

2016 Lead Service Line & Lead Component Survey of Washington's Water Utilities

Department of Health
Office of Drinking Water



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Executive Summary

On May 2, 2016, Governor Inslee issued [Directive 16-06](#) because of increased public concern about lead in drinking water. As there is no safe level of lead, this directive instructed state agencies to work with partners to address potential sources of lead exposure and ways to minimize the exposure of lead. One aspect of this directive was that “Department of Health (DOH) shall work with each Group A public water system to identify all lead service lines and lead components within two years.”

In October 2016, the DOH Office of Drinking Water (ODW) surveyed the state’s 4,062 Group A public water systems about the occurrence of lead service lines and lead components in their system. Group A systems are public water systems that serve more than 15 connections.

There were 686 water systems that responded to the survey, representing over 2.2 million of the 2.5 million connections statewide:

- Five water systems stated they have lead service lines, representing 0.04 percent of the connections served by all survey respondents.
- Fifteen water systems stated they have lead components, representing 0.28 percent of connections served by survey respondents.
- Forty water systems serving more than 1,000 connections responded “unknown” to questions about the number of active lead service lines and/or the number of lead components, representing 15 percent of the connections served by survey respondents.
- Sixty water systems requested information on techniques for identifying lead service lines and lead components, and 25 water systems requested support for reviewing records and construction documents.

The ODW is following up with water systems to develop an action plan for those who reported lead service lines or lead components. We are working with water systems that responded “unknown” to identify the type of assistance needed to quantify and locate lead service lines and components.

As we learn more about the needs of the water systems, we will continue to work with stakeholder groups to develop strategies, policy, and budgetary proposals to remove all known lead service lines and lead components from Group A public water systems within 15 years.

Background

The purpose of the 13-question survey was to gather information from Group A water systems to assess the use of lead in service lines and lead service components connecting water mains to homes, businesses, and other buildings around the state.

This information will also prioritize follow-up work with Group A water systems to help them find and replace all lead service lines and lead components. The ODW is targeting lead service lines and lead components, which can be a significant source of lead in drinking water, to protect the health of Washington’s residents.

Definitions:

- **Lead service line:** A service line made of lead, which connects the water main to the building plumbing. This definition of a lead service line does not include service line components, such as goosenecks.
- **Lead component:** A service line component made of at least 90 percent lead, such as a lead gooseneck, which connects the water main to a galvanized service line. Brass and other lead-alloyed materials are not considered lead components.

Analysis

The 686 water systems that responded to the survey represent 90 percent of the service connections in the state. Water systems ranged from small water systems serving less than 25 connections to the largest water systems in the state.

To estimate the statewide total of lead service lines that remain in service, we extrapolated the definitive survey responses from water systems serving 2.08 million connections to the 2.5 million connections served by all Group A water systems and assumed a similar rate of lead service line occurrence. Following these assumptions, we estimate 1,000 to 2,000 active lead service lines.

To estimate the statewide total of lead components that remain in service, we extrapolated the definitive survey responses from water systems serving 1.95 million connections to the 2.5 million connections served by all Group A water systems and assumed a similar rate of occurrence of lead components. Following these assumptions, we estimate 8,000 active lead components. Many of the larger water systems that responded “unknown” also responded later in the survey that they had previously removed all their lead components.

Next Steps

Water systems identified a lack of service line inventory and inadequate staff resources to perform records review as key barriers to providing accurate estimates of lead service lines and lead service components. Those water systems provided information on the type of assistance they need, and we are following up with them.

We are also helping connect water systems with resources to remove lead components. One option, the Drinking Water State Revolving Fund (DWSRF) Program, can provide funding for the removal and replacement of lead service lines and components. The DWSRF Program provides a competitive loan process and can offer a maximum award of \$3 million.

Survey Questions

Question 1: Administrative information

This question asked water systems to identify themselves. Later, we added the number of service connections served by each system.

Data:

# of Group A systems responding to survey	All Group A systems	% of systems responding to survey
686	4,062	16.9%

# of connections served by systems that responded to survey	All Group A connections	% of Group A connections represented by survey
2,267,302	2,511,214	90.3%

Data interpretation:

More than 680 Group A water systems completed the survey. These water systems represent over **90 percent** of all Group A service connections statewide.

Question 2: Do your records indicate any service lines installed before 1945 are still in service?

Data:

Responses	Yes	No	Insufficient records
# of respondents	49	565	72
% of respondents	7.1%	82.4%	10.5%
% of reported connections served	33.2%	49.9%	16.9%

Data interpretation:

Forty-nine water systems reported some service lines installed before 1945 are still in service. Service lines installed before 1945 are more likely to contain lead than those installed after 1945.

- These systems are more likely to contain lead because of the age of their service connections.
- These systems represent 33.2 percent of the connections reported in the survey.
- Together with systems reporting insufficient records, there are 121 water systems representing 50.1 percent of reported connections that may have active pre-1945 service lines.

Question 3: Do you have any reason to believe lead service lines or other lead components were installed in your system after 1945?

If a survey respondent answered “no” to Questions #2 and #3, their survey **was deemed complete**. For questions 4-13, these water systems are represented within the “N/A or No Response” totals.

Data:

Responses	Yes	No	Insufficient records
# of respondents	26	624	36
% of respondents	3.8%	91.0%	5.2%
% of reported connections served	6.8%	87.9%	5.2%

Data interpretation:

Twenty-six water systems reported lead service lines or other lead components may have been used since 1945.

Question 4: How many lead service lines do you estimate remain in use?

We asked water systems that responded “yes” to estimate the total number of active lead service lines (LSLs) in their system.

Data:

Responses	N/A or no response	LSL present	None	Unknown
# of respondents	542	5	91	48
% of respondents	79.0%	0.7%	13.3%	7.0%
% of reported connections served	46.1%	4.4%	40.9%	8.6%
Estimated total number of lead service lines in use		916		
% of reported connections served with lead		0.04%		

Data interpretation:

The water systems responding “unknown” may need or request technical assistance to estimate LSLs. The table below lists the water systems that reported an estimated number of LSLs remaining in use.

System name	Estimated # of lead service lines	Total service connections
SPOKANE, CITY OF	402	85,259
UNION GAP WATER	300	2,765
BLAINE, CITY OF	200	2,634
SHELTON, CITY OF	10	4,383
HOQUIAM WATER DEPARTMENT	under 5	3,883

The next table lists water systems with more than 1,000 total service connections that responded “unknown.” The italicized names reported the *removal of all their lead service lines* in Question 10.

System name	Total Service Connections
ABERDEEN, CITY OF	7,498
CENTRALIA UTILITIES	7,960
CHENEY, CITY OF	4,245
<i>CHEWELAH WATER DEPT SOUTH</i>	<i>1,270</i>
DAYTON WATER DEPARTMENT	1,482
EAST SPOKANE WATER DIST 1	1,661
<i>ELLENSBURG WATER DEPT</i>	<i>9,745</i>
FERNDALE	5,636
<i>GRANDVIEW, CITY OF</i>	<i>3,334</i>
IRVIN WATER DISTRICT #6	2,026
KELSO, CITY OF	5,235
KENNEWICK, CITY OF	23,736
LAKESWOOD WATER DISTRICT	27,881
<i>LYNDEN WATER DEPARTMENT</i>	<i>5,683</i>
MEDICAL LAKE, CITY OF	2,067
MODERN ELECTRIC WATER CO	8,262
NEWPORT, CITY OF	1,021
OAK HARBOR, CITY OF	8,532
<i>OROVILLE, CITY OF</i>	<i>1,664</i>
PROSSER, CITY OF	2,800
<i>PULLMAN WATER DEPARTMENT</i>	<i>11,481</i>
QUINCY WATER DEPARTMENT	2,249
RIDGEFIELD PUBLIC WORKS	2,023
SELAH, CITY OF	3,087
SEQUIM, CITY OF	3,602
SNOHOMISH, CITY OF	4,624
SNOQUALMIE WATER	5,182
STANWOOD WATER DEPT	3,046
TUMWATER, CITY OF	9,284
<i>WAPATO WATERWORKS</i>	<i>1,776</i>
WEST RICHLAND, CITY OF	5,402
<i>WEST SOUND UTILITY DISTRICT #1</i>	<i>7,835</i>

Question 5: Most lead components were attached to galvanized service lines (GSLs). How many pre-1945 galvanized service lines do you estimate remain in use?

This question helps to establish a potential source of lead components in the water distribution system.

Data:

Responses	N/A or no response	GSL present	None	Unknown
# of respondents	543	39	39	65
% of respondents	79.2%	5.7%	5.7%	9.5%
% of reported connections served	46.1%	26.6%	9.5%	17.7%
Estimated total number of pre-1945 galvanized service lines in use		27,050		
Pre-1945 galvanized service lines as a % of all reported Group A system connections		1.18%		

Data interpretation:

A larger group of water systems reported having pre-1945 GSLs. These systems are at a higher risk because their galvanized lines may have been connected using lead components. The table below lists the water systems reporting the 10 highest number of pre-1945 GSLs.

