



Department of Public Health Lead & Copper Rule Compliance Requirements Part 1

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Lead & Copper Rule

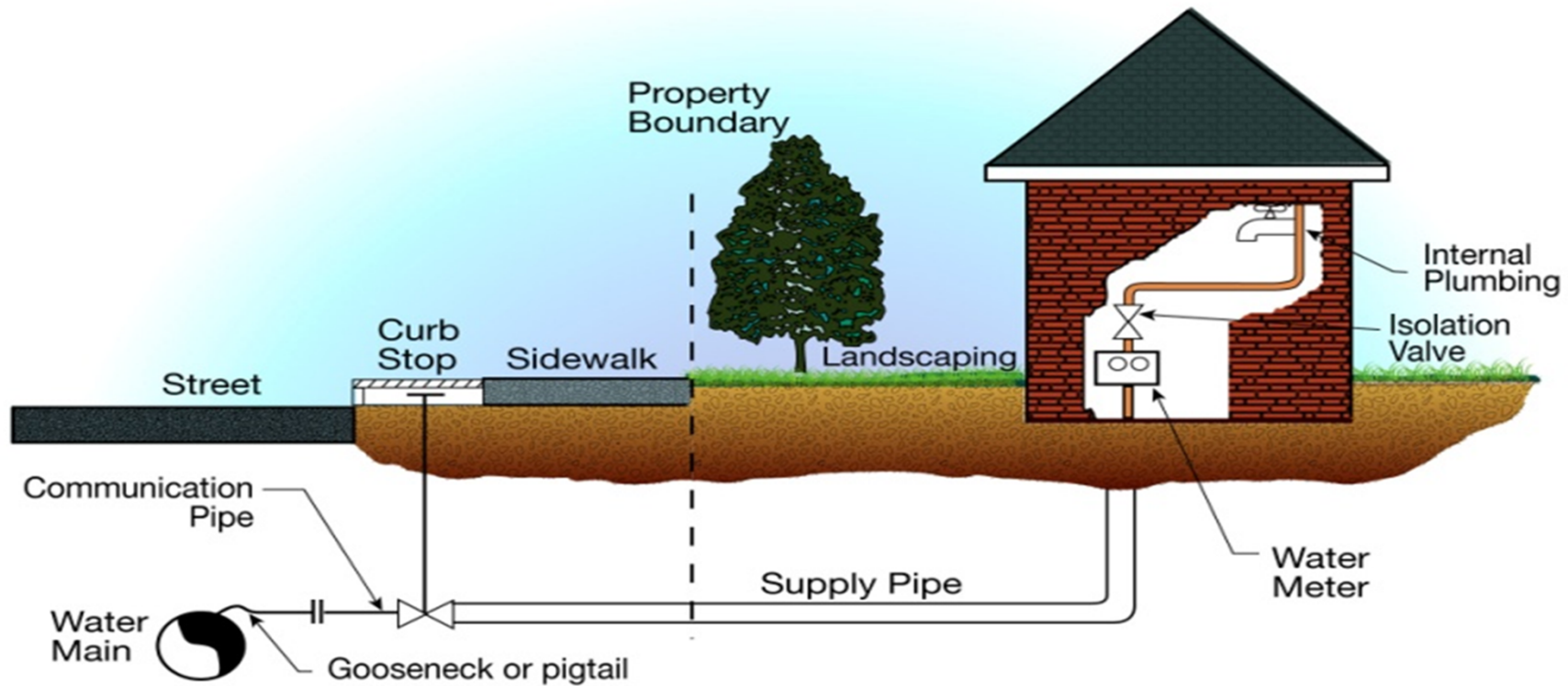
- **Purpose**: Protect Public Health by minimizing lead and copper levels in drinking water, primarily by reducing water corrosivity.
- **Compliance**: Action level for lead (0.015 mg/L) and copper (1.3 mg/L) based on 90th percentile of tap water samples.
- **Applicability**: All community and non-transient, non-community public water systems.
 - 1,150 Community and NTNC systems required to test under the Lead and Copper Rule
 - 170 non-transient non-community systems - schools
- **Benefits**: Reduction in risk of exposure to lead that can cause damage to the brain, red blood cells and kidneys. Reduction in risk of exposure to copper that can cause stomach and intestinal distress, liver or kidney damage, and complications of Wilson's disease.



