



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Michigan Lead and Copper Rule Workshop for Drinking Water Operators

Morning Session

Workshop Purpose

To Review Michigan's Lead and Copper Rule and Upcoming Requirements

To Help Prepare Operators for the 2019 Monitoring Period

To Encourage Participation and Discussion Regarding Lead and Copper in Drinking Water

Agenda

- Lead & Copper Rule Basics and Revisions
- Distribution System Materials and Inventory
- Lead Service Line Replacement
- Tiering Criteria and Sampling Pool
- The Monitoring Process
- Reporting

Lead and Copper Rule Basics and Revisions

Summary of LCR changes

- Federal Lead and Copper Rule
- Michigan Lead and Copper Rule
- Highlighting the major changes
- Implementation
- Q&A

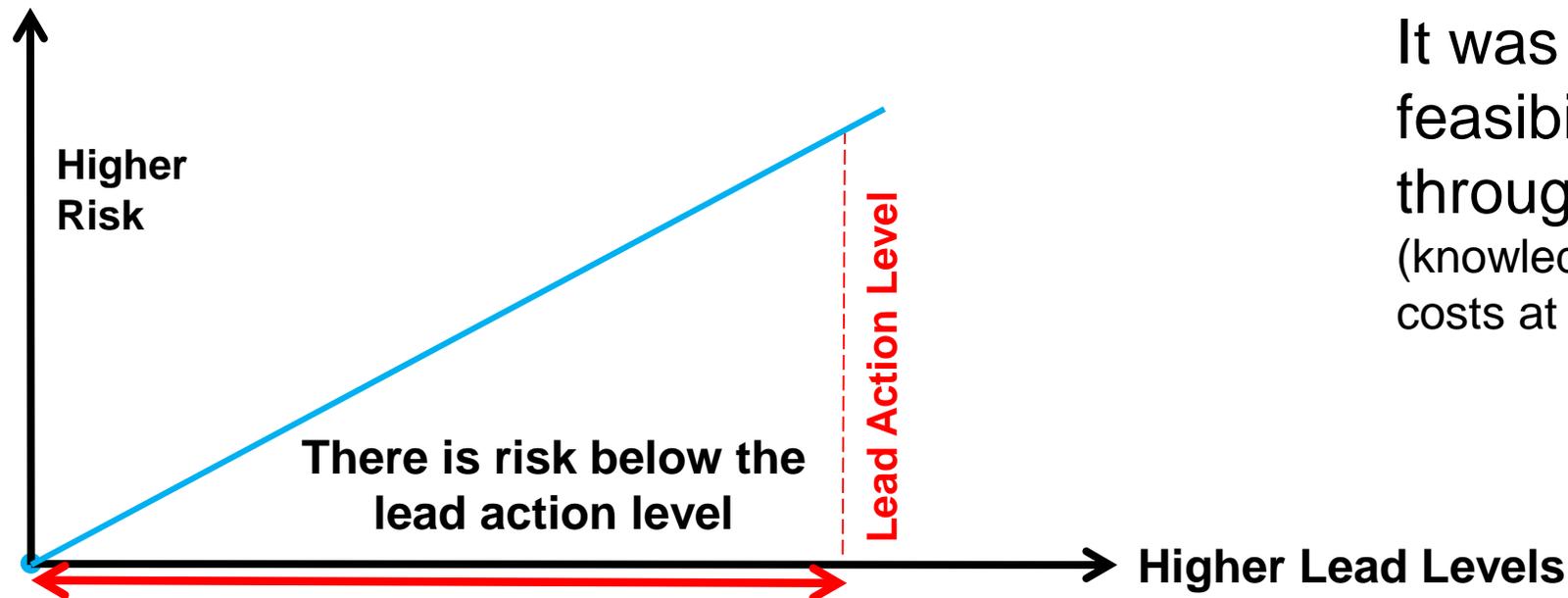
Why do we care about lead?

- No level of lead in the blood is safe; health effects at blood lead levels below previous thresholds
- Lead is a potent irreversible neurotoxin
- Lifelong multigenerational impacts
- Health effects from acute and chronic exposures



Lead Risk

The lead action level is ***not a health-based*** number. It was set in 1991 based on feasibility of reducing lead through controlling corrosion (knowledge of treatment capabilities and costs at the time).

