

**Subject:**proposed call

**Date:**Sun, 25 Sep 2016 22:08:58 -0400

**From:**Nancy Love <[nglove@umich.edu](mailto:nglove@umich.edu)>

**To:**Shawn McElmurry <[s.mcelmurry@wayne.edu](mailto:s.mcelmurry@wayne.edu)>, [masten@egr.msu.edu](mailto:masten@egr.msu.edu)

This is just to you two, although perhaps we need to bring Paul and Laura into this conversation:

I'm in New Orleans and, theoretically, the only day this week I can do a call is Tuesday but it will be tight. Also, I'm hesitant to do so without the three of us having a conversation first and so I would suggest that we three talk on Tue. At best, I might be able to then have a conversation Friday 6 pm eastern.

I appreciate that Amy and Marc want to have a common message, but I do worry that the message we want to convey is different from the message they will want to convey (and have been conveying for months) as they will need to change their message, and I think that will be challenging for VT to do. They have promoted a single point of treatment as being sufficient to protect public health. I think it is not so simple and a modified message is needed. Let me just convey my thoughts/reaction.

Amy and I had a discussion about this in Denmark and I conveyed to her what I think needs to be conveyed to the community. She seemed satisfied with our conversation, but it seems something has changed. Perhaps more people are worried (I still don't mine the Facebook page) and so a clear message about PoU filters is needed. My hope was to develop a message for the community through the Mayor's office and her public health official. One challenge with this plan is that the person isn't starting as soon as hoped. At this point, I think we need to bring Laura S. into this conversation too.

I think the message is:

the water treatment design gold standard is to provide multiple treatment barriers to protect public health. All treatment systems are designed with multiple treatment steps, each of which provides benefits to other steps in the process and enhanced treatment overall. In Flint, the damage to the distribution system has compromised water quality between the treatment plant and homes, so point-of-use treatment has been needed. The single unit PoU treatment method that was selected last January in a moment of crisis was absolutely correct, but alone is insufficient in my opinion for drinking purposes. PoU filters are critical for the inorganic and organic chemical contaminants of concern, and are doing a very good job in reducing exposure of consumers to those contaminants. They are not designed to reduce exposure to bacteria, and indeed both increase bacterial counts and change which bacteria are there. The first of these two consequences has been known for decades (but not the second and Marc is ignoring the second point in his comments). We were clear about the fact that increases in bacteria through filters is nothing new in our discussions with residents, and that all water contains bacteria naturally. However, Flint is not just any city. It is a city with a high prevalence of immune- or health-compromised individuals. It is also a city experiencing a high level of interference in the distribution system (LSL replacements, water main breaks, aging infrastructure). Consequently, it is a city at higher risk for health consequences due to biological quality of the water. How high that risk is, I do not know yet.

Our goal with the RAPID grant was to develop a best practice for Flint. We had hoped that changing filters every two weeks would eliminate the increase in incidence of bacteria (and, presumably, the change in composition of microbial communities). It did not, and I was surprised by this. At this point, I think it is best to take filtered water, boil it, and then refrigerate for drinking. This provides \*\*two\*\* barriers (more in concert with our gold standard of multiple barriers) and covers the chemical and biological risks well.

The message the community has received for months implies that PoU filters alone are sufficient, and I suspect it will be hard for VT to agree to an alternative message. We can get on the phone to try and convince them, but the email messages sound like their intent is to try and convince us to stop talking about bacteria because it scares people. They also do not know about the incidence of enterobacteriaceae and shigella hits we saw and I don't think they need to learn about this before the city and mayor. We are in the midst of trying to figure out what this means and if we have independent measures that confirm what we saw. I think until we have a better handle on what is going on with these indicators in the samples we've detected, a disinfection step is really best. It is what I am starting to do in my own house in Ann Arbor (which is a city with relatively high Myco counts), and I cannot in good conscience recommend otherwise to the citizens of Flint, especially given the average health condition of its citizens. After we have spoken with the city (and maybe Genessee County Health Dept), I am happy to convey more to VT but I do not think it appropriate to do this in the reverse order.

The goal of our RAPID study was to develop a best practices guideline for the city and I think we are ready to make an initial recommendation as noted above, while at the same time clarifying that we continue to analyze samples. I would feel more comfortable having the conversation if we can compile all our data together. Zixu updated the PoU microbial data tonight on the other houses we have data on, and I'll look at that next.

So, I agree a message about our work and the filters needs to be conveyed to the citizens of Flint, but I want to do it in partnership with the Mayor and her office (and county health dept and state if you think necessary).

Let me know what you think about my logic. And, I would like to bring Paul and Laura into this dialog. I will also need to bring Terri in as a partner on the PoU study.

Nancy

**Nancy G. Love, Ph.D., P.E., BCEE**

Professor, Department of Civil and Environmental Engineering

Adjunct Professor, Addis Ababa University Institute of Biotechnology, Ethiopia

Fellow: Water Environment Federation; International Water Association; Association of Environmental Engineering and Science Professors

University of Michigan

183 EWRE Building

1351 Beal Avenue  
Ann Arbor, MI 48109  
Voice: (734) 763-9664  
[nglove@umich.edu](mailto:nglove@umich.edu)  
<http://envbiotech.engin.umich.edu/>  
Twitter: @Love\_H20

----- Forwarded Message -----

**Subject:**Re: Conference Call

**Date:**Thu, 29 Sep 2016 07:48:54 -0400

**From:**Nancy Love <[nglove@umich.edu](mailto:nglove@umich.edu)>

**To:**Susan J. Masten <[masten@egr.msu.edu](mailto:masten@egr.msu.edu)>

**CC:**Shawn Patrick McElmurry <[s.mcelmurry@wayne.edu](mailto:s.mcelmurry@wayne.edu)>

Hi Susan and Shawn:

Susan, I am also glad we can push this off. I had hoped my email would allow for more time but Amy seems anxious to talk again and I felt it would be hard for me to do so without looking like I was blowing her off. Any conversation we had again wouldn't have been different in terms of my message from what we already had. Having you constrain the meeting has helped. I do hear that she wants a common message, which I am fine with. Her email does suggest, however, that she will not like the message we believe needs to be conveyed. We'll just have to find out. But pushing to October 10 will give us more time with our molecular analysis. Will have a full Miseq analysis assessment by today. But, what is really critical is the qPCR and Chia-Chen is out most of next week. Nevertheless, I have pushed on identifying primers that at least target the enterobacteriaceae that are for thermotolerant indicators (typically associated with mammalian sources). I'm starting to think that we should return to doing fecal samples when we go to houses.

Ann Arbor water ran around 100 cfu/mL on average out of the pipe when we did our study November 2014.

Note that are Ann Arbor data was not first flush. The results for Flint are first flush. The lowest is 36 +/- 4 and the highest was 5300 +/- 458. If we eliminate the high number, the average in Flint first flush is 1,600. It very well may be that the piped average after flushing could be around 500 cfu/ml or less; we just haven't taken those measures since our focus has been the filter and plating is hard to do with multiple samples at triplicate each.

What may be more important is the count after 5 minutes coming OUT of the PoU Filter. Average by plating so far is 1,140 +/- 290.

Nancy

**Nancy G. Love, Ph.D., P.E., BCEE**

Professor, Department of Civil and Environmental Engineering

Adjunct Professor, Addis Ababa University Institute of Biotechnology, Ethiopia

Fellow: Water Environment Federation; International Water Association; Association of Environmental Engineering and Science Professors

University of Michigan  
183 EWRE Building  
1351 Beal Avenue  
Ann Arbor, MI 48109  
Voice: (734) 763-9664