

DISTRICT OF COLUMBIA OFFICE OF THE INSPECTOR GENERAL

OIG Project No. 18-1-04LA

April 2019



DC WATER

DC WATER'S PROCEDURES FOR MONITORING LEAD IN DRINKING WATER COULD BE IMPROVED



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Why the OIG Did This Audit

Lead exposure can cause adverse health effects, including impaired neurological development in children, and hypertension and cardiovascular disease in adults. The greatest risk of lead exposure is to infants, young children, and pregnant women.

Health risks for children can include attention deficit and lowered academic achievement; delays in physical and mental development; and problems with cardiovascular, immune, and endocrine systems. In adults, elevated lead levels can cause kidney problems and high blood pressure.

This audit was included in our *Fiscal Year (FY) 2018 Audit and Inspection Plan* because of high levels of lead previously identified as a contaminant in the District's drinking water.

The Office of the Inspector General (OIG) assessed whether DC Water and District government water quality testing and oversight procedures are adequate to ensure that lead levels in the District's drinking water are below mandated limits.

What the OIG Recommends

The OIG made 9 recommendations for DC Water to improve water quality testing and oversight procedures to ensure sources of lead are identified and removed from the District's water distribution system.

DC WATER:

DC WATER'S PROCEDURES FOR MONITORING LEAD IN DRINKING WATER COULD BE IMPROVED

What the OIG Found

DC Water designed and implemented controls to ensure that lead levels in the District's drinking water are at or below 15 parts per billion (ppb) as mandated by the United States Environmental Protection Agency's (EPA's) Lead and Copper Rule (LCR) regulations.¹ However, DC Water's lead monitoring reports to the EPA showed there are still measurable amounts of lead in the District's drinking water, even though DC Water and the EPA² agree "the most effective way to minimize exposure to lead is to remove the source(s) of lead."³ Because DC Water did not design its system of controls to identify and remove all sources of lead, the District did not ensure that all sites with lead service lines are identified and represented in the LCR monitoring activities.

DC Water management indicated that it is not DC Water's responsibility to identify and remove all sources of lead exposure, especially when the lead plumbing is on the customer's property. However, identifying all sites with lead service lines is important to establish a sampling pool for water quality testing representative of the entire population at risk of lead exposure.

Further, DC Water did not maintain complete and reliable data for the service line materials in the District's water distribution system⁴. For example, DC Water's records indicate that 79 percent of the water service lines on customers' property are made of unknown material. According to DC Water officials, poor record maintenance, and lack of historical pipe installation records and updates from customers contributed to the incomplete data on service line material. Accurate information about service line materials in use throughout the District would help DC Water and the District develop a plan to eliminate lead sources from the system.

Besides water testing and monitoring activities, DC Water also replaced some lead service pipes as part of its overall effort to remove lead sources from the District's drinking water system. At the current rate, it would take the District 36 years if it were to replace all the known lead water service pipes. If a significant portion of unknown water service pipes are made of lead, replacement could take even longer. The EPA recommends replacing all known lead service pipes within 15 years⁵ of identification. DC Water's practice of performing partial pipe replacements does not mitigate customers' long-term risk of lead exposure. Full lead pipe replacement is the ideal solution to minimize the risk of lead exposure.

¹ 40 C.F.R. § 141.80(c) (2018).

² EPA website, <https://www.epa.gov/sites/production/files/2015-11/documents/lcrwgmeetsum22jun2015-2.pdf>, last visited Nov. 30, 2018. The Safe Drinking Water Act requires the EPA to determine the Maximum Contaminant Level Goal (MCLG) for each contaminant. EPA set the MCLG for lead in drinking water at zero because that is when all public health risk from lead is eliminated.

³ DC Water's website, <https://www.dewater.com/servicemap>, last visited Nov. 30, 2018.

⁴ For the purposes of this analysis, the water distribution system includes all infrastructure between the Aqueduct and the point of entry to each building.

⁵ EPA only requires water systems to replace lead service lines if the LCR 90th percentile exceeds the lead action level of 15 ppb.

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Office of the Inspector General

Inspector General



April 4, 2019

David L. Gadis
CEO and General Manager
DC Water and Sewer Authority
5000 Overlook Avenue, S.W.
Washington, D.C. 20032

Dear CEO and General Manager Gadis:

Enclosed is our final report, *DC Water's Procedures for Monitoring Lead in Drinking Water Could Be Improved* (OIG No. 18-1-04LA). The audit was included in our *FY 2018 Audit and Inspection Plan*. We conducted this audit under generally accepted government auditing standards (GAGAS).

We provided DC Water with our draft report on January 18, 2019, and received their response on March 13, 2019. Based on DC Water's response, we re-examined our facts and conclusions and determined that the report is fairly presented. We appreciate that DC Water officials addressed some findings immediately upon notification during the audit.

We acknowledge and commend DC Water for announcing new plans to work closely with the District government to implement a new water service pipe replacement program that offers free and discounted (non-lead) replacements of lead water service pipes on private property for thousands of homes across the city. We know implementation of this program depends upon funding from the District, which is anticipated in October 2019.

DC Water concurred with Recommendations 1, 2, 3, 4, 6, 7, and 8. DC Water's actions taken and/or planned are responsive and meet the intent of the recommendations. Therefore, we consider these recommendations resolved but open pending evidence of stated actions. DC Water does not concur with Recommendations 5 and 9, but actions taken or planned by DC Water are responsive and meet the intent of the recommendations. Specifically, DC Water indicated that it will provide additional oversight to address Recommendation 5 and cited that D.C. Law 22-0241, the Lead Water Service Line Replacement and Disclosure Amendment Act of 2018, effective March 13, 2019, includes provisions that address Recommendation 9. Therefore, we consider these recommendations resolved but open pending evidence of stated actions. DC Water's response to the draft report is included in its entirety at Appendix D.

CEO and General Manager Gadis
Monitoring Lead in Drinking Water
Final Report OIG No. 18-1-04LA
April 4, 2019
Page 2 of 3

We appreciate the cooperation and courtesies extended to our staff during this audit. If you have any questions concerning this report, please contact me or Benjamin Huddle, Assistant Inspector General for Audits, at (202) 727-2540.

Sincerely,



Daniel W. Lucas
Inspector General

DWL/caw

Enclosure

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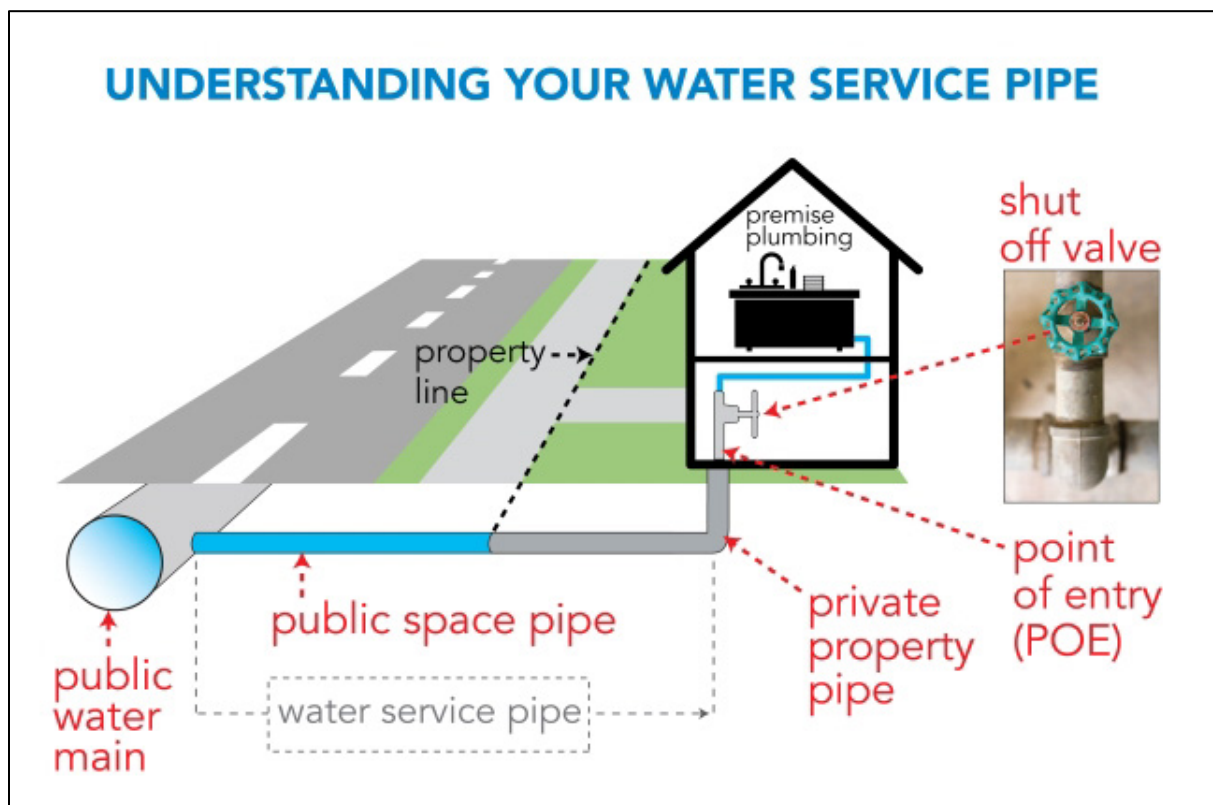
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BACKGROUND

The District of Columbia Water and Sewer Authority (DC Water) operates the District’s water system, including the acquisition and distribution of drinking water. The Washington Aqueduct (the Aqueduct), the water supplier operated by the U.S. Army Corps of Engineers, is responsible for filtering, disinfecting, removing contaminants, and putting corrosion control treatment into water drawn from the Potomac River. DC Water purchases treated water from the Aqueduct for distribution through a network of water mains and service lines connected to District homes and businesses. Each service line runs from the water main to the property. Lead service lines are mostly found supplying water to single family homes or similar buildings, and are not suitable for use in larger buildings. Lead may also be present in plumbing materials within the building, like solder and fixtures, galvanized pipe, brass fittings, faucets, and valves that are not lead-free.

The District government owns the water distribution system, and has delegated authority to DC Water to operate and maintain the system. Property owners own the entire water service line from the public main to their home or building, but maintain only the water service lines on their private property. DC Water may maintain property owners’ water service lines in public space, as needed (see Figure 1 below). However, for the purposes of this analysis, the water distribution system includes all infrastructures between the Aqueduct and the point of entry to each building. According to the EPA, the pipes that connect the home to the water main are service lines, which are typically the most significant source of lead in the water.

Figure 1: Water Service Pipes



Source: DC Water public information

The EPA and the Centers for Disease Control and Prevention (CDC) agree that there is no known safe level of lead in a child's blood. The greatest risk of lead exposure is to infants, young children, and pregnant women. Health risks for children can include attention deficit and lowered academic achievement, delays in physical and mental development, and problems with cardiovascular, immune, and endocrine systems. In adults, elevated lead levels can cause kidney problems and high blood pressure.

The Safe Drinking Water Act, Pub. L. No. 93-523, 88 Stat. 1660 (1974), requires the EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur with an adequate margin of safety. The EPA has set the maximum contaminant level goal (MCLG) for lead in drinking water at zero because lead is a toxic metal that can be harmful even at low exposure levels. To mitigate the effects of lead exposure, EPA established the Lead and Copper Rule (LCR),⁶ which requires that water utilities monitor the effectiveness of corrosion control to detect whether the levels of lead in drinking water are at or below the lead action level⁷ of 15 ppb.

Audit Objective

Our audit objective was to determine whether DC Water and District government water quality testing and oversight procedures are adequate to ensure that lead levels in the District's drinking water are below mandated limits.

Although our objective was focused on the adequacy of DC Water's testing and oversight procedures, we determined that assessing these procedures against the EPA MCLG of zero was necessary because lead is a toxic metal that can be harmful even at low exposure levels. This required an evaluation of DC Water's oversight of the District's water distribution system, including inventory and replacement of lead service lines.

⁶ 40 C.F.R. § 141.80 to §141.91 (2018).

⁷ Lead action level is the concentration of lead in the drinking water at which the water utility is required to take additional action to control corrosion. The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period exceeds .015 mg/L (15 ppb).

FINDINGS

DC WATER'S PROCEDURES FOR MONITORING LEAD IN DRINKING WATER COULD BE IMPROVED

DC Water's procedures complied with the LCR requirement to monitor whether water treatment prevents corrosion of lead and copper pipes. Complying with LCR requirements, however, differs from eliminating lead from the system. DC Water designed its oversight procedures to provide the District reasonable assurance that lead levels in drinking water are at or below 15 ppb, in compliance with the EPA regulations — not to identify and eliminate all lead in the water distribution system. According to DC Water's service line inventory database, most service line materials in the District are unknown. The lack of certainty about the existence and location of lead service lines may pose a public health risk for those DC Water customers who are unaware that they have lead service lines.