Lead & Copper Rule Topics

- Sources of Lead
- LCR Sampling Requirements & Procedures
- LCR Monitoring Schedule Requirements
- Lead & Copper Tier Sites
- Sample Site Plans
- Submission of Results
- Maximum Contaminant Level Goals
- Action Levels
- Calculating 90th Percentiles
- Action Level Exceedance Requirements
- Lead Public Education & Lead Consumer Notice
- Copper Public Notification

Sources of Lead and Copper



Typical Water Service Connection that May Provide Sources of Lead (Sandvig et al., 2008)

Sources of Lead

- Lead is a common metal found in the environment.
- The main sources of lead exposure are lead-based paint and lead-contaminated dust or soil, and some plumbing materials.
- In addition, lead can be found in certain types of pottery, pewter, brass fixtures, food, and cosmetics.
- Other sources include exposure in the work place and exposure from certain hobbies (lead can be carried on clothing or shoes).
- Lead can also be found in some toys, some playground equipment, and some children's metal jewelry.

Sources of Lead

- Drinking water is also a possible source of lead exposure. Most sources of drinking water have no lead or very low levels of lead.
- Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing.
- These materials include lead-based solder used to join copper pipe, brass and chrome plated brass faucets, and in some cases, pipes made of lead that connect your house to the water main (service lines).
- In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%. Homes built before 1988 are more likely to have lead pipes or lead solder.

Sources of Lead

- When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into the drinking water.
 - This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead.
- EPA estimates that 10 to 20 percent of a person's potential exposure to lead may come from drinking water.
- Infants who consume mostly formula mixed with lead-containing water can receive 40 to 60 percent of their exposure to lead from drinking water.



Reduction of Lead in Drinking Water Act of 2011

- Plumbing materials meeting the lead-free definition of less than or equal to 8.0% were still found to contribute to lead levels measured at the tap
- Effective January 2014
 - Further reduced lead in pipes, pipe fittings, plumbing fittings, and fixtures to a weighted average of 0.25 %.
 - Redefine “*lead free*” to mean
 - not containing more than 0.2% lead when used with respect to lead solder and flux, and
 - to lower the maximum lead content of the wetted surfaces of plumbing products such as pipes, pipe fittings, plumbing fittings and fixtures from 8.0% to a weighted average of 0.25%



LCR Sampling Requirements

- Number of sample sites is based on the system's population.
- Samples must be first draw, 1 liter in volume, at cold water taps, and have stood motionless in the plumbing at each sampling site for at least six hours in homes/buildings that are at most risk based on a Tier criteria.
 - Systems unable to collect first draw samples based on operational restraints (i.e. continuous operation) may substitute non-first draw samples provided notification is made to the DWS in writing.

LCR Sampling Requirements

- Samples from residences must be collected from cold water kitchen or bathroom taps
- Samples from non-residential areas must be collected from interior taps from which water is typically drawn for human consumption
- Samples should not be collected from outside taps, vacant units, or sites that are not used for human consumption on a regular basis
 - Motion activated sinks should be avoided



LCR Sampling Requirements

- A water system shall collect each first-draw tap sample from the same sampling site from which it collected a previous sample. If the water system cannot gain entry to a sampling site in order to collect a sample, the system may collect from another site in its sampling pool as long it meets same targeting criteria (Tier Level)



LCR Sampling Procedures

- Sample Collectors/Customers should be given detailed instructions on the proper sample procedures prior to the LCR sample collection
- Sample locations should be clearly identified in the chain of custody and when reporting results
- PWS should always use sample bottles that are 1 liter in volume for compliance purposes



New LCR Sampling EPA Recommendations

- 💧 EPA Clarification on Sample Collection
 - 💧 No Preflushing
 - 💧 First draw with minimum 6 hour stagnation
 - 💧 Aerator stays on faucet
 - 💧 Homeowners should regularly clean their aerators to remove particulate matter
 - 💧 Cleaning of aerators should not be performed prior to lead and copper sample collection
 - 💧 Wide-mouth bottle
 - 💧 Allow for a higher rate of flow that is typical when filling a glass of water for consumption

Lead Service Line Sampling

- Each lead service line sample shall be one (1) liter in volume and have stood motionless for at least six (6) hours.
- Lead service line samples shall be collected in one (1) of the following three (3) ways:
 - At the tap after flushing the volume of water between the tap and the lead service line (the volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line, or
 - Tapping directly into the lead service line, or
 - If the sampling site is a building constructed as a single-family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.

