

**Rennaker, Joanne (DEQ)**

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**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Friday, September 05, 2014 2:52 PM  
**To:** Sygo, Jim (DEQ); Wurfel, Brad (DEQ)  
**Cc:** Shaler, Karen (DEQ); Feuerstein, Heather (DEQ); Willard, Veronica (DEQ); Benzie, Richard (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Flint Site 5 Boil water advisory documents  
**Attachments:** Boil PN TC detected.pdf; Flint-Site5-BWA.pdf

FYI – heads up.

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**From:** Busch, Stephen (DEQ)  
**Sent:** Friday, September 05, 2014 2:47 PM  
**To:** Daugherty Johnson ([djohnson@cityofflint.com](mailto:djohnson@cityofflint.com)); Brent Wright ([bwright@cityofflint.com](mailto:bwright@cityofflint.com)); [mglasgow@cityofflint.com](mailto:mglasgow@cityofflint.com)  
**Cc:** Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ); Prysby, Mike (DEQ); Rosenthal, Adam (DEQ)  
**Subject:** Flint Site 5 Boil water advisory documents

Gentlemen,

Attached are the boil water advisory public notice with all required language and a map of the impacted zone. Please distribute to your media contacts immediately.

Once we have 2 sets of non-detect samples from the impacted area we can discuss lifting the advisory.

You indicated that flushing of the area has already started.

Please ensure the water system is taking investigative steps to identify a possible source

- o Inspect storage facilities
- o Verify pumping and treatment system remains intact and uncontaminated
- o Inspect cross connection accounts in the affected area
- o Survey the area for any unidentified cross connections
- o Review any recent construction or maintenance in the area
- o Check for building permits and with building inspectors for any recent construction in the area
- o Check with fire departments and DPW for any temporary or improper hydrant use
- o Review pumpage and check for breaks, leaks, or an uptick in unaccounted water loss
- o Ensure any vacant properties have had the water service shutoff
- o Review CI residual data, conduct additional CI monitoring, and increase disinfectant residual

I will be in contact with the County Health Department and the MDARD Food and Dairy Division.

You can reach me over the weekend at this number or Mike Prysby at his number.

Stephen Busch, P.E.  
 Lansing and Jackson District Supervisor  
 Office of Drinking Water and Municipal Assistance  
 MDEQ

517-643-2314

## LOCALIZED DRINKING WATER WARNING

***Coliform bacteria detected in localized area of Flint water system***

### **BOIL YOUR WATER BEFORE USING**

Our water system detected the presence of coliform bacteria in the water supply on September 3, 2014. We routinely monitor for the presence of drinking water contaminants. We took routine samples for coliform bacteria during on September 2, 2014 from all sampling locations throughout the city. The location near Flushing Road and Chevrolet Avenue showed the presence of coliform bacteria. We took three repeat samples at this location and at adjacent locations on September 3 and again on September 4, 2014. Two of the three samples on the 3<sup>rd</sup> showed the presence of total coliform bacteria and three of the three samples collected on the 4<sup>th</sup> in this same area showed the presence of total coliform bacteria. All other monitoring locations in the City continue to show no presence of Coliform bacteria.

#### **What should I do?**

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and preparing food. Boiling kills bacteria and other organisms in the water. **Continue using boiled or bottled water until further notice.** This boil notice is limited to the area bordered by Dayton Street (north), DuPont Street (east), Flint River (south), and LaVelle Road to Flint River (west).

If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water.

#### **What does this mean?**

Total coliform bacteria are generally not harmful themselves. *Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present.*

Usually, coliforms are a sign that there could be a problem with the treatment or distribution system (pipes). Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or E. coli, are present. We did not find any of these bacteria in our subsequent testing. If we had, we would have notified you immediately. However, we are still finding coliforms in the drinking water.

#### **What happened? What is being done?**

We are still detecting coliform bacteria. We will inform you when our sampling shows that no bacteria are detected. We are flushing the system and increasing the chlorine residual within the affected area. We anticipate resolving the problem within the next two to three days. In the meantime, please continue using boiled or bottled water until we notify you otherwise.

If you have questions, you may contact Mr. Brent Wright of the City of Flint at 810-787-6537, [bwright@cityofflint.com](mailto:bwright@cityofflint.com), 4500 North Dort Highway, Flint MI. 48505 or Daughtry Johnson, Utilities Administrator (810) 766-7135, ext. 2602. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

#### **CERTIFICATION:**

WSSN: [enter Water Supply Serial Number]

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

Signature

Title

Date Distributed

Reminder to water supplier: This notice / certification must be sent to the DEQ.

cc: [cc the local health department and the Michigan Department of Agriculture and Rural Development if the boil affects a municipal supply.]

*Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.*

This notice is being sent to you as a precautionary measure by the City of Flint.

**CERTIFICATION:**

WSSN: [enter Water Supply Serial Number]

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

\_\_\_\_\_  
Signature\_\_\_\_\_  
Title\_\_\_\_\_  
Date Distributed

Reminder to water supplier: This notice / certification must be sent to the DEQ.

cc: [cc the local health department and the Michigan Department of Agriculture and Rural Development if the boil affects a municipal supply.]





**Rennaker, Joanne (DEQ)**

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**From:** Rosenthal, Adam (DEQ)  
**Sent:** Wednesday, August 26, 2015 11:44 AM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: Flint Water Study-VT

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**From:** Marc Edwards [<mailto:edwardsm@vt.edu>]  
**Sent:** Wednesday, August 26, 2015 11:41 AM  
**To:** Rosenthal, Adam (DEQ)  
**Subject:** RE: Flint Water Study-VT

Adam,

I am teaching a class on graduate engineering ethics at Virginia Tech, and we are using the Flint situation as our case study this semester.

Would you or someone else from DEQ, be willing to be interviewed by my class on some Wednesday between 4-6:45 pm?

Best Regards,  
 Marc

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**From:** Marc Edwards [<mailto:edwardsm@vt.edu>]  
**Sent:** Sunday, August 23, 2015 4:57 PM  
**To:** 'ROSENTHALA@michigan.gov'; 'bwright@cityofflint.com'; 'Ptaszenski, Rachel'  
**Subject:** Flint Water Study-VT

Dear Adam, Mike and Rachel,

Hi there. I am a professor at Virginia Tech who specializes in research on corrosion, opportunistic premise plumbing pathogens, lead in water health effects and engineering ethics.

Over the next few months we will be studying Flint water quality issues, in conjunction with all parties who are interested in this subject.

We will be launching our web page to publicly report results of our work.

We visited Flint last week and collected a lot of samples from the distribution system, and we are also doing a lead in water study with residents, to complement that which was recently conducted by the city under the LCR.

Just giving you a heads up on this, and I hope you can give me a point of contact with each of your agencies. Dependent on what we find, it might be desirable to touch base, in advance of our releasing certain findings. We also intend to collaborate with all parties, in an open manner, to the extent that is possible, as our study progresses.

Mike, I think I met you a few years back at a Michigan AWWA event, and Rachel, you were kind enough to send me the coliform/E.Coli data last week. Adam, I am not sure if I have ever met you or not.

My cell phone is 540 320 8740, my office phone is 540 231-7236, and my e-mail is on this message. Feel free to call me at any time, if any of you should have any questions about our plans, or the Flint water quality issues that we will be studying.

Best Regards,  
Marc Edwards

**Rennaker, Joanne (DEQ)**

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**From:** Rosenthal, Adam (DEQ)  
**Sent:** Monday, August 24, 2015 8:53 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: Flint Water Study-VT

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**From:** Marc Edwards [<mailto:edwardsm@vt.edu>]  
**Sent:** Sunday, August 23, 2015 4:57 PM  
**To:** Rosenthal, Adam (DEQ); [bwright@cityofflint.com](mailto:bwright@cityofflint.com); 'Ptaszenski, Rachel'  
**Subject:** Flint Water Study-VT

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My cell phone is 540 320 8740, my office phone is 540 231-7236, and my e-mail is on this message. Feel free to call me at any time, if any of you should have any questions about our plans, or the Flint water quality issues that we will be studying.

Best Regards,  
Marc Edwards

**Rennaker, Joanne (DEQ)**

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**From:** Wurfel, Brad (DEQ)  
**Sent:** Monday, February 09, 2015 9:29 AM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: Flint water testing-- calendar question

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**From:** Maloney, Damon [<mailto:damon.maloney@abc12.com>]  
**Sent:** Thursday, February 05, 2015 1:51 PM  
**To:** Wurfel, Brad (DEQ)  
**Subject:** Re: Flint water testing-- calendar question

Yes I'm referring to the tthm. You mentioned those being quarterly... When will the next quarterly report be released to public ?

Damon Maloney  
abc12 News  
Sent from my iPhone

On Feb 5, 2015, at 1:45 PM, Wurfel, Brad (DEQ) <[WurfelB@michigan.gov](mailto:WurfelB@michigan.gov)> wrote:

Hey, Damon. Presume you mean tthm testing? The program looks for 80 or 90 different toxics. Some are tested hourly, some -- long term threats like tthm -- are tested quarterly.

Sent from my iPhone

On Feb 5, 2015, at 1:26 PM, "Maloney, Damon" <[damon.maloney@abc12.com](mailto:damon.maloney@abc12.com)> wrote:

Hello Brad,

My name is Damon Maloney, reporter with ABC 12 News in Flint, Michigan. I'm working on a Flint water story today, and had a question about upcoming testing for the drinking water. When are the next tests being performed and when should the public expect to learn the results?

Thank you very much.

**Rennaker, Joanne (DEQ)**

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**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Tuesday, December 09, 2014 9:51 AM  
**To:** Busch, Stephen (DEQ); Benzie, Richard (DEQ)  
**Subject:** FW: Flint water update

Steve/Richard – I spoke with Randy this morning. I offered to review and provide comments on a summary that he drafted for his management. My suggested changes are in the paragraph below. It's important to keep it simple. Any other comments?

- The DEQ met with Flint officials last month. The City prepared an operational plan to reduce the formation of disinfection by-products. They have exceeded the standard which is primarily the result of using water from a different source, namely the Flint River. This is anticipated to be mitigated once the City begins using Lake Huron water from the Karagondi pipeline. A DEQ violation notice will go out next week which will require the city to issue a public notice. The DEQ Director plans to notify legislative members from the Flint area. In conclusion, the DEQ has seen a reduction in the numbers because of operational changes and the cooler weather. The violation is expected to continue for a while because it takes time to resolve this problem.

Liane J. Shekter Smith, P.E., Chief  
Office of Drinking Water and Municipal Assistance  
Michigan Department of Environmental Quality  
517-284-6543

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**From:** Byrne, Randall (Treasury)  
**Sent:** Tuesday, December 09, 2014 9:16 AM  
**To:** Shekter Smith, Liane (DEQ)  
**Subject:** Flint water update

Liane:

Please review this draft on the Flint water issue and make any changes that will clarify this statement:

- The DEQ met with Flint officials last month. The City prepared an operational plan to reduce the disinfection by-product. They have exceeded the standard which is a result of using water from a different source, namely the Flint River. This will be gone once the City begins using Lake Huron water from the Karagondi pipeline. A DEQ violation notice will go out next week which will be a public notice. The DEQ Director will notify legislative members from the Flint area. In conclusion, the DEQ has seen a reduction in the numbers because of the cooler weather. The violation will continue for a while because it takes time to resolve this problem.

Thanks, once again for your assistance,  
Randy,



Randall D. Byrne, Manager, Office of Fiscal Responsibility  
State of Michigan 430 W. Allegan St. , Lansing, MI 48922  
[ByrneR1@michigan.gov](mailto:ByrneR1@michigan.gov) (517) 335-2521



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Thank you.

**Rennaker, Joanne (DEQ)**

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**From:** Benzie, Richard (DEQ)  
**Sent:** Thursday, September 03, 2015 2:20 PM  
**To:** Poy, Thomas (poy.thomas@epa.gov)  
**Cc:** Crooks, Jennifer  
**Subject:** FW: Flint Water

Tom,

The message below from Mike Prysby provides additional information about the city's plans to install optimal corrosion control. The last sentence indicates that Flint is going to invite additional EPA experts to join their TAC.

Richard

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**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, September 03, 2015 1:22 PM  
**To:** Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Flint Water

Below is a note from Howard Croft to our TAC team concerning the return to compliance for TTHMs. Howard also briefly discusses the lead issue and the city's plans to install optimal corrosion control.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

**From:** Howard Croft [<mailto:hcroft@cityofflint.com>]  
**Sent:** Thursday, September 03, 2015 12:28 PM  
**To:** Brent Wright; Dayne Walling; donna. cole; Gerald (Jed) Natzke; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; [larry.koehler@mcc.edu](mailto:larry.koehler@mcc.edu); Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Bincsik; [rosejo@msu.edu](mailto:rosejo@msu.edu); Russell Hudson; Samir Matta; Warren Green  
**Subject:** Flint Water

Technical Advisory Team,

I am pleased to report that the City of Flint has officially returned to compliance with the Michigan Safe Drinking Water Act and we have received confirming documentation from the DEQ today. The GAC filtering was installed on time and was instrumental in our ability to maintain an average level under the MCL. We anticipate that we will have no further notices going out.



Recent testing has raised questions regarding the amount of lead that is being found in the water and I wanted to report to you our current status.

At the onset of our plant design, optimization for lead was addressed and discussed with the engineering firm and with the DEQ. It was determined that having more data was advisable prior to the commitment of a specific optimization method. Most chemicals used in this process are phosphate based and phosphate can be a "food" for bacteria. We have performed over one hundred and sixty lead tests throughout the city since switching over to the Flint River and remain within the EPA standards.

We are currently designing an optimization plan with the engineering firm that will be presented to the DEQ and upon approval we expect to have it implemented by January 2016. It is worthwhile to note that the DEQ has reported that other cities have taken years to complete an optimization plan and we anticipate having a plan in place over the next four months.

It is also worth noting to this group that there are different lead testing methods used within industry and the city remains consistent with the most recent EPA approved testing method which can produce different results than other methods.

We hope to schedule another TAC team meeting for late September or early October, I will attempt to keep everyone informed and look for the best dates. We are inviting additional EPA experts to become a part of this committee.

Thank you,

--

**Howard Croft**

Public Works Director

City of Flint

1101 S. Saginaw Street

Flint, MI 48502

PH# 810.766.7135 Ext.2043

[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)

**Rennaker, Joanne (DEQ)**

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**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, September 03, 2015 1:22 PM  
**To:** Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Flint Water

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 517 290-8817

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**Sent:** Thursday, September 03, 2015 12:28 PM  
**To:** Brent Wright; Dayne Walling; donna. cole; Gerald (Jed) Natzke; Gerald Ambrose; Howard Croft; James Henry; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; [larry.koehler@mcc.edu](mailto:larry.koehler@mcc.edu); Laura Sullivan; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Bincsik; [rosejo@msu.edu](mailto:rosejo@msu.edu); Russell Hudson; Samir Matta; Warren Green  
**Subject:** Flint Water

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Thank you,

--

**Howard Croft**  
Public Works Director  
City of Flint  
1101 S. Saginaw Street  
Flint, MI 48502  
PH# 810.766.7135 Ext.2043  
[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)

**Rennaker, Joanne (DEQ)**

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**From:** Cook, Pat (DEQ)  
**Sent:** Monday, September 09, 2013 10:57 AM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Flint WTP CT  
**Attachments:** FlintCTcalculator.xls

Steve spreadsheet is correct. If you open it up and in the flow rate box insert 18 mgd rather than 36, you'll notice the log inactivation achieved is 0.46, which is what Mike came up with this morning when he used 18 mgd. This is not a %, it's a log number. They need 0.5 logs but are getting 0.46, that's 92% of what they need.

pat

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**From:** Busch, Stephen (DEQ)  
**Sent:** Friday, August 30, 2013 4:28 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Cook, Pat (DEQ)  
**Subject:** RE: Flint WTP CT

They seem to meet the extra 0.5 log removal with no problem (see attached) at 0.25 intermediate Cl, 1.0 PT Cl and 9 pH.

Also they will not be producing 36 MGD during the interim period so the flow rate can be significantly reduced.

Stephen Busch, P.E.  
 Lansing and Jackson District Supervisor  
 Office of Drinking Water and Municipal Assistance  
 MDEQ  
 517-643-2314

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**From:** Prysby, Mike (DEQ)  
**Sent:** Wednesday, August 28, 2013 11:30 AM  
**To:** Cook, Pat (DEQ); Busch, Stephen (DEQ)  
**Subject:** Flint WTP CT

Attached is the Flint WTP CT calculation for several different operating scenarios with worst case meaning cold water – 0.5 deg C.

1. 12 MGD (0.5 C, pH 7.5, final CL 1.0 ppm)
2. 18 MGD (0.5 C, pH 7.5, final CL2 1.5 ppm)
3. 18 MGD w. softening (0.5 C, pH, final CL2 2.5 ppm)

Based on the higher pH, a minimum free residual of 2.5 mg/l from the clearwell appears necessary to meet the required CT in the third scenario.

I also ran the CT calc for the 3 MGAL clearwell at 2 deg C using the regression method. I will place a hard copy of the calc on your desk since my computer not mapped to the scanner on the printer....

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

**Rennaker, Joanne (DEQ)**

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**From:** Matta, Samir <SFMatta@lan-inc.com>  
**Sent:** Thursday, October 29, 2015 2:25 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Busch, Stephen (DEQ); Natasha Henderson (nhenderson@cityofflint.com); hcroft@cityofflint.com; Green, Warren; Mike Glasgow (MGlasgow@CityofFlint.com); Brent Wright (bwright@cityofflint.com); Hansen, Jeff  
**Subject:** FW: Flint WTP PH2 SEG4 - Corrosion Control  
**Attachments:** LMI Series C Pumps.pdf; NSFPhosAcidSpecs.pdf; PhosAcidSafetyDataSheet.pdf; Flint Phosphate Calculations - Revision 4.pdf

Hi Mike,

I just wanted to follow up on the email below and get your estimation on when the permit will be issued. Are you requiring any additional data before a decision can be made?

The calculation that we developed meets with the requirement of the feed rates as agreed to between your office and the EPA based on the email from Stephen Busch to the EPA on November 22, 2015. The pumps were resized to handle the anticipated Max feed rates requested. We are assuming that since we are using the chemical used by DWSD or corrosion control, we are not required to go thru a study phase.

Additionally, during our review of the email trail with EPA, we noticed that the EPA did recommend that Jar Testing be done to evaluate the impact of the orthophosphate dose on turbidity of the DWSD water. Stephen has also noted that a treatability study will need to be conducted on the KWA water in conjunction with the Flint WTP processes to optimize the corrosion control treatment needed before use in the system.

Does the permit to be issued going to highlight more specific requirements on the duration(s), method(s) and reporting needed for each of the testing required before implementation is allowed into the system?

Your assistance and feedback are greatly appreciated to make sure that our timeline for the introduction of the initial corrosion control into the DWSD water and its future implementation into the KWA Raw feed can be accurately depicted in our discussions with the City and KWA.

Thank you very much for your continued support.

**Samir F. Matta, PE**  
 Team Leader



**Lockwood, Andrews  
& Newnam, Inc.**  
 A LEO A DALY COMPANY

1311 South Linden Road, Suite B • Flint, MI 48532  
 2121 University Park Dr, Suite 100 • Okemos, MI 48864-6901  
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[www.lan-inc.com](http://www.lan-inc.com) • [sfmatta@lan-inc.com](mailto:sfmatta@lan-inc.com)

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**From:** Matta, Samir  
**Sent:** Tuesday, October 27, 2015 4:12 PM  
**To:** [prysbym@michigan.gov](mailto:prysbym@michigan.gov)  
**Cc:** Brent Wright ([bwright@cityofflint.com](mailto:bwright@cityofflint.com)); Mike Glasgow ([MGlasgow@CityofFlint.com](mailto:MGlasgow@CityofFlint.com))  
**Subject:** FW: Flint WTP PH2 SEG4 - Corrosion Control

Hi Mike,

I have included the updated calculations, Proposed Pump Cut Sheet as well as the MSDS and the fact sheet for the chemical to be used.

Please let me know if this satisfy your needs to issue the permit.

Thanks.

**Samir F. Matta, PE**  
Team Leader



**Lockwood, Andrews  
& Newnam, Inc.**

A LEO A DALY COMPANY

1311 South Linden Road, Suite B • Flint, MI 48532  
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[www.lan-inc.com](http://www.lan-inc.com) • [sfmatta@lan-inc.com](mailto:sfmatta@lan-inc.com)

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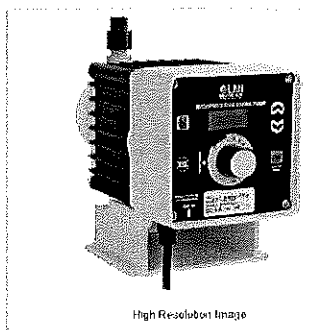
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 Totally encapsulated electronics for protection against moisture and corrosive conditions  
 Inputs for low level switch available on certain models  
 Models with external pacing for flow proportional applications  
 Advanced control options for simplified system integration (pulse multiply/divide, 4-20 mA, remote on/off)  
 \*UL, \*CUL, NSF 50, NSF 61, \*CE Certifications

#### Control Codes:

1 – Dual Manual Control (speed and stroke length)  
 7 – Pulse Input / Dual Manual Control  
 9 – Pulse/Analog Input / Dual Manual Control

| Output Codes with standard liquid end |                    |
|---------------------------------------|--------------------|
| Max Capacity:                         | Max Pressure:      |
| *CX0 – 1.3 GPH (4.9 l/h)              | 300 psi (20.7 Bar) |
| *CX1 – 2.5 GPH (9.5 l/h)              | 150 psi (10.3 Bar) |
| *CX2 – 4.0 GPH (15.1 l/h)             | 100 psi (6.9 Bar)  |
| *CX3 – 8.0 GPH (30.3 l/h)             | 60 psi (4.1 Bar)   |
| *CX4 – 20 GPH (75.7 l/h)              | 25 psi (1.7 Bar)   |
| C76 – 4.0 GPH (15.1 l/h)              | 175 psi (12.1 Bar) |
| C77 – 10.0 GPH (38.0 l/h)             | 80 psi (5.5 Bar)   |
| C78 – 25 GPH (95.0 l/h)               | 30 psi (2.07 Bar)  |



Four Function Valve  
AUTOPRIME™ Liquid End  
High Viscosity Liquid End  
Low Level Float Switch  
Dig-Pulse Flow Monitor  
Repair & Preventive Maintenance Kits  
Calibration Columns

2015 LMI, information and specifications may change without notice. | Legal | Promotional Products | Privacy Policy



**WL Performance**  
**Products LP**

## PRODUCT DATA SHEET

PRODUCT: Phosphoric Acid, 75%

**NSF**

GRADE: Technical

CODE: 750

GENERAL DESCRIPTION: Clear colorless liquid with no foreign odor

FORMULA:  $H_3PO_4$

MOLECULAR WEIGHT: 98.0

CAS NO.: 7664-38-2

DATE EFFECTIVE: November 5, 2005

### CHARACTERISTICS

### SPECIFICATION LIMITS

Specific Gravity @ 25°/15.5°C

1.574 Minimum

Equivalent  $H_3PO_4$ , %

75.0 Minimum

Equivalent  $P_2O_5$ , %

54.3 Minimum

Color, APHA

20 Maximum

NOTE: Specification Limits are subject to change from time to time. Please contact us for current data sheet.

Plant Location: Carondelet (St. Louis), MO; Carteret, NJ; Lawrence, KS  
 Packaging: 3000 gal. tank truck; 14,000 gal. tank cars.  
 15 gal.(200 lb.) & 55 gal. (700 lb.) plastic drums (nonreturnable)  
 Labeling Requirements: Product Label and DOT CORROSIVE label required by law.  
 Shipping Classification: 1. Single package of 5000 lbs. or more:  
     Phosphoric Acid  
     CORROSIVE MATERIAL, UN 1805, RQ  
     STCC4930248  
 2. Single package of less than 5000 lbs.:  
     Phosphoric Acid  
     CORROSIVE MATERIAL, UN 1805  
     STCC4930248

|                                                                                                               |                 |
|---------------------------------------------------------------------------------------------------------------|-----------------|
| Distributed By:<br>PVS NOLWOOD CHEMICALS, INC.<br>10900 Harper Avenue<br>Detroit, MI. 48213<br>(313) 925-0300 |                 |
| PVS ITEM #                                                                                                    | PVS TECH DATA # |
| 10495                                                                                                         | 10495           |

### Handling Precautions:

NOT FOR FOOD OR DRUG USE. CORROSIVE TO MILD STEEL. DANGER! CAUSES BURNS TO EYES AND SKIN. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

FIRST AID: If in eyes or on skin, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse.

IN CASE OF SPILL OR LEAK: Contain spill or leak to prevent discharge to environment. Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

This Product Data Sheet is subject to the terms and conditions on the reverse side hereof.

**CONTROLLED DOCUMENT**  
**IF STAMPED IN RED**

## PHOSPHORIC ACID , 75%; TECHNICAL GRADE

---

### Key Properties:

- Phosphoric acid is relatively non-volatile and stable at elevated temperatures; it is a much milder acid than sulfuric, nitric, or hydrochloric acids.
- Heavy, viscous liquid, 13.1 to 13.2 lbs./gal.
- Remains liquid at very low temperatures: Freezing point, -18°C (0.5°F)
- Shelf-life •• 24 months

### Applications:

- Bonding agent for refractory materials
- Industrial and institutional cleaning and sanitizing products
- Liquid fertilizers
- Aluminum bright-dipping
- Metal treating and phosphatizing
- Flameproofing agent
- Catalyst in chemical processes
- Effluent treatment
- Animal feed supplement
- Potable Water Treatment: ICL Performance Products LP Phosphoric Acid, 75%, conforms to the requirements of ANSI / NSF Standard 60; used for corrosion and scale control.  
Maximum Use Level = 13 mg/L.

FOR MORE COMPLETE INFORMATION ON PROPERTIES AND SAFE HANDLING OF THIS MATERIAL, SEE THE ICL PERFORMANCE PRODUCTS LP MATERIAL SAFETY DATA SHEET (MSDS).

NOTICE: Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, ICL Performance Products LP makes no representations or warranties as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ICL Performance Products LP be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information or the product to which Information refers. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment or formulation in conflict with any patent, and ICL Performance Products LP makes no representation or warranty, express or implied, that the use thereof will not infringe any patent. The data set forth herein are based on samples tested and are not guaranteed for all samples or applications. Such data are intended as guides and do not reflect product specifications for any particular product. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OR MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

ICL PERFORMANCE PRODUCTS LP © November, 2005

### Corporate Offices:

622 Emerson Road  
Suite 500  
St. Louis, Missouri 63141  
314-983-7500

For order assistance, please call our Customer Service Department Toll Free: 1-800-244-6169



## Safety Data Sheet



**RESPONSIBLE CARE®**  
OUR COMMITMENT TO SUSTAINABILITY

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

#### Identification

Product Name: PHOSPHORIC ACID (35% - 95%)  
Reference Number: AST10046  
Date: May 19, 2015  
Synonyms: Emulsi-Phos®; LuminEtch™, LuminEtch™ Ultra, PurEtch®;  
monophosphoric acid; orthophosphoric acid;

|                                                                                                              |           |
|--------------------------------------------------------------------------------------------------------------|-----------|
| Distributed by:<br>PVS HOLWOOD CHEMICALS, INC.<br>10890 Harper Avenue<br>Detroit, MI 48213<br>(313) 925-0300 |           |
| PVS ITEM #                                                                                                   | PVS SDS # |
| Multi                                                                                                        | 0484      |
| CONTROLLED DOCUMENT<br>IF STAMPED IN RED                                                                     |           |

#### Use of the substance or preparation

Phosphates and fertilizers, acid cleaners, aluminum brighteners and metal phosphatizing, leather tanning, varnish, synthetic rubber, and water treatment. Food grade is used as an acidulate for cola drinks, yeast nutrient, etc. NSF International certifies phosphoric acid under Standard 60 as an acceptable drinking water treatment chemical.

#### Company/Undertaking Identification

**ICL PERFORMANCE PRODUCTS LP**  
622 Emerson Road - Suite 500  
St. Louis, Missouri 63141

Emergency telephone: In USA call CHEMTREC: 1 800 424 9300

Outside the USA, including ships at sea, call CHEMTREC's international and maritime telephone number (collect calls accepted): +1 (703) 527-3887.

In Canada call CANUTEC: 1 613 996 6666

General Information: +1 800 244 6169 (Worldwide)

### 2. HAZARDS IDENTIFICATION

#### GHS



**Danger**

GHS05

Skin Corr. 1A H314 Causes severe skin burns and eye damage.  
Eye Dam. 1 H318 Causes serious eye damage.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing.  
Rinse skin with water/shower.

**ICL Performance Products LP Safety Data Sheet**

Material: Phosphoric Acid (35%-95%)

Reference No.: AST10046

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May 19, 2015

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

**3. COMPOSITION/INFORMATION ON INGREDIENTS****Composition**

| <u>Substance</u> | <u>CAS No.</u> | <u>%w/w</u> | <u>EINECS No.</u> |
|------------------|----------------|-------------|-------------------|
| Phosphoric Acid  | 7664-38-2      | 35 - 95     | 231-633-2         |
| Water            | 7732-18-5      | 5 - 65      | 231-791-2         |

**4. FIRST AID MEASURES****General**

This material is an acid; treatment is symptomatic and supportive. Phosphoric acid has irritating effects to mucous membranes.

**Eye contact**

Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. If irritation persists, contact an ophthalmologist.

**Skin contact**

May cause skin irritation. Wash effected area with plenty of soap and water. Get medical attention.

**Inhalation**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Ingestion**

IF SWALLOWED, do NOT induce vomiting. Give victim 2-4 glasses of water to drink. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

**5. FIRE FIGHTING MEASURES****Extinguishing media**

Not combustible. No special requirements.

**Unsuitable extinguishing media**

Non-combustible. No special requirements.

**Exposure hazard**

Not combustible. May give off toxic fumes (oxides of phosphorus) in a fire. May react with metals to liberate hydrogen, a flammable gas.

**ICL Performance Products LP Safety Data Sheet**

Material: Phosphoric Acid (35%-95%)

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**Protective equipment**

Firefighters should wear self-contained breathing apparatus & personal protective clothing (PPE).

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Avoid unnecessary exposure and remove all material from eyes, skin and clothing. Do not ingest or inhale mists of phosphoric acid.

**Environmental precautions**

Small quantities: Avoid discharge into the environment

Large quantities: May cause pollution. Avoid discharge into the environment. Note methods for cleaning up in the next section.

**Methods for cleaning up**

Contain large spills with dikes and transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material or small spills with an inert material and then place in a chemical waste container. Neutralize washings with a base such as soda ash or lime. Flush residual spill area with large amounts of water.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

**7. HANDLING AND STORAGE****Handling**

Do not get in eyes, on skin, or on clothing.  
Avoid breathing mist or vapor.  
Do not taste or swallow.

Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.

**Engineering measures**

Provide natural or mechanical ventilation to minimize exposure. The use of local mechanical exhaust ventilation is preferred at sources of air contamination such as open process equipment. Consult National Fire Protection Association (NFPA) Standard 91 for design of exhaust systems.

Transfer product from drums to process in closed system (hermetically) and if not possible use effective local exhaust ventilation. Empty drums as thoroughly as possible to facilitate disposal.

For bulk transfer, purge lines with nitrogen to remove residual liquid before disconnect. When unloading bulk vehicles, personnel should wear chemical goggles and rubber or neoprene gloves. All fittings should be properly secured prior to energizing unloading system. Care should be taken to avoid acid contact when disconnecting lines/hoses after unloading.

For bulk storage type 316L stainless is recommended. Glass, polyethylene and FRP (depending on resin used) are satisfactory, steel, aluminum and type 304 stainless are not recommended because of rapid or potential corrosion. Vessels should be vented and operated at ambient conditions. Maintenance heat (hot water preferred) may be used to prevent freezing. Dike area around storage tank with sufficient volume to hold entire tank contents.

**Storage**

Store in plastic, rubber-lined, or 316L stainless steel tanks designed for Phosphoric Acid. Store drums away from heat and out of direct sunlight. Store in a well-ventilated dry area away from alkalis and most metals. Store above freezing point. Contact with reactive metals, i.e. mild steel and aluminum may generate hydrogen that may form an explosive mixture in storage vessels.

**ICL Performance Products LP Safety Data Sheet**

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For tank inspection, follow manufacturer's recommended safety guidelines (ex. temperature, etc.). In addition, corrosion data for phosphoric acid (ex. Handbook of Corrosion Engineering, McGraw-Hill, 2000) must be followed to match the storage container of choice (ex. stainless, rubber lined, etc.).

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Occupational Exposure Limits**

| <u>State</u>   | <u>Standard</u>           | <u>Limit</u>                                            |
|----------------|---------------------------|---------------------------------------------------------|
| Australia      | Occupation Exposure Limit | 1 mg/m <sup>3</sup> 8-hr. TWA, 3 mg/m <sup>3</sup> STEL |
| Austria        | Occupation Exposure Limit | MAK 1 mg/m <sup>3</sup> 8-hr                            |
| Belgium        | Occupation Exposure Limit | 1 mg/m <sup>3</sup> 8-hr. TWA, 3 mg/m <sup>3</sup> STEL |
| Denmark        | Occupation Exposure Limit | 1 mg/m <sup>3</sup> 8-hr. TWA                           |
| Finland        | Occupation Exposure Limit | 1 mg/m <sup>3</sup> 8-hr. TWA, 3 mg/m <sup>3</sup> STEL |
| France         | Occupation Exposure Limit | VME 1 mg/m <sup>3</sup> VLE 3 mg/m <sup>3</sup>         |
| Japan          | Occupation Exposure Limit | 1 mg/m <sup>3</sup> 8-hr.                               |
| United Kingdom | Occupation Exposure Limit | 2 mg/m <sup>3</sup> STEL                                |
| United States  | Occupation Exposure Limit | 1 mg/m <sup>3</sup> 8-hr. TWA, 3 mg/m <sup>3</sup> STEL |

**Respiratory protection**

Avoid breathing vapor or mist. Use NIOSH/MSHA approved respiratory protection equipment (full face piece recommended) when airborne exposure limits are exceeded (see below). If used, full-face piece replaces the need for face shield and/or chemical goggles. Refer to U.S. OSHA regulations 29 CFR 1910.134 or European Standard EN 149.

**Hand/Skin protection**

Wear impervious protective gloves and clothing to prevent contact to skin. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean personal protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

**Eye protection**

Wear chemical goggles, a face shield, and if necessary, a full face respirator when conditions warrant or exceed the Occupation Exposure Limit. Refer to U.S. OSHA regulations 29 CFR 1910.133 or European Standard EN 166.

Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure limits legislated for the province in which the substance will be used.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

- a) Appearance: Clear, colorless, syrupy liquid
- b) Odor: None
- c) Odor threshold: Undetermined.
- d) pH: (as a 1% solution @ 25 °C) 75%:1.6; 80%:1.6; 85%:1.6; 95%:1.7
- e) Melting point/freezing point: Freezing point °C: 75%:-17.5; 80%:4.6; 85%: 21.1;95%:24.7
- f) Initial boiling point and boiling range: (°C) 75%:135; 80%:144; 85%:154; 95%:202
- g) Flash point: Undetermined
- h) Evaporation rate: Undetermined.
- i) Flammability (solid, gas) : Undetermined.
- j) Upper/lower flammability or explosive limits: Undetermined.
- k) Vapor pressure: (100% acid): 0.0285 mm Hg @ 20 °C
- l) Vapor density: Undetermined.
- m) Relative density: @ 25/15.5 °C: 75%:1.575; 80%:1.633; 85%:1.692; 95%: 1.808
- n) Solubility(ies) : Complete
- o) Partition coefficient: n-octanol/water: Undetermined.

**ICL Performance Products LP Safety Data Sheet**

Material: Phosphoric Acid (35%-95%)

Reference No.: AST10046

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- p) Auto-ignition temperature: Undetermined.  
 q) Decomposition temperature: Undetermined.  
 r) Viscosity: @ 25 °C 75%:12; 80%:17; 85%:23; 95%:55

Chemical Formula:



|                                        | <u>75%</u> | <u>80%</u> | <u>85%</u> | <u>95%</u> |
|----------------------------------------|------------|------------|------------|------------|
| % Equivalent $\text{H}_3\text{PO}_4$ : | 75.1       | 80.35      | 85.5       | 95.0       |
| Kg/l @ 25 °C                           | 1.57       | 1.64       | 1.69       | 1.81       |
| lb/gallon @ 25 °C                      | 13.17      | 13.66      | 14.15      | 15 - 15.2  |

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

**10. STABILITY AND REACTIVITY**

Product is stable under normal conditions of storage and handling.

**Conditions to avoid**

Incompatible materials

**Materials to avoid**

Avoid contact with metals (such as mild steel and aluminum), which may liberate flammable hydrogen gas that can produce an explosion in confined vessels. Avoid contact with materials such as sulfides and sulfites, which could release toxic gases. Be cautious in mixing with strong bases because high heat of reaction can generate steam.

**Hazardous decomposition**

Phosphorus oxides may form when heated to decomposition.

**11. TOXICOLOGICAL INFORMATION**

Data from ICL Performance Products LP single-dose (acute) animal studies with this material are given below:

**Phosphoric Acid 75%**

Oral - rat LD<sub>50</sub>: 4,400 mg/kg; slightly toxic  
 Dermal - rabbit LD<sub>50</sub>: > 3,160 mg/kg; slightly toxic  
 Eye Irritation - rabbit (24-hr. exp): corrosive  
 Skin Irritation - rabbit (24-hr. exp): corrosive  
 DOT Skin Corrosion - rabbit (4-hr. exp): non-corrosive

**Phosphoric Acid 80%**

Oral - rat LD<sub>50</sub>: 4,200 mg/kg; slightly toxic  
 Dermal - rabbit LD<sub>50</sub>: > 3,160 mg/kg; slightly toxic  
 Eye Irritation - rabbit (24-hr. exp): corrosive  
 Skin Irritation - rabbit (24-hr. exp): corrosive  
 DOT Skin Corrosion - rabbit (4-hr. exp): non-corrosive

**Phosphoric Acid 85%**

Oral - rat LD<sub>50</sub>: 3,500 mg/kg; slightly toxic  
 Dermal - rabbit LD<sub>50</sub>: > 1,260 mg/kg; slightly toxic  
 Eye Irritation - rabbit (24-hr. exp): corrosive  
 Skin Irritation - rabbit (24-hr. exp): corrosive  
 DOT Skin Corrosion - rabbit (4-hr. exp): corrosive



**ICL Performance Products LP Safety Data Sheet**

Material: Phosphoric Acid (35%-95%)

Reference No.: AST10046

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The results of single exposure tests indicate that these concentrations of Phosphoric Acid are slightly toxic orally and no more than slightly toxic after skin application. Following a 24-hour exposure, irreversible eye and skin damage occurred at all tested concentrations of Phosphoric Acid.

Phosphoric Acid has produced no genetic changes in standard tests using bacterial cells.

**Additional Information**

This material is severely corrosive to steel based on DOT, 49 CFR criteria.

Phosphoric Acid has a low vapor pressure at room temperature and is not expected to present a significant inhalation hazard under ambient conditions. Phosphoric Acid can, however, be irritating to the respiratory tract if inhaled as a mist or if the material is vaporized. The American Conference of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV) for Phosphoric Acid. For further information on this material, please refer to the current edition of the Documentation of The Threshold Limit Values and Biological Exposure Indices.

**12. ECOLOGICAL INFORMATION****Environmental toxicity**

Phosphoric acid is practically nontoxic to one species of freshwater fish. No toxicity data was located for other freshwater species, algae, or *Daphnia magna* in a search of the available scientific literature.

The following data have been classified using the criteria adopted by the European Economic Community (EEC) for aquatic organism toxicity.

96-hr. LC<sub>50</sub> Mosquitofish: 138 mg/L, practically nontoxic

**Environmental Fate**

No specific biodegradation test data was located in a search of the available scientific literature. It was reported in the literature that while acidity of this material may be reduced readily in natural waters, the phosphate may persist indefinitely.

**13. DISPOSAL CONSIDERATIONS**

This material when discarded is a hazardous waste as defined by the U.S. Resource Conservation and Recovery Act (RCRA), 40 CFR 261.22, due to its characteristic of corrosivity, EPA hazardous waste number D002. Best Demonstrated Available Treatment (BDAT) as defined by RCRA for D002 characteristic wastes is DEACTIVATION plus meet 40 CFR 268.48 (Universal Treatment Standards) for non-CWA/non-CWA equivalent/non-Class I SDWA systems. Dispose of in accordance with local, state and federal regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

**14. TRANSPORT INFORMATION**

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

**Road/Rail, Sea and Air**

|              |                                              |
|--------------|----------------------------------------------|
| IMDG/UN      | UN 1805, Phosphoric acid, solution, 8, III   |
| ICAO/IATA    | UN 1805, Phosphoric acid, solution, 8, III   |
| RID/ADR      | UN 1805, Phosphoric acid, solution, 8, III   |
| Canadian TDG | UN 1805, Phosphoric acid, solution, 8, III * |
| US DOT       | UN 1805, Phosphoric acid, solution, 8, III * |

\*Reportable Quantity/ Reportable Limit (RQ/RL):

Canadian: Regulated limit (RL) for packages greater than or equal to 230 kg

U.S. DOT: Reportable quantity (RQ) for packages greater than or equal to 5,000 lb

**ICL Performance Products LP Safety Data Sheet**

Material: Phosphoric Acid (35%-95%)

Reference No.: AST10046

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**15. REGULATORY INFORMATION****Chemical Inventory**

|            |        |             |        |
|------------|--------|-------------|--------|
| USA TSCA   | Listed | Australia   | Listed |
| Canada DSL | Listed | Korea       | Listed |
| EC         | Listed | Philippines | Listed |
| Japan      | Listed | China       | Listed |

**Additional information**

WHMIS Classification: D2 (B) - Materials Causing Other Toxic Effects  
E - Corrosive Material

**SARA Hazard Notification**

|                                                       |                |
|-------------------------------------------------------|----------------|
| Hazard Categories Under Title III Rules (40 CFR 370): | Immediate      |
| Section 302 Extremely Hazardous Substances:           | Not Applicable |
| Section 313 Toxic Chemical(s):                        | Not Applicable |

CERCLA Reportable Quantity: 5,000 lbs. of phosphoric acid

Release of 5,000 lbs. or more of this product into the environment in a 24-hour period requires notification to the U.S. National Response Center (800-424-8802 or 202-426-2675). Since local, state, and federal laws vary; consult your attorney or appropriate regulatory officials for information relating to spill reporting.

FDA: Food grades of phosphoric acid are sanctioned as Generally Recognized as Safe (GRAS) by the U.S. Food and Drug Administration and is codified in 21 CFR 182.1073.