DC Water's System of Controls is Not Designed to Identify and Remove All Sources of Lead

According to DC Water, “the most effective way to minimize exposure to lead is to remove the source(s) of lead;”⁸ however, DC Water management did not design its system of controls to identify and remove all sources of lead. Instead, DC Water management designed and implemented its system of controls to ensure that lead levels in the drinking water are at or below 15 ppb as required by the LCR. Once we determined that the EPA's mandated limit for a permissible level of lead in drinking water is not based on an amount of lead that is detrimental to public health but instead is set to trigger additional actions by the water authority when lead levels exceed 15 ppb. We based our findings and conclusions on the EPA MCLG for lead, which is zero.

DC Water management agreed that the most effective way to minimize exposure to lead is to remove sources of lead, but indicated that it is not DC Water's responsibility to identify and remove all sources of lead exposure, especially when the lead plumbing is on the customer's property. According to DC Water, it is only responsible for complying with the LCR, conducting regulatory and voluntary lead testing, reporting results to EPA Region III, conducting public outreach and education, and participating in national research studies.

The District has made considerable improvements since 2001 when the District suffered a crisis of elevated lead levels in the drinking water. This crisis occurred because the Aqueduct changed the chemistry of the water by using chloramines⁹ to comply with a new EPA regulation that required the reduction of byproducts in the water supply. The chloramines reacted with lead pipes and plumbing that resulted in lead leaching¹⁰ into the drinking water. Lead levels in the drinking water rose above the EPA's lead action level of 15 ppb and DC Water and the Aqueduct had to implement corrective measures. The Aqueduct treated the water with orthophosphate—a corrosion control treatment that coats the inside of the pipes preventing lead scales from leaching

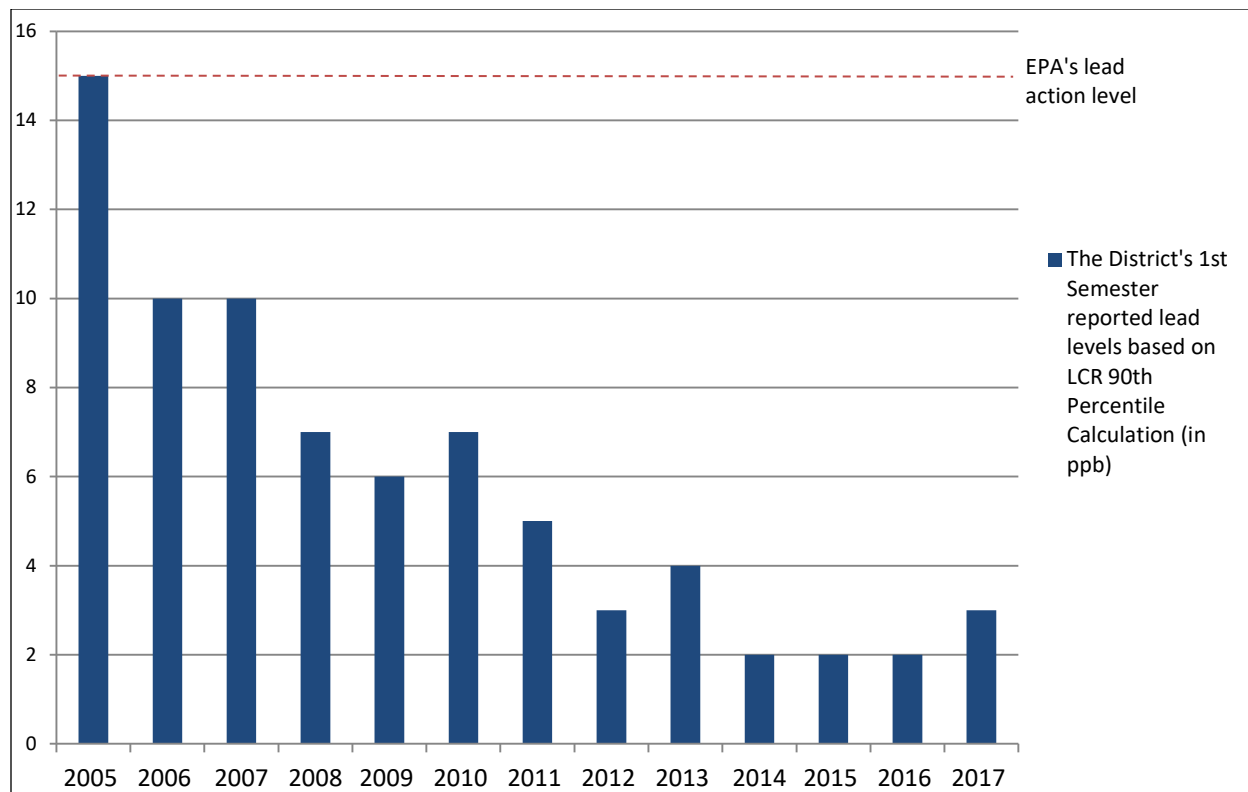
⁸ See n.3, *supra*.

⁹ Disinfectants used to treat drinking water.

¹⁰ Lead enters drinking water when it breaks off from inside lead service lines or plumbing materials as a result of corrosion.

into the pipes. The corrosion control treatment appears to work because lead levels in the District’s drinking water have been at or below the 15 ppb since 2005 (see Figure 2 below).

Figure 2: Historical LCR Monitoring of Lead Levels in the District



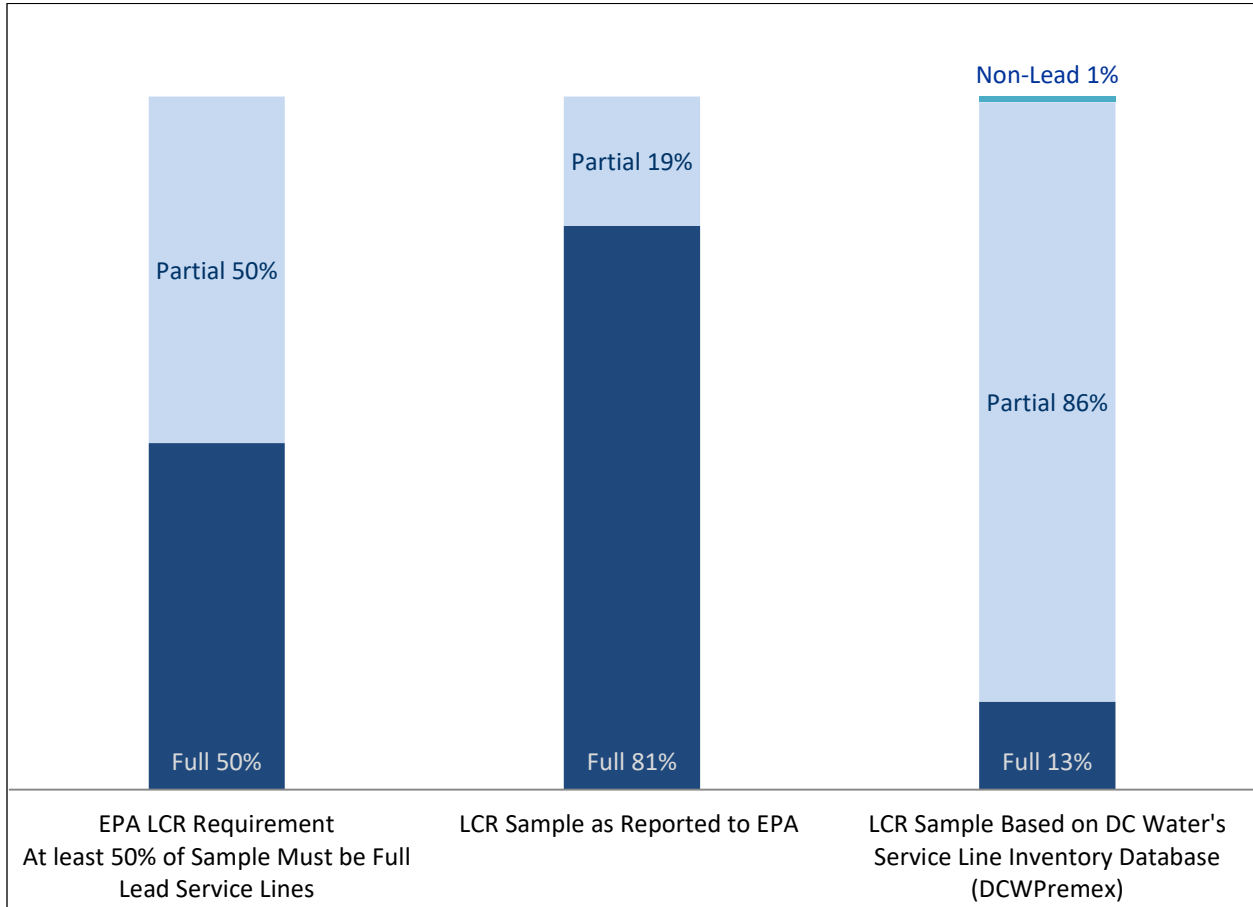
Source: DC Water’s LCR Compliance Reports for 2005-2017 (Semester 1 only)

Besides water treatment to remediate elevated lead levels in the District’s drinking water, the EPA required DC Water to initiate an accelerated lead pipe replacement program beginning in 2003. However, the EPA only requires public utilities to replace lead service lines when lead levels exceed 15 ppb. Although DC Water’s oversight and monitoring procedures are designed to detect the effectiveness of corrosion control treatment, we found that lead may exist in customers’ drinking water because of the system’s infrastructure.

DC Water Did Not Have Complete and Accurate Information of all Sites with Lead Service Lines to Draw a Valid LCR Sample

DC Water cannot be certain that water samples came from full lead service lines because customers may have changed their service lines without informing DC Water. Under (LCR Regulation) 40 C.F.R. § 141.86(a)(8), “[a]ny water system whose distribution system contains lead service lines shall draw 50 percent of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50 percent of the samples from sites served by a lead service line.” DC Water reported to the EPA that its LCR sample was comprised of 81 percent full lead service lines; however, the OIG’s analysis of DC Water’s service line inventory database indicated that only 13 percent of sampled lead service lines were full lead service lines (see Figure 3 on the following page).

Figure 3: LCR Sample Pipe Material Comparison for 2018 Semester 1



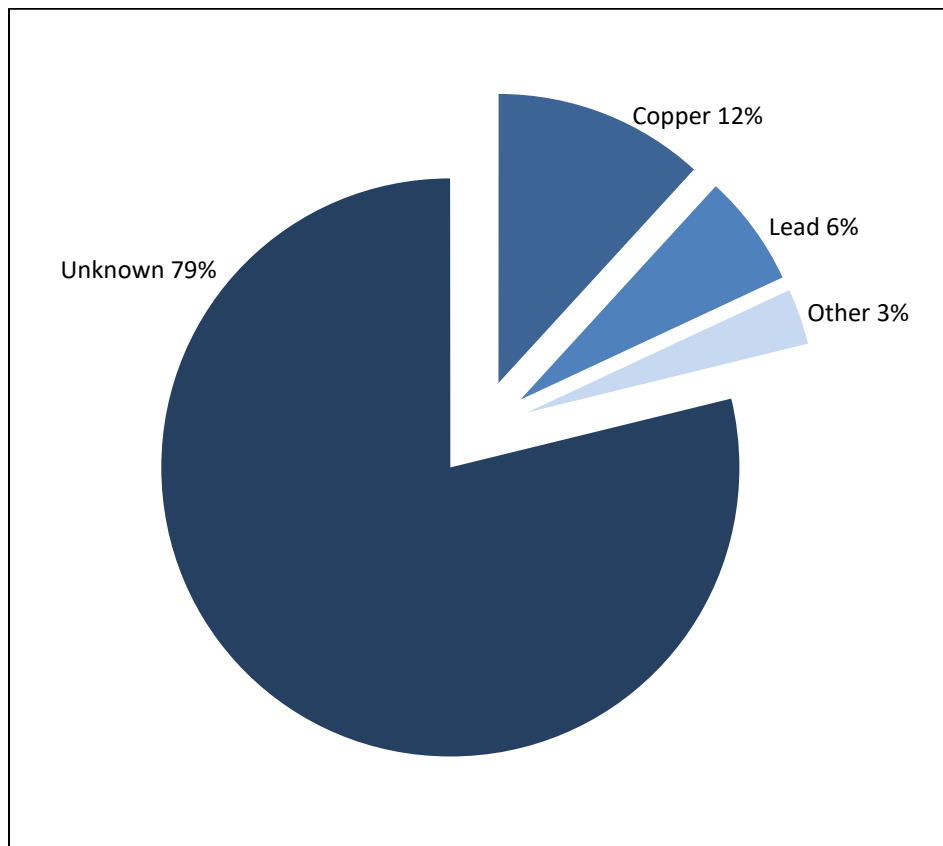
Source: OIG Analysis of DC Water's LCR and Service Line Inventory Data

According to DC Water officials, if a home has a lead service line on the public side and the composition of the private side is unknown, DC Water assumes the home has a full lead service line and records the same in the LCR database, which DC Water uses for LCR monitoring purposes. However, in the service line inventory database, the public side would be recorded as lead but the private side material is recorded as unknown. DC Water officials stated that the EPA is aware of this discrepancy between the two databases, and considers DC Water compliant with the LCR sampling requirements.

