



**Liberty Utilities – Mesa Crest (PWS No. CA1910241)**

**Verification of Lead Status Unknown**

November 8, 2023

## Acronyms

LCRR	Lead and Copper Rule Revision
LSL	Lead Service Line
PWS	Public Water System
SL	Service Line

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## Background

The Lead and Copper Rule Revision (LCRR) requires the PWS to develop an inventory to identify the materials of service lines connected to the public water distribution system (40 CFR §141.84(a)). The PWS must also review sources of information to identify service line materials for the initial inventory. The water system may use sources of information if approved by the State (40 CFR §141.84(a)(3)) such as any identification method to assess service lines materials (40 CFR §141.84(a)(3)(iv)).

One identification method or verification strategy is a statistical approach. The statistical approach allows for completing a service line inventory with a 95% level of statistical confidence (with ±5% margin of error and 50% sample proportion).

A key factor in the success of the strategy mentioned above is the use of a randomly generated list of unknown service lines to be physically inspected. If ANY service line is found to be an LSL (either through the initial records review or the verification process), then this framework will not be used, and an alternate process will be discussed with the State. If NO service line is found to be lead through the records review and verification process, then the remaining unknown service lines will be classified as non-lead, and the submitted inventory will be final (e.g., containing all non-lead service lines). If, in the future, an LSL is found, then the water system will contact the state within 30 days to discuss a path forward. **Since Liberty acquired Liberty Utilities – Mesa Crest in June 2019, Liberty has not encountered any lead service lines.**

**Known** service lines are defined as service lines where the pipe materials are classified using records<sup>(1)</sup>. Records that can be used to classify a SL are mentioned in 40 CFR §141.84 (a)(3)(i),(ii),(iii),(iv). Records showing that service lines were installed after the state lead ban (or local ordinance with an earlier lead ban) and service lines >2 inches (diameter allowance depends on state) will be considered known and classified as non-lead.

**Unknown** service lines are defined as a service line of unknown material with no/low confidence documented material history<sup>(1)</sup>.

Identification methods or verification strategies are based on system size. The verification strategies for the identification of unknown service lines are:

- ✓ Interpolation: Best for small systems with less than 1,500 unknown service connections. For the interpolation method, the PWS must physically verify at least 20% of the total number of unknown service lines.
- ✓ Stratified Random Sampling: Best for medium systems (1,500 to 10,000 unknown service connections); to large systems (more than 10,000 unknown service connections.) For the stratified random sampling, the PWS must physically verify enough lines to reach a minimum 95% confidence level.

### **Identification Process**

Before using the statistical approach to identify unknown service lines, Liberty completed the initial inventory using approved methodologies, such as the ones mentioned in 40 CFR §141.84 (a)(3), as well as

post-1986 construction and larger pipe diameters, to categorize service lines. Based on the applied methodologies, no LSLs were found. Therefore, it is appropriate to use the statistical approach.

The statistical method includes the following steps:

- ✓ Step 1: Identification of all service lines of unknown material.
- ✓ Step 2: Identification of the number of service lines to be physically inspected.
- ✓ Step 3: Random selection of service lines for physical inspection.
- ✓ Step 4: Physical inspection of the service lines.
- ✓ Step 5: Record of the physical inspection process.
- ✓ Step 6: Results input of unknown service lines into the inventory.
- ✓ Step 7: Retention of identification records.

## Step 1: Identification of all service lines of unknown material.

Table 1 shows the total of service connections in Liberty Utilities – Mesa Crest (PWS. No. CA1910241).

Table 2 presents the total number of all the water service lines that could not be categorized using the approved methodologies shown in 40 CFR §141.84 (a)(3) for Liberty Utilities – Mesa Crest (PWS No. CA1910241).

**Table 1: Total of Service Connections**

System Name	Total of Service Connections
Liberty Utilities – Mesa Crest	707

**Table 2: Service Lines with unknown materials**

Category		Number of Service Lines
Public Side	Private Side	
Unknown	Unknown	0
Known (non-lead)	Unknown	621
Unknown	Known (non-lead)	0
<b>Total</b>		<b>621</b>

## Step 2: Identification of the Number of Service Lines to be Physically Inspected.

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Liberty Utilities – Mesa Crest has fewer than 1,500 unknown service lines, so the interpolation method is appropriate. Using the interpolation method, the PWS must physically verify a minimum of 20% of the total number of unknowns. To ensure that the confidence level in the results is higher, Liberty is proposing the verification of 50% more than the minimum number required.