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation.

Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification.

**16. OTHER INFORMATION**

|                       | <u>Health</u> | <u>Fire</u> | <u>Reactivity</u> | <u>Additional Information</u>                                                                          |
|-----------------------|---------------|-------------|-------------------|--------------------------------------------------------------------------------------------------------|
| Suggested NFPA Rating | 3             | 0           | 0                 |                                                                                                        |
| Suggested HMIS Rating | 3             | 0           | 0                 | H<br>H = Splash goggles, gloves (nitrile rubber recommended), synthetic apron, dust & vapor respirator |

Reason for revision: Revised section 1 and 9. Supersedes MSDS dated: May 2, 2013  
Responsible Care ® is a registered trademark of the American Chemistry Council.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, ICL Performance Products LP makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ICL Performance Products LP be responsible for damages of any nature whatsoever resulting from the use of or reliance upon information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS

AST10046.4090

## Flint Phosphate Calculations

Chemical will be 75% NSF certified Phosphoric acid

75% acid has a density of 13.17 #/gal. (5,974 g/gal)  $13.17 \times 453.5923$

Of this 75% is Phosphoric acid ( $\text{H}_3\text{PO}_4$ ) = 4,480 g  $\text{H}_3\text{PO}_4$ /gal  $5,974 \times 0.75$

Molecular weight of  $\text{H}_3\text{PO}_4$  is 97.9913 g/mole

Moles  $\text{H}_3\text{PO}_4$  / gal = 45.72  $4,480/97.9913$

Moles  $\text{H}_3\text{PO}_4$  = Moles Orthophosphate ( $\text{PO}_4^{-3}$ ) = Moles Phosphorus (P)

| Species                 | Molecular Wt. | Moles / gal | g/gal   |
|-------------------------|---------------|-------------|---------|
| $\text{H}_3\text{PO}_4$ | 97.9913       | 45.72       | 4,480   |
| $\text{PO}_4^{-3}$      | 94.9676       | 45.72       | 4341.92 |
| P                       | 30.97         | 45.72       | 1407.72 |

### Proposed Operating Parameters

Assumptions per DEQ:

- City of Detroit residual is 0.39 mg/l as P
- MDEQ wants Flint to maintain a residual of approximately 1.0 mg/l as P
- Feed pump capacity should be sized for a max dose of 2.0 mg/l as P

|         | Plant Flow | Dosage as $\text{PO}_4^{-3}$ * | Dosage as P |
|---------|------------|--------------------------------|-------------|
| Maximum | 25 MGD     | 6.13 mg/l                      | 2.0 mg/l    |
| Average | 16 MGD     | 3.07 mg/l                      | 1.0 mg/l    |
| Minimum | 8 MGD      | 1.53 mg/l                      | 0.5 mg/l    |

\*Equivalent dosage to P dosage

### Feed Rate Calculations

Maximum feed rate (Max Flow  $\times$  Max Dosage)

$$25 \text{ MGD} \times 3782 \text{ g/gal H}_2\text{O} \times 2.0 \text{ ppm} / 1,408 \text{ g/gal} = 134.30 \text{ gpd Phosphoric Acid}$$

Average feed rate (Avg Flow  $\times$  Avg Dosage)

$$16 \text{ MGD} \times 3782 \text{ g/gal H}_2\text{O} \times (1.0 \text{ ppm} - 0.39 \text{ ppm}) / 1,408 \text{ g/gal} = 26.21 \text{ gpd Phosphoric Acid}$$

Minimum feed rate (Min Flow  $\times$  Min Dosage)

$$8 \text{ MGD} \times 3782 \text{ g/gal H}_2\text{O} \times (1.0 \text{ ppm} - 0.39 \text{ ppm}) / 1,408 \text{ g/gal} = 13.10 \text{ gpd Phosphoric Acid}$$

### Storage Requirements

30 days supply at average flow and dosage =  $26.21 \text{ gpd} \times 30 \text{ days} = 786 \text{ gal.}$

Assuming the use of 275 gal semi-bulk totes, 3 totes required (recommend 2 in service, 1 spare)

**Rennaker, Joanne (DEQ)**

---

**From:** Sygo, Jim (DEQ)  
**Sent:** Friday, October 23, 2015 5:17 PM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** FW: Flint WTP PH2 SEG4 - Corrosion Control

This is Bob Kaplan's latest note. Let me know if you have any concerns with the highlighted additions.

---

**From:** Kaplan, Robert [mailto:kaplan.robert@epa.gov]  
**Sent:** Friday, October 23, 2015 4:23 PM  
**To:** Sygo, Jim (DEQ)  
**Subject:** RE: Flint WTP PH2 SEG4 - Corrosion Control

Jim –

We are very close. I checked with the Task Force on the plan you sent to us incorporating EPA's comments. See annotations below. There are several changes (in red italics) that EPA feels need to be incorporated into the text to reflect our earlier comments (from Mike and Darren) and the subsequent call. Additionally, there is a recommendation at the end that was discussed but not incorporated into the writeup you sent which we also feel should be incorporated.

Please feel free to get back with me if you have any questions. We appreciate the opportunity to provide input and your willingness to address our comments.

- Bob

This will summarize our phone conversation of 10/19 and provide clarification regarding the previous comments.

The City of Flint converted back to purchasing of Detroit Water and Sewerage Department water on Friday October 16, 2015. No indications of upset in the distribution system have been reported to date.

Detroit Water and Sewerage Department (DWSD) has confirmed the use of Innophos "Phosphoric Acid 75% Technical" product which is NSF Standard 60 certified with a maximum allowable feed rate of 13 mg/L as product.

The City of Flint will need to supply a similar phosphoric acid product, NSF Standard 60 approved with allowable maximum dosage.

DWSD supplied water is currently dosed at 0.39 mg/L as P (1.2 mg/L as PO<sub>4</sub>) slightly above DWSD's OCCT requirement to dose a minimum of 0.9 mg/L as PO<sub>4</sub> and have a minimum plant tap residual of 0.8 mg/L as PO<sub>4</sub>. DWSD plant tap residuals have been shown to consistently be at 0.39 mg/L as P (1.2 mg/L as PO<sub>4</sub>). In addition water supply entering Flint has been tested and so far shown to contain approximately 0.39 mg/L as P (1.2 mg/L as PO<sub>4</sub>) as well. *Flint will need to test to ensure that pH is not significantly affected at the PO<sub>4</sub> target dosage.*

To achieve pipe passivation Flint will boost orthophosphate dosage to establish a minimum distribution residual of 1.0 mg/L as P (3.1 mg/L as PO<sub>4</sub>). The chemical feed system will be sized to achieve a dose up to 2.0 mg/L as P (6.1 mg/L as PO<sub>4</sub>) in case orthophosphate loss is observed.

Flint will continue Water Quality Parameter Monitoring in accordance with the LCR at the same 25 distribution locations used under the Flint River. In addition 10 of these locations also serve as total coliform monitoring sites, including

disinfectant residual, and Flint will be told to, for the purpose of assessing water stability, conduct water quality parameter monitoring for pH, alkalinity, orthophosphate, along with turbidity and iron sampling will be at these 10 locations on a weekly basis as suggested. This will also ensure that a minimum recommended pH levels are being maintained throughout the system.

EPA ORD staff will provide instructions to the City of Flint for creating test loops to help confirm effectiveness of the corrosion control treatment. This data will help in rebuilding public trust.

The County Health Department and MI Department of Health and Human Services will be conducting blood lead level testing of children in Flint. Children with elevated blood lead levels will be offered exposure assessments of their homes. These assessments should include the contribution of lead from service line and interior plumbing sources. Such diagnostic testing should help further substantiate the effectiveness of corrosion control treatment. Procedures recommended by EPA should be shared with the Michigan Department of Health and Human Services.

The University of Michigan in Ann Arbor had previously expressed interest in assisting the City of Flint. Both the Department of Civil and Environmental Engineering, and School of Public Health should be contacted to determine if that interest still exists with potential to assist in both test loop construction and monitoring, and exposure assessment monitoring in homes. Any water analysis should occur at a certified laboratory.

The City will be required to complete a 6 month round of lead and copper compliance monitoring in the January – June 2016 period. The City continues to offer all residents a first draw lead sample collection and analysis. Any additional staggered monitoring suggestions should be brought before the City's Technical Advisory Committee.

Criteria for deeming the treatment optimized must be established as the LCR only requires compliance with the lead and copper Action Levels once this determination has been made.

The City of Flint is continuing to digitize service line index card records into a Geographic Information System to confirm the location of lead service lines. EPA can provide additional information to the City regarding a sampling procedure to verify lead service line sites.

The City's engineering consultant will need to evaluate KWA water in conjunction with the City of Flint treatment plant processes to determine any necessary adjustments in optimized corrosion control treatment prior to initiating service to customers. Full scale testing may not be feasible.

*Lastly, we discussed additional lead drinking water monitoring Flint should do to better assess lead exposure, determine effectiveness of water source change and corrosion control, and identify lead sources. That discussion does not appear to be captured here.*

Robert Kaplan  
Deputy Regional Administrator  
U.S. EPA Region 5  
Phone: (312) 886-1499  
Cell: (312) 515-9827  
Fax: (312) 692-2075

**From:** Sygo, Jim (DEQ) [<mailto:SygoJ@michigan.gov>]

**Sent:** Friday, October 23, 2015 11:39 AM

**To:** Kaplan, Robert <[kaplan.robert@epa.gov](mailto:kaplan.robert@epa.gov)>

**Subject:** RE: Flint WTP PH2 SEG4 - Corrosion Control

Sounds Good.

Met with the Mayor today and he seems to be under the impression that the City Administrator is on this task force as well. I told him I would check but this was intended to make sure that the state and EPA are taking consistent technical positions. Let me know if I'm wrong about that.

---

**From:** Kaplan, Robert [<mailto:kaplan.robert@epa.gov>]  
**Sent:** Friday, October 23, 2015 10:37 AM  
**To:** Sygo, Jim (DEQ)  
**Subject:** RE: Flint WTP PH2 SEG4 - Corrosion Control

Jim,

Thanks for the note. There does appear to be agreement. I will confirm that with the Task Force team members today just to make certain we haven't missed anything.

This is good news. I'm glad we're moving quickly, and working together. The Task Force will discuss the "test loops" and make sure we have agreement on the protocol.

I'm setting up a call for next week to discuss this weekend's school sampling effort.

- Bob

Robert Kaplan  
 Deputy Regional Administrator  
 U.S. EPA Region 5  
 Phone: (312) 886-1499  
 Cell: (312) 515-9827  
 Fax: (312) 692-2075

---

**From:** Sygo, Jim (DEQ) [<mailto:SygoJ@michigan.gov>]  
**Sent:** Thursday, October 22, 2015 4:39 PM  
**To:** Kaplan, Robert <[kaplan.robert@epa.gov](mailto:kaplan.robert@epa.gov)>  
**Subject:** FW: Flint WTP PH2 SEG4 - Corrosion Control

Bob,

There appears to be agreement on the optimization of corrosion control for the City of Flint. This is the note provided to me by staff after a discussion with members of your task force.

---

**From:** Busch, Stephen (DEQ)  
**Sent:** Thursday, October 22, 2015 12:58 PM  
**To:** Schock, Michael; Lytle, Darren  
**Cc:** Kempic, Jeffrey; Prysby, Mike (DEQ); [kaplan.robert@epa.gov](mailto:kaplan.robert@epa.gov); Krisztian, George (DEQ); Sygo, Jim (DEQ)  
**Subject:** RE: Flint WTP PH2 SEG4 - Corrosion Control

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Stephen Busch, P.E.  
MDEQ Lansing District Coordinator  
Office of Drinking Water and Municipal Assistance  
Lansing and Jackson District Supervisor  
517-643-2314  
[buschs@michigan.gov](mailto:buschs@michigan.gov)

---

**From:** Lytle, Darren [<mailto:Lytle.Darren@epa.gov>]  
**Sent:** Monday, October 19, 2015 12:05 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Schock, Michael; Kempic, Jeffrey; Busch, Stephen (DEQ)  
**Subject:** RE: Flint WTP PH2 SEG4 - Corrosion Control

Mike,

Thank-you for giving us the opportunity to review the city of Flint's corrosion control plan.

We believe it is necessary that Flint boosts orthophosphate dosage. Given that the distribution system has not received orthophosphate in over a year, we expect that orthophosphate will need to be boosted to 1) meet the demand of the distribution system, 2) reach the service lines and other lead-containing components in premise plumbing, and 3) accelerate lead reduction at the consumer's taps. Orthophosphate should preferably be added in the same form as the Detroit source which is phosphoric acid from our understanding. This is the proposed case here, however, a simple test should be performed to make sure that the pH is not impacted in a significant way at the desired target dose.

We have not been able to obtain comprehensive water quality data for the finished water characteristics of the Detroit water that will be fed to Flint, to assess ranges of major chemical characteristic fluctuations. However, based upon the email trail, Detroit water entering the Flint system appears to only contain around 0.4 PO<sub>4</sub>/L. This concentration range is entirely too low compared to that needed in studies presented and published in the last 20+ years that have focused on lead released directly from lead pipes, and the solubility of the most likely lead orthophosphate pipes scales. We also strongly feel that targeted dose of 0.8 mg PO<sub>4</sub>/L is also too low, for the very same reason. We would be glad to share with you numerous standard corrosion control and treatment reference works, best practices guides and published results from US and international lead corrosion control field and pilot studies. Secondly, the basis for that target (other communities using Lake Huron source use the same dose) is not scientifically derived nor does it consider water quality and the current state of Flint's distribution system. We have reviewed the original Detroit corrosion study and have seen some of the LCR monitoring data, and besides the fact that it did not directly pertain to this water source, few dosages were tested in the cited 1994 pipe loop study, and the higher dosage than the one implemented in the field currently was more effective. Based on the limited amount of data on the quality of Detroit water, what we know about the history of Detroit corrosion control, we think an orthophosphate residual of 3 to 4 mg PO<sub>4</sub>/L should be the minimum starting test target residual for pipe passivation. It is likely that, at least initially a higher dosage will be necessary to reach the far ends of the distribution system and sufficiently reduce lead solubility and release from all lead sources. To allow flexibility, we feel the design of the chemical feed and storage systems should be able to consistently deliver a maximum dose of 5 to 6 mg PO<sub>4</sub>/L, if substantial orthophosphate loss is observed, if the starting dose is set for the desired residual level of 3 to 4 mg/L as PO<sub>4</sub>. We suggest that jar tests be performed in advance of orthophosphate addition to Detroit water to evaluate the impact of



orthophosphate dose on turbidity that could result from interactions between orthophosphate and background Detroit water quality parameters (e.g., aluminum, calcium, etc.).

We want to stress that immediately shifting to Detroit water and adding orthophosphate will not necessarily translate to immediate improvements. Furthermore, this is a change, albeit a return to past conditions. Nonetheless, a period of system upset should be anticipated. The need for a communication strategy and a distribution system plan are critical.

Lastly, we see no mention of a water quality monitoring program. Two programs need to be put in place immediately (before return to Detroit water) to 1) identify lead sources, 2) assess treatment effectiveness against lead release from all of the simultaneously operating mechanisms (solubility, particulate release, galvanic corrosion), and 3) assess orthophosphate levels and stability of water quality in the distribution system.

There are multiple sources of lead in the Flint distribution system to the consumers' taps, such as: pipes; leaded brass; leaded solder; accumulations on old galvanized steel pipes; possibly accumulated on copper or some plastic pipes. It is critical that the fate of orthophosphate in the distribution system is understood, and how effective it is against each type of lead source, so dosing adjustment can be properly made. For this purpose, we recommend that a number of residences throughout Flint that meet the following plumbing criteria, be identified for an assessment of the contribution lead from the different potential service line and interior plumbing sources, through detailed mapping of plumbing materials, lengths, sizes, and location and type of inline devices and faucets using profile sampling. For confidence in interpretation, probably at least 5 sites from each of the configurations will be necessary. The configurations we would estimate to be most important (but should be changed or added to if local construction practice indicates it's necessary): Lead service line, galvanized steel interior plumbing; lead service line, copper with leaded solder joints; lead service line, plastic interior plumbing. It is also possible that interior plumbing may differ from the material used for the customer-side service line segment. We would be glad to discuss the specifics of this sampling effort. For the purpose of assessing stability of water quality in the distribution system and to inform on orthophosphate residual adjustment, we suggest that 8 to 10 locations in the distribution system be selected to measure pH, alkalinity, orthophosphate, turbidity and iron on a weekly basis. These could be collected from TCR sampling locations, or other readily-accessible buildings, should be located at a distribution of locations in the distribution system and should be collected after a flush sufficiently long to assure that "fresh" distribution system water is being measured. Research has shown that over time, orthophosphate can reduce disinfectant demand associated with corroding metallic distribution system materials. These measurements need to be performed in the field and can simply be done with a portable HACH test kit or spectrophotometer.

A lead sampling plan needs to be in place to assess the effectiveness of water change and treatment boost. LCR monitoring sites with confirmed lead service lines can be in the sampling pool. Sampling should consist of a 1 liter first draw sample (LCR sample without 5 minute pre-flush), followed by an additional flushed sample or two depending on profile sample results which is intended to capture major lead source(s). The specific details of this effort need to be worked out by the technical committee as soon as possible. We would gladly work with Flint on establishing a water sampling program to identify and verify lead service line sites. The plan and initial sampling effort should be performed before the switch so that one baseline sample set is collected.

Lastly, our strength does not fall under full-scale pump and chemical feed delivery systems. We would only say that the systems need to be scaled-up in size to accommodate our suggested dosing needs. Also, there is some discussion about diverting water to the Dort reservoir and an associated orthophosphate feed system. We are not familiar with the reservoir but are wondering if it is an open reservoir?

Of course this is a lot of information to share and we would gladly be available to discuss the technical and scientific basis for our suggestions.

Let us know if you have any questions and thanks again,

Darren and Mike

Darren A. Lytle, Ph.D., P.E.  
Branch Chief (Acting)  
U.S. Environmental Protection Agency  
26 West Martin Luther King Dr.  
Cincinnati, Ohio 45268  
Phone: (513) 569-7432  
Fax: (513) 487-2543  
email: [lytle.darren@epa.gov](mailto:lytle.darren@epa.gov)

---

**From:** Prysby, Mike (DEQ) [<mailto:PRYSBYM@michigan.gov>]  
**Sent:** Friday, October 16, 2015 1:32 PM  
**To:** Lytle, Darren <[Lytle.Darren@epa.gov](mailto:Lytle.Darren@epa.gov)>; Schock, Michael <[Schock.Michael@epa.gov](mailto:Schock.Michael@epa.gov)>  
**Cc:** Busch, Stephen (DEQ) <[BUSCHS@michigan.gov](mailto:BUSCHS@michigan.gov)>  
**Subject:** FW: Flint WTP PH2 SEG4 - Corrosion Control

Darren, Michael

We have received Flint's corrosion control proposal from their consultant. If you have comments, please provide them to me by Monday morning.

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

---

**From:** Matta, Samir [<mailto:SFMatta@lan-inc.com>]  
**Sent:** Friday, October 16, 2015 12:02 AM  
**To:** Prysby, Mike (DEQ)  
**Subject:** Flint WTP PH2 SEG4 - Corrosion Control

Hi Mike,

Please see attached plans for the Corrosion Control Plan for the City of Flint. I will have the official submittal package to you tomorrow afternoon after I get Brent or Mike's signature on the permit application. I will call you when I get back in Lansing to drop the package. Is three sets of full size plans adequate? Would you like some half size plans? Let me know.

#### **Basis of Design**

Given that Flint will require lead and copper corrosion control and given that Detroit utilizes orthophosphate for their corrosion control methodology, and that Flint will be receiving Detroit water for the immediate future, orthophosphate is the appropriate corrosion control methodology for Flint. A

dosage of 0.8 mg/l as PO<sub>4</sub> has been recommended for the Detroit water. Numerous utilities utilizing Lake Michigan water have a target dosage of 0.9 mg/l as PO<sub>4</sub>. Therefore, a target dosage in the range of 0.8 to 0.9 mg/l appears appropriate.

It is expected that, at least initially, there will be a significant PO<sub>4</sub> demand in the system. This will require a significantly higher dosage until this demand is satisfied and the target residual can be maintained. We are therefore designing for capability of a maximum dosage of 1.5 mg/l. The arriving Detroit water will likely have some residual PO<sub>4</sub> when it arrives at Flint. It has been reported that this residual will be approximately 0.4 mg/l. The system must therefore be capable of a minimum dosage of 0.4 mg/l.

Based upon the usage of 75% Phosphoric Acid and a flow range of 4 MGD to 25 MGD, with an average day of 16 MGD, the expected feed rate will be 1.35 to 32 gpd. Average Phosphoric Acid feed is expected to be 10.8 gpd, requiring 30 days storage of 325 gal.

Orthophosphate will need to be applied at two locations. Detroit water will enter the Flint system at Control Station CS2, and supplementary phosphate will be applied there. However, on occasion some incoming water may need to be diverted to the Dort Reservoir, bypassing CS2. This water would then be introduced to the system through High Service Pump Station PS4 and phosphate would be introduced at this location.

Please let me know if the information is adequate or you require additional information.

Thanks.

**Samir F. Matta, PE**

Team Leader



**Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

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**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Friday, October 16, 2015 1:32 PM  
**To:** lytle.darren@epa.gov; schock.michael@epa.gov  
**Cc:** Busch, Stephen (DEQ)  
**Subject:** FW: Flint WTP PH2 SEG4 - Corrosion Control  
**Attachments:** Flint WTP PH2 S4 - Corrosion Control.pdf

Darren, Michael

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Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
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It is expected that, at least initially, there will be a significant PO<sub>4</sub> demand in the system. This will require a significantly higher dosage until this demand is satisfied and the target residual can be maintained. We are therefore designing for capability of a maximum dosage of 1.5 mg/l.

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Thanks.

**Samir F. Matta, PE**  
Team Leader



**Lockwood, Andrews  
& Newnam, Inc.**

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Vicinity Map

PROJECT LOCATION

### Vicinity Map



**Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

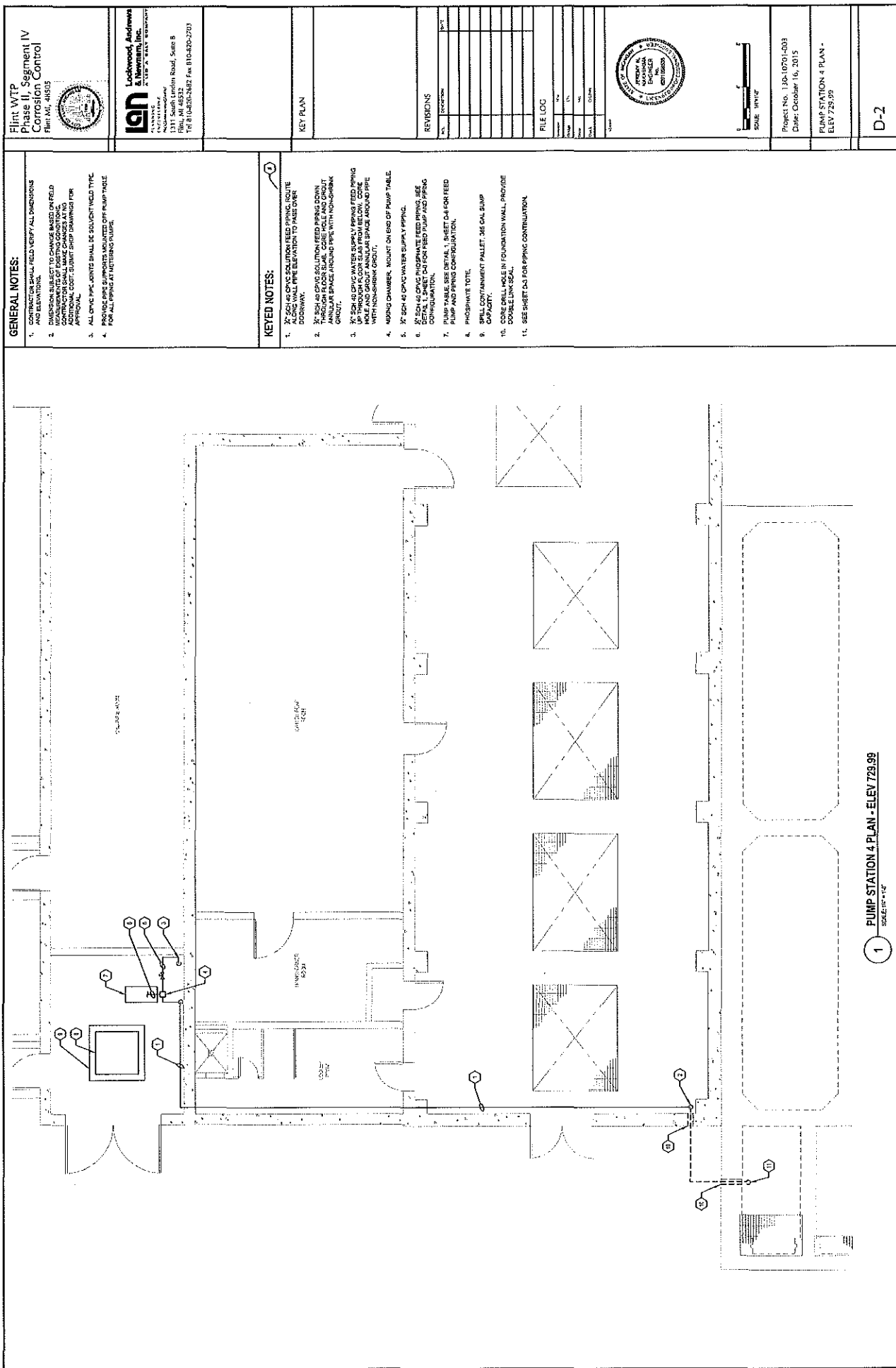
1311 South Linden Road, Suite B  
Flint, MI 48532  
Tel 810-820-2682 Fax 810-820-2703



[illegible]







**GENERAL NOTES:**

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS.
2. DIMENSIONS SUBJECT TO CHANGE BASED ON FIELD MEASUREMENTS OF EXISTING CONDITIONS. CONTRACTOR SHALL MAKE CHANGES AT NO ADDITIONAL COST. SUBMIT SHOP DRAWINGS FOR APPROVAL.
3. ALL CRVIC PIPE JOINTS SHALL BE SOLVENT WELD TYPE.
4. PROVIDE EPS SUPPORTS MOUNTED ON PUMP TABLE FOR ALL CRVIC MATERIALS PUMPS.

**KEYED NOTES:**

1. 2" X 4" OR 6" PVC SOLUTION FEED PIPING, ROUTE ALONG WALL OR CEILING TO PASS OVER DOWNWALL.
2. 2" X 4" OR 6" PVC SOLUTION FEED PIPING DOWN WALL, END OF FEED PIPING TO BE AN ULTIMATE PACE-AROUND PIPE WITH NO-BOUNCE GROUT.
3. 2" X 4" OR 6" PVC WATER SUPPLY FEED PIPING TO BE INSTALLED 18" TO 24" FROM WALL, END OF FEED PIPING TO BE AN ULTIMATE PACE-AROUND PIPE WITH NO-BOUNCE GROUT.
4. MIXING CHAMBER, MOUNT ON END OF PUMP TANK.
5. 1/2" X 4" OR 6" PVC WATER SUPPLY PIPING.
6. 2" X 4" OR 6" PVC PHOSPHATE FEED PIPING, USE 1/2" X 4" OR 6" PVC PHOSPHATE FEED PIPING FOR PUMP CONFIGURATION.
7. PUMP TANK, SEE DETAIL 1, SHEET C-4 FOR FEED PUMP TANK PIPING CONFIGURATION.
8. PHOSPHATE TOTE.
9. 30" X 12" CONTAINER PALLET, 30" GAL. LUMP OR DRUM WALL.
10. CORE WALL, IN FOUNDATION WALL, PROVIDE DOUBLE LUMP SEAL.
11. SEE SHEET C-5 FOR PIPING CONTINUATION.

### KEY PLAN

## REVISIONS

[illegible]

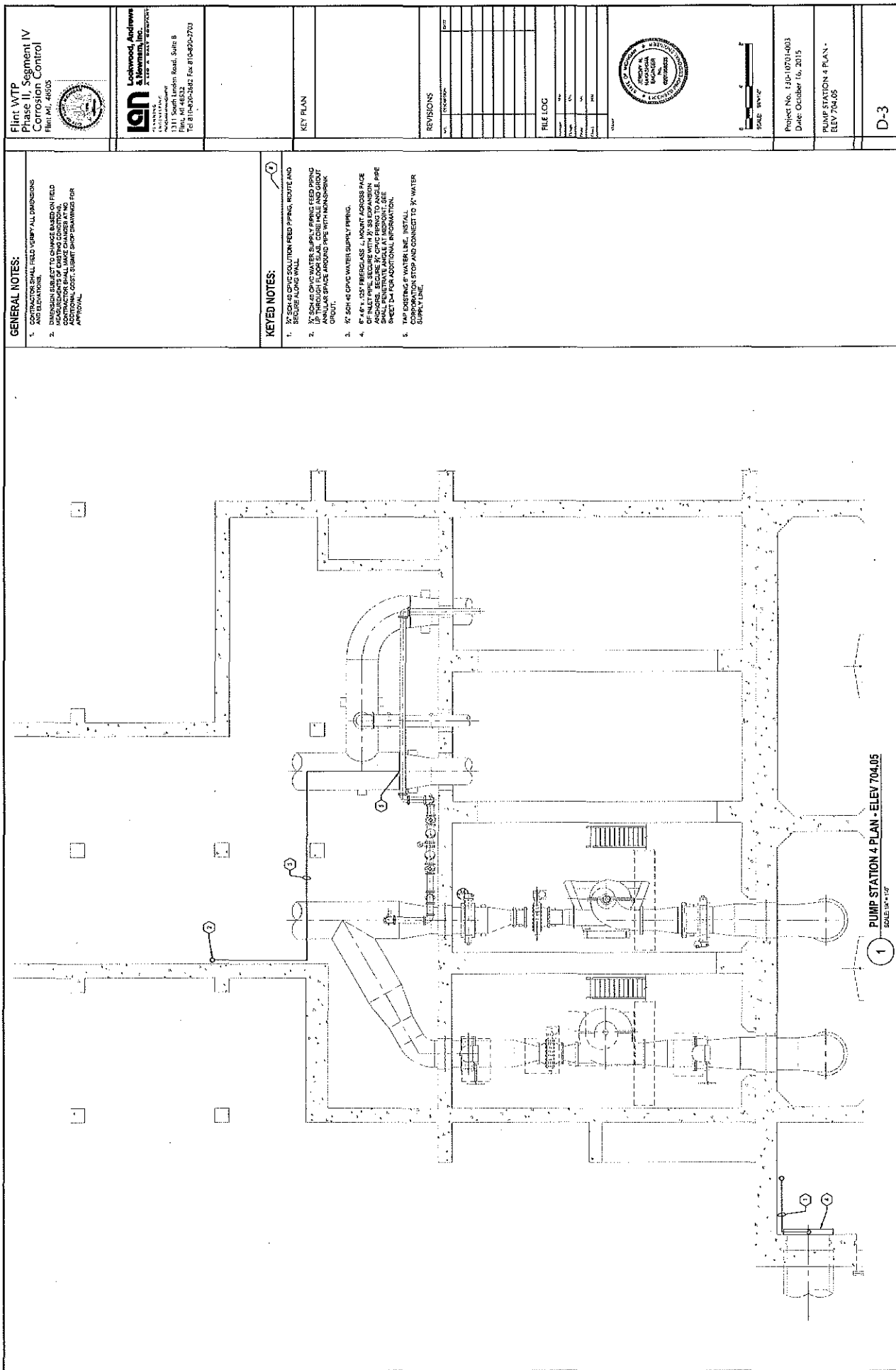
## 2013/5/15

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Project No. 13Q-10701-003  
 Date: October 16, 2015

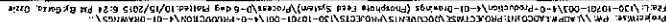
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ELEV 729.99

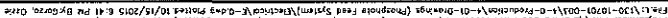
D-2









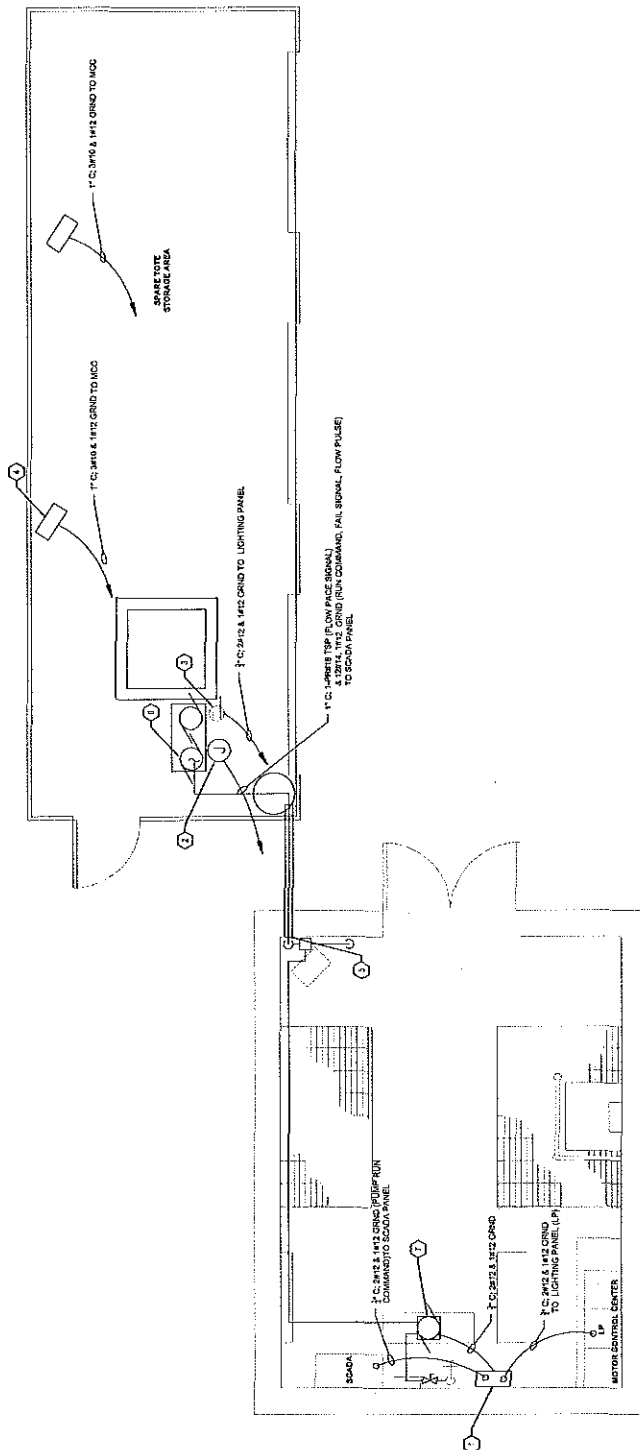


**KEYED NOTES:**

- [illegible]

**GENERAL NOTES:**

1. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH NEC 201.4 AND LOCAL CODES.
2. ALL CONDUIT SHALL BE GALVANIZED RIGID CONDUIT.
3. ALL WIRING SHALL BE TYPE THHN, OR EQUIV.
4. ALL ELECTRICAL BOXES SHALL BE 304 STAINLESS STEEL, NEMA 4X.



## CONTROL STATION ELECTRICAL PLAN

| 1 | CONTROL |
|---|---------|
| 1 | 1       |

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Project No. 130-10701-003  
Date: October 16, 2015

CONTROL STATION 2 -  
ELECTRICAL PLAN

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**Rennaker, Joanne (DEQ)**

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**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, August 22, 2013 2:24 PM  
**To:** Busch, Stephen (DEQ); Cook, Pat (DEQ); Bloemker, Jon (DEQ)  
**Subject:** FW: Flint WTP  
**Attachments:** WTP upgrade MDEQ summary.pdf; Flint WTP Figure 1.pdf

I am forwarding each of you a copy of Flint WTP summary that will be discussed during our meeting next Tues. I will also be reviewing the summary. It may be worthwhile, if necessary, to discuss any concerns and/or questions regarding the upgrades prior to the meeting. I will be in the field tomorrow and in the office on Monday.

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

---

**From:** Jim Redding [<mailto:JRedding@rowepsc.com>]  
**Sent:** Thursday, August 22, 2013 2:00 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Green, Warren  
**Subject:** Flint WTP

Mike,  
Attached are copies of a summary of the upgrades we are thinking are needed at the Flint WTP. Let me know if there are questions or if you'd like additional information in advance of the meeting next week.

Jim Redding  
Rowe Professional Services Company  
810-869-5166  
[jredding@rowepsc.com](mailto:jredding@rowepsc.com)

## Proposed Scope of Upgrades to Flint WTP

### 1. Introduction

The City of Flint plans to utilize their existing WTP to provide water on a continuous basis. The city plans to treat water from the Flint River until construction of the proposed KWA supply is complete and the WTP can then be used to treat water from Lake Huron. An evaluation of the WTP to provide treatment of water from both sources is in process to define the scope of upgrades needed to provide reliable service. In addition to the different treatment requirements of each source, the WTP has not been operated on a continuous basis for 40+ years so facilities are also being evaluated to identify equipment which should be replaced because of its age, condition, or obsolescence.

### 2. Preliminary Scope of Work

Based on the WTP evaluation, the following scope of proposed upgrades has been developed. This summary is preliminary, provided for review and comment by interested parties. Comments received will be used to finalize the scope of work to be implemented at the Flint WTP.

The proposed upgrades have been categorized into two phases. Phase 1 is work that will be completed as soon as practical so that the WTP can be utilized to treat water from the river in 2014. Phase 2 work is needed to provide long-term service with the proposed KWA Lake Huron water source. Phase 2 work will be completed in 2015 to 2016.

Work is proposed to be contracted except where noted "by city" the work is planned to be completed by City staff.

#### Item 1 – Chemical Systems / Ozone

Additional storage of nitrogen and oxygen will be provided for redundancy and 30 day capacity.

Existing ozone units will be serviced to prepare for continuous operation.

New alternative coagulant chemical feed system will be added for treatment of raw water from Lake Huron.

| Phase 1                                 | Phase 2                   |
|-----------------------------------------|---------------------------|
| Oxygen and nitrogen storage             | New coagulant feed system |
| Service existing ozone system (by city) |                           |

Item 2 – Electrical

The WTP presently uses 2400V as primary power. Power feeders and switchgear are rated at 5kV. Upgrading the primary power to 4160V will enable existing power feeders to provide twice the power and eliminate the need to install new feeder circuits throughout the WTP.

The current substation has two 2.5 MVA transformers running in parallel for a total capacity of 5 MVA. The transformers are obsolete. It is planned that the transformers and conductors to the WTP will be replaced to provide two independent power sources for redundancy. The existing on-site backup power generators are obsolete and inoperable. Since two independent power sources will be provided to the WTP, replacement of the generators is not proposed.

Electrical switch gear and equipment at Pump Station 4 will be replaced.

If filter presses (or other equipment) are utilized for dewatering of softening sludge, a new power feed will be required to the equipment.

