Michigan Lead and Copper Rule Workshop for Drinking Water Operators

Afternoon Session
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
The Monitoring Process
Lead & Copper Monitoring
What is Monitoring?

“Monitor” (Oxford Dictionary)
- Observe & check the progress or quality of something over a period of time
- Maintain regular surveillance over

“Monitoring & evaluation” (Wikipedia)
- A process that helps improve performance and achieve results.
What is Lead & Copper Monitoring?

**Sampling & Evaluation** to determine **system** water quality

- Sampling a set of taps in the distribution system
- Sampling taps from sites that are more likely to have lead service lines and plumbing materials containing lead
- Evaluating all results to see if the water is corrosive to the system
- Sampling for other water quality parameters (WQP’s)
How Do You Evaluate The Results?

- Results are reported in mg/L (ppm) or ug/L (ppb)
- The 90th percentile is calculated and compared to the Action Levels (ALs)
- ALs are based on the practical feasibility of reducing lead through controlling corrosion
- AL vs MCL (Maximum Contaminant Level)
- MCLG = Maximum Contaminant Level Goal

- Lead AL = 0.015 mg/L (15 ug/L) → The MCLG is 0 mg/L
- Copper AL = 1.3 mg/L (1300 ug/L) → The MCLG is 1300 mg/L
Why Monitor (and evaluate) ?

- Health risks
  - Lead - especially to infants, pregnant women and young children
  - Copper – person’s with Wilson’s disease
- Water is the universal solvent (corrosive)
  - Breaks down pipe materials
  - Lead and copper are indicators of corrosion
- Lead in plumbing & fixtures
  - Dissolved in the water
  - Particulate release – gets trapped in aerators
## How Many Samples Are Required?

**LCR Tap Monitoring Requirements:**
Required number of sample sites determined by water supply population served

<table>
<thead>
<tr>
<th>Supply Size (# of People Served)</th>
<th>Number of Sites (Standard Monitoring)</th>
<th>Number of Sites (Reduced Monitoring)</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 100,000</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>10,001 - 100,000</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>3,301 – 10,000</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>501 – 3,300</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>101 - 500</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Fewer than 101</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
How Often Do You Sample?

- Depends on several factors
  - Sampling history
  - Water quality & treatment
  - Compliance with the rules

- Frequency Possibilities
  - Semi-Annual (6 month intervals)
  - Annual
  - Triennial (every 3 years)
2018 Monitoring Schedule

ABC Water Utility

WSSN: 12345

Collect samples early in the monitoring period. This schedule reflects your expected routine monitoring and is subject to change. To receive credit for monitoring, include the WSSN, Site Code, and County on your request for analysis form. Collect Bacteriological and Automated Partial Chemistry samples close to the shipping time and send overnight delivery. Send all sample results to your Department of Environmental Quality (DEQ) district office unless you use the DEQ laboratory. Test codes, sample units, and costs are listed to help you complete the DEQ laboratory form. Prices are subject to change without notice. The DEQ laboratory is closed on State holidays.

Location: Plant Tap (Well No. 1 and 2)

Collect these samples at the entry point to the distribution system (after treatment, if applicable.)

