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Issues:	AAO Lead Line Replacements
Witness:	Gary A. Naumick
Exhibit Type:	Direct
Sponsoring Party:	Missouri-American Water Company
Case No.:	WU-2017-0296
Date:	August 1, 2017

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WU-2017-0296

DIRECT TESTIMONY

OF

GARY A. NAUMICK

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

IN THE MATTER OF THE APPLICATION OF MISSOURI-AMERICAN WATER COMPANY FOR AN ACCOUNTING ORDER CONCERNING MAWC's LEAD SERVICE LINE REPLACEMENT PROGRAM.	**CASE NO. WU-2017-0296**

AFFIDAVIT OF GARY A. NAUMICK

Gary A. Naumick, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony entitled "Direct Testimony of Gary A. Naumick"; that said testimony and schedules were prepared by him and/or under his direction and supervision; that if inquiries were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge.

Gary A. Naumick

State of New Jersey
County of Camden
SUBSCRIBED and sworn to
Before me this 1st **day of** August **2017.**

Linda K. Stapleton
Notary Public

My commission expires:

LINDA K. STAPLETON
NOTARY PUBLIC
STATE OF NEW JERSEY
MY COMMISSION EXPIRES MAY 19, 2021

DIRECT TESTIMONY
GARY A. NAUMICK
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WU-2017-0296

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GARY A. NAUMICK

DIRECT TESTIMONY

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Gary Naumick, and my business address is 1025 Laurel Oak Rd, Voorhees, NJ 08043.

Q. By whom are you employed and in what capacity?

A. I am employed by American Water Works Service Company, Inc. ("AWWSC") as Vice President of American Water Engineering.

Q. What are your responsibilities in this position?

A. In my role as Vice President of Engineering, I am responsible for directing the engineering function for American Water Works Company, Inc. ("American Water"). The Engineering department's responsibilities include providing engineering services for all American Water water and wastewater systems, including strategy, standards, governance and oversight for water and wastewater system master planning; capital budgeting and capital investment management; asset technical standards; design and design management; capital project delivery and construction management; support to operations, environmental management, and rates functions.

Q. Please describe your educational background.

A. I received a Bachelor of Science degree in Civil Engineering from the Pennsylvania State University in 1977. I received a Master of Science degree in Engineering Management from the New Jersey Institute of Technology in 2002.

Q. Please describe your professional experience.

A. From 1977 to 1986, I was employed by the U.S. Environmental Protection Agency as an Environmental Engineer. I have been employed by AWWSC since 1986. From 1986 to 1988, I was a Senior Planning Engineer. I was promoted to Director of Planning in 1988, and to the position of Director of Planning & Strategy and Capital Investment Management in 2003. I was promoted to Senior Director of Engineering for American Water in 2008 and Vice President- Engineering in 2015.

I am a licensed Professional Engineer in the Commonwealth of Pennsylvania. I am an active member of the American Water Works Association ("AWWA"), and have served on AWWA's Conservation Committee. Since 2005, I have served as a faculty member for the Institute of Public Utilities Regulatory Studies Program. I have presented on the topic of lead in drinking water at several national water industry functions including (i) Mid-America Regulatory Conference, (ii) National Association of State Utility Consumer Advocates, and (iii) New Mexico State University Center for Public Utilities Advisory Council.

I am a participating member of the national Lead Service Line Replacement Collaborative ("LSLR Collaborative") since its formation in 2016 at the invitation of the National Association of Water Companies ("NAWC"), a steering committee member. The LSLR Collaborative is a joint effort of 24 national public health, water utility,

environmental, labor, consumer, housing, and state and local governmental organizations to help communities to accelerate full removal of the lead service lines providing drinking water to millions of American homes.

Q. Have you previously participated in regulatory matters?

A. Yes. I have provided testimony in support of various American Water utility subsidiary rate filings before public utility commissions in Illinois, Indiana, Kentucky, New Jersey, New Mexico, Missouri, Pennsylvania and Virginia.

Q. Please list the public presentations you have made on the topic of lead service line replacement.

A. I have made presentations at the following conferences:

"A Coordinated Approach to Reduce Lead Exposure from Drinking Water". National Association of State Utility Consumer Advocates ("NASUCA") 2016 Annual Meeting, November 15, 2016; Palm Springs, CA.

"A Coordinated Approach to Reduce Lead Exposure from Drinking Water". New Mexico University Center for Public Utilities Advisory Council, 2017 Current Issues Conference. April 26, 2017; Santa Fe, NM.