System name	Estimated # GSLs	Total service connections
SEATTLE PUBLIC UTILITIES	8,000	173,833
TACOMA WATER DIVISION, CITY OF	6,000	138,202
WALLA WALLA WATER DIVISION	2,500	13,915
PUYALLUP, CITY OF	2,000	15,075
AUBURN, CITY OF	1,500	22,975
PUD #1 OF ASOTIN COUNTY	950	8,945
PARKLAND LIGHT & WATER COMPANY	689	8,492
BREMERTON, CITY OF	625	23,934
WHITE SALMON, CITY OF	500	1,908
DEER PARK, CITY OF	475	1,899

The water systems responding “unknown” may need/request technical assistance to estimate pre-1945 GSLs. The table below lists water systems with more than 1,000 total service connections that responded “unknown.”

System name	Total Service Connections
ABERDEEN, CITY OF	7,498
CENTRALIA UTILITIES	7,960
CHENEY, CITY OF	4,245
CHEWELAH WATER DEPT SOUTH	1,270
DAYTON WATER DEPARTMENT	1,482
EAST SPOKANE WATER DIST 1	1,661
ELLENSBURG WATER DEPT	9,745
ELMA, CITY OF	1,498
FERNDALE	5,636
FORKS MUNICIPAL WATER DEPT	1,981
GOLDENDALE, CITY OF	1,976
GRANDVIEW, CITY OF	3,334
IRVIN WATER DISTRICT #6	2,026
KELSO, CITY OF	5,235
KENNEWICK, CITY OF	23,736
KENT WATER DEPARTMENT	32,307
LAKESWOOD WATER DISTRICT	27,881
LIBERTY LAKE S&W DISTRICT	4,427
LYNDEN WATER DEPARTMENT	5,683
MARYSVILLE UTILITIES	26,077
MEDICAL LAKE, CITY OF	2,067
OKANOGAN WATER DEPARTMENT	1,119
OMAK, CITY OF	2,471
OROVILLE, CITY OF	1,664
PASCO WATER DEPARTMENT	24,337
PROSSER, CITY OF	2,800
PULLMAN WATER DEPARTMENT, CITY OF	11,481
QUINCY WATER DEPARTMENT, CITY OF	2,249
RAYMOND WATER DEPARTMENT	1,564

REDMOND WATER SYSTEM, CITY OF	28,699
SKYWAY WATER & SEWER	4,117
SNOHOMISH, CITY OF	4,624
SNOQUALMIE WATER	5,182
SPO CO WATER DIST 3, SYS 2	4,719
SPOKANE, CITY OF	85,259
STANWOOD WATER DEPT, CITY OF	3,046
SULTAN WATER DEPARTMENT	1,974
TOPPENISH WATER DEPARTMENT	2,592
TRENTWOOD IRRIGATION DISTRICT 3	1,889
TUMWATER, CITY OF	9,284
WEST RICHLAND, CITY OF	5,402
WEST SOUND UTILITY DISTRICT #1	7,835
ZILLAH, CITY OF	1,148

Question 6: Of the galvanized service lines still in use, how many do you estimate connect to the water main by a lead gooseneck or other lead component?

We asked water systems that responded “yes” to estimate the total number of active lead goosenecks or other lead components in their system.

Data:

Responses	N/A or no response	Lead component present	None	Unknown
# of respondents	581	15	47	43
% of respondents	84.7%	2.2%	6.9%	6.3%
% of reported connections served	54.1%	18.3%	14.0%	13.5%
Estimated total number of lead-connected pre-1945 galvanized service lines in use		6,370		
Lead-connected galvanized service lines as a % of all reported Group A system connections		0.28%		

Data interpretation:

The table below lists the water systems reporting the 10 highest number of lead-connected pre-1945 GSLs.

System name	Estimated # of lead-connected GSLs	Total service connections
SEATTLE PUBLIC UTILITIES	2,000	173,833
AUBURN, CITY OF	1,500	22,975
TACOMA WATER DIVISION, CITY OF	1,200	138,202
WENATCHEE, CITY OF	524	10,480
KETTLE FALLS WATER DEPT	350	1,311
BREMERTON, CITY OF	310	23,934
BLAINE, CITY OF	200	2,634
LONGVIEW WATER DEPARTMENT	100	14,388
WALLA WALLA WATER DIVISION	100	13,915
SELAH, CITY OF	31	3,087

The water systems responding “unknown” may need or request technical assistance to estimate lead-connected galvanized service lines. The table below lists water systems with more than 1,000 total service connections that responded “unknown.” The italicized names reported the *removal of all their lead goosenecks* in Question 12.

System name	Total Service Connections
ABERDEEN, CITY OF	7,498
CENTRALIA UTILITIES	7,960
CHENEY, CITY OF	4,245
<i>CHEWELAH WATER DEPT SOUTH</i>	<i>1,270</i>
<i>DAYTON WATER DEPARTMENT</i>	<i>1,482</i>
EAST SPOKANE WATER DIST 1	1,661
ELLENSBURG WATER DEPT	9,745
FERNDALE	5,636
IRVIN WATER DISTRICT #6	2,026
<i>KELSO, CITY OF</i>	<i>5,235</i>
<i>KENNEWICK, CITY OF</i>	<i>23,736</i>
KENT WATER DEPARTMENT	32,307
LAKESWOOD WATER DISTRICT	27,881
LYNDEN WATER DEPARTMENT	5,683
MEDICAL LAKE, CITY OF	2,067
NORTH PERRY AVE WATER DISTRICT	7,619
<i>OROVILLE, CITY OF</i>	<i>1,664</i>
<i>PASCO WATER DEPARTMENT</i>	<i>24,337</i>
PROSSER, CITY OF	2,800
<i>PULLMAN WATER DEPARTMENT, CITY OF</i>	<i>11,481</i>
QUINCY WATER DEPARTMENT, CITY OF	2,249
RAYMOND WATER DEPARTMENT	1,564
SEQUIM, CITY OF	3,602
<i>SPOKANE, CITY OF</i>	<i>85,259</i>
STANWOOD WATER DEPT, CITY OF	3,046
SULTAN WATER DEPARTMENT	1,974
<i>TOPPENISH WATER DEPARTMENT</i>	<i>2,592</i>
UNION GAP WATER	2,765
WEST RICHLAND, CITY OF	5,402
WEST SOUND UTILITY DISTRICT #1	7,835

Question 7: How confident are you in these estimates?

Data:

Responses	N/A or no response	Not confident	Somewhat confident	Very confident
Results for all respondents	546	35	69	36
Results for LSL positive water systems	0	1	5	1
Results for GSL positive water systems	0	4	21	14

Data interpretation:

The water systems responding “not confident” may need or request technical assistance to improve the accuracy of their estimates. The table below lists water systems that responded “not confident.”

System name	Total Service Connections
AUBURN, CITY OF	22,975
BREWSTER, CITY OF	838
CATHLAMET WATER DEPT	570
CHENEY, CITY OF	4,245
CHEWELAH WATER DEPT SOUTH	1,270
COLTON WATER DEPARTMENT	194
EAST SPOKANE WATER DIST 1	1,661
ELLENSBURG WATER DEPT	9,745
FERNDALE	5,636
GOOSEHAVEN	46
IRVIN WATER DISTRICT #6	2,026
KELSO, CITY OF	5,235
LAKEWOOD WATER DISTRICT	27,881
MODERN ELECTRIC WATER CO	8,262
OROVILLE, CITY OF	1,664
PACK FOREST	17
PALO VERDE	16
PALOUSE EMPIRE FAIRGROUNDS	95
PASCO WATER DEPARTMENT	24,337
PONDORAY SHORES W&S	32
PROSSER, CITY OF	2,800

PULLMAN WATER DEPARTMENT	11,481
QUINCY WATER DEPARTMENT	2,249
SEQUIM, CITY OF	3,602
SNOQUALMIE WATER	5,182
STANWOOD WATER DEPT, CITY OF	3,046
TIDELANDS CAMPGROUNDS	51
TOPPENISH WATER DEPARTMENT	2,592
TUMWATER, CITY OF	9,284
UNION GAP WATER	2,765
VADER-ENCHANTED VALLEY	364
WEST RICHLAND, CITY OF	5,402
WEST SOUND UTILITY DISTRICT #1	7,835
WINLOCK CITY	631
WOODLAND, CITY OF	2,496

Question 8: You answered "insufficient records" or "unknown" to one or more of the previous questions. Why? (Select all that apply.)

