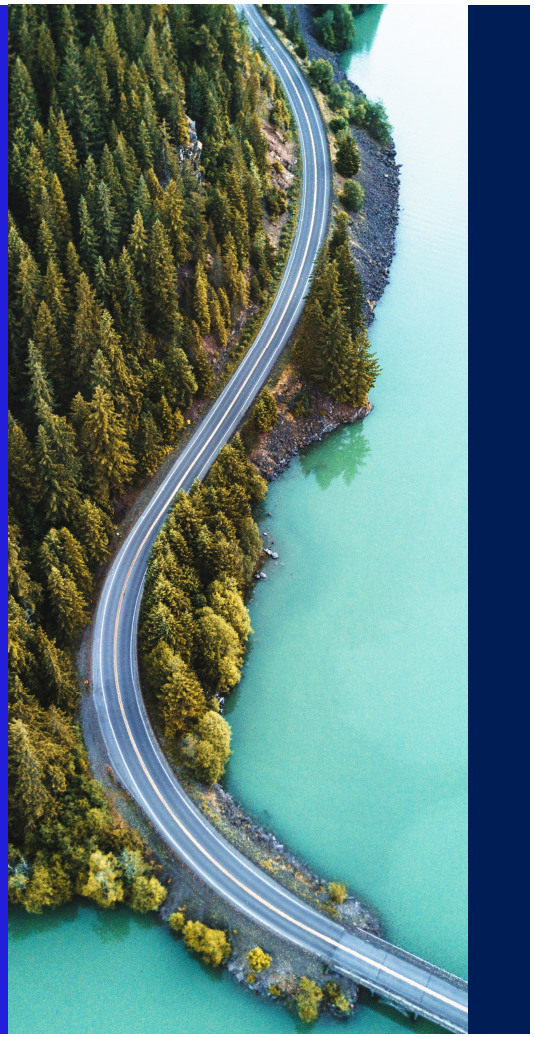
Jacobs Challenging today. Reinventing tomorrow.

What You Need to Know About the Lead & Copper Rule Revisions

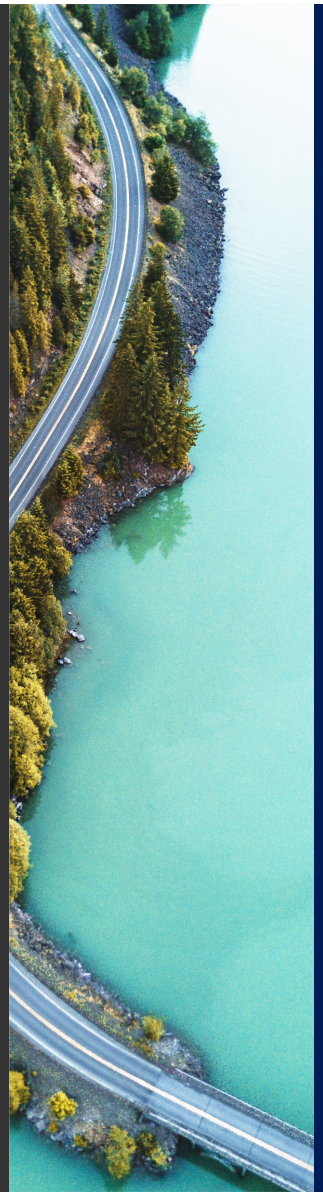


In the kNOW Webinar Series

March 22, 2021

Presenters

- **Russell Ford**, PhD, PE, BCEE
  Jacobs Drinking Water and Reuse Global Solutions Director
- **Jennifer Liggett**
  Jacobs Drinking Water Technologist
- **Rich Giani**
  Jacobs Drinking Water Technical Coordinator
- **John Walsh, PE**
  Utilities Director, City of Cocoa, Florida
- **Alan Roberson, PE**
  Executive Director, Association of State Drinking Water Administrators (ASDWA)



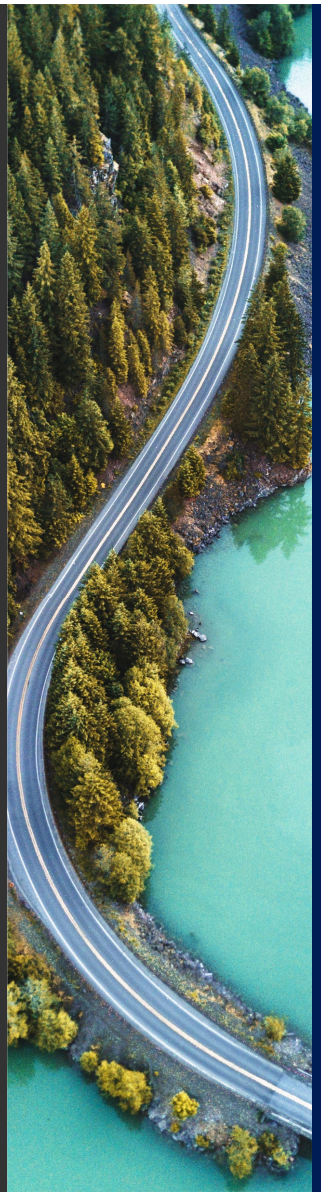
Jacobs

Lead and Copper Rule Revisions

Jennifer Liggett

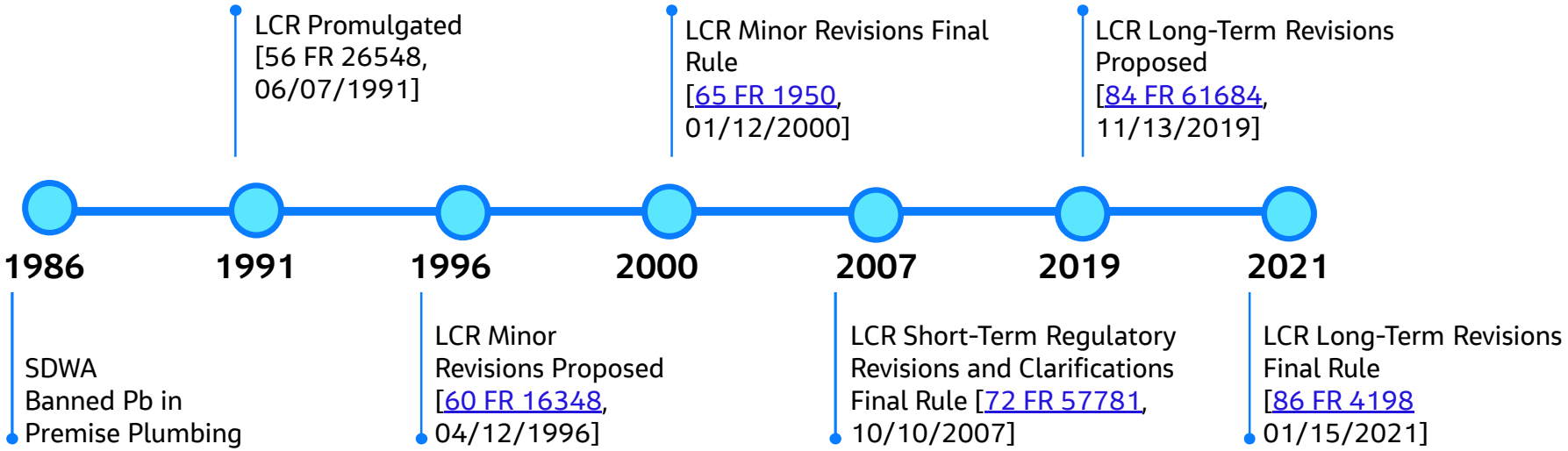
Agenda

- **Lead and Copper Rule History**
- **Lead and Copper Rule Revisions**
  - Lead Service Line Inventory
  - Lead Service Line Replacement Plans
  - Lead and Copper Sampling Sites and Plans
  - Trigger Level, Water Quality Parameters and Find-and-Fix
  - Monitoring in Schools and Licensed Childcare Facilities
  - Public Communication and Outreach