<table>
<thead>
<tr>
<th>Sample Type</th>
<th># Samples/Frequency</th>
<th>Collect Before</th>
<th>Site Code</th>
<th>Fee</th>
<th>Unit Number</th>
<th>Test Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated Partial Chemistry</td>
<td>1/12 months</td>
<td>09/30/2019</td>
<td>CH500</td>
<td>$18.00</td>
<td>32</td>
<td>R</td>
</tr>
<tr>
<td>Volatile Organic Compounds</td>
<td>1/36 months</td>
<td>09/30/2020</td>
<td>CH500</td>
<td>$100.00</td>
<td>36VO</td>
<td>CXVO</td>
</tr>
<tr>
<td>Complete Metals</td>
<td>1/108 months</td>
<td>09/30/2020</td>
<td>CH500</td>
<td>$102.00</td>
<td>36ME</td>
<td>CMET2</td>
</tr>
<tr>
<td>Arsenic</td>
<td>Included in Metals</td>
<td>09/30/2020</td>
<td>CH500</td>
<td>$18.00</td>
<td>36ME</td>
<td>CAS</td>
</tr>
<tr>
<td>Cyanide</td>
<td>1/108 months</td>
<td>09/30/2020</td>
<td>CH500</td>
<td>$25.00</td>
<td>36CN</td>
<td>CCN</td>
</tr>
<tr>
<td>SOC – Pesticides</td>
<td>1/36 months</td>
<td>09/30/2020</td>
<td>CH500</td>
<td>$125.00</td>
<td>36PT</td>
<td>CXPT</td>
</tr>
<tr>
<td>SOC – Herbicides</td>
<td>1/36 months</td>
<td>09/30/2020</td>
<td>CH500</td>
<td>$120.00</td>
<td>36HB</td>
<td>CXHB</td>
</tr>
<tr>
<td>SOC – Carbamates</td>
<td>1/36 months</td>
<td>09/30/2020</td>
<td>CH500</td>
<td>$120.00</td>
<td>36LP</td>
<td>CXLP</td>
</tr>
<tr>
<td>Gross Alpha (Radiological)</td>
<td>1/108 months</td>
<td>09/30/2024</td>
<td>CH500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radium 226 &amp; Radium 228</td>
<td>1/72 months</td>
<td>09/30/2021</td>
<td>CH500</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Location: Distribution System

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Collect Samples According to the ...</th>
<th># Samples/Frequency</th>
<th>Collect</th>
<th>Site Code</th>
<th>Fee</th>
<th>Unit Number</th>
<th>Test Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriological – coliform</td>
<td>TCR Sampling Site Plan</td>
<td>1/Monthly</td>
<td>Monthly</td>
<td>DIST</td>
<td>$16.00</td>
<td>30</td>
<td>BPTC</td>
</tr>
<tr>
<td>Lead Copper for Corrosion Control</td>
<td>Lead and Copper Sampling Pool</td>
<td>5/35 months</td>
<td>Between 06/01 and 9/30/2018</td>
<td>DIST</td>
<td>$25.00</td>
<td>36CC</td>
<td>CCUB</td>
</tr>
</tbody>
</table>
What is a Monitoring Period?

- The length or portion of time to collect samples
- Can collect at any time between these dates
- “Compliance period”

<table>
<thead>
<tr>
<th>Sampling Frequency</th>
<th>Monitoring Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-Annual</td>
<td>Jan-Jun or Jul-Dec</td>
</tr>
<tr>
<td>Annual</td>
<td>Jun 1 – Sept 30</td>
</tr>
<tr>
<td>Triennial</td>
<td>Jun 1 – Sept 30</td>
</tr>
</tbody>
</table>

ALE Exceptions: not required during some CC steps

ALE Exceptions: not required during some CC steps
Typical pathway to reduction (LCR)

Systems are eligible for reduction after demonstrating lead and copper levels below the Action Level or WQPs within set ranges.

Reduction is a privilege, not a right.
Reduced Monitoring

6-Month → Annual

• Small and medium systems (≤50,000)
  - Two consecutive 6-month rounds
  ≤ ALs for both lead and copper

• Systems without Corrosion Control Treatment (CCT)
  - Meets optimal WQP AND two consecutive 6-month rounds ≤ ALs

Accelerated reduced monitoring
Two consecutive 6-month rounds
90th percentile levels ≤0.005 mg/L for lead and ≤0.65 mg/L for copper
Reduced Monitoring

Annual → Triennial

• Systems **without** Optimum Corrosion Control Treatment (OCCT)
  • Small and medium systems (≤50,000)
    - Three consecutive years of monitoring ≤ ALs
  • Any system
    - Meets optimal WQP **AND** three consecutive years of monitoring ≤ ALs

• Supplies **with** OCCT
  • new rules (next slide)
Reduced Monitoring for Supplies with OCCT

- The water supply cannot reduce to triennial lead and copper tap monitoring unless...
  - They meet water quality parameter ranges AND EITHER
    - They have no lead services lines or
    - They have three annual rounds of sampling $\leq 0.005 \text{ mg/L}$ for lead and $\leq 0.65 \text{ mg/L}$ for copper
How to Conduct Lead and Copper Compliance Tap Sampling

New Rule Alert!
Pre-Sampling Preparation

Order Bottles
Order Early!
Order Extra!

- **Do Not Use** any small/narrow mouth bottles you may have lying around....

