Radiation protection, Reporting and recordkeeping requirements, Water supply.

Dated: October 10, 2019.

Andrew R. Wheeler,

Administrator.

For the reasons stated in the preamble, the Environmental Protection Agency proposes to amend 40 CFR part 141 and part 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 definition of ''action level'';
■ b. Adding in alphabetical order the definitions of ''aerator'', ''child care facility'', ''consumer'', ''customer'', and ''find-and-fix'';
■ c. Revising the definition for ''first-draw sample'';
■ d. Adding in alphabetical order the definitions of ''galvanized service line'', ''gooseneck, pigtail or connector'', and ''hydrovacing'';
■ e. Revising the definition of ''lead service line''; and
■ f. Adding in alphabetical order the definitions of ''method detection limit''; ''monitoring period (tap sampling)'', ''pitcher filter''; ''potholing'', ''pre-stagnation flushing''; ''sampling period'', ''school'', ''tap sampling protocol'', ''trenching'', ''trigger level'', and ''wide-mouth bottles''.

The revisions and additions read as follows:

§ 141.2 Definitions

* * * * *

Action level means the concentrations of lead or copper in water as specified in § 141.80(c) which determines, in some cases, the treatment, lead service line replacement, and tap sampling requirements that a water system is required to complete. The action level for lead is 0.015 mg/L and the action level for copper is 1.3 mg/L.

Aerator means the device embedded in the water faucet to enhance air flow with the water stream and to prevent splashing.

* * * * *

Child care facility means a location that houses a licensed provider of child care, day care or early learning services to children, as determined by the State, local, or tribal licensing agency.

* * * * *

Consumer means customers and other users of a public water system.

* * * * *

Customer means a paying user of a public water system.

* * * * *

Find-and-Fix means the requirement in 141.82(j) that water systems must perform at every sampling site that yielded a lead result above the action level (0.015 mg/L). Follow-up sampling results must be provided to the consumer in accordance with § 141.85(d).

First-draw sample means a one-liter sample of tap water, collected in accordance with § 141.86(b)(2).,

* * * * *

Galvanized service line generally means iron or steel piping that has been dipped in zinc to prevent corrosion and rusting.

Gooseneck, pigtail or connector is a short section of piping, usually one to two feet long, which can be bent and used for connections between rigid service piping.

* * * * *

Hydrovacing means an alternative method to digging up a lead service line to identify it using high-pressure water and a vacuum system to dig a hole.

* * * * *

Lead service line means a service line made of lead, which connects the water main to the building inlet. A lead service line may be owned by the water system, owned by the property owner, or both. For the purposes of this subpart, 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. If the only lead piping serving the home or building is a lead gooseneck, pigtail, or connector, and it is not a galvanized service line that is considered an LSL the service line is not a lead service line.

* * * * *

Medium-size water system, for the purpose of subpart I of this part only, means a water system that serves greater than 10,000 and less than or equal to 50,000 persons.

Method Detection Limit (MDL) means the minimum concentration of a substance that can be measured and reporting with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Monitoring period for the purposes of subpart I of this part only means the schedule during which each water system must conduct tap sampling for lead and copper analysis. A monitoring period is determined by lead and copper concentrations in tap samples and the frequency can range from every six months (*i.e.,* semi-annual) up to once every nine years. The start of each new lead monitoring period, with the exception of semi-annual monitoring, must begin on January 1.

* * * * *

Pitcher filter means the filtration insert for water pitchers that removes lead in drinking water, and that is certified to remove lead in accordance with applicable standards established by the American National Standards Institute.

* * * * *

Potholing means the practice of digging a test hole to expose a potential lead service line.

* * * * *

Practical quantitation Limit (PQL) means 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.

* * * * *

Pre-stagnation flushing is the running of taps to flush water from plumbing prior to the minimum 6-hour stagnation period required for lead and copper tap sampling.

* * * * *

Sampling period for the purpose of subpart I of this part only means the time period, within a tap sampling monitoring period, during which the water system is required to collect samples for lead and copper analysis. The annual sampling period must be between the months of June and September, unless a different sampling period is approved in writing to be more appropriate by the primacy agency.

* * * * *

School for the purpose of subpart I of this part only means any public, private, charter or other location that provides student learning for elementary or secondary students.

* * * * *

Small water system, for the purpose of subpart I of this part only, means a water system that serves 10,000 persons or fewer.

* * * * *

Tap sampling protocol means the instructions given to residents or those sampling on behalf of the water system to conduct tap sampling for lead and copper. Tap sampling protocols may not include any instructions or recommendations for pre-stagnation flushing or removal or cleaning of faucet aerators prior to sample collection.

* * * * *

Trenching is a method of excavation, in this case to identify a lead service line, where a depression is dug that is generally deeper than its width.

Trigger level means a particular concentration of contaminants in water as specified in § 141.80(c) that prompts certain activities. The trigger level for lead is a concentration greater than 0.010 mg/L but less than or equal to 0.015 mg/L. The trigger level for lead determines the treatment, lead service

line replacement, and tap sampling requirements applicable to each water system.

* * * * *

Wide-mouth bottles for the purpose of subpart I of this part only means bottles configured with a mouth that is at least 55 mm wide, required to be used for lead and copper tap sampling collection to optimize capturing accurate lead measurements.

* * * * *

■ 3. Amend § 141.31 to revise paragraph (d)(1) to read as follows:

§ 141.31 Reporting requirements.

* * * * *

(d)(1) The public water system, within 10 days of completing the public notification requirements under subpart Q of this part for the initial public notice and any repeat notices, must submit to the primacy agency a certification that it has fully complied with the public notification regulations. For Tier 2 and 3 notices, the public water system must include with this certification a representative copy of each type of notice distributed, published, posted, and made available to the persons served by the system and to the media. (2) For Tier 1 notices public water systems must provide a copy of any Tier 1 notice to the Administrator and the head of the Primacy Agency as soon as practicable, but not later than 24 hours after the public water system learns of the violation or exceedance.

* * * * *

■ 4. Amend § 141.80 by:

■ a. Revising paragraphs (a), (b), (c), (d)(1) and (f);

■ b. Adding paragraph (d)(3);

■ c. Revising paragraph (g);

■ e. Redesignating paragraph (k) as paragraph (m);

■ d. Redesignating paragraphs (h) through (j) as paragraphs (i) through (k); and

■ f. Adding new paragraphs (h) and (1).

The revisions and additions read as follows:

§ 141.80 General requirements.

(a) *Applicability, effective date, and compliance deadlines.* The requirements of this subpart constitute the National Primary Drinking Water Regulations for lead and copper.

(1) The provisions of this subpart apply to community water systems and non-transient, non-community water systems (hereinafter referred to as ''water systems'' or ''systems'') as defined at 40 CFR 141.2.

(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 THREE YEARS AFTER PUBLICATION OF THE FINAL RULE IN THE **Federal Register**], except where otherwise specified at §§ 141.81, 141.84, 141.85, 141.86, and 141.90, or where an exemption in accordance with 40 CFR 142 at subpart C or F has been established by the Administrator.

(4)(i) Between [DATE 60 DAYS AFTER PUBLICATION OF FINAL RULE IN THE **Federal Register**] and [DATE 3 YEARS AFTER 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 141.90 as promulgated in 56 FR 26548, June 7, 1991; 57 FR 28788, June 29, 1992; 59 FR 33862, June 30, 1994; 65 FR 2004, January 12, 2000; 72 FR 57814, October 10, 2007.

(ii) If an exemption from Subpart I has been issued in accordance with 40 CFR 142 subpart C or F, then the water systems must comply with 40 CFR 141.80 through 141.90 as promulgated in 56 FR 26548, June 7, 1991; 57 FR 28788, June 29, 1992; 59 FR 33862, June 30, 1994; 65 FR 2004, January 12, 2000; 72 FR 57814, October 10, 2007 until the expiration of that exemption.

(b) *Scope.* These regulations establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line inventory, lead service line replacement, public notice, monitoring for lead in schools and child care facilities, and public education. Several of these requirements are prompted by the lead and copper action levels or the lead trigger level, specified in paragraph (c) of this section, as measured in samples collected at consumers' taps. All community water systems are subject to sampling for lead in schools and child care facilities and public education requirements regardless of the results of the compliance tap sampling.

(c) *Lead trigger level, lead action level, and copper action level.* Trigger levels and action levels must be determined based on tap water samples collected in accordance with the monitoring requirements of § 141.86 and tested using the analytical methods specified in § 141.89. The trigger level and action levels described in this paragraph are applicable to all sections of subpart I. Trigger level and action levels for lead and copper are as follows:

(1) The *lead trigger level* is exceeded if the 90th percentile concentration of lead as specified in (c)(4) of this section is greater than 0.010 mg/L.

(2) The *lead action level* is exceeded if the 90th percentile concentration of lead as specified in (c)(4) of this section is greater than 0.015 mg/L.

(3) The *copper action level* is exceeded if the 90th percentile concentration of copper as specified in (c)(4) of this section is greater than 1.3 mg/L.

(4) For purposes of this subpart, the *90th percentile concentration* shall be computed as follows:

(i) For systems that do not have lead service line sites and only have sites identified as Tier 3 or 4 under § 141.86(a).

(A) The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(B) The number of samples taken during the monitoring period shall be multiplied by 0.9.

(C) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(4)(i)(B) of this section is the 90th percentile concentration.

(D) For water systems serving fewer than 100 people that collect 5 samples per monitoring period, the 90th percentile concentration is the average of the highest and second highest concentration.

(E) For a public water system that has been allowed by the State to collect fewer than five samples in accordance with § 141.86(c), the sample result with the highest concentration is considered the 90th percentile value.

(ii) For public 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):

(A) The results of all lead or copper samples taken at Tier 1 or Tier 2 sites during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Sample results from Tier 3 and Tier 4 sites shall not be included in this calculation. Each sampling result shall be assigned a number, ascending

by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(B) The number of samples taken at Tier 1 or Tier 2 sites during the monitoring period shall be multiplied by 0.9.

(C) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(4)(ii)(B) of this section is the 90th percentile concentration.

(D) For water systems serving fewer than 100 people that collect 5 samples per monitoring period, the 90th percentile concentration is the average of the highest and second highest concentration.

(E) For a public water system that has been allowed by the State to collect fewer than five samples in accordance with § 141.86(c), the sample result with the highest concentration is considered the 90th percentile value.

(iii) For systems with lead service lines with sites identified as Tier 1 or 2 under § 141.86(a) with insufficient number of Tier 1 or 2 sites to meet the minimum number of sites listed in § 141.86(c):

(A) The results of all lead or copper samples taken at Tier 1 or Tier 2 sites along with the highest results from Tier 3 or Tier 4 sites sufficient to meet the minimum number of sites shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Sample results from any remaining Tier 3 and Tier 4 sites shall not be included in this calculation. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total minimum number of sites listed in § 141.86(c).

(B) The required minimum number of sites listed in § 141.86(c) shall be multiplied by 0.9.

(C) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(4)(iii)(B) is the 90th percentile concentration.

(D) For water systems serving fewer than 100 people that collect 5 samples per monitoring period, the 90th percentile concentration is the average of the highest and second highest concentration.

(E) For a public water system that has been allowed by the State to collect fewer than five samples in accordance with § 141.86(c), the sample result with the highest concentration is considered the 90th percentile value.

(d) *Corrosion control requirements.* (1) All water systems shall install and operate corrosion control treatment in accordance with §§ 141.81 and 141.82, and that meets the definition of *optimal corrosion control treatment* at § 141.2 of this chapter.

* * * * *

(3) Any small water system that complies with the applicable small system compliance flexibility requirements specified by the State under § 141.81 and § 141.93 shall be deemed in compliance with the treatment requirement in paragraph (d)(1) of this section.

* * * * *

(f) *Lead service line replacements.* Lead service line replacements must be conducted as follows:

(1) Any water system exceeding the lead action level specified at (c) of this section must complete mandatory lead service line replacement. Lead service line replacement must be conducted in accordance with § 141.84 and must include public education pursuant to § 141.85.

(2) Any water system exceeding the lead trigger level specified at (c) of this section must complete goal-based lead service line replacement pursuant to § 141.84 and public education pursuant to § 141.85.

(g) *Service line inventory.* All water systems must prepare an inventory of service lines connected to its distribution system, whether or not they are owned or controlled by the water system, to identify those service lines that are made of lead or of unknown material. The inventory must be prepared in accordance with § 141.84(a).

(h) *Public education and notification requirements.* Pursuant to § 141.85(d), all water systems must provide notification of lead tap water monitoring results to persons served at the sites (taps) that are tested. In addition:

(1) Any water system exceeding the lead action level specified at (c) of this section shall implement the public education requirements in accordance with § 141.85(a) and (b).

(2) Any water system exceeding the lead trigger level specified at (c) of this section shall provide notification to all customers with a lead service line in accordance with § 141.85(f).

(3) Any water system exceeding the lead action level specified at (c) of this section shall notify the public in accordance with the public notification requirements in subpart Q of this part.

* * * * *

(l) *Testing in schools and child care facilities.* All water systems must collect samples from all schools and child care facilities within its distribution system in accordance with § 141.92.

(m) *Violation of national primary drinking water regulations.* Failure to comply with the applicable requirements of §§ 141.80 through 141.93, including requirements established by the State pursuant to these provisions, shall constitute a violation of the national primary drinking water regulations for lead and/or copper.

■ 5. 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.* Water systems shall complete the applicable corrosion control treatment requirements described in § 141.82 by the deadline established in this section.

(1) Large water system (serving >50,000 people).

(i) Large water systems with corrosion control treatment that exceed either the lead trigger level or copper action level shall complete the corrosion control treatment steps specified in paragraph (d) of this section.

(ii) Large water systems without corrosion control treatment that exceed either the lead trigger level or the copper action level shall complete the corrosion control treatment steps specified in paragraph (e) of this section.

(iii) Large water systems with corrosion control treatment that do not exceed the lead trigger level and copper action level but are not deemed to have optimized corrosion control under paragraph (b)(3) of this section may be required by the State to complete the corrosion control treatment steps in paragraph (d) of this section.

(iv) Large water systems without corrosion control treatment that do not exceed the lead trigger level and copper action level but are not deemed to have optimized corrosion control under paragraph (b)(3) of this section may be required by the State to complete the corrosion control treatment steps in paragraph (e) of this section.

(2) Medium-size water systems (serving >10,000 and ≤50,000 people).

(i) Medium-size water systems with corrosion control treatment that exceed either the lead trigger level or copper action level shall complete the corrosion control treatment steps specified in paragraph (d) of this section.

(ii) Medium-size water systems without corrosion control treatment that exceed either the lead or copper action

level shall complete the corrosion control treatment steps specified in paragraph (e) of this section.

(iii) Medium-size water systems without corrosion control treatment that exceed the lead trigger level shall complete the treatment recommendation steps specified in paragraph (e) of this section. The water system shall complete the remaining steps in paragraph (e) of this section if it subsequently exceeds either the lead or copper action level.

(3) Small water systems (serving ≤10,000 people).

(i) Small water systems with corrosion control treatment that exceed either the lead trigger level or copper action level shall complete the corrosion control treatment steps specified in paragraph (d) of this section.

(ii) Small water systems without corrosion control treatment that exceed either the lead or copper action level shall complete the corrosion control treatment steps specified in paragraph (e) of this section.

(iii) Small water systems without corrosion control treatment that exceed the lead trigger level shall complete the treatment recommendation steps specified in paragraph (e) of this section. The water system shall complete the remaining steps in paragraph (e) of this section, if it subsequently exceeds either the lead or copper action level.

(b) *Optimized corrosion control.* A system is deemed to have optimized or re-optimized corrosion control and is not required to complete the applicable corrosion control re-optimization steps identified in this section if the system satisfies one of the criteria specified in (b)(1) through (b)(3) of this section. Any such system deemed to have optimized corrosion control under this paragraph and which has treatment in place shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the State determines to be appropriate to ensure optimal corrosion control treatment is maintained. Any small community water system or Non-transient Non-community water system selecting a small system option under paragraph (b)(4) of this section shall follow the schedule for that small system option under § 141.81(f). Any small system selecting a small system option under § 141.93 and which has treatment in place shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the State determines to be appropriate to ensure optimal corrosion control treatment is maintained.

(1) A small or medium-size water system is deemed to have optimized corrosion control if the water system does not exceed the lead trigger level and copper action level during two consecutive 6-month monitoring periods conducted in accordance with § 141.86(b) and (d)(i) or does not exceed the lead trigger level and copper action level in monitoring conducted in accordance with § 141.86(b) and (d)(ii)(C) or (D). A small or medium-size water system is deemed to have re-optimized corrosion control if the water system does not exceed the lead trigger level and copper action level during two consecutive 6-month monitoring periods conducted in accordance with § 141.86.