"A Coordinated Approach to Reduce Lead Exposure from Drinking Water". NASUCA 2017 Mid-Year Meeting, June 5, 2017; Denver, CO.

"A Coordinated Approach to Reduce Lead Exposure from Drinking Water". Mid-America Regulatory Conference ("MARC") 2017 Annual Conference, June 20, 2017; Chicago, IL.

Q. Are you familiar with the properties and business of Missouri-American Water Company ("MAWC" or "Company")?

A. Yes, I am familiar with the properties and business of MAWC.

Q. What is the purpose of your testimony in this proceeding?

A. My direct testimony is being submitted in support of the Company's Application for an Accounting Authority Order related to cost recovery of the replacement of customer-owned lead service lines. In this testimony, I will provide an overview of the issue of lead in drinking water. I will also discuss the Company's approach to managing the risk of customer exposure to lead in drinking water consistent with federal and state regulatory standards established by the United States Environmental Protection Agency ("EPA") and Missouri Department of Natural Resources ("DNR").

II. Overview of Issue of Lead in Drinking Water

Q. Please provide an overview of the issue of lead exposure from drinking water.

A. Lead in contact with drinking water is an important issue to American Water, its operating subsidiaries and the entire water industry. According to the CDC, "Lead can be found in many sources. Lead-based paint and the dust produced as it deteriorates, found mostly in older homes built before 1978, are major contributors of lead exposure in U.S. children. Lead can also be found in some water pipes inside the home or pipes that connect homes to the main water supply pipe. Lead found in tap water usually comes

from the decay of old lead-based pipes, fixtures or from leaded solder that connects drinking water pipes."[1]

Q. How does lead get into drinking water?

A. Lead seldom occurs naturally in water supplies like rivers and lakes, and is rarely present in water coming from treatment plants. Rather, lead, if present in drinking water, is likely a result of corrosion of plumbing materials containing lead such as lead pipe, copper plumbing containing lead-based solders, brass faucets, fittings and other various customer premise fixtures containing lead. The amount of lead in water depends on a number of factors. These factors include the amount of lead that water comes in contact with, the length of time the water stays in contact with the lead, the corrosivity and mineral content of the water, the water temperature and the presence of protective scales or coatings. Lead can leach into water over time through corrosion, which is the dissolving or wearing away of metal caused by a chemical reaction between water and plumbing materials. The risk for lead contamination arises when water passes through lead service lines and/or premise plumbing fixtures with lead-based solder used to join pipes and faucets. Lead solder was banned for use on water pipes in 1986. Congress has also set limits on the amount of lead that can be used in plumbing.[2]

Q. Please explain what is meant by a lead service line?

A. A lead service line is the terminology used to indicate that the service line connecting

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[1] https://www.cdc.gov/nceh/lead/leadinwater/

[2] 42 U.S.C. § 300g-6.

the water distribution main in the street to the customer's home is made of lead pipe. The installation of lead pipe for water service lines dates back 50 to 100+ years ago and its prevalence and period of use varies by geographic region.

Q. Why should we be concerned about lead in drinking water?

A. Lead is a naturally occurring metal that is harmful if inhaled or swallowed, particularly to children and pregnant women. Lead exposure can cause a variety of adverse health effects. For example, lead exposure can cause developmental delays in babies and toddlers and deficits in the attention span, hearing and learning abilities of children. Lead exposure can also cause hypertension, cardiovascular disease and decreased kidney function in adults. The most common sources of lead exposure are paint and dust, but lead can also be found in drinking water. Recent events, including those in Flint, Michigan, have heightened concern about the presence of lead in drinking water.

Q. Please describe the Company's approach to address potential sources of lead in drinking water.

A. As Mr. Aiton describes in this testimony, MAWC employs a proactive, multi-faceted approach to manage the potential exposure to lead as part of its commitment to maintain water quality that meets or surpasses Missouri DNR and USEPA standards for safe drinking water, and protect the health and safety of its customers. These layers of protection include treatment of water (including corrosion control treatment), monitoring of key indicators of water quality, identification and inventorying of service line materials, replacing lead service lines, and customer education.