[Images of bottles: one narrow mouth marked with an 'X', one wide mouth marked with a checkmark.]
Pre-Sampling Preparation

www.Michigan.gov/lcr

ALWAYS go to EGLE website for current reporting forms!
Who Collects the Samples?

- Water supply is ultimately responsible
- Rule allows customers to collect lead and copper tap samples **ONLY** when provided with proper instruction
  - Operator must make sure sample collection was done properly *before* sending sample to the lab
  - You don’t have to accept the sample if you believe it was collected improperly
Compliance Sampling Procedures

**Lead Service Lines**

- **Five 1-liter bottles**
  - Tier 1, Category A sites
  - Tier 2, Category D sites

**No Lead Service Lines**

- **One 1-liter bottle**
  - All other sites
Tap Sampling – No Lead Service Line

1st liter sample protocol

- 1-liter wide mouth bottle
- Do not sample through POU or POE treatment devices
- 1st draw
  - Water must remain motionless in plumbing system for at least 6 hours
- Cold water kitchen or main bath sink tap
- Do not remove aerators
- Do not systematically flush before sampling
- May allow resident to collect AFTER you give them instruction
  - You cannot challenge the accuracy of sample results
Tap Sampling – No Lead Service Line

Collect 1st liter

Keep 1st liter
Tap Sampling – Lead Service Line

1\textsuperscript{st} and 5\textsuperscript{th} liter sample protocol

- Two samples are used for compliance determination
- 1\textsuperscript{st} liter follows the same sampling procedures as sites without LSLs
- Why the 5th liter?
  - More likely to represent water in the LSL rather than in-home plumbing
  - The first draw sample does not always represent the highest risk for a site with an LSL
Why the 5th liter?

• 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 – 5th liter sample

For EGLE lab:
• 2nd through 4th liter are collected, but are not sent to the lab for analysis
• Bottles 2-4 do not have lids
Tap Sampling – Lead Service Lines

Collect

- 2nd liter
- 3rd liter
- 4th liter
- 1st liter
- 5th liter

Keep

- 1st liter
- 5th liter

1
5
Tap Sampling – Lead Service Lines

1ˢᵗ liter
- 6hr stagnation
- 1st draw
- 1-L volume
- Wide-mouth bottle
- Cold water, kitchen or bathroom tap
- No filter or other device designed to remove inorganics
- Do not remove aerators
- Do not systematically flush

5ᵗʰ liter
- Collect first liter
- Collect and waste three liters
- Collect 5ᵗʰ liter
  - 1-L volume
  - Cold water, kitchen or bathroom tap
  - No filter or other device designed to remove inorganics
- DO NOT turn off tap between bottles
- DO NOT let any water run down the drain between bottles
Tap Sampling – Hold Time

- Samples must be to the lab and preserved within 14 days.
- Do not wait too long for that last sample!
Evaluation of Tap Sample Results

- A statistical calculation is done with all results to find the “90\textsuperscript{th} percentile” value.
- The 90\textsuperscript{th} is compared to the ALs to determine if treatment technique actions are needed.
- If the values are below the ALs, it indicates that 90\% of distribution system sites are in compliance with the LCR.
- A supply exceeds the 90\textsuperscript{th} percentile if more than 10\% of all samples are over the ALs.
- ALs are not health standards, they help determine if treatment changes are needed.

**90\textsuperscript{th} Percentile Calculations**
- >15 ug/L (0.015 mg/L) Lead
- >1300 ug/L (1.3 mg/L) Copper

**Action Level Exceedance**
90th Percentile Calculation Steps

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 Example

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

<table>
<thead>
<tr>
<th>Site</th>
<th>1st Liter</th>
<th>5th Liter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lead (ppm)</td>
<td>Copper (ppm)</td>
</tr>
<tr>
<td>123 Main St</td>
<td>0.001</td>
<td>0.6</td>
</tr>
<tr>
<td>124 ABC Rd</td>
<td>0.001</td>
<td>0.2</td>
</tr>
<tr>
<td>125 North St</td>
<td>0.002</td>
<td>0.01</td>
</tr>
<tr>
<td>126 South Blvd</td>
<td>0.002</td>
<td>0.04</td>
</tr>
<tr>
<td>127 West Ave</td>
<td>0.002</td>
<td>0.025</td>
</tr>
</tbody>
</table>