Electrical switch gear and equipment at Plant 2 will be replaced.

| Phase 1                                      | Phase 2                         |
|----------------------------------------------|---------------------------------|
| Upgrade existing substation and power supply | Upgrade power system at Plant 2 |
| Upgrade facilities at Pump Station 4         |                                 |
| Power to filter presses? TBD                 |                                 |

Item 3 – Mid-Point Chlorination

Mid-point chlorination facilities are proposed, including the following principal components:

- Feeders, scales, monitors
- Piping, valves, and controls
- Scrubber
- Ton Containers
- 

| Phase 1                | Phase 2 |
|------------------------|---------|
| Mid-point chlorination |         |

Item 4 – Security Measures

Add three additional security cameras to monitor the following areas:

- Chlorine storage area
- Oxygen and Nitrogen storage area
- East side of WTP property

| Phase 1                               | Phase 2 |
|---------------------------------------|---------|
| Additional security cameras (by City) |         |

Item 5 – Low and High Service Pump Station No. 4

As a result of decreased demands, pumps at Pump Station No. 4 are “over-sized” and do not efficiently operate. Some of the pumps experience vibrations in the shafts and steady bearings. The existing pump station will be rehabilitated to replace “over-sized” pumps and obsolete equipment and provide needed maintenance. Proposed work includes:

- 25 mgd Low Service Pump No. 4 – upgrade motor to inverter duty, rehabilitate pump and piping, install new valve, and install new VFD
- 15 mdg Low Service Pump No. 6 – rehabilitate pump shaft and bearings
- Install two new High Service Pumps (15 mgd @190 feet TH, vertically mounted pumps with 800 HP 2400/4160 V inverter duty motors, with 20 feet of shaft and steady bearings)
- Replacement of existing piping, valves, supports, and bearings
- New intermediate platforms, ladders, & stairs
- New ventilation (for exhausting heat from VFD's)
- Install two medium voltage VFD units
- Demolition of existing equipment to accommodate new equipment

Rehabilitation of Pump Station No. 4 is planned to be completed in two phases. A new high service pump and a new low lift pump will be installed initially to provide efficient service during the period when water from the Flint River is treated. Additional high service and low lift pumps will be installed later to provide long-term reliable, efficient service.

| Phase 1                                          | Phase 2                                                                   |
|--------------------------------------------------|---------------------------------------------------------------------------|
| Rehabilitate Pump 6 shaft and bearings (by City) | Rehabilitate 25 mgd Low Service Pump No. 4, new motor, new valve, new VFD |
| New High Service Pump No. 1                      | New High Service Pump No. 2                                               |
| Install VFD for Pump No. 1                       | Install VFD for Pump No. 2                                                |
| Provide ventilation for Pump No. 1               | Provide ventilation for Pump No. 2                                        |
| Demolition of existing equipment                 | Demolition of existing equipment                                          |

Item 6 – Filter Transfer Station

Recent changes in regulations, enhanced CT is required. Additional CT can be provided by including the volume of the Dort Reservoir in the process train. However, because of its elevation with respect to other treatment processes, pumping will be required to utilize the reservoir. The proposed pumping facility will provide for the following:

- Three 12 mgd @ 40 ft TH vertical turbine pumps with 150 HP, 480 V inverter duty motors are planned.
- Valves and Controls
- Ventilation and boiler system
- Three low voltage VFD's
- Power feeders
- MEP
- Piping connections
- 200 feet of 30" water main
- 600 feet of 36" water main
- Site work, paving, & utilities

| Phase 1                      | Phase 2 |
|------------------------------|---------|
| Filter Transfer Pump Station |         |

Item 7 – SCADA

As new pumps, chemical systems, and controls are installed; instrumentation and monitoring should be provided. It is proposed that the SCADA network is upgraded to current technology and software and training provided in the initial phase.

| Phase 1                  | Phase 2                  |
|--------------------------|--------------------------|
| SCADA Network Upgrade    | SCADA Hardware (Phase 2) |
| Software and Training    |                          |
| SCADA Hardware (Phase 1) |                          |

### Item 8 – Raw Water Piping Connection

The proposed KWA raw water pipeline will connect to the existing 72" PCCP finished water supply line near Center and Pierson Roads. (East of this connection, the 72" PCCP will be utilized by GCDC-WWS for distribution of finished water in the GCDC-WWS service area.) Raw water from Lake Huron will be conveyed to the WTP site via the 72" PCCP pipeline. On the WTP site, the 72" pipeline will be tapped for a 42" pipe and for a 36" pipe to convey raw water for treatment. The following work is proposed:

- Piping connections
- 900 feet of 42" water main
- 100 feet of 36" water main
- Roadway and site restoration
- Storm sewer relocation
- Control valve rehabilitation and replacement

| Phase 1 | Phase 2                      |
|---------|------------------------------|
|         | Raw water piping connections |

### **3. Other Items to Address to Finalize Scope of Work**

In addition to the upgrades proposed above, the following issues/questions need to be addressed before finalizing the scope of proposed upgrades to the WTP:

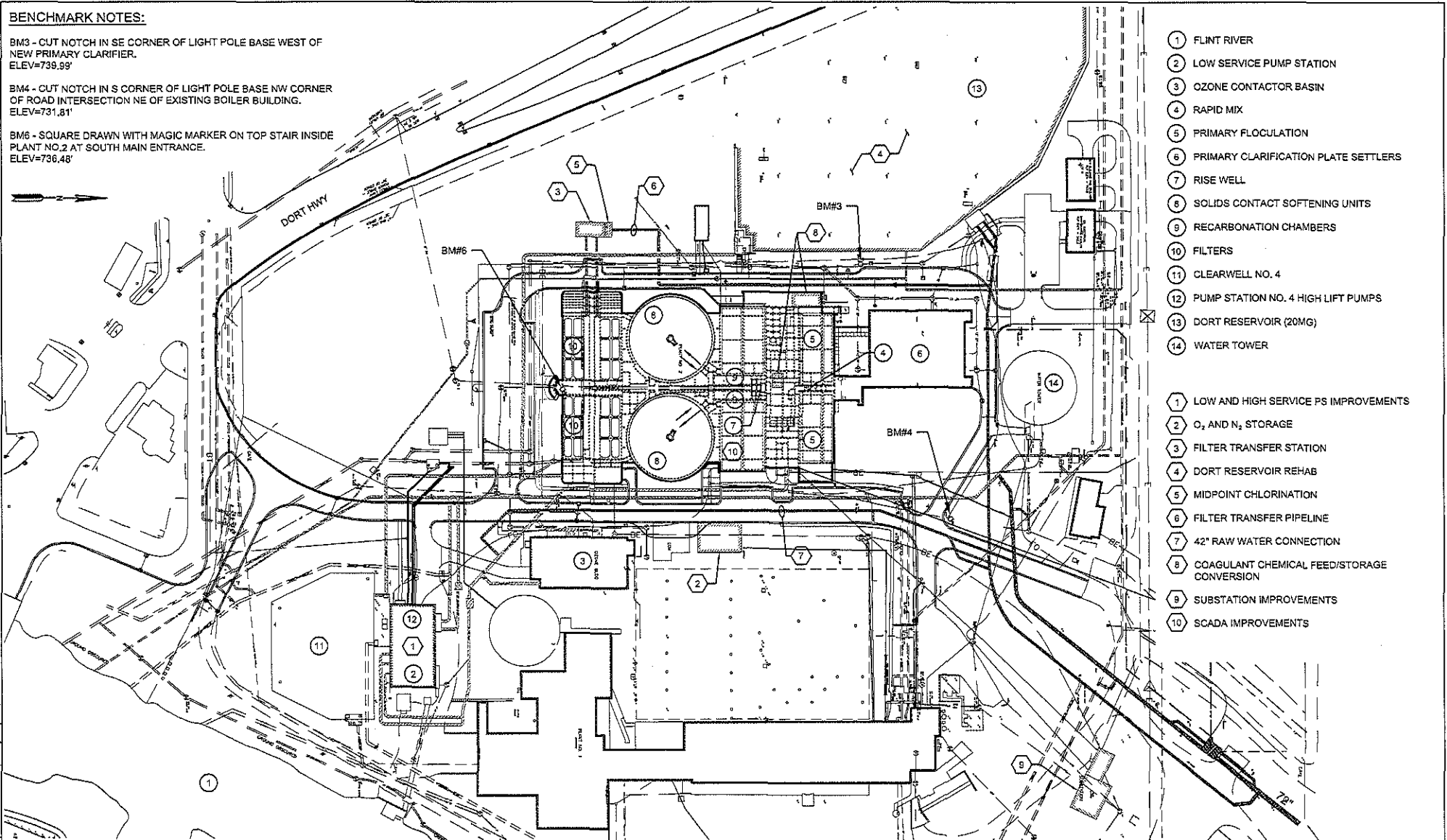
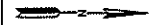
- a) Options for handling / disposal of lime sludge from softening operations (during period Flint River is water source)
- b) Requirements for CT and enhanced treatment
- c) Impacts of using river as continuous supply (quantity, quality monitoring & control, reservoir operating levels)
- d) Chemical storage options

**BENCHMARK NOTES:**

BM3 - CUT NOTCH IN SE CORNER OF LIGHT POLE BASE WEST OF NEW PRIMARY CLARIFIER.  
ELEV=739.99'

BM4 - CUT NOTCH IN S CORNER OF LIGHT POLE BASE NW CORNER OF ROAD INTERSECTION NE OF EXISTING BOILER BUILDING.  
ELEV=731.81'

BM6 - SQUARE DRAWN WITH MAGIC MARKER ON TOP STAIR INSIDE PLANT NO.2 AT SOUTH MAIN ENTRANCE.  
ELEV=736.48'



- 1 FLINT RIVER
- 2 LOW SERVICE PUMP STATION
- 3 OZONE CONTACTOR BASIN
- 4 RAPID MIX
- 5 PRIMARY FLOCCULATION
- 6 PRIMARY CLARIFICATION PLATE SETTLERS
- 7 RISE WELL
- 8 SOLIDS CONTACT SOFTENING UNITS
- 9 RECARBONATION CHAMBERS
- 10 FILTERS
- 11 CLEARWELL NO. 4
- 12 PUMP STATION NO. 4 HIGH LIFT PUMPS
- 13 DORT RESERVOIR (20MG)
- 14 WATER TOWER

- 1 LOW AND HIGH SERVICE PS IMPROVEMENTS
- 2 O<sub>2</sub> AND N<sub>2</sub> STORAGE
- 3 FILTER TRANSFER STATION
- 4 DORT RESERVOIR REHAB
- 5 MIDPOINT CHLORINATION
- 6 FILTER TRANSFER PIPELINE
- 7 42" RAW WATER CONNECTION
- 8 COAGULANT CHEMICAL FEED/STORAGE CONVERSION
- 9 SUBSTATION IMPROVEMENTS
- 10 SCADA IMPROVEMENTS



Genesee County



1311 S. Linden Road, Suite B  
Tel 810-425-1652 Fax 810-425-2763  
www.lan-inc.com

**CITY OF FLINT  
WATER TREATMENT PLANT**

**REVISIONS**

| NO. | DESCRIPTION | DATE |
|-----|-------------|------|
|     |             |      |
|     |             |      |
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**FILE LOG**

| PROJECT | DATE |
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|         |      |
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**WATER TREATMENT PLANT  
PLAN VIEW**

Project No. 130-10701-001  
Date July 8, 2013

Sheet  
**FIG 1**



**Rennaker, Joanne (DEQ)**

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**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Monday, October 12, 2015 12:19 PM  
**To:** Sygo, Jim (DEQ); Wurfel, Brad (DEQ); Pallone, Maggie (DEQ)  
**Cc:** Shaler, Karen (DEQ); Feuerstein, Heather (DEQ); Devereaux, Tracy Jo (DEQ); McDonald, Paul (DEQ); Benzie, Richard (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Flint

FYI

---

**From:** Michael T. Gardner [<mailto:mgardner@audgen.michigan.gov>]  
**Sent:** Monday, October 12, 2015 11:07 AM  
**To:** Busch, Stephen (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Tetzlaff, Katherine (DEQ)  
**Subject:** Flint

Good morning,

My name is Mike Gardner and I'm supervising the performance audit of the Office of Drinking Water and Municipal Assistance that is currently in progress. I believe I have met you a couple times before on other audits. As part of our audit, we would like to take a closer look at Flint's drinking water situation. Liane stated that you would be the person to meet with to obtain documentation/information concerning Flint. To begin our review, we would like to obtain some background information about Flint's change from the Detroit system to drawing water from the Flint River. I'm looking for information such as: why did Flint make the change; who made the decision to make the change; who had to approve such a change; how did Flint have the capacity to make such a change; when did the change occur; what was DEQ's involvement in the change of systems; what testing is required when such a change is made .....

I would like to set up a meeting with you in the near future to discuss Flint and to obtain information concerning the questions identified above. Please suggest a time and location for such a meeting. We are currently located on the 4<sup>th</sup> floor of the south tower but I don't have a phone in my cube. I usually work 6:30 a.m. to 4 p.m. Monday thru Thursday and 6:30 to 10:30 on Fridays. My schedule is very clean this week.

Thank you for your time.

Mike

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Friday, March 22, 2013 2:29 PM  
**To:** Sygo, Jim (DEQ)  
**Cc:** Butler, Sonya (DEQ); Benzie, Richard (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: Flint

Jim – FYI.

I asked Sonya about outstanding revolving loan debt that the city of Flint might have. This may or may not be relevant depending on how Flint proceeds.

Her response follows.

---

**From:** Butler, Sonya (DEQ)  
**Sent:** Friday, March 22, 2013 2:14 PM  
**To:** Shekter Smith, Liane (DEQ)  
**Subject:** Flint

Here are the DW loans to date for Flint:

\$7,220,000 dated September 1999  
 \$9,480,000 dated September 2001  
 \$19,180,000 dated September 2003  
 \$8,035,000 dated August 2000

There are two DW future projects on the project priority list for Flint:

\$11,695,000; transmission main replacement  
 \$13,870,000; transmission main replacement & pump station upgrade

There are no SRF loans; however, Flint did receive an S2 Grant in January 2012 for \$720,000 to do project planning.

Sonya T. Butler, Chief  
 Revolving Loan Section  
 Office of Drinking Water & Municipal Assistance  
 Michigan Department of Environmental Quality  
 525 W. Allegan  
 Lansing, MI 48933  
 V: (517) 373.4737 F: (517) 335.0743

**Rennaker, Joanne (DEQ)**

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**From:** Prysby, Mike (DEQ)  
**Sent:** Wednesday, May 28, 2014 4:12 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: Flint

Steve,

Some more info for me to follow-up on regarding Flint.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

---

**From:** Crooks, Jennifer [mailto:crooks.jennifer@epa.gov]  
**Sent:** Wednesday, May 28, 2014 4:03 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Poy, Thomas  
**Subject:** Flint

Thank you again, Mike, for talking to me about the Flint water issue. I really like your idea of encouraging the City to do some customer service with the citizens that are complaining about the water. Flushing their line and/or taking a sample at the citizen's house might go a long way to calming people down.

I was also thinking about you doing a chain of custody sample at the plant. I know you trust Brent the operator; but this could be another response to customer complaints to instill trust in the water department. It wouldn't have to be compliance sampling; a special purpose sample perhaps.

Something else I thought of—Ohio is having issues of blue-green algae/cyanotoxins in some of its surface waters, which are related to taste and odor, and can cause rashes; pretty nasty stuff. Don Moore said that the Flint River does have a lot of algae growing on it. See the email below, with some websites on the issue of cyanotoxins in drinking water

The person at Ohio EPA that has dealt with blue-green algae/cyanotoxins in drinking water is Heather Raymond. She might be a good resource to discuss whether it would be worth sampling and analyzing for cyanotoxins in the Flint finished water.

FYI, Don Moore said he was organizing a protest picket line in his neighborhood at the water treatment plant.

Jennifer

---

**From:** Drake, Wendy  
**Sent:** Wednesday, May 28, 2014 2:39 PM  
**To:** Crooks, Jennifer  
**Subject:** HABs info

Hi, Jennifer.

Here are a few HABs websites. Both Ohio and Illinois have taken samples at systems and sources where problems have been reported, and I'm not sure about the other states.

**U.S. EPA cyanobacterial HABs website:** <http://www2.epa.gov/nutrient-policy-data/cyanobacterial-harmful-algal-blooms-cyanohabs>; Lesley D'Anglada from the EPA Office of Water's Office of Science and Technology also sends out HABs news updates that people can sign up for by contacting her (see forwarded e-mail below)

**Ohio EPA's HABs—information for PWSs website:** <http://epa.ohio.gov/ddagw/HAB.aspx>; Ohio EPA has a PWS HAB response strategy (<http://epa.ohio.gov/Portals/28/documents/HABs/PWSHABResponseStrategy.pdf>) in which they list Heather Raymond as the PWS HAB Coordinator—her contact information is [heather.raymond@epa.ohio.gov](mailto:heather.raymond@epa.ohio.gov) and (614) 644-2911. Ohio has experienced the most problems in our region.

**Illinois EPA's HABs and algal toxins website:** <http://epa.state.il.us/water/algal-bloom/index.html>; Illinois just launched this program last summer

**IDEM's blue-green algae website:** <http://www.in.gov/idem/algae/>

**MDH's blue-green algal blooms and microcystin website:**  
<http://www.health.state.mn.us/divs/eh/hazardous/topics/bluegreenalgae.html>

**WDNR's blue-green algae website:** <http://dnr.wi.gov/lakes/bluegreenalgae/?a=1>

Please let me know if you have any questions.

Wendy

Wendy Drake | U.S. EPA, Region 5, Water Division, Ground Water and Drinking Water Branch  
77 West Jackson Boulevard, WG-15J | Chicago, IL 60604 | 312-886-6705 | [drake.wendy@epa.gov](mailto:drake.wendy@epa.gov)

**From:** DAnglada, Lesley  
**Sent:** Tuesday, May 27, 2014 5:48 AM  
**To:** DAnglada, Lesley  
**Subject:** HABs News - May 2014

## News

### **EPA's Webinar: Prevention, Control and Mitigation of Cyanobacteria and Cyanotoxins**

EPA's Office of Science and Technology conducted a webinar on Wednesday, May 14th, on the Prevention, Control and Mitigation of cyanobacteria and cyanotoxins. The presentations are posted on the Control and Treatment tab at the CyanoHABs web page: <http://www2.epa.gov/nutrient-policy-data/cyanobacterial-harmful-algal-blooms-cyanohabs> and the audio recording is available here: <https://epa.connectsolutions.com/p17loeigbi/>

### **House Science Panel OKs Bill to Enhance Research, Control Efforts for Algae Blooms**

A House committee approved by voice vote May 21 the *Harmful Algal Bloom and Hypoxia Research and Control Amendments Act* (S. 1254) to authorize a national strategy of research, mitigation and control for algal blooms that kill fish and shellfish by depleting oxygen in marine and freshwater bodies. The bill was approved by the Senate in February. It still must make it through the House Natural Resources Committee before it can go to the full House.  
[http://news.bna.com/deln/DELNWB/split\\_display.adp?fedfid=47002944&vname=dennotallissues&jd=a0f0u7h9x7&split=0](http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=47002944&vname=dennotallissues&jd=a0f0u7h9x7&split=0)

### **Taking the fight to Lake Erie algal blooms before they reach Western New York**

Government officials and environmentalists in Buffalo aim at stopping toxic blue-green algae in Lake Erie before it reaches Western New York. They called for a two-pronged federal approach involving the U.S. Environmental Protection Agency and U.S. Department of Agriculture.

<http://www.buffalonews.com/city-region/environment/taking-the-fight-to-lake-erie-algal-blooms-before-they-reach-western-new-york-20140505>

### **Sea Otter's Scourge**

Microcystin stalks marine mammals off the coast of California and kills dogs and cats further inland.

<http://www.the-scientist.com/?articles.view/articleNo/39864/title/Sea-Otter-s-Scourge/>

### **Climate change brings mostly bad news for Ohio**

Scientists delivered a mostly negative forecast for how climate change will affect Ohioans during the next year or so, and well beyond

<http://phys.org/news/2014-05-climate-bad-news-ohio.html>

### **Blue-green algae in Kansas water**

Warnings and Advisories in place from the previous sampling season.

<http://kansasfirstnews.com/2014/05/22/blue-green-algae-in-kansas-water/>

## ***New Research***

### **Land use patterns, ecoregion, and microcystin relationships in U.S. lakes and reservoirs: A preliminary evaluation (attached)**

John R. Beaver, Erin E. Manis, Keith A. Loftin, Jennifer L. Graham, Amina I. Pollard, and Richard M. Mitchell

Harmful Algae, Volume 36, June 2014, Pages 57-62, ISSN 1568-9883

<http://www.sciencedirect.com/science/article/pii/S1568988314000444>

### **Survival, growth and toxicity of *Microcystis aeruginosa* PCC 7806 in experimental conditions mimicking some features of the human gastro-intestinal environment**

Mara Stefanelli, Susanna Vichi, Giuseppe Stipa, Enzo Funari, Emanuela Testai, Simona Scardala, Maura Manganelli,

Chemico-Biological Interactions, Volume 215, 25 May 2014, Pages 54-61, ISSN 0009-2797

<http://www.sciencedirect.com/science/article/pii/S0009279714000830>

### **Rapid quantitative analysis of microcystins in raw surface waters with MALDI MS utilizing easily synthesized internal standards**

Amber F. Roegner, Macarena Pérez Schirmer, Birgit Puschner, Beatriz Brena, Gualberto Gonzalez-Sapienza, Toxicon, Volume 78, February 2014, Pages 94-102, ISSN 0041-0101

<http://www.sciencedirect.com/science/article/pii/S0041010113004637>

### **Cyanotoxin occurrence and potentially toxin producing cyanobacteria in freshwaters of Greece: A multi-disciplinary approach**

Spyros Gkelis, Nikos Zaoutsos, Toxicon, Volume 78, February 2014, Pages 1-9, ISSN 0041-0101

<http://www.sciencedirect.com/science/article/pii/S0041010113004388>

### **Investigating the production and release of cylindrospermopsin and deoxy-cylindrospermopsin by *Cylindrospermopsis raciborskii* over a natural growth cycle**

Timothy W. Davis, Philip T. Orr, Gregory L. Boyer, Michele A. Burford, Harmful Algae, Volume 31, January 2014, Pages 18-25, ISSN 1568-9883

<http://www.sciencedirect.com/science/article/pii/S1568988313001364>

### **Status, causes and controls of cyanobacterial blooms in Lake Erie**

Morgan M. Steffen, B. Shafer Belisle, Sue B. Watson, Gregory L. Boyer, Steven W. Wilhelm, Journal of Great Lakes Research, Available online 25 January 2014, ISSN 0380-1330

<http://www.sciencedirect.com/science/article/pii/S0380133013001913>

**Cylindrospermopsis raciborskii dominates under very low and high nitrogen-to-phosphorus ratios**

Michael F. Chislock, Katherine L. Sharp, Alan E. Wilson, Water Research, Volume 49, 1 February 2014, Pages 207-214, ISSN 0043-1354, <http://www.sciencedirect.com/science/article/pii/S0043135413009330>

**Acute, chronic and reproductive toxicity of complex cyanobacterial blooms in *Daphnia magna* and the role of microcystins**

Marie Smutná, Pavel Babica, Sergio Jarque, Klára Hilscherová, Blahoslav Maršálek, Maher Haebe, Ludek Bláha, Toxicon, Volume 79, 1 March 2014, Pages 11-18, ISSN 0041-0101

<http://www.sciencedirect.com/science/article/pii/S0041010113004650>

**A nanosensor based on quantum-dot haptens for rapid, on-site immunoassay of cyanotoxin in environmental water**

Long Feng, Anna Zhu, Hongchen Wang, Hanchang Shi, Biosensors and Bioelectronics, Volume 53, 15 March 2014, Pages 1-4, ISSN 0956-5663, <http://www.sciencedirect.com/science/article/pii/S0956566313006362>

**Inductive reasoning and forecasting of population dynamics of *Cylindrospermopsis raciborskii* in three sub-tropical reservoirs by evolutionary computation**

Friedrich Recknagel, Philip T. Orr, Hongqing Cao, Harmful Algae, Volume 31, January 2014, Pages 26-34, ISSN 1568-9883,

<http://www.sciencedirect.com/science/article/pii/S1568988313001339>

*For more information please visit the Cyanobacterial HABs website at <http://www2.epa.gov/nutrient-policy-data/cyanobacterial-harmful-algal-blooms-cyanohabs>*

*Lesley V. D'Anglada, Dr.PH, MEH*

*U.S. Environmental Protection Agency*

*Office of Science and Technology, Office of Water*

*1200 Pennsylvania Ave., N.W. (MC 4304T)*

*Washington, DC 20460*

*Phone: 202-566-1125*

*Fax: 202-566-1140*

**Rennaker, Joanne (DEQ)**

---

**From:** Wyant, Dan (DEQ)  
**Sent:** Tuesday, September 29, 2015 11:47 AM  
**To:** Busch, Stephen (DEQ); Sygo, Jim (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Pallone, Maggie (DEQ); Shaler, Karen (DEQ); Devereaux, Tracy Jo (DEQ); Thelen, Mary Beth (DEQ)  
**Subject:** FW: Flint  
**Importance:** High

Jim and Steve,  
 Director wants you to handle this call with Tom Burke on lead this afternoon at 1:45. You can do it in Jim Sygo's office.  
 Tom's number is 202-564-6620.  
 Thank you.

MBT

-----Original Message-----

**From:** Hedman, Susan [<mailto:hedman.susan@epa.gov>]  
**Sent:** Tuesday, September 29, 2015 9:56 AM  
**To:** Wyant, Dan (DEQ)  
**Cc:** Burke, Thomas  
**Subject:** Flint

Hi Dan --

It strikes me that one of the most important questions that EPA will be asked at the press conference later this week and in the months to come relates to EPA's assessment of the protocols that MDEQ and MDHHS are using to gather and analyze data collected as part of your "10 Point Plan." For that reason, I think that it would be useful to have some conversations now -- before sampling begins -- and I am cc-ing Tom Burke (who heads up EPA's Office of Research and Development) in the hope that we can get that conversation started today.

Please let me know when you plan to talk and I will join you if I can -- which may be difficult because I am traveling to Oklahoma City for an oil and gas task force meeting (where I will be seeing folks from DEQ's OOGM.) It's not essential for me to be part of this conversation -- but I think it is essential for you to start talking with Tom right away.

Thanks,

Susan

Sent from my iPhone

**Rennaker, Joanne (DEQ)**

---

**From:** Shaler, Karen (DEQ)  
**Sent:** Tuesday, September 29, 2015 6:29 PM  
**To:** DEQFOIA; Vorce, Susan (DEQ); Busch, Stephen (DEQ); Rennaker, Joanne (DEQ)  
**Cc:** DEQ-RMD-FOIA; Devereaux, Tracy Jo (DEQ); Thelen, Mary Beth (DEQ); Feuerstein, Heather (DEQ)  
**Subject:** FW: FOIA request from Phelps - 6422-15  
**Attachments:** 6422.pdf; RE: Check; 6422 - EXEC, ODWMA, WRD + Lansing - due: 9/15/15

FYI, Maggie Pallone previously told me that she spoke with Rep. Phelps about his attached FOIA request. He told her that he would get back with her about whether or not he wanted to cancel his request. Maggie has since contacted his office 3 additional times to follow up, but no one has contacted her. That being said, late this afternoon, Maggie said to go ahead and treat his request as a FOIA after all.

In addition, today Sylvia Renteria sent his \$50 FOIA good faith deposit check to the Cashier's Office to be deposited due to the year-end closing deadline to deposit checks and is having it credited to ODWMA (see attached).

It turns out that the Executive Division does not have any of the requested records. However, ODWMA has three documents in the attached e-mail from Tracy Jo Devereaux that are responsive according to my conversation today with Steve Busch, so ODWMA will need to provide Rep. Phelps with those documents, apply the cost against the \$50 check, and either have a refund issued if the total cost is less than \$50 or invoice Rep. Phelps for any additional amount over \$50.

Please let me know if you need anything else from me. Thanks.

Karen

---

**From:** Vorce, Susan (DEQ)  
**Sent:** Tuesday, September 15, 2015 11:31 AM  
**To:** Pallone, Maggie (DEQ); Copen, Leigh (DEQ); Shaler, Karen (DEQ)  
**Cc:** Schinderle, Jack (DEQ); Edlin, Karen (DEQ)  
**Subject:** FW: FOIA request from Phelps - 6422-15

Maggie:

The attached FOIA request has already been entered into the FOIA database.

However, I did not realize the requester was a State Representative.

Karen Shaler and JoAnne Rennaker (ODWMA-Lansing District) are working on this FOIA request.

Please contact me or Karen if you have any questions.

--Susan

Susan Vorce, FOIA Coordinator  
 Department of Environmental Quality  
 517-284-6889 or 800-662-9278



[voces@michigan.gov](mailto:voces@michigan.gov)

FOIA Coordinator  
Department of Environmental Quality  
P.O. Box 30457  
Lansing, MI 48909-7957  
Phone: 800-662-9278

[deqfoia@michigan.gov](mailto:deqfoia@michigan.gov)

6422-15  
Exec, WRD  
ODWMA  
LDO  
due 9-29-15

10-day

Dear FOIA coordinator,

This letter is a request for records under the Freedom of Information Act, MCL 15.231 et seq.

The records I am requesting are:

1. All documents the Michigan Department of Environmental Quality, or its agents, has in its possession, including correspondence, related to any waivers, permits or applications to use the Flint River as a source for water and/or drinking water for the City of Flint or any other municipality or municipal entity.
2. All documents the Michigan Department of Environmental Quality, or its agents, has in its possession, including correspondence, related to any communications between the Michigan Department of Environmental Quality, or its agents, and the Michigan Department of Treasury, or its agents, regarding any waivers, permits or applications to use the Flint River as a source for water and/or drinking water for the City of Flint or any other municipality or municipal entity.
3. All documents the Michigan Department of Environmental Quality has in its possession, including correspondence, related to any communications between the Michigan Department of Environmental Quality, or its agents, and the Office of the Governor of the State of Michigan, or its agents, regarding any waivers, permits or applications to use the Flint River as a source for water and/or drinking water for the City of Flint or any other municipality or municipal entity.

I am enclosing a check in the amount of \$50 as a good faith deposit to cover a portion or all of the cost of these items. If the amount exceeds \$50, please contact me by phone at 810-223-7034, to discuss the balance and the basis for the amounts charged beyond \$50. If the amount is less than \$50 please refund the balance to this office.

Sincerely,

Phil Phelps  
819 Main Street  
Unit A  
Flushing, MI 48433

**DEQFOIA**

---

**From:** Phillip Phelps <pphelps277@yahoo.com>  
**Sent:** Friday, September 04, 2015 4:53 PM  
**To:** DEQFOIA  
**Subject:** FOIA Request  
**Attachments:** Phelps Mich Dept EQ FOIA Request Sept 4 2015.doc

Hello,

Please find the attached FOIA request. If you have any questions please feel free to contact me through the contact information provided in the attached FOIA request.

Thanks,  
Phil

**Rennaker, Joanne (DEQ)**

---

**From:** Renteria, Sylvia (DEQ)  
**Sent:** Tuesday, September 29, 2015 1:51 PM  
**To:** Shaler, Karen (DEQ)  
**Subject:** RE: Check

The check is being credited to ODWMA.

**Sylvia Renteria**  
**Financial Specialist**  
**Michigan Department of Environmental Quality**  
**6<sup>th</sup> Floor Constitution Hall**  
**T: 517-284-5006**  
**F: 517-241-7428**

---

**From:** Shaler, Karen (DEQ)  
**Sent:** Tuesday, September 29, 2015 1:47 PM  
**To:** Renteria, Sylvia (DEQ)  
**Subject:** RE: Check

OK. Is this \$50 being credited to Exec. Div. or ODWMA for this FOIA?

---

**From:** Renteria, Sylvia (DEQ)  
**Sent:** Tuesday, September 29, 2015 8:27 AM  
**To:** Shaler, Karen (DEQ)  
**Subject:** Check

Hi Karen!

I am going to send the check to be deposited. I don't want to close the year with an outstanding check.

Thanks,  
Sylvia

**Sylvia Renteria**  
**Financial Specialist**  
**Michigan Department of Environmental Quality**  
**6<sup>th</sup> Floor Constitution Hall**  
**T: 517-284-5006**  
**F: 517-241-7428**

**Rennaker, Joanne (DEQ)**

---

**From:** Devereaux, Tracy Jo (DEQ)  
**Sent:** Thursday, September 24, 2015 5:01 PM  
**To:** Shaler, Karen (DEQ); DEQFOIA  
**Cc:** DEQ-RMD-FOIA  
**Subject:** 6422 - EXEC, ODWMA, WRD + Lansing - due: 9/15/15  
**Attachments:** 02310\_Flint\_BaselineForm.pdf; ATT00001.htm; BaselineLetterSW - 03 14 07.pdf; ATT00002.htm; BaselineQA - 03 12 07.pdf; ATT00003.htm

Attached are all the documents ODWMA has pertaining to the subject line FOIA request. Our understanding is that the documents are to be reviewed in Executive Division before going anywhere else.

---

**From:** Busch, Stephen (DEQ)  
**Sent:** Thursday, September 24, 2015 4:58 PM  
**To:** Devereaux, Tracy Jo (DEQ)  
**Subject:** Fwd: Flint Baseline Info

Stephen Busch, P.E.  
Lansing and Jackson District Supervisor  
Office of Drinking Water and Municipal Assistance  
MDEQ  
517-643-2314

Sent from my iPhone

Begin forwarded message:

**From:** "Philip, Kris (DEQ)" <PHILIPK@michigan.gov>  
**Date:** September 23, 2015 at 10:24:15 AM EDT  
**To:** "Busch, Stephen (DEQ)" <BUSCHS@michigan.gov>  
**Cc:** "Rennaker, Joanne (DEQ)" <RENNAKERJ@michigan.gov>  
**Subject:** Flint Baseline Info



COMPLETE AND RETURN THIS FORM TO THE MDEQ BY APRIL 1, 2007.

Listed below is the sum of the rated capacity of all low service or intake pumps the MDEQ has on record capable of withdrawing water from a surface water source as of May 29, 2006. If the capacity is correct, check the box provided. If the total capacity is incorrect, put the correct capacity in the blank to the right of the listed capacity. Finally, complete the signature box and return the form to the MDEQ. Thank you for your cooperation.

WSSN: 02310 FLINT

Check this box if the total capacity listed below is correct.

If the data is incorrect, leave this box blank and make the necessary correction below.



Total low service or intake pump capacity:

Capacity on  
Record

Capacity  
Correction

90 MGD

Signature of water supply representative:

BRENT F. WRIGHT

Printed Name

OPS & TECH SUPERVISOR

Title

Signature

3-22-07

Date

Please FAX or mail your  
completed form to:

MDEQ, Water Bureau  
Community Drinking Water Unit  
PO Box 30273  
Lansing, MI 48909-7773

FAX: (517) 241 - 1328



JENNIFER M. GRANHOLM  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



STEVEN E. CHESTER  
DIRECTOR

March 13, 2007

Dear Water Supply Professional:

**SUBJECT: Confirmation of "Baseline Capacity" for Surface Water Sources  
RESPONSE REQUIRED BY APRIL 1, 2007**

This correspondence has been sent to confirm the "baseline capacity" of your surface water source(s). Baseline capacity is a critical component of new laws regulating water withdrawals passed by the Michigan legislature in February 2006. The enclosed "Question and Answer" (Q&A) document further explains this new legislation, its impact on you, and why responding to this letter is to your advantage.

To assign a baseline capacity for community water supplies, the MDEQ must establish the design withdrawal capacity as of May 29, 2006. For surface water sources, the design withdrawal capacity is the sum or total capacity of all pumps capable of withdrawing water from a surface water source. This capacity is the sum of the rated or design capacity of your low service or intake pumps without regard to hydraulic limitations or pump inefficiencies.

Enclosed please find a report on the sum or total rated capacity of your low service or intake pumps currently on record at the MDEQ. Please review this capacity, indicate your agreement or provide necessary corrections, and return the signed form to the MDEQ by April 1, 2007. A single response is all that is necessary, so you may wish to consult with your water system staff before returning your reply.

There is no scenario under the new legislation where confirming your baseline capacity will not be to your advantage. In fact, failure to do so may result in the MDEQ using annual pumpage data instead of available withdrawal capacity to determine your baseline. This default approach will result in a lower baseline capacity being established for your system.

In closing, the MDEQ wants to ensure the low service or intake pump capacity data it has on record is accurate and appropriate for establishing your baseline capacity from surface water source(s). If you have specific questions about the capacity listed on the enclosed report, please contact your district engineer. If you have questions regarding the new water withdrawal legislation, please read the enclosed Q&A document where you will find additional resources and contact information. Thank you for your cooperation.

Sincerely,

James K. Cleland, P.E., Chief  
Lansing Operations Division  
Water Bureau

Enclosures

cc: Operator in Charge

## **Questions and Answers Regarding New Water Withdrawal Legislation & Baseline Capacity**

### **What is the purpose of the new water withdrawal legislation and why do we need to establish baseline capacity?**

The new laws governing large quantity water withdrawals expanded upon water use and reporting requirements for large quantity water users to further assist in management of Michigan's water resources. The laws amended Parts 327 and 328 of the Natural Resources and Environmental Protection Act, and the Safe Drinking Water Act. The amendments redefined the requirements for water use registration and reporting, established environmental standards for assessment of new or increased large quantity water withdrawals, and set in place permit requirements for new large quantity water withdrawals of over 2 million gallons per day for ground water or inland surface water sources and 5 million gallons per day for surface water sources drawing from the Great Lakes or connecting waters.

### **What is a Large Quantity Withdrawal?**

A large quantity withdrawal is defined as 1 or more cumulative total withdrawals of over 100,000 gallons per day (gpd) as an average in any 30-day period supplying a common distribution system, an amount approximately equal to new or additional capacity of 70 gallons per minute (gpm).

### **What is Baseline Capacity?**

Baseline capacity is defined as the withdrawal capacity reported to the MDEQ by the person making a large quantity water withdrawal in the April 1, 2007 annual report of water use. For public water supplies the baseline capacity is the total designed withdrawal capacity as approved by the MDEQ under the Michigan Safe Drinking Water Act. For groundwater systems, the approved withdrawal capacity of your well(s) is the rated capacity of the well pump(s), not the capacity at which the pump(s) may be operating due to well inefficiencies. This capacity may include standby wells equipped with pumps that are maintained for emergency use. For surface water systems, the approved withdrawal capacity is the rated capacities of low service or intake pumps regardless of hydraulic limitations or pump inefficiencies. Only pumping equipment in place and operational within 90 days of the effective date of the legislation, which was February 28, 2006, can be included in the baseline capacity. If the above referenced capacity information is not reported and is otherwise unavailable, baseline capacity defaults to the maximum reported water use reported to the MDEQ for the years 2002 to 2005.

### **Why is establishing a baseline capacity important to you?**

Under the new legislation, all new or increased "large quantity withdrawals" will be subject to evaluation under the new environmental standards. By legislative mandate, a new or increased large quantity withdrawal references a system's baseline capacity, or the existing capacity of the large quantity water user as a point of reference. All existing large quantity withdrawals that can be documented by the April 1, 2007 deadline for reporting are "grandfathered."

(continued on reverse)



### **How might an inaccurate or no baseline capacity affect your public water supply?**

The answer to this question is best exemplified by citing a hypothetical example. Suppose a water supply system (not necessarily a public water supply) is operating with an average water use of 1.2 million gallons per day (MGD) and a peak water use reported to the department in 2004 of 1.6 MGD. However, the sum of capacities for the system's well pumps is 1800 gpm, or 2.6 MGD. Unfortunately, the system fails to notify the MDEQ of their existing well pump capacity. Under the law, 1.6 MGD becomes the grandfathered baseline capacity instead of 2.6 MGD.

Subsequently, the system increases their water use and later reports a water use to the MDEQ of 1.8 MGD, or a 200,000 gpd increase. The system is now subject to application of the new environmental standards adopted in passage of the legislation. Had they reported their baseline capacity, an increase in use of up to 1.0 MGD would have been exempt from application of the new environmental standards.

To give another example, a system using surface water has a peak daily demand reported on June 30, 2004 of 22 MGD. At the water treatment plant, there are 4 low service pumps that may be used to withdraw water from their source. Two of the pumps are rated at 10 MGD. The other 2 pumps have variable frequency motors. One of these pumps can produce up to 10 MGD; the other up to 5 MGD. If the system fails to notify the MDEQ that the total capacity of their low service pumps is 35 MGD, their grandfathered baseline capacity will become 22 MGD. As in the previous example, this system is now subject to the application of the new environmental standards should their water use increase more than 100,000 gpd beyond the 2004 peak demand.

### **Where can I obtain additional information on the new water use legislation?**

Additional information about the new water use and water withdrawal legislation is available on the MDEQ website at <http://www.michigan.gov/deqwateruse>. Specific questions or comments regarding the new legislation should be directed to: Brant Fisher at 517-241-1415 or [fisherb@michigan.gov](mailto:fisherb@michigan.gov) or Ronda Page at 517-241-1380 or [pagerc@michigan.gov](mailto:pagerc@michigan.gov).

Questions specific to your water supply well capacities should be directed to your MDEQ district office.

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Tuesday, April 28, 2015 7:51 AM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: FOIA Request  
**Attachments:** FOIA Request Flint Water April 2 2015.doc

Steve,

Just keeping you in the loop...

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

---

**From:** Henry, James [<mailto:jhenry@gchd.us>]  
**Sent:** Monday, April 27, 2015 4:14 PM  
**To:** Prysby, Mike (DEQ)  
**Subject:** FW: FOIA Request

Hello Mike

Will you please assist with obtaining the information requested in the attached FOIA? Below is the correspondence to the City on April 2<sup>nd</sup>

Thanks Jim

Jim Henry RS, MBA  
Environmental Health Supervisor  
Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
630 S. Saginaw St., Suite 4  
Flint, MI 48502-1540  
Phone (810) 257-3618 Fax (810) 257-3125  
E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)



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**From:** Henry, James  
**Sent:** Thursday, April 2, 2015 4:57 PM  
**To:** 'ajones@cityofflint.com'; 'Crystal Olmstead'; Howard Croft  
**Subject:** FOIA Request

Good afternoon,

Please see the attached FOIA Request. Please let me know if there is confusion. I can clarify as needed.

Thanks Jim

Jim Henry RS, MBA  
Environmental Health Supervisor  
Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
630 S. Saginaw St., Suite 4  
Flint, MI 48502-1540  
Phone (810) 257-3618 Fax (810) 257-3125  
E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)



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# Genesee County Health Department

Mark Valacak, M.P.H., Health Officer  
Gary K. Johnson, M.D., M.P.H., Medical Director

April 2, 2015

FOIA Coordinator, City of Flint  
1101 S. Saginaw Street, 3<sup>rd</sup> floor  
Flint, MI 48502

## **RE: Flint Municipal Water Information Request**

Dear FOIA Coordinator,

Under provisions of the Michigan Freedom of Information Act (MCLA 15.231 et seq; MSA 4.1801 (1) et seq) please provide the following:

Please provide the dates and specific locations of the water main breaks for 2014. Please provide an electronic version with the address data file, if possible.

Please provide dates and specific locations of flushing activities within a mile radius around McLaren Hospital, Flint for 2014

Please provide a copy of the Veolia presentation that was displayed at the Technical Advisory Committee on March 4, 2015. If possible please provide an electronic version.

Please provide the monitoring locations and results for heterotrophic bacteria for 2013 through 2014.

If you determine that any of the requested information is exempt from disclosure, please detail what is being withheld and cite the exemption under FOIA. I anticipate the request being filled within five working days of receipt of this letter, as provided under FOIA. Please contact me at (810) 257-3618 if there are fees associated to comply with this request.

Sincerely,

Jim Henry  
Environmental Health Supervisor  
Genesee County Health Department  
630 S. Saginaw Street  
Flint, MI 48502

cc: Crystal Olmstead, Flint City  
Howard Croft, Flint City

**Better Life Through Better Health**

**Floyd J. McCree Courts & Human Services Building ♦ 630 S. Saginaw Street, Ste. 4 ♦ Flint, Michigan 48502-1540**

**Burton Branch ♦ G-3373 S. Saginaw Street ♦ Burton, Michigan 48529**

Main Phone 810-257-3612 ♦ Visit us at: [www.gchd.us](http://www.gchd.us)

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, April 23, 2015 2:25 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: FOIA Request  
**Attachments:** FOIA Request Flint Water April 2 2015.doc

Steve,

Here's Jim's reminder note sent to Mr. Kroft yesterday regarding the status of his FOIA request.

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

---

**From:** Henry, James [<mailto:jhenry@gchd.us>]  
**Sent:** Wednesday, April 22, 2015 2:03 PM  
**To:** Howard Croft; [ajones@cityofflint.com](mailto:ajones@cityofflint.com); Prysby, Mike (DEQ)  
**Subject:** FW: FOIA Request

Good afternoon,

Howard,  
Would you please look into the attached request? I sent it on April 2, 2015 and haven't heard back.

Mike/Howard,  
Would it be possible to arrange a meeting sometime soon, maybe the next time Mike conducts a site visit in Flint?

Thanks Jim

Jim Henry RS, MBA  
Environmental Health Supervisor  
Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
630 S. Saginaw St., Suite 4  
Flint, MI 48502-1540  
Phone (810) 257-3618 Fax (810) 257-3125  
E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)



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---

**From:** Henry, James  
**Sent:** Thursday, April 2, 2015 4:57 PM  
**To:** 'ajones@cityofflint.com'; 'Crystal Olmstead'; Howard Croft  
**Subject:** FOIA Request

Good afternoon,

Please see the attached FOIA Request. Please let me know if there is confusion. I can clarify as needed.

Thanks Jim

Jim Henry RS, MBA  
Environmental Health Supervisor  
Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
630 S. Saginaw St., Suite 4  
Flint, MI 48502-1540  
Phone (810) 257-3618 Fax (810) 257-3125  
E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)



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# Genesee County Health Department

Mark Valacak, M.P.H., Health Officer  
Gary K. Johnson, M.D., M.P.H., Medical Director

April 2, 2015

FOIA Coordinator, City of Flint  
1101 S. Saginaw Street, 3<sup>rd</sup> floor  
Flint, MI 48502

## **RE: Flint Municipal Water Information Request**

Dear FOIA Coordinator,

Under provisions of the Michigan Freedom of Information Act (MCLA 15.231 et seq; MSA 4.1801 (1) et seq) please provide the following:

Please provide the dates and specific locations of the water main breaks for 2014. Please provide an electronic version with the address data file, if possible.