History of the Lead and Copper Rule

The Lead and Copper Rule, a National Primary Drinking Water Standard, is codified in **40 CFR 141, Subpart I**



CFR= Code of Federal Regulations; FR = Federal Register;
LCR = Lead and Copper Rule; Pb = Lead; SDWA = Safe Drinking Water Act

Biden Administration Regulatory Freeze & EPA Federal Notices

Regulatory freeze to review Revised Lead and Copper Rule on January 20, 2021

- https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/regulatory-freeze-pending-review/
- https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/20/fact-sheet-list-of-agency-actions-for-review/

Two notices released by EPA on March 12, 2021

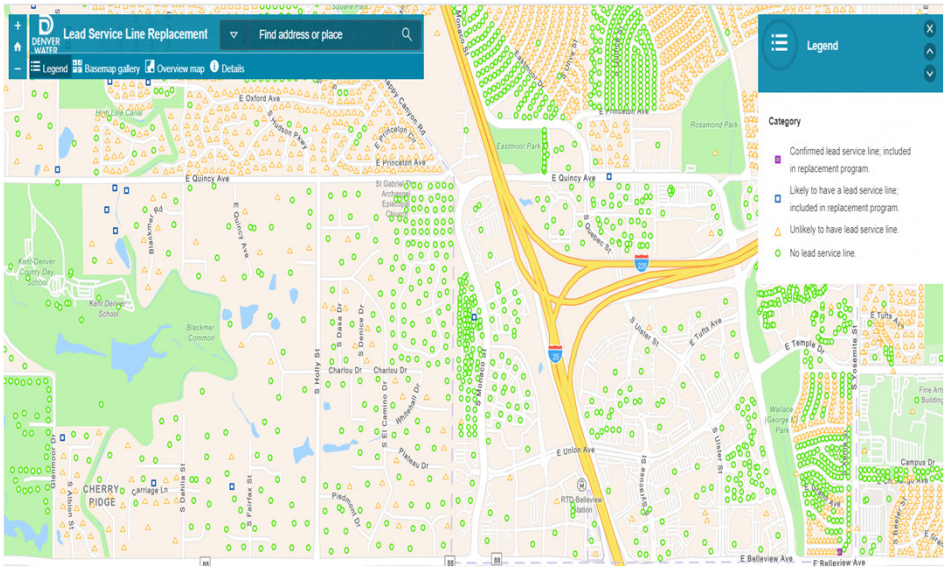
1. "…announces an extension of the effective date for the revised LCR from March 16, 2021 until June 17, 2021."
2. "The second action that was signed proposes to extend the effective date until December 16, 2021 and also proposes a corresponding extension of the revised LCR's compliance deadline to September 16, 2024."

The information presented today is from the final rule as published January 15, 2021.
There may be some changes to the final rule including the timelines and other criteria.

Lead Service Line Inventory

All community water systems must develop a service line inventory within 3 years

- Must include both public and private portions of the service line
- Must indicate if service is lead, non-lead, galvanized requiring replacement, or lead status unknown
  - Galvanized pipe downstream of lead service line must be categorized as “galvanized requiring replacement”
- Must make publicly available online if serving over 50,000 customers
- Provide notification to customers with lead service lines



https://dw.maps.arcgis.com/apps/View/index.html?appid=cb5d6630085b4e4b96ff7fd1adf39025

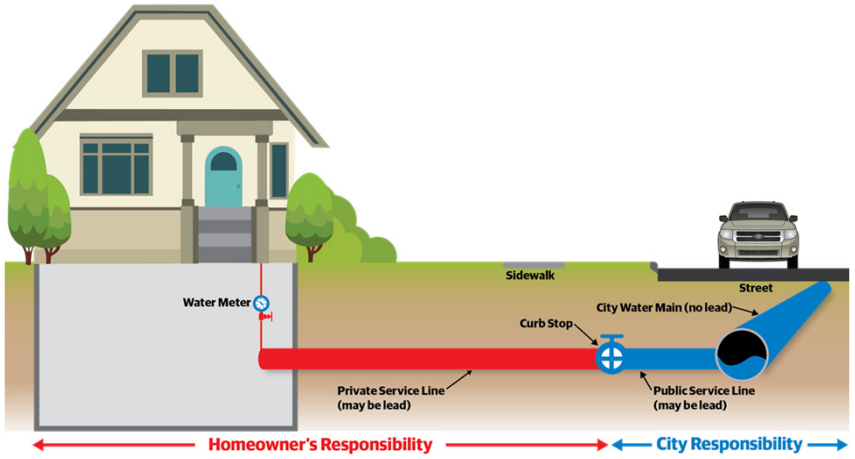
Lead Service Line Replacement Plans

LSL replacement plans must be completed within 3 years

- Must replace at agreed rate per year if lead trigger levels are exceeded
- Must replace at 3% per year based on a 2-year running average if lead action levels are exceeded
- Must replace both public and private portions of LSL
- Provide pitcher filters for replacements
- If homeowner replaces private service line, water system must replace public service line within 45 days (or up to 180 days)
- Replacement plans must include financing options and information for customers

https://www.cityofflint.com/2016/03/31/mayors-plan-to-replace-lead-tainted-pipes-in-flint-making-progress/

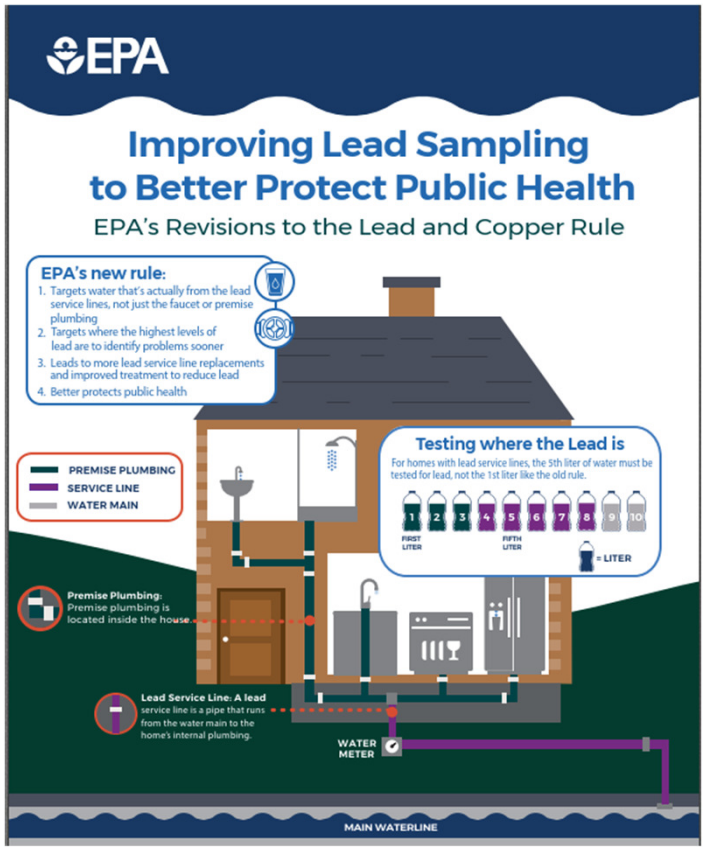
https://www.dcwater.com/new-lead-service-line-replacement-assistance-programs