**90th percentiles**

Lead = 0.020 ppm  
Copper = 0.4 ppm

**Lead ALE**
What Happens if the 90th Percentile Exceeds an AL?

- Triggers numerous actions to be completed by the supply
- Extensive communication with the public
- Source review and sampling
- Increased monitoring frequency and numbers
- Increased LSL replacement (7%), if applicable
Lead Action Level Exceedance Activities

When an AL is exceeded for Lead, supplies must do the following:

- Return to standard lead and copper tap monitoring
- Conduct source water monitoring
- Return to standard water quality parameter monitoring
  - pH, temperature, alkalinity, calcium, conductivity, orthophosphate or silicate (if applicable), chloride, sulfate
- Distribute Public Advisory - within 3 business days
- Distribute Public Education - within 60 days
- Distribute Consumer Notice of Lead and Copper Results
  - 30 days from receipt of result
- Conduct Corrosion Control treatment steps (study, install, and demonstrate)
- Report the exceedance on the Consumer Confidence Report
- Lead Service Line replacement - at a rate of 7% per year if OCCT already in place
Copper Action Level Exceedance Activities

When an Action Level is exceeded for Copper, supplies must do the following:

- Return to standard lead and copper tap monitoring
- Conduct source water monitoring
- Return to standard water quality parameter monitoring
  - pH, temperature, alkalinity, calcium, conductivity, orthophosphate or silicate (if applicable), chloride, sulfate
- Distribute Consumer Notice of Lead and Copper Results
  - 30 days from receipt of result
- Conduct Corrosion Control treatment steps (study, install, and demonstrate)
- Report the exceedance on the Consumer Confidence Report
ALE Letter and Timetable

- Extensive letter detailing the triggered requirements
- Emailed to supply, operator and District
- Provides a chronological list of requirements
- Not on monitoring schedule
- Each requirement has the opportunity to be a monitoring, reporting or treatment technique violation

### Timetable of upcoming requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribute a Public Advisory</td>
<td>Distribute a public advisory to inform all persons served by the water supply of the lead AL concern. Distribution of the notice must be in a form and manner designed to fit the specific situation and must be reasonably calculated to reach all persons served by the public water system.</td>
</tr>
<tr>
<td>Conduct monitoring of Lead and Copper Results to determine if any sites tested above 30 days of the notice period</td>
<td>Conduct monitoring of Lead and Copper Results to determine if any sites tested above 30 days of the notice period.</td>
</tr>
<tr>
<td>November 25, 2018</td>
<td>Perform PIC activities including delivering PIC materials to all consumers.</td>
</tr>
<tr>
<td>November 30, 2018</td>
<td>Collect 60 samples from the distribution system and have them analyzed for lead and copper. This is not on the monitoring schedule.</td>
</tr>
<tr>
<td>December 2, 2018</td>
<td>Send us certification of PIC compliance along with a sample copy of the materials delivered. Sample certification enclosed. Required within 10 days of PIC distribution.</td>
</tr>
<tr>
<td>December 29, 2018</td>
<td>Conduct two sets of WQP samples from your sampling point to the distribution system. Collect two sets of WQP samples at least 24 hours apart from two locations in the distribution system. Repeat each lead and copper monitoring period until both ALs are met.</td>
</tr>
<tr>
<td>Between January 1 and June 30, 2019</td>
<td>Collect 60 samples from the distribution system and have them analyzed for lead and copper. Repeat the results to the EMS and deliver the consumer notices of individual lead and copper results using the downloadable Lead and Copper Report and Consumer Notice of Lead and Copper Results Certificate in Microsoft Word format from <a href="http://michigan.gov/medctopper">http://michigan.gov/medctopper</a>.</td>
</tr>
<tr>
<td>Between January 1 and June 30, 2019</td>
<td>Reduce the results to the EMS and deliver the consumer notices of individual lead and copper results using the downloadable Lead and Copper Report and Consumer Notice of Lead and Copper Results Certificate in Microsoft Word format from <a href="http://michigan.gov/medctopper">http://michigan.gov/medctopper</a>.</td>
</tr>
<tr>
<td>March 31, 2019</td>
<td>Collect one lead and copper sample from year entry point to the distribution system. Repeat every third year until both ALs are met for the three year period.</td>
</tr>
<tr>
<td>March 31, 2019</td>
<td>Collect one lead and copper sample from your sampling point to the distribution system.</td>
</tr>
<tr>
<td>July 1, 2019</td>
<td>Report the 2018 AL compliance in the Consumer Confidence Report.</td>
</tr>
<tr>
<td>Between July 1 and December 31, 2019</td>
<td>Distribute PIC materials from the distribution system and have them analyzed for lead and copper.</td>
</tr>
<tr>
<td>Between July 1 and December 31, 2019</td>
<td>Collect WQP samples.</td>
</tr>
<tr>
<td>Between July 1 and December 31, 2019</td>
<td>Conduct monitoring of Lead and Copper Results as required by the Consumer Confidence Report of the EMS. Collect two sets of WQP samples at least 24 hours apart from two locations in the distribution system. Repeat each lead and copper monitoring period until both ALs are met.</td>
</tr>
<tr>
<td>September 29, 2020</td>
<td>For the July 2020 and 2021 monitoring, send an certification of Consumer Notice of Lead and Copper Results Compliance along with a sample copy of the notice delivered.</td>
</tr>
<tr>
<td>March 31, 2020</td>
<td>For the July 2020 and 2021 monitoring, send an certification of Consumer Notice of Lead and Copper Results Compliance along with a sample copy of the notice delivered.</td>
</tr>
<tr>
<td>March 31, 2022</td>
<td>Collect one lead and copper sample from your entry point to the distribution system. Repeat every third year until both ALs are met for the three year period.</td>
</tr>
</tbody>
</table>
Change in ALs