LCR Monitoring Requirements

System Size (# of People Served)	# of Sites (Standard Monitoring)	# of Sites (Reduced Monitoring)
Greater than 100,000	100	50
10,001 – 100,000	60	30
3,301 – 10,000	40	20
501 – 3,300	20	10
101 – 500	10	5
≤ to 100	5	5



LCR Monitoring Requirements

- Standard monitoring is conducted on a 6 month frequency.
- Systems are eligible for reduced monitoring to an annual frequency if the system meets both action levels during two consecutive 6 month monitoring periods.
- Systems are eligible for reduced monitoring to a triennial frequency if the system meets both action levels during three consecutive annual monitoring periods.
 - Those systems on reduced monitoring must collect all samples during the months of June, July, August or September.



Minimum Number of Samples Required

- 5 samples per monitoring period is the minimum number of samples required for systems serving 100 people or fewer.
- However, certain qualifying systems may be allowed to collect fewer than 5 samples within a monitoring period.
- When less than 5 samples are collected, the sample with the highest result would be the sample in which Action Level compliance would be determined.
 - Qualifying systems would be those with fewer than 5 taps for human consumption, and have been granted permission in writing from the State.

Lead and Copper Tier Sites

- Each CWS and NTNC shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites on their sampling plan
- PWS must identify all lead service lines & lead plumbing materials. **All CWS and NTNCS must revise their sampling site plan to identify as many Tier 1 sample sites as possible.**
- If there is an insufficient number of Tier 1 sites available, then the PWS must collect from as many Tier 2 sites as possible.
- If there is an insufficient number of Tier 2 sites available, then the PWS must collect from as many Tier 3 sites as possible.



Lead and Copper Tier Sites

- The lead and copper sampling pool should be sufficiently large to ensure that the PWS can collect the number of lead and copper tap water samples required for compliance.
- Each CWS or NTNC PWS shall complete a materials evaluation of the distribution system in order to identify a pool of targeted sampling sites.
- The sampling pool should be **reevaluated and updated** to include the Tier Level and Tier Type for each location



LCR Sampling Site Plan

- Sampling sites shall **not** include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants.
- Sampling sites should **not** include faucets that are not regularly used for consumption. (slop sinks, outside faucets, etc.)
- For an explanation of the different tiers, please review the following document: "Lead and Copper Monitoring and Reporting Guidance for Public Water Systems"

<http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100DP2P.txt>

Lead & Copper Rule Tier Types

Tier Level	Tier Type	Community Water Systems
Tier 1	Cu>82S	Single family structure that contains copper pipes with lead solder installed after 1982 and before 1987.
Tier 1	PbPS	Single family structure containing lead pipes.
Tier 1	LSLS	Single family structure served by a lead service line.
Tier 2	Cu>82M	Multiple family structure that contains copper pipes with lead solder installed after 1982 and before 1987.
Tier 2	PbPM	Multiple family structure containing lead pipes.
Tier 2	LSLM	Multiple family structure served by a lead service line.
Tier 3	Cu<83S	Single family structure that contains copper pipes with lead solder installed before 1983.
Non-Tier	NonTS	Single family structure, non-tier.
Non-Tier	NonTM	Multiple family structure, non-tier.

Lead & Copper Rule Tier Types

Tier Level	Tier Type	NTNC Water Systems
Tier 1	Cu>82B	Non-residential structure that contains copper pipes with lead solder installed after 1982 and before 1987.
Tier 1	PbPB	Non-residential structure containing lead pipes.
Tier 1	LSLB	Non-residential structure served by a lead service line.
Non-Tier	Cu<83B	Non-residential structure that contains copper pipes with lead solder installed before 1983.
Non-Tier	NonTB	Non-residential structure, non-tier.