Lead and Copper Sampling Sites and Plans

- Sampling plan due in 3 years & first round of compliance sampling in 3.5 years
- New sampling tiers for water systems and reporting requirements

Tier	Criteria
1	Single-family homes served by a lead service line
2	Buildings or multiple-family homes served by a lead service line
3	Single-family homes with galvanized service lines downstream of a lead service line or lead gooseneck (currently or at any time)
4	Single family structures served by copper pipes with lead solder
5	Locations representative of the distribution system



Trigger Level, Water Quality Parameters, Find-and-Fix

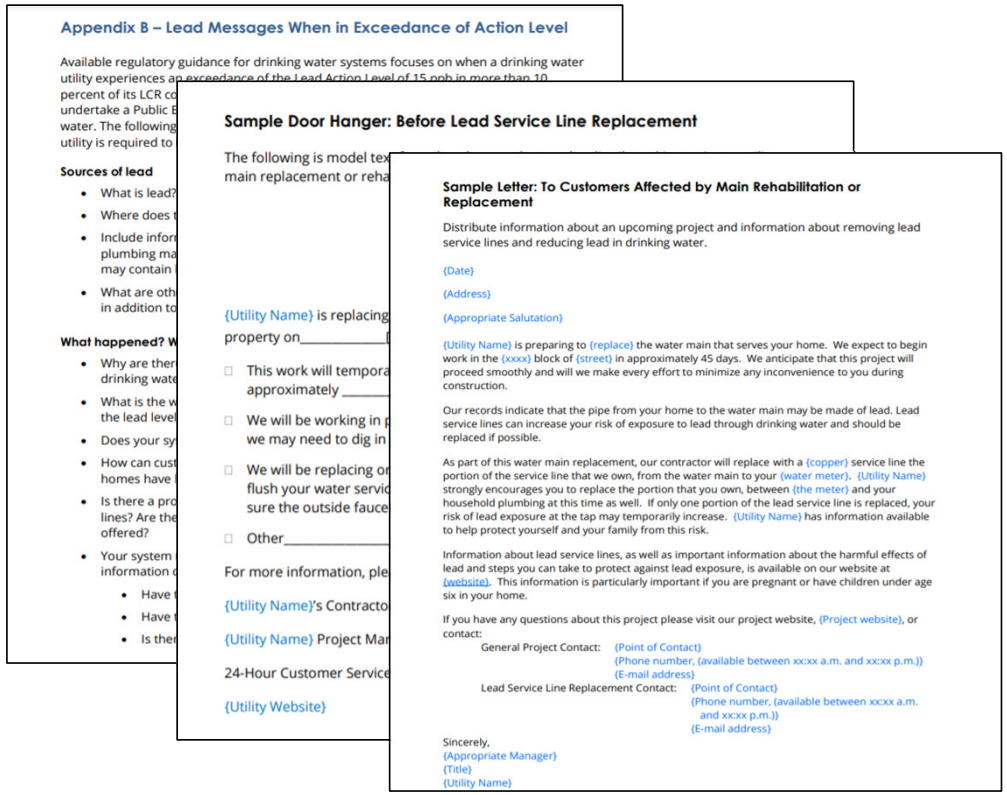
- Action level is unchanged at 15 µg/L for lead and 1.3 mg/L for copper
- New trigger level of 10 µg/L for lead
- If 90th percentile is less than or equal to 5 µg/L Pb and 0.65 mg/L Cu, large systems may go on triannual monitoring
- Water quality parameters
  - Removed calcium hardness as a corrosion control treatment and WQ parameter
  - Water quality parameters will be approved by the State or Primacy Agency
- Large systems must have 25 locations for WQPs and up to 50 for Find-and-Fix for action level exceedances
  - If no location for find and fix is within 0.5 miles and of the same pipe diameter from the house, then a new water quality parameter sample location must be added
  - Required to determine the cause of elevated lead levels

Monitoring in Schools and Licensed Childcare Facilities

- Contact and sample 20% elementary schools and 20% childcare facilities per year over a 5-year period
- EPA's 3Ts:
  - 5-250 mL stagnant samples in elementary schools and 2-250 mL samples for childcare facilities
  - First draw after at least 8-hour stagnation but no more than 18-hour stagnation
- Must sample once in the 5-year period and then upon request thereafter
- Must report results to State or Primacy Agency and local and state health departments as part of annual reporting
- School waived if built past 2014 and adopted lead free act or if State program is similar to EPA LCRR

Public Communication and Outreach

- Public Communication
  - LSL Inventory
  - LSL or Unknown Disturbances
  - LSL Replacement
  - Action Level Exceedances
- Communication and Outreach
  - Schools and Child Care Facilities



Appendix B – Lead Messages When in Exceedance of Action Level

Available regulatory guidance for drinking water systems focuses on when a drinking water utility experiences an exceedance of the Lead Action Level of 15 ppb in more than 10 percent of its LCR co undertake a Public E water. The following utility is required to

Sources of lead

- What is lead?
- Where does t
- Include infor plumbing ma may contain
- What are oth in addition to

What happened? W

- Why are ther drinking wate
- What is the w the lead level
- Does your sy
- How can cust homes have
- Is there a pro lines? Are the offered?
- Your system information c
  - Have t
  - Have t
  - Is ther

Sample Door Hanger: Before Lead Service Line Replacement

The following is model tex main replacement or reha

{Utility Name} is replacing property on_____

- ☐ This work will tempora approximately _____
- ☐ We will be working in p we may need to dig in
- ☐ We will be replacing or flush your water servic sure the outside fauce
- ☐ Other_____

For more information, ple

{Utility Name}'s Contracto

{Utility Name} Project Mar

24-Hour Customer Service

{Utility Website}

Sample Letter: To Customers Affected by Main Rehabilitation or Replacement

Distribute information about an upcoming project and information about removing lead service lines and reducing lead in drinking water.

{Date}

{Address}

{Appropriate Salutation}

{Utility Name} is preparing to {replace} the water main that serves your home. We expect to begin work in the {xxxx} block of {street} in approximately 45 days. We anticipate that this project will proceed smoothly and will we make every effort to minimize any inconvenience to you during construction.

Our records indicate that the pipe from your home to the water main may be made of lead. Lead service lines can increase your risk of exposure to lead through drinking water and should be replaced if possible.