**Lead**
- The lead action level of 15 ppb remains in effect through December 31, 2024
- The new lead action level of **12 ppb** takes effect January 1, 2025

**Copper**
- The copper action level of 1.3 mg/L (1300 ppb) does not change
Lead and Copper - Investigative Sampling

- To locate potential source of lead/copper
  - Fixture, connective plumbing, valves, building pipes
- Use smaller bottle sizes (250 ml, or 125 ml)
  - Do not use a 1-liter bottle
- Proper investigation with multiple bottles
- First sample collected is 1st draw after 6 hrs. stagnation
- Report all results to EGLE
Lead Service Line Replacement Sampling

- In the event of an emergency partial LSLR, supply shall collect a sample at its expense within 72 hours after partial LSLR completion
  - 1st and 5th liter
  - 6-hr stagnation

- Supply shall report results to the customer w/in 3 business days of receiving the results
Hands On Activity

Your turn to....

HAVE FUN AND ACTIVELY PARTICIPATE
Activity #2 - Information

ABC Water Utility

- Supply Size = 520 Customers
- 10 sites have to be sampled between June and September
TO BE COMPLETED BY RESIDENT/CUSTOMER

Which faucet did you use to fill the bottles?
☐ Kitchen          ☐ Main bathroom      ☐ Other (not an option for residential sites)
If you selected Other, please describe: ________________________________

When was water in the house last used before sampling?
Date _______________    Time _______________ AM/PM

When did you fill the bottles?
Date _______________    Time _______________ AM/PM

Is there a faucet mounted filter?
☐ YES    ☐ NO

If you selected Yes, was it bypassed?
☐ YES    ☐ NO

Is this faucet connected to a home treatment device such as a water softener, filter, reverse osmosis unit, iron removal device OR any other kind of treatment?
☐ YES    ☐ NO

If you selected Yes, please describe: ________________________________

Have any plumbing repairs or replacements been done since the previous sampling event?
☐ YES    ☐ NO

If you selected Yes, please describe: ________________________________

I have read the Drinking Water Lead and Copper Sampling Instructions and have taken the tap samples in accordance with these directions.