Please provide dates and specific locations of flushing activities within a mile radius around McLaren Hospital, Flint for 2014

Please provide a copy of the Veolia presentation that was displayed at the Technical Advisory Committee on March 4, 2015. If possible please provide an electronic version.

Please provide the monitoring locations and results for heterotrophic bacteria for 2013 through 2014.

If you determine that any of the requested information is exempt from disclosure, please detail what is being withheld and cite the exemption under FOIA. I anticipate the request being filled within five working days of receipt of this letter, as provided under FOIA. Please contact me at (810) 257-3618 if there are fees associated to comply with this request.

Sincerely,

Jim Henry  
Environmental Health Supervisor  
Genesee County Health Department  
630 S. Saginaw Street  
Flint, MI 48502

cc: Crystal Olmstead, Flint City  
Howard Croft, Flint City

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Main Phone 810-257-3612 ♦ Visit us at: [www.gchd.us](http://www.gchd.us)

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Monday, August 03, 2015 3:34 PM  
**To:** Cook, Pat (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: FOR REVIEW: MDEQ - Flint Call Notes  
**Attachments:** MDEQ Call on July 21\_call notes v4.docx

Just received the attached. Haven't reviewed it yet.

---

**From:** Hyde, Tinka [<mailto:hyde.tinka@epa.gov>]  
**Sent:** Monday, August 03, 2015 3:31 PM  
**To:** Shekter Smith, Liane (DEQ)  
**Cc:** Poy, Thomas; Bair, Rita  
**Subject:** FOR REVIEW: MDEQ - Flint Call Notes

Hi Liane – Attached are our notes from our call on 7/21 regarding Flint Drinking Water System. Please take a look and let me know if you have any questions or comments. Thanks



## Notes on Call with MDEQ on July 21, 2015

### MDEQ Implementation of LCR Rule and Flint Issues

#### Issue #1: Is there a public health concern regarding lead in Flint or other regulatory requirements?

- The 90<sup>th</sup> percentile results of the 2<sup>nd</sup> round of monitoring was 11 ppb.
- The population has dropped to under 100,000 and therefore the 1<sup>st</sup> round of 6-month monitoring was done for 100 samples, but the 2<sup>nd</sup> round only needed 60 samples.
- Customer-requested samples were included, but MDEQ did not have specifics on how many there were.
- Tinka asked about the timeline for Flint to switch over to the Lake Huron water source. MDEQ said the pipeline is under construction and scheduled to be complete by July 2016. MDEQ expects some delays and thinks a more realistic timeframe is October 2016.
- MDEQ explained that Flint would have 18 months to complete the corrosion control study and the complicating factor of switching over to Lake Huron. Should the corrosion control study be based on the Lake Huron source? MDEQ also explained that once Flint is using Lake Huron water that they would then need to complete 2 more rounds of 6-month monitoring to assess whether any adjustments to the corrosion control treatment was needed.
- MDEQ will be sending a letter to Flint telling them they need to complete a corrosion control study – based on results they are not optimized. Given the timing of completing a corrosion control study and the anticipated switch to Lake Huron water, MDEQ will have discussions with Flint and request that they start corrosion control treatment as soon as possible.
- MDEQ asked for Region 5's opinion on whether the regulations allow for the study requirement for Flint to be waived if MDEQ has Flint start pH adjustments and adding phosphates. Region 5 will look into this and get back to MDEQ with an answer. All acknowledged that if Flint initiated corrosion control treatment and continued to evaluate the system to ensure optimization that these efforts would essentially equate to a corrosion control study.
- The Region raised its concern about looking at treatment more comprehensively to ensure problems with DBPs didn't occur. MDEQ stated that Flint is on the brink of DBP compliance and that bacteriological issues haven't occurred since last year. Any adjustments for corrosion control treatment would need to make sure the other issues weren't exacerbated.
- Region 5 again offered the assistance of ORD staff, Darren Lytle and Mike Schock which MDEQ said they had shared with Flint already.

#### Issue #2: Discuss optimal corrosion control requirements

##### Discussion Items:

- MDEQ explained that they did not treat the switch to Flint River water as a "new system", but as a new source. It is their understanding that 2 rounds of 6-month monitoring is still needed to characterize the water quality. They don't know what is optimized until those 2 rounds of 6-month monitoring are completed.

- Region 5 noted that under 141.81(b)(3)(iii) that any system that has been deemed optimized must notify the State of any long-term change in treatment or the addition of a new source. The State must review and approve the change and may require any such system to conduct additional monitoring or other action to ensure that the system maintains minimal levels of corrosion in the distribution system. The State's requirement for 2 additional rounds of 6-month monitoring would fall under the "additional monitoring" prescribed by the State and not the initial 2 rounds of 6-month monitoring for new systems.
- Region 5 explained that they have talked to HQ about the interpretation of regulations and believes that systems that have been deemed optimized need to "maintain" corrosion control. The Region agreed to provide supporting regulatory citations for the language about maintaining corrosion control. Ed Moriarty in OGWDW is also consulting OGC on this topic and the OGC opinion will also be shared.
- MDEQ mentioned that there are other communities that may leave the Detroit system or connect to the new Lake Huron pipeline, but many of those either don't need to treat for corrosion control or will be building new treatment plants. Requirements for maintaining corrosion control for additional communities connecting to the Lake Huron pipeline will be discussed further after receipt of the HQ/OGC opinion.

### **Issue #3: Discuss Pre-flushing (as time allows)**

- Lead compliance sampling procedures in the state of Michigan comply with Federal SDWA requirements which calls for a minimum of 6 hours during which there is no water used from the tap the sample is taken from.
- MDEQ is not interested in changing its position on pre-flushing until new regulations come out. They also pointed out that the pre-flushing instructions are not requirements, but suggestions.
- The Michigan pre-flushing instructions were developed as a way to ensure that sampled faucets were not stagnant for an excessive period of time beyond the targeted 6 hour (i.e., rarely used faucets or when a homeowner has been gone for an extended period of time).

### **Next Steps;**

- MDEQ will send a letter to Flint regarding the 2 rounds of 6-month monitoring results that exceed 5 ppb and the need for a corrosion control study. They will have discussions with Flint to request that they start corrosion control treatment as soon as possible rather than waiting for the completion of a study that can take 18 months.
- MDEQ and the Region were in agreement that it is important to get phosphate addition going in Flint as soon as possible. MDEQ mentioned tapping Mike Shock for help with this in the interim.
- Region 5 commented that we now have a path forward for Flint despite a difference of opinion on whether the regulations required Flint to "maintain" corrosion control treatment when they started serving treated water from the Flint River.
- MDEQ and Region 5 agreed that after Flint implements corrosion control treatment, when they switch back to Lake Huron water, they will need to continue the corrosion control treatment while conducting monitoring to determine if this treatment is optimized with the new Lake Huron water quality.

- Region 5 will get back to MDEQ once it gets HQ/OGC's opinion on the need to "maintain" corrosion control treatment once a system is deemed optimized.
- MDEQ and Region 5 agreed that other communities currently implementing corrosion control treatment and change sources will need to continue to provide corrosion control treatment and conduct monitoring to determine whether the treatment is optimized with the new source water quality.
- Region 5 will research and get back to MDEQ on the 141.81 (3)(b)(5) citation and the ability to waive a CCT study.

DRAFT

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Wednesday, September 17, 2014 12:36 PM  
**To:** Crooks, Jennifer (crooks.jennifer@epa.gov)  
**Cc:** Busch, Stephen (DEQ); 'bwright@cityofflint.com'  
**Subject:** FW: FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

Jennifer,

Below is the response from Water Service Center (WSC). The location was not in the BWA area; however, as Robert indicates, this person did not contact the WSC. Let's hold-off on calling her until I hear whether the Flint WTP staff has had any involvement with this complaint. Robert also indicate local contractors using hydrants improperly as a potential cause.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

**From:** Robert Bincsik [mailto:rbincsik@cityofflint.com]  
**Sent:** Wednesday, September 17, 2014 12:13 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** bwright@cityofflint.com  
**Subject:** Re: FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

To my knowledge we never received a complaint from this address. This would've been south of the effected area and wouldn't have been in the boil water notice. I will have someone go out and flush the hydrants near this address but obviously I have to be made aware of the problem first in order to be able to fix it. I'm quite certain its iron she is seeing in her water and this has been a problem this year in the COF given all the demolition contractors using hydrants improperly.

On Wed, Sep 17, 2014 at 11:13 AM, Prysby, Mike (DEQ) <PRYSBYM@michigan.gov> wrote:

Brent, Robert,

As part of my follow-up to EPA on this latest complaint, provide a summary of action taken and/or communication by the city to address Savanna Young's concerns?

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

---

**From:** Crooks, Jennifer [mailto:[crooks.jennifer@epa.gov](mailto:crooks.jennifer@epa.gov)]  
**Sent:** Wednesday, September 17, 2014 11:04 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Cc:** Benzle, Richard (DEQ)  
**Subject:** FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

Hi, Steve and Mike. Yep, have another Flint complaint. See below. Her water at the tap is brown as of this past Sunday. I thought Flint was flushing in the areas where the valves were closed? Not sure if this woman's address is close to that area. Have there been other complaints of brown water?

I plan to call her this morning and explain the valve issue. Could you also look into her complaint?

Jennifer

---

**From:** Poy, Thomas  
**Sent:** Tuesday, September 16, 2014 5:20 PM  
**To:** Crooks, Jennifer  
**Subject:** Fwd: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

Jen: Can you please provide a response to this person? Inform her of the valve issue and that the water flow should improve. Was Flint flushing too?

T

---

Tom Poy

Chief, Ground and Drinking Water Branch

USEPA - Region 5

(312) 886-5991

Begin forwarded message:

**From:** <[howard.donna@epa.gov](mailto:howard.donna@epa.gov)>  
**Date:** September 16, 2014 at 3:01:05 PM CDT  
**To:** <[poy.thomas@epa.gov](mailto:poy.thomas@epa.gov)>  
**Subject:** FWD: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

09/16/2014

SUBJECT: FWD: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan  
FROM: [howard.donna@epa.gov](mailto:howard.donna@epa.gov)  
TO: [poy.thomas@epa.gov](mailto:poy.thomas@epa.gov)  
CC:

-----Original Message-----

9/14/2014 4:15 PM

HQ LEAD NUMBER: FY14-121728-3715-CV

SUBJECT: Referred to Region - Michigan

FROM: [young.vannah@gmail.com](mailto:young.vannah@gmail.com)

TO:

Name: Savannah Young

Address: 1423 Irene Ave

City: Flint

State: Michigan

Zip: 48503

Phone: 8108776343

Alleged Violator's Name: City of Flint, Water Dept.

Alleged Violator's Address: 1001 S. Saginaw St.

Alleged Violator's City: Flint

Alleged Violator's State: Michigan

Alleged Violator's Zip: 48502

Tip or Complaint: My Flint City tap water is brown. It cannot possibly be safe to drink. No person is available to discuss this issue with me, even after already having three boil water advisories in less than two months time. There has been no announcement made of this current issue, nor has there been any advisory to not drink the water. This has not been addressed or even acknowledged by the city. My neighbor has been having the same issue, and she has also not received any answers, acknowledgement, or regard for her lack of safe drinking water. I have bottled some of the tap water and plan on contacting the local college to request an analysis. I will provide a photo at your request. It is disgusting and they are not even informing the citizens that it is happening.

Specific Directions: The 1400 block of Irene Ave, off off of Miller rd.

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? Yes

--

*Thank you,*

***Robert Bincsik  
Water Distribution and  
Sewer Maintenance Supervisor  
City of Flint  
3310 E. Court Street  
Flint, MI 48506  
Ph: 810.766.7202 ext. 3413  
Fx: 810.743.5758***

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, April 23, 2015 2:26 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: FW: FOIA Request

And here is Mr. Kroft's response....

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

**From:** Howard Croft [<mailto:hcroft@cityofflint.com>]  
**Sent:** Thursday, April 23, 2015 7:36 AM  
**To:** Henry, James  
**Cc:** Althea Jones; Prysby, Mike (DEQ); David Roth  
**Subject:** Re: FW: FOIA Request

Jim,

I had the utilities team gather this information and I believe that the documentation was sent to the legal department. I will check today and find out the status of the information and get you a response quickly.

On Wed, Apr 22, 2015 at 2:02 PM, Henry, James <[jhenry@gchd.us](mailto:jhenry@gchd.us)> wrote:

Good afternoon,

Howard,

Would you please look into the attached request? I sent it on April 2, 2015 and haven't heard back.

Mike/Howard,

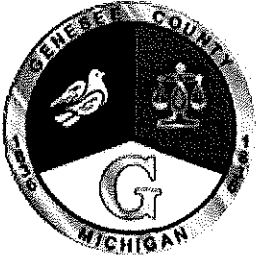
Would it be possible to arrange a meeting sometime soon, maybe the next time Mike conducts a site visit in Flint?

Thanks Jim



Jim Henry RS, MBA  
Environmental Health Supervisor  
Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
630 S. Saginaw St., Suite 4  
Flint, MI 48502-1540  
Phone (810) 257-3618 Fax (810) 257-3125

E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)



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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at <http://www.gchd.us/>

---

**From:** Henry, James  
**Sent:** Thursday, April 2, 2015 4:57 PM  
**To:** '[ajones@cityofflint.com](mailto:ajones@cityofflint.com)'; 'Crystal Olmstead'; Howard Croft  
**Subject:** FOIA Request

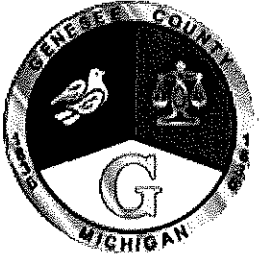
Good afternoon,

Please see the attached FOIA Request. Please let me know if there is confusion. I can clarify as needed.

Thanks Jim

Jim Henry RS, MBA  
Environmental Health Supervisor  
Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
630 S. Saginaw St., Suite 4  
Flint, MI 48502-1540  
Phone (810) 257-3618 Fax (810) 257-3125

E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)



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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at <http://www.gchd.us/>

--

**Howard Croft**  
Public Works Director  
City of Flint  
1101 S. Saginaw Street  
Flint, MI 48502  
PH# 810.766.7135 Ext.2043  
[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Wednesday, September 17, 2014 1:02 PM  
**To:** Crooks, Jennifer (crooks.jennifer@epa.gov)  
**Cc:** Busch, Stephen (DEQ)  
**Subject:** FW: FW: FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

Jennifer,

I received the response from the Flint WTP staff....nothing from that person; however, a complaint from another resident on that street. Robert Bincsik just informed me that he is sending out a crew to flush several hydrants on that street to help alleviate the iron in the water.

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

**From:** Brent Wright [mailto:bwright@cityofflint.com]  
**Sent:** Wednesday, September 17, 2014 12:56 PM  
**To:** Prysby, Mike (DEQ)  
**Subject:** Re: FW: FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

No one here has spoke with this person, but Mike Glasgow did go to a Brooke Awad's house yesterday on Irene and sampled her water for chlorine and bacti. Her complaint was cloudy water.

On Wed, Sep 17, 2014 at 12:36 PM, Prysby, Mike (DEQ) <[PRYSBYM@michigan.gov](mailto:PRYSBYM@michigan.gov)> wrote:

Jennifer,

Below is the response from Water Service Center (WSC). The location was not in the BWA area; however, as Robert indicates, this person did not contact the WSC. Let's hold-off on calling her until I hear whether the Flint WTP staff has had any involvement with this complaint. Robert also indicate local contractors using hydrants improperly as a potential cause.

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

**From:** Robert Bincsik [mailto:[rbincsik@cityofflint.com](mailto:rbincsik@cityofflint.com)]

**Sent:** Wednesday, September 17, 2014 12:13 PM

**To:** Prysby, Mike (DEQ)

**Cc:** [bwright@cityofflint.com](mailto:bwright@cityofflint.com)

**Subject:** Re: FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

To my knowledge we never received a complaint from this address. This would've been south of the effected area and wouldn't have been in the boil water notice. I will have someone go out and flush the hydrants near this address but obviously I have to be made aware of the problem first in order to be able to fix it. I'm quite certain its iron she is seeing in her water and this has been a problem this year in the COF given all the demolition contractors using hydrants improperly.

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Brent, Robert,

As part of my follow-up to EPA on this latest complaint, provide a summary of action taken and/or communication by the city to address Savanna Young's concerns?

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

**From:** Crooks, Jennifer [mailto:[crooks.jennifer@epa.gov](mailto:crooks.jennifer@epa.gov)]

**Sent:** Wednesday, September 17, 2014 11:04 AM

**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)

**Cc:** Benzie, Richard (DEQ)

**Subject:** FW: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

Hi, Steve and Mike. Yep, have another Flint complaint. See below. Her water at the tap is brown as of this past Sunday. I thought Flint was flushing in the areas where the valves were closed? Not sure if this woman's address is close to that area. Have there been other complaints of brown water?

I plan to call her this morning and explain the valve issue. Could you also look into her complaint?

Jennifer

---

**From:** Poy, Thomas

**Sent:** Tuesday, September 16, 2014 5:20 PM

**To:** Crooks, Jennifer

**Subject:** Fwd: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

Jen: Can you please provide a response to this person? Inform her of the valve issue and that the water flow should improve. Was Flint flushing too?

T

---

Tom Poy

Chief, Ground and Drinking Water Branch

USEPA - Region 5

(312) 886-5991

Begin forwarded message:

**From:** <[howard.donna@epa.gov](mailto:howard.donna@epa.gov)>

**Date:** September 16, 2014 at 3:01:05 PM CDT

To: <poy.thomas@epa.gov>

Subject: FWD: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

09/16/2014

SUBJECT: FWD: (SDWA - FY14-121728-3715-CV) Referred to Region - Michigan

FROM: [howard.donna@epa.gov](mailto:howard.donna@epa.gov)

TO: [poy.thomas@epa.gov](mailto:poy.thomas@epa.gov)

CC:

-----Original Message-----

9/14/2014 4:15 PM

HQ LEAD NUMBER: FY14-121728-3715-CV

SUBJECT: Referred to Region - Michigan

FROM: [young.vannah@gmail.com](mailto:young.vannah@gmail.com)

TO:

Name: Savannah Young

Address: 1423 Irene Ave

City: Flint

State: Michigan

Zip: 48503

Phone: 8108776343

Alleged Violator's Name: City of Flint, Water Dept.

Alleged Violator's Address: 1001 S. Saginaw St.

Alleged Violator's City: Flint

Alleged Violator's State: Michigan

Alleged Violator's Zip: 48502

Tip or Complaint: My Flint City tap water is brown. It cannot possibly be safe to drink. No person is available to discuss this issue with me, even after already having three boil water advisories in less than two months time. There has been no announcement made of this current issue, nor has there been any advisory to not drink the water. This has not been addressed or even acknowledged by the city. My neighbor has been having the same issue, and she has also not received any answers, acknowledgement, or regard for her lack of safe drinking water. I have bottled some of the tap

water and plan on contacting the local college to request an analyses. I will provide a photo at your request. It is disgusting and they are not even informing the citizens that it is happening.

Specific Directions: The 1400 block of Irene Ave, off off of Miller rd.

Violation Still Occurring? Yes

State DEP/DEQ/DEM Notified? Yes

--

*Thank you,*

*Robert Bincsik*

*Water Distribution and*

*Sewer Maintenance Supervisor*

*City of Flint*

*3310 E. Court Street*

*Flint, MI 48506*

*Ph: 810.766.7202 ext. 3413*

*Fx: 810.743.5758*

--

**Brent Wright**  
**Water Plant Supervisor**  
**City of Flint**

**4500 N. Dort Hwy.**  
**Flint, MI. 48505**  
**Ph: 810.787.6537 ext. 3510**  
**Fx: 810.787.3710**



**Rennaker, Joanne (DEQ)**

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Friday, October 09, 2015 12:08 PM  
**To:** Busch, Stephen (DEQ); Shekter Smith, Liane (DEQ); Prysby, Mike (DEQ)  
**Cc:** Krisztian, George (DEQ)  
**Subject:** FW: Got dates?

I need a comprehensive picture of lead and copper tests, please. At the plant tap, in the lines, figures we got from the city during the L&C rule tests. Everything. Thank you.  
b

---

**From:** Erb, Robin [<mailto:rerb@freepress.com>]  
**Sent:** Friday, October 09, 2015 11:13 AM  
**To:** Wurfel, Brad (DEQ)  
**Subject:** RE: Got dates?

Hey Brad,

'Just making sure you saw this. Can you help me out? I know it's probably been a hellish couple of weeks, but for what it's worth – weekend's almost here....

Robin

---

**From:** Erb, Robin  
**Sent:** Thursday, October 08, 2015 3:28 PM  
**To:** 'WurfelB@michigan.gov' <[WurfelB@michigan.gov](mailto:WurfelB@michigan.gov)>  
**Subject:** Got dates?

Hey Brad,

I know we've talked about all the testing that was done on the Flint water. I'd like to drive home how much testing was done.

Can you give me a time line of the tests? I believe there were the 7 tests done from the source, and then the two supplemental tests that confirmed ppb lower than 15 (6 and 11).

I know, I know. You've probably explained this 422 time to 422 different reporters (I'm guessing). Can we go over one more time so we have it nailed down on a time line? If it's easier, a phone call works too – 313-222-2708.

Robin

Robin Erb  
Medical Writer  
Desk: 313-222-2708  
Metro Desk: 313-222-6601  
[rerb@freepress.com](mailto:rerb@freepress.com)

Follow me on Twitter: @FreepHealth



[www.freep.com](http://www.freep.com)

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Monday, October 19, 2015 5:29 PM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ); Cook, Pat (DEQ); DeBruyn, Dana (DEQ); Philip, Kris (DEQ)  
**Cc:** Devereaux, Tracy Jo (DEQ)  
**Subject:** FW: Governor's Update

**Importance:** High

I need your summary updates first thing Tuesday morning for anything done today. This is what I have so far:

Item 3. – estimate the number of samples. Done. (100 per school).

Item 5. – legislative changes to Part 54 – draft language provided to Maggie on 10/15.

Item 10. – e-mail sent to Director of Shared Services requesting the three target/pilot elementary schools gather preliminary data and provide support for plumbing assessment by LARA staff.

Item 11. – revised draft sampling protocol shared with LARA, DHHS, EPA and GCHD. 10/19.

Item 19. – EPA comments received on 10/19 regarding Flint's corrosion control treatment plan. Teleconference between DEQ and EPA scheduled for 10/20 to discuss.

---

**From:** Krisztian, George (DEQ)  
**Sent:** Monday, October 19, 2015 5:10 PM  
**To:** Cook, Pat (DEQ); Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Cc:** Sygo, Jim (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** Governor's Update  
**Importance:** High

Please submit your action item update for Monday (10/19/15). Please do this first thing Tuesday morning when you get in if you have not already done it.

Thank you  
 George

George L. Krisztian  
 Flint Action Plan Coordinator  
 Laboratory Director  
 Michigan Department of Environmental Quality  
 Desk ph (517) 284-6719  
 Cell ph (517) 204-0381

**Rennaker, Joanne (DEQ)**

---

**From:** Feuerstein, Heather (DEQ)  
**Sent:** Thursday, October 29, 2015 10:33 AM  
**To:** Krisztian, George (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: handout  
**Attachments:** Water Handout.pdf

Attached is the final version of the report

---

**From:** Cavanaugh, Cheryl (MDARD)  
**Sent:** Thursday, October 29, 2015 9:35 AM  
**To:** Feuerstein, Heather (DEQ)  
**Cc:** Holton, Jennifer (MDARD)  
**Subject:** handout

Attached is the pdf, will send the design file in a sec.  
CC

# **Freeman Elementary School**

## **Outlet Sampling and Plumbing Assessment Recommendations**



## **BACKGROUND INFORMATION**

On Friday, October 23, 2015, the Department of Licensing and Regulatory Affairs (DLARA) and the Department of Environmental Quality (DEQ) conducted an assessment of Freeman Elementary's plumbing system to gain an understanding of how water moves through the building and what types of plumbing materials are used. The assessment identified the following potential sources of lead leaching into drinking water:

- Lead solder joints on copper piping
- Brass valves and brass fittings
- Brass components in fixtures
- Galvanized piping

The assessment also identified 31 faucets or fountains that provide water for drinking, cooking and/or food preparation. The team developed a sequence for sampling the 31 faucets based on how the water travels through the building.

On Saturday, October 24, 2015, the DEQ and the DLARA completed sampling of the 31 faucets/fountains, in the sequence determined by the plumbing assessment from the previous day, following a stagnation period of 12 hours. At each of the 31 faucets/fountains identified, staff collected four samples. Two initial, 125-milliliter samples (P1 and P2), were collected immediately after turning on the tap. The water was then flushed for 30 seconds and a third, 125-milliliter sample (F1) was collected. Finally, the water was flushed for another two minutes, and a fourth 125-milliliter sample (F2) was collected.

## **WATER SERVICE INFORMATION**

A four inch diameter cast iron water service line enters the school in the boiler room on the west wall. Piping in the boiler room immediately transitions into galvanized metal piping for cold water lines. Two separate galvanized cold water supply lines exit the boiler room. One in the northeast corner appears to serve the gym, auditorium, and proposed pre-K facilities on the north end of the school. The other exits the boiler room in the southwest corner and appears to serve the remainder of the school to the south, including the library. This line was also found to have grounding connections attached to the piping, these connections may enhance pipe corrosion. Hot water is distributed in continuous loops that feed from and return to a central water heater in the boiler room. Hot water piping material where exposed was copper piping with 50/50 lead solder joints. Brass valves were seen throughout the building.

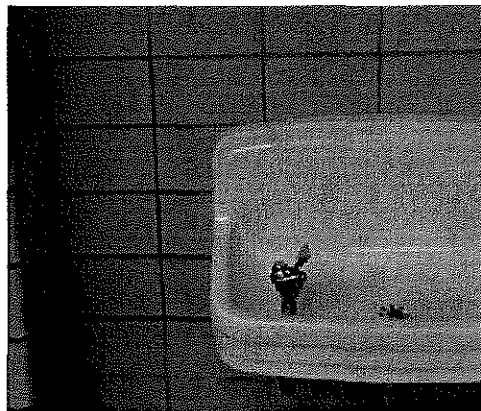
## Outlets With Lead Levels Greater Than 15 Parts per Billion

**Outlet: Bubbler Drinking Fountain, Left (DW001)**

**Location:** Hallway outside Janitorial Room

**Results:** P1=40 parts per billion, P2=6 parts per billion,  
F1=4 parts per billion, F2=1 part per billion

These results suggest the highest contribution of lead may be from the bubbler itself. This bubbler fixture is believed to have a brass valve. The connection underneath the sink also appears to have some brass components including the valve at the wall.



Replacement of this bubbler tap and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

**Outlet: Sink Faucet (CF029)**

**Location:** DHHS Health Office, west wall

**Results:** P1=17 parts per billion, P2=12 parts per billion,  
F1=2 parts per billion, F2= non-detect

These results suggest the highest contribution of lead may be from the faucet and its connecting plumbing. The faucet is a Delta 400. This model faucet valve has brass components. This style faucet also has a mixing valve that may allow mixing of hot and cold water. Connecting plumbing in the cabinet under the sink may also contain brass components.

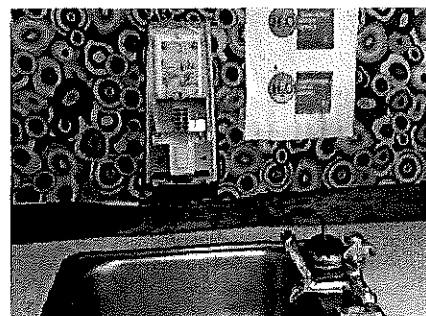


This faucet also has an aerator at the outlet. The aerator should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator should be periodically checked and cleaned.

Replacement of this faucet and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

**Outlet: Integrated faucet and bubbler fountain (CF006)****Location:** Classroom 2, south wall**Results:** P1=16 parts per billion, P2=3 parts per billion,  
F1=1 part per billion, F2=1 part per billion

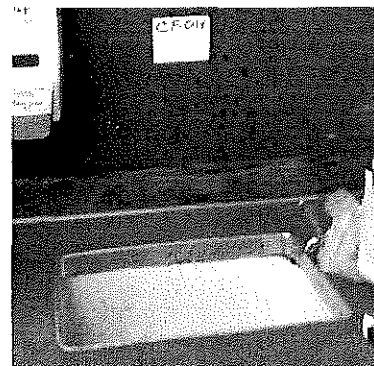
These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself. The make and model of this fixture is unknown but appears to be made of chrome plated brass and may be connected on the underside of the sink using a brass nipple.



Replacement of this fixture and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

**Outlet: Integrated faucet and bubbler fountain (CF014)****Location:** Classroom 10, north wall**Results:** P1=27 parts per billion, P2=7 parts per billion,  
F1=4 parts per billion, F2=3 parts per billion

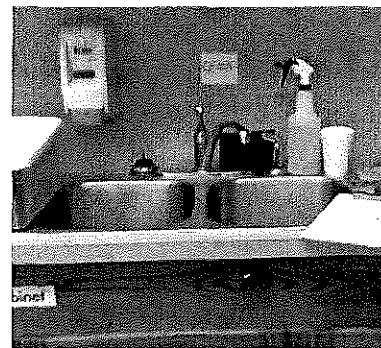
These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself and its connecting plumbing. The make and model of this fixture is unknown but appears to be made of chrome plated brass and may be connected on the underside of the sink using a brass nipple. Connecting plumbing in the cabinet under the sink may also contain brass components.



Replacement of this fixture and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

**Outlet: Sink Faucet (CF013)****Location:** Classroom 10, north wall**Results:** P1=9 parts per billion, P2=18 parts per billion  
F1=3 parts per billion, F2=3 parts per billion

These results suggest the highest contribution of lead may be from the connecting plumbing with some contribution from the faucet itself. The faucet appears to be a Delta 500 series. This model faucet may have some brass components. This style faucet also has a mixing valve that may allow mixing of hot and cold water. Connecting plumbing in the cabinet under the sink should be checked for brass components including brass valves.



This faucet also has an aerator at the outlet. The aerator should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator should be periodically checked and cleaned.



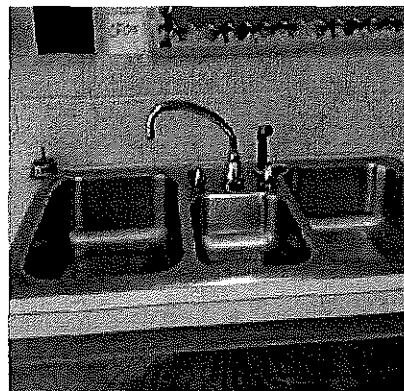
Replacement of this faucet and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

**Outlet: Sink Faucet (CF015)**

**Location:** Classroom 11, northeast corner

**Results:** P1=102 parts per billion, P2=326 parts per billion,  
F1=14 parts per billion, F2=11 parts per billion

These results suggest the highest contribution of lead may be from the connecting plumbing and from the faucet itself. The faucet is an older design that uses a brass tube approximately 8 inches in length between the hot and cold water valves, and connects to the outlet under the sink. This brass tube may be the primary source of lead, explaining the higher second (P2) sample result. The faucet and valves may also contain brass components. Connecting plumbing in the cabinet under the sink should be checked for additional brass components including brass valves.



This faucet also has an aerator at the outlet. The aerator should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator should be periodically checked and cleaned.

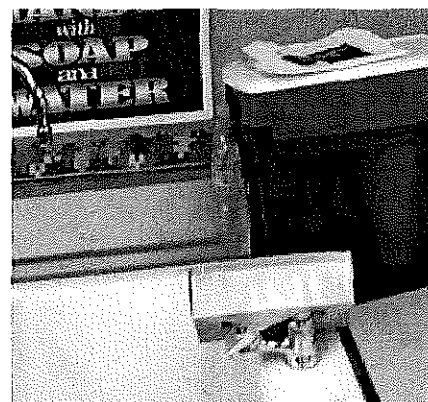
Replacement of this faucet and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location and needs to be completed. If replacement is not currently feasible, **DO NOT USE THIS FAUCET FOR DRINKING OR COOKING.**

**Outlet: Integrated faucet and bubbler fountain (CF024)**

**Location:** Classroom 19, east wall

**Results:** P1=23 parts per billion, P2=3 parts per billion,  
F1=4 part per billion, F2=3 parts per billion

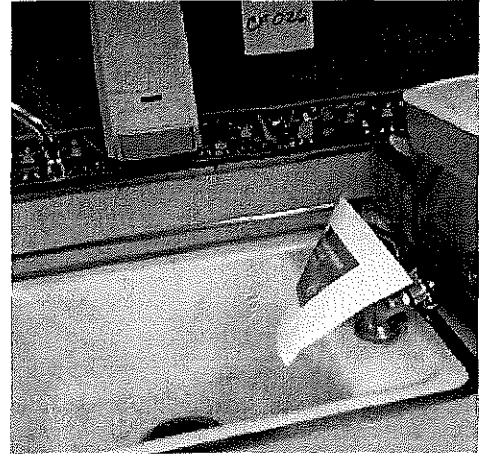
These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself. The make and model of this fixture is unknown but appears to be made of chrome plated brass and may be connected on the underside of the sink using a brass nipple.



Replacement of this fixture and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

**Outlet: Bubbler fountain (CF026)****Location:** Classroom 14, west wall**Results:** P1=36 parts per billion, P2=30 parts per billion,  
F1=17 parts per billion, F2=4 parts per billion

These results suggest the highest contribution of lead may be from the bubbler itself. This bubbler fixture appears to be made of chrome plated brass. This style bubbler typically has a 4-5 inch brass fitting that connects to a 3 inch brass nipple on the underside of the sink. This would explain the higher concentrations in the first two sample results. The connection underneath the sink may also have some brass components and should be checked including the valve.

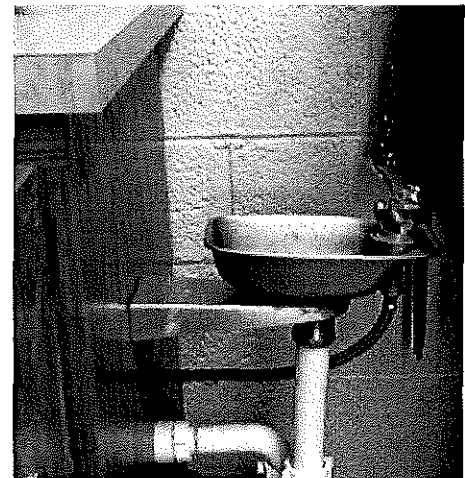


Replacement of this bubbler tap and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location and should be completed. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes prior to each use and for at least 4 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure. In general, use of this fountain for drinking water should be discouraged.

**Outlet: Bubbler fountain (CF031)****Location:** Proposed Pre-K room, south wall**Results:** P1=57 parts per billion, P2=3 parts per billion,  
F1=2 parts per billion, F2=non-detect

These results suggest the highest contribution of lead may be from the bubbler itself. This bubbler fixture appears to be made of chrome plated brass. This bubbler has a brass fitting connection to a brass nipple. The connector hose is not expected to be contributing lead.

Replacement of this bubbler tap and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location and should be completed. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.



## **Outlets With Lead Levels 15 Parts per Billion or Less**

While the remaining 22 outlets showed sample results to be at levels less than 15 parts per billion, several recommendations have been identified.

Several of these outlets are comprised of similar materials as the outlets listed above, and could potentially experience higher lead levels under extended periods of stagnation.

This includes::

- Sink Side Bubbler Units in Room 12 (CF022), Room 5 (CF009), Room 21 (CF028), Hallway Fountain (DW002), Room 15 (CF018), Room 17 (CF020), and Room 1 (DW005).
- Integrated Faucet Bubbler Fountain Units in Room 6 (CF010), Room 9 (CF012), Room 4 (CF008), Room 3 (CF007), and Room 7 (CF011)

Replacement of these fixtures with lead-free materials is also recommended.

The fourth sample at each of these 22 outlets following approximately 3 minutes of use and flushing at a reduced flow reduced lead concentrations to 4 parts per billion or less. This indicates that flushing of all taps used for drinking, cooking, and/or food preparation, for 4 minutes following periods of stagnation will further reduce lead exposure. It is recommended that a flushing operational procedure be developed for use by staff responsible for plumbing operations and maintenance.

**Rennaker, Joanne (DEQ)**

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**From:** Benzie, Richard (DEQ)  
**Sent:** Wednesday, November 04, 2015 1:56 PM  
**To:** Bloemker, Jon (DEQ); Busch, Stephen (DEQ); Donaldson, Kristina (DEQ); Lachance, Amy (DEQ); Philip, Kris (DEQ); Thomas, Chuck (DEQ)  
**Cc:** Cook, Pat (DEQ); Shekter, Jean (DEQ); Gohlke, Holly (DEQ)  
**Subject:** FW: HEADS-UP: Clarifications regarding the application of optimal corrosion control requirements of the lead and copper rule  
**Attachments:** image2015-11-03-155158.pdf; ATT00001.txt

FYI. We can discuss this matter further at our upcoming FOS Managers meeting.

Richard Benzie, P.E., Chief  
 Field Operations Section  
 Office of Drinking Water and Municipal Assistance, MDEQ  
 517-284-6512

-----Original Message-----

**From:** Hyde, Tinka [<mailto:hyde.tinka@epa.gov>]  
**Sent:** Wednesday, November 04, 2015 11:26 AM  
**To:** Willhite, Marcia; [Dave.McMillan@illinois.gov](mailto:Dave.McMillan@illinois.gov); CLARK METTLER, MARTHA; Sygo, Jim (DEQ); Monosmith, Carrie (DEQ); Benzie, Richard (DEQ); [randy.ellingboe@state.mn.us](mailto:randy.ellingboe@state.mn.us); [mike.baker@epa.state.oh.us](mailto:mike.baker@epa.state.oh.us); [jill.jonas@wisconsin.gov](mailto:jill.jonas@wisconsin.gov); [Patrick.Stevens@Wisconsin.gov](mailto:Patrick.Stevens@Wisconsin.gov)  
**Cc:** Henry, Timothy; Poy, Thomas  
**Subject:** HEADS-UP: Clarifications regarding the application of optimal corrosion control requirements of the lead and copper rule

Hi All - Please see the attached memo which provides important clarifications regarding the application of the optimal corrosion control requirements of the lead and copper rule when a large water system ceases to purchase treated water and switches to a new drinking water source. If you have any questions or concerns related to this memo, please contact me or have your staff contact Tom Poy, Chief of the of the Ground Water and Drinking Water Branch at [poy.thomas@epa.gov](mailto:poy.thomas@epa.gov). Thanks

Tinka G. Hyde  
 Water Division Director  
 USEPA W-15J  
 77 W. Jackson Blvd  
 Chicago, IL 60604

Office: 312-886-9296  
 Cell: 312-735-9428



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF WATER

**NOV 03 2015**

**MEMORANDUM**

**SUBJECT:** Lead and Copper Rule Requirements for Optimal Corrosion Control Treatment for Large Drinking Water Systems

**FROM:** Peter C. Grevatt, Director  
Office of Ground Water and Drinking Water

A handwritten signature in black ink, appearing to read "P.C. Grevatt", written over the printed name and title.

**TO:** EPA Regional Water Division Directors, Regions I-X

This memorandum addresses certain concerns raised about the application of the 1991 Lead and Copper Rule, specifically the requirements pertaining to maintenance of optimal corrosion control treatment, in situations in which a large water system ceases to purchase treated water and switches to a new drinking water source. These concerns have been raised most recently in regard to the drinking water system in Flint, Michigan, where the water system was disconnected from the Detroit Water and Sewerage Department, which provided corrosion control treatment for Lake Huron source waters, and instead began distributing water from the Flint River. This type of situation rarely arises and the language of the LCR does not specifically discuss such circumstances. After reviewing the rule with our Office of General Counsel, it appears that there are differing possible interpretations of the LCR with respect to how the rule's optimal corrosion control treatment procedures apply to this situation, which may have led to some uncertainty with respect to the Flint water system. This memorandum clarifies how the LCR applies to this situation and eliminates the uncertainty for water systems and primacy agencies that may face these circumstances in the future.

It is important for large systems and primacy agencies<sup>1</sup> to take the steps necessary to ensure that appropriate corrosion control treatment is maintained at all times, thus ensuring that public health is protected. This memorandum focuses on those steps and clarifies, on a prospective basis, how EPA interprets the LCR corrosion control requirements and how primacy agencies should apply these requirements to large public water systems before, during and after making a significant change in source water, including switching from purchased water to a new source.

Under the LCR, all large systems (those serving more than 50,000 persons), whether purchasing water or not, must have completed a series of steps to either optimize the corrosion control treatment or be deemed to have optimal corrosion control treatment (OCCT) by 1998. 40 CFR 141.81. Key steps for

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<sup>1</sup> The term "primacy agency" refers to the State, tribe or U.S. Environmental Protection Agency regional office having jurisdiction over, and primary enforcement responsibility for, a given public water system.

optimizing corrosion control include monitoring, corrosion control studies, installation of treatment, follow-up sampling and specification by the primacy agency of water quality parameters (WQPs) for monitoring corrosion control. The LCR requires any large system that has met the OCCT requirements through the installation of corrosion control treatment to continue operating and maintaining the treatment and to continue meeting the WQPs established by the primacy agency. 40 CFR 141.81(b) and 141.82(g). Systems deemed to have OCCT without the installation of corrosion control treatment are not subject to this requirement. However, they are required to notify the primacy agency in writing of any upcoming changes in treatment or source and request that the primacy agency modify its determination of the OCCT and WQPs applicable to the system. The primacy agency must then review and approve the change and designate OCCT and WQPs prior to its implementation by the system. 141.81(b)(3). Similarly, systems subject to reduced monitoring or monitoring waivers must notify the primacy agency of any upcoming changes in treatment or source and the primacy agency must subsequently review and approve it. EPA recommends that systems that are not subject to a notification requirement also notify the primacy agency prior to the addition of a new source or treatment and request the primacy agency to modify its determination of the optimal corrosion control and WQPs applicable to the system.

Due to the unique characteristics of each PWS (e.g., source water, existing treatment processes, distribution system materials) it is critical that public water systems, in conjunction with their primacy agencies and, if necessary, outside technical consultants, evaluate and address potential impacts resulting from treatment and/or source water changes. It is also critical for public water systems to conduct ongoing monitoring to ensure compliance with OCCT prior to, during and after a source or treatment change. The rearrangement of a system's existing configuration may trigger the need for OCCT adjustments and establishment of appropriate WQPs. Primacy agencies should work with systems that plan to disconnect from a supplier that had installed corrosion control treatment to determine the OCCT for the new source and establish WQPs for that treatment instead of using the OCCT and WQPs established for the previous source. This will allow a system that ceases to purchase treated water to stay in compliance with any applicable requirements pertaining to OCCT and ensure protection of public health during and after the change in source. EPA has developed a guidance manual<sup>2</sup> specifically focusing on evaluation of corrosion control treatment options and optimization of full-scale treatment to assist water systems and primacy agencies with these efforts. EPA is currently preparing an updated version of the manual, which we anticipate will be released in February 2016.