As part of this water main replacement, our contractor will replace with a {copper} service line the portion of the service line that we own, from the water main to your {water meter}. {Utility Name} strongly encourages you to replace the portion that you own, between {the meter} and your household plumbing at this time as well. If only one portion of the lead service line is replaced, your risk of lead exposure at the tap may temporarily increase. {Utility Name} has information available to help protect yourself and your family from this risk.

Information about lead service lines, as well as important information about the harmful effects of lead and steps you can take to protect against lead exposure, is available on our website at {website}. This information is particularly important if you are pregnant or have children under age six in your home.

If you have any questions about this project please visit our project website, {Project website}, or contact:

General Project Contact: {Point of Contact} {Phone number, (available between xx:xx a.m. and xx:xx p.m.)} {E-mail address}

Lead Service Line Replacement Contact: {Point of Contact} {Phone number, (available between xx:xx a.m. and xx:xx p.m.)} {E-mail address}

Sincerely,
{Appropriate Manager}
{Title}
{Utility Name}

Source: AWWA Lead Service Line Communications Guide
https://www.awwa.org/Portals/0/AWWA/Communications/FINALeadServiceLineCommGuide.pdf

Thank You

Jennifer Liggett
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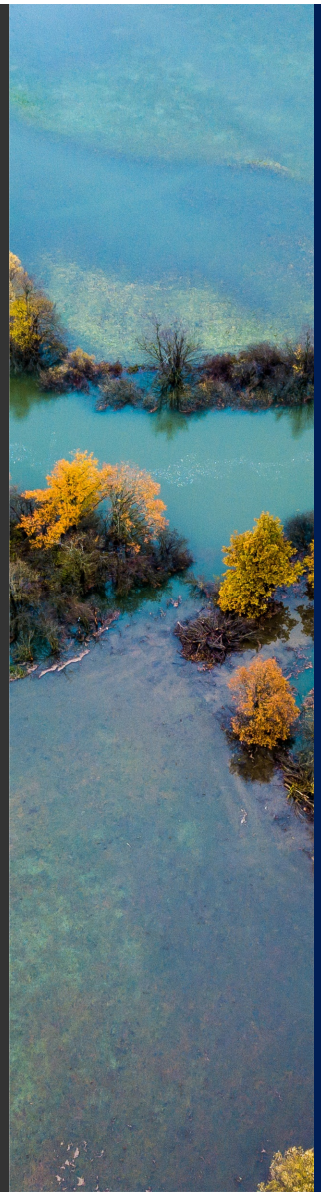
Jacobs

Lead and Copper Rule Revision Tools

Rich Giani

Agenda

- **Inventory Tools**
  - Potholing
  - Profiling
  - Electrochemistry
- **Distribution Assessment Tools**
  - Water Quality Modelling
  - Geochemical Modelling
  - New Source Blending and New Treatment Impacts



Inventory Tools

Physical Inspection

- Experienced person can identify what is entering a home
- However, different material may be underground
- Warm climate locations – service line pipes are usually visible in meter pits
- Test kits or magnets can be used to distinguish between galvanized and lead

DC Water

Potholing

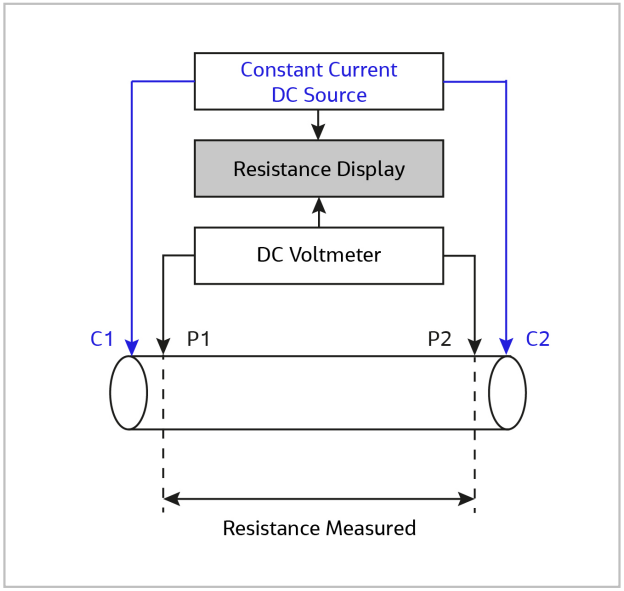
- Accurate
- Invasive to property
- Is considered a “disturbance” for lead pipes
  - Will need to supply filters
- Galvanized pipes can cause discolored water issues

Hydro Spy LLC

Contractors LCC

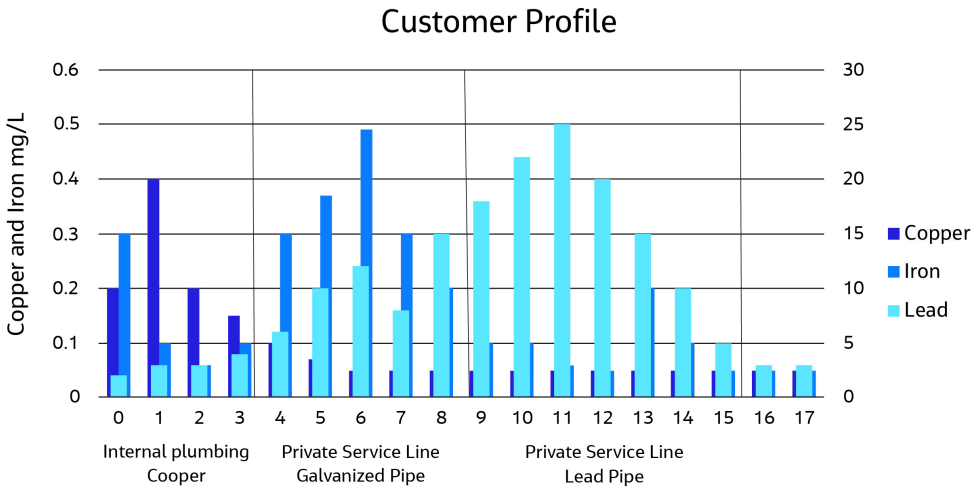
Electrochemistry

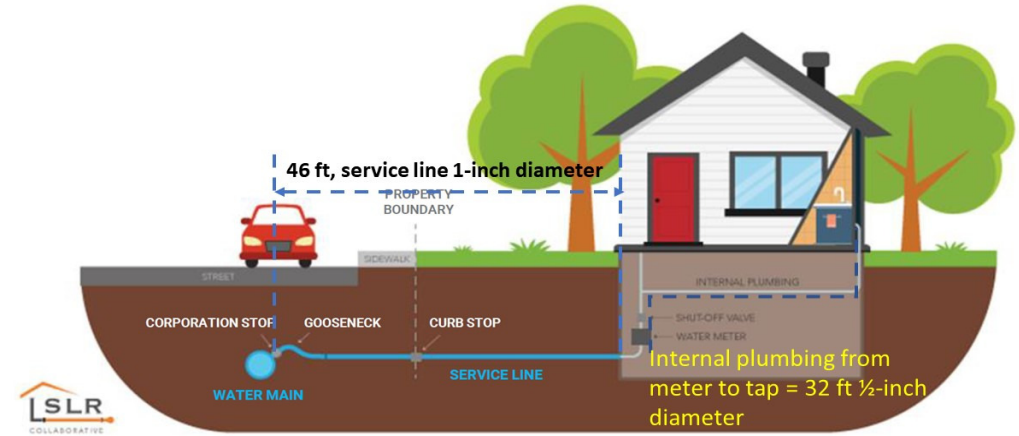
- Measuring the electrical resistance along the pipewall
- Can measure the difference between copper and lead pipe
- Research needed to determine the difference between galvanized and lead pipe:
  - Less invasive
  - Can attach electrode in meter pit or curbstop
  - Longer pipe lengths can be difficult to distinguish
  - Need to establish a baseline