Data:

Responses	N/A or no response	Lacks water main inventory	Lacks service line inventory	Lacks staff resources to review records	Other: Free response
# of respondents	576	19	80	8	22
% of respondents	84.0%	2.8%	11.7%	1.2%	3.2%
% of reported connections served	69.9%	3.0%	21.9%	6.1%	5.4%

Data interpretation:

The table below lists the water systems that responded "lacks staffing resources."

System name	Total Service Connections
ARLINGTON WATER DEPT	6,465
BLAINE, CITY OF	2,634
CATHLAMET WATER DEPT	570
CHENEY, CITY OF	4,245
ENUMCLAW WATER DEPARTMENT	7,205
LEAVENWORTH, CITY OF	2,342
REDMOND WATER SYSTEM, CITY OF	28,699
SPOKANE, CITY OF	85,259

Question 9: What type of assistance can we provide to help you identify lead service lines and lead service components? (Select all that apply.)

Data:

Responses	N/A or no response	Techniques to identify LSLs and goosenecks	Review records and construction documents	Other: Free responses
# of respondents	583	60	25	33
% of respondents	85.0%	8.7%	3.6%	4.8%
% of reported connections served	73.8%	10.9%	11.5%	7.7%

Data interpretation:

We want to prioritize staff resources to help the most number of people. The table below lists water systems with more than 1,000 total service connections that responded “review records.” These systems, together with the water systems listed under Question 8, need our help with reviewing existing utility records.

System name	Total Service connections
AUBURN, CITY OF	22,975
BLAINE, CITY OF	2,634
BELLEVUE, CITY OF	64,961
DAYTON WATER DEPARTMENT	1,482
EATONVILLE WATER DEPT	1,090
GIG HARBOR WATER DEPT	3,573
IRVIN WATER DISTRICT #6	2,026
KELSO, CITY OF	5,235
LYNDEN WATER DEPARTMENT	5,683
OAK HARBOR, CITY OF	8,532
PASADENA PARK IRR DIST 17	2,589
PORT ANGELES COMPOSITE	3,508
PULLMAN WATER DEPARTMENT, CITY OF	11,481
REDMOND WATER SYSTEM, CITY OF	28,699
SKYWAY WATER & SEWER	4,117
SNOQUALMIE WATER	5,182
SPOKANE, CITY OF	85,259

Question 10: Please estimate the total number of lead service lines removed from your system.

Data:

Responses	N/A or no response	Unknown but all removed	None	Estimated LSLs removed
# of respondents	554	28	81	17
% of respondents	80.8%	4.1%	11.8%	2.5%
% of reported connections served	48.1%	7.9%	33.9%	9.2%
Estimated total number of lead service lines removed				2,411

Data interpretation:

The structure of the survey prevented most respondents from getting to this question. In addition, we know that 28 utilities removed all their lead service lines but had insufficient information to provide us an estimate. This suggests a greater number of lead service lines have been removed from service than reported above.

The table below lists the top 10 utilities and their reported number of lead service lines removed.

System name	Estimated # LSLs removed	Estimated # LSLs remaining
BLAINE, CITY OF	200	200
EVERETT PUBLIC WORKS DEPT. CITY OF	12	None
KETTLE FALLS WATER DEPT	350	350
LAKEWOOD WATER DISTRICT	45	Unknown
REST A WHILE RV PARK	95	Unknown
SHELTON, CITY OF	40	10
SPOKANE, CITY OF	600	402
UNION GAP WATER	110	300
YELM, CITY OF	110	None

Question 11: This water system... (Select all that apply.)

We asked this question to understand the type of removal/replacement that was occurring. Water systems described their operational practices.

Data:

Responses:	N/A or no response	...Practices full LSL replacement	...Practices partial LSL replacement	...Is uncertain
# of respondents	657	2	17	11
% of respondents	95.8%	0.3%	2.5%	1.6%
% of reported connections served	88.9%	3.8%	6.2%	1.2%

Data interpretation:

Only two water systems answered that they fully replaced the entire lead service line from water main to the home or business. Most water systems that commented in the free response section of the survey told us they replaced LSLs between the water main and the property line (i.e., partial LSL replacement), and let the private property owners decide whether to replace the portion of the lead service line on their property.

Question 12: Please estimate the total number of lead components (e.g., goosenecks) removed from your system.

Data:

Responses	N/A or no response	Number unknown, but all removed	None	Estimated lead goosenecks removed
# of respondents	555	36	59	36
% of respondents	80.9%	5.2%	8.6%	5.2%
% of reported connections served	48.1%	16.2%	9.1%	26.6%
Estimated total number of lead goosenecks removed				37,745

Data interpretation:

The structure of the survey prevented most respondents from getting to this question. Thirty-six utilities said they removed all their lead goosenecks but had insufficient information to provide us an estimate. This suggests a greater number of lead goosenecks have been removed from service than reported above.

The table below lists the top 10 utilities and their reported number of lead goosenecks removed.

System name	Estimated # goosenecks removed	Estimated # goosenecks remaining
AUBURN, CITY OF	500	1,500
BREMERTON, CITY OF	200	310
DAVENPORT WATER DIVISION	700	30
LONGVIEW WATER DEPARTMENT	600	100
PROSSER, CITY OF	100	Unknown
SEATTLE PUBLIC UTILITIES	4,000	2,000
TACOMA WATER DIVISION, CITY OF	30,000	1,200
UNION GAP WATER	100	Unknown
WENATCHEE, CITY OF	1,048	524
YELM, CITY OF	110	None

Question 13: Please share any other questions or comments you may have on this topic.

Please see Appendix B for the responses to this question.

Appendix A: Original Survey Emails

First email

The ODW sent an email to Group A water systems on October 17, 2016, providing information about the upcoming survey:

In a few days, we will send you an email with a link to a short online survey about the presence of lead materials in your drinking water system. Answering the survey may require some water system managers to research their water main and service line records. If you are not the correct person to complete this survey for your water system, please forward this message to the right person and send a copy of your message to us so we can properly direct the survey.

Earlier this year, the city of Flint, Mich., made national news because of lead in its drinking water. These events created heightened public interest and focused the attention of public health professionals on identifying sources of lead exposure and reducing or eliminating these sources wherever possible.

On May 2, Governor Inslee directed the Department of Health to identify and reduce all sources of lead exposure to the people of Washington State. Flint reminded all of us that one route of lead exposure can be through corrosion of lead service lines and other lead components.

Even if your utility operates within existing standards for lead, we know that any amount of lead in drinking water is harmful to human health. Removing lead materials that come in contact with drinking water will result in lower lead exposure for current and future generations. We are committed to helping public water systems and the communities they serve rid their systems of lead service lines and other lead components.

Your responses will help us develop budgetary and policy recommendations to the Governor, designed to help Washington's public water systems remove lead service lines and other lead components.

We look forward to your input and on-going partnership in this important effort.

For more information, contact Scott Torpie via [email](#) or at 509-329-2121.

Second email

The ODW sent an email to Group A water systems on October 24, 2016, asking them to participate in the survey:

You have been identified as the main point of contact for one or more Group A water systems. Please complete this survey for each Group A system under your supervision/management. If you are not the correct person to complete this survey, please forward this message to the right person. Your response(s) will help us establish budgetary and policy priorities to remove lead materials from our state's drinking water systems. For most systems the survey will take about 10 minutes to complete.

The information you provide will be used to:

- 1. Refine the current estimate of lead service lines that exist in Washington State.*
- 2. Develop an estimate of the number of lead service components that exist in Washington State.*
- 3. Inform budgetary and policy priorities to remove lead from drinking water over the next 15 years and thereby reduce one route of lead exposure in Washington State.*

The information we collect from this survey may be subject to release in accordance with [RCW 42.56](#) (Public Records Act).

On May 2, 2016, in response to concerns about lead exposure, Governor Inslee directed the Department of Health to take actions to reduce sources of lead exposure in an effort to protect public health.

The Governor's Directive addresses many different sources of lead exposure, including exposure through drinking water. Our assignment, which triggered this survey, is to work with each Group A public water system to identify all lead service lines and lead components. We recognize that your actions in completing this survey to protect public health are voluntary and go above and beyond current regulatory requirements.

Lead service lines can be a significant source of lead in drinking water consumed by the customer, especially if the service line is physically disturbed or there is a significant change in water quality. The latest national estimate indicates there are approximately 27,000 lead service lines in Washington State. This estimate was based on input from a very small number of water systems. In addition, there are an unknown number of lead components, sometimes called goosenecks, on service lines in Washington State. For the purpose of this survey:

- Lead service line means a service line made of lead connecting the water main to the building plumbing. This definition of a lead service line does not include service line components such as goosenecks.*
- Lead component means a service line component made of at least 90 percent lead such as a lead gooseneck (also known as a "pigtail" or "whip") that connects the water main to a*

galvanized service line. Brass and other lead-alloyed materials are not considered lead components.

If, as you take the survey, you need to step away to research the answer to a question, simply click "Save." You will be emailed a link (called a "return link" or a "return ticket") to complete the survey at a later time without losing any of the information you've already entered. Once you have completed the survey, you will not be able to change your answers.