Q. Please explain the role of treatment in controlling lead corrosion.

A. MAWC treatment plants produce finished water that meets or surpasses Missouri DNR and EPA standards for safe drinking water. The water quality is controlled to produce stable water within an established range of pH, alkalinity and hardness levels. This stability helps maintain disinfection residuals and other parameters needed to maintain the water quality in the distribution system to our customers. Over time, the water deposits a protective coating on the pipes, creating a barrier between the water and the metallic pipe, and prevents corrosion of the metal.

III. Lead Service Line Removals

Q. Please explain why you are discussing the MAWC lead mitigation approach in this testimony?

A. The Company's treatment and sampling efforts have effectively reduced potential lead exposure from drinking water. However, as the research regarding potential exposure to lead has been further developed and refined, the Company has determined it should take additional steps to further mitigate potential customer exposure to lead in drinking water. The growing body of research indicates that the galvanic corrosion that can occur after a partial lead service line replacement and the physical disturbance of the lead service line have the potential to increase lead levels following replacement. Now, when the Company encounters a lead service line during the course of its main replacement projects, the Company believes all segments of lead in the service line should be replaced. Consequently, we have shifted our construction process to favor full lead service line replacements over partial lead service line replacements where possible. The full LSLR

(lead service line replacement) would include both the lead portions owned by the Company and the lead portions owned by the customer/property owner. This work should be done at the same time whenever possible and should be integrated in the Company's water main replacement program.

Q. How have you incorporated the evolving research into the strategy?

A. In the 25 years since USEPA's original Lead and Copper Rule ("LCR") went into effect, several important changes have occurred that are causing the industry to re-evaluate the issue. First, a growing body of work indicates that partial lead service line replacements, where only the utility-owned portion is replaced and the customer-owned portion of lead service line is left intact, have not been effective in reducing potential lead exposure and may in some cases result in a temporary increase in the amount of lead in the drinking water. Second, significant research has gone into helping the industry advance its understanding of corrosion and the stability of scales on the inside of pipes. Third, utilities are facing an increasing need to upgrade aging infrastructure, which accelerates the need to coordinate the replacement of lead service lines. Our lead mitigation strategy, which I will describe in more detail below, includes treatment, monitoring, locating lead service lines, replacing lead service lines, flushing, sampling, and communicating with the customer. See **Schedule** GAN-01 .

Q. Has the industry research looked at a wide range of water utilities?

A. Yes. The industry's research has been cohesive and is building toward solutions for all utilities. The first studies into the effects following partial LSLR were performed at

utilities that had corrosive waters and did not comply with the LCR. These earlier studies also did not consider flushing of the household plumbing. Recent studies have examined the impact of high velocity flushing on existing service lines, and service lines replaced in partial and in full. We have been following all the research and are applying the findings to our specific systems. We have also conferred with other utilities to understand their lessons learned in implementing programs.

Q. Please define a full lead service line replacement and a partial lead service line replacement.

A. A full LSLR means replacement of all segments of service line made of lead, regardless of whether that portion is Company-owned or customer-owned. (A full LSLR does not include replacing non-lead portions of a service line). For a premise where the entire service line is made of lead, full LSLR generally refers to the replacement of the service line from the water main to just outside the home or to the shut off valve within the premise.

A partial LSLR is the term used by the industry to indicate when only a portion of the lead in a domestic water service line from the water main to the customer's premise has been replaced. Generally, a partial LSLR involves the utility replacing the segment of lead service line that it owns, but not replacing the portion of lead service line owned by the customer.

See Schedule GAN-02 for diagrams of two typical situations regarding the ownership of the service line.

Q. Please explain how replacing only part of the lead service line may potentially increase the risk of lead exposure through drinking water at the customer's tap.

A. Physical disturbance of lead service lines and electrochemical processes both contribute to an increased risk of lead contamination following a partial replacement. Removing and replacing the service line and curb box connection may disturb the "scale" or coating that builds up naturally inside of the service line over its years in service. If an insoluble and adherent scale forms, there is a physical barrier that prevents leaching of lead into the water the lead service line delivers.[3] However, following physical disturbances related to infrastructure work, this protective barrier may be susceptible to releasing lead and other accumulated material in the scales. If a lead service line is replaced with a pipe made of another metal, conditions are created for bimetallic corrosion. The lead in the service line is a sacrificial metal that loses electrons to the non-lead material it adjoins. This is the cause of corrosion, which affects the interior wall of the lead service line and accelerates leaching of lead into the water passing through the line. While optimal corrosion control techniques can mitigate this risk, it is still a risk that should be avoided given the health and safety concerns associated with lead contamination.