DC Water Did Not Maintain Complete and Reliable Data for the Service Line Material found in the District’s Water Distribution System

The OIG found that DC Water could not identify the type of pipe material for 79 percent of water service lines in the District’s water distribution system. According to DC Water’s records, as of March 30, 2018, the pipe material for 98,969 of 125,574 service lines on customers’ properties were unknown. Figure 4 summarizes DC Water’s inventory of pipe material on the customer’s side of the property line.

Figure 4: Private Side Pipe Inventory



Source: OIG Analysis of DC Water’s Service Line Inventory and Pipe Material Data

DC Water officials explained that they do not have to maintain information about the service lines on the customer’s property because the public water distribution system ends at the customer’s property line. However, replacing half of a lead service line does not minimize the risk of lead exposure because part of the service line is still made of lead. According to 40 C.F.R. § 141.86(a) (1), “each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites....” Identifying the pipe materials is vital to ensure an accurate and complete accounting of all sites with lead service lines because identifying lead service lines is a prerequisite in selecting a representative sample for DC Water’s lead monitoring activities of the District’s drinking water. Without accurate information about materials on the private side, customers may not

be aware they have lead service lines and that DC Water considers them responsible for lead hazards in the portions of the water distribution system on their property.

DC Water maintains an interactive map that contains information on the known service line material on both the public space pipe and private property pipe.¹¹ According to DC Water's records, 8 of 251 (3.2 percent) service lines in the District's school system (both DCPS and public charter schools) had lead pipes on either the public or the private side. To test the accuracy of the lead pipe data, while accompanied by a Department of General Services (DGS) Master Plumber we inspected water service pipes at the point of entry into 3 of the 8 school buildings listed in DC Water's records as having lead service lines. We observed that the pipes were not made of lead, and determined that DC Water's records were inaccurate and outdated.

Accurate information is necessary for effectively targeting lead lines for replacement and monitoring lead levels in the District's drinking water. DC Water officials stated that poor record maintenance, lack of historical pipe installation records, and the lack of updates from customers who replace lead service lines on their property contributed to the inaccurate and outdated data on service line materials. A complete inventory of lead materials would ensure that all DC Water customers know the pipe materials carrying drinking water into their homes and businesses.

We recommend that the CEO and General Manager, DC Water:

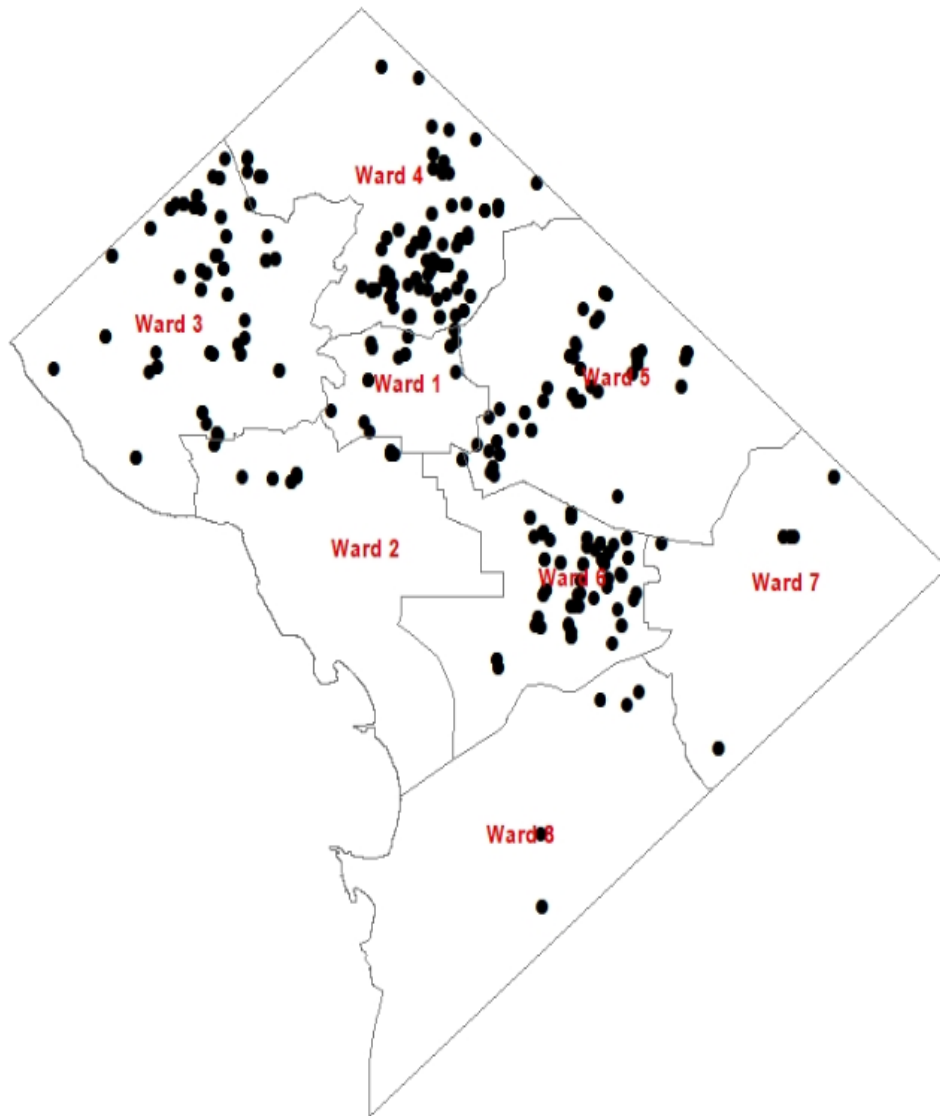
1. Develop a plan to identify unknown pipe materials within the water distribution system.
2. Correct service line information discrepancies in service line materials to ensure transparency, consistency, accuracy and completeness of the best available information for customers and stakeholders.

DC Water Did Not Ensure all Sites with Lead Service Lines were Represented in LCR Sample Monitoring

The LCR samples collected by DC Water customers did not equally represent all the District Wards. We found that DC Water had fewer samples from Wards 1, 2, 7, and 8 than the other Wards (see Figure 5 on the following page). While the LCR does not require samples to be evenly distributed, there is still a potential risk of lead exposures for those areas not tested for lead. A geographically distributed sample would be more representative of the population of homes with lead service lines in the District. DC Water officials explained that they cannot require a customer to participate in testing. They said the sampling pool is limited to volunteers whose homes have known lead service lines and agree to follow sample collection methodology (see page 9 for more information on the sample collection methodology). Nevertheless, because lead levels may vary from home to home and tap to tap, and temperature changes and pipe disturbances can also affect lead levels, testing in each home at each drinking water source is the only way to be certain that the drinking water is safe at a given time.

¹¹ The website address for this map is <https://www.dewater.com/servicemap>.

Figure 5: Geographic Distribution of LCR Samples for 2015–2017



Source: OIG Plotted Unique Sample Site Locations for the District’s LCR Compliance for 2015 - 2017

LCR sampling and testing procedures are designed to test drinking water in a small number of homes with full or partial lead service lines to detect the effectiveness of corrosion control treatment. These procedures, however, do not provide reasonable assurance that the water contains little or no lead citywide. There were only 193 homes identified in DC Water's LCR sampling pool as of January 2018, from which DC Water is required to collect 100 samples per semester. Overall, during the 2015-2017 sampling periods for LCR monitoring, DC Water only tested 242 unique addresses out of 125,574 addresses with water service lines in the entire District water distribution system.

DC Water Could Provide Additional Guidance to Help Ensure the Integrity of the LCR Sample Collection Process

DC Water depends on customer volunteers to collect water samples at their kitchen water tap after a 6-hour stagnation period. As part of its sample collection procedures, DC Water provides its customers a form called *District of Columbia Water and Sewer Authority Water Sampling Form* to be completed and returned to DC Water with the collected sample. Without enhanced guidance of the sample collection process, such as more training for volunteers, DC Water may not have complete assurance that customers follow the sampling procedures as written. For example, if a customer does not allow the water to stagnate in the pipe for 6 hours, reported results may show lower lead concentration than that which is actually present in the water. To ensure that its sample collection procedures are properly followed, DC Water would need to use its own resources or improve its oversight by providing additional guidance such as explaining the significance of the stagnation period to the customers. This action would help DC Water maintain the integrity of the collection process.

DC Water Relies on its Supplier to Conduct LCR Testing

DC Water sends its LCR water samples for testing to the water supplier's (the Aqueduct's) EPA-certified laboratory, but this process relies on the water supplier to conduct lead testing on its own product. This practice creates, at a minimum, the appearance of a lack of segregation of duties. According to GAO's *Standards for Internal Control in the Federal Government*, "[s]egregation of duties helps prevent fraud, waste, and abuse in the entity by considering the need to separate authority, custody, and accounting in the organizational structure." U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-704G, *Standards for Internal Control in the Federal Government* 29 (Sep. 2014).

DC Water chose the Aqueduct laboratory for water quality testing because the Aqueduct maintains an EPA-certified laboratory near DC Water's Water Quality Division. The proximity is helpful because DC Water personnel can drop off and pick up the samples on a monthly and sometimes daily basis. However, segregating those duties, (e.g., using an independent EPA-certified laboratory to conduct testing) or adding an additional control would reduce the risk of compromised test results.

We recommend that the CEO and General Manager, DC Water:

3. Develop a plan to increase water testing participation in areas that are not regularly part of LCR sample testing.
4. Use DC Water staff to collect samples or guide to customers who collect LCR water samples.
5. Develop additional controls to periodically validate test results received from the Aqueduct.

ACCELERATION OF FULL LEAD SERVICE LINE REPLACEMENTS WOULD REDUCE PUBLIC HEALTH RISK

After the District's drinking water exceeded 15 ppb in 2001, DC Water had to replace 7 percent of all lead service lines in the District annually to comply with the LCR. However, in 2008, DC Water's Board of Directors (the Board) directed DC Water to replace public lead service lines – only with water main replacements – and to use discretionary funds to replace public lead service lines – only when a customer agrees to pay for the replacement of the portion on the private property.

Our analysis of lead service lines replacements over the past 3 years found that DC Water replaced an average of 525 full and partial lead service lines in public spaces per year. Based on service line inventory information in DC Water's database, there are 19,103 sites with known lead service lines throughout the District. At the current rate, it would take 36 years to replace all known remaining sites with lead service lines. If a significant portion of the unknown service lines are made of lead, replacement could take even longer.

We noted that the rate of the District's replacement effort contradicted the 7 percent or 15-year replacement completion period recommended by the EPA.¹² According to 40 C.F.R. § 141.84 (b) (1):

A water system shall replace annually at least 7 percent of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system shall identify the initial number of lead service lines in its distribution system, including an identification of the portion(s) owned by the system, based on a materials evaluation....

DC Water indicated that resource limitations, competing needs and requirements, and the effectiveness of the Aqueduct's orthophosphate treatment were contributing factors for the reduced rate of lead service line pipe replacements. DC Water also indicated that customers with lead service lines on their property are also reluctant to pay for replacing the part of the service line on their property.

¹² EPA only requires water systems to replace lead service lines if the LCR 90th percentile exceeds the lead action level of 15 ppb.