This survey typically takes less than five minutes to complete; however, you may need to do additional research to complete the survey.

Appendix B: Free Responses

Below are the responses we received from participating water systems.

Question 1: Administrative Information

Question 2: Do your records indicate any service lines installed before 1945 are still in service?

- 98% of the system was built after 1987. The remaining 2000' of distribution + service lines are being replaced at this time
- AC pipes likely installed in 50's 60's 70's. Ductile Iron likely installed 70's & 80's. PVC likely installed 80's to present.
- All lines are PVC or poly pipe. (x2)
- All lines installed before 1945 have been upgraded to larger service lines
- All lines replaced since that date.
- Areas that old have had the service lines replaced.
- As part of our requirement to upgrade every service to a metered service we have removed and replaced every galvanized service in our system.
- Current lines were installed probably in the 1960's or later. Most lines installed in the 60's at the earliest.
- Everything that has been exposed has been determined as galvanized.
- I have never found lead components on services. We observed 50 percent of our services from sewer installation
- I would believe we do, but don't really have a record of what has been replaced
- In 1930's houses logging and train houses were torn down
- Installed before 1945 not necessarily still in use.
- Installed meters late 1960's or early 1970's. All service lines I have had to deal with have been poly
- I've been employed by the city for over 21 years and have done a lot of work in the water system. To my knowledge we have never come across a lead service line or a lead gooseneck.
- Main lines are CI pipe and service lines indicating galvanized pipe.
- Marysville does not keep records of the service line installation dates or materials used.
- No lead service lines, some lead goose necks only.
- Only a very few. Most of Redmond was developed after 1945, and many original water system components have been replaced.
- Probably very few, if any.
- Records do not go back to before 1945 (x5)
- Records for service lines, if any, are on old work order logs and are not easily accessible. Our meters database only includes 6 records that indicate original services from 1945 and earlier--but this is a limitation of the database and does not reflect historical connections.
- System was created through a LUD in 1999, construction of the system occurred thereafter using modern materials.

- The association has been in existence since 1930, but records show that all lines installed in the early days (wood and cast iron) have been replaced.
- The City has no record of the materials used at the time of installation. When a new water main is installed then the City replaces the old service line. The service line is from the main to the water meter. We do not monitor private service lines from the Meter to the building.
- The District was formed in 1938. Some private service lines may be the original.
- The Gales Addition portion of the PA Composite Water System was taken over by the PUD in the late 1940's. The Gales Addition Reservoir was installed in 1946. The PUD does not have any records showing service lines that may have existed prior to PUD ownership of the Gales Addition System.
- The property was purchased by the George and Madeleine Justus Family in 1960. Apparently it was an established trout farm at the time with one building as a caretaker's living quarters and a barn.
- The SPU direct service area has service lines installed prior to 1945; as a point of clarification, lead service lines were never installed.
- The system is not that old, everything is PVC
- The system was mostly built after 1945 (x3)
- The water system did not exist in 1945 (x48)
- This is a nursery. There are no service lines. All piping is PVC
- Vera does not own or maintain the water services in our district.
- We do not have records that indicate the specific service lines. However we are certain that there are some that have lead goosenecks.
- We don't have service line material records that go back that far
- We don't think so but there are no records of line installation dates
- We had a fire at our public works office
- We have incomplete information.
- We have no records of any lead service lines still active.
- We have old service cards. They do not indicate the type of material used.
- We know there are homes built prior to 1945, but we have no records as the system was private at that time.
- While we do not have records to confirm this, there are likely such services. But since the water system was originally a very small private water system, built on a shoestring, and with farmer available materials, we have only uncovered the use of galvanized and copper pipe in services with brass fittings.

Question 3: Do you have any reason to believe lead service lines or other lead components were installed in your system after 1945?

- 1000 feet of 8' cast iron pipe with lead joints. All the service lines were replaced on that line in 1993 to copper services.
- 98% of the system was built after 1987. The remaining 2000' of distribution + service lines are being replaced at this time

- A water system with black plastic lines was installed sometime in the 1950's, and then completely replaced with white Schedule 40 and 80 PVC lines in 1981.
- Again we do not have accurate records of service lines installed after 1945. We have done physical excavation on selected service lines of older homes and verified there were no lead connections. When the City replaced water mains in older residential areas we verified that there was no Lead goosenecks or service lines.
- All of our records for lead goosenecks are 1930 or earlier.
- Anecdotal evidence based on long serving City water workers seems to indicate the non-existence of lead service lines in the Enumclaw area. This is based on service calls as well as work on existing mains that serve the areas of Enumclaw developed before 1950.
- At the McHaven November 2016 Board of Directors meeting I asked the people in charge of the at the time the new poly pipe distribution system was installed in 2000. This was the Water Operator and the Board President in 2000, and they advised that the contractor installed a poly pipe distribution system water line and there was and is no lead pipe in McHaven's water system. We have 37 water connections in our system.
- Brass fitting with lead in them.
- Distribution system PVC
- Entire system is PVC
- For some fortunate reason, lead components, specifically lead goosenecks, were never installed consistently in Centralia's water system. We rarely uncover any lead components.
- Four of our staff plus a fifth retiree, with about 130 years of combined service on our water distribution system, have never observed a lead service line on either side of a meter. There has been only one observation of a lead connection component, and that was in the 1980s or 1990s.
- Fruitland Water's standards have always been to use a 'swing joint' using galvanized elbows rather than a flexible type of pipe.
- Galvanized and Copper, but most replaced to poly.
- Highland Water District was formed in 1969 and was known as Highland Water Association.
- I believe we have some fire hydrants that are leaded in. Done properly the lead isn't in contact with the water source.
- I don't have reason to believe it but there may be components that I'm unaware of as I didn't work for utility until 2009.
- It is likely lead-containing components were installed, but we have no records to show what may have been installed or where.
- It is possible that some of the brass fittings contain levels of lead that are unknown. Please note that all District water meters were changed out as part of AMR project completed in July of 2012. The meters installed are low lead compliant with current drinking water standards.
- Lead gasket at bells, and solder on older pipes.
- Many of the old fire hydrants and pipe joints we have found some lead oakum joint seals. The old fire hydrants are being changed out on all water and street projects.

- No lead service lines or lead goose necks have been observed during water main and service line upgrades.
- None have ever been found (x2)
- None of the services we have repaired or replaced have had any lead parts.
- Our system was installed about 1978. Mains and service lines were installed in plastic. Under house piping was done in copper. This has subsequently all been replaced with plastic.
- Our water meters were copper bodied until last year. We had a complete meter change out program, and went to plastic bodied radio read meters. No more copper meters in the system
- Over the last 30 years we have found very few (less than 6) lead service lines and those were immediately replaced
- Perhaps old brass/lead meter devices, but they have all been replaced with current standard components.
- The City is currently in the process of refining data on areas where lead 'gooseneck' meter connections may still exist and be in service.
- The only lead that I know of is on the North Touchett 12' cast main line, and those are the main line joints. The main is from the City limits on South 4th street to the end of the line. Parts of the main have been replaced with C-900.
- The Well and connections were updated in the late 1980's and early 1990's, so inside faucets and fixtures may be of that vintage but not the service lines.
- There have been lead components removed in some of the older parts of town.
- They were installed, but all known lead services have been replaced
- Water System Established 1965
- We believe there may be some lead components (goosenecks) in the system. It is believed that these were installed before 1945.
- We have actually excavated and repaired leaking lead joints
- We have done a search of our tap report database. We saw no lead service lines left in the system. We did pull up potentially 295 lead goosenecks. We will have to dig them up to confirm and remove.
- We have never encountered lead service lines or components during routine operations or when performing capital improvement projects replacing mains and services dating back to 1946.
- We have never encountered lead service lines or components during the operation, maintenance, repair of this water system. (x8)
- We have not found any lead components in this water system
- We surveyed employees who have worked here between 20 and 30 years. They do not recall encountering lead service lines or lead components when repairing or replacing old service lines.
- We think there is less than 100 goose necks in the system. We have found 2 in the last five years.
- We very rarely find lead components in our system, but have found a few over the years while fixing service leaks. When we do find them, we eliminate them.

Question 4: How many lead service lines do you estimate remain in use?

