

RESULTS OF FLINT RESIDENT WATER LEAD SAMPLING MARCH 2016

In March 2016, 174 Flint residents (out of 269 who participated in the original August 2015 sampling of Flint water) re-sampled their homes for lead in drinking water. The goal was to track possible improvements since the switch back to Detroit water in October 2015 and implementation of improved corrosion control (i.e., extra phosphate added beyond that present in Detroit water) starting December 2015. This work was coordinated by Virginia Tech and was funded by the United States Environmental Protection Agency (US EPA). The following conclusions are based on a preliminary evaluation of this sampling event.

1. Flint is Not Yet Meeting the 90%'ile Lead Action Level

On the basis of first draw lead levels of samples collected during March 2016, Flint water is still exceeding Federal standards as determined by the EPA 90%'ile action level of 15 ppb. The 90%'ile lead level in the March 2016 sampling event was 23 ppb which is above the 15 ppb EPA 90%'ile action level. Because the pool of 174 homes sampled is random in terms of the home plumbing profile, and was not selected to include at least 50% homes with lead pipe as required by the EPA for Lead and Copper Rule (LCR) monitoring, our reported 90%'ile lead is probably lower than that which would be determined in an approved LCR sampling event. Hence, in our opinion, Flint water is not yet meeting the action level. *All Flint residents should continue to use bottled water, or Flint water passed through a lead filter, for cooking or drinking until further notice.*

Our sampling also demonstrated that water lead throughout the Flint system is highly variable. Thus, virtually all homes in Flint must be considered at risk, at the present time, for elevated lead in water, unless the homeowner is certain that there is no lead plumbing (i.e., lead service line, leaded brass, or lead solder) in the home. This means that homes that may have tested very low for water lead in past sampling efforts, must be considered at risk for high lead in water—the advice to use bottled or filtered water, applies to all homes, regardless of past testing results.

2. Lead Levels Are Lower Now Than in August 2015

On the whole lead in water levels are improving, as indicated by both lower levels of lead, as well as by percentage of water lead samples above 15 ppb. For example, 90%'ile first draw lead dropped from 28.5 to 22.8 ppb in 2016 versus 2015. The percentage of first draw samples over 15 ppb, dropped from 19% down to 15% comparing 2015 to 2016. For water samples collected after \approx 3 minutes of cumulative flushing, 90%'ile lead levels were cut in half comparing 2016 to 2015 (i.e., 7.1 ppb versus 3.1ppb).

	90%'ile (ppb)		% >AL	
	2015	2016	2015	2016
First draw	28.5	22.8	19%	15%
~1 min	11.6	8.3	6%	5%
~3 min	7.1	3.1	3%	2%

3. Iron Levels (and Red Water Complaints) Are Decreasing

The implementation of corrosion control also appears to be reducing iron levels in water. This is evidenced by a reduced number of homes exceeding the EPA's secondary iron standard of 0.3 mg/L (for discoloration and red water), which dropped from 7% down to 4% in 2015 and 2016, respectively.

	90% 'ile (ppb)		% >SMCL	
	2015	2016	2015	2016
First draw	349.4	418.4	13%	14%
~1 min	285.4	157.2	9%	5%
~3 min	247.8	160.6	7%	4%

4. To Speed Up Recovery of The System, Many Residents Will Need to Use More Water

We conducted a detailed investigation of water use in a few homes that had persistently high lead. This investigation revealed that many Flint residents are using very little water. Two homes with persistent elevated lead problem, were only using 20-45% of the monthly volume considered typical for U.S. homes. Our discussions reveal that this low water use is because many residents are: 1) trying to reduce their water bills, 2) showering only once per week for up to 5 minutes to reduce the likelihood of rashes or exposure, and 3) using bottled water for baths, washing dishes and other uses.

The very low water use rates in some Flint homes, hinders recovery of the system due to the improved corrosion control. Less water use means that the orthophosphate and chlorine added to help improve the water quality and reduce lead and bacteria, are not flowing through the homes as much as is desired. Regular water use is needed to help clean out loose lead deposits and control biofilms within the pipes. Moreover, occasionally drawing water at a high rate from a tap with unrestricted flow such as a roman bath spout, hose bib or mud sink, will help to achieve velocities inside pipes that are needed to scour deposits that contain lead and iron rust.

In the next few weeks, it is likely that the United State Environmental Protection Agency and/or the state, will recommend a flushing program for homes with input from Virginia Tech, to help with system recovery and pipe cleaning. If implemented, many problems with lead, discolored water and even certain problems associated with bacteria will be brought under control more quickly. Consumers who use very little water, are likely to have more persistent problems, than those who are using more water or who will follow the recommended flushing program.

**Disclaimer: Although the information in this document has been gathered with funding by the United States Environmental Protection Agency, it may not necessarily reflect the views of the EPA and no official endorsement of either the result or recommendations should be inferred.*