(2) Small or medium-size systems that exceed the lead trigger level but do not exceed the lead and copper action levels during two consecutive 6-month monitoring periods conducted in accordance with § 141.86(b) and (d)(i) or small or medium-size systems that exceed the lead trigger level but do not exceed the lead and copper action levels in monitoring conducted in accordance with § 141.86(d)(1)(ii)(B). A small or medium-size water system is deemed to have re-optimized corrosion control if the water system does not exceed the lead trigger level and copper action level during two consecutive 6-month monitoring periods conducted in accordance with § 141.86.

(i) Water systems without corrosion control treatment must complete the treatment recommendation step to be deemed optimized under this section.

(ii) Water systems with corrosion control treatment are deemed optimized or re-optimized if the system meets the requirements of this section and the State has not required the system to meet optimal water quality parameters and monitor under § 141.87(d).

(3) Any water system is deemed to have optimized or re-optimized corrosion control if it submits results of tap water monitoring in accordance with § 141.86 demonstrating that the 90th percentile tap water lead level is less than or equal to the practical quantitation level of 0.005 mg/L for two consecutive 6-month monitoring periods.

(i) [Reserved].

(ii) Any water system deemed to have optimized or re-optimized corrosion control in accordance with this paragraph shall 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(c) and collecting samples at times and locations specified in § 141.86(d)(4)(iv).

(iii) Any water system deemed to have optimized or re-optimized corrosion control pursuant to this paragraph shall notify the State in writing pursuant to § 141.90(a)(3) of any upcoming long-term change in treatment or addition of a new source as described in § 141.90. 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.

(iv) A water system is not deemed to have optimized or re-optimized corrosion control under this paragraph and shall implement corrosion control treatment pursuant to (b)(3)(v) of this section unless it meets the copper action level.

(v) Any water system triggered into corrosion control because it is no longer deemed to have optimized or re-optimized corrosion control under this paragraph shall implement corrosion control treatment in accordance with the deadlines in paragraph (d) or (e) of this section. The time period for completing each step shall be triggered by the date the sampling was conducted showing that the water system no longer meets the requirements to be deemed to have optimized or re-optimized corrosion control under this paragraph.

(4) Any small system selecting a small system compliance option shall monitor and follow the small system option steps described in § 141.93.

(c) *Corrosion control steps completion for small and medium-size water systems without corrosion control treatment.* (1) Any small or medium-size water system that is required to complete the corrosion control steps in paragraph (e) of this section due to its exceedance of the lead or copper action level may cease completing the treatment steps after paragraph (e), Step 2 of this section, when the water system meets both action levels during each to two consecutive 6-month monitoring periods conducted pursuant to § 141.86 and submits the results to the State. Any such system required to conduct a corrosion control treatment study under paragraph (e), Step 3 of this section, shall complete the study and paragraph (e), Step 4 of this section, unless the water system meets both action levels during each of two consecutive six-month monitoring periods prior to the start of the study. If any such water system thereafter exceeds the lead or copper action level during any

monitoring period, the water system (or the State) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety, and complete all the steps through installation of optimal corrosion control treatment (paragraph (e), Step 5 of this section). 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 shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small or medium-size water system to implement corrosion control treatment steps in accordance with paragraph (e) of this section (including water systems deemed to have optimized corrosion control under paragraph (b)(1) of this section) is triggered whenever any small or medium-size water system exceeds the lead or copper action level.

(2) Any small or medium-size water system that is required to complete the corrosion control steps in paragraph (e) of this section due to its exceedance of the lead trigger level may cease completing the treatment steps after paragraph (e), Step 2 of this section. Any such system required to conduct a corrosion control treatment study under paragraph (e), Step 3 of this section, shall complete the study and paragraph (e), Step 4 of this section. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the water system (or the State) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety and complete all the steps through installation of optimal corrosion control treatment paragraph (e), (Step 5) of this section. 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 shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small or medium-size water system to implement corrosion control treatment steps in accordance with paragraph (e) of this section (including water systems deemed to have optimized corrosion control under paragraph (b)(2)(i) of this section) is triggered whenever any small or medium-size water system exceeds the lead trigger level or copper action level.

(d) *Treatment steps and deadlines for water systems re-optimizing corrosion control treatment.* Except as provided in paragraph (b) of this section, water systems with corrosion control treatment shall 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.

(1) *Step 1.* The water system shall complete the initial tap sampling (§ 141.86(d)(1) and § 141.87(b)) until the water system either exceeds the lead trigger level or copper action level or becomes eligible for reduced monitoring under § 141.86(d)(4)(ii)(A). A water system exceeding the lead trigger level or copper action level shall recommend optimal corrosion control treatment (§ 141.82(a)(5) or (6) or (7)) within six months after the end of the monitoring period during which it exceeds either the lead trigger level or copper action level.

(2) *Step 2.* (i) Large water systems that exceed the lead trigger level or copper action level shall conduct the corrosion control studies for re-optimization under paragraph (d), Step 3 of this section.

(ii) Within 12 months after the end of the monitoring period during which a small or medium-size water system with corrosion control treatment exceeds the lead trigger level or copper action level, the State may require the water system to perform corrosion control studies for re-optimization (§ 141.81(d)(2) or (3)). If the State does not require the system to perform such studies, the State shall specify re-optimized corrosion control treatment (§ 141.82(d)(3) or (4)) within the following timeframes:

(A) For medium-size water systems, within 12 months after the end of the monitoring period during which such water system exceeds the lead trigger level or copper action level.

(B) For small water systems, within 18 months after the end of the monitoring period during which such water system exceeds the lead trigger level or copper action level.

(3) *Step 3.* (i) Large water systems that exceed the lead trigger level or copper action level shall complete the corrosion control treatment studies for re-optimization within 18 months.

(ii) If the State requires a water system to perform corrosion control studies under paragraph (d), Step 2 of this section, the water system shall complete the studies (§ 141.82(c)(1)) within 18 months after the State requires that such studies be conducted.

(4) *Step 4.* (i) The State shall designate re-optimized corrosion control treatment (§ 141.82(d)(3)) within six months after completion of paragraph (d)(3)(i), Step 3 of this section.

(ii) If the water system has performed corrosion control studies under paragraph (d), Step 2 of this section, the State shall designate re-optimized corrosion control treatment (§ 141.82(d)(3) or (4) within six months after completion of paragraph (d), Step 3(ii) of this section.

(5) *Step 5.* (i) Large water systems shall complete modifications to corrosion control treatment to have re-optimized corrosion control treatment installed within 12 months after completion of paragraph (d), Step 4(i) of this section.

(ii) Small or medium-size water systems that exceed the lead trigger level or copper action level shall install re-optimized corrosion control treatment (§ 141.82(e)(3) or (4)) within 12 months after completion of paragraph (d), Step 4(ii) of this section.

(6) *Step 6.* Water systems shall complete follow-up sampling (§ 141.86(d)(2) and § 141.87(c)) within 12 months after completion of paragraph (d), Step 5(i) or (ii) of this section.

(7) *Step 7.* The State shall review the water system's installation of treatment and designate optimal water quality control parameters (§ 141.82(f)(1)) within six months of completion of paragraph (d)(6), Step 6 of this section.

(8) *Step 8.* The water system shall operate in compliance with the State-designated optimal water quality control parameters (§ 141.82(g)(1)) and continue to conduct tap sampling (§ 141.86(d)(3) and water quality parameter monitoring under § 141.87(d)).

(e) *Treatment steps and deadlines for small and medium-size systems without corrosion control treatment.* Except as provided in paragraph (b) of this section, small and medium-size water systems without corrosion control treatment shall 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.

(1) *Step 1.* The water system shall complete the initial tap sampling (§ 141.86(d)(1) and § 141.87(b)) until the water system either exceeds the lead trigger level or copper action level or becomes eligible for reduced monitoring under § 141.86(d)(4)(i)(A) or (B). A water system exceeding the lead trigger level or copper action level shall recommend optimal corrosion control treatment (§ 141.82(a)(1) or (2) or (3) or (4)) within six months after the end of

the monitoring period during which it exceeds either the lead trigger level or copper action level.

(2) *Step 2.* Within 12 months after the end of the monitoring period during which a water system exceeds the lead trigger level or copper action level, the State may require the water system to perform corrosion control studies (§ 141.82(b)(1)); the State shall notify the system in writing of this requirement. If the State does not require the system to perform such studies, the State shall specify optimal corrosion control treatment (§ 141.82(d)(1) or (2)) within the following timeframes:

(i) For medium-size water systems, within 18 months after the end of the monitoring period during which such water system exceeds the lead trigger level or copper action level.

(ii) For small water systems, within 24 months after the end of the monitoring period during which such water system exceeds the lead trigger level or copper action level.

(3) *Step 3.* If the State requires a water system to perform corrosion control studies under paragraph (e), Step 2 of this section, the water system shall complete the studies (§ 141.82(c)(1)) within 18 months after the State notifies the system in writing that such studies must be conducted.

(4) *Step 4.* If the water system has performed corrosion control studies under paragraph (e), Step 2 of this section, the State shall designate optimal corrosion control treatment (§ 141.82(d)(1) or (2)) within six months after completion of paragraph (e), Step 3 of this section.

(5) *Step 5.* Any water system that exceeds the lead or copper action level after the State designates optimal corrosion control treatment under paragraph (e), Step 4 of this section shall install optimal corrosion control treatment (§ 141.82(e)(1) or (2)) within 24 months.

(6) *Step 6.* The system shall complete follow-up sampling (§ 141.86(d)(2)(i) and § 141.87(c) within 12 months after completion of paragraph (e), Step 5 of this section.

(7) *Step 7.* The State shall review the water system's installation of treatment and designate optimal water quality control parameters (§ 141.82(f)(1)) within six months of completion of paragraph (e), Step 6 of this section.

(8) *Step 8.* The water system shall operate in compliance with the State-designated optimal water quality control parameters (§ 141.82(g)(1)) and continue to conduct tap sampling (§ 141.86(d)(3) and water quality parameter monitoring under § 141.87(d)).

(f) *Treatment steps and deadlines for small community water systems and Non-transient Non-community water systems using small system compliance flexibility options under § 141.93.*

Small water systems selecting the corrosion control small system compliance flexibility option shall complete the following steps by the indicated time periods.

(1) *Step 1.* The water system shall complete the initial tap sampling (§ 141.86(d)(1) and § 141.87(b)) until the water system either exceeds the lead trigger level or copper action level or becomes eligible for reduced monitoring under § 141.86(d)(4)(i)(A) or (B). A water system exceeding the lead trigger level or copper action level shall recommend a small system compliance flexibility option (§ 141.93(a) or (b)) within six months after the end of the monitoring period during which it exceeds either the lead trigger level or copper action level.

(2) *Step 2.* The State shall approve in writing the recommended small system treatment option or designate another small system treatment option or require the water system to optimize or re-optimize corrosion control treatment within six months of completion of paragraph (f), Step 1 of this section. Water systems required by the State to optimize or re-optimize corrosion control treatment shall follow the schedules in paragraphs (d) or (e) of this section.

(3) *Step 3.* (i) Small water systems using the lead service line replacement compliance flexibility option under § 141.93.

(A) Small water systems shall begin the lead service line replacement program and must begin to replace lead service line lines at a rate approved by the State within one year after State approval under paragraph (f), Step 2 of this section.

(B) Small water systems shall continue to replace lead service lines at a rate approved by the State and shall complete replacement of all lead service lines no later than 15 years after commencement of the program.

(ii) Small water systems using the point-of-use (POU) device compliance flexibility option under § 141.93.

(A) Small water systems shall install POU devices at the locations listed in § 141.93 on a schedule not to exceed one year after State approval under paragraph (f), Step 2 of this section, or a shorter schedule if specified by the State.

(B) Small water systems shall operate and maintain the POU devices until the water system receives State approval to select one of the other small system compliance flexibility options under § 141.93.

(iii) Non-transient, non-community water systems using the replacement of lead-bearing materials option under § 141.93(d)(4).

(A) Non-transient, non-community water systems with lead service lines shall replace the lead service line within one year after State approval under Step 2 and shall complete the replacement of other lead-bearing materials on a schedule not to exceed one year after State approval under paragraph (f), Step 2 of this section, or a shorter schedule if specified by the State.

(B) Non-transient, non-community water systems without lead service lines shall complete the replacement of lead-bearing material within one year after State approval under paragraph (f), Step 2 of this section, or a shorter schedule if specified by the State.

■ 6. Revise § 141.82 to read as follows:

§ 141.82 Description of corrosion control treatment requirements.

Each system shall complete the corrosion control treatment requirements described as follows, which are applicable to such system under § 141.81.

(a) *System recommendation regarding corrosion control treatment.* (1) Based upon the results of lead and copper tap sampling and water quality parameter monitoring, large systems without corrosion control treatment that exceed the lead trigger level or medium-size water systems without corrosion control treatment that exceed either the lead or copper action level shall recommend designation of one or more of the corrosion control treatments listed in paragraph (c)(1) of this section as the optimal corrosion control treatment for that system. The State may require the system to conduct additional water quality parameter monitoring in accordance with § 141.87(b) to assist the State in reviewing the system's recommendation. Large systems must complete the study in paragraph (c)(1) of this section.

(2) Based upon the results of lead and copper tap sampling and water quality parameter monitoring, small water systems without corrosion control treatment that exceed the lead or copper action level shall recommend designation of one or more of the corrosion control treatments listed in paragraph (c)(1) of this section as the optimal corrosion control treatment for that system or one of the small system options listed in paragraph § 141.93. The State may require the system to conduct additional water quality parameter monitoring in accordance

with § 141.87(b) to assist the State in reviewing the system's recommendation.

(3) Based upon the results of lead and copper tap sampling and water quality parameter monitoring, any medium-size water systems without corrosion control treatment exceeding the lead trigger level shall recommend designation of one or more of the corrosion control treatments listed in paragraph (c)(1) of this section as the optimal corrosion control treatment for that system. This corrosion control treatment shall be installed if the lead or copper action level is subsequently exceeded. The State may require the system to conduct additional water quality parameter monitoring in accordance with § 141.87(b) to assist the State in reviewing the system's recommendation.

(4) Based upon the results of lead and copper tap sampling and water quality parameter monitoring, any small water system without corrosion control treatment exceeding the lead trigger level shall recommend designation of one or more of the corrosion control treatments listed in paragraph (c)(1) of this section as the optimal corrosion control treatment for that system or shall recommend State approval to elect one of the small system compliance options listed in paragraph § 141.93. This corrosion control treatment or small system option shall be implemented if the lead or copper action level is subsequently exceeded. The State may require the system to conduct additional water quality parameter monitoring in accordance with § 141.87(b) to assist the State in reviewing the system's recommendation.

(5) Based upon the results of lead and copper tap sampling and water quality parameter monitoring, any large or medium system with corrosion control treatment that exceeds the lead trigger level shall conduct a re-optimization evaluation of the existing corrosion control treatment and make a recommendation to the State for modification (if any) of the designation of optimal corrosion control treatment. This re-optimization evaluation shall include an evaluation of other corrosion control treatments listed in paragraph (c)(2) of this section to determine the optimal corrosion control treatment. The State may require the system to conduct additional water quality parameter monitoring in accordance with § 141.87(b) to assist the State in reviewing the system's recommendation for a designation of optimal corrosion control treatment. Large systems must complete the study in paragraph (c)(2) of this section.

(6) Based upon the results of lead and copper tap sampling and water quality parameter monitoring, any small system with corrosion control treatment exceeding an action level shall recommend designation of one or more of the corrosion control treatments listed in paragraph (c)(2) of this section as the optimal corrosion control for that system or State approval of one of the small system options listed in paragraph § 141.93. The State may require the system to conduct additional water quality parameter monitoring in accordance with § 141.87(b) to assist the State in reviewing the system's recommendation.

(7) Based upon the results of lead and copper tap sampling and water quality parameter monitoring, any small system with corrosion control treatment exceeding the lead trigger level shall recommend designation of 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 or State approval of one of the small system options listed in paragraph § 141.93. This corrosion control treatment or small system option shall be implemented if the lead or copper action level is subsequently exceeded. The State may require the system to conduct additional water quality parameter monitoring in accordance with § 141.87(b) to assist the State in reviewing the system's recommendation.