The key to identifying and mitigating potential problems is to ensure effective collaboration between the public water system and the primacy agency. Corrosion control treatment can come in many forms. For this reason, it is important to conduct a system-wide assessment prior to any source water and/or treatment modifications and to identify existing or anticipated water quality, treatment or operational issues that may interfere with or limit the effectiveness of corrosion control treatment optimization or re-optimization.

If you have additional questions or concerns, please contact me or have your staff contact Maria Lopez Carbo, Chief of the Protection Branch, in the Office of Ground Water and Drinking Water, at [lopez-carbo.maria@epa.gov](mailto:lopez-carbo.maria@epa.gov).

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<sup>2</sup> U.S. Environmental Protection Agency. *Lead and Copper Rule Guidance Manual, Volume II: Corrosion Control Treatment*. Office of Water, EPA 811-B-92-002. 1992. Available at: <http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=91019DM4.txt>.

**Rennaker, Joanne (DEQ)**

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**From:** Wurfel, Brad (DEQ)  
**Sent:** Thursday, July 09, 2015 4:54 PM  
**To:** Busch, Stephen (DEQ); Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ)  
**Cc:** Pallone, Maggie (DEQ); Wyant, Dan (DEQ)  
**Subject:** FW: here's the interim report

Steve,

The ACLU has saved us the trouble of waiting on EPA for the report ... it's online at the link below. Lindsey Smith at Mi Public Radio picked up the story from Josh. Her inquiry has to do with EPA's Miguel making an assertion that we (DEQ) encourage people to flush their pipes before taking a water sample ... which is the opposite of what you described to me as the protocol. Miguel apparently asserts that the DEQ and EPA are at odds on proper protocol. Which seems weird.

Let's discuss. Thanks!

b

**From:** Lindsey Smith [<mailto:lmsmj@umich.edu>]  
**Sent:** Thursday, July 09, 2015 4:48 PM  
**To:** Wurfel, Brad (DEQ)  
**Subject:** here's the interim report

<http://www.aclumich.org/sites/default/files/file/EPAWaterReport062415.pdf>

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Lindsey Smith  
West Michigan Reporter  
Michigan Radio  
Office (616) 551-0717  
[michiganradio.org](http://michiganradio.org)

**Rennaker, Joanne (DEQ)**

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**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Thursday, February 26, 2015 11:48 AM  
**To:** Sygo, Jim (DEQ); Wurfel, Brad (DEQ)  
**Cc:** Benzie, Richard (DEQ); Busch, Stephen (DEQ); Shaler, Karen (DEQ); Feuerstein, Heather (DEQ); Devereaux, Tracy Jo (DEQ)  
**Subject:** FW: HIGH LEAD: FLINT Water testing Results

FYI – just a heads up.

Begin forwarded message:

**From:** "Prysby, Mike (DEQ)" <[PRYSBYM@michigan.gov](mailto:PRYSBYM@michigan.gov)>  
**Date:** February 26, 2015 at 11:24:32 AM EST  
**To:** "Crooks, Jennifer" <[crooks.jennifer@epa.gov](mailto:crooks.jennifer@epa.gov)>  
**Cc:** "Busch, Stephen (DEQ)" <[BUSCHS@michigan.gov](mailto:BUSCHS@michigan.gov)>, "Rosenthal, Adam (DEQ)" <[ROSENTHALA@michigan.gov](mailto:ROSENTHALA@michigan.gov)>  
**Subject:** RE: HIGH LEAD: FLINT Water testing Results

Jennifer,

I recall Adam showing me a high lead/copper sample result (perhaps it was this one)...as part of the city's routine lead-copper monitoring. If so, it was a stagnated sample as part of the sampling protocol. Adam mentioned that all other samples were below the AL...and the city will not exceed the lead AL. I will confirm this. The city; however, needs to take further action to help address Ms. Walter's concern. The type of plumbing needs to be identified and sample tap location within the premise plumbing. They should offer to re-sample for PB after flushing the tap to demonstrate that flushing the tap will reduce the lead concentration. The city also needs to provide other lead-reduction strategies to Mrs. Walters.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

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**From:** Crooks, Jennifer [<mailto:crooks.jennifer@epa.gov>]  
**Sent:** Thursday, February 26, 2015 10:53 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Cc:** Poy, Thomas; Deltoral, Miguel  
**Subject:** HIGH LEAD: FLINT Water testing Results



Hi, Steve and Mike. Thanks for talking with me yesterday, Steve, about the most recent TTHM results. We'll look forward to receiving them whenever you get them back from the lab.

However, the main purpose of my email is to alert you to the high lead levels reported to a citizen yesterday by Flint Water Dept. I have been discussing the water situation with LeeAnn Walters since January, and she has been talking with Mike Glasgow at the plant about the black sediment in her water. (HUGE KUDOs to MIKE!!) He did test it to find that the iron levels were greater than his test would go; GT 3.3. But, because the iron levels were so high, he suggested testing for lead and copper. WOW!!!! Did he find the LEAD! **104 ppb**. She has 2 children under the age of 3... Big worries here.

So, Steve, this goes back to what you and I were talking about yesterday. That the different chemistry water is leaching out contaminants from the insides of the biofilms inside the pipes. I think Lead is a good indication that other contaminants are also present in the tap water, that obviously were not present in the compliance samples taken at the plant. VOC/SOC and inorganics/metals would be good samples to start with to take at the tap. And since Ms. Walters' drinking water is showing the high lead levels, her tap water would be a good place to start, I think.

We also talked about Dr. Joan Rose from Michigan State being on the Flint Tech Advisory Committee—you also mentioned that someone from the Dept of Community Health was on the Committee. I'm thinking that Dr. Rose would want to dive further into this, since there's actual evidence that the water is leaching contaminants from the biofilms; or Dept of Community Health would want to get involved and look at this from an epidemiological perspective. (She and her family are also exhibiting the rashes when exposed to the water, and her daughter's hair is falling out in clumps.)

Maybe MSU could authorize the payment of the analyses for these samples? Or Dept of Community Health?

The citizen's name is:  
 LeeAnn Walters  
 212 Browning Ave  
 Flint, MI 48507  
 616-212-6233  
[lwalters313@gmail.com](mailto:lwalters313@gmail.com)

Jennifer

**From:** Lea Moste [<mailto:lwalters313@gmail.com>]  
**Sent:** Thursday, February 26, 2015 9:08 AM  
**To:** Crooks, Jennifer  
**Subject:** Fwd: Re: Water testing Results

----- Forwarded message -----

**From:** "Michael Glasgow" <[mglasgow@cityofflint.com](mailto:mglasgow@cityofflint.com)>  
**Date:** Feb 26, 2015 7:55 AM  
**Subject:** Re: Water testing Results  
**To:** "Lea Moste" <[lwalters313@gmail.com](mailto:lwalters313@gmail.com)>  
**Cc:**

Lee,

Here are your Lead & Copper Results. This number is very high, 104 ppb of lead. In the last few months over 100 samples have been tested and only 2 were over the 15 ppb regulatory limit, and the highest level I have seen is 37 ppb. I will pass this info to Mr. Croft so he is aware. I will send the sample I collected from your kitchen faucet today for a complete metals test (12 different metals), to see what the level is without letting the water stagnate over night. I'm hoping that value will be much, but we will have to see. Sorry for this news, but I wanted to let you know right away.

Mike

On Tue, Feb 24, 2015 at 1:50 PM, Michael Glasgow <[mglasgow@cityofflint.com](mailto:mglasgow@cityofflint.com)> wrote:

Lee,

I will bring a copy of last years annual report when I stop by tomorrow. The annual report from 2014 must be delivered to residents by July 1st of this year. I imagine we may have it complete by June.

Mike

On Fri, Feb 20, 2015 at 1:00 AM, Lea Moste <[lwalters313@gmail.com](mailto:lwalters313@gmail.com)> wrote:

Mike,

Thank you for the water reports and we already planned to see you on the 25th at 10:00am. I was wondering if you know who I need to talk to in the water plant to obtain the Annual Drinking Water Report from last year. According to the EPA website there is link to access but when you click on it, it cannot be accessed. Was also curious if there is an expected time frame for this years report due to the switch. If you can be of any assistance I would appreciate it.

Thank You

LeeAnne Walters

On Thu, Feb 19, 2015 at 12:47 PM, Michael Glasgow <[mglasgow@cityofflint.com](mailto:mglasgow@cityofflint.com)> wrote:

Lee & Dennis,

Here is a list of test results from water sampled at your home over the last 2 weeks. I have sent in your lead and copper sample, and also a sample from the toilet tank for manganese. I should hopefully have results from this testing early next week. I'll plan on stopping over on Wednesday (the 25th) around 10 am again to give you these results & sample again.

Mike

**Rennaker, Joanne (DEQ)**

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**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Thursday, March 19, 2015 3:30 PM  
**To:** Sygo, Jim (DEQ); Wurfel, Brad (DEQ)  
**Cc:** Benzie, Richard (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Information Request and Documentation

Please see the note below.

Has there been any further communication with or from DCH?

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**From:** Busch, Stephen (DEQ)  
**Sent:** Thursday, March 19, 2015 3:05 PM  
**To:** Benzie, Richard (DEQ); Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** FW: Information Request and Documentation

Response from Jim Henry below.

Stephen Busch, P.E.  
 Lansing and Jackson District Supervisor  
 Office of Drinking Water and Municipal Assistance  
 MDEQ  
 517-643-2314

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**From:** Henry, James [<mailto:jhenry@gchd.us>]  
**Sent:** Thursday, March 19, 2015 12:15 PM  
**To:** Busch, Stephen (DEQ)  
**Cc:** Valacak, Mark; Cupal, Suzanne  
**Subject:** RE: Information Request and Documentation

Hello Mr. Busch,

Thanks for your response. I'm looking forward to working with your office moving forward. Based upon my experiences with this investigation, I think it is necessary for my communications to be candid and followed up in writing whenever possible. Our goal is to successfully conduct this investigation in efforts to better protect the public.

I agree there are ambiguities written in the FOIA request. GCHD does not have municipal water system expertise and we are continuously learning about the processes. The FOIA request is specific enough that we should have received a timely response from the City of Flint. Also, it is addressed to the City and I apologize if there were misunderstandings regarding the intended recipient.

There have not been any conclusions regarding the source of illnesses. Our team is gathering information and we suspect there may be several sources. It has been made clear that the Flint municipal water system is in compliance with the Safe Drinking Water Act. It seems reasonable that your office would be involved regardless if a potential health risk from municipal water is related to consumption, inhalation or dermal exposure. Perhaps the legislation should be revisited to better address risks.

As you mentioned, we had communications with your office in October 2014, regarding Legionella, but I also had three telephone conversations with Mr. Michael Prysby, from your office between January 21, 2015 and January 23, 2015. These conversations occurred around the same time that your office participated with the TTHM presentation in Flint. I "explicitly explained" the details of the Legionella concerns and the possible associations with the Flint municipal water system and I specifically requested to meet with your office for further discussions.

Mr. Prysby informed me that the concerns were discussed with you. I was informed there was no reason to meet because the municipal water system is in compliance with the Safe Drinking Water Act. Other than the timeframes written in your email, you are correct, I did not contact your office again until the email, dated March, 10, 2015.

GCHD has been working closely with MDCH and has consulted with CDC on several occasions regarding the epidemiological investigation. Also, we have been working with Legionella and municipal water experts, and recently with the USEPA. Based upon these discussions we have been informed that it is likely that a small amount of Legionella will survive the water treatment process at the plant and enter into the distribution system.

Our team is in the process of developing plans, which may include sampling locations within the distribution system and comparing environmental and clinical isolates. We recognize potential social, political and economic impacts regarding this investigation and need to be prepared for all outcomes. Hopefully, your office, the regulatory agency, will be available for assistance.

If a representative from your office is available to meet next week, please respond with some dates and times. I think it would be appropriate for the City to attend meetings and I will contact Mr. Croft, Flint DPW Director, after I receive a response from your office.

Thank you

Jim

Jim Henry  
 Jim Henry RS, MBA  
 Environmental Health Supervisor  
 Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
 630 S. Saginaw St., Suite 4  
 Flint, MI 48502-1540  
 Phone (810) 257-3618 Fax (810) 257-3125  
 E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)



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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at <http://www.gchd.us/>

**From:** Busch, Stephen (DEQ) [<mailto:BUSCHS@michigan.gov>]  
**Sent:** Friday, March 13, 2015 3:47 PM  
**To:** Henry, James  
**Cc:** Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** RE: Information Request and Documentation

Mr. Henry,

The January 27, 2015, FOIA request you provided was directed to the City of Flint, not the DEQ. The DEQ has no record of a FOIA request from your office for such information. It is our understanding that the City has responded to your FOIA request, has helped you adequately redefine your request within the City's scope of public record to address such ambiguities as "any additional areas of concern", and provided you with additional information beyond the scope of your request.

The DEQ fully recognizes the public health threat posed to individuals that contract Legionnaires' Disease with the understanding that the disease is not contracted by ingestion of potable water and therefore not regulated under the federal Safe Drinking Water Act. Your email below claims that you have explicitly explained the situation to our Department. However, since contacting our office early last October to indicate a rise in cases, we have not received any further information regarding your epidemiological investigation into this matter.

Further, conclusions that legionella is coming from the public water system without the presentation of any substantiating evidence from your epidemiologic investigation appears premature and prejudice toward that end.

It is highly unlikely that legionella would be present in treated water coming from the City of Flint water treatment plant given the treatment plant's use of ozone along with complete treatment and chlorine disinfect contact time to comply with federal surface water treatment rules for potable water. Detections of total coliform or heterotrophic bacteria in the City's public water distribution system indicate an environment where bacterial growth may be supported. However, there is no direct correlation that can be made to the presence of legionella. While total organic carbon levels in potable water may serve as a food source for bacteria growth in private plumbing system, water temperatures in the City's distribution system are below legionella growth range, and chlorine residual levels would also limit such growth.

Our office agrees that water main breaks, water leaks, and system repairs are possible vectors for legionella to enter the public water system. These should be investigated as part of your epidemiology. DEQ staff can be made available to assist GCHD and the City regarding such matters, but to date no request by GCHD for any such meeting has been received, let alone declined as alleged in your email.

If GCHD is seeking assistance to complete its epidemiological investigation regarding this matter, such resource requests should be directed to the Michigan Department of Community Health. Our Office agrees that a multi-agency partnership would be beneficial to move forward and develop a unified response. In that respect, if our Office can be of any further assistance you may contact me directly.

Stephen Busch, P.E.  
 Lansing and Jackson District Supervisor  
 Office of Drinking Water and Municipal Assistance  
 MDEQ  
 517-643-2314

**From:** "Henry, James" <[jhenry@gchd.us](mailto:jhenry@gchd.us)>  
**Date:** March 10, 2015 at 6:40:17 PM EDT  
**To:** Howard Croft <[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)>, "Mike Prysby (DEQ)"

<prysbym@michigan.gov>, Elizabeth Murphy <emurphy@cityofflint.com>, "Natasha Henderson" <nhenderson@cityofflint.com>, Jerry Ambrose <gambrose49@gmail.com>, Dayne Walling <dwalling@cityofflint.com>  
**Cc:** "Valacak, Mark" <MVALACAK@gchd.us>, "Cupal, Suzanne" <scupal@gchd.us>, "Hasan, Shurooq" <shasan@gchd.us>, "Childs, Bonnie" <BCHILDS@gchd.us>, "Hallwood, Dawn" <dhallwood@gchd.us>, "Johnson, M.D., Gary" <GJOHNSON@gchd.us>

**Subject: Information Request and Documentation**

Hello everyone,

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The increase of the illnesses closely corresponds with the timeframe of the switch to Flint River water. The majority of the cases reside or have an association with the city. Also, McLaren Hospital identified and mitigated Legionella in their water system. This is rather glaring information and it needs to be looked into now, prior to the warmer summer months when Legionella is at its peak and we are potentially faced with a crisis.

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Respectfully,

Jim

Jim Henry  
 Jim Henry RS, MBA  
 Environmental Health Supervisor  
 Genesee County Health Department [www.gchd.us](http://www.gchd.us)  
 630 S. Saginaw St., Suite 4  
 Flint, MI 48502-1540  
 Phone (810) 257-3618 Fax (810) 257-3125  
 E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Thursday, March 12, 2015 8:41 AM  
**To:** Wurfel, Brad (DEQ); Sygo, Jim (DEQ); Howes, Sarah (DEQ)  
**Cc:** Shaler, Karen (DEQ); Benzie, Richard (DEQ); Devereaux, Tracy Jo (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Information Request and Documentation  
**Attachments:** FOIA Request Flint Water.doc  
  
**Importance:** High

The district received this late Tuesday.

Steve Busch has indicated that the district has not received a meeting request from Jim Henry or the Genesee County Health Department as indicated in his email below.

The FOIA is specifically directed to the City of Flint not the DEQ.

While the change in source may have created water quality conditions that could provide additional organic nutrient source to support legionella growth, there is no evidence or confirmation of legionella coming directly from the Water Treatment Plant or in the community water supply distribution system at this time.

Seems like the next step is to communicate with DCH and possibly develop a joint strategy/response. Not sure who in Exec wants to take the lead on this. Steve Busch and Mike Prysby will continue to be lead for us on this. They have been in contact with DCH recently but only to learn that little progress has been made in identifying a source or sources for the illnesses.

Begin forwarded message:

**From:** "Henry, James" <jhenry@gchd.us>  
**Date:** March 10, 2015 at 6:40:17 PM EDT  
**To:** Howard Croft <hcroft@cityofflint.com>, "Mike Prysby (DEQ)" <prysbym@michigan.gov>, Elizabeth Murphy <emurphy@cityofflint.com>, "Natasha Henderson" <nhenderson@cityofflint.com>, Jerry Ambrose <gambrose49@gmail.com>, Dayne Walling <dwalling@cityofflint.com>  
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Phone (810) 257-3618 Fax (810) 257-3125

E-mail [jhenry@gchd.us](mailto:jhenry@gchd.us)





# Genesee County Health Department

Mark Valacak, M.P.H., Health Officer  
Gary K. Johnson, M.D., M.P.H., Medical Director

January 27, 2015

FOIA Coordinator, City of Flint  
1101 S. Saginaw Street, 3<sup>rd</sup> floor  
Flint, MI 48502

## **RE: Flint Water Plant Information Request**

Dear FOIA Coordinator,

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If you determine that any of the requested information is exempt from disclosure, please detail what is being withheld and cite the exemption under FOIA. I anticipate the request being filled within five working days of receipt of this letter, as provided under FOIA. Please contact me at (810) 257-3618 if there are fees associated to comply with this request.

Sincerely,

**Jim Henry**

Jim Henry  
Environmental Health Supervisor  
Genesee County Health Department  
630 S. Saginaw Street  
Flint, MI 48502

**Better Life Through Better Health**

**Floyd J. McCree Courts & Human Services Building ♦ 630 S. Saginaw Street, Ste. 4 ♦ Flint, Michigan 48502-1540**

**Burton Branch ♦ G-3373 S. Saginaw Street ♦ Burton, Michigan 48529**

Main Phone 810-257-3612 ♦ Visit us at: [www.gchd.us](http://www.gchd.us)

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Thursday, March 12, 2015 2:48 PM  
**To:** Miller, Corinne (DCH)  
**Cc:** Busch, Stephen (DEQ); Benzie, Richard (DEQ)  
**Subject:** FW: Information Request and Documentation  
**Attachments:** FOIA Request Flint Water.doc

Corinne –

This is the e-mail I mentioned this morning.

Liane J. Shekter Smith, P.E., Chief  
 Office of Drinking Water and Municipal Assistance  
 Michigan Department of Environmental Quality  
 517-284-6543

Begin forwarded message:

**From:** "Henry, James" <jhenry@gchd.us>  
**Date:** March 10, 2015 at 6:40:17 PM EDT  
**To:** Howard Croft <hcroft@cityofflint.com>, "Mike Prysby (DEQ)" <prysbym@michigan.gov>, Elizabeth Murphy <emurphy@cityofflint.com>, "Natasha Henderson" <nhenderson@cityofflint.com>, Jerry Ambrose <gambrose49@gmail.com>, Dayne Walling <dwalling@cityofflint.com>  
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Respectfully,

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Environmental Health Supervisor

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# Genesee County Health Department

Mark Valacak, M.P.H., Health Officer  
Gary K. Johnson, M.D., M.P.H., Medical Director

January 27, 2015

FOIA Coordinator, City of Flint  
1101 S. Saginaw Street, 3<sup>rd</sup> floor  
Flint, MI 48502

## **RE: Flint Water Plant Information Request**

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**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Friday, March 13, 2015 3:55 PM  
**To:** Wurfel, Brad (DEQ); Benzie, Richard (DEQ); Sygo, Jim (DEQ); Howes, Sarah (DEQ)  
**Cc:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: Information Request and Documentation  
**Attachments:** FOIA Request Flint Water.doc

FYI – in case you weren't bcc'd on this note. Just wanted to make sure we stay on the same page....

Nicely done Steve and Mike.

---

**From:** Busch, Stephen (DEQ)  
**Sent:** Friday, March 13, 2015 3:47 PM  
**To:** jhenry@gchd.us  
**Cc:** Prysby, Mike (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** RE: Information Request and Documentation

Mr. Henry,

The January 27, 2015, FOIA request you provided was directed to the City of Flint, not the DEQ. The DEQ has no record of a FOIA request from your office for such information. It is our understanding that the City has responded to your FOIA request, has helped you adequately redefine your request within the City's scope of public record to address such ambiguities as "any additional areas of concern", and provided you with additional information beyond the scope of your request.

The DEQ fully recognizes the public health threat posed to individuals that contract Legionnaires' Disease with the understanding that the disease is not contracted by ingestion of potable water and therefore not regulated under the federal Safe Drinking Water Act. Your email below claims that you have explicitly explained the situation to our Department. However, since contacting our office early last October to indicate a rise in cases, we have not received any further information regarding your epidemiological investigation into this matter.

Further, conclusions that legionella is coming from the public water system without the presentation of any substantiating evidence from your epidemiologic investigation appears premature and prejudice toward that end.

It is highly unlikely that legionella would be present in treated water coming from the City of Flint water treatment plant given the treatment plant's use of ozone along with complete treatment and chlorine disinfect contact time to comply with federal surface water treatment rules for potable water. Detections of total coliform or heterotrophic bacteria in the City's public water distribution system indicate an environment where bacterial growth may be supported. However, there is no direct correlation that can be made to the presence of legionella. While total organic carbon levels in potable water may serve as a food source for bacteria growth in private plumbing system, water temperatures in the City's distribution system are below legionella growth range, and chlorine residual levels would also limit such growth.

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Lansing and Jackson District Supervisor  
Office of Drinking Water and Municipal Assistance  
MDEQ  
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# Genesee County Health Department

Mark Valacak, M.P.H., Health Officer  
Gary K. Johnson, M.D., M.P.H., Medical Director

January 27, 2015

FOIA Coordinator, City of Flint  
1101 S. Saginaw Street, 3<sup>rd</sup> floor  
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**Rennaker, Joanne (DEQ)**

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Wednesday, September 09, 2015 4:52 PM  
**To:** Busch, Stephen (DEQ); Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: june 24 memorandum  
**Attachments:** 4239\_001.pdf

Heads up  
b

---

**From:** Ronald Fonger [<mailto:RFONGER1@mlive.com>]  
**Sent:** Wednesday, September 09, 2015 1:28 PM  
**To:** Wurfel, Brad (DEQ)  
**Subject:** june 24 memorandum

Brad:  
I know you said the state would not comment on unofficial draft reports from U.S. EPA staff, but since the attached June 24 memorandum was sent to four DEQ staff members, can you comment about what – if anything – the state has done in response?  
Was the city of Flint notified of the issues raised in the memorandum directly by DEQ?  
Was there a written response from DEQ to U.S. EPA to the memo?  
Thanks, we are looking further into some of the issues raised in this document.

**Ron Fonger**  
MLive Media Group  
Reporter

mobile 810.347.9963  
email [rfonger1@mlive.com](mailto:rfonger1@mlive.com)  
address 540 S. Saginaw St. #101, Flint MI 48502



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 REGION 5  
 77 WEST JACKSON BOULEVARD  
 CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

WG-15J

June 24, 2015

**MEMORANDUM**

SUBJECT: High Lead Levels in Flint, Michigan – Interim Report

FROM: Miguel A. Del Toral *WADT*  
 Regulations Manager, Ground Water and Drinking Water Branch

TO: Thomas Poy  
 Chief, Ground Water and Drinking Water Branch

The purpose of this interim report is to summarize the available information regarding activities conducted to date in response to high lead levels in drinking water reported by a resident in the City of Flint, Michigan. The final report will be submitted once additional analyses have been completed on pipe and water samples.

Following a change in the water source, the City of Flint has experienced a number of water quality issues resulting in violations of National Primary Drinking Water Regulations (NPDWR) including acute and non-acute Coliform Maximum Contaminant Level (MCL) violations and Total Trihalomethanes (TTHM) MCL violations as follows:

Acute Coliform MCL violation in August 2014  
 Monthly Coliform MCL violation in August 2014  
 Monthly Coliform MCL violation in September 2014  
 Average TTHM MCL violation in December 2014  
 Average TTHM MCL violation in June 2015

In addition, as of April 30, 2014, when the City of Flint switched from purchasing finished water from the City of Detroit to using the Flint River as their new water source, the City of Flint is no longer providing corrosion control treatment for lead and copper.

A major concern from a public health standpoint is the absence of corrosion control treatment in the City of Flint for mitigating lead and copper levels in the drinking water. Recent drinking water sample results indicate the presence of high lead results

in the drinking water, which is to be expected in a public water system that is not providing corrosion control treatment. ~~The lack of any mitigating treatment for lead is of serious concern for residents that live in homes with lead service lines or partial lead service lines, which are common throughout the City of Flint.~~

In addition, following the switch to using the Flint River, the City of Flint began adding ferric chloride, a coagulant used to improve the removal of organic matter, as part of the strategy to reduce the TTHM levels. Studies have shown that an increase in the chloride-to-sulfate mass ratio in the water can adversely affect lead levels by increasing the galvanic corrosion of lead in the plumbing network.

Prior to April 30, 2014, the City of Flint purchased finished water from the City of Detroit which contained orthophosphate, a treatment chemical used to control lead and copper levels in the drinking water. ~~When the City of Flint switched to the Flint River as their water source on April 30, 2014, the orthophosphate treatment for lead and copper control was not continued.~~ In effect, the City of Flint stopped providing treatment used to mitigate lead and copper levels in the water. In accordance with the Lead and Copper Rule (LCR), all large systems (serving greater than 50,000 persons) are required to install and maintain corrosion control treatment for lead and copper. In the absence of any corrosion control treatment, lead levels in drinking water can be expected to increase.

~~The lack of mitigating treatment is especially concerning as the high lead levels will likely not be reflected in the City of Flint's compliance samples due to the sampling procedures used by the City of Flint for collecting compliance samples.~~ The instructions from the City of Flint to residents direct the residents to 'pre-flush' the taps prior to collecting the compliance samples. A copy of the instructions provided by the City of Flint to residents will be included in the final report.

The practice of pre-flushing before collecting compliance samples has been shown to result in the minimization of lead capture and significant underestimation of lead levels in the drinking water. Although this practice is not specifically prohibited by the LCR, it negates the intent of the rule to collect compliance samples under 'worst-case' conditions, which is necessary for statistical validity given the small number of samples collected for lead and copper under the LCR. This is a serious concern as the compliance sampling results which are reported by the City of Flint to residents could provide a false sense of security to the residents of Flint regarding lead levels in the water and may result in residents not taking necessary precautions to protect their families from lead in the drinking water. Our concern regarding the inclusion of 'pre-flushing' in sampling instructions used by public water systems in Michigan has been raised with the Michigan Department of Environmental Quality (MDEQ). The MDEQ has indicated that this practice is not prohibited by the LCR and continues to retain the 'pre-flushing' recommendation in their lead compliance sampling guidance to public water systems in Michigan. A copy of the MDEQ guidance will be included in the final report.

In the case of the Flint resident that contacted U.S. EPA (Ms. Lee-Anne Walters), the initial results from drinking water samples collected by the City of Flint in her home

for lead were 104 ug/L and 397 ug/L. The level of iron in the water also exceeded the capability of the measurement ( $>3.3$  mg/L). The lead results were especially alarming given that the samples were collected using the sampling procedures described above, which minimize the capture of lead. When contacted by U.S. EPA Region 5, the MDEQ indicated that the lead was coming from the Walters' plumbing. Ms. Walters had previously indicated that all of the plumbing in the home was plastic.

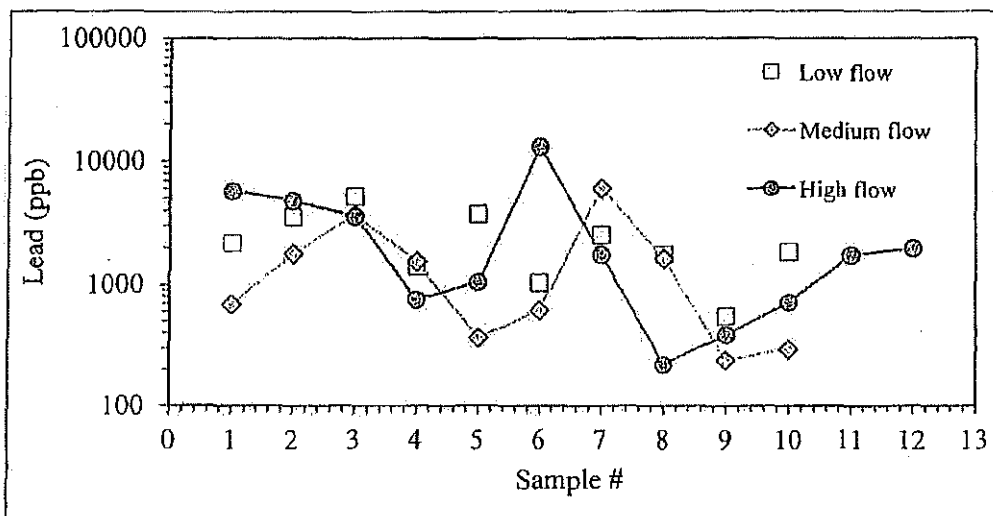
Following the confirmation of the initial high lead results, U.S. EPA Region 5 conducted two visits to the Walters' home on April 27, 2015 and May 6, 2015. Based on an inspection of the plumbing and subsequent sampling conducted at the Walters' residence, it was determined that except for a few minor metallic connectors, all interior plumbing, including the pipes, valves and connectors are made of plastic certified by the National Sanitation Foundation (NSF) for use in drinking water applications. Subsequent sampling showed that the faucets in the home appear to be compliant with the new lead-free requirements and are also not the source for the high lead levels. Our inspection of the interior plumbing and analysis of follow-up sampling results demonstrate that the home plumbing network is not the source of the high lead levels found at the Walters' residence. The photographs and all sampling results will be included in the final report.

Based on the U.S. EPA inspection and documentation of the plastic plumbing at the Walters' residence, it was suspected that the high lead was being introduced into the Walters' home plumbing from outside the home, likely from a lead service line. Three portions of the service line were extracted during a subsequent trip on May 6, 2015 and sent for analysis, when the Walters' service line was replaced. Analyses performed to date indicate that a portion of the service line is made of galvanized iron pipe. Inspection of the remaining portion from the water main to the external shut-off valve confirmed that the portion from the water main to the external shut-off valve is a lead service line.

Ms. Walters has also provided U.S. EPA with medical reports on her child's blood lead testing indicating that the child had a low blood lead level (2 ug/dL) prior to the source water switch and an elevated blood lead level following the switch (6.5 ug/dL). Redacted copies of these reports will also be included in the final report.

Subsequent to the discovery of high lead levels in the Walters' drinking water, the water to the Walters' home was shut off on April 3, 2015. The water was briefly turned back on to collect additional samples on April 28, 2015. Since the water had stagnated for an extended period of time, the kitchen tap was flushed for 25 minutes the night before collecting the samples. Three sets of samples were collected at different flow rates (10 at low flow, 10 at medium flow and 10 at high flow).

The drinking water samples collected from the Walters' residence on April 28, 2015 contained extremely high lead levels, ranging in value from 200 ug/L to 13,200 ug/L (see below).



*Sample results and graph are provided courtesy of Virginia Tech*

Additional sample results from resident-requested samples have also shown lead levels in excess of the lead action level. As with the samples collected by the City of Flint for compliance, the resident-requested samples are also being collected using the 'pre-flushing', so the lead levels captured in these samples likely do not represent the worst-case lead levels in the water and the actual lead levels at these homes may be much higher.

Pending completion of the final report, my interim recommendations are as follows:

1. The U.S. EPA should follow up with the MDEQ and the City of Flint on the recommendation made by U.S. EPA to MDEQ on June 10, 2015 to offer the City of Flint technical assistance on managing the different water quality issues in Flint, including lead in the drinking water. Although there have been two written assessments regarding water quality and operational issues in Flint at the time of this report, they do not address lead in drinking water. The first is an Operational Evaluation Report (OER) produced in November 2014 by Lockwood, Andrews and Newnam, Inc. to assess the factors contributing to high Total Trihalomethane (TTHM) levels in Flint following the source change. The focus of this report is to identify potential causes and remedial actions for lowering TTHM levels. The second report (Water Quality Report) produced by Veolia for the City of Flint on March 12, 2015, is an assessment of Flint's water quality and operations which provides advice to the City of Flint primarily focused on TTHM control and other operational issues. Both reports were written prior to the recent discovery of high lead results in Flint drinking water. As such, the reports do not take into account the potential effects on lead levels in drinking water.

As previously mentioned, the City of Flint currently has no mitigating treatment for lead and is also planning another source water change in the near future. U.S. EPA's Office of Research and Development in Cincinnati has extensive experience in corrosion and corrosion control treatment and distribution system issues and would be a valuable addition to the drinking water advisory group for the City of Flint. Copies of the qualifications and experience for Michael Schock and Darren Lytle have been forwarded to MDEQ.

2. U.S. EPA should review the compliance status of the City of Flint with respect to whether the system is in violation of the LCR requirement to install and maintain optimal corrosion control and whether the MDEQ is properly implementing the LCR provisions regarding optimal corrosion control treatment requirements for large systems. Pursuant to 40 CFR Section 141.82(i), the EPA Regional Administrator may review treatment determinations made by a State and issue federal treatment determinations consistent with the requirements of the LCR where the Regional Administrator finds: (1) A state has failed to issue a treatment determination by the applicable deadlines; (2) A State has abused its discretion in a substantial number of cases or in cases affecting a substantial population; or (3) The technical aspects of a State's determination would be indefensible in an expected Federal enforcement action taken against a system.
3. The U.S. EPA should review whether relevant resident-requested samples are being included by the City of Flint in calculating the 90<sup>th</sup> percentile compliance value for lead. Recent drinking water tests conducted at homes in Flint for lead that are not part of the compliance sampling pool have revealed high lead levels in the drinking water. The U.S. EPA memorandum signed on December 23, 2004 provides clarification on compliance determinations and states that customer-requested samples are to be included in the 90<sup>th</sup> percentile lead compliance calculation where the sampling is conducted during the monitoring period from sites and sampling procedures meeting the LCR criteria. Given the prevalence of lead service lines in the City of Flint, should these sample results be from homes with lead service lines, the sample results would be considered compliance samples under the LCR.

Also attached is a timeline of events for Flint, Michigan. Should you have any questions regarding the information or recommendations provided, please let me know.

cc: Liane Shekter-Smith (MDEQ)  
 Pat Cook (MDEQ)  
 Stephen Busch (MDEQ)  
 Michael Prysby (MDEQ)  
 Marc Edwards (Virginia Tech)  
 Michael Schock, EPA-ORD  
 Darren Lytle, EPA-ORD

**Rennaker, Joanne (DEQ)**

---

**From:** Sygo, Jim (DEQ)  
**Sent:** Tuesday, April 16, 2013 9:59 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ); Benzie, Richard (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Shaler, Karen (DEQ); Thelen, Mary Beth (DEQ)  
**Subject:** FW: KWA and City of Flint  
**Attachments:** KWA and City of Flint.pdf; ATT00001.htm

Steve, Mike and Richard,

Please take a look at DWSD's last best offer to the City of Flint and provide your collective perspective to the Director through Liane by the end of the week. Copy me in as well. I'll be out of the office but would like to know if you think this is worth considering.

Thank you for your expedited review.

---

**From:** Wyant, Dan (DEQ)  
**Sent:** Tuesday, April 16, 2013 6:52 AM  
**To:** Sygo, Jim (DEQ)  
**Subject:** FW: KWA and City of Flint

Jim,

Liane is out of the office today, Can you forward this directly to her staff that worked on this with us.

Dan Wyant, Director  
 Department of Environmental Quality  
 517-373-7917

---

**From:** Wyant, Dan (DEQ)  
**Sent:** Tuesday, April 16, 2013 6:51 AM  
**To:** Sygo, Jim (DEQ); Creal, William (DEQ); Shekter Smith, Liane (DEQ)  
**Cc:** Anderson, Madhu (DEQ)  
**Subject:** FW: KWA and City of Flint

Bill and Liane,

Can you have your staff's take a quick look at this and let me know today if they think this changes their thoughts and comments to me last week.

Dan Wyant, Director  
 Department of Environmental Quality  
 517-373-7917

---

**From:** Dillon, Andy (Treasury)  
**Sent:** Monday, April 15, 2013 7:55 PM  
**To:** Wyant, Dan (DEQ); Dennis Muchmore; Roberts, John (GOV)  
**Cc:** Stibitz, Brom (Treasury); Saxton, Thomas (Treasury)  
**Subject:** Fwd: KWA and City of Flint

FYI

Dan, any thoughts re the attached?

We gave dwsd until today to put best offer on table. Flint is to get back to us tmrw. I want to make sure their expected rejection is made in good faith.

Sent from my iPad

Begin forwarded message

**From:** "Debra Ragland" <[dragland@dwsd.org](mailto:dragland@dwsd.org)>  
**To:** "[ekurtz@cityofflint.com](mailto:ekurtz@cityofflint.com)" <[ekurtz@cityofflint.com](mailto:ekurtz@cityofflint.com)>  
**Cc:** "[jwright@co.genesees.mi.us](mailto:jwright@co.genesees.mi.us)" <[jwright@co.genesees.mi.us](mailto:jwright@co.genesees.mi.us)>, "Dillon, Andy (Treasury)" <[DillonA2@michigan.gov](mailto:DillonA2@michigan.gov)>, "James Fausone" <[fausone@dwsd.org](mailto:fausone@dwsd.org)>, "[orrk@detroitmi.gov](mailto:orrk@detroitmi.gov)" <[orrk@detroitmi.gov](mailto:orrk@detroitmi.gov)>, "Sue McCormick" <[mccormick@dwsd.org](mailto:mccormick@dwsd.org)>  
**Subject:** KWA and City of Flint

Please see attached on behalf of Sue F. McCormick.

Faxed copy forwarded to Mayor Dayne Walling and Jeff Wright.



CITY OF DETROIT  
WATER AND SEWERAGE DEPARTMENT  
OFFICE OF THE DIRECTOR

735 RANDOLPH STREET  
DETROIT, MICHIGAN 48226  
WWW.DETROITMI.GOV

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April 15, 2013

Karengondi Water Authority  
4160 Beecher Rd.  
Flint, Michigan 48532-2617

Ed Kurtz, Emergency Manager  
City of Flint  
1101 South Saginaw Street  
Flint, Michigan

Gentlemen:

Over the last several months, governed by a process laid out by the State of Michigan, the Detroit Water and Sewerage Department (DWSD) has proposed a number of alternatives for long term water supply to the City of Flint. Each alternative was offered in the spirit of working in earnest to address the needs, priorities and concerns of the City of Flint and each provided an immediate cost reduction when compared to the current costs of water purchased from DWSD. In the final analysis conducted by Flint, these proposals did not overcome the desire for the Flint/Genesee region to be served by the same system and to have a voice in the future decisions governing the provision of water to this region.

Many of the proposals DWSD has made to Flint during this period are applicable to Flint/Genesee County or KWA with adjustments to demand and use requirements and would provide similar overall benefit. These options remain available for further discussion should the parties' desire. These prior proposals are included in summary form in Attachment 1 as an expanded table 6-1 from the February 2013 State of Michigan Contract No. 271N3200089, City of Flint Water Supply Assessment, submitted by Tucker, Young, Jackson, Tull, Inc. For comparison purposes only, DWSD's new proposal (Flint's 30% allocated share) is inserted.

The proposal scenarios outlined today offer a public/public partnership with options tailored to Flint/Genesee County or KWAs interests. For ease of writing, the remainder of this memo will present this proposal to KWA. Two basic scenarios are presented for consideration, both of which contemplate that KWA would enter a multi-year contract. Service commitments and usage definitions would be negotiated in the same manner as employed that have resulted in new contracts for other customers.

In brief, the proposal provides a unique opportunity to reserve capacity at DWSD's Lake Huron Water Treatment Plant and to participate in decision making for facility operation and capital investment through a joint operating committee. The proposal envisions that KWA would enter into a 30-year contract to purchase treated water directly onsite at DWSD's Lake Huron Water Treatment Plant.

In Scenario 1 the purchased water can either be pressurized or unpressurized. This first scenario results in a "supply only" rate schedule, with a "standby delivery" component to provide for emergency service at the existing Baxter / Potter connection. This scenario provides KWA the ability to construct new transmission owned and operated by KWA.

Scenario 2 maintains the public/public partnership concept and extends it to transmission facilities through which the Lake Huron Water Treatment Plant provides water. This scenario results in a "full service" rate schedule. The standby delivery component is eliminated, since the rate structure to KWA includes costs associated with the transmission system between the Lake Huron Water Plant and the Baxter / Potter connection.

DWSD proposes a modified rate schedule for the customers currently served through the contract with the City of Flint, which includes Flint and Genesee County. This modified schedule is intended to facilitate negotiations for a new water service agreement with the Karegnondi Water Authority (KWA). The scenarios presented herein represent the innovative thinking that DWSD and its new leadership are bringing to the table. Our goal is to provide the lowest cost water solution for the KWA service area.

The potential rate structures are introduced in summary form herein, with preliminary calculations using the proposed rate structures with FY 2013-14 as a baseline. These calculations and the accompanying discussion are based on the assumptions regarding contract terms that approximate recent discussions amongst the parties.

