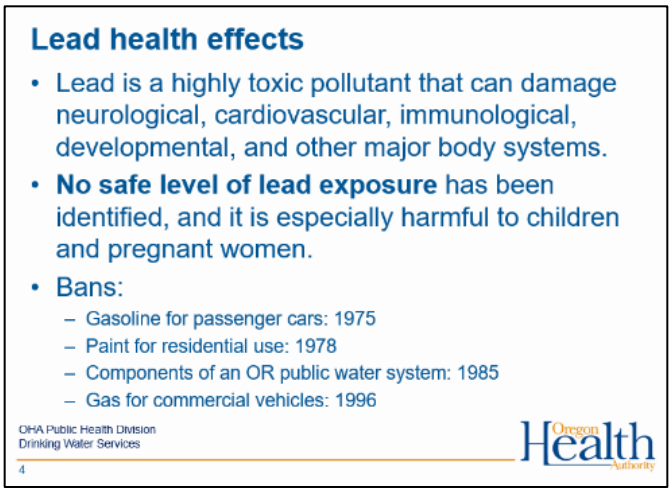
Optimizing Corrosion Control and Understanding Lead and Copper Rule Requirements

January 2023



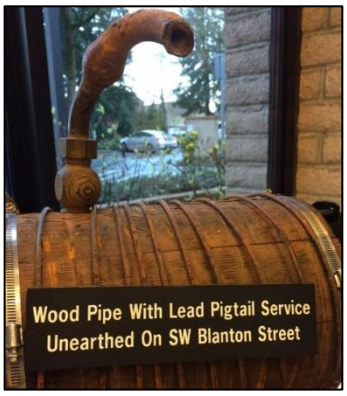
Corrosive water can not only lead to elevated lead and copper levels with public health implications but can also shorten the serviceable life of the distribution system. Due to the public health implications, sampling for lead and copper at customer's homes and/or businesses is required for non-transient non-community (NTNC) and community (C) water systems under OAR 333-061-0036(10) – page 148. Even most schools are required to sample under the Healthy Schools program, however, their requirements are very different from those of NTNC and C systems and not addressed in this document.

The regulatory requirements for NTNC and C systems are complicated and have changed recently to require water systems to develop an inventory of all service lines and address those that contain lead, so please refer to our website for more information. Viewing the quick reference guide to the lead and copper rule provided by USEPA is a good first step in understanding requirements briefly discussed below.

Lead and Copper Rule: A Quick Reference Guide

Overview of the Rule	
Title[1]	Lead and Copper Rule (LCR)[2], 56 FR 26460 - 26564, June 7, 1991
Purpose	Protect public health by minimizing lead (Pb) and copper (Cu) levels in drinking water, primarily by reducing water corrosivity. Pb and Cu enter drinking water mainly from corrosion of Pb and Cu containing plumbing materials.
General Description	Establishes action level (AL) of 0.015 mg/L for Pb and 1.3 mg/L for Cu based on 90th percentile level of tap water samples. An AL exceedance is not a violation but can trigger other requirements that include water quality parameter (WQP) monitoring, corrosion control treatment (CCT), source water monitoring/treatment, public education, and lead service line replacement (LSLR).
Utilities Covered	All community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) are subject to the LCR requirements.

Monitoring lead and copper levels



Monitoring for levels of lead (Pb) and copper (Cu) is based on the population served and starts out as standard monitoring, which may later be changed to reduced monitoring if the PWS meets certain criteria, as shown in Tables 1 and 2. Routine sampling not only helps identify corrosion from leaded solder and copper pipes but can also reveal the presence of lead service lines and connector pipes (commonly called "goosenecks" – roughly 2- to 3-foot segments of lead pipe that connect the water main to a service line). Lead, and to a lesser extent copper, can have serious health implications and lines containing these materials should be treated accordingly.

Table 1: Lead and Copper Tap and WQP Tap Monitoring

Size Category	System Size	Number of Pb/Cu Tap Sample Sites[3]		Number of WQP Tap Sample Sites[4]	
		Standard	Reduced	Standard	Reduced
Large	> 100K	100	50	25	10
	50,001 - 100K	60	30	10	7
Medium	10,001 - 50K	60	30	10	7
	3,301 - 10K	40	20	3	3
Small	501 - 3,300	20	10	2	2
	101 - 500	10	5	1	1
	≤ 100	5	5	1	1

[3] With written State approval, PWSs can collect < 5 samples if all taps used for human consumption are sampled.
[4] Two WQP tap samples are collected at each sampling site.