Submission of Results

- Lead and Copper samples results must be submitted by the 9th of the month following the end of the monitoring period (January 9th, July 9th or October 9th).
- All lead and copper results that meet the tiering criteria must be submitted as compliance samples
 - Include customer requested sample results
- Results must be submitted with the sample location identified using the Sample Point ID in the sampling plan
 - Do not use Sample Point ID "4"



Submission of Results

- Water quality analytical results must be reported to the DWS via Electronic Data Interchange (EDI). Additional information regarding the EDI program and a list of laboratories providing EDI services are available on the DWS website at:

<http://www.ct.gov/dph/cwp/view.asp?a=3139&q=387308>

- All water quality results are to be sent for processing to:

drinking.water@ct.gov



LCR Maximum Contaminant Level Goals

- EPA established Maximum Contaminant Level Goals (MCLG) for Lead and Copper.
 - Lead MCLG = 0 mg/l
 - Copper MCLG = 1.3 mg/l
- The MCLG means the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety.
- MCLGs are non-enforceable health goals.

LCR Action Levels

- EPA established Action Levels (AL) for Lead and Copper based on the 90th percentile of samples collected.
 - Lead Action Level = 0.015 mg/l
 - Copper Action Level = 1.3 mg/l
- The lead or copper action level is exceeded if the concentration in more than 10 percent of water samples collected after a minimum stagnation period of 6 hours is greater than the respective action level.

Calculating 90th Percentiles

- How do you calculate the 90th percentile result?
 - For systems collecting more than 5 samples;
 - Place Lead or Copper results in ascending order.
 - Assign each sample a number, 1 for the lowest value and rank.
 - Multiply the total number of samples collected by 0.9
 - Example: 20 samples X 0.9 = 18
 - Therefore, the 18th highest ranked result is the 90th percentile sample to be compared to the Action Level.



Calculate the Lead 90th Percentile 10 samples collected

Site 1: 0.005 mg/L
Site 2: 0.015 mg/L
Site 3: 0.005 mg/L
Site 4: 0.014 mg/L
Site 5: 0.017 mg/L
Site 6: 0.005 mg/L
Site 7: 0.011 mg/L
Site 8: 0.002 mg/L
Site 9: 0.018 mg/L
Site 10: 0.004 mg/L

What is the 90th percentile value?

Calculate the Lead 90th Percentile 10 samples collected

Order and Rank Lead results from lowest to highest:

- Rank 1 – Site 8 – 0.002 mg/L
- Rank 2 – Site 10 – 0.004 mg/L
- Rank 3 – Site 6 – 0.005 mg/L
- Rank 4 – Site 3 – 0.005 mg/L
- Rank 5 – Site 1 – 0.005 mg/L
- Rank 6 – Site 7 – 0.011 mg/L
- Rank 7 – Site 4 – 0.014 mg/L
- Rank 8 – Site 2 – 0.015 mg/L
- Rank 9 – Site 5 – 0.017 mg/L**
- Rank 10 – Site 9 – 0.018 mg/L

Multiply the number of samples by 0.9:

$0.9 \times 10 \text{ samples} = 9$ Therefore, the 9th highest ranked sample is the 90th percentile result to compare to the Action Level.

Lead 90th Percentile = 0.017 mg/L
(Action Level is 0.015 mg/L)



Calculating 90th Percentiles

- Calculating 90th percentile result for system that collected 5 samples:
 - Rank results in ascending order and assign a number to each with 1 being the lowest rank.
 - Calculate the average of the 4th highest and 5th highest ranked results.
 - The result of which is then compared to the Action Level.

Calculating 90th Percentiles

Calculate the Lead 90th Percentile
5 samples collected

Order and Rank lead results from lowest to highest:

Rank 1 – 0.001 mg/L

Rank 2 – 0.003 mg/L

Rank 3 – 0.005 mg/L

Rank 4 – 0.012 mg/L

Rank 5 – 0.026 mg/L

Multiply the number of samples by 0.9 :

0.9 X 5 samples = 4.5. Therefore, calculate the average of the 4th (0.012) and 5th (0.026) highest ranked result to get the 90th percentile result to compare to the Action Level.

$$\frac{0.012 \text{ mg/L} + 0.026 \text{ mg/L}}{2} = 0.019 \text{ mg/L}$$

Lead 90th percentile = 0.019 mg/l (Action Level is 0.015 mg/l)



90th percentile Interpolation Calculation

Calculate the Copper 90th Percentile
7 samples collected

- Calculating 90th percentile result for system that collected 7 samples:
 - Rank results in ascending order and assign a number to each with 1 being the lowest rank.
 - Interpolate to get the 90th percentile level. The result of which is then compared to the Copper Action Level.