We recommend that the CEO and General Manager, DC Water:

6. Develop a plan to accelerate the rate of lead service line replacements.

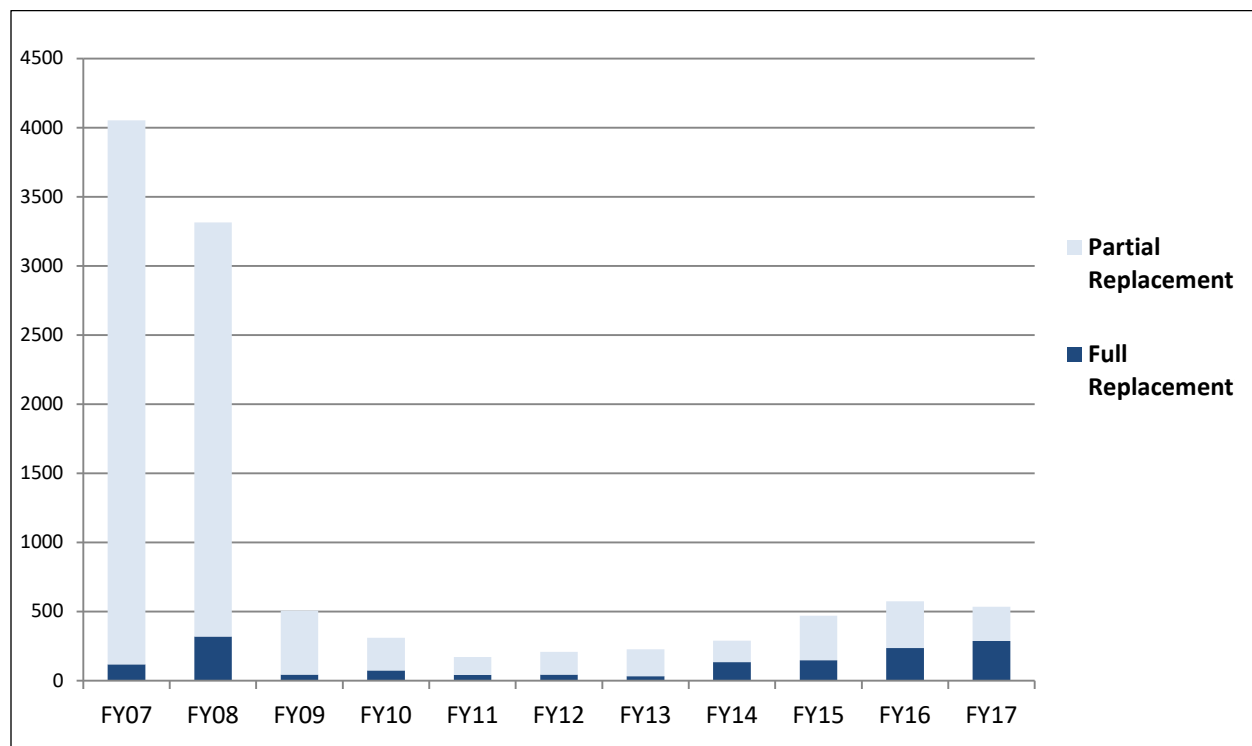
Partial Pipe Replacements Do Not Mitigate the Risk of Lead Exposure

The EPA set the MCLG for lead in drinking water at zero because that is when all public health risk from lead exposure is eliminated. While replacing part of a lead service line is an acceptable practice under LCR regulations, it is not the most effective way to minimize exposure to lead because partial replacement does not remove the source of lead. In 2004, the Board proposed and approved a resolution¹³ to fund an accelerated lead pipe replacement program. This resolution required DC Water to replace all known lead service lines in public space by September 30, 2010, and replace any newly discovered lead service lines within 90 days of discovery. The resolution also required DC Water to encourage customers to replace their private side portion of the lead service lines when the public side is replaced, offering the property owner the same rate as DC Water's actual cost.

In 2008, however, the Board redirected DC Water to replace public lead service lines only with water main replacements. The Board instructed DC Water to use discretionary funds to replace public lead service lines only when a customer requests replacement and agrees to pay for the portion on their private property. The number of full lead service line replacements decreased for the next several years as shown in Figure 6 on the following page. According to DC Water records, the slow-down in lead service line replacements occurred even while 255 customers expressed an interest in replacing their lead service lines during the January 2016 to June 2018 timeframe. DC Water maintains this list of customers, but did not record the reason the work was not performed. DC Water also had no process or procedure to follow-up with these customers.

¹³ Resolution #04-28.

Figure 6: District Lead Service Line Replacements for FYs 2007-2017



Source: DC Water’s Lead Service Line Replacement Data

Overall, DC Water’s actions to fund partial replacements do not mitigate the long-term risk of lead exposure to the customer. Therefore, a full lead line replacement is the ideal solution to remove the source(s) of lead and minimize the risk of lead getting into the water from the service line.

We recommend that the CEO and General Manager, DC Water:

7. Develop a process or procedure to follow-up on outstanding customer requests for lead service line replacements, including the 255 customers currently on the list.
8. Determine a funding source to provide DC Water customers assistance with replacing their lead service lines on private property.
9. Conduct a feasibility study to introduce market-based opportunities to replace lead service lines when homes are sold and/or renovated, and report the results to the District.

CONCLUSION

To determine whether DC Water and District government water quality testing and oversight procedures are adequate to ensure that lead levels in the District's drinking water are below mandated limits, we assessed DC Water's compliance with regulatory requirements, such as the EPA's LCR. We also assessed DC Water's progress toward achieving the EPA's stated goal of zero lead in the drinking water. Although DC Water is complying with the EPA's LCR, there is still the risk of lead exposure from the District's drinking water in homes and buildings with lead service lines or plumbing materials.

DC Water's oversight and monitoring procedures are designed to detect the effectiveness of corrosion control treatment, but do not require the removal of lead sources. The long term solution to minimize lead in the District's drinking water is to identify and remove all lead sources, including lead service lines and plumbing materials. The first step, however, is to develop an accurate and complete inventory of lead service lines and plumbing materials in every household throughout the District.

To increase customer participation in DC Water's LCR monitoring, DC Water should increase cooperation and collaboration with the District government and residents. For example, providing customer incentives, such as tax credits, may encourage participation in water sampling so LCR testing provides a more representative picture of District residents' risk of lead exposure. Incentives are also necessary to help customers pay to replace lead service lines on their property. These replacements will help the District realize the benefits of little to no lead in the drinking water.

RECOMMENDATIONS

We recommend that the CEO and General Manager, DC Water:

1. Develop a plan to identify the unknown pipe materials within the water distribution system.
2. Correct the service line information discrepancies in service line materials to ensure transparency, consistency, accuracy, and completeness of the best available information for customers and stakeholders.
3. Develop a plan to increase water testing participation in areas not regularly part of the LCR sample testing.
4. Use DC Water staff to collect samples or guide customers who collect LCR water samples.
5. Develop additional controls to periodically validate test results received from the Aqueduct.
6. Develop a plan to accelerate the rate of lead service line replacements.
7. Develop a process or procedure to follow-up on outstanding customer requests for lead service line replacement, including the 255 customers currently on the list.
8. Determine a funding source to provide DC Water customers assistance with replacing their lead service lines on private property.
9. Conduct a feasibility study to introduce market-based opportunities to replace lead service lines when homes are sold and/or renovated, and report the results to the District.

DC WATER'S RESPONSE AND OFFICE OF THE INSPECTOR GENERAL COMMENTS

We provided DC Water with our draft report on January 18, 2019, and received their response on March 13, 2019. We appreciate that DC Water officials addressed some findings immediately upon notification during the audit.

DC Water concurred with Recommendations 1, 2, 3, 4, 6, 7, and 8. DC Water's actions taken and/or planned are responsive and meet the intent of the recommendations. Therefore, we consider these recommendations resolved but open pending evidence of stated actions.

DC Water does not concur with Recommendations 5 and 9, but actions taken or planned by DC Water are responsive and meet the intent of these recommendations. Specifically, DC Water indicated that it will provide additional oversight to address Recommendation 5 and cited that D.C. Law 22-0241, the Lead Water Service Line Replacement and Disclosure Amendment Act of 2018, effective March 13, 2019, includes provisions that address Recommendation 9. Therefore, we consider these recommendations resolved but open pending evidence of stated actions.

APPENDIX A. OBJECTIVE, SCOPE, AND METHODOLOGY

We conducted this audit from January 2018 to August 2018 in accordance with generally accepted government auditing standards (GAGAS). Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The audit was included in the Office of the Inspector General's (OIG's) *Fiscal Year (FY) 2018 Audit and Inspection Plan*.

The audit objective was to determine whether DC Water and District government water quality testing and oversight procedures are adequate to ensure that lead levels in the District's drinking water are below mandated limits.

Once we determined that the EPA's mandated limit for a permissible level of lead in drinking water is not based on an amount of lead detrimental to public health but instead is set to trigger additional actions by the water authority when lead levels exceed 15 ppb, we based our findings and conclusions on EPA MCLG for lead, which is zero.

To accomplish the objectives, we reviewed DC Water's current lead level testing and monitoring procedures, lead pipe replacements from FY 2007-2017, and current and historical data within DC Water's LCR and DCW Premex (service line inventory) databases.

We also performed independent testing of the drinking water from the water mains, physical inspections of water service lines at select District Public Schools (DCPS), and walkthroughs of water testing and monitoring procedures. We analyzed documentation and testing data to assess compliance with regulations, laws, resolutions, and standard operating procedures.

We interviewed DC Water personnel and DGS officials and obtained preliminary information from the Department of Energy and Environment, Office of Risk Management, and DCPS. We mapped DC Water's lead level testing throughout the District. And we reviewed DGS' lead monitoring activities at DCPS and inquired about water service line material at 3 DCPS and 5 District Public Charter Schools (DCPCS) schools.

We used the *United States Government Accountability Office (GAO) Standards for Internal Control in the Federal Government* to evaluate the adequacy of internal controls over DC Water's lead monitoring activities.

We assessed the validity and reliability of computer-processed data and performed limited testing to verify the accuracy and completeness of the data. We obtained full and unrestricted access to the data in DC Water's LCR and DCW Premex databases current as of March 30, 2018. While there are inherent limitations in the accuracy and completeness of historical and manually-keyed records, we determined the data are sufficiently reliable to achieve the purpose of our audit objective.

APPENDIX B. ACRONYMS AND ABBREVIATIONS

The Aqueduct	The Washington Aqueduct
C.F.R.	Code of Federal Regulations
The Board	The DC Water Board of Directors
DCPS	District of Columbia Public Schools
DCPCS	District of Columbia Public Charter Schools
DC Water	District of Columbia Water and Sewer Authority
DGS	Department of General Services
EPA	United States Environmental Protection Agency
FY	Fiscal Year
GAGAS	Generally Accepted Government Auditing Standards
GAO	United States Government Accountability Office
LCR	Lead and Copper Rule
MCLG	Maximum Contaminant Level Goal
OIG	Office of the Inspector General
ppb	parts per billion

APPENDIX C. DC WATER'S LEAD EXPOSURE MONITORING PROCESS

DC Water uses these procedures to monitor lead level exposures in the District's drinking water:

- Maintain a database to track a list of eligible customers who have volunteered to collect water samples at the tap within their homes according to EPA protocols.
- Generate the sample pool list from the database.
- Mail notification letters to selected participants 2 weeks prior to scheduled sample bottle drop off.
- Drop off lead test kits containing: two 1-liter bottles, sample form, pipe material information sheet, and point-of-entry pipe material form at given addresses.
- Pickup sample bottles containing date and time stagnation started, date and time of sample collection, and address.
- Determine if the samples can be submitted to the Aqueduct for laboratory analysis.
- Obtain laboratory results from the Aqueduct.
- Mail tap monitoring results to individual customers within 30 days after receiving the results from the Aqueduct.
- Send tap-monitoring results to the EPA by July 10th for the first monitoring period and January 10th for the second monitoring period.
- Perform pipe loops research testing.¹⁴

¹⁴ Pipe loops are harvested lead service lines from District homes constructed into a loop to simulate a lead service line environment. Water from the Aqueduct goes into the pipe loops that are housed at DC Water's Fort Reno location. DC Water collects stagnated water samples from this test environment to detect whether there are lead release changes due to the water chemistry.

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT



DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY | 1385 CANAL STREET, SE | WASHINGTON, DC 20003

March 13, 2019

Daniel W. Lucas, Inspector General
District of Columbia Office of the Inspector General
717 14th Street, N.W.
Washington, D.C. 20005

RE: OIG Project No. 18-1-04LA

Dear Mr. Lucas:

Thank you for the opportunity to review, provide comments and respond to the recommendations in the draft report, *DC Water's Procedures for Monitoring Lead in Drinking Water Could Be Improved*. We have made excellent use of the time that you permitted us to complete our review, which we hope will enable greater understanding of the EPA Lead and Copper Rule and DC Water's efforts to not only comply with those requirements, but provide information to the public that will empower them to take the steps necessary to reduce their risk of exposure to lead in water.

In responding to the recommendations, we have identified an opportunity that will provide even more information to the public and planners regarding the material of construction of the service line on private property. We are now working to populate the private property service line data fields with the same historic data that DC Water has relied on to populate the public space service line data fields.

This will reduce the number of null and unknown service line data, which will help homeowners take advantage of the lead service line replacement payment assistance program established in the *Lead Water Service Line Replacement and Disclosure Amendment Act of 2018*. We too encourage the District to fund this important program anticipated in October 2019.

dcwater.com

Please contact me at [REDACTED] or [REDACTED] at [REDACTED] if you require any additional information.

Sincerely,



Biju George,
Executive Vice-President Ops & Engineering
DC Water

Attachments: DC Water's Comments and Response to the Recommendations in the draft report, *DC Water's Procedures for Monitoring Lead in Drinking Water Could Be Improved* (OIG Project No 18-1-04LA)

C: David L. Gadis, CEO and General Manager
[REDACTED] Interim Executive Vice President, Legal Affairs
[REDACTED] Senior Vice President Chief Engineer, Engineering
[REDACTED] Senior Director, Water Operations
[REDACTED] Director Water Quality

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

DC Water's Comments on draft report, *DC Water's Procedures for Monitoring Lead in Drinking Water Could Be Improved* (OIG Project No 18-1-04LA)

1. Page 1, last paragraph, Why The OIG Did This Audit?: "The OIG made 9 recommendations for DC Water to improve water quality testing and oversight procedures to ensure sources of lead are identified and removed from the District's water distribution system."