Sequential Sampling or Profiling

- Similar to collecting the “5th liter”
- Measure Lead, Copper, and Iron
- Need to develop baseline between lead, copper, and galvanized pipes
- Develops a percent confidence factor





Lead Service Line Replacement Collaborative

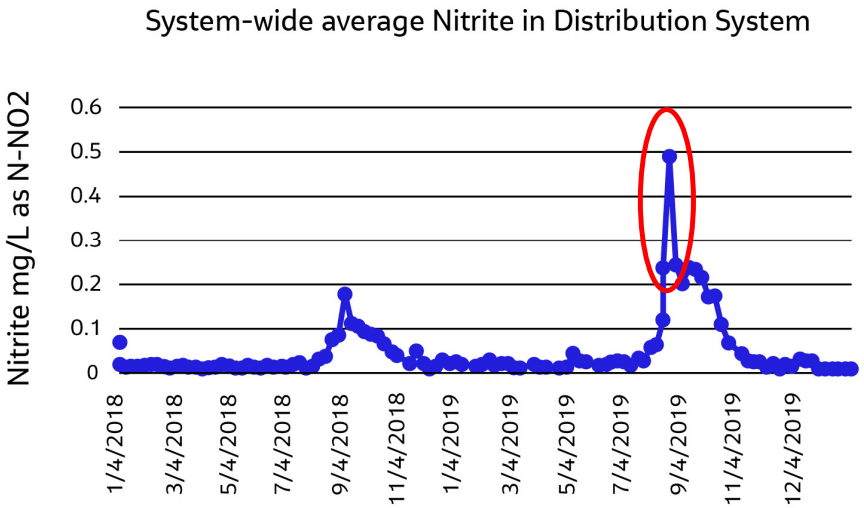
Distribution Assessment

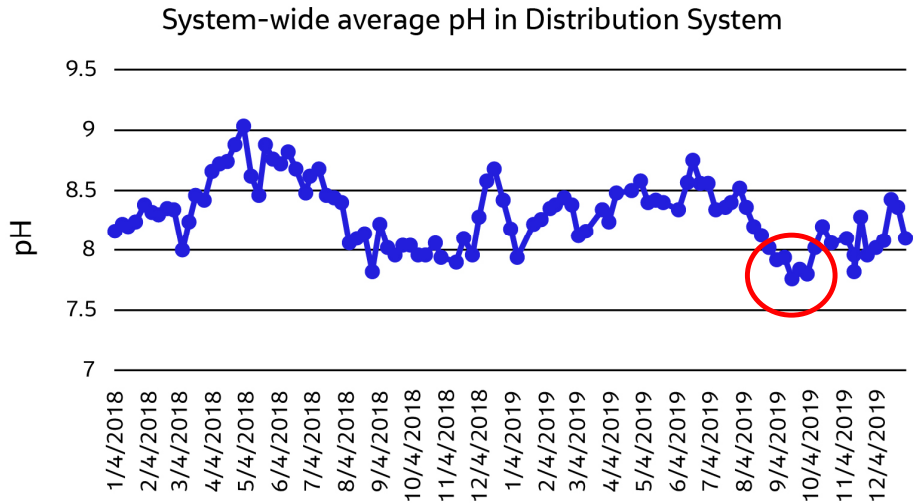
Distribution Assessments

- Can qualify the type of deposition and type of pipe scale based on water quality from high velocity samples.
- Geochemical models can predict the type of dominant metal speciation and develop more specific solubility charts for key metals.
  - Lead, copper, iron, manganese, aluminum, calcium, and other heavy metals (i.e., arsenic)
- Water quality models can be used to predict changes in water quality that can impact scales.
- Blending models can used to determine changes in water quality when new sources are added to the distribution system.
- Distribution assessment data can be useful for 10 years if a utility is looking to make changes to treatment or sources. Plug data into models.

Case Study

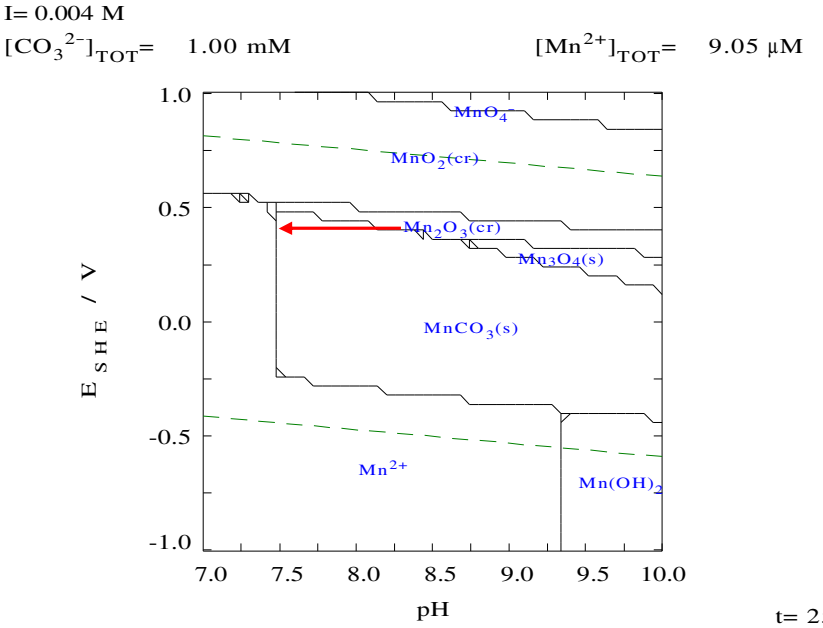
Distribution assessment data was able to determine the cause of discolored water events that were correlated with manganese release due to a large nitrification event.