90th percentile Interpolation Calculation

Calculate the Copper 90th percentile
7 samples collected

Interpolate: $0.9 \times 7 \text{ samples} = 6.3$.

Therefore, interpolate to get the 90th percentile result to compare to the Action Level.

- Rank 1 – Result = 1.17 mg/l
- Rank 2 – Result = 1.19 mg/l
- Rank 3 – Result = 1.34 mg/l
- Rank 4 – Result = 1.51 mg/l
- Rank 5 – Result = 1.57 mg/l
- Rank 6 – Result = 1.73 mg/l
- Rank 7 – Result = 1.95 mg/l



90th percentile Interpolation Calculation

Calculate the Copper 90th percentile
7 samples (90th %) = 6.3 ranked sample

First, subtract the difference between the 6th (1.73) & 7th (1.95) ranks.

$$1.95 - 1.73 = 0.22$$

Second, multiply the answer by 0.3 since the 90th percentile is 0.3 higher than the 6th ranked result in this case.

$$0.22 \times 0.3 = 0.066$$

Next, add 0.066 to the 6th ranked result (1.73).

$$1.73 + 0.066 = 1.8 \text{ mg/l}$$

Copper 90th percentile = 1.8 mg/l (Action Level is 1.3 mg/l)



Lead Consumer Notice

- Requirement to provide a lead consumer notice of tap water monitoring results to consumers who occupy homes or buildings that are tested for Lead.
 - Systems must provide written notification to household occupants within 30 days after PWS learns of the results collected at those locations, and post or otherwise notify occupants of non-residential buildings of the results of lead testing.
 - DPH requests that locations with high lead results receive the lead consumer notice within 48 hours of being notified of the result



Lead Consumer Notice

- Each sample location that tested for lead must receive a copy of the lead consumer notice that lists the lead test results for that location
- The Lead Consumer Notice must also include:
 - an explanation of the lead health effects,
 - steps consumers can take to reduce exposure,
 - utility contact info, and
 - the Lead Action Level.

Consumer Notice of Lead Tap Water Results

Public Water System: _____

PWS ID: _____

We are responsible for providing water at this location and ensuring that the drinking water we provide to you meets state and federal standards. This notice is to inform you of the lead tap monitoring results for the drinking water samples collected at the locations identified below:

Drinking Water Sample Results for Lead		
Location	Date	Lead Result (mg/L)

What Does This Mean?

Under the authority of the Safe Drinking Water Act, EPA set the action level for lead in drinking water at 0.015 milligrams of lead per liter of water (mg/L). This means utilities must ensure that water from the customer's tap does not exceed this level in at least 90 percent of the sites sampled. The action level is the concentration of the contaminant, which if exceeded, triggers treatment or other requirements which a water system must follow to correct the problem. Because lead may pose serious health risks, the EPA set a Maximum Contaminant Level Goal (MCLG) of zero for lead. The MCLG is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

What Are The Health Effects of Lead?

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

What Are Some Sources of Lead?

Although the primary sources of lead exposure for most children are deteriorating lead-based paint, lead-contaminated dust, and lead-contaminated soil, the U.S. EPA estimates that 10 to 20 percent of human exposure to lead may come from drinking water. Exposure to lead is a significant health concern, especially for young children and infants whose growing bodies tend to absorb more lead than the average adult. Although our facility's lead levels were below the action level, if you are concerned about lead exposure in your home, parents should ask their health care providers about testing children to determine levels of lead in their blood.

What Can I Do To Reduce Exposure to Lead in Drinking Water?

- *Run the Water To Flush Out Lead.* Run water for 15-30 seconds or until it becomes cold or reaches a steady temperature before using it for drinking or cooking. This flushes lead-containing water from the pipes.
- *Use Cold Water for Cooking and Preparing Baby Formula.* Do not cook with or drink water from the hot water tap; lead dissolves more easily in hot water. Do not use water from the hot water tap to make baby formula.
- *Do not boil water to remove lead.* Boiling water will not reduce lead.
- *Look for alternative sources of water.*

For More Information

Call us at _____ . For more information on reducing lead exposure around your home and the health effects of lead, visit EPA's Web site at www.epa.gov/lead, call the National Lead Information Center at 800-424-LEAD, or contact your health care provider.