In 1991, EPA promulgated the LCR – a treatment technique regulation under the Safe Drinking Water Act (SDWA) – to protect public health by minimizing lead and copper levels in drinking water, primarily by reducing water corrosivity through corrosion control treatment. This rule applies to 68,000 public water systems nationwide. See EPA Lead and Copper Revisions White Paper (October 2016). "The treatment technique requires public water systems to monitor drinking water at customer taps. If the lead concentration exceeds the action level of 15 ppb..., the system must undertake a number of additional actions to control corrosion." See <https://www.epa.gov/dwreginfo/lead-and-copper-rule>. The objective of the LCR mandated lead compliance monitoring program is not to ensure sources of lead are identified and removed from the "District's water distribution system" but to ensure that the corrosion control measures implemented at the treatment plant (Washington Aqueduct) are optimized to control lead corrosion at levels below the mandated lead action level of 15 ppb. The LCR requires public water system to identify certain sources of lead, but only for the purpose of developing a pool of high risk Tier 1 sites to effectively conduct the required LCR compliance monitoring or to perform mandated lead service line replacements when the lead action level has been exceeded. See 40 C.F.R. § 141.84(b)(1) and 86(a)(1). The LCR does not mandate how large that sample pool must be, but that the pool must be of sufficient size to perform the LCR compliance monitoring. See 40 C.F.R. 141.86(a)(1). DC Water identifies roughly 200 Tier 1 sites (single family residence with either a full or partial lead service line) to ensure that we can collect the minimum number of samples to comply with the standard LCR compliance monitoring requirement of 100 Tier 1 sites. See 40 C.F.R. § 141.86(c).

The LCR only requires public water systems to remove lead service lines if the systems 90th percentile lead level exceeds the lead action level of 15 ppb. Further, the service line replacement requirement only applies to the lead service lines that the system owns. See 40 C.F.R. § 141.84(d) ("(d) A water system shall replace that portion of the lead service line that it owns.") As we have previously reported, lead service lines are not owned by DC Water or the District, but by the private property owner. If the lead action level is exceeded, the LCR requires a number of response action including public education, reassessment of the corrosion control treatment measure, removal of lead service line owned by the water system, return to or continued standard lead and copper compliance monitoring, and other activities. Consequently, the proposition that DC Water's LCR compliance monitoring is directed to ensure that sources of lead are identified and removed is incorrect and where the LCR requires such action, it is only for limited purposes and situations.

2. Page 1, first paragraph, What the OIG Found: "However, DC Water's lead monitoring reports to the EPA showed there are still measurable amounts of lead in the District's

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

drinking water, even though DC Water and the EPA agree “the most effective way to minimize exposure to lead is to remove the source(s) of lead.”

DC Water and EPA do agree that the most effective long term solution for a community to eliminate the risk of any exposure to lead from drinking water system is to remove all sources of lead. However, the report presents a faulty comparison between compliance with the LCR compliance monitoring requirements to minimize lead exposure risk and need to remove all sources of lead to comply with the LCR and may confuse the public to believe that the removal of the lead service line alone will remove all sources of lead.

First, compliance with EPA’s LCR lead action level of 15 ppb, by definition, means that a public water system may have levels of lead in drinking water greater than zero. The EPA LCR is designed to permit levels of lead in water, provided the 90th percentile water lead levels do not exceed 15 ppb. As long as the 90th percentile water lead levels are at or below 15 ppb, the LCR does not require any additional actions to minimize exposure to levels except to maintain optimum corrosion control treatment, monitor water at customer taps to ensure the corrosion control treatment is effective, provide public education information to the public on the risks of lead exposure and encourage the public to take steps to mitigate exposure to lead. It is only when the public water system’s 90th percentile lead level exceeds the lead action level, that the EPA LCR requires public water systems to remove lead service lines, that are owned by the system and to offer the property owner the opportunity to have their privately owned lead service line removed at their cost. Absent an exceedance, the EPA LCR does not require the public water system to remove any sources of lead.

Finally, the report implies that the removal of the lead service line alone will remove all sources of lead. This is incorrect. Even if DC Water replaced all lead service lines in public space in accordance with the authority provided in DC Law 1-78 and the private portion under the authority of D.C. Act 22-0567, this would not remove all sources of lead. Lead may be present in private plumbing materials, and solder and fixtures, brass fittings, faucets and valves that are not lead-free, and galvanized iron plumbing that is/was connected to a lead service line. Consequently, the presence of these other sources of lead are why the EPA’s LCR is not focused on the removal of all sources of lead that are largely beyond the control of the public water system to remove, but focuses its requirements on “reducing water corrosivity through corrosion control treatment” to ensure that water treatment is optimized to maintain the 90th percentile water lead level at or below 15 ppb. LCR compliance monitoring is the critical component necessary to measure the effectiveness of that corrosion treatment, and it will remain as a failsafe way to assure the control of lead exposure risk through drinking water

3. Page 1, first paragraph last sentence, What the OIG Found: Because DC Water did not design its system of controls to identify and remove all sources of lead, the District did not ensure that all sites with lead service lines are identified and represented in the LCR monitoring activities.

The report states that the DC Water LCR compliance sampling pool is not representative of all sites with a lead service line. First, as noted below, the EPA LCR requires public water systems “to identify a pool of targeted sampling sites that meets the requirements of this section, and

APPENDIX D. DC WATER’S RESPONSE TO THE DRAFT REPORT

which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in paragraph (c) of this section. See 40 C.F.R. § 141.86(a)(1). While the LCR does not include any requirement regarding the geographic representation of the sites that are included in LCR compliance monitoring, DC Water’s sampling pool is representative of the geographic distribution of lead service lines in each Ward as provided in the below table:

Ward	Percent of LCR Homes	Percent of all premises with lead on public side	Percent of all premises with lead on either side
1	6%	10%	13%
2	5%	7%	6%
3	17%	13%	11%
4	31%	30%	25%
5	16%	13%	17%
6	20%	18%	20%
7	3%	5%	4%
8	2%	4%	4%

Total number for each category	243	11,197	19,516
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- Page 1, second paragraph, What the OIG Found: However, identifying all sites with lead service lines is important to establish a sampling pool for water quality testing representative of the entire population at risk of lead exposure.

This statement is inconsistent with the LCR. As noted above, the EPA LCR does not require all sites with lead service lines to be identified to “establish a sampling pool ...representative of the entire population at risk of lead exposure,” but it requires public water systems to identify a sampling pool that is “sufficiently large to ensure that the water system can collect the number of lead and copper tap samples...” See 40 C.F.R. § 141.86(a)(1). DC Water does believe that it is important to identify all lead service lines to inform all individuals at risk, and provides the public with all available information. However, due to the history of the document management systems the Board of Commissioners and the District used to maintain service line information and the fact that the material of construction cannot readily be determined absent excavation, DC Water relies on and provides the best data available and updates that information when available. In summary, identifying all elements contributing to lead exposure on the private side of the property is not a practical approach, and corrosion control is the proven and effective way to achieve this. Representative sampling is an acceptable and proven way to assure the effectiveness of corrosion control.

- Page 1, third paragraph, What the OIG Found: Accurate information about service line materials in use throughout the District would help DC Water and the District develop a plan to eliminate lead sources from the system.

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

This statement is misleading and could create greater public health risks if the public believes that the removal of the lead service line alone will eliminate lead sources. As noted above, DC Water and the District cannot “eliminate” all sources of lead even if all lead service lines in public space and private property were removed because lead service lines are not the only source of lead in private plumbing system. Lead can be present in any household plumbing that is not “lead free”, including lead household pipe, solder, fixtures, joints, valves; brass plumbing and fixtures; and galvanized iron pipe that is/was connected to a lead service line. As discussed below in comment 22, DC Water will populate the data fields for the service line data on private property based on the historic service line data that was used to populate the service line data in public space. This will provide more information to the public and assist in planning the replacement of lead service line on private property.

6. Page 1, fourth paragraph, second sentence, What the OIG Found: it would take DC Water 36 years to replace all the known lead service lines.

Please revise to read “replace all the known lead service lines in public space.” because this projection is only applicable DC Water’s replacement of lead service lines in public space not the entire lead service line. Even if the District provided funding to pay for the replacement of lead service lines on private property when DC Water replaces the lead service lines in public space, there are thousands of partial lead service lines on private property that property owners would need to independently act to have those removed. Therefore, the timeline for the replacement of partial lead service lines on private property is unknown.

7. Page 1, last paragraph, fourth sentence, What the OIG Found: “The EPA recommends replacing all known lead service lines within 15 years⁴ of identification.”

This is a misinterpretation of the EPA guidance. EPA does not recommend replacing lead service lines within 15 years of identification. See 40 C.F.R. § 141.84(b). EPA requires public water systems to replace 7% of the lead service lines that they own, but this requirement is only applicable if the public water system’s 90th percentile water lead monitoring level exceeds the lead action level of 15 ppb. Under this condition, all the lead service lines would only be replaced in 15 years if the 90th percentile lead water monitoring level exceeded 15 ppb for fifteen continuous years. If, however, the 90th percentile water lead monitoring levels were reduced to 15 ppb or less for 2 consecutive monitoring periods, that public water system would not be required to continue replacing lead service lines. If, thereafter, the public water system’s 90th percentile lead level exceeded the lead action level, the system would continue the remaining portion of the 15-year schedule. For example, “systems resuming lead service line replacement after previously conducting two years of replacement would divide the updated inventory by 13”. See 40 C.F.R. § 141.84(b)(2).

8. Page 1, last paragraph, last sentence, What the OIG Found: “Full lead line replacement is the ideal solution to minimize the risk of lead exposure.”

Please note that neither the DC Water nor the District can achieve full lead service line replacement without the consent of the property owner. Even under the recently passed lead replacement legislation, D.C. Act A22-0567, *Lead Pipe Replacement and Disclosure*

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

Amendment Act of 2018, which will pay for the costs to replace the lead service line on private property, the property owner will have the right not to consent to the replacement of the lead service line on private property. In these cases, only a partial replacement will be performed. There are brass fittings with lead content, and replacement of all lead pipe is no assurance of eliminating all sources of material in contact with water would be without lead.

9. Page 1, first paragraph, next to last sentence, Background: Lead service lines are mostly found supplying water to single family homes or similar buildings and cannot exceed 2 inches in diameter.

Clarification. DC Water has found lead service lines greater than 2 inches in diameter, but has only found less than 5. Therefore, it is incorrect to state that lead service lines cannot exceed 2 inches, but they "rarely exceed 2 inches in diameter". Further, to assist the public to understand that there are other sources of lead, please also include the sentence. "Lead may also be present in interior plumbing, lead solder and in other plumbing fixtures."

10. Page 1, first paragraph, last sentence, Background: "Lead is a soft metal and is not suitable for use in larger buildings because of the high pressure required to provide water to larger structures."

Clarification. Lead pipe is not used in larger buildings not because of the high pressure requirements, but because larger buildings require a larger pipe size which lead is an unsuitable material because of the weight and malleability of the material. Our observation is that typically lead service lines are 2-1/2 inches in diameter or smaller.

11. Page 2, Background, second paragraph: "To mitigate the effects of lead exposure, EPA established the Lead and Copper Rule (LCR),⁵ which requires that water utilities monitor the effectiveness of corrosion control to detect whether the levels of lead in drinking water are at or below the lead action level⁶ of 15 ppb."

Since the concept of the action level may be new for readers of this report, we suggest that the report include more information about the lead action level and its implications. The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with the LCR is greater than 0.015 mg/L. If the lead action level is exceeded, the LCR requires a number of response actions including public education, reassessment of the corrosion control treatment measures, removal of lead service lines owned by the public water system, return to or continued standard lead and copper compliance monitoring, and other activities.

12. Page 2, Audit Objective, second paragraph: "our objective was focused on the adequacy of DC Water's testing and oversight procedures..."

The report addresses DC Water LCR compliance monitoring program, but does not include DC Water's voluntary lead testing programs. DC Water tested 242 homes for the LCR compliance program during the 2015-2017 study period and tested 2,508 homes through DC Water's voluntary programs during the same period. DC Water expanded its lead testing

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

program in 2003 beyond the EPA LCR compliance monitoring requirements to provide residents with lead test data for their individual home. In addition, throughout the report OIG refers to "DC Water's testing" or "DC Water's procedures" when the accurate language should be "DC Water's EPA LCR testing" or "DC Water's EPA LCR compliance monitoring procedures".

13. Page 2, Audit Objective, second paragraph: "we determined that assessing these procedures against the EPA MCLG of zero was necessary because lead is a toxic metal that can be harmful even at low exposure levels."

As OIG is aware, lead in drinking water is a highly regulated area. See OIG No. 04-2-17LA, Audit of Elevated Levels of Lead in the District's Drinking Water at Ex. C (Jan. 5, 2005) (describing detailed regulatory scheme under EPA's Lead and Copper Rule (LCR) addressing, among other things, corrosion control treatment, monitoring, public education, and lead service line (LSL) replacement). In the District, the federal government has sole authority to implement and enforce the LCR and EPA Region III is the primacy agency. *Id.* The LCR has a significant federal rulemaking history that reflects the input of many stakeholders and EPA's judgment on how to regulate lead in water while accounting for health risks, cost and technological feasibility, risk communication, and other considerations. See generally, LCR, 56 Fed. Reg. 26460 (June 7, 1991).