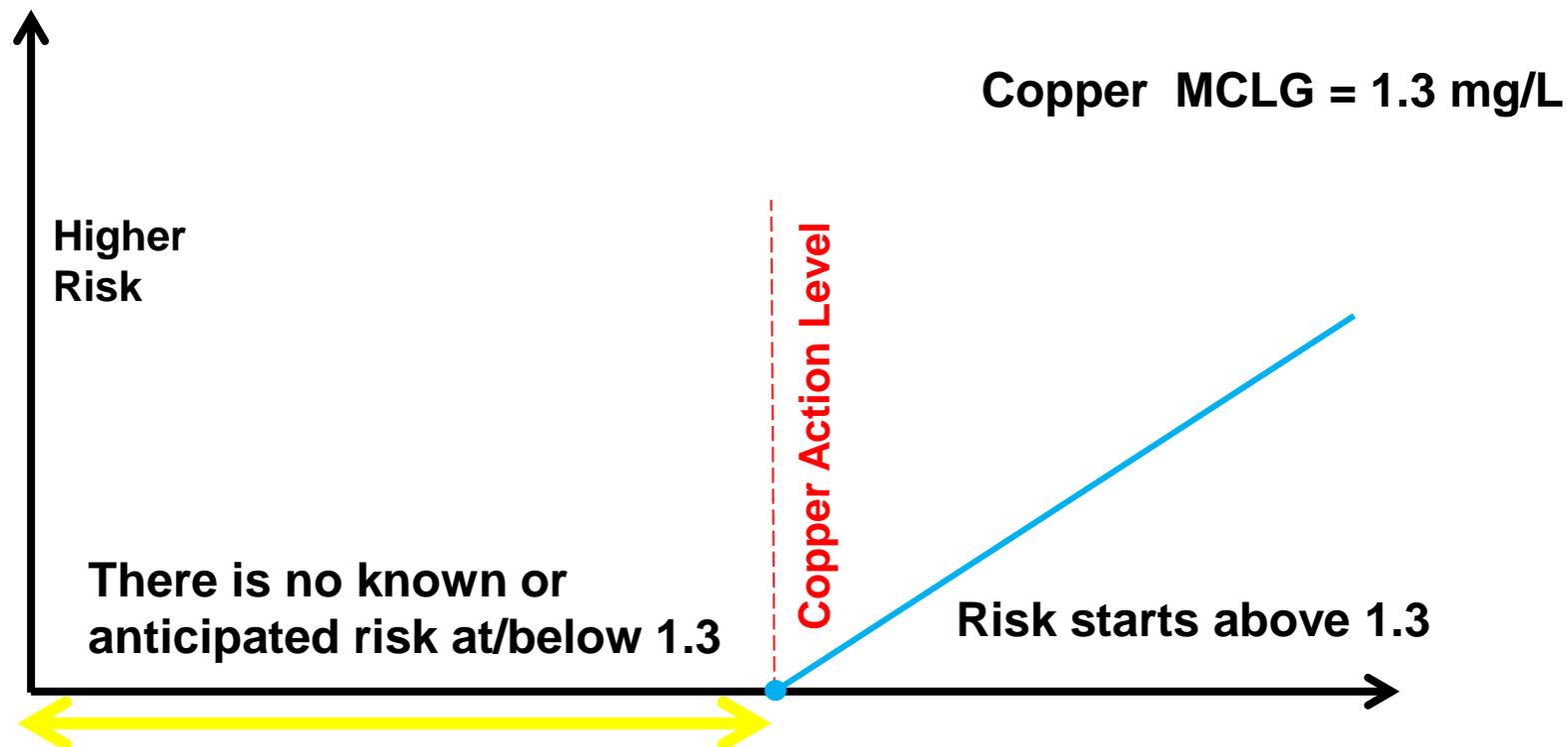


Lead MCLG = 0 = *No level* without known or anticipated adverse health effects

Why do we care about copper?

- Small amounts of copper are essential for health
- High exposure can result in a variety of negative health effects

Copper Risk



When MCLG = specified value (not zero) = no known or anticipated adverse health effects occur *below* that value.