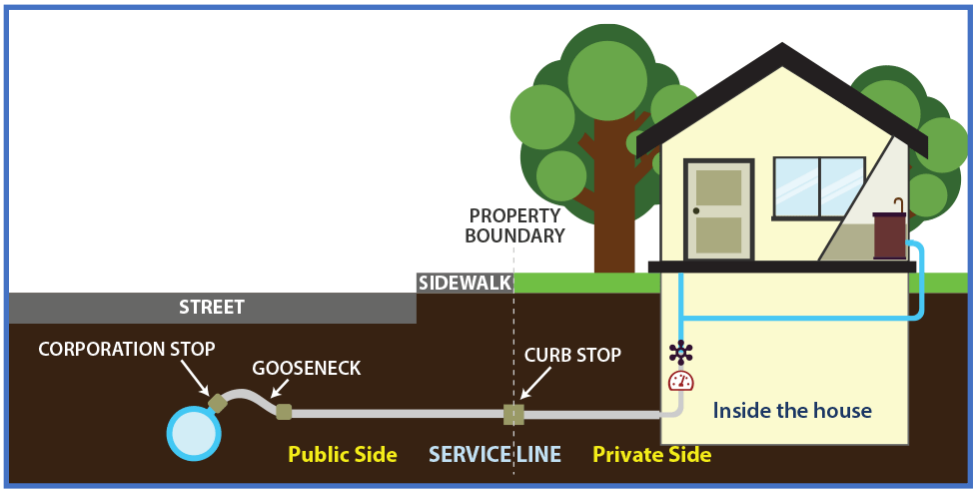
* See the "Monitoring following treatment installation and excursions" section below for more information on water quality parameter (WQP) monitoring.

Table 2: Criteria for Reduced Pb/Cu Tap Monitoring

Annual	1. PWS serves ≤ 50,000 people and is ≤ both ALs for 2 consecutive 6-month monitoring periods; or 2. Any PWS that meets optimal WQPs (OWQPs) and is ≤ Pb AL for 2 consecutive 6-month monitoring periods.
Triennial	1. PWS serves ≤ 50,000 people and is ≤ both ALs for 3 consecutive years of monitoring; or 2. Any PWS that meets OWQP specifications and is ≤ Pb AL for 3 consecutive years of monitoring; or 3. Any PWS with 90th percentile Pb and Cu levels ≤ 0.005 mg/L and ≤ 0.65 mg/L, respectively, for 2 consecutive 6-month monitoring periods (i.e., accelerated reduced Pb/Cu tap monitoring).

** PWS = Public Water System (applicable to C and NTNC systems).
OWQP = Optimal Water Quality Parameters.
AL = Action Level

For NTNC and C systems, sample locations are selected using certain criteria to identify Tier 1, 2 and 3 sites to monitor areas most likely to show high lead and/or copper levels. A USEPA memo from 2016 clarifies how to address specific situations (e.g., taps with aerator screens, etc.). Typically these sample sites are tested for many monitoring periods (often coincident with other chemical monitoring) ranging from once every six months, annually, or once every three years, but may be changed upon submittal of a sample site selection change form (Form 141-A). Customers themselves are often provided sampling instructions to sample their own taps. Operators need to ensure samples taken by customers are valid and sampled according to the instructions provided, because once submitted to the lab samples may not be invalidated (unless done so by the lab).



Lead Tap Water Monitoring
Certification of Notice to Individual Consumers

Water System Name:
PWS ID No: 41-

Monitoring period to which the notice applies (for example, June – Sept. 2009): -
Date(s) results were received from laboratory:
Date(s) results were provided to consumers:

- ☐ Notice included individual tap results from lead tap water monitoring completed according to OAR 333-061-0034(5)(e)
- ☐ Notice included an explanation of the health effects of lead.
- ☐ Notice included steps that consumers can take to reduce exposure to lead in drinking water.
- ☐ Notice included contact information for our water utility.
- ☐ Notice included the maximum contaminant level goals and action levels for lead, and the definitions of these two terms from OAR 333-061-0043.