The proposal introduces the concepts, but does not definitively present all of the specifics, appreciating that such specifics are best addressed through negotiations designed to produce a new contractual agreement satisfactory to all parties.

*[Remainder of page intentionally left blank]*

### Scenario 1 – Lake Huron Direct Supply Purchase:

- KWA enters into a long term partnering arrangement with DWSD to purchase all of its primary water supply directly at the DWSD Lake Huron water treatment plant.
- Supply rate schedule is designed to recover only water treatment revenue requirements. This rate schedule does not contain any delivery costs (pumping, transmission, storage, etc.).
- Supply rate schedule is computed based on specific costs associated with the Lake Huron Plant. No other DWSD revenue requirements, including those associated with other DWSD water plants, are included in the rate to KWA.
- Revenue requirements are separated into capital recovery and operation and maintenance expense elements. Baseline revenue requirement data (including operating budget, rate of return, depreciation assumptions, etc.) are identical to those developed for all other wholesale customers.
- KWA is allocated Lake Huron Plant capital revenue requirements based on the proportion of their contracted max day demand (assumed in these calculations at 40.6 mgd) relative to the total capacity at the Lake Huron Plant (400 mgd). The resulting revenue requirements are recovered through a fixed monthly charge.
- KWA is allocated Lake Huron Plant operating revenue requirements based on the proportion of their contracted average daily usage (assumed in these calculations at 24 mgd) relative to the total average daily usage at the Lake Huron Plant (assumed at 125 mgd in these calculations).
- Calculations are conducted for two alternatives. Purchase of *pressurized* water (after high lift pumping) and *unpressurized* water (KWA takes directly from clearwell.)
- Contract includes an arrangement for emergency service at the existing Baxter / Potter connection, and computes a standby charge related to such service.
- The standby charge is computed in the manner set for the by the American Water Works Association (AWWA) in its Manual of Water Supply Practices M1 - "Principles of Water Rates, Fees, and Charges" Manual M1.
  - KWA is allocated one day's worth of transmission related capital revenue requirements.

### Scenario 2 – "Full Service" Lake Huron System

- Same as the "pressurized" option in Scenario 1, except that concept is extended to the pumping, storage, and transmission facilities directly served by the Lake Huron Plant
- Transmission rate schedule is computed based on specific costs associated with these facilities. No other DWSD revenue requirements, including those associated with other DWSD transmission mains, etc, are included in the rate to KWA.
- Revenue requirements are separated into capital recovery and operation and maintenance expense elements. Baseline revenue requirement data (including operating budget, rate of return, depreciation assumptions, etc.) are identical to those developed for all other wholesale customers.
- KWA is allocated Lake Huron "transmission system" capital revenue requirements based on the proportion of their contracted max day demand (assumed in these calculations at 40.6 mgd) relative to the total capacity at the Lake Huron Plant (400 mgd). The resulting revenue requirements are recovered through a fixed monthly charge.

- KWA is allocated Lake Huron "transmission system" operating revenue requirements based on the proportion of their contracted average daily usage (assumed in these calculations at 24 mgd) relative to the total average daily usage at the Lake Huron Plant (assumed at 125 mgd in these calculations).
- Standby charge is eliminated.

The resulting potential proposed rate structures under both Scenarios are summarized below.

Potential Proposed DWSD Water Rate to KWA  
Lake Huron Direct Scenario

|                                         | 1 - Supply Rate @ LH Plant |                    | 2 - Full Service      |
|-----------------------------------------|----------------------------|--------------------|-----------------------|
|                                         | <u>Unpressurized</u>       | <u>Pressurized</u> | <u>Wholesale Rate</u> |
| <u>Supply Rate</u>                      |                            |                    |                       |
| Fixed Monthly Capital Charge - \$       | 219,900                    | 316,600            | 503,200               |
| Commodity Rate - \$/Mcf                 | 2.60                       | 4.16               | 5.31                  |
| <i>Average Unit Cost - \$/Mcf</i>       | <i>4.85</i>                | <i>7.40</i>        | <i>10.46</i>          |
| Monthly Standby Charge                  | 167,500                    | 110,300            | 0                     |
| Total Monthly Charge                    | 387,400                    | 426,900            | 503,200               |
| <i>Total Average Unit Cost - \$/Mcf</i> | <i>6.57</i>                | <i>8.53</i>        | <i>10.46</i>          |

The direct comparison over the period 2013-2042 is demonstrated in Attachment 2.

As KWA considers this proposal, I offer the following observations for consideration:

- The Public Partnership requires the least near term capital investment and preserves the economy of scale associated with operation of a large regional system resulting in an immediate reduction in the cost of water supply for Flint/Genesee, making the identified and necessary near term investment in local water infrastructure more feasible.
- The Public Partnership provides the opportunity to optimize service level and efficiency through collaborative asset management decision making.
- The Public Partnership provides representation for critical decision making consistent with DWSD newly demonstrated interest in engaging our customers in critical decisions impacting them. This formalizes that interest in contractual terms.
- The Public Partnership reduces the risks identified with a 'go alone' solution, including further declines in use/sales (see graph), project cost overruns or schedule delays and other unforeseen costs inherent in starting a new venture. See Attachment 3
- The DWSD Board of Commissioners has previously approved sale of raw water from the Lake Huron facilities for raw water end use. We remain open to further discussion about the raw water capacity needs and stand ready to provide an affordable commodity option.



DWSD is an organization in transformation. In April of 2011, a new Board of Commissioners was seated with additional autonomy and more direct customer representation. In the past year we have demonstrated the ability to reduce costs, resolve long standing compliance issues and have gained support for establishing a new legal and operational model for DWSD that could enable broadened representation for Flint/Genesee on the Governing Board.

I remain available to discuss this proposal to assure that each of the issues critical to Flint/Genesee are addressed.

Best regards,

Sue McCormick, Director  
Detroit Water and Sewerage Department

Cc: Andy Dillon, State Treasurer  
Dayne Walling, Mayor – City of Flint  
Kevyn Orr, City of Detroit Emergency Financial Manager  
Jeff Wright, Genesee County Drain Commissioner  
James Fausone, Chair – Detroit Board of Water Commissioners

## Attachment 1

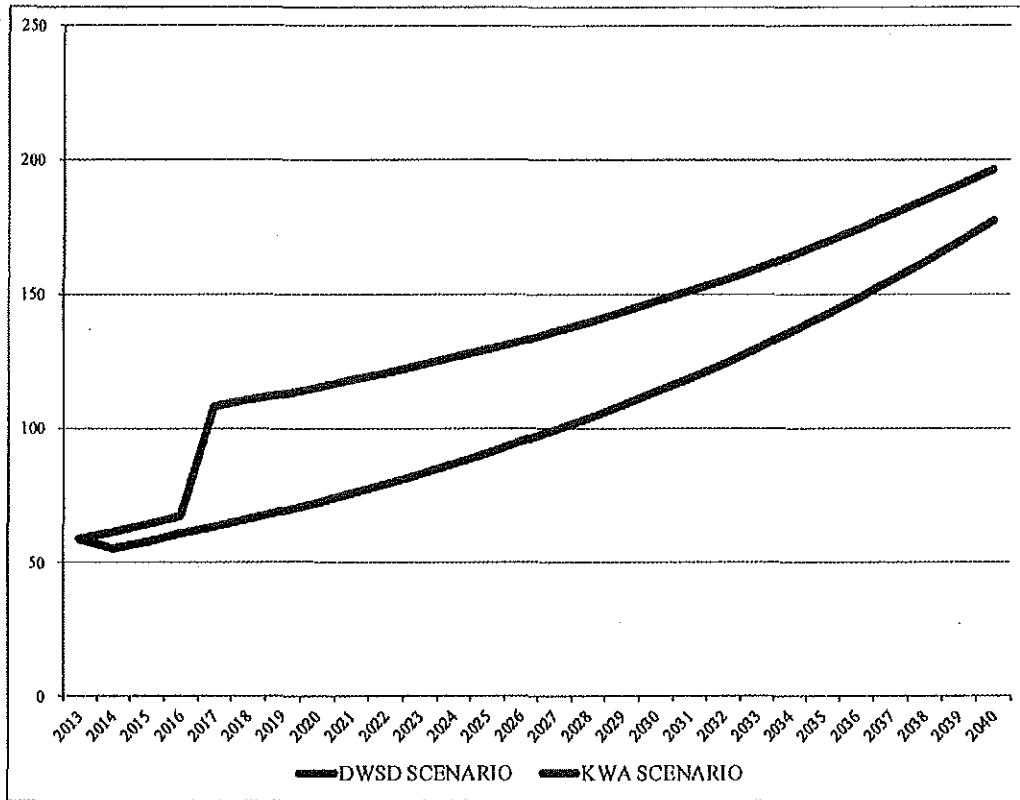
## DWSD Water Supply Costs Estimates to Flint

| Option                                            | Water<br>Supply               | Ranking     |
|---------------------------------------------------|-------------------------------|-------------|
|                                                   | Costs (\$)                    | by          |
|                                                   | <u>through</u><br><u>2042</u> | <u>Cost</u> |
| DWSD 4/15/2013 Scenario 2                         | 587,990,650                   | 1           |
| DWSD 8 MGD Max Day @ Imlay                        | 634,795,488                   | 2           |
| KWA (10/31/12 No Overruns, As Provided) *         | 649,775,166                   | 3           |
| DWSD 8 MGD Max Day @ Baxter / Potter              | 672,671,705                   | 4           |
| KWA-1 (10/31/12 No Overruns with Financing Costs) | 707,279,715                   | 5           |
| DWSD 12 MGD Max Day @ Imlay                       | 725,576,803                   | 6           |
| DWSD 12 MGD Max Day @ Baxter / Potter             | 762,110,308                   | 7           |
| KWA-2 (Treasury Estimate)                         | 766,784,313                   | 8           |
| DWSD 12 mgd Twin Line Proposal / No blending      | 818,092,150                   | 9           |
| DWSD 18 MGD Max Day @ Baxter / Potter             | 821,226,268                   | 10          |

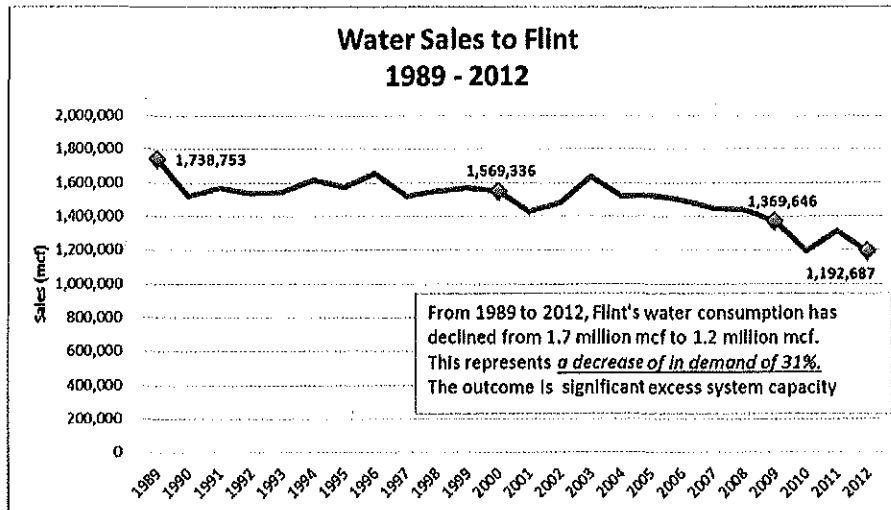
**Italicized Options as presented in TYJT Report**DWSD Water Supply Costs Estimates to Flint / GCDC  
\$ millions

| Option                    | All Water                     | Ranking     |
|---------------------------|-------------------------------|-------------|
|                           | Costs (\$)                    | by          |
|                           | <u>through</u><br><u>2042</u> | <u>Cost</u> |
| DWSD 4/15/2013 Scenario 2 | 3,282.00                      | 1           |
| Estimate of KWA           | 4,090.06                      | 2           |

## Attachment 2

SUMMARY OF TOTAL PROJECTED WATER COSTS TO FLINT/GCDC - SCENARIO COMPARISON (\$ millions)

## Attachment 3





**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Friday, October 02, 2015 9:17 AM  
**To:** Rosenthal, Adam (DEQ)  
**Cc:** Busch, Stephen (DEQ)  
**Subject:** FW: Lead & Copper Report  
**Attachments:** Updated Final Report.pdf

Flint's updated PB/CU report

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

**From:** Michael Glasgow [<mailto:mglasgow@cityofflint.com>]  
**Sent:** Friday, October 02, 2015 9:02 AM  
**To:** Prysby, Mike (DEQ)  
**Subject:** Lead & Copper Report

Mike,

Here was the last version of the lead & copper report after talking with Steve and Adam a month ago.

--

Mike Glasgow  
Utilities Administrator  
City of Flint  
1101 S. Saginaw St.  
Flint, MI 48502  
(810)766-7135 ext. 2602

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
 OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE  
**LEAD AND COPPER REPORT AND  
 CONSUMER NOTICE OF LEAD RESULT  
 CERTIFICATE FOR COMMUNITY WATER SUPPLY**



Issued under authority of 1976 PA 399, MCL 325.1001 *et al.*, and Administrative Rules, as amended.  
 Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within 10 days after the end of the monitoring period. This form may be used to meet this requirement. Submit the information to the appropriate Department of Environmental Quality (DEQ) district office. For district office addresses, visit [www.michigan.gov/deq](http://www.michigan.gov/deq) and click on Locations.

1. Water Supply Name: City of Flint Water Plant  
 2. County: Genesee 3. WSSN: 2310  
 4. Population: 99,763 5. Monitoring Period: From: 1/1/15 To: 6/30/15  
 6. Minimum # of Samples Required: 60 7. # of Samples Taken: 69  
 8. Name of Certified Laboratory: DEQ Drinking Water Laboratory

9. SAMPLE CRITERIA:

| Yes                                                                                                                                                                                                        | No                                  | Explain No responses in Comments block.                                                                                             |                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/>                                                                                                                                                                                   | <input checked="" type="checkbox"/> | a. Are the same sampling points used as in the previous monitoring period?                                                          |                                                                                            |
| <input type="checkbox"/>                                                                                                                                                                                   | <input checked="" type="checkbox"/> | b. Are all samples from Tier 1 sites?                                                                                               | For more information see <i>Instructions</i> paragraph 11, subparagraph "Sample Category." |
| <input checked="" type="checkbox"/>                                                                                                                                                                        | <input type="checkbox"/>            | c. Are all samples from Tier 1, 2, or 3 sites giving Tier 1 priority?                                                               |                                                                                            |
| <input checked="" type="checkbox"/>                                                                                                                                                                        | <input type="checkbox"/>            | d. If no Tier 1, 2, or 3 sites are available, do all sites have plumbing materials commonly found at other locations in the system? |                                                                                            |
| <input checked="" type="checkbox"/>                                                                                                                                                                        | <input type="checkbox"/>            | e. Is the minimum number of lead service line samples taken (when applicable)?                                                      |                                                                                            |
| Comments: Revised report after conference call with DEQ staff. Two samples were removed from list for not meeting sample criteria, and due to population the number of samples required was reduced to 60. |                                     |                                                                                                                                     |                                                                                            |

10. NAME:

Name: Michael Glasgow  
 Title: Utilities Administrator Phone: 810-766-7135 Date: 8/20/2015

## 11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water PlantWSSN 2310

## RESULTS:

| Sample Location      | Sample Date | Sample Category <sup>1</sup> | Service Lines <sup>2</sup> | Bldg Plumb-ing <sup>2</sup> | Lead (ppb) | Copper (ppb) | Lab # |
|----------------------|-------------|------------------------------|----------------------------|-----------------------------|------------|--------------|-------|
| 2205 Flusing Rd      | 2/15/15     | 1                            | L                          | C,P                         | N.D.       | 0.13         | 54663 |
| 1809 Stevenson St.   | 2/10/15     | 1                            | L                          | P                           | 10         | N.D.         | 54956 |
| 4202 Custer Ave.     | 3/4/15      | 1                            | L                          | C,P                         | 6          | 0.27         | 56223 |
| 401 E. Newall St.    | 3/2/15      | 1                            | L                          | P                           | 5          | N.D.         | 56225 |
| 215 Browning Ave.    | 3/21/15     | 1                            | L                          | C,P                         | N.D.       | 0.16         | 56226 |
| 2615 Trumbull Ave.   | 2/27/15     | 1                            | L                          | C,P                         | 3          | N.D.         | 56227 |
| 201 Browning Ave.    | 3/5/15      | 1                            | L                          | P                           | N.D.       | N.D.         | 56228 |
| 1224 Decker St.      | 3/17/15     | 1                            | L                          | C,P                         | 13         | 0.10         | 57728 |
| 1220 Decker St.      | 3/17/15     | 1                            | L                          | P                           | 4          | N.D.         | 57730 |
| 1379 Washington Ave. | 3/19/15     | 1                            | L                          | P                           | 8          | N.D.         | 57731 |
| 1383 Washington Ave. | 3/19/15     | 1                            | L                          | C,P                         | 6          | 0.17         | 57734 |
| 1372 Washington Ave. | 3/19/15     | 1                            | L                          | C,P                         | 2          | 0.14         | 57733 |
| 1367 Washington Ave. | 3/17/15     | 1                            | L                          | P                           | 1          | N.D.         | 57735 |
| 1701 Marquette Dr.   | 3/14/15     | 1                            | L                          | C,P                         | 1          | 0.19         | 57736 |
| 778 Bundy Ave.       | 3/24/15     | 1                            | L                          | P                           | N.D.       | N.D.         | 58413 |
| 3714 Beecher Rd.     | 3/24/15     | 1                            | L                          | C                           | 2          | 0.52         | 58414 |
| 1016 Ingleside Ave.  | 4/9/15      | 1                            | L                          | C,P                         | 7          | 0.07         | 59749 |
| 1818 Rock Creek Ln.  | 4/6/15      | 1                            | L                          | C,P                         | 3          | 0.11         | 59750 |
| 3010 Cheyenne St.    | 4/3/15      | 1                            | L                          | C,P                         | 5          | 0.10         | 59751 |
| 2606 Mountain Ave.   | 4/15/2015   | 1                            | L                          | P                           | N.D.       | N.D.         | 60546 |

<sup>1</sup> Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

<sup>2</sup> Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

## TO BE DETERMINED BY DEQ

|    | 90 <sup>th</sup> percentile | Ave | Max | # > AL |
|----|-----------------------------|-----|-----|--------|
| Pb |                             |     |     |        |
| Cu |                             |     |     |        |

## 11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water PlantWSSN 2310

## RESULTS:

| Sample Location       | Sample Date | Sample Category <sup>1</sup> | Service Lines <sup>2</sup> | Bldg Plumb-Ing <sup>2</sup> | Lead (ppb) | Copper (ppb) | Lab # |
|-----------------------|-------------|------------------------------|----------------------------|-----------------------------|------------|--------------|-------|
| 2020 Crooked Ln.      | 4/24/15     | 1                            | L                          | C,P                         | 5          | 0.10         | 61845 |
| 310 E. Moore St.      | 4/22/15     | 1                            | L                          | P                           | 5          | N.D.         | 61846 |
| 631 Alvord Ave.       | 5/6/15      | 1                            | L                          | P                           | 42         | N.D.         | 63410 |
| 216 Browning Ave.     | 5/7/15      | 1                            | L                          | C,P                         | 22         | 0.31         | 63411 |
| 3714 Beecher Rd.      | 5/14/15     | 1                            | L                          | C,P                         | 8          | 0.15         | 64283 |
| 912 Lexington Ave.    | 5/15/15     | 1                            | L                          | P                           | 6          | N.D.         | 64285 |
| 349 Robbie Ln.        | 5/31/15     | 1                            | L                          | P                           | 2          | N.D.         | 67428 |
| 353 Robbie Ln.        | 5/30/15     | 1                            | L                          | C,P                         | 5          | 0.11         | 67427 |
| 341 Robbie Ln.        | 5/31/15     | 1                            | L                          | C,P                         | 3          | 0.05         | 67426 |
| 328 Robbie Ln.        | 5/30/15     | 1                            | L                          | C,P                         | 2          | 0.09         | 67425 |
| 357 Robbie Ln.        | 5/31/15     | 1                            | L                          | C                           | 3          | 0.20         | 67424 |
| 344 Robbie Ln.        | 5/31/15     | 1                            | L                          | C,P                         | 4          | 0.11         | 67423 |
| 1807 Oren Ave.        | 6/8/15      | 1                            | L                          | P                           | 21         | N.D.         | 68023 |
| 421 Lyon St.          | 6/14/15     | 1                            | L                          | C,P                         | 7          | 0.14         | 68788 |
| 1528 Delaware Ave.    | 6/12/15     | 1                            | L                          | P                           | 3          | N.D.         | 68789 |
| 3811 Brentwood Dr.    | 6/14/15     | 1                            | L                          | P                           | 42         | N.D.         | 68790 |
| 1615 S. Franklin Ave. | 6/14/15     | 1                            | L                          | P                           | N.D.       | N.D.         | 68791 |
| 853 E. 7th St.        | 6/12/15     | 1                            | L                          | C,P                         | 7          | 0.07         | 68792 |
| 1150 Woodside Dr.     | 6/14/15     | 1                            | L                          | P                           | 29         | N.D.         | 68793 |
| 547 Copeman Blvd.     | 6/15/14     | 1                            | L                          | P                           | 18         | N.D.         | 68794 |

<sup>1</sup> Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

<sup>2</sup> Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

## TO BE DETERMINED BY DEQ

|    | 90 <sup>th</sup> percentile | Ave | Max | # > AL |
|----|-----------------------------|-----|-----|--------|
| Pb |                             |     |     |        |
| Cu |                             |     |     |        |

## 11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water PlantWSSN 2310

## RESULTS:

| Sample Location     | Sample Date | Sample Category <sup>1</sup> | Service Lines <sup>2</sup> | Bldg Plumb-ing <sup>2</sup> | Lead (ppb) | Copper (ppb) | Lab # |
|---------------------|-------------|------------------------------|----------------------------|-----------------------------|------------|--------------|-------|
| 2114 Flushing Rd.   | 6/30/15     | 1                            | L                          | P                           | 5          | 0.05         | 71170 |
| 709 Frost St.       | 6/30/15     | 1                            | L                          | P                           | 2          | N.D.         | 72033 |
| 920 Stocker Ave.    | 6/21/15     | 1                            | L                          | P                           | 1          | N.D.         | 69622 |
| 742 Lincoln Ave.    | 6/19/15     | 1                            | L                          | P                           | 2          | N.D.         | 69623 |
| 3517 Bennett Ave.   | 6/24/15     | 1                            | L                          | C,P                         | 3          | 0.06         | 69624 |
| 1730 Overhill Dr.   | 6/22/15     | 1                            | L                          | C,P                         | 1          | 0.08         | 69625 |
| 2117 Stanford Ave.  | 6/23/15     | 1                            | L                          | C,P                         | 5          | 0.08         | 69626 |
| 2432 Beta Ln.       | 6/21/15     | 1                            | L                          | P                           | N.D.       | N.D.         | 69627 |
| 2023 Miller Rd.     | 6/21/15     | 1                            | L                          | C,P                         | 3          | 0.06         | 69628 |
| 721 East St. Apt #2 | 6/25/15     | 4                            | L                          | C,P                         | 10         | 0.16         | 70222 |
| 3814 Whitter        | 6/25/15     | 1                            | L                          | P                           | 2          | N.D.         | 70223 |
| 3120 Norwood        | 6/24/15     | 1                            | L                          | P                           | 5          | N.D.         | 70224 |
| 2122 Pierce St.     | 6/21/15     | 1                            | L                          | P                           | 2          | N.D.         | 70225 |
| 3521 Bennett Ave.   | 6/25/15     | 1                            | L                          | P                           | 3          | N.D.         | 70226 |
| 1602 Raspberry Ln.  | 6/24/15     | 1                            | L                          | P                           | N.D.       | N.D.         | 70227 |
| 1809 Lynbrook       | 6/26/15     | 1                            | L                          | P                           | 3          | N.D.         | 70228 |
| 2112 Sherff         | 6/24/15     | 1                            | L                          | C,P                         | 9          | 0.06         | 70229 |
| 1205 Blanchard Ave. | 6/24/15     | 1                            | L                          | C,P                         | 11         | 0.05         | 70230 |
| 860 Schafer St.     | 6/26/15     | 1                            | L                          | C,P                         | N.D.       | 0.06         | 70231 |
| 2110 Flushing Rd.   | 6/30/15     | 1                            | L                          | C                           | N.D.       | 0.10         | 71158 |

<sup>1</sup> Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

<sup>2</sup> Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

## TO BE DETERMINED BY DEQ

|    | 90 <sup>th</sup> percentile | Ave | Max | # > AL |
|----|-----------------------------|-----|-----|--------|
| Pb |                             |     |     |        |
| Cu |                             |     |     |        |

## 11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water PlantWSSN 2310

## RESULTS:

| Sample Location     | Sample Date | Sample Category <sup>1</sup> | Service Lines <sup>2</sup> | Bldg Plumb-ing <sup>2</sup> | Lead (ppb) | Copper (ppb) | Lab # |
|---------------------|-------------|------------------------------|----------------------------|-----------------------------|------------|--------------|-------|
| 2300 Flushing Rd.   | 6/29/15     | 1                            | L                          | C                           | 3          | 0.28         | 71159 |
| 2130 Flushing Rd.   | 6/28/15     | 1                            | L                          | C,P                         | 6          | 0.05         | 71160 |
| 2202 Flushing Rd.   | 6/29/15     | 1                            | L                          | C,P                         | 2          | 0.06         | 71162 |
| 2429 Flushing Rd.   | 6/30/15     | 1                            | L                          | C,P                         | N.D.       | 0.06         | 71163 |
| 4013 Brownell Blvd. | 6/29/15     | 1                            | L                          | C,P                         | 2          | 0.08         | 71165 |
| 2414 Flushing Rd.   | 6/30/15     | 1                            | L                          | P                           | N.D.       | N.D.         | 71166 |
| 1914 Penbrook Ln    | 6/29/15     | 1                            | L                          | P                           | 2          | N.D.         | 71167 |
| 3901 Leedra St.     | 6/26/15     | 1                            | L                          | P                           | N.D.       | N.D.         | 71168 |
| 3142 McClure        | 6/26/15     | 1                            | L                          | P                           | 3          | N.D.         | 71169 |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |
|                     |             |                              |                            |                             |            |              |       |

<sup>1</sup> Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

<sup>2</sup> Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

## TO BE DETERMINED BY DEQ

|    | 90 <sup>th</sup> percentile | Ave | Max | # > AL |
|----|-----------------------------|-----|-----|--------|
| Pb |                             |     |     |        |
| Cu |                             |     |     |        |

## Consumer Notice of Lead Result in Drinking Water

Water Supply Name: City of Flint  
 County: Genesee WSSN: 2310  
 Sample Location: 401 E. Newall St. Date Sampled: 3/2/15

Thank you for participating in the lead and copper monitoring of drinking water. The levels of lead and copper found at your location are in the table below.

| Key to Table                                                                                                                                                                                                                                                                                                                                                                                                     | Contaminant  | AL   | MCLG | Your Result  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------|------|--------------|
| <b>Action Level (AL):</b> The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.<br><b>Maximum Contaminant Level Goal (MCLG):</b> The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.<br><b>ppb:</b> parts per billion or micrograms per liter. | Lead (ppb)   | 15   | 0    | 5            |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | Copper (ppb) | 1300 | 1300 | Not Detected |

*Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and it can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.*

To reduce exposure to lead in drinking water:

- *Run your water to flush out lead.* Run the water until it becomes cold.
- *Use cold water for cooking and preparing baby formula.* Do not cook with or drink water from the hot water tap; lead dissolves more easily in hot water.
- *Do not boil water to remove lead.* Boiling water will not reduce lead levels.
- *Look for alternative sources or treatment of water.* If your lead result is above 15 ppb, you may want to consider purchasing bottled water or a water filter. Read the package to be sure the filter is approved to reduce lead or contact NSF International at 800-NSF-8010, or [www.nsf.org](http://www.nsf.org) for information on performance standards for water filters.
- *Identify if your plumbing fixtures contain lead.* New faucets, fittings, and valves, may contain up to 8 percent lead including those advertised or labeled as "lead-free" and may contribute lead to drinking water. Consumers should be aware of this when choosing fixtures and take appropriate precautions.

Although the primary sources of lead exposure for most children are deteriorating lead-based paint, lead-contaminated dust, and lead-contaminated soil, the U.S. EPA estimates that 10 to 20 percent of human exposure to lead may come from drinking water.

For more information, contact us at: City of Flint Water Plant (810) 787-6537.  
 For more information on reducing lead exposure around your home and the health effects of lead, visit the U.S. EPA's Web site at [www.epa.gov/lead](http://www.epa.gov/lead), call the National Lead Information Center at 800-424-LEAD, or contact your health care provider.

**Certification:**

I certify that this public water supply has provided the consumer notice of lead result to persons served at each of the taps that was tested, either by mail or by another method approved by the DEQ, within 30 days of knowing the result. The Notice includes required content.

Michael J. Lange UTILITIES ADMINISTRATOR 3/17/15  
 Signature Title Date Sent to Consumer

Reminder to water supplier: Complete this certification on only one (1) example copy of a notice sent to a consumer and submit it to the DEQ.

**Rennaker, Joanne (DEQ)**

---

**From:** Rosenthal, Adam (DEQ)  
**Sent:** Friday, February 27, 2015 1:57 PM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Lead Copper Cert form  
**Attachments:** 212 Browning Pb & Cu sample info.pdf

FYI

**From:** Michael Glasgow [<mailto:mglasgow@cityofflint.com>]  
**Sent:** Friday, February 27, 2015 1:53 PM  
**To:** Rosenthal, Adam (DEQ)  
**Subject:** Re: Lead Copper Cert form

Adam,

Here is the copy of the lead & copper sample info from 212 Browning.

Mike

On Fri, Feb 27, 2015 at 1:26 PM, Michael Glasgow <[mglasgow@cityofflint.com](mailto:mglasgow@cityofflint.com)> wrote:  
Adam,

Here are the 4th Qtr WQM results & the Lead & Copper Report. This hit for 104 ppb on lead come from the current 2015 monitoring period, I am attempting to get more samples from the neighbors around this site. This is a new Pb & Cu site, that was not sampled during the 2014 monitoring period.

Mike

On Fri, Feb 27, 2015 at 9:13 AM, Rosenthal, Adam (DEQ) <[ROSENTHALA@michigan.gov](mailto:ROSENTHALA@michigan.gov)> wrote:

Morning Mike, I need your lead/copper cert form – it was due by 1/10/15. I also need your 4<sup>th</sup> quarter WQPs for 2014. EPA is asking due to your 104 hit on lead. If you can, I need them today.

thanks,

Adam Rosenthal, EQA

MDEQ – Office of Drinking Water and Municipal Assistance



Lansing District – Constitution Hall 1SW

PO Box 30242

Lansing, MI 48909

517-284-6644

fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:

[DEQ-DWMA-Lansing@michigan.gov](mailto:DEQ-DWMA-Lansing@michigan.gov)

## Drinking Water Lead & Copper Sampling Instructions

Dear Resident:

Thank you for helping to monitor for lead and copper in the drinking water.

To get an accurate measurement of the lead or copper in the water, please collect your sample after the water has sat idle for 6 to 8 hours. **DO NOT** sample from a faucet that has not been used for an extended period of time such as a basement sink, guest bath or garden hose tap. **DO NOT** use taps that are connected to water softeners or point-of-use treatment devices.

1. The night before you collect the sample, turn on the COLD faucet of your kitchen or main bathroom sink and let it run for 3 to 4 minutes. If you have a single-handle faucet, turn it to the COLD side.
2. Do not use the water for 6 to 8 hours.
3. In the morning, fill the sample bottle to the neck with the "first draw" of COLD water from the faucet that you flushed the previous night.
4. Please answer the following questions:

Did you run the water for 3 to 4 minutes the night before you filled the bottle? ☒ Yes ☐ No

What date and time in the evening did you run the water? Date 2/17/15 Time 11:30 P.M.

What date and time in the morning did you fill the bottle? Date 2/18/15 Time 7:15 A.M.

Did you fill the bottle from the faucet you flushed the night before? ☒ Yes ☐ No

If No, please explain: \_\_\_\_\_

Which faucet did you use to fill the bottle? ☒ Kitchen ☐ Main Bathroom ☐ Other

If Other, please describe: \_\_\_\_\_

Your Printed Name LeeAnne Walters

Your Address 212 Browning Ave

Your Signature [Signature]

5. Attach this form to the bottle and leave it outside your front door for pick-up.

If you have any questions call:

Water Supply: CITY OF FLINT WATER PLANT

Manager or  
Water Operator: MIKE GLASGOW

Phone: 810-787-6537 ext. 3512

Or contact:

Michigan Department of Environmental Quality

DEQ contact: \_\_\_\_\_

Phone: \_\_\_\_\_

Thanks again for your help. Information on this year's lead and copper monitoring will be printed in the Consumer Confidence Report that will be made available to you by July 1 of next year.

**Rennaker, Joanne (DEQ)**

---

**From:** Rosenthal, Adam (DEQ)  
**Sent:** Thursday, July 09, 2015 2:22 PM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: lead/copper  
**Attachments:** June 2015 Bromate Results.pdf

fyi

**From:** Michael Glasgow [<mailto:mglasgow@cityofflint.com>]  
**Sent:** Thursday, July 09, 2015 2:19 PM  
**To:** Rosenthal, Adam (DEQ)  
**Cc:** Brent Wright  
**Subject:** Re: lead/copper

Adam,

I just sent the last of the samples to the lab today. Unfortunately we did not reach 100 samples. I believe the count I have is 76 total. Since we have had a few more hits this round, we are going to continue to solicit samples for our own informational purposes. I am disappointed in the turnout of sampling, we distributed close to 200 sample bottles. With this monitoring violation will we be required to collect another round of 100 samples?

Also, I have attached a copy of our June bromate test results.

On Thu, Jul 9, 2015 at 9:55 AM, Rosenthal, Adam (DEQ) <[ROSENTHALA@michigan.gov](mailto:ROSENTHALA@michigan.gov)> wrote:

Morning Mike, do you have a count on how many lead/copper samples were turned in? I know they all haven't been run at the lab yet, but if I can verify how many there will be, that would be good. So far I have 70 results and the City is below the AL for lead – current 90<sup>th</sup> = 13 ppb. All the copper results are below.

thanks,

Adam Rosenthal, EQA

MDEQ – Office of Drinking Water and Municipal Assistance

Lansing District – Constitution Hall 1SW

PO Box 30242

Lansing, MI 48909

517-284-6644

fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:

[DEQ-DWMA-Lansing@michigan.gov](mailto:DEQ-DWMA-Lansing@michigan.gov)

--

Mike Glasgow  
Utilities Administrator  
City of Flint  
1101 S. Saginaw St.  
Flint, MI 48502  
(810)766-7135 ext. 2602

**NSF International**

789 N. Dixboro Rd. Ann Arbor, MI 48105, USA  
1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org

# TEST REPORT

**Send To: C0211289**

Mr. Michael Glasgow  
City of Flint, Municipality  
1101 South Saginaw Street  
Flint, MI 48502

**Facility: C0211290**

City of Flint Water Plant  
4500 North Dort Highway  
Flint MI 48505  
United States

| Result          | COMPLETE                        | Report Date | 26-JUN-2015 |
|-----------------|---------------------------------|-------------|-------------|
| Customer Name   | City of Flint, Municipality     |             |             |
| Tested To       | USFDA CFR Title 21 Part 165.110 |             |             |
| Description     | Municipal Water                 |             |             |
| Test Type       | Test Only                       |             |             |
| Job Number      | J-00173940                      |             |             |
| Project Number  | 10005233 (CL06)                 |             |             |
| Project Manager | Anna Ciechanowski               |             |             |

**Thank you for having your product tested by NSF International.**

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

**Report Authorization** Kerri Levanseler

**Date** 26-JUN-2015

Kerri Levanseler - Director, Chemistry Laboratory

**General Information**

Standard: USFDA CFR Title 21 Part 165.110  
Date and Time Sampled: 06/22/2015 08:45 EDT  
Product Description: Municipal Water  
Test Description: Bromate - June 2015

Sample Id: **S-0001167921**  
Description: Municipal Water - 06/22/2015 08:45 EDT  
Sampled Date: 06/22/2015  
Received Date: 06/23/2015

| Testing Parameter                                      | Reporting Limit | Result | FDA SOQ | Units | P/F  |
|--------------------------------------------------------|-----------------|--------|---------|-------|------|
| <b>Disinfection Residuals/Disinfection By-Products</b> |                 |        |         |       |      |
| Bromate                                                | 5               | ND     | 10      | ug/L  | Pass |



## &lt;&lt;Additional Information&gt;&gt;

Sample Id: S-0001167921

| Test Parameter                                  | Date Analyzed | Time Analyzed | Date Prepared/ Processed |
|-------------------------------------------------|---------------|---------------|--------------------------|
| Disinfection Residuals/Disinfection By-Products |               |               |                          |
| Bromate (Ref: EPA 300.1)                        | 25-JUN-2015   |               |                          |


**Testing Laboratories:**

|                                                        | Flag | Id     | Address                                                        |
|--------------------------------------------------------|------|--------|----------------------------------------------------------------|
| All work performed at:<br>(Unless otherwise specified) | →    | NSF_AA | NSF International<br>789 N. Dixboro Road<br>Ann Arbor MI 48105 |

**References to Testing Procedures:**

| NSF Reference | Parameter / Test Description |
|---------------|------------------------------|
| C3015         | Bromate (Ref: EPA 300.1)     |

**Certifications:**

|                             |                            |                            |
|-----------------------------|----------------------------|----------------------------|
| Arizona ( # AZ0655 )        | California ( # 03214 CA )  | Connecticut ( # PH-0625 )  |
| Florida ( # E-87752 FL )    | Hawaii                     | Indiana                    |
| Maryland ( # 201 )          | Michigan ( # 0048 )        | North Carolina ( # 26701 ) |
| New Jersey ( # MI770 )      | Nevada ( # MI000302010A )  | New York ( # 11206 )       |
| Pennsylvania ( # 68-00312 ) | South Carolina ( # 81005 ) | Virginia ( # 00045 )       |
| Vermont ( # VT 11206 )      |                            |                            |

Test descriptions preceded by an asterisk "\*" indicate that testing has been performed per NSF International requirements but is not within its scope of accreditation.

The reported result for Odor, Phenolics, Potassium, Specific Conductance and Total Residual Chlorine cannot be used for compliance purposes within the State of Arizona.

**Notes:**

- 1) Bottled water sold in the United States shall not contain Fluoride in excess of the levels published by the USFDA in 21 CFR Part 165.110. These levels are based on the annual average of maximum daily air temperatures at the location where the bottled water is sold at retail. Please refer to the most current edition of the regulation to determine the Fluoride maximum level that pertains to your product.
- 2) A blank on the FDA SOQ column indicates that no maximum level has been established by the FDA for that contaminant.
- 3) An ND result means that the contaminant was not detected at or above the reporting limit.

For a list of NSF International Method Detection Limits refer to  
[http://www.nsf.org/media/enews/documents/minimum\\_detection\\_level\\_spreadsheet.pdf](http://www.nsf.org/media/enews/documents/minimum_detection_level_spreadsheet.pdf).



**Rennaker, Joanne (DEQ)**

---

**From:** Crooks, Jennifer <crooks.jennifer@epa.gov>  
**Sent:** Monday, August 31, 2015 2:35 PM  
**To:** Shekter Smith, Liane (DEQ); Benzie, Richard (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: links to update flint water news

**Importance:** High

Today's updates on Marc Edwards' site. His staff is phone calling and emailing results to citizens. Talk at 2.

**From:** Porter, Andrea  
**Sent:** Monday, August 31, 2015 1:19 PM  
**To:** Poy, Thomas  
**Cc:** Deltoral, Miguel; Crooks, Jennifer; Shoven, Heather  
**Subject:** links to update flint water news

Hi All,

Today, activists delivered a petition (with ~27,000 signatures) asking Flint to immediately switch back to Detroit water:  
<http://www.abc12.com/news/headlines/Crowd-gathers-outside-Flint-City-Hall-demands-switch-to-Detroit-water--323442421.html>

And, in case you haven't checked the Marc Edwards Flint site today, there are more Pb results posted:  
<https://flintwaterstudyupdates.wordpress.com/>

**"Analysis of water samples from an additional 72 Flint homes are concerning**  
 August 31, 2015 flintwaterstudy Articles

Over the weekend, we analyzed another 72 lead samples collected by Flint residents and mailed to Virginia Tech. For the 120 samples analyzed to date, forty two percent were over 5 ppb, which suggests a serious lead in water problem according to our experience and criteria.

Twenty-three (20% of the 120 samples collected to date) also exceeded the 15 ppb lead action limit. The highest lead sampled in first draw so far was 158 ppb, and the highest sample after 45 second flushing is 1,051 ppb. Six of 120 homes sampled (5%), had over 15 ppb lead even after 2 minutes of continuous flushing.

The 90'th lead level in the Flint Water Study is currently 30 ppb, which is double the EPA standard applied to homes with "worst case" lead plumbing, and in a range where water consumption has caused lead poisoning in children and adverse pregnancy outcomes. Needless to say, these data are very worrisome, especially considering that our survey did not target "worst case" lead plumbing systems as is required for EPA sampling.

Look at our summary page here for more details. We just heard that we are approaching the 250 (out of 300) mark of returned kits and we couldn't be more grateful and proud of Flint's citizen scientists. Please continue collecting samples, as larger number of samples helps to draw stronger conclusions. More samples may also help Flint residents understand what regions of the city and the types of plumbing systems that have the most serious lead problems. We are also contacting homes with high lead levels via phone and email and all sampled residents will receive their results via regular mail."

---

There's also this part about how residents with high results in the first round were called:

**"Informing Flint Residents about lead in their water"**

All Flint residents who returned their lead kits will receive their results via regular mail. You will also receive this document on how to interpret your lead results. For the first 48 lead kits analyzed so far, we have finished calling residents who had considerably high lead in their water. For those we couldn't get through, we left voicemail messages and sent an email."

Thanks,  
Andrea Porter

Environmental Engineer  
Ground Water & Drinking Water Branch  
U.S. EPA, Region 5 (WG-15J)  
77 W. Jackson Blvd.  
Chicago, IL 60604  
Phone: 312-886-4427  
Fax: 312-697-2656

**Rennaker, Joanne (DEQ)**

---

**From:** Rosenthal, Adam (DEQ)  
**Sent:** Tuesday, June 24, 2014 9:00 AM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: May 2014 MOR  
**Attachments:** May 2014 MOR scan.pdf

Adam Rosenthal, EQA  
MDEQ – Office of Drinking Water and Municipal Assistance  
Lansing District – Constitution Hall 1SW  
PO Box 30242  
Lansing, MI 48909  
517-284-6644  
fax: 517-241-3571

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**From:** Prysby, Mike (DEQ)  
**Sent:** Tuesday, June 10, 2014 2:53 PM  
**To:** Rosenthal, Adam (DEQ); McDermott, Kristine (DEQ)  
**Subject:** FW: May 2014 MOR

Here is a copy of Flint's May 2014 MOR.