Health Effects

– Health Effects of Lead

- Biggest concern is young children and infants, who absorb more lead than the average adult
- Health effect in children include:
 - Impaired mental development
 - IQ deficits
 - Shorter attention spans
 - Low birth weight

– Health Effects of Copper

- Stomach and intestinal distress
- Complication of Wilson's Disease
- Chronic exposure can cause liver disease in predisposed individuals

Sources of Lead in Drinking Water

- Lead pipes
 - Service lines, customer site piping, and building plumbing
- Brass fixtures and valves
 - These items are ubiquitous in water treatment plants, distribution systems, customer site piping, and building plumbing systems
- Galvanized pipe
 - Service lines, customer site piping, and building plumbing
 - Harbors particulate lead; lead in the zinc coating

Lead Variability in Drinking Water

- Many factors affect lead release
- Particulate vs. Dissolved
 - Particulate lead release is random and mostly unpredictable
 - Dissolved lead release is reasonably well characterized

Particulate vs. Dissolved Lead

Particulate Release

- Physical disturbances (hydrant flushing, road work, etc.)
- LSL replacement (full or partial)
- Galvanic corrosion
- Hydraulic disturbances and transport of particles

Dissolved Release

- Largely dependent on water quality
- Also on surface area of lead (pipe length, diameter);
- Stagnation time of water

Why do we have the LCR?

- To minimize lead and copper in drinking water
- The LCR is a treatment technique rule
- The action levels are based on the practical feasibility of reducing lead through controlling corrosion (per EPA)
- Used to help determine if the chemistry of the water is causing excessive corrosion
- Lead and copper are indicators

Lead Regulation and Federal Lead and Copper Rule

- 1986 – Federal Lead Ban
- 1991 – Lead and Copper Rule
- 2004 – Lead and Copper Minor Revisions
- 2007 – Lead and Copper Short-term Revisions
- 2012 – Reduction of Lead in Drinking Water Act (2014)

- 2020?– Long-term Lead and Copper Rule revisions

Michigan's Lead and Copper Rule

June 2018 – Michigan's LCR revisions were promulgated

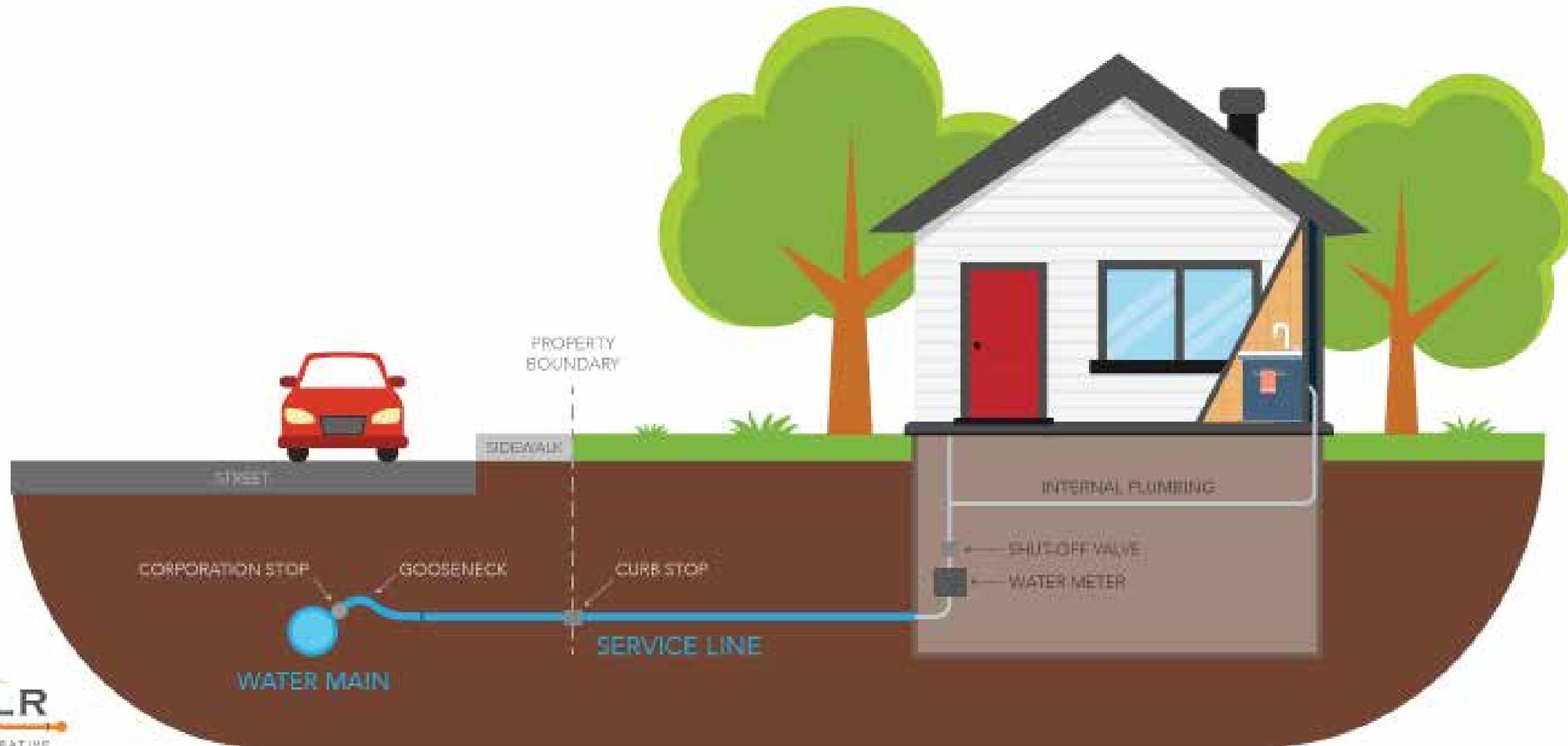
- Major Changes
- Definitions
- Materials Inventory
- Sampling pools
- Tiering criteria
- 90th percentile calculation
- Action Level
- Sampling – Tap sampling and WQP
- LSLR
- Transparency
- Public Education
- Water Advisory Councils
- Continuity of Source/Treatment