(b) *State decision to require studies to identify initial optimal corrosion control treatment (applicable to small and medium-size systems) and re-optimized corrosion control treatment.* (1) The State may require any small or medium-size system without corrosion control that exceeds either the lead or copper action level to perform corrosion control treatment studies under paragraph (c)(1) of this section to identify *optimal corrosion control treatment* for the system.

(2) The State may require any small or medium-size system without corrosion control that exceeds the lead trigger level to perform corrosion control treatment studies under paragraph (c)(1) of this section to *identify optimal corrosion control treatment* for the system. This corrosion control treatment shall be installed if the lead or copper action level is subsequently exceeded.

(3) The State may require any small or medium-size water systems with corrosion control treatment exceeding either the lead trigger level or copper action level to perform corrosion control treatment studies under paragraph (c)(3) of this section to identify re-optimized optimal corrosion control treatment for the system (*i.e.* optimal corrosion control treatment after a re-optimization evaluation).

(c) *Performance of corrosion control studies.* (1) Water systems without corrosion control that are conducting corrosion control studies shall complete the following:

(i) Any water system without corrosion control treatment shall evaluate the effectiveness of each of the following treatments, and if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for the system:

(A) Alkalinity and pH adjustment;

(B) The addition of an orthophosphate- or silicate-based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples;

(C) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain a 1 mg/L orthophosphate residual concentration in all tap test samples, and;

(D) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain a 3 mg/L orthophosphate residual concentration in all tap test samples.

(ii) The water system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry, and distribution system configurations. Metal coupon tests can be used as a screen to reduce the number of options that are evaluated using pipe rig/loops to the current conditions and two options.

(iii) The water system shall measure the following water quality parameters in any tests conducted under this paragraph before and after evaluating the corrosion control treatments previously listed in this section:

(A) Lead;

(B) Copper;

(C) pH;

(D) Alkalinity;

(E) Orthophosphate (when an orthophosphate-based inhibitor is used), and;

(F) Silicate (when a silicate-based inhibitor is used).

(iv) The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and

document such constraints with one of the following:

(A) Data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the constraints identified in this section.

(B) Data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the constraints identified in this section unless the treatment was found to be ineffective in a previous pipe loop/rig study.

(v) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the effects identified in this section.

(vi) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the State in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in paragraphs (c)(2)(i) through (v) of this section.

(2) Systems with a pH and alkalinity corrosion control treatment process conducting re-optimization corrosion control studies shall complete the following:

(i) Any system with a pH and alkalinity corrosion control treatment process shall evaluate the effectiveness of each of the following treatments, and if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for the system:

(A) Additional alkalinity and/or pH adjustment;

(B) The addition of an orthophosphate- or silicate-based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples;

(C) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain a 1 mg/L orthophosphate residual concentration in all tap test samples, and;

(D) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain a 3 mg/L orthophosphate residual concentration in all tap test samples.

(ii) The system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry, and distribution system configurations. Coupon tests can be used as a screen to reduce the number of options that are evaluated using pipe rig/loops to the current conditions and two options.

(iii) The water system shall measure the following water quality parameters in any tests conducted under this paragraph before and after evaluating the corrosion control treatments listed above:

(A) Lead;

(B) Copper;

(C) pH;

(D) Alkalinity;

(E) Orthophosphate (when an orthophosphate-based inhibitor is used), and;

(F) Silicate (when a silicate-based inhibitor is used).

(iv) The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with one of the following:

(A) Data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the constraints identified in this section.

(B) Data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the constraints identified in this section unless the treatment was found to be ineffective in a previous pipe loop/rig study.

(v) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the effects identified in this section.

(vi) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the State in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in paragraph (c)(1)(i) through (v) of this section.

(3) Systems with an inhibitor corrosion control treatment process conducting re-optimization corrosion control studies shall complete the following:

(i) Any system with an inhibitor corrosion control treatment process shall evaluate the effectiveness of each of the following treatments, and if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for the system:

(A) Alkalinity and/or pH adjustment;

(B) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain a 1 mg/L orthophosphate residual concentration in all tap test samples unless the current inhibitor process already meets this residual, and;

(C) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain a 3 mg/L orthophosphate residual concentration in all tap test samples unless the current inhibitor process already meets this residual.

(ii) The system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry, and distribution system configurations. Coupon tests can be used as a screen to reduce the number of options that are evaluated using pipe rig/loops to the current conditions and two options.

(iii) The water system shall measure the following water quality parameters in any tests conducted under this

paragraph before and after evaluating the corrosion control treatments listed above:

(A) Lead;

(B) Copper;

(C) pH;

(D) Alkalinity;

(E) Orthophosphate (when an orthophosphate-based inhibitor is used), and;

(F) Silicate (when a silicate-based inhibitor is used).

(iv) The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with one of the following:

(A) Data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the constraints identified in this section.

(B) Data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the constraints identified in this section unless the treatment was found to be ineffective in a previous pipe loop/rig study.

(v) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes. Systems using coupon studies to screen and/or pipe loop/rig studies to evaluate treatment options shall not exclude treatment strategies from the studies based on the effects identified in this section.

(vi) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the State in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in paragraph (c)(3)(i) through (v) of this section.

(d) *State designation of optimal corrosion control treatment and re-optimized corrosion control treatment.* (1) *Designation of Initial OCCT for medium systems.* (i) Based upon considerations of available information including, where applicable, studies conducted under paragraph (c)(1) of this section and a system's recommended corrosion control treatment option, the State shall either approve the corrosion control treatment option recommended by the medium-size water system or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(1)(i) of this section. When designating optimal corrosion control treatment, the State shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(ii) The State shall notify the medium-size water system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the State requests additional information to aid its review, the water system shall provide the information.

(2) *Small systems.* (i) Based upon considerations of available information including, where applicable, studies conducted under paragraph (c)(1) of this section and a system's recommended treatment alternative, the State shall either approve the corrosion control treatment option recommended by the small water system or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(1)(i) of this section or a *small water system compliance flexibility* under § 141.93. When designating optimal corrosion control treatment, the State shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(ii) The State shall notify the small water system of its decision on either optimal corrosion control treatment or a *small water system compliance flexibility* in writing and explain the basis for this determination. If the State requests additional information to aid its review, the water system shall provide the information.

(3) *Designation of Re-optimized OCCT for large and medium systems.* (i) Based upon considerations of available information including, where applicable, studies conducted under paragraph (c)(2) or (c)(3) of this section and a system's recommended treatment alternative, the State shall either approve the corrosion control treatment modification option recommended by the water system or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(2)(i) or (c)(3)(i) of this section. When designating re-optimized corrosion control treatment, the State shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(ii) The State shall notify the water system of its decision on re-optimized corrosion control treatment in writing and explain the basis for this determination. If the State requests additional information to aid its review, the water system shall provide the information.

(4) *Designation of Re-optimization of OCCT or small water system compliance flexibility.* (i) Based upon considerations of available information including, where applicable, studies conducted under paragraph (c)(2) or (c)(3) of this section and a system's recommended treatment alternative, the State shall either approve the corrosion control treatment modification recommended by the small water system or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(2)(i) or (c)(3)(i) of this section or an applicable *small water system compliance flexibility* under § 141.93. When designating re-optimized corrosion control treatment, the State shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(ii) The State shall notify the water system of its decision on re-optimized corrosion control treatment in writing and explain the basis for this determination. If the State requests additional information to aid its review, the water system shall provide the information.

(e) *Installation of optimal corrosion control treatment and re-optimization of corrosion control treatment.* (1) Each medium-size water system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the State under paragraph (d)(1) of this section.

(2) Each small water system shall properly install and operate throughout its distribution system the optimal corrosion control treatment or implement the *small water system compliance flexibility* as designated by the State under paragraph (d)(2) of this section.

(3) Each medium-size water system shall properly modify and operate throughout its distribution system the re-optimized corrosion control

treatment designated by the State under paragraph (d)(3) of this section.

(4) Each small water system shall properly modify and operate throughout its distribution system the re-optimized corrosion control treatment or implement the *small water system compliance flexibility* designated by the State under paragraph (d)(2) of this section.

(f) *State review of treatment and specification of optimal water quality control parameters for optimal corrosion control treatment and re-optimized corrosion control treatment.* (1) The State shall evaluate the results of all lead and copper tap sampling and water quality parameter sampling submitted by the water system and determine whether the water system has properly installed and operated the optimal corrosion control treatment designated by the State in paragraph (d)(1) or (d)(2) of this section, respectively. Upon reviewing the results of tap water and water quality parameter monitoring by the water system, both before and after the water system installs optimal corrosion control treatment, the State shall designate:

(i) A minimum value or a range of values for pH measured at each entry point to the distribution system.

(ii) A minimum pH value measured in all tap samples. Such a value shall 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.

(iii) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for orthophosphate or silicate measured at each entry point to the distribution system.

(iv) If a corrosion inhibitor is used, a minimum orthophosphate 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, such a concentration shall be equal to or greater than 0.5 mg/L as orthophosphate, unless the State determines that meeting an orthophosphate residual of 0.5 mg/L is not technologically feasible or is not necessary for the system to optimize corrosion control.

(v) If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples.

(vi) The values for the applicable water quality control parameters, previously listed in this section, shall be those that the State determines to reflect optimal corrosion control treatment for the water system. The State may designate values for additional water quality control parameters determined by the State to reflect optimal corrosion control for the water system. The State shall notify the system in writing of these determinations and explain the basis for its decisions.

(2) The State shall evaluate the results of all lead and copper tap sampling and water quality parameter monitoring submitted by the water system and determine whether the water system has properly installed and operated the re-optimized corrosion control treatment designated by the State in paragraph (d)(3) or (d)(4) of this section, respectively. Upon reviewing the results of tap sampling and water quality parameter monitoring by the water system, both before and after the water system installs re-optimized corrosion control treatment, the State shall designate:

(i) A minimum value or a range of values for pH measured at each entry point to the distribution system.

(ii) A minimum pH value measured in all tap samples. Such a value shall 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.

(iii) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for orthophosphate or silicate measured at each entry point to the distribution system.

(iv) If a corrosion inhibitor is used, a minimum orthophosphate 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, such a concentration shall be equal to or greater than 1.0 mg/L as orthophosphate, unless the State determines that meeting an orthophosphate residual of 1.0 mg/L is not technologically feasible or is not necessary for the system to optimize corrosion control.

(v) If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples.

(vi) The values for the applicable water quality control parameters, previously listed in this section, shall be those that the State determines to reflect optimal corrosion control treatment for the water system. The State may designate values for additional water quality control parameters determined by the State to reflect optimal corrosion control for the water system. The State shall notify the system in writing of these determinations and explain the basis for its decisions.

(g) *Continued operation and monitoring for optimal corrosion control treatment and re-optimized corrosion control treatment.* (1) All systems optimizing corrosion control shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameters at or above minimum values or within ranges designated by the State under paragraph (f)(1) of this section, in accordance with this paragraph for all samples collected under § 141.87(d) through (f). 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. Any water system with optimal corrosion control treatment or re-optimized corrosion control treatment that is not required to monitor water quality parameters under § 141.87 shall continue to operate and maintain such treatment. Compliance with the requirements of this paragraph shall be determined every six months, as specified under § 141.87(d). A water system is out of compliance with the requirements of this paragraph for a six-month period if it has excursions for any State-specified parameter on more than nine days 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 follows. States have discretion to delete results of obvious sampling errors from this calculation.

(i) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall 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 the 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 shall be used to aggregate multiple measurements taken at a sampling point for the water quality parameters in lieu of the formula in this paragraph.

(ii) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall 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 shall be the daily value calculated on the most recent day on which the water quality parameter was measured at the sampling location.

(2) All systems re-optimizing corrosion control shall continue to operate and maintain re-optimized corrosion control treatment, including maintaining water quality parameters at or above minimum values or within ranges designated by the State under paragraph (f)(2) of this section, in accordance with this paragraph for all samples collected under § 141.87(d) through (f). Compliance with the requirements of this paragraph shall be determined every six months, as specified under § 141.87(d). A water system is out of compliance with the requirements of this paragraph for a six-month period if it has excursions for any State-specified parameter on more than nine days 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 follows. States have discretion to delete results of obvious sampling errors from this calculation.

(i) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall 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 the 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 shall be used to aggregate multiple measurements taken at a sampling point for the water quality parameters in lieu of this formula in this paragraph.

(ii) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall 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 shall 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 optimal corrosion control and re-optimized corrosion control.* 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 optimal corrosion control treatment under paragraph (d)(1), (d)(2), (d)(3), or (d)(4) of this section, or optimal water quality control parameters under paragraph (f)(1) or (f)(2) of this section. A request for modification by a system or other interested party shall be in writing, explaining why the modification is appropriate, and providing supporting documentation. 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 re-optimized corrosion control treatment. A revised determination shall be made in writing, set forth the new treatment requirements and/or 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 the EPA in lieu of the State on optimal corrosion control treatment and re-optimized corrosion control treatment.* (1) Pursuant to the procedures in § 142.19 of this chapter, the EPA Regional Administrator may review optimal corrosion control treatment determinations made by a State under paragraph (d)(1), (d)(2), (d)(3), (d)(4), (f)(1), (f)(2), or (h) of this section and issue Federal treatment determinations consistent with the requirements of those paragraphs where the Regional Administrator finds that:

(i) A State has failed to issue a treatment determination by the applicable deadlines contained in § 141.81.

(ii) A State has abused its discretion in a substantial number of cases or in cases affecting a substantial population; or

(iii) The technical aspects of a State's determination would be indefensible in an expected Federal enforcement action taken against a water system.

(j) *Find-and-fix assessment for tap sample sites that exceed the lead action level.* The water system shall conduct the following steps, when a tap sample site exceeds the lead action level under monitoring conducted under § 141.86.

(1) *Step 1.* The water system shall sample at a new water quality parameter site that is on the same size water main in the same pressure zone and located within a half mile of the location with the action level exceedance within 5 days of receiving the sample results. The water system shall measure the following parameters:

(i) pH;

(ii) Alkalinity;

(iii) Orthophosphate, when an inhibitor containing an orthophosphate compound is used;

(iv) Silica, when an inhibitor containing a silicate compound is used; and

(v) Water systems with an existing water quality parameter location that meets the requirements of this section can conduct this sampling at that location. All water systems required to meet optimal water quality control parameters shall add new sites to the minimum number of sites as described in § 141.87(g).

(2) *Step 2.* Water systems shall collect a follow-up sample at any tap sample site that exceeds the action level within 30 days of receiving the sample results. 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 shall be submitted to the State but shall not 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 shall provide documentation to the State, explaining why it was unable to collect a follow-up sample.

(3) *Step 3.* Water systems shall evaluate the results of the monitoring conducted under this paragraph to determine if either localized or centralized adjustment of the optimal corrosion control treatment (initial, modified, or re-optimized) is necessary and submit the recommendation to the State within six months after the end of the monitoring period in which the site(s) exceeded the lead action level. Corrosion control treatment modification may not be necessary to address every exceedance. Water systems shall note if the cause of the elevated lead level if known in their recommendation to the State.

(4) *Step 4.* The State shall approve the treatment recommendation or specify a different approach within six months of completion of paragraph (j), Step 3 of this section.

(5) *Step 5.* If the State-approved treatment recommendation requires the water system to adjust the optimal corrosion control treatment process, the water system shall complete modifications to its corrosion control

treatment within 12 months after completion of paragraph (j), Step 4 of this section. Systems without corrosion control treatment required to install optimal corrosion control treatment shall follow the schedule in § 141.81(e).

(6) *Step 6.* Water systems adjusting its optimal corrosion control treatment shall complete follow-up sampling (§ 141.86(d)(2) and § 141.87(c)) within 12 months after completion of paragraph (j), Step 5 of this section.

(7) *Step 7.* For water systems adjusting its optimal corrosion control treatment, the State shall review the water system's modification of corrosion control treatment and designate optimal water quality control parameters (§ 141.82(f)(1)) within six months of completion of paragraph (j), Step 6 of this section.

(8) *Step 8.* For water systems adjusting its optimal corrosion control treatment, the water system shall operate in compliance with the State-designated optimal water quality control parameters (§ 141.82(g)(1)) and continue to conduct tap sampling (§§ 141.86(d)(3) and 141.87(d)).

■ 7. Revise § 141.84 to read as follows:

§ 141.84 Lead service line inventory and replacement requirements.

(a) *Lead service line inventory.* All water systems must develop and maintain a publicly accessible inventory of lead service lines and service lines of unknown materials in its distribution system. The inventory must meet the following requirements:

(1) *Deadlines.* All water systems must develop the initial inventory by [DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE **Federal Register**] and submit it to the primacy agency in accordance with § 141.90.