Department of Public Health Lead & Copper Rule Compliance Requirements Part 2

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DPH - Drinking Water Section

November 21, 2016

Action Level Exceedances

Action Level Exceedance Requirements:

An action level exceedance is not a violation but triggers other requirements to minimize exposure to lead and copper in drinking water.

- An exceedance of the lead or copper action level triggers these additional requirements:
 - Water Quality Parameter (WQP) Monitoring
 - Source Water Lead & Copper Monitoring/Treatment
 - Optimal Corrosion Control Treatment (OCCT) Evaluation and Installation
- – Lead Service Line Monitoring and/or Replacement
(repeated lead exceedance only)



Action Level Exceedances

Action Level Exceedance Requirements:

- Increased Lead & Copper Monitoring Frequency to every 6 months
- Tier 2 Copper Public Notification
- Lead Public Education Materials Distribution
 - The lead public education materials are distributed to all customers after a lead exceedance
 - Educates customers about the health effects of lead and how to reduce exposure.
- Lead Consumer Notice Distribution
 - Lead consumer notice is sent to the specific locations that were tested for lead, which provides the customer with their lead sample result



Water Quality Parameters

- Water Quality Parameters (WQPs) are required for:
 - All Community of NTNCs PWSs which exceed either the Lead or Copper Action Levels, and
 - PWS which serve >50,000 people
- Used to determine water corrosivity and aide in determining Corrosion Control Treatment selection
- Water Quality Parameters include:
 - pH, Alkalinity, Calcium, Conductivity, and temperature (measured in field)
 - Include orthophosphate and/or silica if used in existing treatment system



Water Quality Parameters

- Number of samples is determined by population served.
- Samples are collected in the distribution system as well as each entry point.
- WQPs required as a result of an Action Level Exceedance must be collected during the same monitoring period in which the exceedance occurred.
 - For example, if a system is conducting lead & copper sampling on an annual or triennial frequency and exceeds either Action Level, WQPs must be collected before September 30th of that monitoring period.

WQP Monitoring Requirements

System Size (# of People Served)	# of Sites
Greater than 100,000	25
10,001 to 100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
Less than or equal to 100	1

Distribution Sampling

Systems shall collect **two (2) tap samples** for each applicable water quality parameter at the number of sites listed in the table above.

Entry Point Sampling

Systems shall collect **two (2) samples** for each applicable water quality parameter at each active entry point.

Source Water Monitoring

- Required by all systems that exceed either the Lead or Copper Action Level
- System shall collect a minimum of one (1) Lead and Copper sample at each active entry point within six months of the end of the monitoring period in which the exceedance occurs
 - Based on the results, the State may require source water treatment in which the system would have 24 months to install.
 - The State may also set maximum permissible levels for source water lead and copper



Lead Public Education

- Required for all systems that have incurred a Lead Action Level Exceedance.
- Educates customers about the health effects of lead and how to reduce exposure.
- Lead education materials must be delivered within 60 days of the monitoring period in which the exceedance occurred.

http://www.ct.gov/dph/lib/dph/drinking_water/pdf/DPH-DWS-LCR004-Lead_Education_Template.pdf

- DPH requests Public Education Materials to be distributed within 48 hours
- Distribution of lead education materials is an annual requirement, although may be discontinued once Action Level compliance is achieved through the most recent 6-month monitoring period.
 - At least quarterly, CWS also required to include lead information in each water bill or in separate mailing with approval from DWS.



Public Education Requirements

- 2007 Revisions were made in the areas of message content, delivery requirements, and Consumer Confidence Report.
 - Message content revised to make it shorter and easier to understand.
 - Delivery requirements revised to deliver materials to new organizations, engage in new outreach activities, post lead info on water bills, issue two press releases during periods of lead action level exceedances.
 - Modify the CCR such that all systems would have to include info regarding the risks of lead in drinking water in their CCRs on a regular basis.

IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER

_____ found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant women and young children. Please read this information closely to see what you can do to reduce lead in your drinking water. Although most homes have very low levels of lead in their drinking water, some homes in the community have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L).

What Happened? What is being done?

Under State and Federal law we are required to have a program in place to minimize lead in your drinking water. This program includes corrosion control treatment, source water treatment, and public education. We are currently conducting additional monitoring and reviewing treatment options to correct the situation. We are also required to replace the portion of each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program.