Table 3 presents the minimum and proposed number of unknown service lines to be physically verified.

**Table 3: Minimum and Proposed Number of Unknown SLs to be Physically Verified**

Statistical Approach	Total of Unknown SLs	Number of SLs to Verify (Minimum)	Number of SLs to Verify (Minimum x 1.5) (Proposed)
Interpolation	621	124	186

### **Step 3: Random Selection of Service Lines for Physical Inspection.**

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From the number of unknown service lines identified in Step 1 and the proposed number from Step 2, Liberty randomly selected service lines to be physically inspected as determined in Step 2. The selection was uniformly random and not based on any specific criteria, which could introduce bias.

The generation of the uniformly random set of service lines for inspection was created using a Microsoft Excel spreadsheet utilizing the RAND function. The RAND function in Excel is one of the functions specially designed for generating random numbers <sup>(2)</sup>.

The list of the random set of service lines for physical inspection is presented in Appendix A.



## **Step 4: Physical inspection of the service lines.**

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The type of service line verification method that Liberty will use is:

- ✓ **Private Side:** Meter Pit Inspection.

At least one point of verification will be conducted for the portion of the unknown service line. The verification method includes meter pit inspection. If one or more of the original randomly selected sites cannot be verified, the next available location from the random number generation will be used. For example, if a system has 2,000 unknowns and has to verify 322 SLs but is only able to verify 312 SLs, then the next 10 SLs will be taken from the original random number list (e.g., 323 to 333).

Appendix B shows the LSL Field Investigation Sheet for a single site that Liberty will use in the verification process.

## **Step 5: Record of the physical inspection process.**

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Liberty will use a Microsoft Excel spreadsheet to enter the service line category and materials observed at each point. The four service line category types shown in 40 CFR §141.84 (4) are lead, non-lead, galvanized requiring replacement, and unknown. Liberty will use subclassification categories (e.g., copper, plastic) to capture the various material types for Liberty's records.

Appendix C shows the recordkeeping spreadsheet that will be used to record the findings.

## **Step 6: Results input of unknown service lines into the inventory.**

For unknown service lines that will be inspected for the statistical sampling, Liberty will record the water system material identification method (physical inspection – meter pit inspection). Liberty will list the exact line material type in the inventory spreadsheet found in Appendix C.

For unknown service lines not needing to be inspected, Liberty will record the material identification method as “*statistical*” and service line material as *non-lead*.

## **Step 7: Retention of Identification Records.**

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Liberty will retain all the documentation of all service line identification efforts and will be available to the Division of Drinking water (DDW) if requested.

## References

(1) Oregon Health Authority. Statistical Guidance for Evaluating Unknown Service Lines. March 2023.

(2) Cheusheva, Svetlana. How to generate random numbers in Excel: RAND and RANDBETWEEN functions. Available at: <https://www.ablebits.com/office-addins-blog/random-number-generator-excel/>

## Appendix A: Random Set of Service Lines for Physical Inspection

Location	Year Built	Material on the Public Side	Material on the Private Side
5684 Bramblewood Road	1966	Non-Lead	Unknown
5170 Redwillow Lane	1966	Non-Lead	Unknown
5161 Crown Avenue	1966	Non-Lead	Unknown
765 Starlight Heights Drive	1966	Non-Lead	Unknown
756 Galaxy Heights Dr	1966	Non-Lead	Unknown
5330 Crown Avenue	1966	Non-Lead	Unknown
470 Starlight Crest	1966	Non-Lead	Unknown
5219 Crown Avenue	1966	Non-Lead	Unknown
5531 Stardust Road	1966	Non-Lead	Unknown
5346 Stardust Road	1966	Non-Lead	Unknown
875 Greenridge Drive	1966	Non-Lead	Unknown
241 Starlane Drive	1974	Non-Lead	Unknown
5779 Briartree Drive	1974	Non-Lead	Unknown
5590 Godbey Drive	1967	Non-Lead	Unknown
267 Starlight Crest Drive	1967	Non-Lead	Unknown
5637 Burning Tree Drive	1967	Non-Lead	Unknown
534 Starlight Crest	1966	Non-Lead	Unknown
5609 Burning Tree Drive	1967	Non-Lead	Unknown
5834 Briartree Drive	1967	Non-Lead	Unknown
5349 Godbey Drive	1967	Non-Lead	Unknown
820 Greenridge Drive	1967	Non-Lead	Unknown
757 Galaxy Heights Dr	1966	Non-Lead	Unknown
738 Galaxy Heights Dr	1966	Non-Lead	Unknown
5483 Burning Tree Drive	1967	Non-Lead	Unknown
5367 Godbey Drive	1966	Non-Lead	Unknown
5246 Redwillow Lane	1967	Non-Lead	Unknown
5393 Godbey Drive	1967	Non-Lead	Unknown
5781 Summit Crest	1966	Non-Lead	Unknown
5338 Stardust Road	1966	Non-Lead	Unknown
5815 Briartree Drive	1966	Non-Lead	Unknown
555 Meadowview Drive	1966	Non-Lead	Unknown
204 Mariners View Street	1967	Non-Lead	Unknown
5755 Summit Crest	1966	Non-Lead	Unknown
662 Starlight Crest	1967	Non-Lead	Unknown
217 Starlane Drive	1966	Non-Lead	Unknown
5361 Godbey Drive	1967	Non-Lead	Unknown
715 Forest Green Drive	1966	Non-Lead	Unknown