DC Water is concerned that OIG's alternative objective potentially conflicts with EPA's carefully crafted regulatory scheme and will result in outcomes that are contrary to OIG's statutory mandate. DC OIG, Report on Activities, Fiscal Year 2018 at 3 ("The OIG's legislative mandate is to promote economy, efficiency, and effectiveness and prevent and detect corruption, mismanagement, waste, fraud, and abuse in District government.")

As a threshold matter, OIG's use of the LCR's MCLG for lead of zero as the basis of its stated objective and recommendations represents a substantial departure from the LCR. The audit's stated objective was to "determine whether DC Water and District government water quality testing and oversight procedures are adequate to ensure that lead levels in the District's drinking water are below mandated limits." Draft Rpt. at 15. (emphasis added). OIG explains that it departed from this objective, and chose instead to base its "findings and conclusions on EPA's MCLG for lead, which is zero," *id.*, and that EPA set the MCLG at zero "because lead is a toxic metal that can be harmful even at low exposure levels." *Id.* at 2. This is not correct. EPA explained in detail when it promulgated the LCR that the MCLG was set at zero principally because the threshold for adverse effects from lead is not known, not because EPA had determined zero was a harm threshold. See 56 Fed. Reg. 26460-01, ("it is currently difficult to identify clear threshold exposure levels below which there are no risks of adverse health effects."); See 56 Fed. Reg. 26469, see also GAO, Government Auditing Standards § 8.108-115 (2018) (evidence supporting audit findings and conclusions must be sufficient and appropriate).

EPA's "mandated limits," which are embodied in the LCR's treatment technique approach reflect a balancing of a many considerations that includes public health benefits, and not the least, cost and technological feasibility. By choosing to base its objective and

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

recommendations on only one factor, the MCLG (which, as noted above, is not a harm threshold), OIG upsets this balance and conflicts with the judgment of EPA as the primacy agency. DC Water believes this will result in unnecessary confusion among the public and substantial waste for the District and DC Water.

To minimize such confusion, EPA chose "to promulgate a final rule consisting solely of a treatment technique that seeks to remedy all sources of lead and copper contamination caused by both corrosion and contaminated source water." EPA states "that this will be the most effective approach to control lead and copper in drinking water, that this approach will be simpler for the public and regulated community to understand, and that the approach is consistent with the statutory scheme of the SDWA." See 56 Fed. Reg. 26460 at 26472.

14. Page 3, Findings, first paragraph, fourth sentence: "According to DC Water's service line inventory database, most service line materials in the District are unknown."

This statement is only correct with respect to the service line material located on the private property side. However, DC Water will use the same data that populated the database for the service line materials in public space to populate the service line data filed for private property. This will result in reducing the number of null or unknown service line materials on private property.

In the early 2000s, when DC Water created our database, we added more service line data fields to capture pipe material and location information at different portions of the service line: main-to-meter, meter-to-property line, property line-to-house. DC Water used the available data to populate the data fields for main-to-meter and meter-to-property line, but did not use that data to populate the data filed for property line-to-premise filed. The property line-to-premise field (private portion) was left unpopulated instead of auto-filling with the historic material information. The result is a large number of null fields for the pipe material on private property. DC Water has reviewed the historic application of the District's lead service line data and will populate the pipe material data fields using the information that was obtained from the District and applied to the material data field for the public side of the service line. This is based on the reasonable understanding that at the time of original installation, the plumber only installed one pipe material for the entire service line from the water main in public space to the building. This will significantly reduce the number of unknown/null fields in the database and provide more information to the public.

15. Page 3, Findings, second paragraph: Once we determined that the EPA's mandated limit for a permissible level of lead in drinking water is not based on an amount of lead that is detrimental to public health but instead is set to trigger additional actions by the water authority when lead levels exceed 15 ppb. We based our findings and conclusions on the EPA MCLG for lead, which is zero.

DC Water reiterates the concerns regarding the application of the MCLG noted above in comment 13. According to EPA, the "MCLG is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, allowing an adequate margin of safety. MCLGs are non-enforceable public health

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

goals.” See 40 C.F.R. § 141.2 MCLGs consider only public health and not the limits of detection and treatment technology effectiveness. Therefore, MCLGs are sometimes set at levels which water systems cannot meet because of technological limitations. Once the MCLG is determined, EPA sets an enforceable standard.

When there is no reliable method that is economically and technically feasible to measure a contaminant at concentrations to indicate there is not a public health concern, EPA sets a “treatment technique” rather than an MCL. A treatment technique is an enforceable procedure or level of technological performance which public water systems must follow to ensure control of a contaminant. Treatment technique rules also list: 1) The best available technology for meeting the standard; and 2) Compliance technologies available and affordable for small systems.

Examples of treatment technique rules are the: Surface Water Treatment Rule (disinfection and filtration) and Lead and Copper Rule (optimized corrosion control).

EPA then sets the MCL as close to the MCLG as feasible. Taking cost into consideration, EPA must determine the feasible MCL or treatment technique. This is defined by SDWA as the level that may be achieved with: use of the best available technology or treatment approaches and other means which EPA finds are available (after examination for efficiency under field conditions, not solely under laboratory conditions).

See <https://www.epa.gov/dwregdev/how-epa-regulates-drinking-water-contaminants>

16. Page 3, Findings, third paragraph: DC Water management agreed that the most effective way to minimize exposure to lead is to remove sources of lead, but indicated that it is not DC Water’s responsibility to identify and remove all sources of lead exposure, especially when the lead plumbing is on the customer’s property.

While DC Water’s LCR compliance monitoring program is focused on ensuring that the Washington Aqueducts corrosion control treatment is effective to maintain the 90th percentile water lead levels below 15 ppb, the implication that DC Water should be responsible for identifying and removing all sources of lead especially on the customer’s property is false and misleading. First, property owners have a constitutional right of privacy in their homes that prohibits the government (DC Water) from entering their property without appropriate permission or authorization. Second, in addition to lead service lines, there are other numerous potential sources of lead within a property that DC Water has no control over. This includes, lead household pipe, lead solder, fixtures, valves and lead containing plumbing such as brass and galvanized iron plumbing that is/was connected to a lead service line. Third, DC Water is only authorized to perform plumbing work on private property if it is paid for by the property

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owner or another payee such as the District. See D.C. Code 8-205(b)¹ and 40 C.F.R §141.84² Finally, DC Water has an extensive program to replace lead service lines in public space when it is necessary to repair, maintain or renew the service line or when the customer voluntarily agrees to pay for the repair on private property. Once the District provides funds to implement D.C. Act A22-0567, DC Water will have the resources available to complete full lead service line replacements during service line repair and water main replacement activities, provided the property owner consents to the replacement of the lead service line replacement on their private property.

17. Page 3, Findings, third paragraph: According to DC Water, it is only responsible for complying with the LCR, conducting regulatory and voluntary lead testing, reporting results to EPA Region III, conducting public outreach and education, and participating in national research studies.

This statement does not reflect the full breadth of DC Water's voluntary testing program. The voluntary testing program is available to all homes in the District and multi-family dwellings. In addition, it does not reflect the nature of DC Water's research programs, which includes our own research and programs that we participate in locally and nationally. Therefore, DC Water suggests the following revisions to read as follows:

According to DC Water, it is only responsible for complying with the LCR, conducting regulatory and voluntary lead testing of all homes in the District requesting water testing, reporting results to EPA Region III, conducting public outreach and education, conducting research, and participating in local and national research studies.

18. Page 4, Findings, second paragraph, second sentence: "However, the EPA only requires public utilities to replace lead service lines when lead levels exceed 15 ppb"

The above statement is not clear. EPA requires public water systems to replace lead service lines that they own annually if their 90th percentile water lead level exceed the lead action level of 15 ppb. For clarity, DC Water suggest the following revisions to read as follows:

However, the EPA only requires public water systems to replace 7% of the lead service lines that they own when the 90th percentile lead level exceeds the lead action level of 15 ppb.

¹ D.C. Code 8-205(b) "...The District of Columbia Water and Sewer Authority, where he deems such action necessary, may also perform maintenance or repair work on private property, in which case, the cost, including overhead expense, shall be paid by the property owner."

² 40 C.F.R. § 141.84(d) "A water system shall replace that portion of the lead service line that it owns. In cases where the system does not own the entire lead service line, the system shall notify the owner of the line, or the owner's authorized agent, that the system will replace the portion of the service line that it owns and shall offer to replace the owner's portion of the line. A system is not required to bear the cost of replacing the privately-owned portion of the line, nor is it required to replace the privately-owned portion where the owner chooses not to pay the cost of replacing the privately-owned portion of the line, or where replacing the privately-owned portion would be precluded by State, local or common law."

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19. Page 4, Findings, second paragraph, last sentence: Although DC Water's oversight and monitoring procedures are designed to detect the effectiveness of corrosion control treatment, we found that lead may exist in customers' drinking water because of the system's infrastructure.

Clarification. This sentence is not clear and may confuse the public concerning what the "system's infrastructure" is referring to the customer's household plumbing or the District's potable water distribution system. There is no lead in the District's potable water distribution system. OIG audit's lead testing results of the lead levels in the District's potable water distribution system i.e., the "system's infrastructure" were non-detect. If OIG is implying that the lead water service lines are part of the District's potable water distribution system that is incorrect. The service lines are not part of the District's potable water distribution system in the same way that a property's driveway is not part of the District's roadway system. Service lines like driveways are owned by the property owner not the District. Since lead containing plumbing materials are only in the customer household plumbing system, suggest revising to read:

Although DC Water's oversight and monitoring procedures are designed to detect the effectiveness of corrosion control treatment, we found that lead may exist in customers' drinking water because of the lead in the household plumbing materials, such lead solder, brass fittings, faucets or valves that are not "lead-free"; galvanized plumbing that is/was connected to a lead service line; and the lead service line.

20. Page 4, Findings, paragraph title: DC Water Did Not Have Complete and Accurate Information of all Sites with Lead Service Lines to Draw a Valid LCR Sample

DC Water agrees that the LCR sampling sites and samples used to comply with the LCR monitoring requirements, must be based on the best information available, but DC Water does not agree with the assertion that DC Water is required to have accurate information for all sites with lead service lines in the District in order to draw a valid sample.

The LCR specifies criteria for acceptable sample sites and sample collection procedures as set forth in the LCR at 40 CFR § 141.86: Specifically: 40 C.F.R. § 141.86(a) lists criteria for a Tier 1 site; 40 C.F.R. § 141.86 (a)(3) defines a Tier 1 site that "consists of single family dwellings", "[c]ontains copper pipes with lead solder installed after 1982 or contains lead pipes; and/or" "[a]re served by a lead service line..." 40 CFR § 141.86 (a)(8) defines the percent of samples from Tier 1 homes with a lead service line, which is 50%. Please note that the LCR does not contain any requirements regarding the geographic distribution for the Sample Pool.

One hundred percent of the sampling sites for the LCR compliance monitoring program comply with these requirements and are valid sites. The sites included in DC Waters LCR monitoring program were Tier 1 sites based on the historic pipe material data obtained from the District and maintained by DC Water. DC Water does not include any site in the calculation of the 90th percentile if the available information shows that the site is not a Tier 1 site.

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As discussed further below, DC Water obtained historic service line material data from the District, which provided one pipe material for the entire service line. This data represented the best available information for the service line material of construction. When DC Water created its database, it created two data fields—public and private side to record activity conducted on the service line. By default, the historic data populated the public side, but not the private side which was left unpopulated in DCWPremex Dataset. However, for the EPA LCR monitoring program, DC Water applied the historic data for both the public and private side because at the time the service line was installed; the same material was used from the water main to the home. Where the historic data showed the pipe material in public space as lead, the private property side was also noted as lead, or full lead service line unless excavation results or other information revealed non-lead pipe material on the private side. In these cases, the site's classification was changed from a full lead service line to a partial lead service line. If excavation on the public side revealed non-lead pipe, and no other information was available for the private side, then the site would be removed from the Sample Pool to reduce the probability of having a non-lead service line home in the Sample Pool.

One hundred percent of the LCR monitoring samples collected and analyzed were also valid samples. The LCR, 40 C.F.R. § 141.86(b), provides criteria for the collection and analysis of valid LCR samples. Per 40 C.F.R. 141.86(b)(2) states, [e]ach first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. First-draw samples from residential housing shall be collected from the cold water kitchen tap or bathroom sink tap... First-draw samples may be collected by the system or the system may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in this paragraph... If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

As provided in the LCR, DC Water permits its customers to collect the LCR samples. To ensure that all of the samples are valid, DC Water reviews the chain-of custody completed by the customer and the sample bottles. Samples are rejected and not analyzed if the chain-of-custody is incomplete or the sample bottle is improperly labeled. If, after the sample is analyzed, DC Water obtains information that the site does not meet the Tier 1 criteria or there was an error in the analysis of the sample, DC Water sends that information to EPA requesting the invalidation of the sample result. If approved by EPA, that result is not included in the calculation of the 90th percentile.