Definitions

Definitions

- Service Line – means the pipe from the discharge of the corporation fitting to customer site piping or to the building plumbing at the first shut-off valve inside the building, or 18 inches inside the building, whichever is shorter.
- Lead Service Line (LSL) – means either a service line which is made of lead or any lead pigtail, lead gooseneck, or other lead fitting that is connected to the service line, or both.

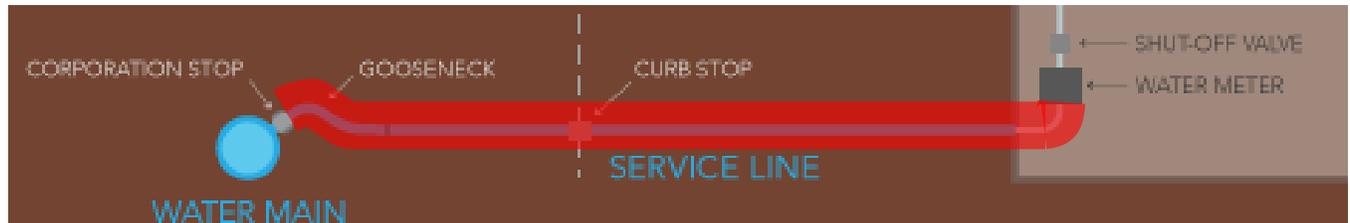
Service Line Diagram



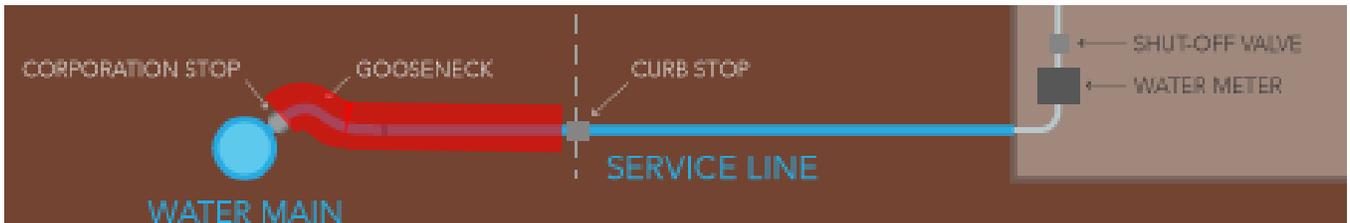
LSL – Examples of LSLs

Copper or Plastic

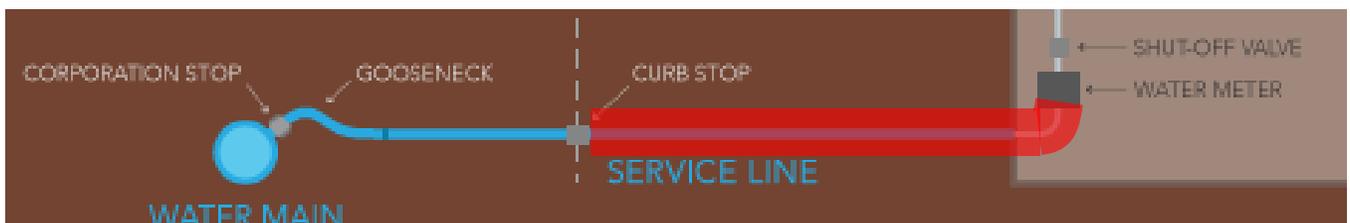
Lead



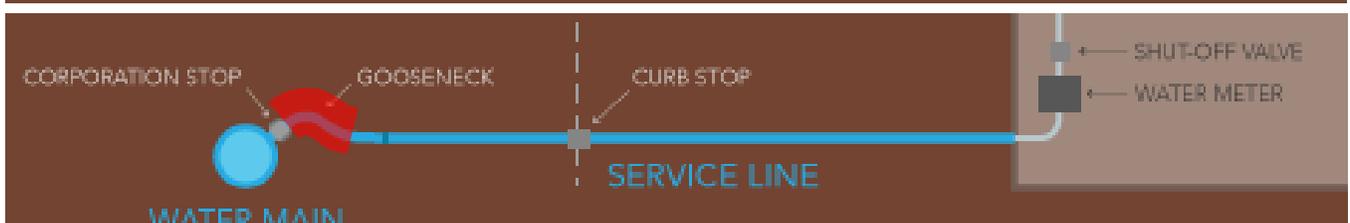
Full LSL



Partial LSL



Partial LSL



Lead gooseneck

Distribution System Materials Inventory (DSMI)

Distribution System Materials Inventory (DSMI)

- All supplies must
 - January 1, 2020 – submit a preliminary DSMI based on available information
 - January 1, 2025 – submit a final comprehensive DSMI and update every five years
- Supplies with LSLs must
 - Notify residents served by lead service lines within 30 days of determining the service line content
 - Report to EGLE annually on status of lead service line replacement

Tap Sampling – Sampling Plan

Tap Sampling – Sampling Plan

- Sampling pool
 - Reviewed, updated as necessary, and submitted to EGLE by January 1, 2020
- Preliminary DSMI and sampling pool are BOTH due January 1, 2020
 - Guidance, forms and training to be developed
 - EPA form available on EGLE website

Tap Sampling – Sampling Plan

MICHIGAN COMMUNITY WATER SUPPLY LEAD AND COPPER TAP SAMPLING POOL

>>> REVIEW INSTRUCTIONS ON PAGES 5 AND 6 BEFORE COMPLETING FORM BELOW <<<

WSSN: _____ Supply Name: _____ Page ____ of ____

Standard Number of Sites Required: _____ Reduced Number of Sites Required: _____

Site No.	Address	Tier Level	Category	Structure Type	Service Line Material	Interior Plumbing Material	Site Validation Method
00	<i>Ex: 0000 Any Street – Any Town, MI</i>	1	A	SFR	L	C	Visual