_________________________  ________________
Signature                  Date

Sample Collection Address
<table>
<thead>
<tr>
<th>Site No.</th>
<th>Address</th>
<th>Tier Level</th>
<th>Category</th>
<th>Structure Type</th>
<th>Service Line Material</th>
<th>Interior Plumbing Material</th>
<th>Site Validation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Ex: 0000 Any Street—Any Town, MI</td>
<td>1</td>
<td>A</td>
<td>SFR</td>
<td>L</td>
<td>C</td>
<td>Visual</td>
</tr>
<tr>
<td>01</td>
<td>340 Illinois Ave</td>
<td>1</td>
<td>B</td>
<td>SFR</td>
<td>C</td>
<td>L</td>
<td>Visual</td>
</tr>
<tr>
<td>02</td>
<td>352 Illinois Ave</td>
<td>3</td>
<td>F</td>
<td>SFR</td>
<td>G</td>
<td>CLS</td>
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<td>1</td>
<td>A</td>
<td>SFR</td>
<td>L</td>
<td>CLS</td>
<td>Records</td>
</tr>
<tr>
<td>04</td>
<td>2100 Iowa St</td>
<td>0</td>
<td>OT</td>
<td>SFR</td>
<td>C</td>
<td>C</td>
<td>Survey</td>
</tr>
<tr>
<td>05</td>
<td>2314 Iowa St</td>
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<td>OT</td>
<td>SFR</td>
<td>G</td>
<td>C</td>
<td>Survey</td>
</tr>
<tr>
<td>06</td>
<td>111 Maryland</td>
<td>0</td>
<td>OT</td>
<td>SFR</td>
<td>G</td>
<td>C</td>
<td>Survey</td>
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<tr>
<td>07</td>
<td>112 Maryland</td>
<td>1</td>
<td>A</td>
<td>SFR</td>
<td>L</td>
<td>CLS</td>
<td>Survey</td>
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<tr>
<td>08</td>
<td>100 Michigan Ave</td>
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<td>OT</td>
<td>SFR</td>
<td>C</td>
<td>P</td>
<td>Survey</td>
</tr>
<tr>
<td>09</td>
<td>110 Michigan Ave</td>
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<td>OT</td>
<td>SFR</td>
<td>C</td>
<td>C</td>
<td>Survey</td>
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<tr>
<td>10</td>
<td>115 Michigan St</td>
<td>1</td>
<td>A</td>
<td>SFR</td>
<td>L</td>
<td>CLS</td>
<td>Records</td>
</tr>
<tr>
<td>11</td>
<td>300 Minnesota Blvd</td>
<td>3</td>
<td>F</td>
<td>SFR</td>
<td>C</td>
<td>CLS</td>
<td>Permit</td>
</tr>
<tr>
<td>12</td>
<td>657 North Western</td>
<td>3</td>
<td>F</td>
<td>SFR</td>
<td>C</td>
<td>CLS</td>
<td>Permit</td>
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<td>SFR</td>
<td>C</td>
<td>C</td>
<td>Survey</td>
</tr>
<tr>
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<td>OT</td>
<td>SFR</td>
<td>G</td>
<td>C</td>
<td>Survey</td>
</tr>
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<td>OT</td>
<td>BLD</td>
<td>G</td>
<td>C</td>
<td>Survey</td>
</tr>
<tr>
<td>16</td>
<td>100 Purdue</td>
<td>1</td>
<td>A</td>
<td>SFR</td>
<td>L</td>
<td>L</td>
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</tr>
<tr>
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<td>200 Rutgers</td>
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<td>P</td>
<td>C</td>
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<td>C</td>
<td>C</td>
<td>Survey</td>
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<tr>
<td>19</td>
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<td>A</td>
<td>SFR</td>
<td>L</td>
<td>P</td>
<td>Survey</td>
</tr>
<tr>
<td>20</td>
<td>127 Wisconsin Blvd</td>
<td>1</td>
<td>A</td>
<td>SFR</td>
<td>L</td>
<td>CLS</td>
<td>Visual</td>
</tr>
</tbody>
</table>
Activity #2 Instructions

“Sample Pick Up”

- We have 10 stations around the room
- You are going to work in a group
- Review sample bottle and sampling instructions at each station
- Determine if you will accept the sample or not
- Write down your decision on your form (green) in your packet
- Choose a spokesperson for your group
<table>
<thead>
<tr>
<th>Station #</th>
<th>Site No.</th>
<th>Sample Ok?</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 1        | 01      | Not Sure   | Form not complete:  
Don’t know which faucet was used to fill bottle  
Don’t know if there is a POE or POU device |
| 2        | 02      | Not Sure   | Did not describe what type of home treatment device they have or if it was bypassed |
| 3        | 03      | Yes        | Looks to be ok |
| 4        | 07      | Not Sure   | You should ask the resident if the bathroom in the basement is used on a regular basis |
| 5        | 10      | No         | 4 days without use is not typical daily use |
| 6        | 11      | Not Sure   | Softener installed recently, but don’t know if it was bypassed  
Also, the date bottle filled is the day before they last used the water |
| 7        | 12      | No         | Not a 6 hour hold time |
| 8        | 16      | No         | Faucet mount filter was not bypassed |
| 9        | 19      | No         | Laundry sink and almost a month since last used |
| 10       | 20      | Yes        | Looks like proper tap, hold time of at least 6 hours, no filters |
Water Quality Parameter (WQP) Sampling
What are Water Quality Parameters (WQP)?