(2) A water system shall use the information on lead and galvanized steel that it is required to collect under § 141.42(d) of this part when conducting the inventory of service lines in its distribution system for the initial inventory under paragraph (a)(1) of this section. The water system shall also review the sources of information listed below to identify service line materials for the initial inventory. In addition, the water system shall seek to collect such information where possible in the course of its normal operations (*e.g.,* checking service line materials when reading water meters or performing maintenance activities):

(i) All plumbing codes, permits, and records in the files of the building department(s) which indicate the service line materials used to connect water system- and customer-owned structures to the distribution system.

(ii) All water system records, including distribution system maps and drawings, historical records on each service connection, meter installation records, historical capital improvement or master plans, and standard operating procedures.

(iii) All inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system.

(iv) Any resource required by the State to asses service line materials for structures built prior to 1989.

(3) The initial 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 would include both the portion of the service line owned by the water system and the customer-owned portion of the service line). Service lines shall be categorized in the following manner:

(i) Lead where either the water system portion, customer portion or both portions of the service line are made of lead or where the customer-owned portion is a galvanized pipe where the water system's portion is or was a lead service line.

(ii) Non-lead where both the water system portion and customer portion are non-lead.

(iii) Unknown where the service line material is only known to be non-lead on either the water system portion or the customer portion of the service line or the service line material for both portions of the line is unknown.

(4) Systems shall update the inventory on an annual basis to address any lead service line replacement or service line material identification at sites with lines characterized as unknown. The updated inventory shall be submitted to the State on an annual basis.

(5) Service lines listed as unknown in the initial inventory or the updated inventory in paragraph (a)(4) of this section must be counted as lead service lines for purposes of calculating lead service line replacement rates as well as for issuing targeted public education to consumers served by a lead or unknown service line.

(i) These service lines must be considered lead service lines unless they are demonstrated to be non-lead by records or physical examination.

(ii) Service lines of unknown material shall not be used for Tier 1 sampling sites.

(iii) When a service line initially listed as a lead service line on an inventory is later determined to be non-lead, the water system must update its inventory and shall subtract it from the number of lead service lines used to calculate lead service line replacement rates. Such service lines must not be considered replaced.

(iv) Service lines initially characterized as non-lead that are later found to be made of lead on either the system or customer portion shall be re-characterized as a lead service line and added to the number of lead service lines used to calculate the lead service line replacement rates.

(6) The primacy agency may designate acceptable methods to determine the service line material of unknown lines.

(7) All water systems with lead service lines must make its inventory publicly accessible.

(i) The inventory must include a location identifier, such as a street, intersection, or landmark, served by each lead service line. Water systems are not required to list the exact address of each lead service line.

(ii) Water systems serving greater than 100,000 persons must make the inventory available electronically.

(b) *Lead service line replacement plan.* All water systems with lead service lines in their distribution system shall, by [DATE 3 YEARS AFTER PUBLICATION OF FINAL RULE IN **Federal Register**], submit a lead service line replacement plan and lead service line inventory to the primacy agency described in paragraph (a) of this section. The plan must include procedures to conduct full lead service line replacement, a strategy for informing customers before a full or partial lead service line replacement, a lead service line replacement goal rate in the event of a lead trigger level exceedance, a pitcher filter tracking and maintenance system, a procedure for customers to flush service lines and premise plumbing of particulate lead, and a funding strategy for conducting lead service line replacements.

(c) *Operating procedures for replacing lead goosenecks, pigtails, or connectors.* (1) The water system must replace any lead gooseneck, pigtail, or connector it owns when encountered during emergency repairs or planned water system infrastructure work.

(2) The water system must offer to replace a customer-owned lead gooseneck, pigtail, or connector; however, the water system is not required to bear the cost of replacement of the customer-owned parts.

(3) The water system is not required to replace a customer-owned lead gooseneck, pigtail, or connector if the customer objects to its replacement.

(4) The replacement of a lead gooseneck, pigtail, or connector does not count for the purposes of meeting

the requirements for goal-based or mandatory lead service line replacements, in accordance with paragraphs (e)(2) and (f)(2) of this section, respectively.

(5) Upon replacement of any gooseneck, pigtail, or connector that is attached to a lead service line, the water system must follow risk mitigation procedures specified in 141.85(e)(5)(ii).

(d) *Requirements for conducting lead service line replacement that may result in partial replacement.* (1) Any water system that plans to partially replace a lead service line (*e.g.,* replace only the portion of a lead service line that it owns) in coordination with planned infrastructure work must provide notice to the owner of the lead service line, or the owner's authorized agent, as well as non-owner resident(s) served by the lead service line at least 45 days prior to the replacement. The notice must explain that the system will replace the portion of the line it owns and offer to replace the portion of the service line not owned by the water system. The 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.

(i) The water system must provide notification explaining that consumers may experience a temporary increase of lead levels in their drinking water due to the replacement, information about the health effects of lead, and actions consumers can take to minimize their exposure to lead in drinking water. In instances where multi-family dwellings are served by the lead service line to be partially replaced, the water system may elect to post the information at a conspicuous location instead of providing individual notification to all residents.

(ii) The water system must provide information about service line flushing in accordance with § 141.84(b).

(iii) The water system must provide the consumer with a pitcher filter certified to remove lead, three months of replacement cartridges, and instructions for use. 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, three months of replacement cartridges and use instructions to every residence in the building.

(iv) The water system must take a follow up tap sample between three months and six months after completion of any partial lead service line replacement. The water system must provide the results of the sample to the consumer in accordance with § 141.85(d).

(2) Any water system that replaces the portion of the lead service line it owns due to an emergency repair, must provide notice and risk mitigation measures to the customer served by the lead service line within 24 hours. The water system must provide notification and risk mitigation measure in accordance with (d)(1)(i)–(iv) of this section.

(3) A water system must replace the lead service line it owns when it is notified that the customer has replaced the customer-owned portion of the lead service line. When a water system is notified by the customer that he or she intends to replace the customer portion of the lead service line the water system has 45 days from the day of their notification to conduct the replacement of the system-owned portion. The water system must make a good faith effort to coordinate simultaneous replacement. The water system must provide notification and risk mitigation measure in accordance with (d)(1)(i)–(iv) of this section.

(4) When a water system is notified by the customer that he or she has replaced the customer-owned portion and that replacement has occurred within the previous 3 months, the water system must replace its portion within 45 days from the day of their notification. The water system must provide notification and risk mitigation measures in accordance with (d)(1)(i)–(iv) of this section.

(5) When a water system is notified by the customer that he or she has replaced the customer-owned portion and the replacement has occurred more than three months in the past, the water system is not required to complete the lead service line replacement of the system-owned portion.

(e) *Requirements for conducting full lead service line replacement.* (1) Any water system that conducts a full lead service line replacement (*e.g.,* replace both the portion of a lead service line owned by the customer and by the water system) must provide notice to the owner of the lead service line, or the owner's authorized agent, as well as non-owned resident(s) served by the lead service line within 24 hours of the replacement.

(i) The water system must provide notification explaining that consumers may experience a temporary increase of lead levels in their drinking water due to the replacement, information about the health effects of lead, and actions consumers can take to minimize their exposure to lead in drinking water. In instances where multi-family dwellings are served by the lead service line to be replaced, the water system may elect to post the information at a conspicuous location instead of providing individual notification to all residents.

(ii) The water system must provide information about service line flushing in accordance with § 141.84(b).

(iii) The water system must provide the consumer with a pitcher filter certified to remove lead, three months of replacement cartridges, and instructions for use. 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, three months of replacement cartridges and use instructions to every residence in the building.

(iv) The water system must take a follow up tap sample between three months and six months after completion of any partial lead service line replacement. The water system must provide the results of the sample to the consumer in accordance with § 141.85(d).

(f) *Water systems whose 90th percentile lead level from tap samples is above the trigger level but at or below the action level.* Water systems whose 90th percentile lead level from tap samples taken pursuant to § 141.86 is above the lead trigger level but at or below the lead action level must conduct goal-based lead service line replacement.

(1) Within six months following completion of the initial invention, pursuant to paragraph (a) of this section, water systems serving over 10,000 persons must determine a goal rate at which it will replace lead service lines after their 90th percentile lead level exceeds of the trigger level but is below the lead action level. This lead service line replacement goal rate must be approved by the State pursuant to (b) of this section.

(2) Water systems must apply the goal replacement rate to the initial number of lead service lines, including service lines of unknown material, in the water system's LSL inventory. If the water system at any time determines a service line of unknown material is non-lead, the water system may subtract it from the initial number of lead service lines used for calculating the lead service line replacement rate.

(3) Lead service line replacement must be conducted in accordance with the requirements of paragraphs (d) or (e) of this section.

(4) Only full lead service line replacements count towards a water system's annual replacement goal. Partial lead service line replacements do not count towards the goal.

(5) The water system must provide notification to customers with lead service lines as required in § 141.85(f).

(6) Any water system that fails to meet its lead service line replacement goal must:

(i) Conduct public outreach activities pursuant to § 141.85(g) until either the water system meets its replacement goal, or tap sampling shows the 90th percentile of lead is below the trigger level for two consecutive monitoring periods.

(ii) Recommence its goal-based lead service line replacement program pursuant to this paragraph if the 90th percentile lead value anytime thereafter exceeds the lead trigger level.

(7) The first year of lead service line replacement shall begin on the first day following the end of the monitoring period in which the lead action level was exceeded. If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the State has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.

(8) Pursuant to the procedures in § 142.19, the EPA Regional Administrator may review the lead service line replacement goal rate determination made by a State under paragraph § 141.84(b) of this section and issue a Federal goal-based lead service line replacement rate determination where the Regional Administrator finds that a higher goal-based lead service line replacement rate is feasible for a water system.

(g) *Lead service line replacement for water systems that exceed the lead action level in tap samples.* Water systems that exceed the lead action level in tap samples taken pursuant to § 141.86 must replace full lead service lines at a minimum annual rate.

(1) Water systems must annually replace three percent of the initial number of lead service lines in the inventory, including service lines of unknown material at time of the action level exceedance. The water system must meet the replacement rate with full lead service line replacements but is not required to bear the cost of removal of the portion of the lead service line it does not own. If the water system later determines a service line of unknown material is non-lead, the water system may subtract it from the initial number of lead service lines used for calculating the lead service line replacement rate.

(2) Lead service line replacement must be conducted in accordance with the requirements of paragraphs (c) or (d) of this section.

(3) Only full lead service line replacements count towards a water system's mandatory replacement rate. Partial lead service line replacements do not count towards the mandatory replacement rate.

(4) Water systems must conduct notification to customers with lead service lines as required in § 141.85(f).

(5) Community water systems serving 10,000 or fewer persons may elect to conduct a corrosion control treatment or point-of-use filter compliance approach as described in section § 141.93 instead of lead service line replacement. Non-transient non-community water systems may elect to conduct a corrosion control treatment, point-of-use filter compliance approach, or choose a replacement of lead-bearing plumbing approach, as described in section § 141.93.

(6) A water system may cease mandatory lead service line replacement when its lead 90th percentile level, calculated under § 141.80(c)(4), is at or below the lead action level during each of four consecutive monitoring periods. If first draw tap samples collected in any such system thereafter exceed the lead action level, the system shall recommence mandatory lead service line replacement.

(7) The water system may cease mandatory lead service line replacement if it obtains refusal to conduct full lead service line replacement from every customer in its distribution area served by a lead service line on the customer's portion. If the water system exceeds the action level again, it must reach out to any customers served by a lead service line where there has been a change in residents with an offer to replace the customer-owned portion. The water system is not required to bear the cost of replacement of the customer-owned lead service line.

(8) The first year of lead service line replacement shall begin on the first day following the end of the monitoring period in which lead action level was exceeded under paragraph (a) of this section. If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the State has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.

(9) The State shall require a system to replace lead service lines on a shorter schedule than that required by this section, taking into account the number of lead service lines in the system, where a shorter replacement schedule is feasible. The State shall make this determination in writing and notify the system of its finding within six months after the system is required to begin lead service line replacement based on monitoring referenced in paragraph (f) of this section.

(h) *State reporting to demonstrate compliance.* To demonstrate compliance with paragraphs (a) through (f) of this section, a system shall report to the State the information specified in § 141.90(e).

■ 8. Amend § 141.85 by:

■ a. Revising the introductory text, paragraphs (a)(1)(ii), (b)(2)(ii)(B), and (b)(2)(ii)(B)(*1*);

■ b. Adding paragraph (b)(2)(ii)(B)(*7*) and removing paragraph (b)(2)(ii)(C);

■ c. Revising paragraphs (d)(1), (2), and (4) ; and

■ d. Adding paragraphs (e), (f), and (g).

The revisions and additions read as follows:

§ 141.85 Public education and supplemental monitoring requirements.

All water systems must deliver a consumer notice of lead tap water monitoring results to persons served by the water system at sites that are tested, as specified in paragraph (d) of this section. A water system with lead service lines must deliver public education materials to persons with a lead service line as specified in paragraph (e) and (f) of this section. All water systems must conduct annual outreach to healthcare providers and caregivers as outlined in section (g) of this section. A water system that exceeds the lead action level based on tap water samples collected in accordance with § 141.86 shall deliver the public education materials contained in paragraph (a) of this section and in accordance with the requirements in paragraph (b) of this section. Water systems that exceed the lead action level must sample the tap water of any customer who requests it in accordance with paragraph (c) of this section.

(a) * * *

(1) * * *

(ii) *Health effects of lead.* Exposure to lead can cause serious health effects in all age groups. Infants and children who drink water containing lead could have decreases in IQ and attention span and increases in learning and behavior problems. Lead exposure among women who are pregnant increases prenatal risks. Lead exposure among women who later become pregnant has similar risks if lead stored in the mother's bones is released during pregnancy. Recent science suggests that adults who drink water containing lead have increased

risks of heart disease, high blood pressure, kidney or nervous system problems.

* * * * *

(b) * * *

(2) * * *

(ii) * * *

(B) * * *

(*1*) Schools, child care facilities and school boards.

* * * * *

(*7*) Obstetricians-Gynecologists and Midwives.

(d) *Notification of results.* (1) Reporting requirement. All water systems must provide a notice of the individual tap results from lead 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 residence where the tap was tested).

(2) Timing of notification. A water system must provide the consumer notice as soon as practical, in accordance to the following timeframes:

(i) For individual samples that do not exceed the lead action level, no later than 30 days after the water system learns of the tap monitoring results.

(ii) For individual samples that exceed the lead action level, no later than 24 hours after the water system learns of the tap monitoring results.

* * * * *

(4) Delivery. (i) For lead tap sample results that do not exceed the lead action level of 0.015 mg/L, the water systems must provide consumer notice to persons served at the tap that was tested, either by mail or by another method approved by the State. For example, upon approval by the State, a non-transient non-community water system could post the results on a bulletin board in the facility to allow users to review the information. The system must provide the notice to consumers, including customers at taps where sampling was conducted.

(ii) For tap sample results that exceed the lead action level of 0.015 mg/L, the water systems must provide consumer notice to consumers served at the tap that was tested electronically or by phone or another method approved by the State.

(e) *Notification of lead service line.* (1) *Notification requirements.* All water systems with lead service lines must provide notification to all consumers with a lead service line or a service line of unknown material informing them they have a lead service line or a service line of unknown material.

(2) *Timing of notification.* A water system must provide the initial notification within 30 days of completion of the lead service line inventory required under § 141.84 and repeat the notification on an annual basis until the customer no longer has a lead service line. For new customers, water systems shall provide the notice at the time of service initiation.

(3) *Content.* (i) Consumers with a confirmed lead service line. The notice must include a statement that the consumer's service line is lead, an explanation of the health effects of lead, steps consumers can take to reduce exposure to lead in drinking water, information about opportunities to replace lead service lines and information about programs that provide innovative financing solutions to assist consumers with replacement of their portion of a lead service line, and a statement that the water system is required to replace its portion of a lead service line when the consumer notifies them they are replacing their owned portion of the lead service line.

(ii) Customers with a service line of unknown material. The notice must include a statement that the customer's service line is of unknown material that may be lead, an explanation of the health effects of lead, steps customers can take to reduce exposure to lead in drinking water and information about opportunities to verify the material of the service line.

(4) *Delivery.* The notice must be provided to persons served by a lead service line or service line of unknown material, either by mail or by another method approved by the primacy agency.

(5) *Notification due to a disturbance of a lead service line.* (i) Water systems that cause disturbance to a lead service line that results in the water being shut off, and without conducting a partial or full lead service line replacement, must provide the consumer with information about the potential for elevated lead in drinking water a result of the disturbance as well as a flushing procedure to remove particulate lead.