Q. Please define physical disturbance of a lead service line.

A. The term physical disturbance is used to indicate when a lead service line is either physically cut or otherwise disconnected, or when sufficient vibration occurs in close proximity to the line that the integrity of the interior scale may be vulnerable to breaking

[3] *See Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primacy Agencies and Public Water Systems*, EPA 816-B-16-003 (Mar. 2016), pp. 9-10.

off. Vibration concerns include when excavation occurs in close proximity to the service line, such as during water main replacement, other nearby underground utility work, or tree removal.

Q. What is a lead gooseneck?

A. A lead gooseneck is the term used to identify a short flexible portion of lead line used to connect the service line to the tap in the main. Goosenecks are usually about 2 - 3 feet in length and shaped like a goose's neck. They were generally utilized to connect a galvanized iron pipe to the water main. During an infrastructure replacement project, lead goosenecks are easier to eliminate as they are the point of connection to the older main and would be removed in the process of transferring a service to a new main.

Q. When are service lines and goosenecks generally replaced?

A. Company owned service lines and gooseneck connections are replaced:

1) during associated main replacement projects when customers are connected to the new water main; and,

2) during targeted service line replacement work when a leak is found on the service line or if roadway reconstruction work necessitates their upgrade.

Q. Are lead service lines a concern in upgrading water distribution system infrastructure?

A Yes. Replacing lead service lines is a challenging yet impactful way to reduce potential lead exposure from drinking water. Generally, if a lead service line is encountered, it is found during a cast iron water main replacement project. Because lead is so durable, lead service lines can physically outlast cast iron pipe. An old cast

iron water main may show signs of failing via main breaks or discolored water before any sign of physical failure is apparent on the lead service line. The proactive replacement of lead service lines needs to be considered in terms of reducing our customers' potential exposure to lead in drinking water.

Q. Why are you and others proposing full lead service line replacement?

A. As addressed earlier, numerous recent industry studies have documented the potential for continued and/or increased lead release from the portion of the lead service line that remains after a partial replacement. By removing the entire lead service line from active operation, a source of lead will be removed, reducing the potential for exposure to lead in the drinking water we supply our customers.

Q. Are there things that can be done to mitigate lead exposure during the replacement process and have you included these in the LSLR Program?

A. Yes. Recent industry studies have been investigating the benefits of flushing the service line after any lead service line replacement (partial or full). In addition, material selection for the replacement service line can also help to reduce the impact of galvanic corrosion.

Q. What is your flushing protocol?

A. Our protocol includes two steps. First, our contractor [4] flushes the new service line for 30 minutes. Next, our contractor works with the customer to flush their household

[4] The Contractor uses a licensed plumber to perform certain activities, including flushing, as explained in Mr. Aiton's testimony

plumbing for an additional 30 minutes (see also Mr. Aiton's Direct Testimony).

Q. What is your sampling protocol?

A. A water sample is taken immediately following the flushing steps described above and a sample bottle is left with the customer to take a second sample within 72 hours of the work being completed. The customer (or contractor) is directed to take the second sample after the water has remained motionless for at least 6 hours (e.g., first thing in the morning, or upon arriving home after the workday).

Q. How did you develop your flushing and sampling protocol?

A. Our participation in the LSLR Collaborative has given us access to a range of national experts on this topic. We reviewed relevant research, as well as information from other utilities that have already implemented a full LSLR process. Our processes were further refined following data verification and evaluation of an intensive monitoring program during replacement work performed by American Water subsidiaries in New Jersey and Illinois.

Q. Do you share the sample results with the customer?

A. Yes. The Company contacts the customer with the results as soon as available.

Q. Do you provide any additional information to the customer?

A. Yes. We inform the customer that they can further mitigate their potential exposure to lead in drinking water by flushing their kitchen faucet or any other faucet they use for drinking

water anytime the water sits motionless for 6 hours or more. We also advise the customer that they can consider using bottled water or using a filter until the sample results are returned. We provide them with a fact sheet that suggests they should look for NSF certified filters that specifically are tested to remove lead.

Q. How do other plumbing materials containing lead impact the customers' potential exposure to lead in their drinking water?