- I would guess that number to be very low. I would guess that to 1% or less out of 2700 services.
- As far as I know we have never run across any Lead service lines.
- Bremerton never had lead service lines
- City maintenance crews have not identified any lead service lines or goose necks in the system.
- Don't know of any still in existence, and have not come across any.
- Don't think there ever were any
- Due to insufficient records we had to mark unknown. However, to our knowledge, we do not have lead service lines or components in our service lines.
- Early service lines from the main to property line were galvanized. Starting in 1950 service lines were copper piping, and that is still our design standard today.
- I have worked here for over 21 years and have not seen any lead service lines in the system.
- In our Lead and Copper testing that we are required to do by DOH we have not come across any indication of lead in our system. We have also not come across lead components when repairing service lines.
- I've asked all our current and former employees and no one has ever encountered a lead line out here. I've even asked all the old time contractors and they haven't found any either
- Lead service lines never installed in our system.
- No LEAD SERVICE LINES were ever installed in the dam
- No lead service lines. We believe there are some lead components that remain. (x3)
- None have been found in our system for the 18 years I have been serving.
- Once again I really don't know, but we have found very few over the 31 years I have been with the water dept.
- Records on service installations are random. In addition, the District went through one of the largest ULID projects in the country in 1977 thru 1985. Service lines were broken at the corporation stop, partial replacement, or replacement of the service line in its entirety. No records were kept during the time of all of this activity because of the magnitude of construction during that time period.
- Records show on utility map unknown components used, i.e. galv. poly, copper
- Redmond has never repaired or replaced a lead service line.
- Sampling indicates we have none.
- See comment under question 3.
- Staff with about 130 years of combined service on our water distribution system have never observed a lead service line on either side of a meter. There has been only one observation of a lead connection component, and that was in the 1980s or 1990s.
- The District has no record of lead service lines within its service area. Over the last 6 months the District has performed a physical audit of all potential galvanized service lines.

- The District uses only copper or poly for its service lines. Private service lines are copper or poly, although some of the older private service lines may be galvanized.
- There are no as-built drawings that show that any Lead Service Lines were ever installed on Fairchild AFB.
- Unknown until after we complete our in-house lead gooseneck survey, but based on our current and past findings very few lead service lines are still in use. Within the last 30 years we have uncovered two 'live' lead goosenecks. Those two were more than ten years ago and were replaced. Within the past fifteen years we have uncovered three or four abandoned lead goosenecks. We are in the process of completing an in-house lead service line survey. If we have any lead goosenecks or service lines that are 'live', I estimate the number to be very low.
- We are not 100% sure that all the lead goose necks have been removed. We have not experienced a lead service line installed in the City.
- We do not think we have any, but do not have the records to confirm.
- We have never encountered a full lead service line.
- We have not encountered any lead service lines in the system. The Terrace Heights Water System was acquired by the County in 1993. Service line materials used prior to the acquisition are not well known.
- We identified a handful of services connected to water mains that were installed in the time frame when lead service lines and lead components were used. We used a vactor truck to excavate down to the service line and point of connection. We did not find any lead lines or components.
- We recently had an assessment of all the buildings, and the rest of the buildings appear to be built in the early 1960's or later.
- While we do not believe any lines are pre 1945 there are services lines from the 1970s serving many homes

Question 5: Most lead components were attached to galvanized service lines. How many pre-1945 galvanized service lines do you estimate remain in use?

- Again, records of the service line replacements through the years are too few to even have a good guess.
- All goosenecks were changed to copper.
- Any that old would be disintegrated at this point.
- Based on 1947 aerial photographs.
- City population in 1945 was about 1,500 persons. Assuming approximately 500 connections at that time, and assuming upgrades to 50% of those systems, there may be approximately 250 pre-1945 galvanized service lines remaining active today. This ignores older homes that were outside the City and on wells when constructed but were connected to the distribution system using galvanized service lines in the 1960s and later. Galvanized service lines remain common on older facilities in our service area.
- Estimate based on existing records.
- I do not know
- It would take considerable effort to get a number

- Lead components never installed in our system.
- More than half of these are estimated to NOT contain lead goosenecks.
- Most every service line has been updated over the last 20 years
- Most may have been changed in the street. Not sure in customer's property.
- Not known at this time without doing extensive research.
- Only one line still connected to galvanized line, but the new ABS line is installed. All fittings are pvc to both ends of the galvanized pipe.
- Our downtown district consisting of approx. 5 blocks still may have some lead gooseneck connections pre 1945.
- Our soil is so corrosive it wouldn't allow galvanized pipe to last longer than 5 years.
- Our system used copper service lines from the main to the meter setter
- Probably not many.
- Purely an estimate. The vast majority of our older homes have upgraded their service piping since 1945
- Records are incomplete, however, there are at least 763 galvanized service lines in our GIS and of those 763 locations, installation data is incomplete.
- See comment under question 3.
- Some service lines are buried underneath the concrete slabs for the warehouse-type facilities.
- The City has very few if any galvanized water lines. Most lead goosenecks are connected into transite and AC water lines.
- The District performed an audit of their ~22,000 water services records. The result was 272 water services were constructed of unknown or galvanized piping -- 133, of the 272, were physically inspected to date. 7 were found to be galvanized and none had lead transitional piping connected to the galvanized lines. Currently 4 of the 7 galvanized lines were replaced.
- The District service lines are copper or poly. No galvanized service lines to the meter were installed from District water mains. Not many because of the small size of the District in 1945. Many of the private service lines have likely been replaced, District has no record of private replaced services, (no District galvanized services to meters, service lines are copper).
- The majority of galvanized service lines that we replaced or uncovered during leak repair are plumbed into the water main using galvanized fittings, not lead goosenecks. Within the last 30 plus years we have only uncovered 2 'live' lead goosenecks and they were replaced. We have approximately five miles of galvanized water main (2' and smaller), I cannot reasonably estimate how much galvanized service pipe remains in service. We do have a proactive 'steel pipe replacement program' that has been in place for many years. During the replacement of the galvanized steel water mains we do replace the galvanized service lines.
- There are galvanized service lines in the older neighborhoods of the Gales Addition System. The District has been replacing them. They do not last long due to the soil-water conditions of the area. The possibility of galvanized service lines installed before 1945 still in service is nil.

- To our knowledge pre 1945 water services have been verified but the City has existing galvanized service lines that were installed after 1945. To our knowledge copper goosenecks were being used on galv. service lines after 1945.
- We do have some galvanized lines in our system but the lead aspect is unknown. We have also received a grant to replace many of those lines.
- We do not have a record of the galvanized, but have come across some in our projects.
- We don't have service line material records that go back that far.
- We have 6,144 pre-1945 services that are either galvanized or of an unknown material.
- We have 8,340 residential/commercial/Industrial services. I estimate 3% of these still in use are pre 1945.
- We have no records to give an indication as to how many there were to begin with. We do have some galvanized services in our system but no way of knowing how many and locations.
- When we installed meters on the system most if not all of the galvanized service lines were replaced.

Question 6: Of the galvanized service lines still in use, how many do you estimate connect to the water main by a lead gooseneck or other lead component?

- Based on the excavation we did at a few services that had the potential to have lead goosenecks or lead components
- Based on years of installation, the year the main was installed and review of paper records, we believe we have as many as 1,200.
- Copper Gooseneck service lines.
- Don't have a good estimate of the number of galvanized lines still in service.
- I have never seen a lead goose neck on any galvanized lines that we have replaced.
- If we find a galvanized service line we would also normally replace the water main, if it's 2' steel.
- In my 35 years with the City of Camas I have seen 1 lead gooseneck connection. In the area that this was found it has been replaced with DI main piping and copper services.
- In the many areas of town where city forces have worked on or replaced water mains and services, we have not observed any lead components within the system and services.
- Interviews with current and retired field staff along with review of field books indicate very few lead goosenecks were used in the system. When they were encountered, the goosenecks were removed.
- None ever found in the last 33 years.
- None that we are aware of. Whenever goosenecks have been uncovered they have been replaced.
- Of the leaking service lines we have replaced or repaired, we have yet to find a lead gooseneck or other lead component. We don't have records to tell us either way.
- Of the galvanized lines that we have come across, they were into a threaded saddle.
- See comment number 5.

- The District would need to develop a plan and evaluate for the presence of lead components. In the last 30 years, less than 5 lead goosenecks have been found in the system.
- The galvanized services we have repaired/replaced have been connected using a saddle and brass corporation stop valve.
- This is a rough estimate based on a sample of 137 galvanized lines where there was documentation that 52% did not have lead goosenecks.
- This is an approximation from history when we added services
- Through leak repairs, meter replacement and infrastructure upgrades we have found no lead components.
- Unknown, but I can say with reasonable certainty there are very few. We are currently working on an in-house lead survey that will give us better information. However, based on what we have found in the past and what we currently find, there must be very few, if any. Again, we rarely, almost never, find 'live' goosenecks that connect galvanized service lines to the water main. The service line is typically connected to the water main with galvanized fittings. For some fortunate reason, lead goosenecks never were used with consistency in Centralia.
- We do not believe any homes in our system used a lead gooseneck
- We estimate none because we have observed only one lead component, and that was in the 1980s or 1990s. In 130 combined years of active field service, lead components have been observed only once.
- We have never dug up or repaired an old line that has a gooseneck.
- We have never found a lead gooseneck in our distribution system.
- We have seen galvanized service lines connect to a copper stub from the water main, but not a lead gooseneck.
- We have seen smaller lines that are all galvanized, some older 2 inch lines that have a lead gooseneck. We have no way to know an exact number.