I hereby certify that consumer notice of tap water monitoring has been provided to consumers at each specific sampling site from which a sample was collected. I also certify that these results and the following information were provided to such persons within 30 days of receiving the test results from the laboratory:

Certified by
Name:
Title:
Phone number:
Date:

Delivery Method
- ☐ Notice was distributed by mail or other direct delivery. Specify other direct delivery methods:
- ☐ Electronic mail.
- ☐ Posting the notice on the Internet at www. .
- ☐ Posting the notice in public places (attach a list of locations).
- ☐ Delivery of multiple copies to single bill addresses serving several persons such as: apartments, businesses, and large private employers.
- ☐ Other methods.

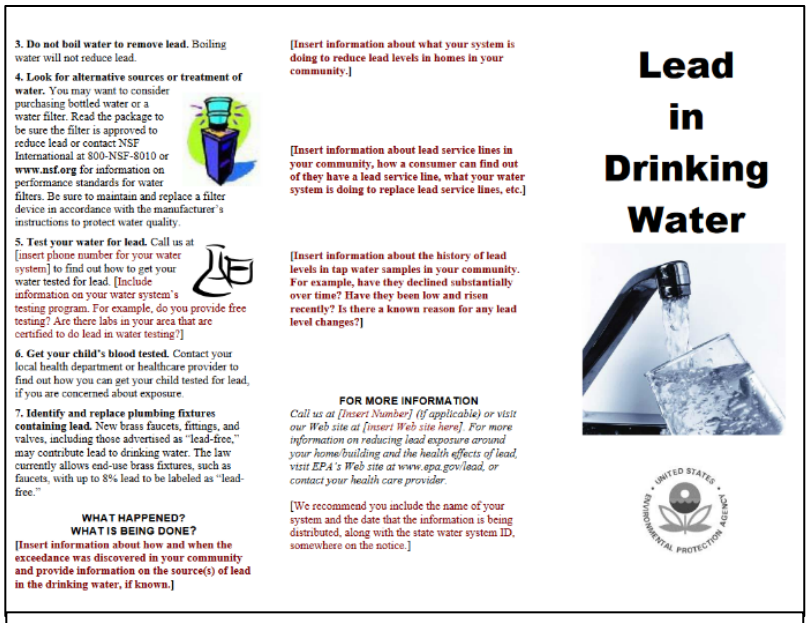
Please return this form as follows within 3 months of the end of the monitoring period along with one sample copy of consumer notice (per OAR 333-061-0040(1)(g)(E)(iii)):

Drinking Water Services
PO Box 14350
Portland, OR 97293-0350
E-mail: dwp.dmce@state.or.us
Fax: 971-673-0694

Consumer Notification must be sent to all services the sampling is conducted at and water systems. Templates of these notices are available online. Water suppliers must report how and when the consumer notices were distributed using a special reporting form and must also submit a representative copy of each type of notice distributed. The reporting form and copies of notices may be emailed to Drinking Water Services at DWP.DMCE@odhsoha.oregon.gov

Action level exceedances

Sometimes sampling shows that corrosion issues result in exceedances of the lead action level (0.015 mg/l = 15 ppb) or copper action level (1.3 mg/l). The term *action levels* is used because it means that certain actions are required to be taken when the action levels are exceeded. Exceedances of the lead action level requires that the public education (PE) brochure be delivered to all customers in addition to the aforementioned consumer notification (see graphic on right).



3. Do not boil water to remove lead. Boiling water will not reduce lead.

4. Look for alternative sources or treatment of water. You may want to consider purchasing bottled water or a water filter. Read the package to be sure the filter is approved to reduce lead or contact NSF International at 800-NSF-8010 or **www.nsf.org** for information on performance standards for water filters. Be sure to maintain and replace a filter device in accordance with the manufacturer's instructions to protect water quality.

5. Test your water for lead. Call us at [insert phone number for your water system] to find out how to get your water tested for lead. [Include information on your water system's testing program. For example, do you provide free testing? Are there labs in your area that are certified to do lead in water testing?]

6. Get your child's blood tested. Contact your local health department or healthcare provider to find out how you can get your child tested for lead, if you are concerned about exposure.

7. Identify and replace plumbing fixtures containing lead. New brass faucets, fittings, and valves, including those advertised as "lead-free," may contribute lead to drinking water. The law currently allows end-use brass fixtures, such as faucets, with up to 8% lead to be labeled as "lead-free."