<b>Location</b>	<b>Year Built</b>	<b>Material on the Public Side</b>	<b>Material on the Private Side</b>
5511 Burning Tree Drive	1967	Non-Lead	Unknown
861 Greenridge Drive	1967	Non-Lead	Unknown
5207 Crown Avenue	1966	Non-Lead	Unknown
5489 Burning Tree Drive	1966	Non-Lead	Unknown
5652 Stardust Road	1967	Non-Lead	Unknown
638 Starlight Crest	1967	Non-Lead	Unknown
5837 Briartree Drive	1966	Non-Lead	Unknown
731 Forest Green Drive	1966	Non-Lead	Unknown
5160 Redwillow Lane	1967	Non-Lead	Unknown
5203 Starlight Mesa Lane	1966	Non-Lead	Unknown
5248 Stardust Road	1966	Non-Lead	Unknown
413 Noren Street	1966	Non-Lead	Unknown
211 Mariners View Street	1966	Non-Lead	Unknown
Mariners View Lane	1966	Non-Lead	Unknown
415 Gleneagles Pl	1966	Non-Lead	Unknown
831 Greenridge Drive	1967	Non-Lead	Unknown
5602 Bramblewood Road	1966	Non-Lead	Unknown
5608 Bramblewood Road	1966	Non-Lead	Unknown
783 Starlight Heights Dr	1966	Non-Lead	Unknown
5302 Ivafern Lane	1967	Non-Lead	Unknown
772 Greenridge Drive	1966	Non-Lead	Unknown
788 Starlight Heights Dr	1966	Non-Lead	Unknown
808 Greenridge Drive	2003	Non-Lead	Unknown
732 Galaxy Heights Dr	1966	Non-Lead	Unknown
5651 Stardust Road	1958	Non-Lead	Unknown
Starlight Crest Drive	1966	Non-Lead	Unknown
5314 Stardust Road	1958	Non-Lead	Unknown
324 Starlane Drive	1966	Non-Lead	Unknown
5335 Godbey Drive	1958	Non-Lead	Unknown
263 Starlight Crest Drive	1967	Non-Lead	Unknown
5238 Redwillow Lane	1958	Non-Lead	Unknown
5164 Redwillow Lane	1967	Non-Lead	Unknown
5630 Bramblewood Road	1958	Non-Lead	Unknown
5603 Stardust Road	1967	Non-Lead	Unknown
5215 Stardust Road	1967	Non-Lead	Unknown
5347 Godbey Drive	1967	Non-Lead	Unknown
5214 Diamond Point Road	1967	Non-Lead	Unknown
5304 Godbey Drive	1957	Non-Lead	Unknown
770 Galaxy Heights Dr	1958	Non-Lead	Unknown
801 Greenridge Drive	1956	Non-Lead	Unknown