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							

Tiering Criteria

Tiering Criteria

Site	Sample Category	
Tier 1	A	Single family residence with a lead service line*.
	B	Single family residence with copper plumbing with lead solder installed after 1982 and before 1989.
	C	Single family residence with lead interior plumbing.
	D	Multiple family residence (MFR) with either a lead service line*, copper plumbing with lead solder installed after 1982 and before 1989 , or lead plumbing. Note: Only when MFR comprise at least 20 percent of the total service connections for the system.
Tier 2	E	Multi-family residences or other buildings with a lead service line*.
	F	Multi-family residences or other buildings with copper plumbing with lead solder installed after 1982 and before 1989.
	G	Multi-family residences or other buildings with lead interior plumbing.
Tier 3	H	Single family residence with copper plumbing with lead solder installed before 1983.
Other		If no Tier 1, 2, or 3 sites available, sample sites that use plumbing materials commonly found at other locations in the water supply.

*Priority should be placed on sites with full LSLs, followed by partial LSLs, followed by lead goosenecks.

Tiering Criteria

Site	Sample Category	
Tier 1	A	Single family residence with a lead service line*.
	B	Single family residence with lead interior plumbing.
	C	Multiple family residence (MFR) with either a lead service line*, or lead plumbing. Note: Only when MFR comprise at least 20 percent of the total service connections for the system.
Tier 2	D	Multi-family residences or other buildings with a lead service line*.
	E	Multi-family residences or other buildings with lead interior plumbing.
Tier 3	F	Single family residence with copper plumbing with lead solder installed <u>before July 1988.</u>
Other		If no Tier 1, 2, or 3 sites available, sample sites that use plumbing materials commonly found at other locations in the water supply.
*Priority should be placed on sites with full LSLs, followed by partial LSLs, followed by lead goosenecks.		