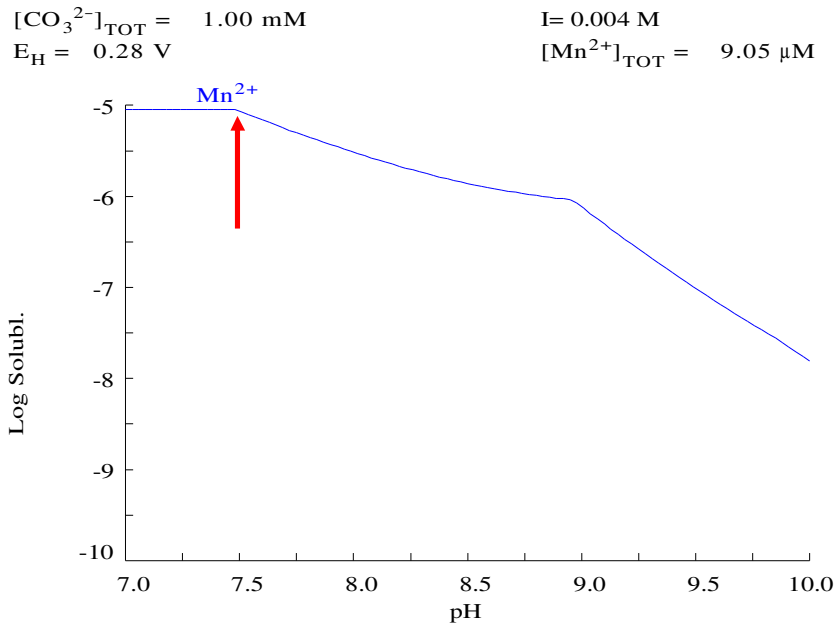




Case Study – Geochemical Models Predictions

- Distribution assessment identified manganese as the primary metal in system wide deposition.
- Geochemical models predicted the manganese was most likely in the form of manganese carbonate (rhodochrosite).
- Rhodochrosite completely solubilizes at a pH of 7.5 under the water quality conditions that occurred.
- Hypothetically, if lead existed and was adsorbed to the manganese, lead release could have also occurred simultaneously.





Thank You

Richard Giani
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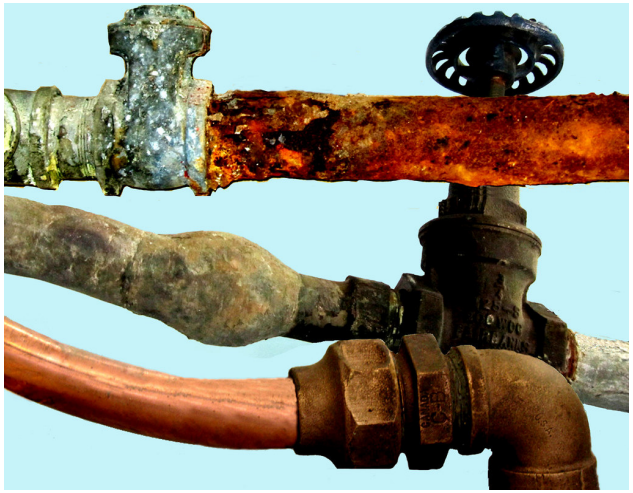
Lead and Copper Rule Revision from Utility's Perspective

John "Jack" Walsh, PE

Utility Impacts to Operations

Lead Service Line Inventory within 3 years



Requirements

- Plan on starting early to meet the deadline
- Utility will be responsible for lead service line inventory program
- Details of how to conduct and analyze are open

Approach

- Conduct inventory – start with desktop
- Lines identified to be replaced must be replaced on customer-side as well as public-side in order to qualify as replaced
  - Identify grants and funding for customers
  - Enforcement action if customer does not comply
  - Utility will be responsible for R&R that meets 3% rule – 2yr. running average

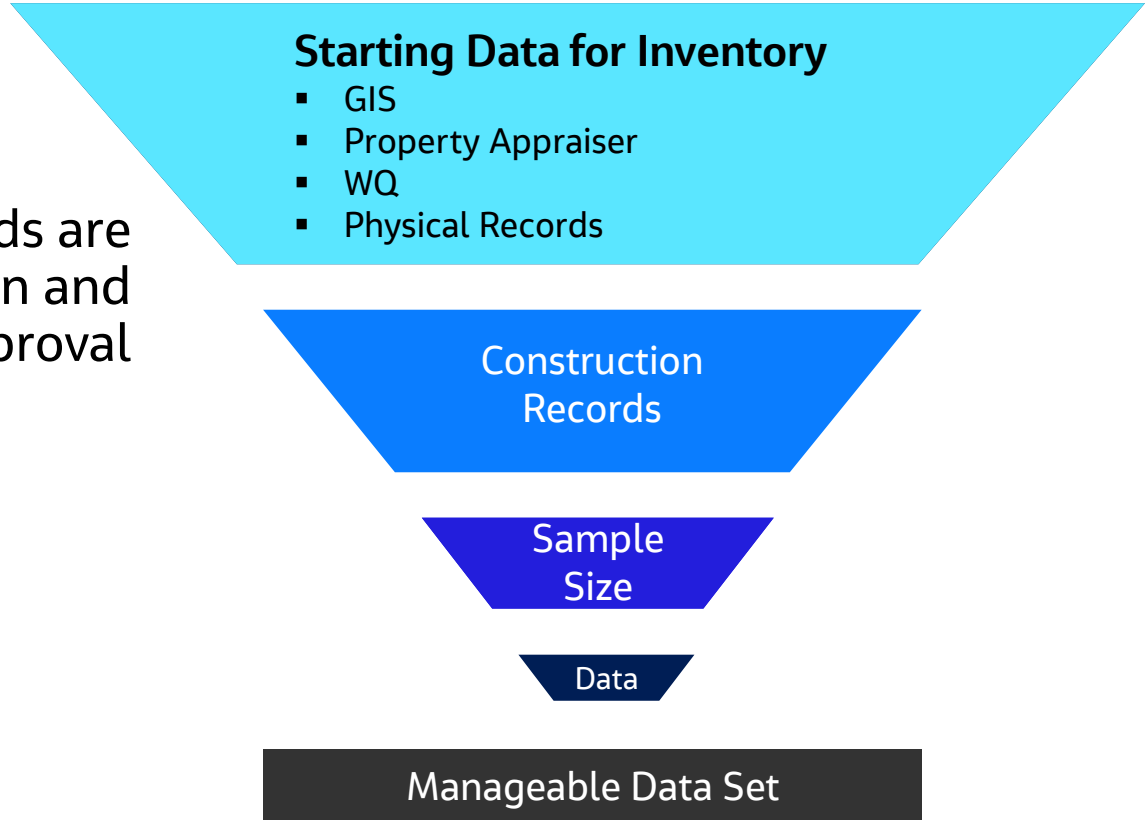
Preparing an Inventory Plan

Desk Top Evaluation

- Inventory of original construction year
- Plumbing codes
- Field operations experience, documentation and inventory
- LCR historic sampling events
- Use statistics …
- Last resort … field verification

Preparing an Inventory Plan

- Sort and cull available data
  - Requirements and methods are open to interpretation and approval



Lead Service Line Replacement Plan

Execution - dependent upon LSL inventory results and WQ sampling

- Determine necessary resources for compliance
  - Permit requirements for replacement (local, regional, FDOT etc.)
  - Estimate costs

Internal Approach

- Potential dedicated City team for LSL replacement
- Backflow Crew
- Field Operations Crew

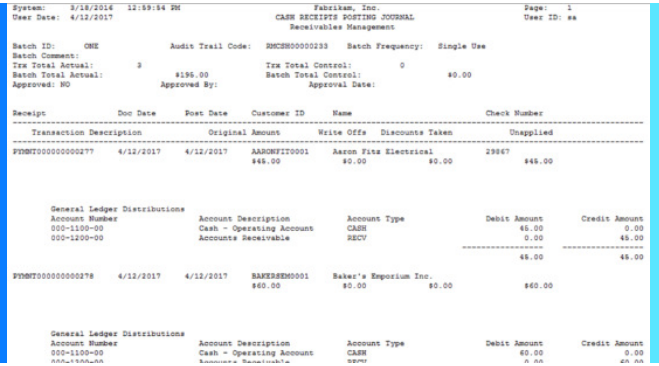
External Approach

- Local contractors, vendors, and consultants

Combination Approach

Elementary School and Childcare Facilities and Public Outreach

- **Approach**
  - Data Search
    - Customer Service Records
    - Conservation Records - critical facilities
    - City and County business receipts
- **Public Outreach/PR Campaign**
- Sample 20% per yr. (waived if built after 2014)