(ii) If the disturbance of a lead service line results from the replacement of the water meter or gooseneck, pigtail, or connector, the water system must comply with the requirements in paragraph (e)(5)(i) of this section as well as provide the consumer with a pitcher filter certified to remove lead, instructions to use the filter, and three months of filter replacement cartridges.

(iii) A water system that conducts a partial or full lead service line replacement must comply with the requirements in paragraph (e)(5)(i) of this section as well as provide the consumer with a pitcher filter certified to remove lead, instructions to use the filter, and three months of filter replacement cartridges.

(iv) The water system must comply with the requirements of paragraphs (e)(5) of this section before the consumer's water is turned back on after it has been shut off by the water system.

(f) *Notification of exceedance of the lead trigger level.* (1) All water systems with lead service lines that exceed the lead trigger level of 0.010 mg/L must provide customers that have a lead service line information regarding the water system's goal-based lead service line replacement program and opportunities for replacement of the lead service line.

(2) *Timing.* Waters Systems shall send notification within 30 days of the end of the monitoring period in which the trigger level exceedance occurred. Water systems must repeat the notification annually until the results of sampling conducted under § 141.86 is at or below the lead trigger level.

(3) *Delivery.* The notice must be provided to persons served by a lead service line, either by mail or by another method approved by the State.

(g) *Outreach activities for failure to meet the lead service line replacement goal.* (1) In the first year that a water system that does not meet its annual lead service line replacement goal as required under § 141.84, it must conduct one outreach activity from the following list in the following year until the water system meets it replacement goal or until tap sampling shows that the 90th percentile for lead is at or below the trigger level of 0.010 mg/L. Any water system that thereafter continues to fail to meet its lead service line replacement goal must conduct two outreach activities per year from the following list:

(i) Conduct social media campaign.

(ii) Contact organizations representing plumbers and contractors by mail to provide information about lead in drinking water including health effects, sources of lead, and the importance of using lead free plumbing materials.

(iii) Send certified mail to customers with a lead service line to inform them about the water system's goal-based lead service line replacement program and opportunities for replacement of the lead service line.

(iv) Conduct a town hall meeting or participate in a community event to provide information about its lead service line replacement program and distribute public education materials.

(v) Visit targeted customers to discuss the lead service line replacement program and opportunities for replacement.

(vi) In the case where all lead service line customers refuse to participate in the lead service line replacement program, obtain a signed letter from each customer stating such refusal.

(h) *Public education to local and State health agencies.* (1) All water systems shall provide public education materials that meet the content requirements of paragraph (a)(1) of this section.

(2) *Timing.* Water systems must send public education materials no later than January 15 of each calendar year.

(3) *Delivery.* Water systems shall send public education materials or provide public education by mail or by another method approved by the State.

■ 9. Amend § 141.86 by:

■ a. Revising paragraphs (a), (b)(1), and (b)(2);

■ b. Reserving paragraph (b)(3);

■ c. Revising paragraphs (d) and (e);

■ d. Revising the heading of paragraph (f); and

■ e. Adding paragraphs (h) and (i).

The revisions and additions read as follows:

§ 141.86 Monitoring requirements for lead and copper in tap water.

(a) *Sample site location.* (1) By the applicable date for commencement of monitoring under paragraph (d)(1) of this section, each water system shall complete a lead service line inventory of its distribution system and identify a pool of targeted sampling sites that meet the requirements of this section, and which is sufficiently large enough to ensure that the water system can collect the number of lead and copper tap samples required in paragraph (c) of this section. Water systems with lead service lines or service lines of unknown material must re-evaluate the tap sampling locations based on a lead service line inventory conducted under § 141.84(a), which must be updated annually thereafter, including identifying any changes to the sampling locations. Sites may not include faucets that have point-of-use (POU) or point-of-entry (POE) treatment devices designed to remove inorganic contaminants, except for systems monitoring under § 141.93 (Small System Compliance Flexibility). Lead and copper sampling results for systems monitoring under 141.93(c)(3) and (d)(3) may not be used for the purposes of meeting the criteria for reduced monitoring specified in (d)(4) of this section.

(2) A water system shall use the information on lead, copper, and galvanized steel that is required to be collected under § 141.42(d) (special monitoring for corrosivity characteristics) when conducting a materials evaluation. A water system shall use the information on lead service lines that is required to be collected under § 141.84(a) to identify potential lead service line sampling sites. When an evaluation of the information collected pursuant to § 141.42(d) and 141.84(a) is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in paragraph (a) of this section, the water system shall review the sources of information listed below to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (*e.g.,* checking service line materials when reading water meters or performing maintenance activities):

(i) All plumbing codes, permits, and records in the files of the building department(s) that indicate the plumbing materials that are installed within publicly and privately-owned structures connected to the distribution system;

(ii) All inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system; and

(iii) All existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.

(3) The sampling sites selected for a community water system's sampling pool ("Tier 1 sampling sites") shall consist of single-family structures that are served by a lead service line. When multiple-family residences comprise at least 20 percent of the structures served by a water system, the system may include these types of structures in its Tier 1 sampling pool, if served by a lead service line. Service lines of unknown material must not be used as Tier 1 sampling sites.

(4) Any community water system with insufficient Tier 1 sampling sites shall complete its sampling pool with "Tier 2 sampling sites," consisting of buildings, including multiple-family residences that are served by a lead service line.

(5) Any community water system with insufficient Tier 1 and Tier 2 sampling sites shall complete its sampling pool with "Tier 3 sampling sites," consisting of single-family structures that contain copper pipes with lead solder.

(6) A community water system with insufficient Tier 1, Tier 2, and Tier 3 sampling sites shall complete its sampling pool with "Tier 4 sampling sites," consisting of single-family structures or buildings, including multiple family residences that are representative of sites throughout the distribution system. For the purpose of this paragraph, 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.

(7) The sampling sites selected for a non-transient non-community water system ("Tier 1 sampling sites") shall consist of buildings that are served by a lead service line. Service lines of unknown material must not be used as Tier 1 sampling sites.

(8) A non-transient non-community water system with insufficient Tier 1 sites that meet the targeting criteria in paragraph (a)(7) of this section shall complete its sampling pool with "Tier 3 sampling sites," consisting of sampling sites that contain copper pipes with lead solder.

(9) A non-transient non-community water system with insufficient Tier 1 and Tier 3 sampling sites shall complete its sampling pool with "Tier 4 sampling sites," consisting of sampling sites that are representative of sites throughout the distribution system. For the purpose of this paragraph, 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.

(10) Any water system whose distribution system contains lead service lines shall collect all samples for monitoring under this section from sites served by a lead service line. A water system that cannot identify a sufficient number of sampling sites served by lead service lines shall still collect samples from every site served by a lead service line, and collect the remaining samples in accordance with tiering requirements under (a)(2)(iii) of this section.

(b) *Sample collection methods.* (1) All tap samples for lead and copper collected in accordance with this subpart, with the exception of samples collected under paragraph (b)(5) and paragraph (h) of this section, shall be first draw samples.

(2) Each first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. Bottles used to collect these samples shall be wide-mouth one-liter sample bottles. First-draw samples from residential housing shall be collected from the cold-water kitchen tap or bathroom sink tap. First-draw samples from a nonresidential building shall be one liter in volume and collected at an interior tap from which water is typically drawn for consumption. Non-first-draw samples

collected in lieu of first-draw samples pursuant to paragraph (b)(5) of this section shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First-draw samples may be collected by the system or the system may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in this paragraph. Sampling instructions provided to customers shall not include instructions for aerator removal and cleaning or flushing of taps prior to the start of the minimum six-hour stagnation period. To avoid problems of residents handling nitric acid, acidification of first-draw samples may be done up to 14 days after the sample is collected. After acidification to re-solubilize the metals, the sample must stand in the original container for the time specified in the approved EPA method before the sample can be analyzed. If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

* * * * *

(d) *Timing of monitoring* (1) *Initial tap sampling.* (i) All water systems with lead service lines deemed optimized under § 141.81(b)(3) and systems that did not conduct monitoring that meets the requirements of this section prior to the compliance date of this section must begin the first six-month monitoring period on January 1 in the year following the compliance date of this section.

(ii) Systems that conducted monitoring that meets the requirements of this section prior to the effective date of this section shall conduct the next round of monitoring on the following schedules based on the results of that monitoring:

(A) Systems that exceed the action levels for lead or copper shall begin the first six-month monitoring period on January 1 in the year following the effective date of this section.

(B) Systems that exceed the lead trigger level and meet the lead and copper action levels shall begin the first annual monitoring period on January 1 in the year following the effective date of this section. Samples shall be analyzed for lead on an annual basis. Samples shall be analyzed for copper on a triennial basis. Systems without corrosion control treatment that meet the lead trigger level in three annual monitoring periods may reduce monitoring in accordance with paragraph (d)(4) of this section.

(C) Lead service line systems that do not exceed the lead trigger level and copper action level shall begin the next annual monitoring period on January 1 of the year following the effective date of this section. Samples shall be analyzed for lead on an annual basis. Samples shall be analyzed for copper on a triennial basis. Systems that do not exceed the lead trigger level in three annual monitoring periods may reduce monitoring in accordance with paragraph (d)(4) of this section.

(D) Systems without lead service lines that do not exceed the lead trigger level and the copper action level shall begin the next triennial monitoring period within three calendar years of the previous round.

(2) *Monitoring after installation of initial or re-optimized corrosion control treatment and installation of source water treatment.* (i) Any water system that installs or re-optimizes corrosion control treatment shall continue to monitor for lead and copper every six months until the State specifies water quality parameter values for optimal corrosion control.

(ii) Any system that re-optimizes corrosion control treatment as a result of exceeding the lead trigger level shall monitor annually for lead. Samples shall be analyzed for copper on a triennial basis. Small and medium-size systems for which the State did not specify water quality control parameters under § 141.82 that meet the lead trigger level in three annual monitoring periods may reduce monitoring in accordance with paragraph (d)(4) of this section.

(iii) Any system that installs source water treatment pursuant to § 141.83(a)(3) shall monitor every six months until the system meets the lead and copper action levels for two consecutive six-month monitoring periods. Systems that meet the lead and copper action levels, but not the lead trigger level for two consecutive 6-month monitoring periods may reduce monitoring in accordance with paragraph (d)(4) of this section.

(3) *Monitoring after State specifies water quality parameter values for optimal corrosion control treatment.* (i) After the State specifies the values for water quality control parameters under § 141.82(f), all large and any small or medium size systems that exceeded an action level shall continue to monitor every six months until the system does not exceed the lead and copper action levels for two consecutive 6-month monitoring periods. Systems that do not exceed the lead and copper action levels, but exceed the lead trigger level (>10 μg/L) shall monitor annually at the standard number of sites listed in (c) of this section. Systems that do not exceed the lead trigger level and copper action level in three annual monitoring periods may reduce monitoring in accordance with paragraph (d)(4) of this section.

(ii) Any small or medium size system which exceeded the lead trigger level for which the State has specified water quality parameter values for optimal corrosion control treatment shall continue to monitor every six months until the system meets the lead and copper action levels for two consecutive 6-month monitoring periods. Systems that do not exceed the lead and copper action levels, but exceed the lead trigger level shall monitor annually at the standard number of sites listed in paragraph (c) of this section. Systems that do not exceed the lead trigger level and copper action level in three annual monitoring periods may reduce monitoring in accordance with paragraph (d)(4) of this section.

(4) *Reduced Monitoring based on 90th percentile lead levels.* (i) (A) A small or medium-size system that meets the lead trigger level and copper action level under paragraph (d)(1)(i) of this section may reduce the frequency of sampling to annual monitoring. This monitoring shall begin in the calendar year immediately following the end of the second consecutive 6-month monitoring period.

(B) A small or medium-size water system that meets the lead trigger level and copper action level under paragraph (d)(1)(ii)(D) of this section may reduce the number of samples in accordance with paragraph (c) of this section and reduce the sampling frequency to triennial monitoring. This monitoring shall begin during the calendar year three years after the monitoring conducted under paragraph (d)(1)(ii)(D) of this section. A small or medium system collecting fewer than five samples as specified in paragraph (c) of this section that meets the lead trigger level and copper action level under paragraph (d)(1)(ii)(D) of this section may reduce the sampling frequency to triennial monitoring. In no case may the system reduce the number of samples below the minimum of one sample per available tap. This monitoring shall begin during the calendar year three years after the monitoring conducted under paragraph (d)(1)(ii)(D) of this section.

(C) Any small or medium-size system without corrosion control treatment that exceeds the lead trigger level, but meets copper action level, shall collect the standard number of samples on an annual basis. This sampling shall begin in the calendar year following the monitoring conducted under paragraph (d)(1)(i) or (d)(1)(ii)(B) of this section. A small or medium system collecting

fewer than five samples as specified in paragraph (c) of this section that meets the lead trigger level and copper action level under paragraph (d)(1)(i) or (d)(1)(ii)(D) of this section shall collect the standard number of samples on an annual basis. In no case may the system reduce the number of samples below the minimum of one sample per available tap. This sampling shall begin in the calendar year following the monitoring conducted under paragraph (d)(1)(i) or (d)(1)(ii)(B) of this section.

(D) Any small or medium-size system with corrosion control treatment that exceeds the lead trigger level but meets the lead and copper action levels and is not required by the State to make changes to the corrosion control treatment as a result of the re-optimization assessment under § 141.82, shall collect the standard number of samples on an annual basis. This sampling shall begin in the calendar year following the monitoring conducted under paragraph (d)(1)(i) or (d)(1)(ii)(B) of this section. A small or medium system collecting fewer than five samples as specified in paragraph (c) of this section that meets the lead trigger level and copper action level under paragraph (a)(ii)(D) of this section shall collect the standard number of samples on an annual basis. In no case may the system reduce the number of samples below the minimum of one sample per available tap. This monitoring shall begin in the calendar year following the monitoring conducted under paragraph (d)(1)(i) or (d)(1)(ii)(B) of this section.

(ii) (A) Any water system that meets the lead trigger level and copper action level and maintains the range of values for the water quality parameters for optimal corrosion control treatment specified by the State under § 141.82(f) during each of two consecutive six-month monitoring periods may reduce the sampling frequency for the standard number of samples to annual monitoring. This sampling shall begin in the calendar year immediately following the end of the second consecutive six-month monitoring period. The State shall review monitoring, treatment, and other relevant information submitted by the water system in accordance to § 141.90 and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The State shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the frequency of tap sampling becomes available.

(B) Any water system that exceeds the lead trigger level but meets the lead and copper action levels and maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under § 141.82(f) during each of two consecutive six-month monitoring periods may reduce the monitoring frequency at the standard number of sites to annual monitoring. This sampling shall begin in the calendar year immediately following the end of the second consecutive 6-month monitoring period. The State shall review monitoring, treatment, and other relevant information submitted by the water system in accordance to § 141.90 and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The State shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the frequency of monitoring becomes available.

(iii) (A) A small or medium-size water system that meets the lead trigger level and copper action level under paragraph (d)(4)(i)(D) of this section may reduce the number of samples in accordance with paragraph (c) of this section and reduce the monitoring frequency to triennial monitoring. This sampling should begin during the calendar year three years after the monitoring conducted under paragraph (d)(ii)(D) of this section. A small or medium system collecting fewer than five samples as specified in paragraph (c) of this section that meets the lead trigger level and copper action level under paragraph (d)(ii)(D) of this section may reduce the monitoring frequency to triennial monitoring. This monitoring should begin during the calendar year three years after the monitoring conducted under paragraph (d)(ii)(D) of this section. In no case may the system reduce the number of samples below the minimum of one sample per available tap. This sampling should begin during the calendar year three years after the monitoring conducted under paragraph (a)(ii)(D) of this section.

(B) Any small or medium-size system monitoring under § 141.86(d)(4)(i)(A) or (B) that meets the lead trigger level and the copper action level in three consecutive rounds of annual monitoring may reduce the number of samples in accordance with paragraph (c) of this section and reduce the sampling frequency to triennial monitoring. This sampling should begin during the calendar year three years after the monitoring conducted under paragraph (a)(ii)(D) of this section. A small or medium system collecting fewer than five samples as specified in paragraph (c) of this section that meets the lead trigger level and copper action level under paragraph (a)(ii)(D) of this section may reduce the sampling frequency to triennial monitoring. In no case may the system reduce the number of samples below the minimum of one sample per available tap. This monitoring must begin during the calendar year three years after the monitoring conducted under paragraph (a)(ii)(D) of this section.