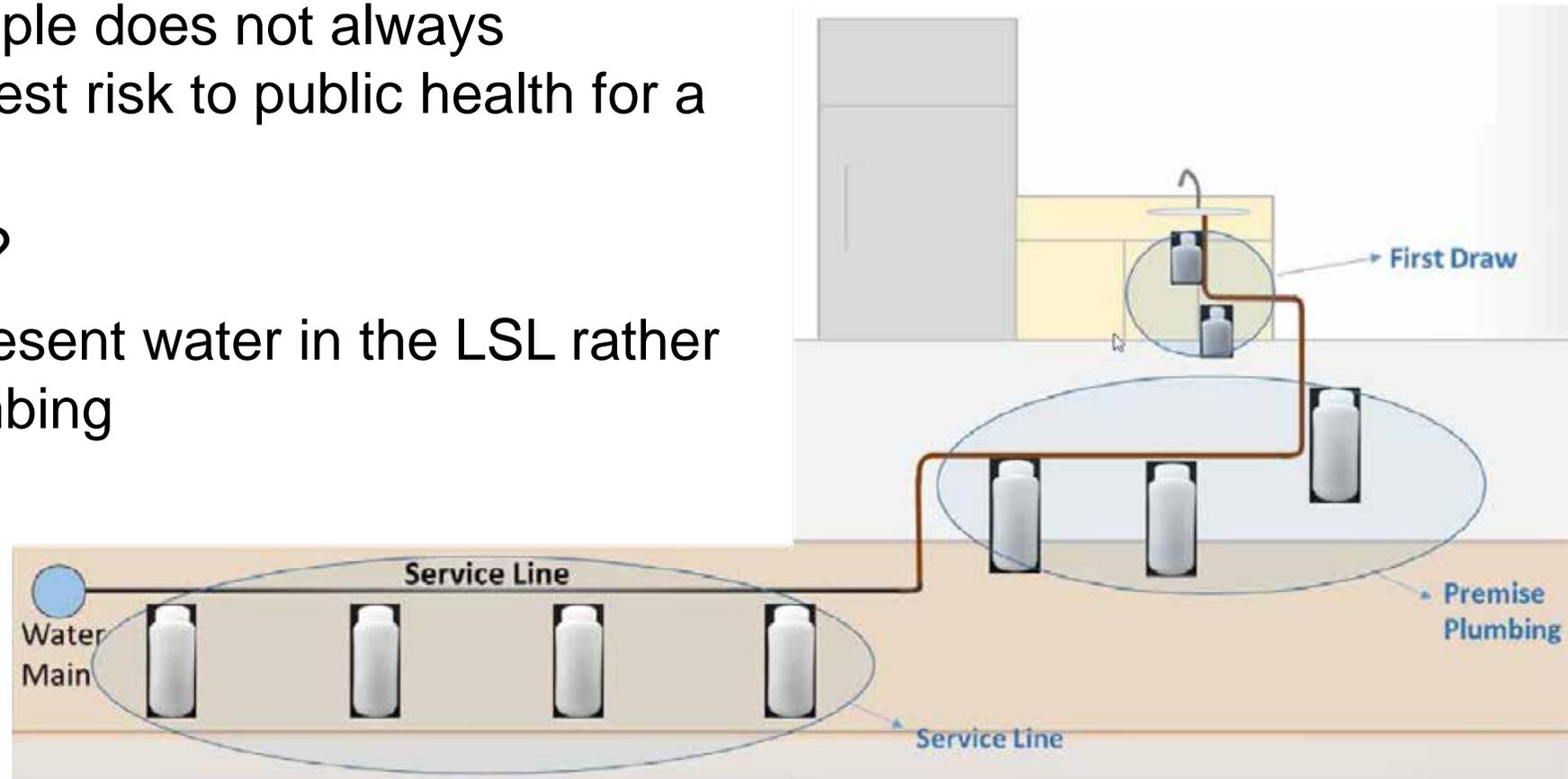
Tap Sampling – Sampling Methodology

Tap Sampling – Sampling Methodology

- Proper sample collection
 - NO systematic flushing of a sampling site
 - NO aerator removal or cleaning immediately before compliance sampling is conducted
- Fifth liter sample at sites with LSLs
 - Sites without LSLs continue to collect a first draw sample only
 - Sites with LSLs are required to collect a second sample (5th liter)

Tap Sampling – 5th Liter Sample

- Why collect a second sample?
 - The first draw sample does not always represent the highest risk to public health for a site with an LSL
- Why the fifth liter?
 - More likely to represent water in the LSL rather than in-home plumbing