<b>Location</b>	<b>Year Built</b>	<b>Material on the Public Side</b>	<b>Material on the Private Side</b>
5308 Godbey Drive	1957	Non-Lead	Unknown
5729 Summit Crest	1967	Non-Lead	Unknown
784 Starlight Heights Dr	1958	Non-Lead	Unknown
5814 Briartree Drive	1967	Non-Lead	Unknown
451 Meadowview Drive	1956	Non-Lead	Unknown
461 Noren Street	1958	Non-Lead	Unknown
234 Starlight Crest Drive	1967	Non-Lead	Unknown
5825 Briartree Drive	1958	Non-Lead	Unknown
5706 Alder Ridge Drive	1956	Non-Lead	Unknown
5322 Stardust Road	1958	Non-Lead	Unknown
Starlight Heights Drive	1956	Non-Lead	Unknown
5320 Godbey Drive	2000	Non-Lead	Unknown
769 Starlight Heights Drive	1956	Non-Lead	Unknown
433 Starlight Crest	1956	Non-Lead	Unknown
5423 Godbey Drive	1956	Non-Lead	Unknown
5377 Godbey Drive	1958	Non-Lead	Unknown
444 Meadowview Drive	1956	Non-Lead	Unknown
849 Greenridge Drive	1958	Non-Lead	Unknown
5213 Redwillow Lane	1957	Non-Lead	Unknown
450 Noren Street	1957	Non-Lead	Unknown
5809 Briartree Drive	1975	Non-Lead	Unknown
5140 Redwillow Lane	1967	Non-Lead	Unknown
5537 Stardust Road	1963	Non-Lead	Unknown
434 Meadowview Drive	1971	Non-Lead	Unknown
624 Starlight Crest	1963	Non-Lead	Unknown
510 Starlight Crest	1962	Non-Lead	Unknown
5204 Diamond Point Road	1969	Non-Lead	Unknown
763 Starlight Crest Drive	1956	Non-Lead	Unknown
5703 Evening Canyon Drive	1956	Non-Lead	Unknown
5710 Ridge Court	1967	Non-Lead	Unknown
5421 Burning Tree Drive	1971	Non-Lead	Unknown
5215 Crown Avenue	1962	Non-Lead	Unknown
5403 Godbey Drive	1966	Non-Lead	Unknown
312 Starlane Drive	1956	Non-Lead	Unknown
5735 Summit Crest	1963	Non-Lead	Unknown
5748 Briartree Drive	1968	Non-Lead	Unknown
5320 Ivafern Lane	1969	Non-Lead	Unknown
5771 Evening Canyon Drive	1956	Non-Lead	Unknown
731 Starlight Heights Drive	1968	Non-Lead	Unknown
5615 Bramblewood Road	1962	Non-Lead	Unknown



Location	Year Built	Material on the Public Side	Material on the Private Side
797 Greenridge Drive	1963	Non-Lead	Unknown
5451 Godbey Drive	1957	Non-Lead	Unknown
5555 Burning Tree Drive	1966	Non-Lead	Unknown
5708 Alder Ridge Drive	1967	Non-Lead	Unknown
5704 Alder Ridge Drive	1957	Non-Lead	Unknown
5714 Alder Ridge Drive	1966	Non-Lead	Unknown
320 Noren Street	1956	Non-Lead	Unknown
418 Noren Street	1962	Non-Lead	Unknown
Forest Green Drive	1962	Non-Lead	Unknown
428 Noren Street	1965	Non-Lead	Unknown
544 Meadowview Drive	1962	Non-Lead	Unknown
203 Starlight Crest Drive	1963	Non-Lead	Unknown
5711 Catherwood Drive	1956	Non-Lead	Unknown
5730 Briartree Drive	1958	Non-Lead	Unknown
5072 Westslope Lane	1966	Non-Lead	Unknown
745 Galaxy Heights Dr	1978	Non-Lead	Unknown
5112 Redwillow Lane	1956	Non-Lead	Unknown
560 Starlight Crest	1969	Non-Lead	Unknown
756 Greenridge Drive	1956	Non-Lead	Unknown
740 Galaxy Heights Dr	1963	Non-Lead	Unknown
5231 Stardust Road	1956	Non-Lead	Unknown
5676 Bramblewood Road	1963	Non-Lead	Unknown
823 Greenridge Drive	1956	Non-Lead	Unknown
5349 Ivafern Lane	2018	Non-Lead	Unknown
5379 Godbey Drive	1956	Non-Lead	Unknown
5830 Briartree Drive	1956	Non-Lead	Unknown
5657 Burning Tree Drive	1957	Non-Lead	Unknown
5709 Evening Canyon Drive	1956	Non-Lead	Unknown
550 Starlight Crest	1962	Non-Lead	Unknown
865 Greenridge Drive	1962	Non-Lead	Unknown
5147 Crown Avenue	1962	Non-Lead	Unknown
5227 Crown Avenue	1966	Non-Lead	Unknown
5314 Ivafern Lane	1972	Non-Lead	Unknown
422 Meadowview Drive	1966	Non-Lead	Unknown
5328 Godbey Drive	1975	Non-Lead	Unknown
5334 Crown Avenue	1956	Non-Lead	Unknown
837 Greenridge Drive	1962	Non-Lead	Unknown
5840 Angeles Crest Highway	1962	Non-Lead	Unknown
582 Starlight Crest	1966	Non-Lead	Unknown
5475 Burning Tree Drive	1968	Non-Lead	Unknown