(iv) A water system that reduces the frequency of sampling shall collect these samples from representative sites included in the pool of targeted sampling sites identified in paragraph (a) of this section. Systems monitoring annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August, or September unless the State has approved a different monitoring period in accordance with paragraph (d)(iv)(A) of this section.

(A) The State at its discretion may approve a different period for conducting the lead and copper tap sampling for systems collecting samples at a reduced frequency. Such a period shall be no longer than four consecutive months 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 shall designate a period that represents normal operation for the system. This monitoring shall begin during the period approved or designated by the State in the calendar year immediately following the end of the second 6-month monitoring period for systems initiating annual monitoring and during the 3-year period following the end of the third consecutive year of annual monitoring for systems initiating triennial monitoring.

(B) Systems monitoring annually that have been collecting samples during the months of June through September and that receive State approval to alter their monitoring period under paragraph (d)(4)(iv)(A) 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

collection period as per paragraph (d)(4)(iv)(A) of this section must collect their next round of samples during a time period that ends no later than 45 months after the previous monitoring period. Subsequent monitoring must be conducted annually or triennially, as required by this section. Small 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 monitoring period as per paragraph (d)(4)(iv)(A) of this section must collect their next round of samples before the end of the 9-year period.

(v) Any water system that demonstrates for two consecutive 6-month monitoring periods that its 90th percentile lead level, calculated under § 141.80(c)(4), is less than or equal to 0.005 mg/L and the 90th percentile copper level, calculated under § 141.80(c)(4), is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with paragraph (c) of this section and reduce the frequency of monitoring to triennial monitoring.

(vi)(A)(*1*) A small or medium-size water system on reduced triennial monitoring that exceeds the lead or copper action level shall resume monitoring in accordance with paragraph (d)(3)(i) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section. Such a system shall also conduct water quality parameter monitoring in accordance with § 141.87(b), (c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any such water system may resume annual monitoring for lead and copper and discontinue water quality parameter monitoring in accordance with § 141.87(b), (c) or (d) (as appropriate) after it has completed two consecutive 6-month rounds of monitoring that meet the criteria of (d)(4)(i)(A) of this section, and may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii)(B) or (d)(4)(v) of this section.

(*2*) A small or medium-size water system subject to annual monitoring that exceeds the lead or copper action level shall resume sampling in accordance with paragraph (d)(3)(i) of this section. Such a system shall also conduct water quality parameter monitoring in accordance with § 141.87(b), (c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any such system may resume annual monitoring for lead and copper and discontinue water quality parameter monitoring in accordance with § 141.87(b), (c) or (d) (as appropriate) after it has completed two subsequent consecutive 6-month rounds of monitoring that meet the criteria of (d)(4)(i)(A) of this section, and may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii)(B) or (d)(4)(v) of this section.

(*3*) A small or medium-size system subject to reduced triennial monitoring that exceeds the lead trigger level shall resume sampling in accordance with (d)(4)(ii)(B) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section. If required by the State, such a system shall also conduct water quality parameter monitoring in accordance with § 141.87(b), (c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any such system may resume triennial monitoring for lead and copper and discontinue water quality parameter monitoring in accordance with § 141.87(b), (c) or (d) (as appropriate) after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section.

(B)(*1*) Any water system subject to the reduced triennial monitoring frequency that fails to meet the lead or copper action level during any four-month monitoring period or fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the State under § 141.82(f) for more than nine days in any 6-month monitoring period specified in § 141.87(d) shall conduct tap water monitoring for lead and copper at the frequency specified in paragraph (d)(3)(i) of this section, collect the number of samples specified for standard monitoring under paragraph (c) of this section, and shall resume sampling for water quality parameters in accordance with § 141.87(d). This standard tap water monitoring shall begin no later than the 6-month period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion. Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

(*i*) The system may resume annual monitoring for lead and copper after it has completed two subsequent 6-month rounds of monitoring that meet the criteria of paragraph (d)(4)(ii)(A) of this section and the system has received written approval from the State that it is appropriate to resume reduced monitoring on an annual frequency. This monitoring shall begin during the calendar year immediately following the end of the second consecutive 6-month monitoring period.

(*ii*) The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section and the system has received written approval from the State that it is appropriate to resume triennial monitoring.

(*iii*) The system may reduce the number of water quality parameter tap water samples required in accordance with § 141.87(e)(1) and the frequency with which it collects such samples in accordance with § 141.87(e)(2). Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of § 141.87(e)(2), that it has re-qualified for triennial monitoring.

(*2*) Any water system subject to the reduced annual monitoring frequency that fails to meet the lead or copper action level during any four-month monitoring period or fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the State under § 141.82(f) for more than nine days in any 6-month monitoring period specified in § 141.87(d) shall conduct tap water monitoring for lead and copper at the frequency specified in paragraph (d)(3)(i) of this section, and shall resume sampling for water quality parameters in accordance with § 141.87(d). This standard monitoring shall begin no later than the 6-month period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion. Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

(*i*) The system may resume annual monitoring for lead and copper after it has completed two subsequent 6-month rounds of monitoring that meet the criteria of paragraph (d)(4)(ii)(A) of this section and the system has received written approval from the State that it is appropriate to resume reduced monitoring on an annual frequency.

This sampling shall begin during the calendar year immediately following the end of the second consecutive 6-month monitoring period.

(*ii*) The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section and the system has received written approval from the State that it is appropriate to resume triennial monitoring.

(*iii*) The system may reduce the number of water quality parameter tap water samples required in accordance with § 141.87(e)(1) and the frequency with which it collects such samples in accordance with § 141.87(e)(2). Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of § 141.87(e)(2), that it has qualified for triennial monitoring.

(*3*) Any water system subject to the reduced triennial monitoring frequency that exceeds the lead trigger level during any four-month monitoring period shall conduct tap water sampling for lead and copper at the frequency specified in paragraph (d)(4)(ii)(B) of this section, collect the number of samples specified for standard monitoring under paragraph (c) of this section, and shall resume sampling for water quality parameters in accordance with § 141.87(d). This standard tap water monitoring shall begin no later than the 6-month period beginning January 1 of the calendar year following the lead trigger level exceedance or water quality parameter excursion. Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

(*i*) The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section and the system has received written approval from the State that it is appropriate to resume triennial monitoring.

(*ii*) The system may reduce the number of water quality parameter tap water samples required in accordance with § 141.87(e)(1) and the frequency with which it collects such samples in accordance with § 141.87(e)(2). Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of § 141.87(e)(2), that it has re-qualified for triennial monitoring.

(*iii*) Any water system subject to a reduced monitoring frequency under paragraph (d)(4) of this section shall notify the State in writing in accordance with § 141.90(a)(3) of any upcoming long-term change in treatment or addition of a new source as described in that section. 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 the system to resume sampling in accordance with paragraph (d)(3) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section or take other appropriate steps such as increased water quality parameter monitoring, or re-evaluation of corrosion control treatment given the potentially different water quality considerations.

(e) *Additional monitoring by systems.* The results of any monitoring conducted in addition to the minimum requirements of this section (such as customer-requested sampling) shall be considered by the system and the State in making any determinations (*i.e.,* calculating the 90th percentile lead or copper level) under this subpart. Lead service line water systems that are unable to collect the minimum number of samples from Tier 1 or Tier 2 sites shall calculate the 90th percentile using data from all the lead service lines sites and the highest values from lower tier sites to meet the specified minimum number of sites. Data from additional lower tier sites shall be submitted to the State but shall not be used in the 90th percentile calculation. Customer-requested samples from known lead service line sites shall be included in the 90th percentile calculation when they meet the requirements of paragraph (b) of this section.

(f) *Invalidation of lead and copper tap samples collected under § 141.86(d).*

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(h) *Follow-up samples for "find-and-fix" under § 141.82(j).* Systems shall collect a follow-up sample at any site that exceeds the action level within 30 days of receiving the sample results. These follow-up samples may use different sample volumes or different sample collection procedures to assess the source of elevated lead. Samples collected under this section shall be submitted to the State but shall not be included in the 90th percentile calculation.

(i) *Public availability of tap monitoring results used in the 90th percentile calculation.* All water systems shall make available to the public the results of the tap water monitoring used to make the 90th percentile calculation under § 141.80(c)(4). Water systems shall not be required to list the addresses of the sites where the tap samples were collected. Large systems shall make available the monitoring results in a digital format. Small and medium-size systems shall make available the monitoring results in either a written or digital format.

* * * * *

■ 11. Revise § 141.87 to read as follows:

§ 141.87 Monitoring requirements for water quality parameters.

All large water systems, and all small- and medium-size water systems that exceed the lead or copper action level, and all small- and medium-size water systems with corrosion control treatment that exceed the lead trigger level shall monitor water quality parameters in addition to lead and copper in accordance with this section. The requirements of this section are summarized in the table at the end of this section.

(a) *General requirements.* (1) *Sample collection methods.* (i) Tap samples shall be representative of water quality throughout the distribution system, taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under § 141.86(a).

Note to paragraph (a)(1)(i): Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling under § 141.21 in this chapter.

(ii) Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (*i.e.,* when water is representative of all sources being used).

(2) *Number of samples.* (i) Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under paragraphs (b) through (e) of this section from the following minimum number of sites. Systems that add sites as a result of the "find-and-fix" requirements in § 141.82(j) shall collect tap samples for applicable water quality

parameters during each monitoring period under paragraphs (c) through (e) of this section and shall sample from that adjusted minimum number of sites.

TABLE 1 TO PARAGRAPH (a)(2)(i)

System size (number people served)	Minimum number of sites for water quality parameters
100,000	25
10,001–100,000	10
3,301–10,000	3
501–3,300	2
101–500	1
≤100	1

(ii)(A) Except as provided in paragraph (c)(2) of this section, water systems without corrosion control treatment shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in paragraph (b) of this section. During each monitoring period specified in paragraphs (c) through (e) of this section, water systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

(B) During each monitoring period specified in paragraphs (b) through (e) of the section, water systems with corrosion control treatment shall continue to collect one sample for each applicable water quality parameter at each entry point to the distribution system no less frequently than once every two weeks.

(b) *Initial sampling for water systems without corrosion control treatment.* (1) Water systems without corrosion control treatment shall measure the applicable water quality parameters at the locations specified below during each 6-month monitoring period specified in § 141.86(d)(1), during which the water system exceeds the lead or copper action level, and continue until the water system meets the lead and copper action levels for two consecutive 6-month monitoring periods.

(i) At taps:

(A) pH;

(B) Alkalinity;

(C) Orthophosphate, when an inhibitor containing an orthophosphate compound is used;

(D) Silica, when an inhibitor containing a silicate compound is used;

(ii) At each entry point to the distribution system all of the applicable parameters listed in paragraph (b)(1) of this section.

(2) All large water systems shall measure the applicable water quality parameters as specified in paragraph (b)(1) of this section, at taps and at each entry point to the distribution system during each 6-month monitoring period specified in § 141.86(d)(1). All small and medium-size systems with corrosion control shall measure the applicable water quality parameters at the locations specified below during each 6-month monitoring period specified in § 141.86(d)(1) during which the system exceeds the lead trigger level or copper action level.

(i) At taps:

(A) pH;

(B) Alkalinity;

(C) Orthophosphate, when an inhibitor containing an orthophosphate compound is used;

(D) Silica, when an inhibitor containing a silicate compound is used;

(ii) At each entry point to the distribution system, all of the applicable parameters listed in paragraph (b)(2) of this section.

(c) *Monitoring after installation of optimal corrosion control or re-optimized corrosion control treatment.* (1) Any large water system that re-optimizes corrosion control treatment pursuant to § 141.81(d)(5)(i) and any small or medium-size water system that exceeds the lead or copper action level and re-optimizes corrosion control treatment pursuant to § 141.81(d)(5)(ii) shall measure the water quality parameters at the locations and frequencies specified in paragraph (c)(1)(i) of this section, during each 6-month monitoring period specified in § 141.86(d)(2)(i). Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each 6-month monitoring period specified in § 141.86(d)(2)(i).

(i) At taps, two samples for:

(A) pH;

(B) Alkalinity;

(C) Orthophosphate, when an inhibitor containing an orthophosphate compound is used;

(D) Silica, when an inhibitor containing a silicate compound is used;

(ii) Except as provided in paragraph (c)(3) of this section, at each entry point to the distribution system, at least one sample no less frequently than every two weeks (biweekly) for:

(A) pH;

(B) When alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration; and

(C) When a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate or silica (whichever is applicable).

(iii) Any groundwater system can limit entry point sampling described in paragraph (c)(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 shall provide to the State, written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(2) States have the discretion to require small and medium-size systems that exceed the lead trigger level but not the lead and copper action levels to conduct water quality parameter monitoring as described in paragraph (c)(ii) of this section or the State can develop its own water quality control parameter monitoring structure for these systems.

(d) *Monitoring after State specifies water quality parameter values for optimal corrosion control.* (1) After the State specifies the values for applicable water quality parameters reflecting optimal corrosion control treatment under § 141.87(f), all large systems shall measure the applicable water quality parameters in accordance with paragraph (c) of this section and determine compliance with the requirements of § 141.82(g) every six months with the first 6-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). Any small or medium-size water system that exceeded an action level shall conduct such monitoring until the water system meets the lead and copper action levels and the optimal water quality control parameters in two consecutive 6-month monitoring periods under § 141.86(d)(3)(i) and this paragraph. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to § 141.86(d)(4) at the time of the action level exceedance, the start of the applicable 6-month monitoring period under this paragraph shall coincide with the start of the applicable monitoring period under § 141.86(d)(4). Compliance with State-

designated optimal water quality parameter values shall be determined as specified under § 141.82(g).

(2) Any small or medium-size system that exceeds the lead trigger level, but not the lead and copper action levels for which the State has set optimal water quality control parameters shall monitor according to the structure in paragraph (c)(ii) of this section, until the system no longer exceeds the lead trigger level in three consecutive annual monitoring periods. States have the discretion to continue to require these systems to monitor optimal water quality control parameters.

(e) *Reduced monitoring.* (1) Any large water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under § 141.82(f) and does not exceed the lead trigger level during each of two consecutive 6-month monitoring periods under paragraph (d) of this section shall continue monitoring at the entry point(s) to the distribution system as specified in paragraph (c)(ii) of this section. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each 6-month monitoring period.

TABLE 1 TO PARAGRAPH (e)(1)

System size (number of people served)	Reduced minimum number of sites for water quality parameters
100,000	10
10,001–100,000	7
3,301–10,000	3
501–3,300	2
101–500	1
≤100	1

(2)(i) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under § 141.82(f) and does not exceed the lead trigger level during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in this paragraph (e)(1) of this section, from every six months to annually. This sampling begins during the calendar year immediately following the end of the monitoring period in which the third consecutive year of 6-month monitoring occurs. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under § 141.82(f) and meets the lead trigger level during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in paragraph (e)(1) of this section from annually to every three years. This sampling begins no later than the third calendar year following the end of the monitoring period in which the third consecutive year of monitoring occurs.

(ii) A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in paragraph (e)(1) of this section to every three years 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 specified in § 141.89(a)(1)(ii), that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L in § 141.80(c)(3), and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under § 141.82(f). Monitoring conducted every three years shall be done no later than every third calendar year.

(3) A water system that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.

(4) Any water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the State in § 141.82(f) for more than nine days in any 6-month period specified in § 141.82(g) shall resume distribution system tap water sampling in accordance with the number and frequency requirements in paragraph (d) of this section. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in paragraph (e)(1) of this section after it has completed two subsequent consecutive 6-month rounds of monitoring that meet the criteria of that paragraph and/or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (e)(2)(i) or (e)(2)(ii) of this section.

(f) *Additional monitoring by systems.* The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the water system and the State in making any determinations (*i.e.,* determining concentrations of water quality parameters) under this section or § 141.82.

(g) *Additional sites added from Find-and-Fix.* Any water system that adds water quality parameter sites through the "find-and-fix" provisions pursuant to § 141.82(j) shall add those sites to the minimum number of sites specified under paragraphs (a) through (e) of this section.

■ 12. Amend § 141.88 by:
■ a. Revising paragraphs (a)(1)(i), (b), paragraph (d) introductory text, paragraph (d)(1) introductory text, paragraph (e)(1) introductory and paragraph (e)(1)(i);
■ b. Removing and reserving paragraph (e)(1)(ii);
■ c. Revising paragraph (e)(2); and
■ d. Removing and reserving paragraph (e)(2)(ii).

The revisions read as follows:

§ 141.88 Monitoring requirements for lead and copper in source water.