A. Materials in contact with drinking water that could contain lead may include lead service lines, lead pipe gooseneck connections attaching the service line to the water main, customer-owned copper pipe with lead solder and customer-owned brass plumbing fixtures. I have discussed replacing lead goosenecks and lead service lines. Lead solder has been banned from use, and new rules on plumbing fixtures greatly reduce the amount of lead allowed in plumbing materials and fixtures. Copper plumbing installed before the lead solder ban is generally protected by good corrosion control treatment. Effective corrosion control treatment by the water utility and flushing by the customer after long periods of non-use generally also protects against exposure due to lead solder in brass fittings and faucets.

Q. Does the Company's LSLR Program also provide the customer with information about how to reduce their potential exposure to lead from faucets, pipe solder and other household plumbing materials containing lead?

A. Yes. We provide a lead fact sheet with information about how to reduce exposure to lead in drinking water. This information is also on our website with links to:

1) MAWC's water quality reports,

2) The Missouri DNR website

3) the AWWA webpage on guidance to cleaning aerators,

4) the NSF website page to search for NSF certified home water treatment devices,

5) the USEPA lead webpage, and

6) the AWWA Lead Resource Community page.

Q. If the sample results are above the LCR's lead action level, what do you do?

A. If the sample exceeds the lead action level, we contact the customer and schedule a second round of flushing and sampling.

Q. What if the lead concentration remains above the lead action level after a second round of flushing?

A. We will provide the sample results to the customer and perform a third round of flushing and sampling. If after the third sample round, the level still exceeds the lead action level, then we suggest that the customer have a plumber evaluate their internal household plumbing for other sources of lead.

Q. In the work performed in Missouri to date, has MAWC needed to refer any customers to a plumber for additional evaluation?

A. No. Of the 189 samples taken so far in 2017 during removal of lead service lines, 100% have been resolved by the second round of flushing.

Q. Are you proposing to replace in home plumbing for any customers?

A. No. We are not proposing to replace home plumbing. This would remain the responsibility of the property owner. Research by the Water Research Foundation ("WRF")[5] has indicated that the lead service line can be the largest contributor to lead in drinking water.

Q. Do you discuss filters with your customers as part of your LSLR Program?

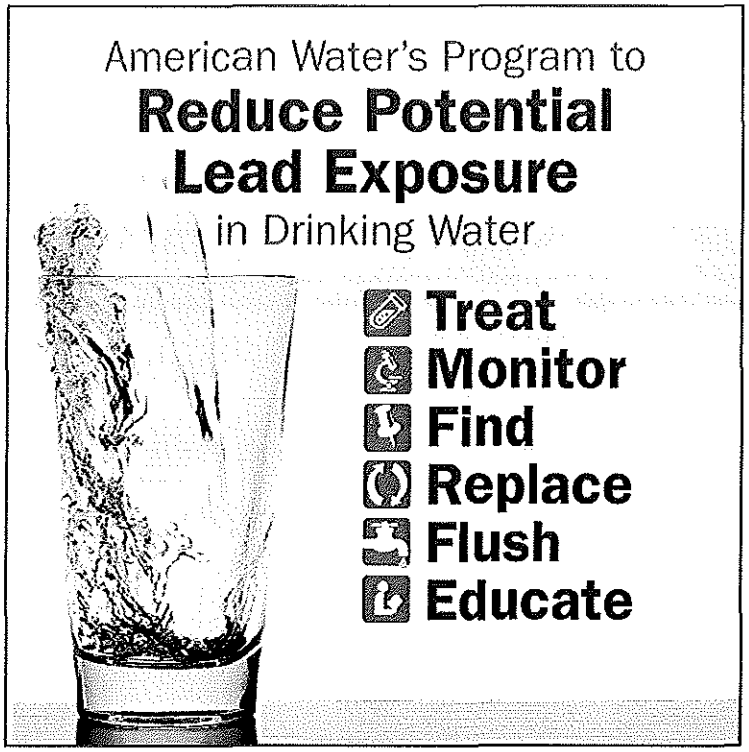
A. Yes. The recommended process includes significant flushing, sampling and education. The education component provides a link on where to find the NSF guide to home filters certified for lead removal (NSF/ ANSI 53). Most filters certified by NSF / ANSI 53 for lead reduction are models that are plumbed-in, refrigerator type or connected to faucets.

Q. Does this conclude your direct testimony at this time?

A. Yes, it does.

[5] WRF 2008: Contribution of Service Line and Plumbing Fixtures to Lead and Copper Rule Compliance

Schedule GAN-01



Schedule GAN-02 – Service Line Ownership Diagram for MAWC and MAWC St Louis County