- Alkalinity, pH, conductivity, temp, calcium, chloride, sulfate, and if used – orthophosphate & silica
- Used to determine the corrosivity of the water
- Helps EGLE determine the type of CCT that a system might need to install and how the treatment should be operated
  - For most water systems that require treatment, CCT is the primary mechanism for reducing lead and copper levels
What Are Optimal Water Quality Parameters (OWQP)?

• Specific ranges or minimums determined by the State for each relevant WQP

• Represent the conditions under which systems must operate their CCT to most effectively minimize lead & copper exposure at users’ taps
WQP Monitoring

- WQP sampling is now required for all supplies with OCCT, and all other supplies exceeding an action level
  - Includes smalls and mediums
- WQPs have been expanded to include chloride and sulfate
- Compliance with WQP ranges necessary to be eligible for reduced tap monitoring
  - WQP monitoring can reduce to annual if criteria is met, but can no longer be reduced to triennial monitoring
- Rules clarified to require establishment of WQP ranges in the distribution system
WQP Monitoring - Sites

Required number of sample sites determined by water supply population served

<table>
<thead>
<tr>
<th>Supply Size (# of People Served)</th>
<th>Number of Sites (Standard Monitoring)</th>
<th>Number of Sites (Reduced Monitoring)</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 100,000</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>10,001 - 100,000</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>3,301 – 10,000</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>501 – 3,300</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>101 - 500</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fewer than 101</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

- Standard Monitoring – Six Month Monitoring
- Reduced Monitoring – Six Month or Annual Monitoring
WQP Monitoring - Frequency

Sampling for non-CCT systems in response to an ALE

- Each point of entry (POE) and # of locations in the distribution system
- 6-months from the beginning of the monitoring period
  - November 30 – Summer monitoring period
  - June 30 – Jan 1-June 30 monitoring period
  - December 31 – July 1-December 31 monitoring period
- Two sets of samples required each monitoring period
  - Quarterly

Continued ALE → Corrosion Control treatment steps and eventual installation and transition to sampling requirements for CCT systems
## WQP Monitoring - Analytes

### BEFORE INSTALLING CCT

<table>
<thead>
<tr>
<th>Entry Point &amp; Distribution</th>
<th>WQP1a</th>
<th>WQP1b</th>
<th>WQP1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>WQP1a</td>
<td>No inhibitor used</td>
<td>Phosphate inhibitor used</td>
<td>Silicate inhibitor used</td>
</tr>
<tr>
<td>pH</td>
<td></td>
<td>pH</td>
<td>pH</td>
</tr>
<tr>
<td>alkalinity</td>
<td></td>
<td>alkalinity</td>
<td>alkalinity</td>
</tr>
<tr>
<td>calcium</td>
<td></td>
<td>calcium</td>
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</tr>
<tr>
<td>conductivity</td>
<td></td>
<td>conductivity</td>
<td>conductivity</td>
</tr>
<tr>
<td>temperature</td>
<td></td>
<td>temperature</td>
<td>temperature</td>
</tr>
<tr>
<td>sulfate</td>
<td></td>
<td>sulfate</td>
<td>sulfate</td>
</tr>
<tr>
<td>chloride</td>
<td></td>
<td>chloride</td>
<td>chloride</td>
</tr>
<tr>
<td>orthophosphate</td>
<td></td>
<td></td>
<td>silica</td>
</tr>
</tbody>
</table>
WQP Monitoring - Frequency

**Sampling for CCT systems**

- Each point of entry (POE)
  - One sample every two weeks
- # of locations in the distribution system
- 6-months from the beginning of the monitoring period
  - November 30 – Summer monitoring period
  - June 30 – Jan 1-June 30 monitoring period
  - December 31 – July 1-December 31 monitoring period
- Two sets of samples required each monitoring period
  - Quarterly