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

**From:** Michael Glasgow [<mailto:mglasgow@cityofflint.com>]  
**Sent:** Tuesday, June 10, 2014 11:41 AM  
**To:** Prysby, Mike (DEQ)  
**Subject:** May 2014 MOR

Mike,  
Good morning. I just wanted to send you a scanned copy of our May 2014 MOR so you would have it today. A hard copy is going out in the mail today.

Mike Glasgow  
City of Flint Water Plant

# MONTHLY OPERATION REPORT OF WATER TREATMENT PLANT

SUPPLY NAME: CITY of FLINT WATER PLANT  
WSSN: 2310

Michael Glasgow  
Operator-in-Charge

May 2014  
Month/Year

F-1R, F-2  
Certification of Operator-in-Charge

F-1  
Water Plant Classification

Michael Glasgow  
Signature of Operator-in-Charge

Genesee  
County

## Treatment Rate and Filter Data

|                          |             |                                    |
|--------------------------|-------------|------------------------------------|
| Maximum Treatment Rate:  | <u>26.9</u> | Million Gallons per Day            |
| Rated Plant Capacity:    | <u>36</u>   | Million Gallons per Day            |
| Average Filter Run:      | <u>101</u>  | Hours                              |
| Average Head Loss:       | <u>*</u>    | Feet                               |
| Average Filtration Rate: | <u>2.6</u>  | Gallons Per Square Feet per Minute |
| Maximum Filtration Rate: | <u>3.8</u>  | Gallons Per Square Feet per Minute |
| Average Wash Water Use:  | <u>2</u>    | Percent of Treated Water           |

## Chemical Data

|                                              |                  |              |                |
|----------------------------------------------|------------------|--------------|----------------|
| Chlorine on hand:                            | <u>22000</u> lb. | Est. supply: | <u>20</u> days |
| Primary Coagulant (Ferric Chloride) on hand: | <u>83765</u> lb. | Est. supply: | <u>14</u> days |
| Cost of All Chemicals per Million Gallons:   | <u>*</u> dollars |              |                |
| Total Power Cost per Million Gallons:        | <u>*</u> dollars |              |                |

## Remarks

|                                                 |              |
|-------------------------------------------------|--------------|
| Number of filter confluence samples > 0.3 NTU:  | <u>3</u>     |
| Number of filter confluence samples collected:  | <u>350</u>   |
| Percent of filter confluence samples > 0.3 NTU: | <u>0.86%</u> |
| Number of filter confluence samples > 1 NTU     | <u>0</u>     |

## Did any individual filter exceed:

|                                                                                            |           |
|--------------------------------------------------------------------------------------------|-----------|
| 1.0 NTU in two consecutive measurements taken 15 minutes apart?                            | <u>NO</u> |
| If yes, attach specific filter(s) information and indicate required follow-up status.      |           |
| 0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? | <u>NO</u> |
| If yes, attach specific filter(s) information and indicate required follow-up status.      |           |
| 1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?   | <u>NO</u> |
| If yes, attach specific filter(s) information and indicate required follow-up status.      |           |
| 2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?   | <u>NO</u> |
| If yes, attach specific filter(s) information and indicate required follow-up status.      |           |

|                                                                                                        |           |
|--------------------------------------------------------------------------------------------------------|-----------|
| Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?               | <u>NO</u> |
| If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet. |           |

|                                                                    |           |
|--------------------------------------------------------------------|-----------|
| Did POE disinfectant residual fall below 0.2 ppm during the month? | <u>NO</u> |
| If yes, indicate date(s) and duration on a separate sheet.         |           |

|                                                               |            |
|---------------------------------------------------------------|------------|
| Was minimum C*T credit achieved for the entire month?         | <u>YES</u> |
| If no, indicate on a separate sheet the date(s) not achieved. |            |

|                                                                                      |             |
|--------------------------------------------------------------------------------------|-------------|
| Was continuous POE chlorine residual monitoring equipment off-line during the month? | <u>YES*</u> |
| If yes, indicate date(s) and duration on a separate sheet.                           |             |

| Parameters |                         |                     | Turbidity, Units  |      |      |              |                                  |      |      |                                 |                                          |                         |                                  |      |      |                                 |                                          |                         |                |
|------------|-------------------------|---------------------|-------------------|------|------|--------------|----------------------------------|------|------|---------------------------------|------------------------------------------|-------------------------|----------------------------------|------|------|---------------------------------|------------------------------------------|-------------------------|----------------|
| Date       | Million Gallons Treated | Ferric as Fe3+ mg/L | Number of Samples | Raw  |      | Applied      | Confluence Point, No.1 (N) North |      |      |                                 |                                          |                         | Confluence Point, No.2 (S) South |      |      |                                 |                                          |                         | Point of Entry |
|            |                         |                     |                   | Avg. | Max. | Applied Avg. | Number of Samples                | Avg. | Max  | No. of 4 Hr. Compliance periods | No. of 4 Hr. Compliance periods >0.3 NTU | No. of Samples >0.3 NTU | Number of Samples                | Avg. | Max  | No. of 4 Hr. Compliance periods | No. of 4 Hr. Compliance periods >0.3 NTU | No. of Samples >0.3 NTU | Plant Tap NTU  |
| 1          | 15.1                    | 10.9                | 6                 | 9.60 | 12.7 | 5.04         | 6                                | 0.10 | 0.19 | 6                               | 0                                        | 0                       | 6                                | 0.07 | 0.08 | 6                               | 0                                        | 0                       | 0.09           |
| 2          | 14.7                    | 11.3                | 6                 | 10.1 | 10.7 | 7.12         | 6                                | 0.06 | 0.07 | 6                               | 0                                        | 0                       | 6                                | 0.07 | 0.10 | 6                               | 0                                        | 0                       | 0.09           |
| 3          | 21.4                    | 12.3                | 6                 | 11.2 | 12.6 | 7.40         | 6                                | 0.15 | 0.18 | 6                               | 0                                        | 0                       | 6                                | 0.11 | 0.15 | 6                               | 0                                        | 0                       | 0.11           |
| 4          | 21.4                    | 11.8                | 6                 | 26.2 | 31.2 | 8.65         | 6                                | 0.11 | 0.13 | 6                               | 0                                        | 0                       | 6                                | 0.10 | 0.11 | 6                               | 0                                        | 0                       | 0.12           |
| 5          | 21.6                    | 12.3                | 9                 | 12.6 | 14.5 | 5.80         | 6                                | 0.16 | 0.23 | 6                               | 0                                        | 0                       | 6                                | 0.14 | 0.18 | 6                               | 0                                        | 0                       | 0.12           |
| 6          | 22.3                    | 12.1                | 6                 | 15.0 | 20.3 | 4.53         | 6                                | 0.21 | 0.27 | 6                               | 0                                        | 0                       | 6                                | 0.18 | 0.21 | 6                               | 0                                        | 0                       | 0.19           |
| 7          | 21.9                    | 12.1                | 6                 | 15.5 | 14.8 | 5.23         | 6                                | 0.13 | 0.16 | 6                               | 0                                        | 0                       | 6                                | 0.12 | 0.17 | 6                               | 0                                        | 0                       | 0.11           |
| 8          | 22.7                    | 11.7                | 6                 | 12.6 | 15.5 | 4.74         | 6                                | 0.16 | 0.25 | 6                               | 0                                        | 0                       | 6                                | 0.11 | 0.13 | 6                               | 0                                        | 0                       | 0.16           |
| 9          | 22.2                    | 12.0                | 6                 | 9.30 | 9.60 | 4.33         | 6                                | 0.12 | 0.15 | 6                               | 0                                        | 0                       | 6                                | 0.11 | 0.16 | 6                               | 0                                        | 0                       | 0.14           |
| 10         | 21.8                    | 12.2                | 6                 | 13.2 | 15.3 | 5.60         | 6                                | 0.11 | 0.18 | 6                               | 0                                        | 0                       | 6                                | 0.09 | 0.10 | 6                               | 0                                        | 0                       | 0.09           |
| 11         | 19.1                    | 13.8                | 6                 | 12.6 | 14.1 | 6.43         | 6                                | 0.19 | 0.29 | 6                               | 0                                        | 0                       | 6                                | 0.08 | 0.09 | 6                               | 0                                        | 0                       | 0.09           |
| 12         | 8.5                     | 15.3                | 2                 | 12.0 | 13.9 | 8.46         | 1                                | 0.09 | 0.09 | 1                               | 0                                        | 0                       | 1                                | 0.07 | 0.07 | 1                               | 0                                        | 0                       | 0.08           |
| 13         | 0.0                     | 12.9                | 2                 | 11.3 | 14.1 | n/a          | 0                                | n/a  | n/a  | 0                               | n/a                                      | n/a                     | 0                                | n/a  | n/a  | 0                               | n/a                                      | n/a                     | 0.10           |
| 14         | 22.2                    | 12.3                | 6                 | 30.8 | 71.7 | 11.8         | 6                                | 0.24 | 0.37 | 6                               | 1                                        | 1                       | 6                                | 0.23 | 0.31 | 6                               | 1                                        | 1                       | 0.16           |
| 15         | 16.6                    | 20.6                | 6                 | 45.2 | 63.0 | 5.68         | 6                                | 0.21 | 0.28 | 6                               | 0                                        | 0                       | 6                                | 0.24 | 0.28 | 6                               | 0                                        | 0                       | 0.22           |
| 16         | 20.2                    | 18.7                | 6                 | 28.2 | 37.3 | 5.21         | 6                                | 0.21 | 0.38 | 6                               | 1                                        | 1                       | 6                                | 0.22 | 0.45 | 6                               | 1                                        | 1                       | 0.22           |
| 17         | 21.0                    | 20.0                | 6                 | 14.3 | 19.3 | 4.90         | 6                                | 0.12 | 0.22 | 6                               | 0                                        | 0                       | 6                                | 0.09 | 0.08 | 6                               | 0                                        | 0                       | 0.11           |
| 18         | 20.8                    | 18.3                | 6                 | 9.50 | 10.7 | 6.03         | 6                                | 0.14 | 0.26 | 6                               | 0                                        | 0                       | 6                                | 0.08 | 0.09 | 6                               | 0                                        | 0                       | 0.09           |
| 19         | 22.0                    | 18.2                | 6                 | 9.20 | 11.3 | 4.59         | 6                                | 0.12 | 0.17 | 6                               | 0                                        | 0                       | 6                                | 0.07 | 0.10 | 6                               | 0                                        | 0                       | 0.09           |
| 20         | 22.1                    | 18.0                | 6                 | 7.20 | 8.40 | 4.63         | 6                                | 0.11 | 0.11 | 6                               | 0                                        | 0                       | 6                                | 0.09 | 0.11 | 6                               | 0                                        | 0                       | 0.09           |
| 21         | 21.0                    | 19.4                | 6                 | 7.80 | 8.90 | 6.27         | 6                                | 0.11 | 0.18 | 6                               | 0                                        | 0                       | 6                                | 0.08 | 0.08 | 6                               | 0                                        | 0                       | 0.09           |
| 22         | 21.0                    | 18.6                | 6                 | 9.40 | 11.3 | 6.50         | 6                                | 0.11 | 0.16 | 6                               | 0                                        | 0                       | 6                                | 0.07 | 0.09 | 6                               | 0                                        | 0                       | 0.08           |
| 23         | 21.0                    | 18.9                | 6                 | 9.10 | 10.4 | 6.24         | 6                                | 0.11 | 0.13 | 6                               | 0                                        | 0                       | 6                                | 0.08 | 0.09 | 6                               | 0                                        | 0                       | 0.08           |
| 24         | 20.8                    | 17.9                | 6                 | 7.10 | 8.30 | 5.38         | 6                                | 0.12 | 0.18 | 6                               | 0                                        | 0                       | 6                                | 0.08 | 0.09 | 6                               | 0                                        | 0                       | 0.09           |
| 25         | 21.0                    | 18.3                | 6                 | 6.00 | 7.30 | 5.62         | 6                                | 0.14 | 0.22 | 6                               | 0                                        | 0                       | 6                                | 0.18 | 0.25 | 6                               | 0                                        | 0                       | 0.10           |
| 26         | 22.0                    | 18.0                | 6                 | 5.20 | 5.60 | 3.23         | 6                                | 0.12 | 0.14 | 6                               | 0                                        | 0                       | 6                                | 0.10 | 0.13 | 6                               | 0                                        | 0                       | 0.11           |
| 27         | 20.6                    | 19.4                | 6                 | 5.70 | 7.30 | 2.78         | 6                                | 0.13 | 0.18 | 6                               | 0                                        | 0                       | 6                                | 0.12 | 0.14 | 6                               | 0                                        | 0                       | 0.10           |
| 28         | 20.1                    | 20.0                | 6                 | 4.20 | 5.30 | 3.52         | 6                                | 0.11 | 0.13 | 6                               | 0                                        | 0                       | 6                                | 0.08 | 0.08 | 6                               | 0                                        | 0                       | 0.08           |
| 29         | 19.7                    | 20.0                | 6                 | 5.20 | 10.3 | 3.72         | 6                                | 0.09 | 0.12 | 6                               | 0                                        | 0                       | 6                                | 0.07 | 0.08 | 6                               | 0                                        | 0                       | 0.06           |
| 30         | 19.3                    | 16.1                | 6                 | 3.50 | 5.30 | 3.54         | 6                                | 0.11 | 0.16 | 6                               | 0                                        | 0                       | 6                                | 0.07 | 0.07 | 6                               | 0                                        | 0                       | 0.06           |
| 31         | 18.0                    | 17.6                | 6                 | 3.50 | 4.40 | 2.23         | 6                                | 0.09 | 0.12 | 6                               | 0                                        | 0                       | 6                                | 0.08 | 0.09 | 6                               | 0                                        | 0                       | 0.08           |
| Avg.       | 19.4                    | 15.8                | 6                 | 12.3 |      | 5.51         | 6                                | 0.13 | 0.19 | 6                               | 0                                        | 0                       | 6                                | 0.11 | 0.14 | 6                               | 0                                        | 0                       |                |
| Max.       | 22.7                    | 20.6                | 6                 | 45.2 | 71.7 | 11.8         | 6                                | 0.24 | 0.38 | 6                               | 1                                        | 1                       | 6                                | 0.24 | 0.45 | 6                               | 1                                        | 1                       | 0.22           |
| Min.       | 0.0                     | 10.9                | 2                 | 3.50 |      | 2.23         | 0                                | 0.06 | 0.07 | 0                               | 0                                        | 0                       | 0                                | 0.07 | 0.07 | 0                               | 0                                        | 0                       |                |
| Total      | 602.1                   |                     |                   |      |      |              |                                  |      |      |                                 |                                          |                         |                                  |      |      |                                 |                                          |                         |                |

**Fluoridation &  
Chlorination**

 City of Flint Water Treatment Plant  
 WSSN: 2310

May 2014

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| Date | Fluoride<br>Applied as<br>F- mg/L | Fluoride Analysis (mg/L) |      |       | Chlorine Application (mg/L) |               |                   | Chlorine Residual (mg/L) |       |           |       |      |       |
|------|-----------------------------------|--------------------------|------|-------|-----------------------------|---------------|-------------------|--------------------------|-------|-----------|-------|------|-------|
|      |                                   |                          |      |       | Intermediate<br>Chlorine    | Post Chlorine | Total<br>Chlorine | Filtered                 |       | 3 MG Well |       | Tap  |       |
|      |                                   | Raw                      | Tap  | Dist. |                             |               |                   | Free                     | Total | Free      | Total | Free | Total |
| 1    | 0                                 | 0.14                     | 0.19 |       | 3.4                         | 0.0           | 3.4               | 1.4                      | 1.6   | 1.4       | 1.6   | 1.2  | 1.5   |
| 2    | 0                                 | 0.15                     | 0.34 |       | 4.0                         | 0.0           | 4.0               | 1.2                      | 1.3   | 1.6       | 2.0   | 1.3  | 1.6   |
| 3    | 0                                 | 0.14                     | 0.18 |       | 4.0                         | 0.0           | 4.0               | 1.8                      | 2.2   | 1.7       | 2.0   | 1.5  | 1.7   |
| 4    | 0                                 | 0.15                     | 0.24 |       | 4.4                         | 0.0           | 4.4               | 2.2                      | 2.6   | 1.5       | 1.7   | 1.8  | 2.2   |
| 5    | 0                                 | 0.14                     | 0.13 |       | 4.7                         | 0.0           | 4.7               | 1.9                      | 2.2   | 1.8       | 2.1   | 1.2  | 1.4   |
| 6    | 0                                 | 0.14                     | 0.13 |       | 4.9                         | 0.0           | 4.9               | 1.9                      | 2.3   | 1.7       | 1.9   | 1.2  | 1.5   |
| 7    | 0                                 | 0.15                     | 0.14 |       | 4.9                         | 0.0           | 4.9               | 1.8                      | 2.2   | 2.0       | 2.3   | 1.9  | 2.2   |
| 8    | 0                                 | 0.15                     | 0.14 | 0.17  | 4.7                         | 0.0           | 4.7               | 1.8                      | 2.3   | 1.8       | 2.2   | 1.7  | 2.1   |
| 9    | 0                                 | 0.15                     | 0.13 |       | 5.1                         | 0.0           | 5.1               | 1.5                      | 1.9   | 1.7       | 2.0   | 1.5  | 1.9   |
| 10   | 0                                 | 0.15                     | 0.14 |       | 5.2                         | 0.0           | 5.2               | 2.0                      | 2.5   | 1.7       | 2.1   | 1.5  | 2.0   |
| 11   | 0                                 | 0.16                     | 0.14 |       | 5.6                         | 0.0           | 5.6               | 2.1                      | 2.6   | 2.0       | 2.6   | 1.7  | 2.1   |
| 12   | 0                                 | 0.15                     | 0.13 |       | 6.9                         | 0.0           | 6.9               | 1.8                      | 2.4   | 1.7       | 2.2   | 1.4  | 2.0   |
| 13   | 0                                 | 0.15                     | 0.25 |       | 5.0                         | 0.0           | 5.0               | n/a                      | n/a   | 1.7       | 2.0   | 1.5  | 1.8   |
| 14   | 0                                 | 0.15                     | 0.13 | 0.23  | 4.9                         | 0.0           | 4.9               | 1.9                      | 2.3   | 1.5       | 1.9   | 1.5  | 1.8   |
| 15   | 0                                 | 0.14                     | 0.14 |       | 6.2                         | 0.0           | 6.2               | 2.0                      | 2.4   | 2.0       | 2.5   | 2.2  | 2.6   |
| 16   | 0                                 | 0.14                     | 0.13 |       | 5.3                         | 0.0           | 5.3               | 1.9                      | 2.3   | 1.6       | 2.0   | 1.4  | 1.7   |
| 17   | 0                                 | 0.15                     | 0.14 |       | 5.1                         | 0.6           | 5.7               | 1.7                      | 2.1   | 1.6       | 1.9   | 1.6  | 2.0   |
| 18   | 0                                 | 0.16                     | 0.15 |       | 5.1                         | 0.6           | 5.7               | 1.5                      | 1.9   | 1.6       | 1.9   | 1.4  | 1.7   |
| 19   | 0                                 | 0.15                     | 0.14 |       | 4.7                         | 0.2           | 4.9               | 1.6                      | 1.8   | 1.9       | 2.3   | 1.5  | 1.7   |
| 20   | 0                                 | 0.15                     | 0.15 |       | 5.0                         | 0.5           | 5.5               | 1.9                      | 2.3   | 2.1       | 2.6   | 1.6  | 1.9   |
| 21   | 0                                 | 0.15                     | 0.16 |       | 4.9                         | 0.4           | 5.3               | 1.8                      | 2.3   | 2.0       | 2.4   | 1.8  | 2.3   |
| 22   | 0                                 | 0.15                     | 0.14 |       | 5.0                         | 0.2           | 5.2               | 1.7                      | 2.1   | 2.1       | 2.5   | 1.5  | 1.8   |
| 23   | 0                                 | 0.14                     | 0.13 |       | 4.9                         | 0.4           | 5.3               | 1.5                      | 1.8   | 1.8       | 2.3   | 1.6  | 2.1   |
| 24   | 0                                 | 0.15                     | 0.15 |       | 5.0                         | 0.9           | 5.9               | 1.5                      | 2.0   | 1.5       | 2.0   | 1.3  | 1.7   |
| 25   | 0                                 | 0.15                     | 0.14 |       | 5.0                         | 1.0           | 6.0               | 1.4                      | 1.8   | 1.6       | 2.0   | 1.5  | 1.9   |
| 26   | 0                                 | 0.15                     | 0.16 |       | 5.0                         | 0.9           | 5.9               | 1.5                      | 1.8   | 1.7       | 2.3   | 1.7  | 2.0   |
| 27   | 0                                 | 0.16                     | 0.17 |       | 5.3                         | 0.9           | 6.2               | 1.5                      | 1.7   | 1.8       | 2.2   | 1.5  | 1.7   |
| 28   | 0                                 | 0.15                     | 0.16 | 0.19  | 5.7                         | 1.0           | 6.7               | 1.6                      | 2.0   | 1.9       | 2.3   | 1.6  | 2.0   |
| 29   | 0                                 | 0.16                     | 0.16 |       | 5.1                         | 0.8           | 5.9               | 1.5                      | 1.8   | 1.8       | 2.1   | 1.2  | 1.4   |
| 30   | 0                                 | 0.16                     | 0.17 |       | 5.1                         | 1.1           | 6.2               | 1.4                      | 1.7   | 1.6       | 1.8   | 1.4  | 1.7   |
| 31   | 0                                 | 0.15                     | 0.16 |       | 5.4                         | 1.4           | 6.8               | 1.4                      | 1.7   | 1.6       | 2.0   | 1.2  | 1.6   |
| Avg. | 0                                 | 0.15                     | 0.16 | 0.20  | 5.0                         | 0.4           | 5.4               | 1.7                      | 2.1   | 1.7       | 2.1   | 1.5  | 1.9   |
| Max. | 0                                 | 0.16                     | 0.34 | 0.23  | 6.9                         | 1.4           | 6.9               | 2.2                      | 2.6   | 2.1       | 2.6   | 2.2  | 2.6   |
| Min. | 0                                 | 0.14                     | 0.13 | 0.17  | 3.4                         | 0.0           | 3.4               | 1.2                      | 1.3   | 1.4       | 1.6   | 1.2  | 1.4   |

## Chemical Analyses

City of Flint Water Treatment Plant  
WSSN: 2310

May 2014

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| Date | pH (S.U.) |      | Total Hardness as CaCO <sub>3</sub> (mg/L) |     | Total Alkalinity as CaCO <sub>3</sub> (mg/L) |     | Non-Carbonate Hardness as CaCO <sub>3</sub> (mg/L) |     | Calcium as Ca <sup>2+</sup> (mg/L) |      | Magnesium as Mg <sup>2+</sup> (mg/L) |      | Chloride as Cl <sup>-</sup> (mg/L) |      |
|------|-----------|------|--------------------------------------------|-----|----------------------------------------------|-----|----------------------------------------------------|-----|------------------------------------|------|--------------------------------------|------|------------------------------------|------|
|      | Raw       | Tap  | Raw                                        | Tap | Raw                                          | Tap | Raw                                                | Tap | Raw                                | Tap  | Raw                                  | Tap  | Raw                                | Tap  |
| 1    | 8.44      | 7.71 | 246                                        | 146 | 196                                          | 66  | 50                                                 | 80  | 56.7                               | 48.1 | 20.9                                 | 7.8  | 43.0                               | 67.0 |
| 2    | 8.27      | 7.07 | 250                                        | 162 | 196                                          | 80  | 54                                                 | 82  | 83.4                               | 48.1 | 10.2                                 | 10.2 | 44.0                               | 41.0 |
| 3    | 8.26      | 7.47 | 250                                        | 132 | 200                                          | 60  | 50                                                 | 72  | 82.6                               | 42.5 | 10.7                                 | 6.3  | 40.0                               | 60.0 |
| 4    | 8.39      | 7.50 | 256                                        | 120 | 196                                          | 70  | 60                                                 | 50  | 86.6                               | 60.9 | 6.3                                  | 6.3  | 47.0                               | 60.0 |
| 5    | 8.39      | 7.41 | 232                                        | 152 | 204                                          | 76  | 28                                                 | 76  | 78.6                               | 54.5 | 8.7                                  | 3.9  | 45.0                               | 75.0 |
| 6    | 8.25      | 7.21 | 240                                        | 160 | 202                                          | 90  | 38                                                 | 70  | 80.2                               | 54.5 | 9.7                                  | 7.3  | 53.0                               | 71.0 |
| 7    | 8.24      | 7.24 | 266                                        | 210 | 212                                          | 130 | 54                                                 | 80  | 71.3                               | 66.5 | 21.4                                 | 10.7 | 51.0                               | 76.0 |
| 8    | 8.33      | 7.13 | 272                                        | 218 | 210                                          | 128 | 62                                                 | 90  | 86.6                               | 84.2 | 10.7                                 | 2.4  | n/a                                | n/a  |
| 9    | 8.29      | 7.22 | 264                                        | 224 | 210                                          | 130 | 54                                                 | 94  | 86.6                               | 75.4 | 11.7                                 | 8.7  | 50.0                               | 60.0 |
| 10   | 8.38      | 7.36 | 260                                        | 216 | 214                                          | 122 | 46                                                 | 94  | 81.8                               | 73.7 | 13.6                                 | 7.8  | 48.0                               | 80.0 |
| 11   | 8.35      | 7.46 | 286                                        | 230 | 216                                          | 126 | 70                                                 | 104 | 81.0                               | 73.7 | 20.4                                 | 11.2 | 46.0                               | 82.0 |
| 12   | 8.33      | 7.43 | 266                                        | 218 | 208                                          | 120 | 58                                                 | 98  | 99.4                               | 72.1 | 4.4                                  | 9.2  | 45.0                               | 76.0 |
| 13   | 8.28      | 7.24 | 278                                        | 202 | 216                                          | 114 | 62                                                 | 88  | 85.8                               | 59.3 | 15.6                                 | 13.1 | 48.0                               | 66.0 |
| 14   | 8.23      | 7.30 | 264                                        | 220 | 208                                          | 138 | 56                                                 | 82  | 68.9                               | 68.1 | 22.4                                 | 12.2 | 45.0                               | 72.0 |
| 15   | 8.06      | 7.42 | 242                                        | 206 | 184                                          | 122 | 58                                                 | 84  | 66.5                               | 65.7 | 18.5                                 | 10.2 | 43.0                               | 73.0 |
| 16   | 8.05      | 7.12 | 234                                        | 214 | 196                                          | 118 | 38                                                 | 96  | 81.0                               | 69.7 | 7.8                                  | 9.7  | 41.0                               | 90.0 |
| 17   | 8.16      | 7.21 | 246                                        | 206 | 200                                          | 98  | 46                                                 | 108 | 85.8                               | 65.7 | 7.8                                  | 10.2 | 41.0                               | 85.0 |
| 18   | 8.29      | 7.27 | 280                                        | 212 | 206                                          | 116 | 74                                                 | 96  | 77.0                               | 64.9 | 14.6                                 | 12.2 | 47.0                               | 80.0 |
| 19   | 8.24      | 7.27 | 266                                        | 214 | 214                                          | 120 | 52                                                 | 94  | 85.8                               | 69.7 | 12.6                                 | 9.7  | 43.0                               | 78.0 |
| 20   | 8.22      | 7.44 | 254                                        | 220 | 212                                          | 124 | 42                                                 | 96  | 85.8                               | 70.5 | 9.7                                  | 10.7 | 43.0                               | 80.0 |
| 21   | 8.23      | 7.42 | 246                                        | 226 | 208                                          | 118 | 38                                                 | 108 | 77.8                               | 74.5 | 12.6                                 | 9.7  | 45.0                               | 85.0 |
| 22   | 8.33      | 7.50 | 244                                        | 216 | 208                                          | 118 | 36                                                 | 98  | 79.4                               | 72.1 | 11.2                                 | 8.7  | 42.0                               | 85.0 |
| 23   | 8.22      | 7.49 | 248                                        | 222 | 208                                          | 114 | 40                                                 | 108 | 82.6                               | 72.9 | 10.2                                 | 9.7  | 48.0                               | 87.0 |
| 24   | 8.24      | 7.52 | 258                                        | 228 | 208                                          | 118 | 50                                                 | 110 | 78.6                               | 72.9 | 15.1                                 | 11.2 | 42.0                               | 80.0 |
| 25   | 8.30      | 7.49 | 240                                        | 228 | 208                                          | 124 | 32                                                 | 104 | 8.6                                | 75.4 | 9.7                                  | 11.2 | 42.0                               | 82.0 |
| 26   | 8.28      | 7.30 | 248                                        | 220 | 208                                          | 120 | 40                                                 | 100 | 84.2                               | 81.0 | 9.2                                  | 4.4  | 41.0                               | 80.0 |
| 27   | 8.21      | 7.55 | 242                                        | 226 | 208                                          | 126 | 34                                                 | 100 | 78.6                               | 77.0 | 11.2                                 | 8.3  | 41.0                               | 84.0 |
| 28   | 8.28      | 7.46 | 242                                        | 240 | 208                                          | 126 | 34                                                 | 114 | 82.6                               | 80.2 | 8.8                                  | 9.7  | 43.0                               | 87.0 |
| 29   | 8.23      | 7.46 | 254                                        | 224 | 210                                          | 114 | 44                                                 | 110 | 83.4                               | 78.6 | 11.2                                 | 6.8  | 42.0                               | 88.0 |
| 30   | 8.33      | 7.49 | 256                                        | 230 | 216                                          | 132 | 40                                                 | 98  | 83.4                               | 79.4 | 11.7                                 | 7.8  | 42.0                               | 88.0 |
| 31   | 8.32      | 7.41 | 248                                        | 242 | 212                                          | 130 | 36                                                 | 112 | 77.8                               | 74.5 | 13.1                                 | 13.6 | 40.0                               | 78.0 |
| Avg. | 8.27      | 7.37 | 254                                        | 206 | 207                                          | 113 | 48                                                 | 93  | 78.3                               | 68.6 | 12.3                                 | 9.1  | 44.4                               | 77.2 |
| Max. | 8.44      | 7.71 | 286                                        | 242 | 216                                          | 138 | 74                                                 | 114 | 99.4                               | 84.2 | 22.4                                 | 13.6 | 53                                 | 90   |
| Min. | 8.05      | 7.07 | 232                                        | 120 | 184                                          | 60  | 28                                                 | 50  | 8.6                                | 42.5 | 4.4                                  | 2.4  | 40                                 | 41   |

Bacteriological &  
Physical ParametersCity of Flint Water Treatment Plant  
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| Date | Total Coliform     |       |                         |       |           |       | Standard Plate Count |     | Wind Direction | Temp. C | Color |     | Odor |     |
|------|--------------------|-------|-------------------------|-------|-----------|-------|----------------------|-----|----------------|---------|-------|-----|------|-----|
|      | Raw (Coli-ert MPN) |       | Filter Confluence (N&S) |       | Plant Tap |       |                      |     |                |         |       |     |      |     |
|      | # Samples          | Count | # Samples               | # pos | # Samples | # pos | Raw                  | Tap |                | Raw     | Raw   | Tap | Raw  | Tap |
| 1    | 1                  | 1166  | 12                      | 0     | 1         | 0     | 14760                | <2  |                | 12.6    |       |     |      |     |
| 2    | 1                  | 864   | 12                      | 0     | 1         | 0     | 800                  | <2  |                | 13.2    |       |     |      |     |
| 3    | 1                  | 930   | 12                      | 0     | 1         | 0     | 1300                 | <2  |                | 12.0    |       |     |      |     |
| 4    | 1                  | 974   | 12                      | 0     | 1         | 0     | >14760               | <2  |                | 13.6    |       |     |      |     |
| 5    | 1                  | 882   | 12                      | 0     | 1         | 0     | >14760               | <2  |                | 12.5    |       |     |      |     |
| 6    | 1                  | 618   | 12                      | 0     | 1         | 0     | 12460                | <2  |                | 14.9    |       |     |      |     |
| 7    | 1                  | 728   | 12                      | 0     | 1         | 0     | >14760               | <2  |                | 14.3    |       |     |      |     |
| 8    | 1                  | 426   | 12                      | 0     | 1         | 0     | 9400                 | <2  |                | 13.4    |       |     |      |     |
| 9    | 1                  | 342   | 12                      | 0     | 1         | 0     | >14760               | <2  |                | 16.6    |       |     |      |     |
| 10   | 1                  | 610   | 12                      | 0     | 1         | 0     | >14760               | 2   |                | 17.6    |       |     |      |     |
| 11   | 1                  | 220   | 12                      | 0     | 1         | 0     | >14760               | 2   |                | 18.1    |       |     |      |     |
| 12   | 1                  | 218   | 12                      | 0     | 1         | 0     | >14760               | <2  |                | 18.3    |       |     |      |     |
| 13   | 1                  | 126   | 12                      | 0     | 1         | 0     | 11100                | <2  |                | 19.5    |       |     |      |     |
| 14   | 1                  | 2910  | 12                      | 0     | 1         | 0     | >14760               | <2  |                | 19.6    |       |     |      |     |
| 15   | 1                  | 16328 | 12                      | 0     | 1         | 0     | 14760                | <2  |                | 17.4    |       |     |      |     |
| 16   | 1                  | 12588 | 12                      | 0     | 1         | 0     | 5980                 | <2  |                | 13.2    |       |     |      |     |
| 17   | 1                  | 3720  | 12                      | 1     | 1         | 0     | 3320                 | 2   |                | 14.3    |       |     |      |     |
| 18   | 1                  | 1618  | 12                      | 0     | 1         | 0     | 7840                 | <2  |                | 16.7    |       |     |      |     |
| 19   | 1                  | 4494  | 12                      | 0     | 1         | 0     | 16.1                 | <2  |                | 16.1    |       |     |      |     |
| 20   | 1                  | 1816  | 12                      | 0     | 1         | 0     | 860                  | <2  |                | 17.2    |       |     |      |     |
| 21   | 1                  | 4764  | 12                      | 0     | 1         | 0     | 14760                | <2  |                | 18.2    |       |     |      |     |
| 22   | 1                  | 2934  | 12                      | 0     | 1         | 0     | 7440                 | <2  |                | 19.0    |       |     |      |     |
| 23   | 1                  | 960   | 12                      | 0     | 1         | 0     | 7840                 | <2  |                | 18.0    |       |     |      |     |
| 24   | 1                  | 682   | 12                      | 0     | 1         | 0     | 3780                 | <2  |                | 18.3    |       |     |      |     |
| 25   | 1                  | 398   | 12                      | 0     | 1         | 0     | 14760                | 2   |                | 18.7    |       |     |      |     |
| 26   | 1                  | 482   | 12                      | 0     | 1         | 0     | >14760               | <2  |                | 21.4    |       |     |      |     |
| 27   | 1                  | 2034  | 12                      | 0     | 1         | 0     | 1600                 | <2  |                | 20.6    |       |     |      |     |
| 28   | 1                  | 2028  | 12                      | 0     | 1         | 0     | 7440                 | <2  |                | 21.1    |       |     |      |     |
| 29   | 1                  | 918   | 12                      | 0     | 1         | 0     | 5740                 | <2  |                | 20.6    |       |     |      |     |
| 30   | 1                  | 852   | 12                      | 0     | 1         | 0     | 2160                 | <2  |                | 22.3    |       |     |      |     |
| 31   | 1                  | 1166  | 12                      | 0     | 1         | 0     | 3320                 | <2  |                | 22.7    |       |     |      |     |
| Avg. |                    |       |                         |       |           |       |                      |     |                | 17.2    |       |     |      |     |
| Max. |                    |       |                         |       |           |       | > 14760              | 2   |                | 22.7    |       |     |      |     |
| Min. |                    |       |                         |       |           |       |                      |     |                | 12.0    |       |     |      |     |



**Distribution System  
Monitoring**

 City of Flint Water Treatment Plant  
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| Date | Free Chlorine Residual at Bacteriological Monitoring Stations mg/l |     |     |     |     |     |     |     |     |     | Number<br>of<br>Samples |
|------|--------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|
|      | 1                                                                  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | CS  | WR  |                         |
| 1    |                                                                    |     |     |     |     |     |     |     | 0.6 | 0.8 | 2                       |
| 2    |                                                                    |     |     |     |     |     |     |     | 0.6 | 0.8 | 2                       |
| 3    |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 4    |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 5    |                                                                    |     |     |     |     |     |     |     | 0.7 | 0.6 | 2                       |
| 6    |                                                                    |     |     |     |     |     |     |     | 1.1 | 1.4 | 2                       |
| 7    | 1.0                                                                | 1.3 | 0.9 | 1.0 | 0.9 | 0.9 | 0.9 | 1.3 | 0.4 | 0.6 | 10                      |
| 8    | 1.1                                                                | 1.3 | 1.0 | 1.4 | 0.9 | 1.1 | 0.9 | 1.4 | 0.8 | 0.6 | 10                      |
| 9    |                                                                    |     |     |     |     |     |     |     | 0.7 | 0.6 | 2                       |
| 10   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 11   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 12   |                                                                    |     |     |     |     |     |     |     | 0.3 | 0.4 | 2                       |
| 13   |                                                                    |     |     |     |     |     |     |     | 0.3 | 0.4 | 2                       |
| 14   | 1.0                                                                | 0.7 | 1.0 | 1.0 | 0.7 | 0.7 | 0.9 | 0.7 | 0.3 | 0.4 | 10                      |
| 15   | 0.6                                                                | 0.5 | 0.5 | 0.3 | 0.2 | 0.3 | 0.2 | 0.4 | 0.2 |     | 9                       |
| 16   |                                                                    |     |     |     |     |     |     |     | 0.3 |     | 1                       |
| 17   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 18   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 19   |                                                                    |     |     |     |     |     |     |     | 0.4 | 0.3 | 2                       |
| 20   |                                                                    |     |     |     |     |     |     |     | 0.3 | 0.3 | 2                       |
| 21   | 0.3                                                                | 1.2 | 0.7 | 0.8 | 0.5 | 1.0 | 0.7 | 1.2 | 0.3 | 0.3 | 10                      |
| 22   | 0.8                                                                | 0.9 | 0.7 | 0.4 |     |     |     |     | 0.3 | 0.2 | 6                       |
| 23   |                                                                    |     |     |     |     |     |     |     | 0.3 | 0.2 | 2                       |
| 24   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 25   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 26   |                                                                    |     |     |     |     |     |     |     | 0.3 | 0.1 | 2                       |
| 27   |                                                                    |     |     |     |     |     |     |     | 0.2 | 0.0 | 2                       |
| 28   | 0.7                                                                | 0.9 | 0.6 | 0.1 | 0.5 | 0.6 | 0.5 | 1.0 | 0.2 | 0.1 | 10                      |
| 29   | 0.7                                                                | 1.1 | 0.6 | 0.9 | 0.3 | 0.9 | 0.9 | 1.1 | 0.3 | 0.1 | 10                      |
| 30   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |
| 31   |                                                                    |     |     |     |     |     |     |     |     |     | 0                       |

**Distribution Sample Summary**

|                                                  |     |
|--------------------------------------------------|-----|
| Total # of routine distribution samples analyzed | 100 |
| Total # of routine distribution samples required | 100 |

**Distribution Disinfectant Free Residual Summary**

|                                                         |     |
|---------------------------------------------------------|-----|
| Percent samples with a detectable disinfectant residual | 99  |
| Average disinfectant residual this month                | 0.7 |

**Distribution Bacteriological Summary**

|                                                  |   |
|--------------------------------------------------|---|
| Total # of positive routine distribution samples | 0 |
| Percent of routine distribution samples positive | 0 |

**Positive Distribution Samples**

| Date | Monitoring Station | Date | Repeat Monitoring Stations | Residual | Positive or Negative |
|------|--------------------|------|----------------------------|----------|----------------------|
|      |                    |      |                            |          |                      |
|      |                    |      |                            |          |                      |
|      |                    |      |                            |          |                      |
|      |                    |      |                            |          |                      |
|      |                    |      |                            |          |                      |

**Distribution System  
Monitoring**

 City of Flint Water Treatment Plant  
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| Date | Total Chlorine Residual at Bacteriological Monitoring Stations mg/l |     |     |     |     |     |     |     |     |     | Number of Sample |
|------|---------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------|
|      | 1                                                                   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | CS  | WR  |                  |
| 1    |                                                                     |     |     |     |     |     |     |     | 0.7 | 1.0 | 2                |
| 2    |                                                                     |     |     |     |     |     |     |     | 0.7 | 0.8 | 2                |
| 3    |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 4    |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 5    |                                                                     |     |     |     |     |     |     |     | 1.0 | 0.8 | 2                |
| 6    |                                                                     |     |     |     |     |     |     |     | 1.9 | 0.9 | 2                |
| 7    | 1.5                                                                 | 1.7 | 1.4 | 1.4 | 1.1 | 1.1 | 1.1 | 1.7 | 0.6 | 0.9 | 10               |
| 8    | 1.6                                                                 | 1.9 | 1.2 | 1.7 | 1.3 | 1.7 | 1.3 | 1.7 | 0.9 | 1.1 | 10               |
| 9    |                                                                     |     |     |     |     |     |     |     | 0.9 | 0.8 | 2                |
| 10   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 11   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 12   |                                                                     |     |     |     |     |     |     |     | 0.4 | 0.6 | 2                |
| 13   |                                                                     |     |     |     |     |     |     |     | 0.4 | 0.7 | 2                |
| 14   | 1.3                                                                 | 1.0 | 1.4 | 1.3 | 1.0 | 1.1 | 1.2 | 0.9 | 0.4 | 0.7 | 10               |
| 15   | 0.8                                                                 | 0.7 | 1.0 | 0.6 | 0.5 | 0.7 | 0.7 | 0.7 | 0.3 |     | 9                |
| 16   |                                                                     |     |     |     |     |     |     |     | 0.4 |     | 1                |
| 17   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 18   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 19   |                                                                     |     |     |     |     |     |     |     | 0.5 | 0.5 | 2                |
| 20   |                                                                     |     |     |     |     |     |     |     | 0.4 | 0.5 | 2                |
| 21   | 0.4                                                                 | 1.9 | 1.2 | 1.3 | 1.0 | 1.5 | 1.1 | 1.6 | 0.4 | 0.4 | 10               |
| 22   | 1.2                                                                 | 1.5 | 1.0 | 1.7 |     |     |     |     | 0.5 | 0.3 | 6                |
| 23   |                                                                     |     |     |     |     |     |     |     | 0.4 | 0.3 | 2                |
| 24   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 25   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 26   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 27   |                                                                     |     |     |     |     |     |     |     | 0.4 | 0.2 | 2                |
| 28   | 1.1                                                                 | 1.2 | 1.0 | 0.3 | 0.8 | 1.1 | 0.9 | 1.4 | 0.3 | 0.2 | 10               |
| 29   | 1.1                                                                 | 1.5 | 1.1 | 1.1 | 0.5 | 1.1 | 1.1 | 1.2 | 0.5 | 0.3 | 10               |
| 30   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |
| 31   |                                                                     |     |     |     |     |     |     |     |     |     | 0                |

| Distribution Disinfectant Total Residual Summary        |     |
|---------------------------------------------------------|-----|
| Percent samples with a detectable disinfectant residual | 100 |
| Average disinfectant residual this month                | 1.0 |

**Cover Page Notes:**

1. Filter head loss meters are not operational on our SCADA. They will be operational after our SCADA upgrades are complete. The SCADA upgrades are out for bid at the moment.
2. No cost analysis done for chemicals or power. An accurate chemical cost could not be determined due to polymer usage. We were given significant quantities (4-5 days) of polymer to use as a trial on two different occasions. No power cost was determined because I am trying to gain access to the correct monthly power cost.
3. POE continuous chlorine residual monitoring equipment has not been installed. We plan to move the continuous chlorine analyzer from the 3MG Well to the discharge side of the high service pumps. At this time we are taking residuals in the 3MG well, and using our lab tap to represent POE.