WHAT HAPPENED? WHAT IS BEING DONE?

[Insert information about how and when the exceedance was discovered in your community and provide information on the source(s) of lead in the drinking water, if known.]

[Insert information about what your system is doing to reduce lead levels in homes in your community.]

[Insert information about lead service lines in your community, how a consumer can find out of they have a lead service line, what your water system is doing to replace lead service lines, etc.]

[Insert information about the history of lead levels in tap water samples in your community. For example, have they declined substantially over time? Have they been low and risen recently? Is there a known reason for any lead level changes?]

FOR MORE INFORMATION

Call us at [Insert Number] (if applicable) or visit our Web site at [insert Web site here]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's Web site at www.epa.gov/lead, or contact your health care provider.

[We recommend you include the name of your system and the date that the information is being distributed, along with the state water system ID, somewhere on the notice.]

Lead in Drinking Water

"Lead in Drinking Water" public education brochure template

- For community water systems: MS Word or PDF
- For non-transient non-community water systems: MS Word or PDF

Community systems must also include certain language in the next billing delivered to customers and ensure required content is included in the annual Consumer Confidence Report. Actions also include sampling for corrosion parameters such as pH and alkalinity, additional lead and copper sampling, and may even require the installation of additional treatment to specifically address corrosion.

A water bill informational statement must be distributed, beginning with the next bill following a lead action level exceedance and no less often than quarterly and for as long as the lead action level is exceeded:

> *[PWS NAME] found high levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information please call {PWS CONTACT and PHONE NUMBER or PWS WEBSITE (if applicable)]*

Treatment

Many systems never have to install corrosion control treatment; however, additional treatment may be required following an action level exceedance and are advisable because corrosion not only affects lead and copper levels, but it can also corrode and shorten the life of distribution tanks, piping and related fittings.

Corrosion chemistry is complicated and therefore selecting treatment often requires the help of consultants with experience in corrosion control treatment and always requires regulatory plan approval. Plan approval is also required to modify existing treatment that may affect corrosion characteristics of treated water, so it is important to check with your regulator before making any changes such as changing treatment chemicals, points of injection, adding new sources, or changes to filtration systems. Reviewing USEPA's manual on evaluating corrosion control treatment options is a good place to start. USEPA also has online resources for optimizing corrosion control treatment.

Monitoring following treatment installation and excursions

Once treatment is installed, increased lead and copper tap sampling is required, after which the state sets sampling requirements and minimum water quality parameters (e.g., treatment levels) such as pH and alkalinity for both the entry point and the distribution system. These data must be reported each month on special forms customized for each water system. Each day these minimum levels are exceeded counts as one *excursion*. Additionally, if an excursion occurs and sampling is not done, those days without sampling results also count as an excursion. If a water system exceeds more than nine excursions in a six-month period, they will need to increase lead and copper tap sampling.

Water Quality Parameter (WQP)	
Applicability	► Systems serving > 50,000 people. ► Systems serving ≤ 50,000 during monitoring periods in which either AL is exceeded.
Standard	► WQP samples at taps are collected every 6 months. ► WQPs at entry points to distribution system (EPTDS) are collected every 6 months prior to CCT installation, then every 2 weeks.
Reduced	► See Table 1 for sample number and page 2 for criteria. Does not apply to EPTDS WQP monitoring.

*** CCT = Corrosion Control Treatment
EPTDS = Entry point total dissolved solids

Excursions can occur due to a variety of issues such as:

1) Changes in source water due to storms or land-use practices that result in lower pH or alkalinity
2) The addition of a new source such as drilling a new well
3) Changes in coagulant and/or disinfection dose or coagulant/disinfectant chemicals
4) Inaccurate flow metering where the meter signals the dosing pump to automatically adjust the speed (sometimes flow meters do not pick up low flows resulting in no or inadequate corrosion control chemical dosing)
5) Automated coagulation dosing that does not account for pH adjustments needed (especially important when using alum)

6) Distribution practices such as inadequate flushing, disinfectant levels, high water age, etc.

In conclusion, corrosion control is not an insurmountable feat. It just takes patience and attention to detail. USEPA has online resources for optimizing corrosion control and remember, your regulator is always there to provide assistance, so contact us at 971-673-0405!