System: 3/16/2016 12:59:54 PM Fabrikam, Inc. Page: 1
User Date: 4/12/2017 CASH RECEIPTS POSTING JOURNAL User ID: sa
Receivables Management

Batch ID: ONE Audit Trail Code: RMCSH00000233 Batch Frequency: Single Use
Batch Comment:
Trx Total Actual: 2 Trx Total Control: 0
Batch Total Actual: $196.00 Batch Total Control: $0.00
Approved: NO Approved By: Approval Date:

Receipt	Doc Date	Post Date	Customer ID	Name	Check Number
Transaction Description		Original Amount	Write Offs	Discounts Taken	Unapplied
PYMNT000000000277	4/12/2017	4/12/2017	AARONFIT0001	Aaron Fitz Electrical	29867
		$45.00	$0.00	$0.00	$45.00

General Ledger Distributions

Account Number	Account Description	Account Type	Debit Amount	Credit Amount
000-1100-00	Cash - Operating Account	CASH	45.00	0.00
000-1200-00	Accounts Receivable	RECV	0.00	45.00
			45.00	45.00

PYMNT000000000278	4/12/2017	4/12/2017	BAKERSEM0001	Baker's Emporium Inc.	
		$60.00	$0.00	$0.00	$60.00

General Ledger Distributions

Account Number	Account Description	Account Type	Debit Amount	Credit Amount
000-1100-00	Cash - Operating Account	CASH	60.00	0.00

Thank You

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jwalsh@cocoafl.org

Jacobs

asdwa
Association of State
Drinking Water Administrators

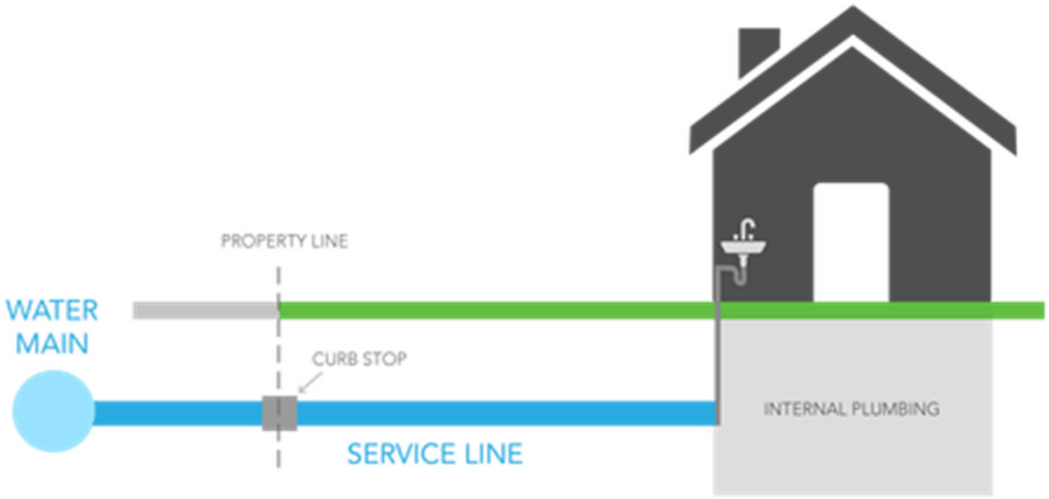
Lead and Copper Rule Revisions

What it Means to States and Water Systems

Alan Roberson, PE

LCRR Challenges

- Lead service line inventories
  - Compliance monitoring plans
  - Replacement plans
- Action level exceedance (ALE)
  - Required actions after ALE
- Trigger level & find-and-fix
- Corrosion control treatment
- Public education & public notification
- Testing in schools and child care facilities
- $$ for cities and states

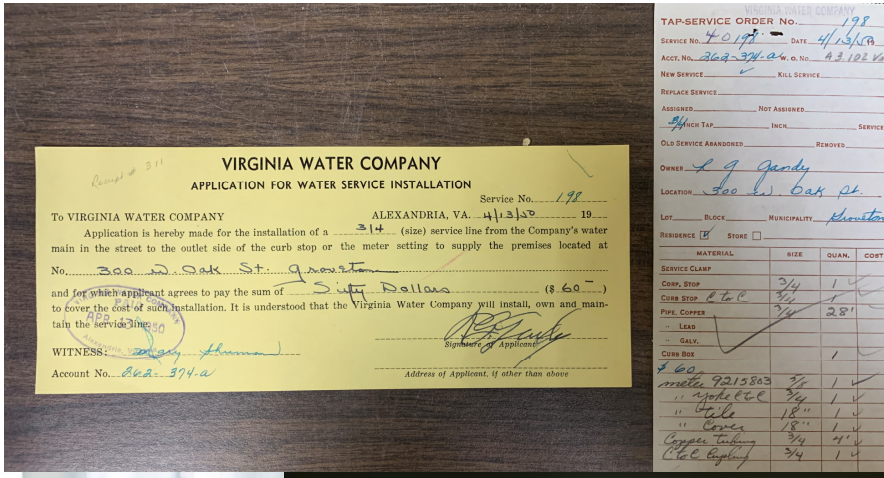


EPA “Curveball” Exacerbates These Challenges

- Executive Order review of “last-minute” regulations
  - Reviews typical for a new Administration
  - 2001 review of revised arsenic regulation
- Two Federal Notices published on Friday, March 12th
- First notice:
  - Extends effective date to June 17th
- Second notice:
  - Proposes extending effective date to December 16th
  - Comments due on April 12th
  - Allows time for EPA consultation with stakeholders
    - ASDWA’s members are co-regulators w/ EPA
- What’s next & possible scenarios at the end

Lead Service Line Inventories & Sampling Plans

- Inventories
  - Materials for both public and private sides of all service lines
    - Looking for lead service lines
    - Many unknowns on private side
- Initial inventory in three years
  - Will have lots of unknowns
    - How to decrease that number?
      - Models & algorithms
  - Must be publicly available
    - Website – serving >50,000 people
- Samplings plans will need to be revised based on inventories
- Both requirements will remain?


VIRGINIA WATER COMPANY

APPLICATION FOR WATER SERVICE INSTALLATION

Service No. 198

To VIRGINIA WATER COMPANY ALEXANDRIA, VA. 4/13/50 19

Application is hereby made for the installation of a 3/4 (size) service line from the Company's water main in the street to the outlet side of the curb stop or the meter setting to supply the premises located at

No. 300 N. Oak St. Groveton

and for which applicant agrees to pay the sum of Sixty Dollars ($ 60)

to cover the cost of such installation. It is understood that the Virginia Water Company will install, own and maintain the service line.