Tap Sampling – Consecutive Sampling Rescinded

Tap Sampling - Consecutive Sampling Rescinded

- EPA rescinded approval for consecutive and modified consecutive sampling arrangements

- Types of Agreements:
 - Consecutive Arrangements:
Seller and customer supplies sampled as a whole with one overall 90ths
 - Modified Consecutive Arrangements:
Seller and customer supplies conduct own sampling and have own 90ths, but customers sampled a pro-rated number of sites

Tap Sampling - Consecutive Sampling Rescinded

- 2019 Schedule Changes for Consecutives
 - **Consecutive Sampling Arrangements:**
Most increasing lead/copper to 6-month standard monitoring because there is no individual 90th history for each system
 - **Modified Consecutive Sampling Arrangements:**
Most increasing lead/copper to RULE REDUCED number of sites (increase from pro-rated number), but many can stay on reduced due to individual 90th history for each system
 - **WQP Sampling:**
Now collected by individual customer supplies
- Note: Some consecutive systems never sampled under a consecutive sampling arrangement

Tap Sampling – Rule Revisions

Tap Sampling – Rule Revisions

- Supplies with optimal corrosion control treatment (OCCT) cannot reduce to three year lead and copper tap monitoring unless...
 - It meets water quality parameter ranges

AND EITHER

- The water supply has no lead service lines
 - The water supply has three annual rounds of sampling with 90th percentiles ≤ 5 ppb for lead and ≤ 650 ppb for copper.
- No change to supplies without OCCT

Tap Sampling – Rule Revisions

- Many systems with CCT will be returned to annual reduced monitoring for lead and copper
- Will see entry point and distribution schedules for WQP at small & medium systems, in addition to large systems

90th Percentile Calculation

90th Percentile Calculation

- Step 1: Place results in ascending order
- Step 2: Assign each a number, 1 for the lowest value
- Step 3: Multiply number of samples by 0.9
 - Example: 20 samples x 0.9 – 18th sample
- Step 4: Compare result with action level
 - Example above, 90th percentile is value of 18th result

- * If number of samples x 0.9 is not a whole number, interpolation is used

90th Percentile Calculation

- 90th percentiles are now calculated using the highest lead and highest copper results from each site
 - Applies to systems with lead services lines (1st and 5th liter samples)
 - Any other system that collects multiple samples at the same site

	1st Liter		5th Liter	
	Lead (ppm)	Copper (ppm)	Lead (ppm)	Copper (ppm)
123 Main St	0.001	0.6	0	0.04
124 ABC Rd	0.001	0.2	0	0
125 North St	0.002	0.01	0.010	0
126 South Blvd	0.002	0.04	0.002	0.02
127 West Ave	0.002	0.025	0.030	0.01

90th
percentiles
 Lead = 0.020 ppm
 Copper = 0.4 ppm

Lead ALE

Action Level (AL)

Action Level (AL)

- AL \neq MCL (Maximum Contaminant Level)
- An AL is a screening tool for determining when treatment technique actions are needed
- ALs are based on the practical feasibility of reducing lead through controlling corrosion

Lead AL = 0.015 mg/L (15 ppb)

Copper AL = 1.3 mg/L (1300 ppb)

- Maximum Contaminant Level Goals (MCLG)
 - Lead MCLG = 0 mg/L
 - Copper MCLG = 1.3 mg/L

Action Level

- The lead action level of 15 parts per billion (ppb) remains in effect through December 31, 2024
- The new lead action level of 12 ppb takes effect January 1, 2025

Water Quality Parameter (WQP) Sampling – Rule Revisions

WQP Sampling – Rule Revisions

- WQP sampling is now required for all supplies with OCCT, including small and medium supplies, and all other supplies exceeding an action level
- Expanded to include chloride and sulfate
- WQP monitoring can reduce to annual if criteria met, but can no longer be reduced to triennial monitoring
- Rules clarified to require establishment of WQP ranges in the distribution system
 - If a supply is outside their WQP ranges for any nine days within six months, it triggers a Treatment Technique violation.

WQP Sampling – Rule Revisions

- Sampling for systems with corrosion control treatment
 - Each point of entry (POE)
 - One sample every two weeks
 - # of locations distribution system
 - 6-months from the beginning of the monitoring period
 - Two sets of samples required each monitoring period
 - One set every quarter on 2019 monitoring schedules
- Distribution system sample locations are representative of the distribution system. Similar to bacteriological sampling.