21. Page 5, Figure 3, first column: EPA LCR Requirement At least 50% of Sample Must be Full Lead Service Lines

The graphic incorrectly reflects the LCR requirement in 40 C.F.R. §141.86(a)(8), which the report correctly cites on page 4. While 50% of the samples must be from sites that have full lead service lines, the remainder must be from sites that are not just partial lead sites as stated in the graphic, but may comprise sites with “lead pipes, or copper pipes with lead solder”.

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22. Page 5, Findings, last paragraph, last sentence: DC Water officials stated that the EPA is aware of this discrepancy between the two databases, and considers DC Water compliant with the LCR sampling requirements.

DC Water disagrees with the characterization that there is a discrepancy between the LCR database and the service line inventory database, but that the differences reflect a different application of the available historic service line data. The historic service line records from the District included data that provided one pipe material for the entire service line because only one pipe material was used at the time of the original installation. This data was applied differently in the LCR monitoring database versus the DCWPremex database. When DC Water created the LCR monitoring database, the pipe material from the District's data was used to populate the material field for both the private and public side. We apply the "lead" on public side as a full lead service line unless excavation or additional data reported that the material on private side was not lead (copper, brass, etc). However, when we created the DCWPremex database, we created two fields—public and private sides to record replacement activity conducted on those parts of the service line. By default, the historic data populated the public side and the private side was not populated in DCWPremex resulting in a null or unknown pipe material designation. DC Water will work to update the information in the DCWPremex to populate the private side data field in the same manner that the public side data fields were populated. This will reduce the number of null or unknown pipe material designations on the private side.

23. Page 6, Findings, first paragraph: The OIG found that DC Water could not identify the type of pipe material for 79 percent of water service lines in the District's water distribution system.

As noted above, service lines are not part of the District's potable water distribution system, but part of the customer's water system. The SDWA defines public water system to include "(A) any collection, treatment, storage, and distribution facilities under control of" the system, and "(B) any collection or pretreatment facilities not under such control * * *." EPA stated that the listing of distribution facilities in subparagraph (A) of this section, as opposed to paragraph (B), indicated that Congress intended to exclude from the responsibility of PWSs distribution facilities, such as customer's plumbing, which are not under control of the system. See generally, LCR, 56 Fed. Reg. 26460, at 26476 (June 7, 1991).

In addition, the 79% figure only applies to the service lines on private property. DC Water records show that 13% of the service lines in public space are unknown. As discussed above, DC Water will apply the historic service line material data obtained from the District to populate the private side data fields in the same manner that data has been applied in the EPA LCR monitoring program. To clarify the distinctions between the property's water system and the District's potable water distribution system, suggest the following revisions to read:

The OIG found that DC Water could not identify the type of pipe material for 79 percent of water service lines located on private property in the District.

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24. Page 6, Findings, second paragraph: DC Water officials explained that they do not have to maintain information about the service lines on the customer's property because the public water distribution system ends at the customer's property line.

Clarification: While DC Water is authorized to maintain the lead service line in public space, the service line is still owned by the property owner. The water service line extends from the water main to the building. While D.C. Law 1-98 authorized the District/DC Water to maintain, repair and renew the water service line, that law did not transfer title/ownership to the District or DC Water. Therefore, the public potable water distribution system ends at the water main, not at the property line and the water service line is not part of the public [District] potable water distribution system. While there is no District law or regulation that requires DC Water to maintain information on the service line on private property, DC Water maintains and make readily accessible the best information available on private service lines. This includes the service line information maintained in the DCWPremex database which is available to the public by contacting Customer Service Department or on our website. The website provides the public a GIS based map system that the public can use to obtain the available service line information at any time. In addition, DC Water encourages customers to send photograph and any other information to update the information in our database.

25. Page 6, Findings, last paragraph, third sentence: "According to 40 C.F.R. § 141.86(a) (1), "each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites...." Identifying the pipe materials is vital to ensure an accurate and complete accounting of all sites with lead service lines because identifying lead service lines is a prerequisite in selecting a representative sample for DC Water's lead monitoring activities of the District's drinking water."

The draft Report does not include the complete sentence from the LCR to fully understand the purpose of the materials evaluation. Consequently, it incorrectly relates the purpose for the material evaluation to "selecting a representative sample for DC Water's lead monitoring program, with the need to account for "all sites with lead service lines. OIG left out the remaining part of the sentence that relates to the purpose for conducting the materials evaluation "to identify a pool of targeted sampling sites that meets the requirements of this section, and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in paragraph (c) of this section. (Emphasis added) See 40 C.F.R. § 141.86(a)(1).

The LCR does not require identifying and confirming the pipe material for all sites in the District, but a sampling pool that is "sufficiently large" to ensure we have enough to collect the requisite number of samples. EPA "clarified that the materials evaluation is not required for the entire system but only to identify a sufficient number of sites to perform the required tap sampling. For example, the largest size systems (those serving more than 100,000 persons) are only required to identify a sufficient number of sites so that they can sample at 100 locations. Smaller size systems are required to sample at fewer sites (see Table 18). While systems will likely need to identify more sites than these in order to assure that the number of available sites (taking into account any difficulties in entering sites) is sufficient, the total number of sites to be located is still relatively small." See LCR, 56 Fed. Reg. 26460, 26517

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(June 7, 1991). In compliance with these requirements, DC Water maintains a LCR monitoring pool of over 200 Tier 1 sites.

26. Page 6, Findings, last paragraph, last sentence: "Without accurate information about materials on the private side, customers may not be aware they have lead service lines and that DC Water considers them responsible for lead hazards in the portions of the water distribution system on their property."

DC Water continuously provided information to customers regarding the lead service lines serving their property. In addition to extensive information DC Water provides to customers about lead on its website, bill inserts, and annual reports, in 2017, DC Water posted the available service line information on our website. See <https://geo.dcwater.com/Lead/>. Last fall, DC Water also sent letters to all customers with lead service lines informing them that their service pipe is a source of lead on their property and encouraging them to "take advantage of [DC Water's] lead service pipe replacement program." The customer response to this letter has increased the number of Voluntary/Demand Lead Service Line Replacement program requests. Finally, upon passage of D.C. ACT 22-567, *Lead Water Service Line Replacement and Disclosure Amendment Act of 2018*, DC Water issued a press release about two new lead water service line replacement programs: 1) Full lead service line replacement, where the portion of the lead service line on private property will be paid for with funds proved by the District; and 2) Lead Water Service Line Replacement Assistance program, which will provide between 50% to 100% of the cost to replace the lead service line on private property when the service line in public space is non-lead. Finally, DC Water will be populating the service line material data field for the private side with the historical data used to populate the service line material data field for the public space side.

27. Page 7, Findings, second paragraph, last sentence: "To test the accuracy of the lead pipe data, while accompanied by a Department of General Services (DGS) Master Plumber we inspected water service pipes at the point of entry into 3 of the 8 school buildings listed in DC Water's records as having lead service lines. We observed that the pipes were not made of lead, and determined that DC Water's records were inaccurate and outdated."

The historical service line records maintained by DC Water are the best available evidence of the pipe material. DC Water updates this data based on service line replacement inspection records and information provided by the property owner. Examining the material at the point of entry can confirm that the lead service line on private property is lead, but it does not provide 100% guarantee that the service line does not change material before it crosses the property-line or that a portion at the point of entry was not replaced. While water lead monitoring results and other non-earth disturbing methods can provide information about the pipe material, the only definitive method to confirm the pipe material is through excavation. If the property-line for these schools was not at the face of the building, it is possible that there is still some lead left in private-space.

28. Page 7, Findings, title and last paragraph: "DC Water Did Not Ensure all Sites with Lead Service Lines were Represented in LCR Sample Monitoring"; "We found that DC Water had fewer samples from Wards 1 2, 7 and 8 than other Wards..."; and "A geographically

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distributed sample would be more representative of the population of homes with lead service lines in the District”

DC Water does not agree that the distribution of the LCR sample sites in the Wards of the District is not representative because lead service lines are not equally distributed throughout the District. As noted above, the LCR does not include any requirements for the geographic distribution of LCR sampling sites. However, the number of samples collected in each ward of the District reflect the percentage of the service lines in those wards. Further, considering the probability of participation, DC Water's sample pool accurately represents the distribution of lead throughout the District. The majority of the lead service lines are in the NW Quadrant of the District – the oldest parts of the District are Wards 3 and 4. In addition, there are many other factors that affect the samples collected, not the least of which is reliance on the customers willingness to participate and collect the samples following the specified procedures. Below is a table showing the distribution of related categories by Ward.

Ward	Percent of LCR Homes	Percent of all premises with lead on public side	Percent of all premises with lead on either side
1	6%	10%	13%
2	5%	7%	6%
3	17%	13%	11%
4	31%	30%	25%
5	16%	13%	17%
6	20%	18%	20%
7	3%	5%	4%
8	2%	4%	4%

Total number for each category	243	11,197	19,516
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29. Page 7, Findings, title to last paragraph: Nevertheless, because lead levels may vary from home to home and tap to tap, and temperature changes and pipe disturbances can also affect lead levels, testing in each home at each drinking water source is the only way to be certain that the drinking water is safe at a given time.

DC Water disagrees that testing the water at each home in the District is the only way to be certain that drinking water is safe at a given time. In fact, there is no regulatory program under the SDWA that requires that level of testing. At best, EPA has evaluated the issues regarding the wide variability in tap water lead levels and noted that it is influenced by many factors, such as standing time of the water in the plumbing, age and type of plumbing, volume of the water sample, and the corrosivity of source water (Schock, 1988, 1990). See LCR, 56 Fed. Reg. 26460, 26476 (June 7, 1991). EPA concluded that sampling at 100 high risk Tier 1 sites was reasonable to account for the variability and assess the effectiveness of the corrosion

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control treatment. Id. DC Water follows all laws and regulations applicable and proven methods accepted by industry as best practice.

30. Page 9, Findings, second paragraph, first and second sentence: “To ensure that its sample collection procedures are properly followed, DC Water would need to use its own resources or improve its oversight by providing additional guidance such as explaining the significance of the stagnation period to the customers. This action would help DC Water maintain the integrity of the collection process.”

The use of the term “integrity” implies that the sample collection process is incomplete or lacks authenticity, when the recommended improvements would provide greater precision and confidence in the data gathered.

31. Page 9, Findings, third paragraph, first and second sentence: “DC Water sends its LCR water samples for testing to the water supplier’s (the Aqueduct’s) EPA- certified laboratory, but this process relies on the water supplier to conduct lead testing on its own product. This practice creates, at a minimum, the appearance of a lack of segregation of duties.”

The report raises the concern regarding the lack of segregation of duties between Washington Aqueducts water treatment and water testing duties but does not provide any material evidence that these dual roles compromised any test results or caused the District’s water to fail to meet the requirements of the LCR or any other SDWA requirement. Further, the report does not address the prevalence of the dual role practice, including within the District’s neighboring water systems such as WSSC, Fairfax Water, Prince William Service Authority, and Loudon Water.

The Safe Drinking Water Act defines a National Drinking Water Regulation to include “criteria and procedures... [for] quality control and testing procedures to insure compliance...”. The EPA certification and audit process fulfills this requirement. The Washington Aqueduct laboratory is an EPA-certified laboratory and undergoes an audit every three years (2017 was the most recent). Specifically, for lead analyses, the WA laboratory is certified for Method 200.8 to a minimum reporting level (MRL) of 0.0002 mg/L or 0.2 parts per billion which is lower than the local commercial laboratories. Please see <https://www.epa.gov/dwlabcert> for more information.

32. Page 10, Findings, first paragraph: After the District’s drinking water exceeded 15 ppb in 2001, DC Water had to replace 7 percent of all lead service lines in the District annually to comply with the LCR. However, in 2008, DC Water’s Board of Directors (the Board) directed DC Water to replace public lead service lines – only with water main replacements – and to use discretionary funds to replace public lead service lines – only when a customer agrees to pay for the replacement of the portion on the private property.

First, the draft Report incorrectly cites the date when DC Water exceeded the lead action, which was 2002, not 2001. Second, the report uses two data points, that relate to the initiation of DC Water’s LCR lead service line replacement program in “2002” and the action by the Board through Resolution 08-75 on September 4, 2008 that changed the non-regulatory lead

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service line replacement program, but does not include the interceding events that were the predicate for the 2008 Board action and provide context for those changes.

On July 1, 2004, through Resolution 04-60, the Board established a Lead Service Line Replacement (LSLR) Policy to replace all known lead service lines, approximately 23,000, in public space by September 30, 2010 and replace all lead service lines within 90 days if they are not identified prior to September 30, 2010.