This brochure explains the simple steps you can take to protect you and your family by reducing your exposure to lead in drinking water. If you have any questions about how we are carrying out the requirements of the lead regulation please call _____.

Health Effects of Lead

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

Sources of Lead

Lead is a common metal found in the environment. The main sources of lead exposure are lead-based paint and lead-contaminated dust or soil, and some plumbing materials. In addition, lead can be found in certain types of pottery, pewter, brass fixtures, food, and cosmetics. Other sources include exposure in the work place and exposure from certain hobbies (lead can be carried on clothing or shoes). Lead can also be found in some toys, some playground equipment, and some children's metal jewelry.

Drinking water is also a possible source of lead exposure. Most sources of drinking water have no lead or very low levels of lead. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome plated brass faucets, and in some cases, pipes made of lead that connect your house to the water main (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%. Homes built before 1988 are more likely to have lead pipes or lead solder.

When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead. EPA estimates that 10 to 20 percent of a person's potential exposure to lead may come from drinking water. Infants who consume mostly formula mixed with lead-containing water can receive 40 to 60 percent of their exposure to lead from drinking water.

Steps You Can Take to Reduce Your Exposure to Lead in Drinking Water

Despite our best efforts mentioned earlier to control water corrosivity and remove lead from the water supply, lead levels in some homes or buildings can be high. To find out whether you need to take action in your own

Health Effects of Lead

- Lead can cause serious health problems if too much enters your body from drinking water or other sources.
- It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body.
- Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life.

Health Effects of Lead

- The greatest risk of lead exposure is to infants, young children, and pregnant women.
- Scientists have linked the effects of lead on the brain with lowered IQ in children.
- During pregnancy, the child receives lead from the mother's bones, which may affect brain development.



Ways to Reduce Lead Exposure

- **Run the water to flush out lead.** Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours.
 - Flushing the tap means running the cold water faucet until the water gets noticeably colder, usually about 15-30 seconds.
 - If your house has a lead service line to the water main, you may have to flush the water for a longer time, perhaps one minute, before drinking.
- **Use cold water for cooking and preparing baby formula.** Do not to cook with, or drink water from the hot water tap. Lead can dissolve more easily in hot water. Do not use water from the hot water tap to make baby formula.



Ways to Reduce Lead Exposure

- **Clean aerators and flush faucets.**
 - Regularly remove the faucet strainers from all taps and flush out any debris that has accumulated over time by running the water for 3 to 5 minutes.
 - **Do not clean the aerators before sampling for lead and copper**
- **Identify and replace plumbing fixtures containing lead.**
 - Brass faucets, fittings, and valves, including those advertised as “lead-free,” may contribute lead to drinking water. Prior to 2014, end-use brass fixtures, such as faucets, with up to 8% lead were labeled as “lead free.” Visit the Web site at www.nsf.org to learn more about lead-containing plumbing fixtures.



Ways to Reduce Lead Exposure

- **Get your child's blood tested.**
 - Contact your local health department or health care provider to find out how you can get your child tested for lead, if you are concerned about exposure.
- **Have an electrician check your wiring.**
 - If grounding wires from the electrical system are attached to your pipes, corrosion may be greater. Check with a licensed electrician or your local electrical code to determine if your wiring can be grounded elsewhere.
 - DO NOT attempt to change the wiring yourself because improper grounding can cause electrical shock and fire hazards.

What is Corrosion?

- Corrosion can be defined as the electrochemical interaction between a metal surface such as a pipe wall or solder and water.
 - During the interaction, metal is oxidized and transferred to the water or to another location on the surface as a metal ion.
- The LCR is concerned with controlling **metals release** into water
 - The release of metals into water is affected by corrosion as well as the physical, chemical, and biological characteristics of the water and the metal surface.