Question 7: How confident are you in these estimates?

- 98% of the system was built after 1987. The remaining 2000' of distribution + service lines are being replaced at this time
- Again, there are no records. Information is based on field experience only.
- All of the original water mains from that era have been replaced, and we have never dug up a lead gooseneck in my 27+ years in charge of the water system. Many field observations are reflected in the previous statement.
- All service lines in Benton City are either copper or pvc. Any lead in water is from old house plumbing. We are replacing all of our meters, and they are all built low or no lead.
- Although previous work has been done to remove lead goose necks in the past, no known records were kept prior to my hire date.
- As Water Operator for 38 years I have only run into one lead seal within the water system in an old portion of Newport's water system. The line was completely changed out during the Spruce Street Project with new C900 main line and AWWA approved 200 PSI Vinyl.

- Estimate based on review of our meters database, and corporate memory of fairly extensive field observations going back to ~1972. This includes 5 persons with combined experience of about 130 years. Our 5,400 connections include approximately 500 pre-1945 connections.
- Being involved during the installation of meters on the whole system just 9 years ago gives me confidence in answering these questions.
- Did not provide estimates due to lack of information at this time.
- Extensive records research and corresponding field work performed in April 2016 to validate.
- Field observation after 28 years of service in this community.
- From past experience on replacing mainline, we get a general sense of what is there.
- Haven't observed any but do not have records from that era.
- I believe that all of the lead goosenecks I have seen have been removed from the downtown area. This is the oldest part of the water system. Many galvanized lines have been replaced in this area.
- I did not review all the records. Info is mostly from the crew that repairs the lines.
- I feel very confident as we have NEVER encountered lead piping.
- I have been here over 10 years and have yet to see a lead gooseneck.
- I will be very confident after we have review the findings of our comprehensive lead survey. Within a few months, once we have completed our comprehensive lead survey, I will be very confident in our results. I can/will make Centralia's lead survey results available to DOH upon request. Upon customers' request, we have been sampling homes that fall within the lead service line dates and leaded solder dates and have not found lead to be present in the samples taken to date.
- In all of the new construction that we have had in our town a lot of the old possible components have been changed out to meet the lead and copper regulations.
- Like I stated previously, as part of our 6 year project to meter every service in our system that will be complete in April 2017, we have inspected every service line material and replaced all galvanized service as part of our metering project.
- Most of the records on service lines were lost, taken?
- Most of the older sections of the water system have been upgraded to new DI mains with copper service lines.
- No District services were constructed using Lead pipe material. One of our District Board of Commissioners graduated in 1942 and has a good knowledge of the construction practices of that era.
- No lead in my system
- Not due to records but due to the fact that I have never dug any up.
- Only known lead components are poured lead joints on steel main
- Over the past 29 years of working for this utility (in the oldest district within our service area), we have never come across any goosenecks while rebuilding or abandoning services and mains.
- See comments on question 5
- See comments under question 3.

- Very sure that goosenecks are different, not lead. Most mains are 1950 or newer. No records, all field inspection.
- We believe we have removed most if not all of the galvanized service lines in our system. We spent a considerable amount of time going into the older service areas and updating the services to poly pipe.
- We cannot be certain how many lead goosenecks exist.
- We do not believe we have lead in the system, based on field observations, but historical records are incomplete.
- We don't keep records of materials used on water services dating back to 1945. We have records of water mains that were installed prior to 1945, and the services that have been dug up have been copper.
- We have definite records on service line material. We don't have records on which galvanized services used goosenecks. Observations are from field crews when galvanized service lines are replaced.

Question 8: You answered "insufficient records" or "unknown" to one or more of the previous questions. Why?

- A review of records found no record of lead service lines.
- All possible areas were addressed, and the connections were not leaded prior to the galvanized pipe. The only remaining pipe that is being replaced this next year with the addition of a storage tank
- No known records, but we have never found any lead service lines on old mains or services. All have been copper service lines. Also we have a very aggressive plan replacing our old AC water mains.
- No known records of 1945 construction
- Our records don't go back that far.
- Our spring-fed water system lacks records prior to 1960's for the original building.
- Previous management retained work completed and did not make any known records of lead goose neck removal.
- Some data is unavailable on older installations.
- Some repairs have been done without changing the maps.
- Some unknown materials.
- System lacks dates back around 1945.
- The dam was built in 1960. Galvanized pipes were used, no lead.
- The Switch Yard has no LEAD Service lines.
- The system has existed since the early 1900s. Took ownership in early 1980's.
- There are no records for customer side - meter to dwelling.
- We are confident that most, if not all, of the lead components have been replaced or removed. In our repairs of service lines we see copper, not lead, fittings.
- We are reviewing as-builts and identifying areas of the City that fall into a pre-1972 era that is indicative of a change in City standards that discontinue use of goosenecks.
- We have no lead service lines in the dam. We have galvanized pipes.

- We have not reviewed all of our available records for the old Rose Hill water system that the City acquired in 1996. We don't have data from that water system regarding dates of construction.
- We have only found one and have not come across any others.
- We have pretty good data.

Question 9: What type of assistance can we provide to help you identify lead service lines and lead service components? (Select any that apply.)

- Again, Lakewood Water District's problem on this question is, we don't have any idea of how many goosenecks remain in service because of the sewer construction. The District had all field staff involved with suppling and doing major repairs.
- Encourage lead rule waivers for systems with very low levels of lead.
- Funding and manpower to identify potential components containing lead.
- Funding assistance to investigate and repair.
- Have maps but they don't indicate lead, galv. only.
- If you would have old records.
- I'm confident we do not have lead service lines.
- It would good for the school to have any records filed with the county prior to 1960.
- Money.
- More time to fix.
- No records.
- None (x10).
- None at this time. We need to look over our records better to see where we are lacking.
- Provide any records that DOH may have regarding service lines in the District.
- State outreach to the public regarding the potential for lead in water services and what they can do to limit their exposure.
- We are currently working on it through GIS and potholing.
- We can do an internal review/observation.
- We currently do lead testing and have not come across any positive samples.
- We have no Lead Service Lines.
- We will do an inventory/observation (x2).
- Without digging all the service lines up and checking there is no way of being 100% sure.

Question 10: Please estimate the total number of lead service lines removed from your system.

- All service lines to the meter were replaced during construction phases during the 1990's.
- Any lead/brass components are in the process of being replaced.
- As far as we know, we have never come across a lead service line in the City of Quincy.
- As I mentioned before we spent a considerable amount of time in the last 20 years updating our older service areas. In that time we may have come across 2 or 3 services which were abandoned at some point that had a lead gooseneck. To my knowledge and that of some of our longer tenured water employees, we have not found any active

service lines that had a lead component. There are no records of materials used when the original water services were installed. We do not believe that any of the galvanized service lines that were installed pre 1945 would have lasted this long in the system due to the nature of our soil conditions in our service area.

- As previously mentioned, within the past 30 plus years we have only uncovered 2 lead goosenecks that were in service. There are no known lead service lines or goosenecks in Centralia's water system. As I previously mentioned, they are not regularly discovered during pipe replacement projects or while fixing leaks.
- Copper Goosenecks service lines. WE are replacing the service lines when they start leaking, or when we replace the water main for upgrading the system.
- Did not need one.
- During the late 90's-early 2000's, crews spent a tremendous amount of time removing lead goosenecks. However, the manager that assigned the work and would have kept track of locations and amounts passed away, and no known records have been located. Staff will continue to search for old records.
- During the project no lead service lines were discovered. All new water mains were installed and the old lines are buried in place. The old mains left in place are post WWII steel and newer AC pipe.
- Have never seen a lead service line input system in over 40 years.
- I have not seen any lead service lines in the system. Can't say for positive that there are not any.
- I know of no lead service lines left in the system.
- If a lead service or a lead component was found, we would remove it as soon as possible.
- If there were any to start with. We replaced ALL of our water meters from brass bodies to plastic. And as far as we know and have records of, we have NO lead service lines in our system. All plastic and copper.
- If we come across a lead and/or galvanized service line, we replace the line with PE pipe.
- In my 18 years of service we have not found a service line that used lead components in our system. All galvanized services found thus far have been connected to the main with a threaded saddle and brass corporation stop valve followed by threaded galvanized fittings. I have not experienced any lead fittings or goosenecks.
- In my 20 plus years working here this is what I estimate I have seen removed from the system.
- In our Lead and Copper testing that is done every four years there has been no indication of any lead in our system. That being said we are confident that all of the pre-1945 lead components have been removed in our water system.
- In the past 38 years we have replaced many water mains and service lines. I have never seen any type of lead service line or component.
- Lead service lines never installed in our system.
- Most of our service lines were replaced in a system upgrade in 1966. As far as we know there were never any lead service lines.
- My old boss said he never came across any.
- N/A. We never had any lead service lines to begin with.
- N/A. The District doesn't have lead service lines.