<b>Location</b>	<b>Year Built</b>	<b>Material on the Public Side</b>	<b>Material on the Private Side</b>
Irrig Summit Crest Drive	1968	Non-Lead	Unknown
5451 Burning Tree Drive	1975	Non-Lead	Unknown
5702 Alder Ridge Drive	1962	Non-Lead	Unknown
761 Starlight Heights Drive	1956	Non-Lead	Unknown
5326 Godbey Drive	1958	Non-Lead	Unknown
5070 Westslope Lane	1956	Non-Lead	Unknown
163 Starlight Crest Drive	1958	Non-Lead	Unknown
5759 Briartree Drive	1957	Non-Lead	Unknown
5641 Stardust Road	1956	Non-Lead	Unknown
237 Starlane Drive	1958	Non-Lead	Unknown
Forest Green Drive	1958	Non-Lead	Unknown
5749 Evening Canyon Drive	1958	Non-Lead	Unknown
5539 Burning Tree Drive	1965	Non-Lead	Unknown
725 Forest Green Drive	1957	Non-Lead	Unknown
5264 Stardust Road	1959	Non-Lead	Unknown
5707 Catherwood Drive	1956	Non-Lead	Unknown
257 Starlane Drive	1957	Non-Lead	Unknown
771 Forest Green Drive	1958	Non-Lead	Unknown
510 Meadowview Drive	1957	Non-Lead	Unknown
736 Galaxy Heights Dr	1966	Non-Lead	Unknown
314 Noren Street	1957	Non-Lead	Unknown
5451 Godbey Drive	1957	Non-Lead	Unknown
729 Starlight Heights Drive	1958	Non-Lead	Unknown
775 Forest Green Drive	1990	Non-Lead	Unknown
748 Greenridge Drive	1958	Non-Lead	Unknown
775 Starlight Heights Dr	1956	Non-Lead	Unknown
466 Starlight Crest	1958	Non-Lead	Unknown
871 Greenridge Drive	1957	Non-Lead	Unknown
203 Mariners View Street	1957	Non-Lead	Unknown

# Appendix B: LSL Field Investigation Sheet – Single Site

## LCRR Field Investigation Template

Date of Inspection: \_\_\_\_\_

Customer Name: \_\_\_\_\_

Address/Location of Service Line: \_\_\_\_\_

Meter Number: \_\_\_\_\_

Description of Meter and/or Location: \_\_\_\_\_

### Material for Public Service Line

- Lead
- Galvanized Requiring Replacement
- Galvanized
- Non-Lead Copper
- Non-Lead Plastic
- Non-Lead – Other

### Public Side Pipe Diameter

- 5/8 inch     ½ inch
- 1 inch       ¾ inch
- 1 ½ inch
- 2 inch

### Material for Private Service Line

- Lead
- Galvanized Requiring Replacement
- Galvanized
- Non-Lead Copper
- Non-Lead Plastic
- Non-Lead - Other

### Private Side Pipe Diameter

- 5/8 inch     ½ inch
- 1 inch       ¾ inch
- 1 ½ inch
- 2 inch

Is there a lead connector? (Y) / (N)

Is there a Lead Solder in the Service Line? (Y) / (N)

Describe any other fitting and equipment connected to the service line that contains lead (for example, a backflow preventer or meter containing lead):

\_\_\_\_\_  
\_\_\_\_\_

Building Type:

- Single Family Home                       Building
- Multi-Family Home                         Other: \_\_\_\_\_

# Appendix C: LSL Field Investigation Recordkeeping Spreadsheet.

PWS Name: \_\_\_\_\_

PWS No. \_\_\_\_\_

LSL Field Investigation Notes										
Investigation Date	Unique Service Line ID (if any)	Address	City	ZIP Code	Public SL Material Classification (*)	Public SL Material (**)	Private SL Material Classification (*)	Private SL Material (**)	Material Identification Method (***)	Comments

(\*) Material classification includes: Non-lead, galvanized requiring replacement, lead, unknown.

(\*) Materials include: Copper, plastic, galvanized, lead, other

(\*\*\*) Meter Pit inspection or Statistical