WITNESS:

Account No. 642-374-a

Signature of Applicant

Address of Applicant, if other than above

TAP-SERVICE ORDER No. 198

Lead Service Line Replacement Plans

- Requirement will remain? % the same?
- Replacement Plans
  - Goal: replace all the lead service lines all the way to building wall
  - Systematic & detailed plan
    - How to prioritize
    - How to inform homeowners
    - How to provide financial assistance for private side replacement costs
- Plan should be developed even without an Action Level Exceedance

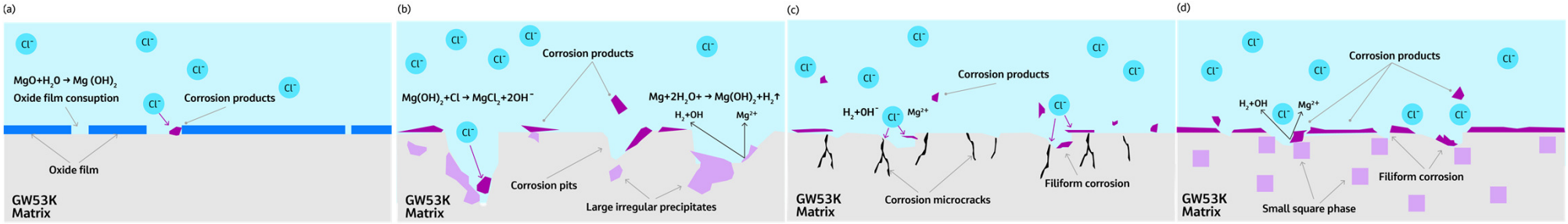
Action Level Exceedances & Trigger Level

- Action Level Exceedances (ALEs)
  - 90th percentile (P90) - “bright line”
    - 15 ppb for lead
- Required actions
  - Public notification
  - Corrosion control treatment if not already in place
  - 3% annual requirement for lead service line replacement
- Going to see a lot more ALEs
  - New sampling plans
  - Fifth liter sample for LSL locations
- New Trigger Level P90=10 ppb
  - Modifies the required actions
- Find-and-fix for sample >15 ppb
  - Additional sampling in the area around the sample >15 ppb
  - Stay out of fixing anything in the home
- What’s going to happen with the Action Level and Trigger Level?
  - It’s anybody’s guess…

Corrosion Control Treatment

Requirements will remain?

- Corrosion Control Treatment (CCT) is not simple
- Can be as much an art as science
- Many systems will have to re-optimize
- Many studies to be conducted
- Desktops to pipe loops
- CCT expertise needs to be increased
- AWWA and ASDWA partnering on CCT training for systems, consultants, and primacy agencies
- AWWA CCT certificate program to be released sometime in 2021



Public Education & Notification

- Requirements will remain? Revised?
- Public needs to be educated about the locations of lead service lines
  - Why it's important to have them removed
- Public education needs to be ongoing
  - Going to take several years to replace all the lead services lines all the way to building wall
- Public notification requirements
  - 24 hours after a system-wide action level exceedance
  - 72 hours for a compliance sample > 15 ppb
    - 30 days for samples < 15 ppb

Testing in Schools and Childcare Facilities

- Requirements will remain?
  - Revised??
- Systems required to test 20% of elementary schools and childcare facilities annually for 5 years
  - On request after initial five years
  - Secondary schools on request
- Systems provide sampling results
- Remediation of problematic fixtures has a significant cost

Costs for Systems

LCRR Costs (from EPA) @ 3%

- PWSs: $215.3 million annually
- States: $20.3 million
- Homeowners: $11.0 million
- WWTP: $1.5 million

Benefits (IQ) @ 3%

- $434 million annually

Potential Issues with the Costs

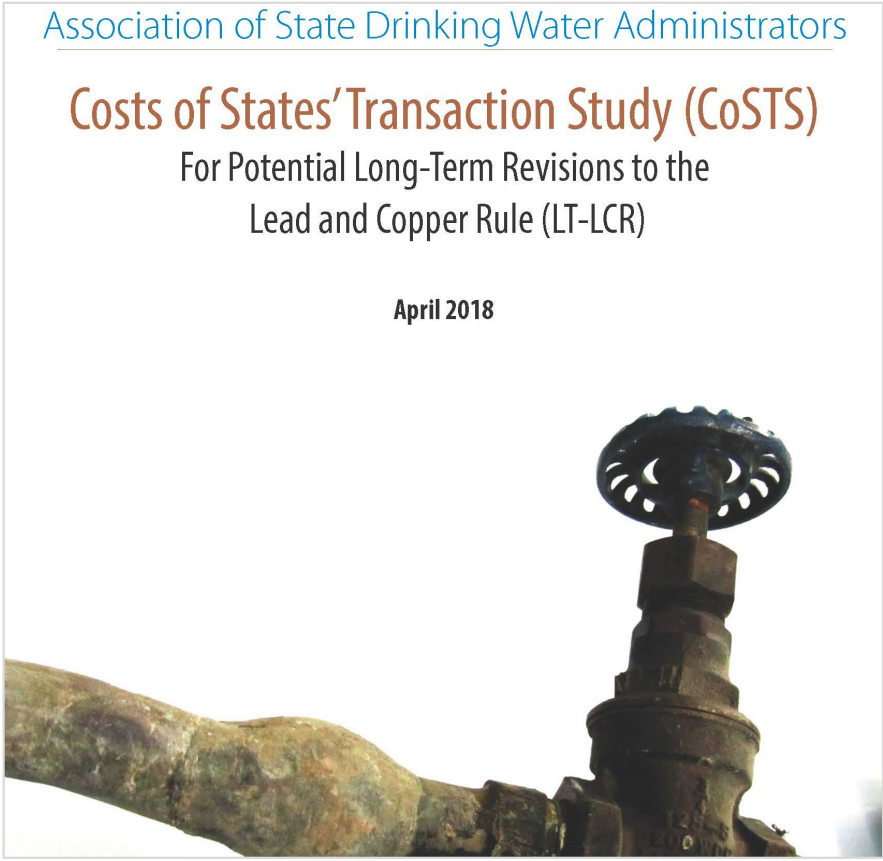
- Average LSLR cost - $4,700
- Could be on the low side
- What will happen if many residents want LSLR in the early stages of LCRR implementation?
- How will systems will provide subsidies to residents for private side LSLR?

Using 7% - costs and benefits are approx.
3.6% higher

Costs for States

States' Costs (from ASDWA)

- Review of all inventories & plans, compliance sampling, lead service line replacement, corrosion control studies, public education and notification, and testing in schools and child care facilities
- 835,000/yr. additional staff hours
  - $49 million annually for states
  - 44% of current Public Water Supply System (PWSS) funding to states
- Data management a big concern



What's Next and Scenarios

What's Next?

- Comments will be submitted to EPA on extension to Sept. 16th
- EPA will talk to stakeholders in spring/summer
- EPA will decide on how to proceed on LCRR
  - Agency will have to balance getting rule out with "making a mark"
    - Decision will be made a high levels of Biden-Harris Administration

Possible Scenarios

- Supplemental proposed rulemaking
  - Target a handful of issues to propose revisions
    - Minimize public comment period & comment response effort
- Re-propose a completely different LCRR
  - Significant time and resources

Thank You

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