Service Line Replacement (LSLR)

Service Line Replacement (SLR)

- A new service line definition was added, and the lead service line (LSL) definition was updated
- The full lead service line must be replaced at water supply expense, regardless of ownership
- Requirement to replace galvanized that is or was connected to a lead service line
- Partial LSLR no longer allowed, except for emergency repair

LSLR – Replacement Schedules

- Requirement for supplies with a lead ALE and OCCT already in place to conduct SLR at 7% per year remains in effect
- Starting January 1st, 2021, all supplies with LSLs or galvanized that is or was connected to a lead service line, must conduct SLR at an average rate of 5% per year, not to exceed 20 years
 - Alternate schedules can be incorporated into an asset management plan, and approved by EGLE

Partial LSLR Ban

Partial LSLR Ban

- Partial LSLRs pose a significant health risk
- Construction activities increase exposure to particulate lead
- Banned except in the case of emergency repairs
- AWWA standard, C810-17, “Replacement and Flushing of Lead Service Lines”

LSLR – Emergency Partial LSLR Deadlines

- Notification requirements
 - Timeline: As soon as practicable
 - Content: Explain that they may experience a temporary increase in lead levels; provide guidance on minimizing lead exposure.
- Sampling requirements
 - Timeline: Within 72 hours after LSLR is completed
 - Method: First and fifth sampling methodology
 - Results: Delivered or mailed to owner/resident within 3 business days
- Keep remaining partial LSL on your DSMI!

Transparency

Transparency

- Consumer Notice of Results
 - Must now include copper
- Public Education (lead ALE only)
 - Additional content and delivery requirements
- Consumer Confidence Report (CCR)
 - Lead and copper reporting (max and min)
 - Lead service line reporting

Transparency - Consumer Confidence Report

- Must include the most recent 90th percentile
- Number of detects above the action level (AL)
- Must include the range of individual compliance samples

Inorganic Contaminant Subject to AL	AL	MCLG	Your Water ⁴	Year Sampled	# of Samples Above AL	Range of Individual Samples	Typical Source of Contaminant
Lead (ppb)	15	0					Corrosion of household plumbing systems; Erosion of natural deposits
Copper (ppm)	1.3	1.3					Corrosion of household plumbing systems; Erosion of natural deposits

Should be in different units

Transparency - Consumer Confidence Report

– If CWS has LSLs or service lines with unknown contents, they need to include:

1. # of LSLs
2. # of service lines of unknown material
3. Total number of service lines

Lead Advisory Councils

Lead Advisory Councils

- A statewide advisory council will be created to assist with development of public awareness campaign materials
- Supplies serving 50,000 people or more must establish a community advisory council to assist with development of public awareness campaign materials

Continuity During Source / Treatment Change

Continuity During Source / Treatment Change

- Clarified that supplies providing or supplying water with OCCT must maintain OCCT
- Clarified that EGLE may require new or updated corrosion control studies when a supply changes source or treatment, or at any other time as appropriate

Implementation

Implementation

- Partial lead service line replacement ban is in effect
- Many of the Rule changes have future deadlines
- New forms and guidance documents are being developed for full implementation in 2019

Important Dates

- September 14, 2018
- December 14, 2018
- January 1, 2019
- January 1, 2020
- January 1, 2020
- January 1, 2021
- January 1, 2025
- January 1, 2025
- Statewide Advisory Councils
- Public Water Systems Advisory Councils
- Sampling procedure for sites with LSLs
- Submit preliminary DSMI
- Submit updated tap sampling pools
- 20 year (avg 5%) LSLR begins
- Action Level lowered to 12 ppb
- Submit complete DSMI

Materials Available Online

[Michigan.gov/DrinkingWater](https://www.michigan.gov/DrinkingWater)

- Click on link “Information about Lead and Copper in Drinking Water”
 - General information
 - Link to lead brochures and flyers
 - Reduce exposure
 - Particulate lead
 - Construction activities
 - Regulatory links
 - School information
 - Council information

[Michigan.gov/LCR](https://www.michigan.gov/LCR)

- Act 399
- Administrative Rules
- Strike bold copy of the Rule changes
- Regulatory links

[Michigan.gov/EGLELeadPublicAdvisory](https://www.michigan.gov/EGLELeadPublicAdvisory)

[Michigan.gov/CleanWaterRevolvingFund](https://www.michigan.gov/CleanWaterRevolvingFund)

When You Need Help or Other Resources...

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