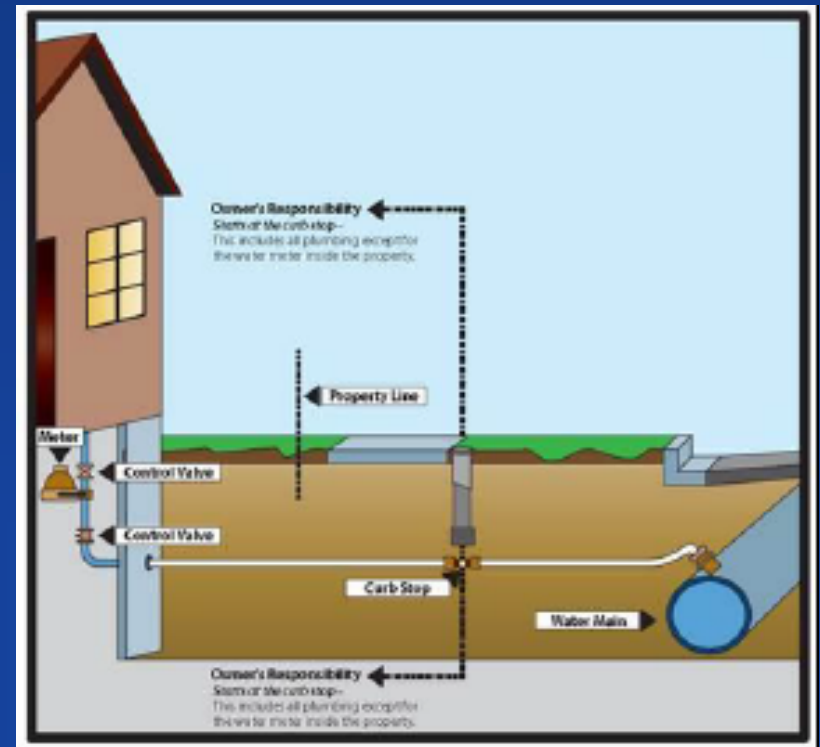


Source Water Treatment

- A PWS exceeding the lead or copper action level shall collect one source sample at each entry point to the distribution system within 6 months after the end of the monitoring period in which it exceeded the action level.
- The Department shall make a determination on whether source water treatment is necessary to minimize tap water lead and copper levels within six (6) months after the source water lead and copper samples are received

Lead Service Lines

- Lead service lines in place in some older homes (pre -1940s/1950s)
- Pipes from main to curb stop
- Pipes from curb stop to home
 - Increased levels when water chemistry changes or pipes are disturbed





Lead Service Line Replacement

- If a system continues to exceed the Action Level after CCT or SWT installation, the system must proceed with Lead Service Line Replacement/Monitoring.
 - LSL Replacement – System must replace 7% of LSLs per year that contribute more than 0.015 mg/L of Lead to the system's tap water levels.
- Systems can discontinue Lead Service Line Replacement whenever Lead Action Level compliance is achieved for two consecutive 6-month monitoring periods of tap samples.



Lead Service Line Replacement

- If only a portion of the LSL is replaced, the PWS must:
 - Notify customers served by LSL being replaced about the potential for increased Lead levels at least 45 days prior to replacement.
 - Collect samples within 72 hours of replacement and mail/post results within 3 days of receipt of results.



Lead Service Line Replacement

Lead Service Line Monitoring

– Two types associated with LSL Replacement:

- Optional – Monitoring from LSL to determine need for replacement.
 - If all Lead samples from the line are ≤ 0.015 mg/L, then the LSL does not need to be replaced and also then is considered replaced and can be included in the 7% annual replacement requirement.
- Required – Monitoring when partial LSL replacement occurs.
 - Sample collected must be representative of water in partially replaced line.

Lead Service Line Replacement

- Complete service line replacement is an eligible Drinking Water State Revolving Fund (DWSRF) expense, regardless of pipe material and ownership of the property on which the service line is located. **(Circular Letter #2016-13)**
- Continuing from the publicly-owned portion of the pipe often found under a street, the service line from the public water main to the point at which it connects with premise plumbing is located.



Copper Public Notification

- Required for systems that exceed the Copper Action Level.
- Tier 2 – The system shall notify consumers of the concentration no later than 30 days after the system learns of the exceedance.
- A copy of the notice and certification must be submitted to the DWS.
- The Public Notification must be repeated every three months for as long as the exceedance exists. If the notice is posted, it must remain in place until the situation is resolved but, for no less than 7 days. The system is also required to submit certification of delivery or posting during these situations.

Health Effects of Copper

- Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.



Additional Information

- Drinking Water Section – Lead & Copper Rule Page
 - <http://www.ct.gov/dph/cwp/view.asp?a=3139&q=541928>
- EPA - Lead & Copper Rule Page
 - <https://www.epa.gov/dwreginfo/lead-and-copper-rule>



Thank you

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