- Need to go over our records to see all the upgrades done over the years.
- No idea.
- No known lead service lines. The majority of the old system was cast iron or terra cotta. Majority of lead in our system resides in the water meters.
- No lead service lines installed.
- No lead service lines known of in the water system at any time.
- None found (x2).
- None were installed. No District service lines were lead materials.
- Not sure.
- Our system is worked on regularly and it has been quite some time since a lead gooseneck has been encountered.
- Over the past 29 years, we have NEVER run across lead goosenecks while rebuilding or replacing water service lines or mains.
- Over the past decades we have installed some new services lines, back to the main, for remodels and upgrades. These lines are now poly all the way to the main.
- Prior to 1960 when the property was purchased, we are not aware of lead service lines installed or removed due to lack of records.
- Records are not maintained regarding service line material and installation dates. Exploration of a few services that could contain lead goosenecks or lead components revealed copper or brass based materials. Survey of long time employees indicates lead service lines and lead components have not been discovered during service repair or replacement activities.
- Removed 1/2 mile plus of lead bell joint and calamine pipe in the early 1990's.
- See comment to question 3.
- SPU did not use lead service lines.
- The Board of Commissioners has adopted a Resolution and policy to remove any leaded used in contact with water. Also, any materials or products in service but are not in contact directly with water will be replaced on a priority basis e.g. leaded hydrants and leaded fittings.
- The city has not identified any lead service lines or components to replace.
- The City never used lead service lines.
- The City's water operator has been employed here for over 30 years. He can recollect only removing three lead goose necks in those 30 years. Any time we service a line, it is inspected for lead-containing components. If lead-containing components are present, they are removed and replaced with lead-free.
- There have been no known lead service lines to remove based on observations since ~1972.
- There were no LEAD SERVICE LINES in the facility.
- This is a guess because we rarely find lead service lines!
- To my knowledge there are no lead service lines in the system. Field observation has only revealed galvanized, copper and poly/pvc service lines.
- We are a small system with limited records on service lines. Available records and interviews with people long familiar with the system suggest no lead service lines exist, or at least none have been discovered.

- We believe all have been removed, none are shown in our inventory.
- We do not believe that we have any lead service lines.
- We do not believe we have any.
- We do not have any records, evidence or anecdotes to suggest that we have ever installed or otherwise used lead service lines.
- We don't have any. We only have Poly Plastic.
- We estimate that less than 20 lead goosenecks still remain in our system on an older section of water main.
- We have a very good idea of the number of lead lines and their locations. We are in the process to have the remaining 402 lines replaced over the next three years.
- We have never encountered a lead service line. I have seen one lead gooseneck, which was the connection on the back side of the meter.
- We have never found a lead service line in our district.
- We have never found any in our water main replacements and service line repair observations.
- We have no indication that we have any lead service lines. We as a purveyor have not removed any lead lines.
- We have no record of lead service lines in our system.
- We have not come across any lead service lines for the 20 years that I have been with this utility.
- We have not discovered nor do we believe there are any lead service lines in our system.
- We have not found a lead service line to date.
- We have not found any lead service lines or components. I do not believe there are any. The District was formed less than 10 years ago by merging, administratively and somewhat physically, two existing investor-owned public water systems. The records of the investor-owned system were incomplete and lacking details such as dates of installation. The earliest recorded water main is an 8-inch malleable steel pipe that was part of the dairy infrastructure from the 1930's. All of the taps from that main, that we have serviced, are brass connected to an HDPE service line. Our Water System Plan identifies that water main (AKA 'Hog Back') is due to be replaced in 2019.
- We have removed two in my time here (6yrs). We remove or replace all older service lines as the utility and uses change. New services required with change of use.
- We have some water main materials in the ground with lead joints, but at this time are unaware of any service line material, that we have found.
- We haven't come across any lead service lines when we have done repairs in the pre-1945 areas.

Question 11: This water system... (Select all that apply.)

- Again I have not seen any lead service lines. When we replace a service it's only the City side of the service.
- Again, we don't know what may be in the ground from 80 plus years ago. If lead-containing components are found, they are removed and replaced with lead-free components.

- As stated before, as far as I can find out there has never been lead service lines encountered in Raymond.
- Don't know that lead was ever used
- I have never found a lead service line.
- No full lead service lines have ever been found. When lead goosenecks were located, the lead and galvanized pipe were replaced from the main to the meter.
- The city has removed lead components as a part of reconstruction project efforts over the years. There may be lead components in very old private residential buildings that predate 1975. The City would have no records on those types of structures.
- We are unaware of lead service lines.
- We have never encountered a lead service line going to any building. We have only encountered lead goosenecks that connect the service line to the water main.

Question 12: Please estimate the total number of lead components (e.g., goosenecks) removed from your system.

- A better answer would be unknown, but we remove them when we find them.
- Again I have not seen any lead service lines in the system. When we replace a service it's from the main to the meter.
- Any lead components discovered in the system have been removed.
- As previously stated, only one lead component has ever been observed in the distribution system, on an older home observed in the 1980s or 1990s, and it was removed. However, based on policy and procedures understood from 1972 to present, the utility would have generally replaced service lines and components from the main to the meter.
- As we come across any lead components they are removed.
- Goosenecks are removed when galvanized service lines are replaced; this is done any time a galvanized service is found to be leaking or otherwise encountered during construction or main repair. A rough estimate of galvanized service line removal dating back to the 1970's is 15,000-20,000 services. The rough estimate for historical gooseneck removal is based on 20-25% of galvanized connections.
- Have not encountered any lead service lines. All replacement fittings are lead-free
- If we found lead in the 1980's we removed it, and/or installed new water mains and services.
- It is not known how many lead components have been removed. There are no known records indicating replacements. Only what staff can recall.
- Lead components never installed in our system.
- Luckily we have never discovered a lead service line or gooseneck, thus we don't have to remove them.
- N/A.
- None (x9).
- Number removed is unknown but whenever goosenecks have been uncovered they have been removed.

- Numerous Fairchild AFB As-Built Drawings show that there were no Lead Service Lines installed in the first place.
- Over the past 29 years, we have NEVER run across lead goosenecks while rebuilding or replacing water service lines or mains.
- Over the years, Bremerton has replaced the city side of galvanized service lines when there is construction, problems with the service, or a gooseneck has been encountered.
- Refer to 10.
- See comment to question 3.
- The city has not identified any lead service lines or components to replace.
- The City of Camas is responsible from the main to property line. This is where the meter is located. The property owner is responsible for the piping from the meter to the home.
- The City's water operator has been employed here for over 30 years. He can recollect only removing three lead goosenecks in those 30 years. Any time we service a line, it is inspected for lead-containing components. If lead-containing components are present, they are removed and replaced with lead-free.
- The estimate is based on the number of 1930's and earlier galvanized services removed from our system since 2010. An additional 1,800 services with an unknown material/unknown installation date have also been removed since 2010, some of which may have had a gooseneck.
- The high lead levels we incurred were traced back to old Central Brass faucets. We have changed out all that we have found, so far.
- The only recollection we have of a lead gooseneck removal was an employee recollection that it happened in the early 1990's.
- This is a rough estimate, but we have firsthand experience of only removing two live goosenecks within the past thirty years.
- This is just an estimate from the last 40 years.
- Unknown.
- Unknown due to lack of records prior to 1960.
- Unknown. We pulled up records that show 295 or less lead goosenecks. There is reason to believe that there are less, but can't confirm until field research is done.
- We came across a Scissor-style fire hydrant that had a lead joint, and it was removed.
- We do not have precise records to show how many were removed. We know that we are in the thousands that have been removed through our metering project.
- We do not have records of lead components removed from the system.
- We have a policy that states, any leaded goosenecks will be removed.
- We have found no active lead service lines or goosenecks in our water service line replacement program, but have found 4 abandoned lead goosenecks in the pipe trench in the 12 years I have worked for the City
- We have never found any in our water main replacements and service line repair observations.
- We have not found any lead services lines during any sub-grade work.
- We have only found Lead Goosenecks in one section of our City. All were removed to my knowledge 20 years ago.

- We have only run into one, and it was a lead flat seal where it connected to the main. This was replaced during a water repair many years ago. (In the late 70s.)
- We have potholed a number of water services in the pre-1945 area and have not found any lead service lines or lead goosenecks. We have not found any lead service lines or goosenecks in any of the leaking services in the pre-1945 areas.
- We have removed 5-10 lead components in the last 10 years or so.
- We have removed some lead joint main lines, and are scheduled to remove the remaining steel lines.
- We have removed every one that we have found.
- We replace these lead components as we discover them on our older sections of water main.
- When goosenecks were found in the field, they were removed.
- When old meter locations were known at the time of new installations, the old apparatus was removed.