On August 23, 2004, the Washington Aqueducts began treating the water with orthophosphate to passivate the lead containing materials in the customer water system to reduce the dissolution of lead into the water. See USEPA, *Elevated Lead in D.C. Drinking Water – A Study of Potential Causative Events, Final Summary Report*, EPA 815-R-07-021 (August 2007)

On January 6, 2006, DC Water notified EPA that DC Water LCR compliance monitoring 90th percentile water lead level met the lead action level for two consecutive six-month monitoring periods, which terminated DC Water's requirement to continue to perform LCR lead service line replacements.

On February 1, 2006, through Resolution 06-27, the Board revised the LSLR Policy to set the deadline for replacing any additional lead service lines "as soon as practicable but not later than the end of FY 2016"; identify all unknown lead service lines by FY 2015; "take all steps necessary to implement appropriate legislation to facilitate the replacement of lead service lines on private property;" and to review the "LSLR Policy biannually to determine whether any adjustments need to be made in light of experience and the goal of cost-efficiency, and to implement any changes to policy or practice in this regard."

Further, the changes made to LSLR Policy occurred after DC Water had secured expert advice from EPA and health experts, from George Washington School of Public Health and conducted a public outreach campaign to discuss and receive public comments on the potential changes to the Board LSLR Policy. This included five community meetings, one stakeholder meeting, two neighborhood meetings, numerous presentations at other meetings, meetings with the editorial boards and staff of elected officials, and many hearings on the topic conducted by the committees of the District of Columbia Council and the U.S. Congress.

Finally, the impact of the 2008 financial crisis must also be included as a consideration for the basis of the change in the LSLR Policy. The financial crisis of 2007–2008, also known as the global financial crisis and the 2008 financial crisis, is considered by many economists to have been the most serious financial crisis since the Great Depression of the 1930s.

33. Page 10, Findings, second paragraph, second sentence: "Based on service line inventory information in DC Water's database, there are 19,103 sites with known lead service lines throughout the District."

The number of known lead service lines "19,103" is incorrect. The report counts the number of service lines in public space separately from the service lines in private property, when the

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service line is one system that runs from the main to the building. As of March 30, 2018, the DCWPremex Dataset reported 11,318 lead service lines in public space and 7,857 on private property, of which some are full lead service lines. Totaling these figures may confuse the public and the programs directed to support the replacement of lead service lines.

34. Page 11, Findings, first paragraph, first sentence: The EPA set the MCLG for lead in drinking water at zero because that is when all public health risk from lead exposure is eliminated.

The report does not qualify that the MCLG is not a mandated standard that public water systems are required to meet, which can cause public confusion regarding the nature and role of the MCLG. Further, as noted above, EPA explained in detail when it promulgated the LCR that the MCLG was set at zero principally because the threshold for adverse effects from lead is not known, not because EPA had determined zero was a harm threshold. See 56 Fed. Reg. 26460-01, ("it is currently difficult to identify clear threshold exposure levels below which there are no risks of adverse health effects.") See 56 Fed. Reg. 26469. Finally, it is important to recognize that even if lead in water was eliminated, there are still systemic public health issues with lead from paint and from soil. Acute issues of lead poisoning can also occur with jewelry and other materials that could also be accidentally ingested by children.

35. Page 13, Conclusions third paragraph last sentence: "Incentives are also necessary to help customers pay to replace lead service lines on their property. These replacements will help the District realize the benefits of little to no lead in the drinking water."

The draft Report's concluding statement is misleading and give the public the impression that performing a full lead service line replacement will mitigate all risks of lead-water exposure. While D.C. ACT 22-567, *Lead Water Service Line Replacement and Disclosure Amendment Act of 2018* will provide funding to pay for the full replacement of lead service line, the replacement of the full lead service line will only remove part of the source of the lead from the household plumbing system. As noted above, lead can be present in any household plumbing that is not "lead free", including lead household pipe, solder, fixtures, joints, valves; brass plumbing and fixtures; and galvanized iron plumbing that is/was connected to a lead service line. To effectively protect public health, the report needs to encourage the public to identify and remove all sources of lead in their household plumbing and in the interim to take the following actions to minimize potential lead exposure until all sources of lead have been removed:

- Flush your pipes before using any tap water for drinking or cooking. Run cold water until the temperature changes and then allow it to run for an additional two minutes.
- Use only cold water for drinking and cooking.
- Filter your water if there are known or suspected lead sources.
- Remove and clean faucet aerators every 3 months.
- [Request a free lead test kit.](#)

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DC Water's Response to the Recommendations in the draft report, *DC Water's Procedures for Monitoring Lead in Drinking Water Could Be Improved* (OIG Project No 18-1-04LA)

1. Develop a plan to identify the unknown pipe materials within the water distribution system.

DC Water agrees with this recommendation. DC Water will document current/existing business processes that captures the ongoing effort to identify unknown pipe materials within the water distribution system. DC Water anticipates completing this work by April 1, 2019.

2. Correct the service line information discrepancies in service line materials to ensure transparency, consistency, accuracy, and completeness of the best available information for customers and stakeholders.

DC Water agrees with this recommendation. DC Water is constantly (and has been over the past 15 years) in the process of updating its service line material inventory with accurate and complete data. DC Water's efforts to update its database began in earnest under the former Lead Service Replacement (LSR) Program. As data was reported from the field activities (i.e., test pits and service line replacements) under the 2004-1, 2005-1, LSR 8, LSR 9, etc. Contracts, specific QA/QC processes and procedures were performed to verify accuracy and completeness of the data. Once all the QA/QC checks had passed, the data was added to the DCWPremex Dataset, which was the repository for both the public-side (i.e., from the water main to the property-line) and private-side (i.e., from the property-line to the premise) service line material type(s).

At present, DC Water continues to update the material type(s) for addresses in the District via the reporting of field activities under:

- Department of Engineering and Technical Services (DETS) Capital Improvement Program (CIP) Small Diameter Water Main Replacement (SDWMR) Projects
- Voluntary/Demand Lead Service Replacement (LSR) Program
- Emergency repairs performed by the Department of Water Operations (D
- Department of Water Quality and Technology (DWQ&T) studies and individual home investigations
- Homeowner and plumber/contractor reporting of point-of-entry (i.e., private-side) data

Since the early 2000s, DC Water has made significant progress with its service line material inventory. DC Water has determined or verified the service line material type for over 44,500 addresses in public-space. Also, DC Water has determined or verified the service line material type for over 24,900 addresses in private-space. As noted above, these material types were determined via test pits and service line replacement work, i.e., visual identification. Industry consensus is that the only reliable method for determining precise, customer-specific material type(s) is visual identification. Other identification tools currently being evaluated by industry include eddy current test, acoustic tests, cameras in

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curb stops, and various methods to facilitate direct visual identification. If it is determined that alternative methods to test-pitting/service line replacements can efficiently and accurately verify the service line material type, DC Water will consider these options as long as they are not cost-prohibitive and require significant rate increases for the customer.

In addition, as discussed in DC Water's comments on the draft report, DC Water will populate the private side pipe material data field with the historic data service line data. The historic service line records from the District included data that provided one pipe material for the entire service line because only one pipe material was apparently used at the time of the original installation. This data was applied differently in the LCR monitoring database versus the DCWPremex Database. When DC Water created the LCR monitoring database, the pipe material from the District's data was used to populate the material field for both the private and public side. We apply "lead" on public side as a full lead service line unless excavation or additional data reported that the material on private side was not lead (copper, brass, etc). However, when we created the DCWPremex Database, we created two fields—public and private sides to record replacement activity conducted on those parts of the service line. By default, the historic data populated the public side and it was decided to leave the private side unpopulated in DCWPremex resulting in a null or unknown pipe material designation. DC Water will work to update the information in the DCWPremex to populate the private side data field. This will reduce the number of null or unknown pipe material designations.

DC Water anticipates completing this work by fiscal year 2020 to sequence with our other data system upgrades.

3. Develop a plan to increase water testing participation in areas not regularly part of the LCR sample testing.

DC Water will create a plan that describes voluntary testing programs and outreach activities. DC Water anticipates completing this work by May 1, 2019.

4. Use DC Water staff to collect samples or guide customers who collect LCR water samples.

DC Water staff cannot effectively collect samples due to the LCR sampling requirements and logistical challenges. In accordance with the LCR's standard LCR monitoring program, samples must be collected at a minimum of 100 Tier 1 sits and the samples must be collected after all water use at the property has not been used for more than 6 hours. This requirement limits the time when staff can coordinate the entry into the customer's home because it depends on the time that is best for the customer to stop water use, and their availability to permit DC Water staff entry into the home to collect the sample. In addition, it would be near impossible to coordinate the collection of 100 samples within 6 months, where each home can have its own time when they are available for sample collection. However, DC Water will revise its LCR Standard Operating Procedures (SOPs) to include the communication of the sampling procedures

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with new participants in the LCR monitoring program. DC Water anticipates completing the revisions to the LCR Customer orientation process by July 1, 2019

5. Develop additional controls to periodically validate test results received from the Aqueduct.

DC Water disagrees with this recommendation, but will provide additional oversight as discussed below. The Safe Drinking Water Act defines a National Drinking Water Regulation to include “criteria and procedures.. [for] quality control and testing procedures to insure compliance...”. The EPA certification and audit process fulfills this requirement. The Washington Aqueduct laboratory is an EPA-certified laboratory and undergoes an audit every three years (2017 was the most recent). Specifically, for lead analyses, the WA laboratory is certified for Method 200.8 to a minimum reporting level (MRL) of 0.0002 mg/L or 0.2 parts per billion which is lower than the local commercial laboratories. Please see <https://www.epa.gov/dwlabcert> for more information. While DC Water disagrees that additional controls are necessary to validate the Washington Aqueducts test results, DC Water will review the tri-annual audit report for the Washington Aqueduct laboratory and ensure that they address any issues of concerned raised in that report.

6. Develop a plan to accelerate the rate of lead service lines replacements.

DC Water agrees with this recommendation. DC Water will perform the following actions:

- 1) Reduce the use of cleaning and lining for small diameter water main rehabilitation and focus on replacing small diameter water mains, which will include the replacement of the service lines connected to the water mains. DC Water has initiated this action.
 - 2) Secure additional funding for small diameter water main replacement (SDWMR) program beginning in FY 2021. DC Water anticipates completing this work in April 2019.
 - 3) Revise SDWMR program scoring criteria to prioritize mains and neighborhoods with higher concentrations of lead service lines. DC Water anticipates completing this work in October 2019.
 - 4) Upon enactment and funding, implement D.C. Act A22-0567, *Lead Pipe Replacement and Disclosure Amendment Act of 2018*. Subject to the District including funding in an approved budget and financial plan, DC Water anticipates initiating the implementation of this legislation in October 2019.
7. Develop a process or procedure to follow-up on outstanding customer requests for lead service line replacement, including the 255 customers currently on the list.

DC Water agrees with this recommendation. DC Water will document current/existing business processes for following up with outstanding customer requests for lead service line replacements. DC Water anticipates completed this work by April 1, 2019.

APPENDIX D. DC WATER'S RESPONSE TO THE DRAFT REPORT

8. Determine a funding source to provide DC Water customers assistance with replacing their lead service lines on private property.

DC Water agrees with this recommendation. On January 16, 2019, the Mayor signed D.C. Act 22-567, *Lead Water Service Line Replacement and Disclosure Amendment Act of 2018*, which, once the District includes funds in an approved budget and financial plan, this Act will establish two programs that provide funds to assist DC Water customers with financial support to replace their lead service lines on private property.

- 1) Full Lead Water Service Line Replacement Program. Under this program, the District will provide funding to pay for the costs to replace the lead water service line in private property when DC Water is performing lead water service pipe replacements on public space either during planned or emergency repair of the service line or water main.
- 2) Lead Service Line Payment Assistance Program - Under this program the District will provide funding to assist DC Water customers to replace the lead service line on private property if the service line in public space is not lead. The program will pay all or part of the costs provided the property owners meet certain income levels. DOEE will review and approve for eligibility and transfer the funding to DC Water. Once the lead water service line has been replaced, DC Water will certify that the work has been completed and pay the contractor for the work up to the amount approved by DOEE.

Subject to the District including funding in an approved budget and financial plan, DC Water anticipates initiating the implementation of this legislation in October 2019.

9. Conduct a feasibility study to introduce market-based opportunities to replace lead service lines when homes are sold and/or renovated, and report the results to the District.

DC Water disagrees with this recommendation. This recommendation is outside of DC Water's statutory authority. However, D.C. Act 22-0567, *Lead Water Service Line Replacement and Disclosure Amendment Act of 2018*, includes two provisions that will have a direct impact on facilitating opportunities to replace lead water service lines when homes are sold or renovated by providing lead water disclosure information to tenants and prospective property purchasers. This is accomplished through: 1) the Mayor's lead disclosure form requirement for tenants, and 2) the Residential Real Property Seller Disclosure requirements for purchasers. This information includes, but not limited to: a) lead water test results, b) lead-bearing plumbing including lead water service line, c) lead water service line replacement; and d) for tenant's lead-in-water warning statement.

The disclosure of this information will have a direct impact on spurring opportunities to replace lead service lines when homes are rented, sold or renovated.