

## **UTILITY GUIDELINES ON HOW TO COLLECT AND ANALYZE SEQUENTIAL PROFILE SAMPLES**

### **SUMMARY**

These are instructions for a sampling protocol used to create a lead profile of a home's plumbing. "Profiling" is a sampling strategy to identify the location(s) and source(s) of lead contributing to lead in household drinking water, including lead solder or a lead water service pipe. To create the profile, twelve or more one-liter samples of tap water will be collected one after another from a faucet in the home. Each of these one-liter samples will be analyzed for total lead concentration. Filtered lead is also recommended for profile sampling. However, budgetary limitations and laboratory workload may limit the ability to analyze filtered lead and any other metals.

### **MATERIALS FOR SAMPLE COLLECTION**

Prepare a kit for sample collection with the following suggested items:

- Twelve (or more) one-liter wide mouth sample bottles, glass or polypropylene. Prepare bottles (clean and acid washed) and label as per normal lead collection procedures. Do not add a preservative (acid) to the sample prior to collection.
- Permanent marking pen or sample bottle labels.
- Jar opener pad to help remove faucet aerator. Provide new replacement aerators if desired by customer.
- Lead-free wet wipes for hand cleaning (optional).
- Data collection form/chain of custody.

## PREPARATION

Select the home to be sampled.

1. If possible, have two people available for sampling. Taking a profile requires rapidly handling the twelve (12) or more bottles without losing any water. Having one person to collect water from the faucet and another to handle bottles is highly recommended.
2. Use only wide-mouth bottles (1 liter, typically high-density polyethylene or equivalent).
3. **Choose the time for the sample collection event after the home plumbing system has not been used for at least six hours.** This is typically early morning before any water has been used, including shower, toilet, automatic sprinklers, etc. If the home is vacant during the day, and water is stagnant in the home plumbing for six hours, it is possible to collect the samples in the late afternoon.
4. Read through this protocol to be sure your bottles are ready and that you understand the procedure. Once the tap is open and sampling begins, sample collection must be completed. If the process is interrupted, the entire collection must be rescheduled for another day using clean bottles.
5. Select a water faucet from which to sample.
  - a. The faucet should be one that is used often by the family, such as the kitchen sink faucet.
  - b. Faucet used for sampling either should not contain an aerator or screen, or has an aerator/screen that can be removed prior to sampling (recommend removing aerator prior to more than 6-hour stagnation period).
  - c. On the date of sampling, all the water from the faucet will need to be collected in bottles. Therefore, it will not be possible to test how to turn on the faucet unless this is done the day before or earlier. It is important to be familiar with the sink and faucet, via interviews with the customer or experimentation on site in days prior to



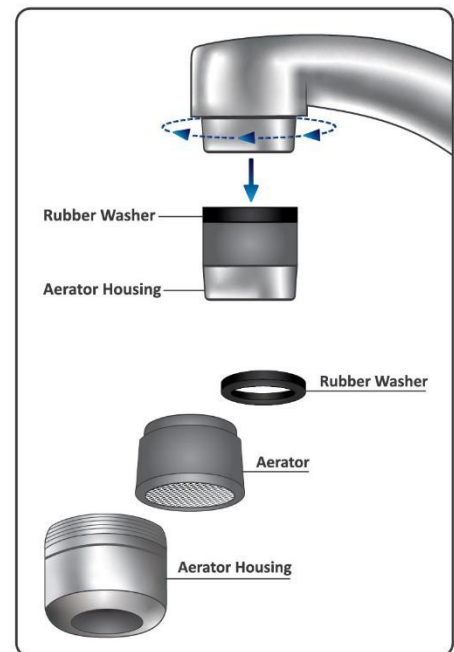
Set up sample containers before you start. The faucet must run continuously while you fill the twelve (12) containers without allowing any water to flow to drain.

sampling event, to verify how to ensure only COLD water is running – Do not sample hot water - and to adjust flow rate. The latter is described qualitatively as being like filling a glass of water. Quantitatively, this is about 1 gpm or about 4 L/min which is the "normal" flow rate estimated for customer use (DeOreo et al. 2016).

6. Verify that there is adequate room to arrange both empty and full sample bottles.
7. Label the sample bottles (e.g., "1" through "12") with marker or on container labels before sampling. NEVER rely solely on labeling the bottle cap.
8. When ready to collect profile samples, set all twelve (12) bottles with caps removed near the sample tap so the sampling can be done without interruption. Align them numerically 1 - 12 and place on one side of the sink to facilitate filling.
9. Make sure there is adequate room to handle sample bottles quickly without spilling them.

## PROCEDURE

1. Remove faucet aerator (preferably, prior to more than 6-hour stagnation immediately preceding sample collection).
2. Fill out data form to record time and location of sampling event.
3. Wipe hands with wet wipes (optional). Set bottle labeled "1" under the faucet and open faucet to allow cold water to flow at a rate that would be normally be used by the homeowner — **cold water only.**  
Do not adjust flow at any time during the sampling period. As soon as the faucet is turned on, all water must be collected – don't let any water flow to the drain. The water should remain flowing at a constant rate until all twelve (12) containers are filled.
4. Fill bottles "1," and then "2," etc. to one-liter mark until all twelve (12) bottles are filled, not allowing any water to go down the drain between bottles.
5. Once all of the sample bottles are collected:



- a. Turn off water.
- b. Cover each sample container tightly.
- c. Re-attach the faucet aerator/ screen using a new washer or aerator if needed.
6. Review the sample tracking sheet.
  - a. Are all the bottles accounted for?
  - b. Is the information for each sample bottle complete?
  - c. Were there any difficulties with the sample protocol to note?
7. Transport sample bottles to the laboratory and prepare the samples for analysis as described in the next section. Preparation needs to be completed on the same day as the samples were collected so please arrange for same day delivery to the laboratory. Occasionally samples are collected at the end of the day (after customer gets home from work or school). In these cases, if sample cannot be filtered that evening, samples as soon as possible the next morning.

## **SAMPLE PREPARATION**

**Note: Sample preparation at your utility may vary based on the analytical method used by your laboratory.**

1. For the “total lead” sample, **do not filter and do not transfer to any other bottle until after acidification.**
  - a. **Acidify the sample in the original 1-L bottle.** It is necessary to acidify the whole sample to dissolve all the particles including those sticking to the bottle.
  - b. After acidifying the sample to  $\text{pH} < 2$  and mixing the 1 L bottle, allow it to stand for  $>16$  hours.
  - c. Record the date and time.
  - d. Label this sample bottle “total”.
2. Repeat this procedure creating total samples from each of the twelve (12) containers.
3. Analyze all sample bottles (12) for total lead.
4. Concentrations need to be reported as  $\mu\text{g/L}$  for each bottle.