(a) * * *

(1) * * *

(i) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

* * * * *

(b) *Monitoring frequency after system exceeds tap water action level.* Any system which exceeds the lead or copper action level at the tap for the first time or for the first time after a change in source or source water treatment required under § 141.83(b)(2) shall collect one source water sample from each entry point to the distribution system no later than six months after the end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or if the State has established an alternate monitoring period, the last day of that period. If the State determines that source water treatment is not required under § 141.83(b)(2), the system is not required to conduct additional source water monitoring unless directed by the State. A system subject to discontinued source water monitoring under this paragraph, shall notify the State in writing

pursuant to § 141.90(a)(3) of the addition of a new source.

(1) The State may waive additional source water monitoring under the following conditions:

(i) The water system has already conducted source water monitoring following a previous action level exceedance;

(ii) The State has determined that source water treatment is not required; and

(iii) The system has not added any new water sources.

(2) [Reserved].

* * * * *

(d) *Monitoring frequency after State specifies maximum permissible source water levels.* (1) A system shall monitor at the frequency specified in paragraphs (d)(1) and (2) of this section, in cases where the State specifies maximum permissible source water levels under § 141.83(b)(4).

* * * * *

(e) * * *

(1) A water system using only groundwater may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle (as that term is defined in § 141.2) provided that the samples are collected no later than every ninth calendar year and if the system meets the following criteria:

(i) The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the State in 141.83(b)(4) during at least three consecutive compliance periods under section (d)(1) of this section.

(ii) [Reserved].

(2) A water system using surface water (or a combination of surface water and groundwater) may reduce the monitoring frequency in paragraph (d)(1) of this section to once during each 9-year compliance cycle (as that term is defined in § 141.2 of this chapter) provided that the samples are collected no later than every ninth calendar year and if the system meets the following criteria:

(i) * * *

(ii) [Reserved].

* * * * *

■ 13. Amend § 141.89 by revising paragraph (a) introductory text, paragraph (a)(1) introductory text and paragraph (a)(1)(iii) to read as follows:

§ 141.89 Analytical methods.

(a) Analyses for lead, copper, pH, alkalinity, orthophosphate, and silica shall be conducted in accordance with methods in 141.23(k)(1).

(1) Analyses for alkalinity, orthophosphate, pH, and silica may be performed by any person acceptable to the State. Analyses under this section for lead and copper shall only be conducted by laboratories that have been certified by EPA or the State. To obtain certification to conduct analyses for lead and copper, laboratories must:

* * * * *

(iii) Achieve method detection limit for lead of 0.001 mg/L according to the procedures in Appendix B of part 136 of this title.

* * * * *

■ 14. Revise § 141.90 to read as follows:

§ 141.90 Reporting Requirements.

All water systems shall report all of the following information to the State in accordance with this section.

(a) *Reporting requirements for tap water monitoring for lead and copper and for water quality parameter monitoring except for small systems using the point-of-use compliance flexibility option.* (1) Except as provided in paragraph (a)(1)(viii) of this section, a water system shall report the information specified in paragraphs (a)(1)(i) through (ix) of this section, for all tap water samples specified in § 141.86 and for all water quality parameter samples specified in § 141.87 within the first 10 days following the end of each applicable monitoring period specified in §§ 141.86 and 141.87 (*i.e.*, every six months, annually, every three years, or every nine years). For monitoring periods with a duration less than six months, the end of the monitoring period is the last date samples can be collected during that period as specified in §§ 141.86 and 141.87.

(i) The results of all tap samples for lead and copper including the location of each site and the criteria under § 141.86(a)(3) through (8), and/or (9), under 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) For lead service line systems, documentation of sampling pools with insufficient number of lead service line sites to meet the minimum number of sites criterion in § 141.86(c).

(A) Community water systems shall document why the system was unable to meet the minimum number of sites in § 141.86(c) with sites meeting the criteria under § 141.86(a)(3) or (4) with the inventory developed under § 141.84(a).

(B) Non-transient, non-community water systems shall document why the system was unable to meet the minimum number of sites in § 141.86(c) with sites meeting the criteria under § 141.86(a)(7) with the inventory developed under § 141.84(a).

(iv) The 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period (calculated in accordance with § 141.80(c)(4) or (c)(4)(ii)), unless the State calculates the water system's 90th percentile lead and copper levels under paragraph (h) of this section;

(v) The water system shall 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 pH, and where applicable, alkalinity, orthophosphate, or silica collected under § 141.87(b) through (e);

(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 (e);

(viii) A water system shall report the results of all water quality parameter samples collected under § 141.87(c) through (f) during each 6-month monitoring period specified in § 141.87(d) within the first 10 days following the end of the monitoring period unless the State has specified a more frequent reporting requirement.

(ix) A copy of the tap sampling protocol provided to residents or those sampling, to verify that pre-stagnation flushing, aerator cleaning or removal and the use of narrow-necked collection bottles were not included as recommendations.

(2) For a non-transient non-community water system, or a community water system meeting the criteria of § 141.85(b)(7), that does not have enough taps that can provide first-draw samples, the water system must either:

(i) Provide written documentation to the State identifying standing times and locations for enough non-first-draw samples to make up its sampling pool under § 141.86(b)(5) by the start of the first applicable monitoring period under § 141.86(d) unless the State has waived prior State approval of non-first-draw sample sites selected by the water system pursuant to § 141.86(b)(5); or

(ii) If the State has waived prior approval of non-first-draw sample sites selected by the water system, identify, in writing, each site that did not meet the 6-hour minimum stagnation time and the length of stagnation time for that particular substitute sample

collected pursuant to § 141.86(b)(5) 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.

(3) At a time specified by the State, or if no specific time is designated by the State, then as early as possible prior to the addition of a new source or any long-term change in water treatment, a water system shall submit written documentation to the State describing the change or addition referred to in § 141.86(d)(4). The State must review and approve the addition of a new source or long-term change in treatment before it is implemented by the water system. Examples of long-term treatment changes include the addition of a new treatment process or modification of an existing treatment process. 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). Long-term changes can include dose changes to existing chemicals if the water system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes.

(4) Any small water system 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 first applicable monitoring period in § 141.86(d), any small 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 § 141.86(g)(4)(i), each small water 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 small water system with a monitoring waiver shall provide written notification to the State, setting forth the circumstances resulting in the lead-containing and/or copper-containing materials being introduced into the water system and what corrective action, if any, the water system plans to remove these materials.

(iv) Reserved.

(5) Each groundwater system that limits water quality parameter monitoring to a subset of entry points under § 141.87(c)(3) 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 water system.

(b) *Source water monitoring reporting requirements.* (1) A water system shall report the sampling results for all source water samples collected in accordance with § 141.88 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.

(2) With the exception of the first round of source water sampling conducted pursuant to § 141.88(b), the water system shall specify any site which was not sampled during previous monitoring periods and include an explanation of why the sampling point has changed.

(c) *Corrosion control treatment reporting requirements.* By the applicable dates under § 141.81, water systems shall report the following information:

(1) For water systems demonstrating that they have already optimized corrosion control, information required in § 141.81(b)(2) or (3).

(2) For water systems required to reoptimize corrosion control, their recommendation regarding optimal corrosion control treatment under § 141.82(a).

(3) For water systems required to evaluate the effectiveness of corrosion control treatments under § 141.82(c), the information required by that paragraph.

(4) For water systems required to install optimal corrosion control designated by the State under § 141.82(d), a letter certifying that the water system has completed installing that treatment.

(d) *Source water treatment reporting requirements.* By the applicable dates in § 141.83, water systems shall provide the following information to the State:

(1) If required under § 141.83(b)(1), their recommendation regarding source water treatment;

(2) For water systems required to install source water treatment under § 141.83(b)(2), a letter certifying that the water system has completed installing the treatment designated by the State within 24 months after the State designated the treatment.

(e) *Lead service line inventory and replacement reporting requirements.* Water systems shall report the following information to the State to demonstrate compliance with the requirements of § 141.84:

(1) No later than 12 months after the end of a monitoring period in which a water system exceeds the lead action level in sampling referred to in § 141.84(f), the water system must submit written documentation to the State of the material evaluation conducted as required in § 141.84(a), identify the initial number of lead service lines in its distribution system at the time the water system exceeds the lead action level, and provide the water system's schedule for annually replacing at least 3 percent of the initial number of lead service lines in its distribution system.

(2) No later than 12 months after the end of a monitoring period in which a water system exceeds the lead action level in sampling referred to in § 141.84(f), and every 12 months thereafter, the water system shall certify to the State in writing that the water system has:

(i) Replaced in the previous 12 months at least 3 percent of the initial lead service lines (or a greater number of lines specified by the State under § 141.84(f)(10)) in its distribution system,

(ii) Conducted consumer notification as specified in § 141.84(e).

(iii) Additionally, the water system must certify to the State that it delivered public education materials to the affected consumers as specified in § 141.85(a) and the notification of lead service line materials as specified in § 141.85(e).

(3) The annual letter submitted to the State under paragraph (e)(2) of this section shall contain the following information:

(i) The number of lead service lines scheduled to be replaced during the previous year of the water system's replacement schedule;

(ii) The location of each lead service line replaced, and total number replaced during the previous year of the water system's replacement schedule;

(iii) The certification that the water system has notified the resident(s) served by the lead service line at least 45 days prior to the planned lead service line replacement or within 24 hours of an emergency full or partial replacement;

(iv) The certification that the water system delivered lead service line

information materials in § 141.85(e) to the affected consumers; and

(v) The certification that results of samples collected between three months and six months after the date of a full or partial lead service line replacement were provided to the customer in accordance with the timeframes in 141.85(d)(2). Mailed notices post-marked within three business days of receiving the results shall be considered "on time."

(4) [Reserved].

(5) No later than the compliance date of the rule, the water system must submit to the State an inventory of lead service lines as required in § 141.84(a), and every 12 months thereafter, any water system that has lead service lines must submit to the State an updated inventory that includes the number of lead service lines remaining in the distribution system as required in § 141.84(a).

(i) Any water system that contains a lead service line in their distribution system must submit to the State, as specified in section § 141.84(b) a lead service line replacement plan at the same time the lead service line inventory is submitted.

(ii) Any water system that contains a lead service line in their distribution system or a service line of unknown material must certify to the State annually that it conducted consumer notification as specified in § 141.85(e).

(iii) Any water system that contains a lead service line in their distribution system or a service line of unknown material must certify to the State annually that it delivered lead service line information materials to the affected consumers as specified in § 141.85(e).

(6) No later than 12 months after the end of a monitoring period in which a water system exceeds the lead trigger level but not the lead action level in sampling referred to in § 141.84(e) has replaced lead service lines at the annual goal rate. In addition, every 12 months thereafter, the water system shall certify to the State in writing that the water system has:

(i) Replaced in the previous 12 months, at least enough of the initial lead service lines to meet the annual goal-based rate set by the State under § 141.84(d)(1) in its distribution system;

(ii) Conducted consumer notification as specified in § 141.85(f);

(iii) Additionally, the water system must certify to the State that it delivered the notification of lead service line materials as specified in § 141.85(b); and

(iv) A water system that does not meet its annual service line replacement goal as required under § 141.84(f) shall certify to the State in writing that the water system has conducted customer outreach as specified in § 141.85(g).

(f) *Public education program reporting requirements.* (1) Any water system that is subject to the public education requirements in § 141.85 shall, within 10 days after the end of each period in which the water system is required to perform public education in accordance with § 141.85(b), send written documentation to the State that contains:

(i) A demonstration 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

(ii) A list of all the newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks.

(2) Unless required by the State, a water system that previously has submitted the information required by paragraph (f)(1)(ii) of this section need not resubmit the information required by paragraph (f)(1)(ii) of this section, as long as there have been no changes in the distribution list and the water system certifies that the public education materials were distributed to the same list submitted previously.

(3) No later than three months following the end of the monitoring period, each water system must mail 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 on July 1, a demonstration that the water system delivered annual notification to customers with a lead service line or service line of unknown material in accordance with § 141.85(e).

(5) Annually on July 1, a demonstration that the water conducted an outreach activity in accordance with § 141.85(g) when failing to meet the lead service line replacement goal as specified in § 141.84(f).

(g) *Reporting of additional monitoring data.* Any water system which collects sampling data in addition to that required by this subpart shall 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 "find and fix" pursuant to §§ 141.86(h) and 141.87(g).

(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 monitoring period, as required by paragraph (a)(1)(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 has specified a date before the end of the applicable monitoring period by which the water system must provide the results of lead and copper tap water samples;

(2) The water 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 criteria under § 141.86(a)(3) through (8) and/or (9), under which the site was selected for the water system's sampling pool, pursuant to paragraph (a)(1)(i) of this section; and

(ii) An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation 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 before the end of the monitoring 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 shall 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 it made a good faith effort to identify schools and child care facilities in accordance with § 141.92(a). The good faith effort may include reviewing customer records and requesting lists of schools and child care facilities from the primacy agency or other licensing agency. A water system that certifies that no schools or child care facilities are served by the water system is not required to include information in paragraph (i)(1)(ii) through (i)(1)(iii) of this section in the report.

(ii) Certification that the water system has completed the notification and sampling requirements of §§ 141.86 and 141.92 at a minimum of 20 percent of schools and child care facilities;

(A) The number of schools and child care facilities served by the water system;

(B) The number of schools and child care facilities sampled in the calendar year;

(C) The number of schools and child care facilities that have refused sampling;

(D) Information pertaining to attempts to gain entry for sampling that were declined by the customer; and

(iii) Certification that sampling results were provided to schools, child care facilities, and local or State health departments.

(iv) Certification of compliance with an alternative school and childcare testing program at least as stringent paragraphs (a) through (c) of § 141.92, if applicable.

(j) *Small system compliance flexibility option using point-of-use devices.* Small water systems and non-transient, non-community water systems shall report the results from the tap sampling required under § 141.93 and any corrective actions taken if the trigger level was exceeded in that monitoring. Small water systems shall also provide documentation to certify maintenance of the point-of-use devices if requested by the State.

■ 15. Add § 141.92 to subpart I to read as follows:

§ 141.92 Monitoring for lead in schools and child care facilities.

All community water systems must conduct directed public education to schools and child care facilities served by the water system, including any facilities that are consecutive water systems if those schools or child care facilities were constructed prior to January 1, 2014.

(a) Public Education to schools and child care facilities. (1) By the compliance date for the rule, each water system shall compile a list of schools or licensed child care facilities served by the system. The provisions of this section do not apply to a school or child care facility that is a regulated as a public water system, including consecutive public water systems.

(2) Each water system shall contact schools or licensed child care facilities identified by the system in paragraph (a) of this section to provide:

(i) Information about health risks from lead in drinking water on at least an annual basis;

(ii) Notification that the water system will be conducting sampling for lead at the facility, including information about testing 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), and;

(iii) Instructions for identifying outlets for sampling and preparing for a sampling event 30 days prior to the event.

(3) The water system must include documentation in the proposed reporting requirement in § 141.90(i) if a school or child care facility refuses entry or otherwise declines to participate in the monitoring or education requirements of this section.

(b) Monitoring for lead in schools and child care facilities. (1) A water system shall collect five samples per school and two samples per child care facility at outlets typically used for consumption. The outlets shall not have point-of-use (POU) devices and shall consist of the following locations:

(i) For schools: Two drinking water fountains, one kitchen faucet used for food or drink preparation, one classroom faucet, 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 preparation of food or drink or one classroom faucet.

(iii) If any facility has fewer than the required number of outlets, the water system shall sample all outlets used for consumption.

(iv) If any facility does not contain the type of faucet listed above, the water system shall collect a sample from another outlet typically used for consumption as identified by the facility.

(v) Samples shall be collected from the cold water tap subject to the following additional requirements:

(A) Each sample for lead shall be a first-draw sample;

(B) The sample must be 250 ml in volume;

(C) 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;

(D) Samples may be collected by either the customer, school or child care facility, or the water system, and;

(E) Samples shall be analyzed using acidification and the corresponding analytical methods in § 141.89.

(2) [Reserved].

(c) Frequency of sample collection at schools and child care facilities. (1) A water system shall collect samples from at least 20 percent of schools served by the system and 20 percent of child care facilities served by the system per year until all schools and child care facilities identified under paragraph (a) of this section have been sampled or have declined to participate.

(2) A water system shall continue to collect samples from at least 20 percent of school and child care facilities in its distribution system each year thereafter.

(3) A water system shall conduct monitoring at all schools and child care facilities at least once every five years.

(4) The water system must include documentation in the report required in § 141.90(i) if a school or child care facility refuses entry or otherwise declines to allow the system to conduct the monitoring or education requirements of this section.