**Impact:** Lot of small and medium systems will have **new** schedules for entry point and distribution WQP monitoring in 2019
## WQP Monitoring - Analytes

### AFTER INSTALLING CCT

<table>
<thead>
<tr>
<th>Entry Point</th>
<th>WQP2a</th>
<th>WQP2b</th>
<th>WQP2c</th>
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</thead>
<tbody>
<tr>
<td>Phosphate inhibitor used</td>
<td>Alkalinity adjusted as part of CC</td>
<td>Silicate inhibitor used</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>pH</td>
<td>pH</td>
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</tr>
<tr>
<td>sulfate</td>
<td>sulfate</td>
<td>sulfate</td>
<td></td>
</tr>
<tr>
<td>chloride</td>
<td>chloride</td>
<td>chloride</td>
<td></td>
</tr>
<tr>
<td>orthophosphate dosage</td>
<td>alkalinity dosage</td>
<td>silica dosage</td>
<td></td>
</tr>
<tr>
<td>orthophosphate residual</td>
<td>alkalinity concentration</td>
<td>silica residual</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution</th>
<th>WQP3a</th>
<th>WQP3b</th>
<th>WQP3c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphate inhibitor used</td>
<td>Ca carbonate stabilization used</td>
<td>Silicate inhibitor used</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>pH</td>
<td>pH</td>
<td></td>
</tr>
<tr>
<td>alkalinity</td>
<td>alkalinity</td>
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</tr>
<tr>
<td>sulfate</td>
<td>sulfate</td>
<td>sulfate</td>
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</tr>
<tr>
<td>chloride</td>
<td>chloride</td>
<td>chloride</td>
<td></td>
</tr>
<tr>
<td>orthophosphate</td>
<td>calcium</td>
<td>silica</td>
<td></td>
</tr>
</tbody>
</table>
WQP monitoring - Field kit vs lab

- Field tests at the time of sample collection
  - pH and temperature

- All other parameters can be either done in the field with a test kit (Hach multi-test DR-900 or equivalent test kits) or sent to a lab.
  - Alkalinity, calcium, conductivity, orthophosphate, chloride* and sulfate

*Field test kit not currently available
WQP monitoring – Test Codes

- WQP monitoring is a combination of tests
- EGLE lab
  - Multiple bottles
    - 32 and 33 bottles
  - Multiple test codes
    - R, CORR
- Other labs
  - Take your monitoring schedule to your lab to help get the correct parameters tested.
**WQP Monitoring - Reduction**

**Point of entry monitoring**
Every 2wks – no eligibility for reduction

**Distribution system monitoring**
Gathering information to designate OWQP
- 6m / 6m
- State designates OWQP (within 6m)
- Demonstrate compliance with OWQP
  - 6m / 6m – 1\textsuperscript{st} year
  - 6m / 6m – 2\textsuperscript{nd} year – Eligible for reduced sampling sites
  - 6m / 6m – 3\textsuperscript{rd} year
- Eligible for annual monitoring
WQP Monitoring - Compliance

Possible violations

- Monitoring violations
  - Failure to sample timely
  - Failure to sample for one or more parameters
- Treatment Technique violation
  - Failure to meet OWQP ranges for any **nine** days within **six months**.
  - **Excursion**
- Reporting violations
  - Failure to report timely
Common Monitoring Errors

**Lead and Copper Tap Sampling**
- Site selection
  - Not the highest tier
- Sample collection methodology
  - Not a kitchen or bathroom tap
  - Stagnation time
  - Vacant
- Hold time issues
  - Sample not received by lab within 14 days
- Incomplete request for analysis paperwork

**WQP Sampling**
- Incorrect WQP analytes
- Failure to collect POE samples every timely (2wks, 6-months, etc.)
- Failure to collect second set of WQP samples
- Thermal preservation
- Incomplete request for analysis paperwork
Common Result Interpretation Errors

- Units
  - As phosphate vs. phosphorous
  - Incorrectly reporting ppm vs ppb
- Types of Phosphate
  - Orthophosphate
  - Polyphosphate
  - Total Phosphate
- Excursion days for OWQP ranges
Questions?