Question 13: Please share any other questions or comments you may have on this topic.

- Although I do not have records to prove one way or the other, I feel fairly confident that we do not have any active services line that have a lead gooseneck installed.
- Although no records have been found indicating lead gooseneck removal prior to 2015, current records are maintained for future compliance. We continue to look for lead components, and replace when located. I will keep looking for any records that may show how many lead components have been replaced.
- As a community water system, our services, when excavated tend to be iron pipe that is from the 1950s and more recent. We do not have any evidence that there is lead system components in the system.
- As discussed in the City water system plan, Enumclaw is planning to replace all remaining steel water mains within its system. This would include replacing the services connected to said mains up to the City water meter.
- As Water Distribution Specialist for our small Spring-Fed water system I am required to perform tests for Lead. I performed an Investigative test for Lead in July, 2016, and the required test as per the DOH for Lead and Copper in September, 2016. Both tests are within required limits.
- Because older Brass and galvanized piping has some lead content in it you could get leaching into the water system. I have directed homeowners to always do a 30-second flush on their cold water tap before using the water.
- Bellingham began a very proactive program to meter 100% of our customers about 9 years ago. From that time to now, we have removed and replaced every lead or galvanized service line from the meter to the water main throughout our system. We do not have records on lead in our system from the meter to and inside the house as this is considered privately owned.
- Bremerton began reviewing our files after the Governor's Directive was issued. We are almost finished with this review of existing records going back to the 1920s. The next step would be for crews to field check the remaining 4,700 services installed prior to

1950 for which we do not have documentation of service line materials -- this will be a time-consuming effort so any additional direction on this effort would be appreciated.

- Continuing to remove steel mains with lead joints. All service lines that were attached to the steel mains were that of the saddle type.
- Elma only made use of lead goosenecks. Most were replaced due to leaks caused by corrosion (as evidenced by the street patches that were located at service line origins). As mains were upgraded from wood to cast iron, it appears that the goosenecks were replaced with a galvanized pipe 'elbowed goose-neck'. Since the early 1980's Elma has included water main and service line replacement with all asphalt overlay and street reconstruction projects.
- Funding for lead planning, investigation, and repair/replacement is needed.
- How best would a small system determine if lead components do exist in the older service connections? Test for lead and copper in older homes without plumbing upgrades?
- I believe we make a reasonable effort to remove lead as we find it. We require customers to upgrade services as land uses and zoning change.
- I don't believe our system ever had any lead service lines.
- I feel we are doing well replacing mainline and removing all the lead components in our system.
- I have or have been a part of digging up water mains and service lines for over 21 years. To my knowledge we do not have lead service lines or lead gooseneck components.
- I will be interested in how these lines will be physically identified.
- In doing the Lead and Copper Survey throughout our city, especially in the older parts of our water system, we have not come across any lead components on service lines. Our records indicate that we are way below the reporting levels throughout our water system. Making us confident that all lead components have been eliminated.
- It seems to me a better route would be to request some type of panel of water tests from the systems to show characteristics of the water chemistry for determining potential problems, as we understand the past problems have been a pH issue most of the time.
- It would be good to have cost information included in this survey. The remaining goosenecks in our system are in older neighborhoods, over half of which are under concrete panel streets. Approximately half of the estimated \$10M cost to replace the remaining 1,200 services with a suspected gooseneck is related to pavement restoration. Additionally, capturing information related to how water purveyors are locating lead components in the absence of records? Are there any technologies available to help identify them prior to excavation?
- Lead components goosenecks were on the original downtown CI main, which has been replaced or the goosenecks have been removed.
- Mainly in the system the goosenecks have been copper rather than lead, on galvanized service lines.
- More lead is leached from Moen single handle faucets (65%)than any solder in a house or water works brass.

- Most Benton City components aren't old enough to have had a high lead content. Only older home plumbing is a problem I have found with finding lead content in the water
- N/A.
- No, any help that we receive from Dept. of Health is appreciated. Thank you.
- No.
- None (x3).
- Not much historical data to properly answer many of the question.
- Not much historical data to properly answer many of the question.
- Our limited records do not indicate any lead service lines or components. In the last 20 years we have not identified any lead service lines or components.
- Our records are insufficient to determine how many lead service lines are still in service.
- Our records generally date back to the early 1960's. Lead components have not been observed in the last 20+ years nor do existing records show lead services.
- Sampled the lines and pipes at start up with Billy Jr. at Arcadia, and most of the system was up-dated by the time we went on-line. But saying that the only line that might have had lead was the house hot water tank connection and all of the plumbing in the house was redone with the remodel.
- Since LCR monitoring began for the City in 2002, we have collected 243 samples from about 74 different homes. Lead concentrations fall into these 4 classes: ND = 71% of all samples; ≤ 0.003 mg/L = 20%; 0.003 to 0.015 mg/L = 7%; > 0.15 mg/L AL = 2%. A total of 4 individual samples (2%) from 3 different homes exceeded the AL of 0.015 mg/L, and all of these homes were constructed in the mid-1980s (2 detections in 2003-2004, and 2 detections in 2015). A total of 16 samples were above 0.003 mg/L and below the AL-- these too were all constructed in the 1980s. The 10 samples from 5 homes constructed between 1908 and 1940 were all non-detects except for one at 0.001 mg/L. To the extent this is a sample of the effects of plumbing on homes in our service area, we are detecting the most lead in homes constructed in the 1980s, and relatively little in homes constructed prior to 1945.
- Small systems with very low levels of lead should be given a waiver on meeting the lead removal requirement or the state should provide funding to pay for the removal since it is a mandate from the governor.
- The # of connections prior to 1990 was only 150. All mains, meter setters and 90% of THOSE service lines have been replaced to the house.
- The Lead removal program for the Lakewood Water District will take place in 2 ways. First, through continued Rehabilitation and Replacement Program, the District is replacing its oldest portions of infrastructure first, spending \$3.5 million a year. Secondly, at any time it is discovered any existing leaded goosenecks will be removed immediately.
- The questions do not expand to help systems answer that older parts of their system, but have not come across any lead lately. Also the Lead/Copper testing is in effect and should help as an indicator to the system health.
- There are no lead service mains, meters, or backflow devices in use in the new system. There may, however, be some lead pipe in private residences.
- Very confident there are under 5 lead services in our system.

- We are a small transient water system with less than a mile of water main. I am open to any information you can provide to help me identify if I have lead service lines in my water system. I believe that all my mains are 6' iron.
- We are confident that we have no lead piping in our system. We have discovered some old faucets that had a high lead content, but we have changed those out.
- We are planning on investigating the lead gooseneck issue in the spring of 2017. The City of Wenatchee, to this point, hasn't had any lead issues. We test free of charge for any customer who has a lead concern.
- We are working towards finishing our comprehensive in-house lead survey. This will give us a high degree of confidence regarding if any lead goosenecks or service lines remain. If any remain currently, I estimate the total number to be low. Our proactive approach sampling practices have not found any lead to this point. It would be helpful if DOH had a guide or program on how to sample for and find lead components within a water system. I have closely followed Tacoma's lead response and found that to be helpful.
- We estimate approximately 90% have been removed since 1992.
- We have approximately 319 homes built between 1900 and 1945. To the best of our knowledge, all of those homes have replaced their service lines from the meter to the house in the last 80 years. We have no records that we are aware of that indicate we have ever used lead goosenecks or lead components in our system from the main to the meter.
- We have good records of the years the water mains were installed, some prior to 1945. We have potholed to investigate whether we have lead services or goosenecks. We have potholed or replaced 10 service lines in the pre-1945 area recently and found no lead service lines or lead goosenecks. We estimate about 200 water services in this area.
- We have had sewer projects in our water system area in the early part of our district and all the service lines and goosenecks were either galvanized or copper. We replaced water mains also.
- We have one area of the city that has an older infrastructure we have removed lead goosenecks in the past, but lack information as to the extent of their existence.
- We have overlaid structures built prior to 1950 over our distribution system lines installed prior to 1950 and have found one area that meets both criteria and are investigating those services.
- We have replaced lead joints on old fire hydrants with new hydrants and connections. We have replaced water mains with lead joints. The only lead joints I know of are on the North Touchett 12' water main, which I believe was installed in the 30's
- We recognize the health threat, and have done what we can with our small staff and budget to remove lead from our system. Hopefully funding and manpower can be provided to smaller systems to keep this issue from becoming another unfunded mandate that would potentially cripple a small system.
- We remove lead goosenecks whenever we discover them during maintenance or replacement of service lines and main lines.

- With time, money and effort we could resolve most issues within our water system. Our crew is willing to give it the time and the effort needed to do the work needed. But money is the issue for most work that needs done. Most jobs end up as band-aids. Are there grants that could help us? Most records for our water system show where the mainline is and were the services are. Just not what was put into the ground at the time.