(d) Alternative School Sampling Programs. (1) If Local or State law or regulations require schools and childcare facilities to be tested, by either the school or the water system, in a way that is at least as stringent as paragraphs (a) through (c) of this section, the water system may execute that program to comply with the requirements of this section.

(2) The water system must include documentation in the report required in § 141.90(i) if a school or child care facility refuses entry or otherwise declines to allow the system to conduct the monitoring or education requirements of this section.

(e) Confirmation or revision of schools and child care facilities in inventory. A water system shall either confirm that there have been no changes to its list of schools and child care facilities served by the system developed pursuant to § 141.92(a), or submit a revised list at least once every five years.

(f) Notification of Results. A water system shall provide analytical results as soon as practicable but no late than 30 days after receipt of the results to:

(1) The school or child care facility, along with information about remedial options;

(2) the local or State health department; and

(3) the primacy agency.

■ 16. Add § 141.93 to subpart I to read as follows:

§ 141.93 Small Water System Compliance Flexibility

The compliance alternatives described in this section apply to small community water systems serving 10,000 or fewer persons or non-transient non-community water systems.

(a) A small community water system that exceeds the lead trigger level but meets the lead and copper action levels must evaluate compliance options in paragraphs (a)(1) through (3) of this section and make a compliance option

recommendation to the State within six months of the end of the monitoring period in which the exceedance occurred. A State must approve the recommendation or designate an alternative from compliance options in paragraphs (a)(1) through (3) of this section within six months of the recommendation by the water system. If the water system subsequently exceeds the lead action level it must implement the approved option. Community water systems must select from the following compliance options:

(1) *Lead Service Line Replacement.* A water system shall implement a full lead service line replacement program and replace its lead service lines on a schedule approved by the State and shall complete replacement of all lead service lines within 15 years, even if its 90th percentile is below the action level in future monitoring periods.

(2) *Corrosion Control Treatment.* A water system must install and maintain corrosion control treatment in accordance with § 141.82, even if its 90th percentile is below the action level in future monitoring periods. Any water system that has corrosion control treatment installed must re-optimize as per § 141.82(d).

(3) *Point-of-Use Devices.* A water system must install, maintain, and monitor POU devices in each household or building, even if its 90th percentile is below the action level in future monitoring periods.

(i) A community water system must install a minimum of one POU device (at one tap) in every household or building in its distribution system.

(ii) The POU device must be certified by the American National Standards Institute to reduce lead in drinking water, and

(iii) The POU device must be maintained by the water system to ensure continued effective filtration, including but not limited to changing filter cartridges and resolving any operational issues.

(iv) The community water system must monitor one-third of the POU devices each year and all POU devices must be monitored within a three-year cycle. First-draw tap samples collected under this section must be taken after water passes through the POU device to assess its performance. Samples should be one-liter in volume and have had a minimum 6-hour stagnation time. All samples must be at or below the lead trigger level. The system must document the problem and take corrective action at any site where the sample result exceeds the lead trigger level.

(b) A non-transient non-community water system that exceeds the lead trigger level but meets the lead and copper action levels must evaluate compliance options in paragraphs (b)(1) through (4) of this section and make a compliance option recommendation to the State within six months of the end of the monitoring period in which the exceedance occurred. A State must approve the recommendation or designate an alternative from compliance options in paragraphs (b)(1) through (4) of this section within six months of the recommendation by the water system. If the water system subsequently exceeds the lead action level it must implement the approved option. Non-transient non-community water system must select from the following compliance options:

(1) *Lead Service Line Replacement.* A water system shall implement a full lead service line replacement program and replace its lead service lines on a schedule approved by the State and shall complete replacement of all lead service lines within 15 years, even if its 90th percentile is at or below the action level in future monitoring periods.

(2) *Corrosion Control Treatment.* A water system must install and maintain corrosion control treatment in accordance with § 141.82, even if its 90th percentile is below the action level in future monitoring periods. Any water system that has corrosion control treatment installed must re-optimize as per § 141.82(e).

(3) *Point-of-Use Devices.* A water system must install, maintain, and monitor POU devices in each household or building, even if its 90th percentile is at or below the action level in future monitoring periods.

(i) A non-transient non-community water system must provide a POU device to every tap that is used for cooking and/or drinking.

(ii) The POU device must be certified by the American National Standards Institute to reduce lead in drinking water and:

(iii) The POU device must be maintained by the water system to ensure continued effective filtration, including but not limited to changing filter cartridges and resolving any operational issues.

(iv) The non-transient non-community water system must monitor one-third of the POU devices each year and all POU devices must be monitored within a three-year cycle. First-draw tap samples collected under this section must be taken after water passes through the POU device to assess its performance. Samples should be one-liter in volume and have had a minimum 6-hour stagnation time. All samples must be at or below the lead trigger level. The system must document the problem and take corrective action at any site where the sample result exceeds the lead trigger level.

(4) *Replacement of Lead-Bearing Plumbing.* A water system must replace all plumbing that is not lead free in accordance with 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, including a lead service line, even if its 90th percentile is below the action level in future monitoring periods. A water system must have control over all plumbing in its buildings. The replacement of all lead-bearing plumbing must occur on a schedule established by the State, not to exceed one year.

(c) A small community water system that exceeds the lead action level but meets the copper action level must evaluate according to paragraphs (c)(1) through (3) of this section and make a compliance option recommendation to the State within six months of the end of the monitoring period in which the exceedance occurred. A State must approve the recommendation or designate an alternative from compliance options in paragraphs (c)(1) through (3) of this section within six months of the recommendation by the water system. If the water system subsequently exceeds the lead action level it must implement the approved option. Community water systems must select from the following compliance options:

(1) *Lead Service Line Replacement.* A water system shall implement full lead service line replacement program and replace its lead service lines on a schedule approved by the State and shall complete replacement of all lead service lines within 15 years, even if its 90th percentile is below the action level in future monitoring periods.

(2) *Corrosion Control Treatment.* A water system must install and maintain corrosion control treatment in accordance with § 141.82, even if its 90th percentile is below the action level in future monitoring periods.

(3) *Point-of-Use Devices.* A water system must install, maintain, and monitor POU devices in each household or building, even if its 90th percentile is below the action level in future monitoring periods.

(i) A community water system must install a minimum of one POU device (at one tap) in every household or building in its distribution system.

(ii) The POU device must be certified by the American National Standards

Institute to reduce lead in drinking water, and

(iii) The POU device must be maintained by the water system to ensure continued effective filtration, including but not limited to changing filter cartridges and resolving any operational issues.

(iv) The community water system must monitor one-third of the POU devices each year and all POU devices must be monitored within a three-year cycle. First-draw tap samples collected under this section must be taken after water passes through the POU device to assess its performance. Samples should be one-liter in volume and have had a minimum 6-hour stagnation time. All samples must be at or below the lead trigger level. The system must document the problem and take corrective action at any site where the sample result exceeds the lead trigger level.

(d) A non-transient non-community water system that exceeds the lead action level but does not exceed the copper action level must evaluate (1) through (4) of this section and make a compliance recommendation to the State from compliance options in paragraphs (d)(1) through (4) of this section within six months of the end of the monitoring period in which the exceedance occurred. A State must approve the recommendation or designate an alternative within six months of the recommendation by the water system. If the water system subsequently exceeds the lead action level it must implement the approved option. Non-transient non-community water systems must select from the following compliance options:

(1) *Lead Service Line Replacement.* A water system shall implement full lead service line replacement program and replace its lead service lines on a schedule approved by the State and shall complete replacement of all lead service lines within 15 years, even if its 90th percentile is at or below the action level in future monitoring periods.

(2) *Corrosion Control Treatment.* A water system must install and maintain corrosion control treatment in accordance with § 141.82, even if its 90th percentile is at or below the action level in future monitoring periods. Any water system that has corrosion control treatment installed must re-optimize as per § 141.82(e).

(3) *Point-of-Use Devices.* A water system must install, maintain, and monitor POU devices in each household or building, even if its 90th percentile is at or below the action level in future monitoring periods.

(i) A non-transient non-community water system must provide a POU device to every tap that is used for cooking and/or drinking.

(ii) The POU device must be certified by the American National Standards Institute to reduce lead in drinking water and:

(iii) The POU device must be maintained by the water system to ensure continued effective filtration, including but not limited to changing filter cartridges and resolving any operational issues.

(iv) The non-transient non-community water system must monitor one-third of the POU devices each year and all POU devices must be monitored within a three-year cycle. First-draw tap samples collected under this section must be taken after water passes through the POU device to assess its performance. Samples should be one-liter in volume and have had a minimum 6-hour stagnation time. All samples must be below the lead trigger level. The system must document the problem and take corrective action at any site where the sample result exceeds the lead trigger level.

(4) *Replacement of Lead-Bearing Plumbing.* A water system must replace all plumbing that is not lead free in accordance with 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, including a lead service line, even if its 90th percentile is below the action level in future monitoring periods. A water system must have control over all plumbing in its buildings. The replacement of all lead-bearing plumbing must occur on a schedule established by the State, not to exceed one year.

■ 17. Amend § 141.153 by revising paragraph (d)(4)(vi) to read as follows:

§ 141.153 Content of the reports

* * * * *

(d) * * *

(4) * * *

(vi) For lead and copper: The 90th percentile concentration of the most recent round of sampling, the number of sampling sites exceeding the action level, and the range of tap sampling results;

* * * * *

■ 18. Amend § 141.154 to revise 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 following information:

If present, 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, but cannot control the variety of materials used in plumbing components. 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, 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 to remove lead from drinking water. If you are concerned about lead in your water you may 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 *http://www.epa.gov/safewater/lead.*

* * * * *

■ 19. Amend Appendix A to Subpart O of Part 141 by revising the entry for lead to read as follows:

APPENDIX A TO SUBPART O OF PART 141—REGULATED CONTAMINANTS

Contaminant	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
*	*	*	*	*	*	*
Lead	AL = .015	1000	AL = 15	0	Corrosion of household plumbing systems, Erosion of natural deposits.	*Exposure to lead can cause serious health effects in all age groups. Infants and children who drink water containing lead could have decreases in IQ and attention span and increases in learning and behavior problems. Lead exposure among women who are pregnant increases prenatal risks. Lead exposure among women who later become pregnant has similar risks if lead stored in the mother's bones is released during pregnancy. Recent science suggests that adults who drink water containing lead have increased risks of heart disease, high blood pressure, kidney or nervous system problems.*
*	*	*	*	*	*	*

■ 20. Amend § 141.201 by:
■ a. Adding entry (a)(3)(vi) in Table 1 to § 141.201; and
■ b. Revising paragraph (c)(3).

The additions read as follows.

§ 141.201 General public notification requirements.

* * * * *

(a) * * *

TABLE 1 TO § 141.201—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A PUBLIC NOTICE

(3) Special public notices:
* * * * * * *
(vi) Exceedance of the lead action level.

* * * * *

(c) * * *

(3) A copy of the notice must also be sent to the primacy agency and the Administrator (as applicable) in accordance with the requirements of § 141.31(d).

■ 21. In § 141.202 amend paragraph (a) by adding entry (10) in Table 1 to § 141.202, to read as follows:

§ 141.202 Tier 1 Public Notice—Form, manner and frequency of notice.

(a) * * *

TABLE 1 TO § 141.202—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A TIER 1 PUBLIC NOTICE

* * * * * * *
(10) Exceedance of the Action Level for lead as specified in § 141.80(c).

* * * * *

■ 22. Amend Appendix A to subpart Q by adding an entry for Violations of National Primary Drinking Water Regulations (NPDWR) under "C. Lead and Copper Rule" 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 0.015 mg/L, for copper is 1.3 mg/L)				
* * * * * * *				
2. Exceedance of the Action Level for lead	1	141.80(c)		

APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]—Continued

Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
* * *	*	*	*	*

[1] Violations and other situations not listed in the table (*e.g.*, failure to prepare Consumer Confidence Reports), do not require notice unless determined by the primacy agency. Primacy agencies may, at their options, 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.

* * * * *

■ 23. Amend Appendix B to subpart Q by revising the entry for contaminant "23. Lead" 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
*	*	*	* * * *
D. Lead and Copper Rule			
23. Lead	zero	TT [13]	Exposure to lead can cause serious health effects in all age groups. Infants and children who drink water containing lead could have decreases in IQ and attention span and increases in learning and behavior problems. Lead exposure among women who are pregnant increases prenatal risks. Lead exposure among women who later become pregnant has similar risks if lead stored in the mother's bones is released during pregnancy. Recent science suggests that adults who drink water containing lead have increased risks of heart disease, high blood pressure, kidney and nervous system problems.
*	*	*	* * * *

[1] MCLG—Maximum contaminant level goal.
[2] MCL—Maximum contaminant level.
* * * * * * *
[13] Action Level = 0.015 mg/L.

* * * * *

PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION

■ 24. 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.

■ 25. Amend § 142.14 by revising paragraphs (d)(8)(iii) and (d)(8)(vii) and adding paragraphs (d)(8)(xviii) through (xx) to read as follows:

§ 142.14 Records kept by States.

* * * * *

(d) * * *

(8) * * *

(iii) Section 141.82(d)—designations of optimal corrosion control treatment and any simultaneous compliance considerations that factored into the designation;

* * * * *

(viii) Section 141.84(e)—determinations of lead service line replacement goal rate as well as mandatory full lead service line service line replacement rates below 3 percent;

* * * * *

(xviii) Section 141.88—evaluation of water system source water or treatment changes;

(xix) Section 141.93—identification of small 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;

(xx) Section 141.84(a)—completed lead service line inventories and annual updates to inventories.

* * * * *

■ 26. Amend § 142.15 by:

■ a. Revising paragraphs (b)(4)(i), (b)(4)(i)(A), (b)(4)(ii), and (b)(4)(ii)(A) through (E) to read as follows; and removing paragraph (b)(4)(iii).

§ 142.15 Reports by States.

* * * * *

(b) * * *

(4) * * *

(i) States shall report the name and PWS identification number:

(A) Each public water system which exceeded the lead and copper action levels and the date upon which the exceedance occurred;

* * * * *

(ii) States shall report the PWS identification number of each public water system identified in paragraphs (c)(4)(iii)(A) through (F) of this section.

(A) For each public water system, regardless of size, all 90th percentile lead levels calculated during each monitoring period specified in § 141.86 of this chapter, and the first and last day of the monitoring period for which the 90th percentile lead level was calculated;

(B) For each public water system (regardless of size), the 90th percentile copper level calculated during each monitoring period in which the system exceeds the copper action level, and the first and last day of each monitoring period in which an exceedance occurred;

(C) For each public water system for which the State has designated optimal water quality parameters under § 141.82(f) of this chapter, or which the State has deemed to have optimized corrosion control under § 141.81(b)(1) or (b)(3) of this chapter, the date of the determination and the paragraph(s) under which the State made its determination, the corrosion control treatment status of the water system, and the water system's optimal water quality parameters;

(D) For each public water system, the number of lead service lines in its distribution system, including service lines of unknown material;

(E) For each public water system required to begin replacing lead service lines after a lead trigger level or action level exceedance, as specified in § 141.84 of this chapter and the date each system must begin replacement; and

* * * * *

■ 27. Amend § 142.16 by:

■ a. Adding paragraphs (d)(5) through (9); and

■ b. Revising paragraph (o)(2)(i)(B).

The additions and revision to read as follows:

§ 142.16 Special primacy requirements.

* * * * *

(d) * * *

(5) Section 141.84—Establishing lead service line replacement goal rates.

(6) Section 141.84—Designating acceptable methods for determining service line material for the lead service line inventory.

(7) Section 141.92—Defining a school or childcare facility and determining any existing State testing program is at least as stringent as the Federal requirements.

(8) Section 141.82—Verifying compliance with "find-and-fix" requirements.

(9) Section 141.88—Reviewing any change in source water or treatment and how this change may impact other National Primary Drinking Water Regulations.

* * * * *

(o)(2)(i)(B) Treatment, including corrosion control treatment and water quality parameters as applicable,

* * * * *

■ 28. Amend § 142.19 redesignating paragraphs (b) through (f) as paragraphs (c) through (g) and adding a new paragraph (b) to read as follows:

§ 142.19 EPA review of State implementation of national primary drinking water regulations for lead and copper.

* * * * *

(b) Pursuant to the procedures in this section, the Regional Administrator may review state determinations establishing a goal lead service line replacement rate and may issue an order establishing federal goal rate requirements for a public water system pursuant to § 141.84(b) where the Regional Administrator finds that an alternative goal lead service line replacement rate is feasible.

* * * * *

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