**Report Notes:**

1. Plant operations were shut down on 5/12 until 5/14. This was done to drain a softening clarifier and change plant set-up to test a new polymer. Storage reservoirs were utilized during this time.
-

**Rennaker, Joanne (DEQ)**

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**From:** Pallone, Maggie (DEQ)  
**Sent:** Tuesday, September 29, 2015 5:16 PM  
**To:** Busch, Stephen (DEQ); Wurfel, Brad (DEQ)  
**Subject:** FW: MDEQ Water Testing for Flint Community Schools

Steve-  
 Can you work on putting together the quick info they will need?  
 Thanks,  
 Maggie

---

**From:** Sitko, Anthony M [<mailto:tsitko@flintschools.org>]  
**Sent:** Tuesday, September 29, 2015 5:15 PM  
**To:** Pallone, Maggie (DEQ) <[PalloneM@michigan.gov](mailto:PalloneM@michigan.gov)>  
**Cc:** Tawwab, Bilal <[btawwab@flintschools.org](mailto:btawwab@flintschools.org)>; Lisa Ermak <[lermak@byrumfisk.com](mailto:lermak@byrumfisk.com)>  
**Subject:** RE: MDEQ Water Testing for Flint Community Schools

Greetings Maggie,

Mr. Tawwab our Superintendent has a principal meeting tomorrow morning with our district principals.

If at all possible it would be good for us to be able to present them with the information needed (protocols) to prepare for the County Health Department to get the water samples from the schools on Thursday and/or Friday.

Mr. Tawwab would like to get them a memo communication in the morning to this effect. Therefore, please send the needed information that we discussed in the conference call as early as you can tomorrow for this important communication to our district principals.

Thanking you in advance,  
 Tony

---

**From:** Pallone, Maggie (DEQ) [<mailto:PalloneM@michigan.gov>]  
**Sent:** Tuesday, September 29, 2015 3:12 PM  
**To:** Sitko, Anthony M  
**Cc:** Tawwab, Bilal; FARRIS SHARRECE; Lisa Ermak; Busch, Stephen (DEQ); Tommasulo, Karen (DEQ); Pallone, Maggie (DEQ)  
**Subject:** RE: MDEQ Water Testing for Flint Community Schools

We would like to have this call at 4:00.

Conference call info: 1-888-251-2909  
 Access Code: 8426781

Please let me know if you have any questions.

Thanks!

Heather Feuerstein for Maggie Pallone  
Management Assistant to  
Maggie Pallone, Deputy Director and  
Brad Wurfel, Communications Director  
Department of Environmental Quality  
517.284.6715

---

**From:** Sitko, Anthony M [<mailto:tsitko@flintschools.org>]  
**Sent:** Tuesday, September 29, 2015 1:23 PM  
**To:** Pallone, Maggie (DEQ)  
**Cc:** Tawwab, Bilal; FARRIS SHARRECE; Lisa Ermak  
**Subject:** MDEQ Water Testing for Flint Community Schools  
**Importance:** High

Greetings, Maggie,

Thank you for taking the time to talk with me this afternoon regarding water testing for our schools. Please find the attached list of sites within the Flint Community Schools at which Superintendent Tawwab would like water tested.

Per our discussion on the phone this afternoon, the list of school buildings is attached and I will be available between 3:00PM and 5:00PM for a conference call with yourself and the identified other parties.

I await your reply on the time for the conference call.

Regards,  
Tony

**Rennaker, Joanne (DEQ)**

---

**From:** Crooks, Jennifer <crooks.jennifer@epa.gov>  
**Sent:** Monday, June 22, 2015 8:53 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Poy, Thomas; Cook, Pat (DEQ); Deltoral, Miguel; Bair, Rita  
**Subject:** FW: Mike Schock's Bio for MDEQ  
**Attachments:** Michael Schock 6-17-15.pdf

Hi, Steve and Mike. A second bio for you. To follow up from our semi-annual call in which we discussed Flint issues and lead in the distribution system, I am forwarding you Mike Schock's resume. Mike is a national expert in lead, and would be a great resource for the City and for you all, and for the City's Technical Advisory group; as you can see he is very well qualified. I hope you will take advantage of his technical expertise. His contact information is on the attached resume. If you have questions about Mike, please contact Miguel at 312.886.5253.

Jennifer

**From:** Deltoral, Miguel  
**Sent:** Thursday, June 18, 2015 9:29 AM  
**To:** Crooks, Jennifer  
**Cc:** Poy, Thomas; Bair, Rita; Porter, Andrea; Kuefler, Janet  
**Subject:** Re: Mike Schock's Bio for MDEQ

Sorry, forgot the file...

Miguel A. Del Toral  
 Regulations Manager  
 U.S. EPA R5 GWDWB  
 77 West Jackson Blvd, (WG-15J)  
 Chicago, IL 60604  
 Phone: (312) 886-5253

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**From:** Deltoral, Miguel  
**Sent:** Thursday, June 18, 2015 09:16 AM  
**To:** Crooks, Jennifer  
**Cc:** Poy, Thomas; Bair, Rita; Porter, Andrea; Kuefler, Janet  
**Subject:** Mike Schock's Bio for MDEQ

Morning Jen,

Here's Mike's bio as requested by Flint. I haven't received anything from Darren yet.

Miguel A. Del Toral  
 Regulations Manager  
 U.S. EPA R5 GWDWB  
 77 West Jackson Blvd, (WG-15J)  
 Chicago, IL 60604  
 Phone: (312) 886-5253

# MICHAEL R. SCHOCK

U. S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF RESEARCH AND DEVELOPMENT  
 NATIONAL RISK MANAGEMENT RESEARCH LABORATORY  
 WATER SUPPLY AND WATER RESOURCES DIVISION  
 TREATMENT TECHNOLOGY EVALUATION BRANCH  
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## EXPERIENCE

### 1995–Present U. S. Environmental Protection Agency, Cincinnati, OH

*Chemist (National Expert, GS-14), Treatment Technology Evaluation Branch, Water Supply and Water Resources Division, National Risk Management Research Laboratory, Office of Research and Development*

- Conducted both in-house and field research into drinking water treatment with emphasis on corrosion control of premise plumbing and distribution systems, regulatory interactions, and smaller water system problems
- Written papers, book chapters and given presentations to diverse water industry audiences on research results and different aspects of water treatment and water analysis
- Work Assignment Manager for on-site analytical support contract for the Water Supply and Water Resources Division for 25+ years, as well as specific-purpose Work Assignments for development of field research studies and publications.
- Provided technical consultation to other EPA offices, State agencies, consultants, private citizens, foreign entities including government technical staff, and a variety of utilities in the international water supply industry
- Participated in regulatory workgroups for the Total Coliform/Distribution System Rule, and the Lead and Copper Rule, as well as multi-year research planning workgroups
- Developed and refined analytical methods for selected inorganics in drinking water and pipe corrosion deposits, particularly the acquisition of instrumentation and development of analytical methods for X-ray diffraction and X-ray fluorescence analyses, and application of XANES spectrometry to corrosion by-product analysis.
- Published break-through work on the chemistry and control of tetravalent lead and cuprosolvency in drinking water, metal accumulation in distribution system pipe scales, and related "simultaneous compliance" guidance issues

### 1989–1994 U. S. Environmental Protection Agency, Cincinnati, OH

*Research Chemist (GS-13), Physical and Chemical Contaminants Removal Branch, Drinking Water Research Division, National Risk Reduction Engineering Laboratory, Office of Research and Development*

- Conducted both in-house and field research into drinking water corrosion control, particularly copper and lead
- Wrote papers, book chapters and gave presentations on research results
- Initiated and managed on-site analytical support contract work assignment for the Water Supply and Water Resources Division
- Provided technical consultation to other EPA offices, State agencies, consultants and utilities in the water supply industry

- Developed and refined analytical methods for selected inorganics in drinking water and pipe corrosion deposits, such as Be and TIC, and X-ray diffraction compound analyses in corrosion deposits
- Worked with NSF to develop test waters still used for NSF/ANSI 61 Section 9 certification for end-point plumbing products

#### **1982–1989 Illinois State Water Survey, Champaign, IL**

##### *Associate Chemist, Aquatic Chemistry Section*

- 1985-1989 headed Inorganic Analytical Support Group for the Aquatic Chemistry Section (4 chemists, 1 biologist, 1 engineer, plus temporary associates), charged with providing rapid, high-quality sample collection and analyses involving both routine and special method applications for investigators conducting various ground water and corrosion control projects
- Planned and oversaw the development of a fully-equipped inorganic research analytical laboratory that grew from contract dependence to a self-sufficient capability of over 55,000 determinations per year in a broad suite of water matrices
- Prepared and assisted in preparation of research proposals for outside funding from agencies such as U. S. EPA., Illinois Department of Transportation, and the AWWA Research Foundation
- Conducted research into corrosion control in drinking water, well encrustation, ground water geochemistry and monitoring, including preparation of papers and project reports
- Developed or set up methods and conducted numerous analyses for inorganic metals and anions in water and corrosion scales using instruments such as auto-analyzers, UV/VIS spectrometers, pH meters, redox measurement systems, atomic absorption spectrophotometers, carbonate coulometer, potentiometric titrator, and X-ray diffractometer

#### **1980–1982 U. S. Environmental Protection Agency, Cincinnati, OH**

##### *Research Chemist (GS-9/11), Drinking Water Research Division, Municipal Environmental Research Laboratory*

- Developed and refined existing computerized models for metal solubility to apply to drinking water corrosion control of metal and asbestos-cement pipe
- Published research results of corrosion control and analytical method studies
- Operated laboratory and pilot-plant corrosion control experiments
- Provided analytical and logistical support to Branch in-house and extramural projects

#### **1978–1980 U. S. Environmental Protection Agency, Cincinnati, OH**

##### *Physical Science Technician/Chemist (GS-5/9) Drinking Water Research Division, Municipal Environmental Research Laboratory*

- Operated laboratory and pilot-plant corrosion control experiments
- Conducted large variety of inorganic laboratory analyses
- Developed calculator and computer programs for metal solubility and speciation calculation, particularly lead and zinc

#### **POST-GRADUATE ACADEMIC EDUCATION**

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|------|--------------------------|----------------|
| 1995 | University of Cincinnati | Cincinnati, OH |
| ■    | SEM/EDXA microanalysis   |                |



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|-----------------------------------------------------|-----------------------------------|---------------------|
| 1983                                                | University of Illinois            | Urbana, IL          |
| ■ Advanced water treatment chemistry                |                                   |                     |
| 1978-1979                                           | University of Cincinnati          | Cincinnati, OH      |
| ■ Environmental and analytical chemistry            |                                   |                     |
| 1977-1978                                           | The Pennsylvania State University | University Park, PA |
| ■ Aqueous and analytical chemistry and geochemistry |                                   |                     |
| 1976-1977                                           | Wright State University           | Dayton, OH          |
| ■ Equilibrium and physical chemistry                |                                   |                     |

## GRADUATE EDUCATION

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- |                                                                                                         |                           |                  |
|---------------------------------------------------------------------------------------------------------|---------------------------|------------------|
| 1974-1976                                                                                               | Michigan State University | East Lansing, MI |
| ■ MS, Geology ( <i>with thesis</i> ), 1978                                                              |                           |                  |
| ■ Course work in aqueous geochemistry, geology, environmental engineering, limnology, X-ray diffraction |                           |                  |

## UNDERGRADUATE EDUCATION

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- |                              |                         |            |
|------------------------------|-------------------------|------------|
| 1970-1974                    | Wright State University | Dayton, OH |
| ■ BS, Geology, 1974          |                         |            |
| ■ Analytical chemistry minor |                         |            |

## PROFESSIONAL AWARDS

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- 2015 AWWA overall Jour. AWWA and Distribution & Plant Operations Division Best Paper Awards "*Importance of Pipe Deposits to Lead and Copper Rule Compliance*"
  - 2011 American Water Works Association A. P. Black Award
  - 2011 U. S. Environmental Protection Agency-ORD Scientific and Technological Achievement Award, Level III, for "*Critical analysis of Corrosion and Presentation of Guidance for Solving Drinking-Water Corrosion and Scaling*"
  - 2010 *Environmental Science & Technology* "Excellence in Review" award
  - 2009 AWWA Research Division Best Paper award co-author "*Pitting of Copper in High pH and Low Alkalinity Waters.*"
  - 2008 U. S. Environmental Protection Agency-ORD Scientific and Technological Achievement Award, Honorable Mention, for "*Exploring the Possible Unintended Consequences of Implementing Treatment Changes at a Drinking Water Utility*"
  - 2008 U. S. Environmental Protection Agency-ORD Scientific and Technological Achievement Award, Honorable Mention, for "*Impact of Water Chemistry on the Transformation of Pb(II) to Pb(IV) in Chlorinated Water*"
  - 2007 EPA Bronze Medal from Office of Water for "*Improving the public health protections provided by the Lead and Copper Rule*"
  - 2006 EPA Bronze Medal from Region VIII for support in solving lead problems at Warren Air Force Base
  - 2006 EPA award from Office of Science Policy for "*Exceptional/Outstanding ORD Technical Assistance to the Regions or Program Offices*" for support to Office of Water
  - 2006 AWWA Water Quality Division Best Paper award co-author "*Lead Leaching from Inline Brass Devices: A Critical Evaluation of the Existing Standard*"
  - 2006 AWWA Water Quality Division Best Poster award co-author "*The Effect of Fluoride Additives on Lead Solubility and Corrosion*"

- 2005 EPA Gold Medal from OGWDW for *"Addressed simultaneous challenges of unprecedented technical problems of elevated lead levels in drinking water, public's concern, and uncertain health threat."*
- 2004 USEPA/ORD Scientific and Technological Achievement Award Level 3 for *"Identifying Unanticipated Drinking-Water, Human-Exposure Problems and the Water Treatment and Monitoring Implications."*
- 2003 EPA Bronze Medal from OSP for *"Promoting Strong Science in Agency Decisions"*
- 2003 USEPA/ORD Scientific and Technological Achievement Award, Level 3, for simultaneous corrosion control and radon removal by application of an innovative use of aeration treatment
- 2003 EPA Bronze Medal for developing a strategy to promote sound-science basis for support to OGWDW for the 6-Year Review process.
- 2002 USEPA Region VIII "Most Effective Team Award" for the Warren AFB Drinking Water Enforcement Team.
- 2002 USEPA/ORD Scientific and Technological Achievement Award, Honorable Mention, for "Raising Awareness of Environmentally Relevant Topics Among Educators in Furtherance of chemically Sound Environmental Research and Its Application in the Field"
- 2002 "Editor's Award," Jour. of Environmental Engineering for manuscript review
- 2000 USEPA/ORD Scientific and Technological Achievement Award, Level 3, for "A Comprehensive Review of Hexafluorosilicate and Fluoride Chemistry and its Application to Public Water Treatment"
- 1999 USEPA/ORD Scientific and Technological Achievement Award, Level 3, for "Issues in Managing the Risks Associated with Perchlorate in Drinking Water."
- 1999 New England Water Works Association Dexter Brackett award for best paper published in the NEWWA Journal the past year ("Reasons for Corrosion Control Other than the Lead and Copper Rule")
- 1999 Federal Executive Board of Greater Cincinnati, Federal Service Excellence, Professional/Scientific category.
- 1999 Cincinnati Public Service Recognition Week Honoree, Federal Employee of the Year
- 1998 New England Water Works Association Past Presidents' award for best multi-authored paper published in the NEWWA Journal the past year ("Lead and Copper Control Using Non-Zinc Orthophosphate")
- 1998 USEPA/ORD Scientific and Technological Achievement Award, Level 3, for "Application of Aeration to Reduce Lead and Copper in Waters with Suitable pH and Carbon Dioxide Levels."
- 1998 Ohio Section AWWA Wendell R. La Due Citation (20 years service)
- 1997 USEPA/ORD Scientific and Technological Achievement Award, Level 2, for "New Research, Critical Review and Evaluation of Information, and Synthesis of Guidance for the Control of Lead in Drinking Water."
- 1993 USEPA/RREL STAR program publication award "Evaluation of a Field Test Kit for Monitoring Lead in Drinking Water", *Jour. AWWA*
- 1993 USEPA/RREL STAR program publication award "Investigating the Preferential Dissolution of Lead from Solder Particulates", *Jour. AWWA* (second author)
- 1993 USEPA/ORD Scientific and Technological Achievement Award, Level 1, "Determining Beryllium in Drinking Water by Graphite Furnace Atomic Absorption Spectroscopy", *Jour. AWWA* (second author)
- 1981 USEPA Special Achievement Award
- 1981 AWWA Research Division, best paper, Jour. AWWA, "Response of Lead Solubility to Dissolved Carbonate in Water"
- 1981 USEPA Scientific and Technological Achievement Award, Control Systems category

## ACTIVE PROFESSIONAL COMMITTEES

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- Vice-Chair, NSF 61 “Extraction Water Chemistries” Task Group
- USEPA Lead and Copper Rule Revisions, Six Year Review
- USEPA CCL3 and UCMR4 workgroups
- AWWA Research Division Inorganic Contaminants (2002-present)
- IWA Specialist Group Metals and Related Substances in Drinking Water (management committee)
- New England Water Works Association Publications Committee
- New England Water Works Association Corrosion Control Committee
- Assistant Editor for Peer-Review: Journal of the New England Water Works Association
- NSF Drinking Water Additives Program Mechanical Plumbing Products Task Group, ANSI/NSF Standard 61 (1987-1994; 2004-present)
- Member of Water Research Foundation Project Advisory Committee for:
  - “Evaluation of Lead Service Line Lining and Coating Technologies,” Project 4351, 2011-present
- Standard Methods for the Examination of Water and Wastewater

## PAST PROFESSIONAL COMMITTEES

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- AWWA WITAF project: Impact of Changing Lead and Copper Rule Sample Pool and Sample Protocol Requirements and Cost Assessment of OCCT and Treatment Consequences (2012-2014)
  - AWWA Technical Advisory Workgroup for Inorganic and Corrosion By-products (1988-2008)
- Water Research Foundation Infrastructure Reliability research advisory committee (as external “expert” on corrosion area), 2003-2010
- Organizing committee, AWWA 2004, 2006, 2008, 2010 Inorganic Contaminants Workshop
  - New England Water Works Association Corrosion and Its Effects On Water Quality Committee (1997-2005)
  - AWWA Water Quality Division Committee on Control of Water Quality in Transmission and Distribution Systems (1990-2001)
  - AWWA Research Division Corrosion Committee, 1986 – 1994 (committee disbanded)
  - AWWA Research Division Committee on Distribution System Research (1994-2007)
  - ASCE Task Committee on Control of Lead Levels in Potable Water, 1989 - 1992 (committee inactive after 1992)
  - NSF “Lead Reduction Task Group” for ANSI/NSF Standard 53, Drinking Water Treatment Units (1998-2006)
  - AWWA Research Foundation Project Advisory Committees:
    - “Economics of Internal Corrosion Control”, 1988- 1989
    - “Development of a Pipe Loop Protocol”, 1991 – 1994
    - “Development of Analytical Methodology to Identify Species in Phosphate-Based Corrosion Inhibitors”, 1992-1995
    - “General Framework for Corrosion Control”, 1994-1997
    - “Corrosion and Metal Release for Lead-Containing Plumbing: Influence of Natural Organic Matter and Corrosion Mitigation”, 1994-1997.
    - “Water Quality Changes Following Corrosion Control Strategies,” 1995-2000
    - “Role of Phosphate Inhibitors in Mitigating Lead and Copper Corrosion,” 1997-2001.
    - “Corrosion Inhibitors and Pb/Cu Corrosion By-product Release,” 1996-2003.
    - “Optimizing Corrosion Control in Water Distribution Systems,” 1999-2004

- "Required Treatment and Water Quality Criteria for Distribution System Blending of Treated Surface, Ground and Saline Sources," 2000-2005
- "Contribution of Service Line and Plumbing Fixtures to Lead and Copper Rule Compliance Issue," Project 3018, 2004-2008.
- "Stannous Chloride Corrosion Inhibitor Mechanisms," 2006-2009
- "Assessment of Inorganics Accumulation in Drinking Water System Scales and Sediments," Project 3118, 2005-2009
- "Impacts of Lining Materials on Water Quality," Project 4036, 2006-2009
- "Criteria for Optimized Distribution Systems," Project 4109, 2007-2009
- "Secondary Impacts of Corrosion Control on Distribution System and Treatment Plant Equipment," Project 4029, 2007-2009
- "Influence of Water Chemistry on the Dissolution and Transformation Rates of Lead Corrosion Products," Project 4064, 2007-2010
- "Green Building Design: Water Quality and Utility Management Considerations," Project 4383, 2011-2015
- "Legacy of Manganese Accumulation in Water Systems: Assessment, Consequence, Remediation and Prevention," Project 4314, 2010-2015
- AWWARF Internal Corrosion of Water Distribution Systems (1985, 1996 books)
- AWWA Water Quality and Treatment, Fourth (1990) and Fifth (1999) and Sixth (2010) Editions (book chapter author)
- Standard Methods for the Examination of Water and Wastewater, method 2320, Alkalinity 18<sup>th</sup>-current Editions (chair, 20<sup>th</sup> Edition)
- Standard Methods for the Examination of Water and Wastewater, method 4500-CO<sub>2</sub>, Carbon Dioxide, 20<sup>th</sup> Edition
- International Water Association Management Committee for the Specialist Group on Metals and Related Substances in Drinking Water
- Member of IWA writing teams for: "Best Practice Guide on the Control of Lead in Drinking Water" (2010) and "Internal Corrosion Control of Water Supply Systems Code of Practice" (2012)

## PROFESSIONAL SOCIETIES

American Water Works Association (Ohio and New England Sections), American Chemical Society, Cincinnati Federal Environmental Chapter of Sigma Xi (Secretary/Treasurer, 1996; Vice-President 1997-1998; President, 1999-2001), The Geochemical Society, International Water Association

## JOURNAL & PUBLICATION REVIEWER

Environmental Science & Technology, Journal of the American Water Works Association, Water Research, Corrosion Science, Journal Water SRT—AQUA, Environmental Health Insights, Environmental Health Perspectives, Environmental Pollution, American Society for Materials, Fresenius Environmental Bulletin, Journal of the Electrochemical Society, Desalination, Journal of Environmental Quality, American Society for Microbiology, Biofouling, Environmental Monitoring and Assessment, Chemosphere, Journal of Environmental Engineering, NACE Corrosion.

## **ANALYTICAL AND COMPUTER SKILLS**

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- Experienced with X-Ray diffraction, Scanning Electron Microscope, Wavelength- and Energy-dispersive X-Ray fluorescence analysis, and X-Ray Absorption Near-Edge Spectroscopy analytical techniques for solid samples
- Familiar with flame and flameless Atomic Absorption Spectrophotometry for major constituent and trace metals analysis
- Experienced with analytical method development for atomic absorption, potentiometric, segmented-flow, and spectrophotometric techniques applied to natural, contaminated, and drinking waters, including peer-reviewed publications of resulting methods and application of statistics for method evaluation
- Experienced with all standard laboratory solution preparation and sample handling procedures, including trace metal analysis.
- Experienced with coulometric analysis of aqueous and solid carbonates and application of automated chemical analyzers, such as Technicon Auto-Analyzers and related instruments, to water samples
- Considerable experience with many different word processing, spreadsheet, data management, graphical, and statistical analysis software packages for IBM-compatible and i-Mac personal computers, such as Word, PowerPoint, Origin, EndNote, SigmaPlot, SAS, and others
- Experienced with the application of geochemical equilibrium modeling computer programs (including MINTEQA2, PHREEQC, WATEQ-family, MINEQL+ 50, Geochemists' Workbench, among others) to ground and drinking water studies, and modifications of their code and data bases
- Experienced with FORTRAN language programming, having developed models such as LEADSOL, CU2SOL, and ZINCSOL used in many publications
- Experienced with DOS, Windows and Mac OSX, operating systems, numerous text editor and utility programs, and PC/peripherals hardware configuration and support.

## JOURNAL AND PEER-REVIEWED PUBLICATIONS

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"Direct Determination of Copper, Manganese and Iron in Soils and Sediments Using Secondary Absorption Lines". M. R. Schock and R. B. Mercer. *Atomic Absorption Newsletter*, 16:30 (1977). Errata 16:69 (1977).

"Laboratory Techniques for Measurement of pH for Corrosion Control Studies and Water not in Equilibrium with the Atmosphere". M. R. Schock, R. W. Buelow, and W. Mueller. *Journal American Water Works Association*, 72:5:304 (1980).

"Response of Lead Solubility to Dissolved Carbonate in Drinking Water". M. R. Schock. *Jour. AIWWA*, 72:12:695 (1980). Errata 73:3:36 News (1981).

"The Behavior of Asbestos-Cement Pipe Under Various Water Quality Conditions: Part 2, Theoretical Considerations". M. R. Schock and R. W. Buelow, *Jour. AIWWA*, 73:11:609 (1981).

"Effect of Container Type on pH and Alkalinity Stability". M. R. Schock and S. C. Schock. *Water Research*, 16:1455 (1982).

"Plumbosolvency Reduction by High pH and Low Carbonate: Solubility Relationships". M. R. Schock and M. C. Gardels. *Jour. AIWWA*, 75:2:87 (1983).

"Temperature and Ionic Strength Corrections to the Langelier Index (Revisited)". M. R. Schock. *Jour. AIWWA*, 76:8:72 (Aug. 1984).

"An Inexpensive Flow-Through Cell and Measurement System for Monitoring Selected Chemical Parameters in Ground Water". E. E. Garske and M. R. Schock. *Ground Water Monitoring Review*, 6:79 (1986).

"Trace Metal Contamination from Brass Fittings". M. R. Schock and C. H. Neff, *Jour. AIWWA*, 80:11:47 (1988).

"Understanding Corrosion Control Strategies for Lead". M. R. Schock. *Jour. AIWWA*, 81:7:88 (1989).

"Spatial and Temporal Gradients in Aquifer Oxidation-Reduction Conditions". M. J. Barcelona, T. R. Holm, M. R. Schock, and G. K. George. *Water Resources Research*, 25:5:991 (1989).

"Network Design Factors Assessing Temporal Variability in Ground Water Quality". M. J. Barcelona, D. P. Lettenmaier, and M. R. Schock. *Environmental Monitoring and Assessment*, 12:149 (1989).

"Causes of Temporal Variability of Lead in Domestic Plumbing Systems". M. R. Schock. *Environmental Monitoring and Assessment*, 15:59 (1990).

"Internal Corrosion and Deposition Control". M. R. Schock. Chapter 17 in *Water Quality and Treatment, Fourth Edition*, American Water Works Association, McGraw-Hill (1990).

"Potential Effects of Polyphosphate Water Treatment Products on Lead Solubility in Plumbing Systems". T. R. Holm and M. R. Schock. *Jour. AIWWA*, 83:7:76 (1991). Correspondence, 83:12:10 (1991).

"Beryllium Determination in Drinking Water by Graphite Furnace Atomic Absorption Spectroscopy (GFAAS)". D. A. Lytle, M. R. Schock, N. R. Dues and J. U. Doerger. *Jour. AWWA*, 85:2:77 (1993).

"Preferential Dissolution of Lead from Solder Particulate Material". D. A. Lytle, M. R. Schock, N. R. Dues and P. J. Clark. *Jour. AWWA*, 85:7:104 (1993).

"Evaluation of a Field Test Kit for Monitoring Lead in Drinking Water". M. R. Schock and G. K. George, *Jour. AWWA*, 85:8:90 (1993).

"Statistical Procedures for Corrosion Studies". B. M. Wysock, A. M. Sandvig, M. R. Schock, C. P. Frebis, and Boris Prokop, *Jour. AWWA* 87:7: 99(1995).

"Alkalinity, pH and Copper Corrosion By-Product Release," M. A. Edwards, M. R. Schock, and T. E. Meyer, *Jour. AWWA*, 88:3:81 (1996).

"Corrosion Inhibitor Applications in Drinking Water Treatment: Conforming to the Lead and Copper Rule," M. R. Schock, Proceedings of the National Association of Corrosion Engineers Symposium "Reviews on Corrosion Inhibitor Science and Technology-II", Paper No. 231, NACE Corrosion/96, Denver, CO, March 24-29 (1996).

"Controlling Lead Corrosion in the Drinking Water of a Building by Orthophosphate and Silicate Treatment," Darren A. Lytle, M. R. Schock, and T. J. Sorg, *Journal of the New England Water Works Association*, 110:3:202 (1996).

"Impact of Alloy Composition and pH on Brass Corrosion in Drinking Water," Darren A. Lytle and Michael R. Schock, *Advances in Environmental Research*, 1:2:213 (1997).

"Use of Aeration for Corrosion Control," D. A. Lytle, M. R. Schock, J. A. Clement, and C. M. Spencer. *Jour. AWWA*, 90:3:74 (1998). Erratum, *Jour. AWWA*, 90:5:4 (1998). Erratum. *Jour. AWWA*, 90:9:4 (1998).

"Lead and Copper Control with Non-Zinc Orthophosphate", M. R. Schock and J. A. Clement, *Jour. NEWWA*, 112:2:20 (1998).

"Computing Saturation Indices and Calcium Carbonate Precipitation Potential Using Spreadsheet Programs," T. R. Holm and M. R. Schock, *Jour. AWWA*, 90:7:80 (1998).

"Reasons for Corrosion Control Other Than the Lead and Copper Rule," M. R. Schock. *Jour. NEWWA*, 113:2:128 (1999).

"Issues in Managing the Risks Associated with Perchlorate in Drinking Water," E. T. Urbansky and M. R. Schock, *Jour. Environmental Management*, 56:79(1999).

"Ion Exchange Softening : Effects on Metals Concentrations," T. J. Sorg, M. R. Schock and D. A. Lytle, *Jour. AWWA*, 91:8:85 (1999).

"Implementation and Secondary Impacts of Corrosion Control Treatment: Chicopee Water Supply and Water Pollution Control," B. Cook, C. Silke, C. M. Spencer, K. Eager, & M. R. Schock, *Jour. NEWWA* 113:4:308 (1999).

"Can Fluoridation Affect Lead(II) in Potable Water? Hexafluorosilicate and Fluoride Equilibria in Aqueous Solution," E. T. Urbansky and M. R. Schock, *International Journal of Environmental Studies—Section B*, 57:597-637 (2000).

"Understanding, Deriving, and Computing Buffer Capacity," E. T. Urbansky and M. R. Schock, *Journal of Chemical Education*, 77:1640 (2000).

"Impact of Stagnation Time on Metal Dissolution from Plumbing Materials in Drinking Water." D. A. Lytle and M. R. Schock, *J. Water SRT—Aqua*, 49:5:243 (2000).

"Role of Pipe Aging in Copper corrosion By-Product Release." Edwards, M., Powers, K. & Hidmi, L., Schock, M. R., *Water Science and Technology: Water Supply*, 43(10) G04 (2001).

"Flowcharts for the Selection of Lead and Copper Corrosion Control Strategies." J. A. Clement, M. R. Schock, C. M. Spencer, S. C. Olson, J. Dwyer, B. K. Cook and W. Marshall, *Journal of the New England Water Works Association*, 115:4:288-312 (2001).

"California's First Aeration Plants for Corrosion Control," M. R. Schock, T. R. Lovejoy, J. Holldber, J. Lowry. *Jour. AIWWA*, 94:3:88-100 (2002).

"Aluminum-Containing Scales in Water Distribution Systems: Prevalence and Composition," Vernon L. Snoeyink, Michael R. Schock, Pankaj Sarin, Lili Wang, Abraham S.-C. Chen, Stephen M. Harmon. *J. Water SRT—Aqua*, 52:7:455 (2003).

"Are We Monitoring in the Right Places for Metals and Radionuclides?" M. R. Schock, and T. R. Holm. *Jour. New England Water Works Association*. 141:2:102 (2003).

"Lead Leaching from Inline Brass Devices: A Critical Evaluation of the Existing Standard." Dudi, Abhijeet, Schock, Michael, Murray, Nestor, and Edwards, Marc. *Journal of the American Water Works Association*, 97:8:66 (2005).

"Replacing Polyphosphate with Silicate to Solve Problems with Lead, Copper and Source Water Iron." Michael R. Schock, Darren A. Lytle, Anne M. Sandvig, Jonathan Clement, and Stephen M. Harmon, *Journal of the American Water Works Association*, 97:11:84 (2005).

"The Formation of Pb(IV) Oxides in Chlorinated Water." D. A. Lytle and M. R. Schock, *Journal of the American Water Works Association*, 97:11:102 (2005).

"Knowing Chemistry Can Help Get the Lead Out." Burlingame, Gary A., Schock, Michael R., and Edwards, Marc A. *Op-Flow*, 32:9:34 (2006).

"Effects of Disinfectant Change on Lead and Copper Release" Boyd, G. R., Dewis, K. M., Korshin, G. V., Reiber, S. H., Schock, M. R., Sandvig, A. M. and Giani, R., *Journal of the American Water Works Association*, 100:11:75-87 (2008).



- “Physiochemical characterization of five iron tubercles from a single drinking water distribution system: Possible new insights on their formation and growth.” Gerke, T. L., Maynard, J. B., Schock, M. R. and Lytle, D. A., *Corrosion Science*, 50:7:2030-2039 (2008).
- “Lead Exposures in U.S. Children, 2008: Implications for Prevention ” Levin, R., Brown, M. J., Kashtock, M. E., Jacobs, D., Whelan, E. A., Rodman, J., Schock, M. R., Padilla, A. and Sinks, T., *Environmental Health Perspectives*, 116:10:1285-1293 (2008).
- “Pitting of Copper in High pH and Low Alkalinity Waters.” Lytle, D. A. and Schock, M. R., *Journal of the American Water Works Association*, 100:3:115-128 (2008).
- “Occurrence of Contaminant Accumulation in Lead Pipe Scales from Domestic Drinking-Water Distribution Systems.” Schock, M. R., Hyland, R. N. and Welch, M. M., *Environ. Sci. Technol.*, 42:12:4285-4291 (2008).
- “Synthesis of Lead Pyrophosphate,  $Pb_2P_2O_7$ , in Water.” Lytle, D. A., White, C. and Schock, M. R., *Microscopy and Microanalysis*, 14:04:335-341 (2008).
- “Long-Term Impacts of Orthophosphate Treatment on Copper Levels.” Schock, M. R. and Sandvig, A. M., *Journal of the American Water Works Association*, *Journal of the American Water Works Association*, 101:7:71-82 (2009).
- “Effect of Phosphate Inhibitors on the Formation of Lead Phosphate/Carbonate Nanorods, Microrods and Dendritic Structures.” Nadagouda, M., Schock, M., Metz, D. H., Desantis, M., Lytle, D. and Welch, M. M., *Crystal Growth & Design*, 9:4:1798-1805 (2009).
- “Identification and Distribution of Vanadinite ( $Pb_5(V^{5+}O_4)_3Cl$ ) in Lead Pipe Corrosion By-Products.” Gerke, T. L., Scheckel, K. G. and Schock, M. R., *Environmental Science & Technology*, 42:12:4412-4418 (2009).
- “The Inhibition of Pb(IV) Oxide Formation in Chlorinated Water by Orthophosphate.” Lytle, D. A., Schock, M. R. and Scheckel, K., *Environmental Science & Technology*, 43:17:6624-6631 (2009).
- “Challenges in addressing variability of lead in domestic plumbing.” Schock, M. R. and Lemieux, F. G., *Water Science & Technology: Water Supply*, 10:5:792-798 (2010).
- “Detection and Evaluation of Elevated Lead Release from Service Lines: A Field Study.” Del Toral, M. A., Porter, A. and Schock, M. R., *Environmental Science & Technology*, 47:16:9300-9307 (2013).
- “Optimization of corrosion control for lead in drinking water using computational modeling techniques.” Hayes, C. R., Croft, T. N., Campbell, J. A., Douglas, I. P., Gadoury, P. J. and Schock, M. R., *Journal of the New England Water Works Association*, 127:3:232-251 (2013).
- “Importance of Pipe Deposits to Lead and Copper Rule Compliance.” Schock, M. R., Cantor, A. F., Triantafyllidou, S., DeSantis, M. K. and Scheckel, K. G., *Journal - American Water Works Association*, 106:7:E336-E349 (2014).
- “Low Contribution of  $PbO_2$ -Coated Lead Service Lines to Water Lead Contamination at the Tap.” Triantafyllidou, S., Schock, M. R., DeSantis, M. K. and White, C., *Environ Sci Technol*, 49:6:3746-54 (2015).

## PEER-REVIEWED BOOK CHAPTERS

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## MISCELLANEOUS PUBLICATIONS

"Don't Blame Your Water Softener—Ion Exchange Softening and the Leaching of Metals from Household Plumbing Systems." T. J. Sorg & M. R. Schock, *Water Conditioning and Purification*, December (1997), pp. 46-51.

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**Rennaker, Joanne (DEQ)**

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**From:** Rosenthal, Adam (DEQ)  
**Sent:** Wednesday, December 10, 2014 1:20 PM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: Monitoring Results  
**Attachments:** November 2014 Bromate Results.pdf; December 2014 Radiological Test Results.pdf

update on Flint pbcu monitoring.

**From:** Michael Glasgow [<mailto:mglasgow@cityofflint.com>]  
**Sent:** Wednesday, December 10, 2014 12:55 PM  
**To:** Rosenthal, Adam (DEQ)  
**Subject:** Monitoring Results

Adam,

Good afternoon, I just wanted to pass some monitoring results to you. Attached below are the results from November 2014 Bromate monitoring, and our 4th quarter Radiological monitoring. We have also completed out 4th quarter WQM, I should be able to get those results to you by the middle of next week. Also, I thought I would give you an update on our Lead & Copper Monitoring. As of today I have received the results from 12 samples, and I have 39 more samples that should be delivered to the Lansing lab tomorrow (12/11). That will take us to 51 samples total. I have distributed a total of 110 sample bottles, and plan to distribute 25 more by the end of the week. This way I would anticipate being able to collect 100 total. If extra samples come in I will have them analyzed regardless. Enjoy your day, I'm sure I'll talk with you soon.

Mike Glasgow  
City of Flint Water Plant

**NSF International**

789 N. Dixboro Rd. Ann Arbor, MI 48105, USA  
 1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org

# TEST REPORT

**Send To: C0211289**

Mr. Michael Glasgow  
 City of Flint, Municipality  
 1101 South Saginaw Street  
 Flint, MI 48502

**Facility: C0211290**

City of Flint Water Plant  
 4500 North Dort Highway  
 Flint MI 48505  
 United States

| Result          | COMPLETE                        | Report Date | 03-DEC-2014 |
|-----------------|---------------------------------|-------------|-------------|
| Customer Name   | City of Flint, Municipality     |             |             |
| Tested To       | USFDA CFR Title 21 Part 165.110 |             |             |
| Description     | Municipal Water                 |             |             |
| Test Type       | Test only                       |             |             |
| Job Number      | J-00148751                      |             |             |
| Project Number  | 9841598 (CL03)                  |             |             |
| Project Manager | Anna Ciechanowski               |             |             |

**Thank you for having your product tested by NSF International.**

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

**Report Authorization**

Kerri Levanseler - Director, Chemistry Laboratory

**Date** 03-DEC-2014

**General Information**

Standard: USFDA CFR Title 21 Part 165.110  
Date and Time Sampled: 11/24/2014 09:21 EST  
Product Description: Municipal Water  
Test Description: Bromate - November

Sample Id: **S-0001103518**  
Description: Municipal Water - 11/24/2014 09:21 EST  
Sampled Date: 11/24/2014  
Received Date: 11/25/2014

| Testing Parameter                                      | Reporting Limit | Result | FDA SOQ | Units | P / F |
|--------------------------------------------------------|-----------------|--------|---------|-------|-------|
| <b>Disinfection Residuals/Disinfection By-Products</b> |                 |        |         |       |       |
| Bromate                                                | 10              | ND     | 10      | ug/L  | Pass  |



## &lt;&lt;Additional Information&gt;&gt;

Sample Id: S-0001103518

| Test Parameter                                  | Date Analyzed | Time Analyzed | Date Prepared/ Processed |
|-------------------------------------------------|---------------|---------------|--------------------------|
| Disinfection Residuals/Disinfection By-Products |               |               |                          |
| Bromate (Ref: EPA 300.1)                        | 27-NOV-2014   |               |                          |


**Testing Laboratories:**

|                                                        | Flag | Id     | Address                                                        |
|--------------------------------------------------------|------|--------|----------------------------------------------------------------|
| All work performed at:<br>(Unless otherwise specified) | →    | NSF_AA | NSF International<br>789 N. Dixboro Road<br>Ann Arbor MI 48105 |

**References to Testing Procedures:**

| NSF Reference | Parameter / Test Description |
|---------------|------------------------------|
| C3015         | Bromate (Ref: EPA 300.1)     |

**Certifications:**

|                             |                            |                            |
|-----------------------------|----------------------------|----------------------------|
| Arizona ( # AZ0655 )        | California ( # 03214 CA )  | Connecticut ( # PH-0625 )  |
| Florida ( # E-87752 FL )    | Hawaii                     | Indiana                    |
| Maryland ( # 201 )          | Michigan ( # 0048 )        | North Carolina ( # 26701 ) |
| New Jersey ( # MI770 )      | Nevada ( # MI000302010A )  | New York ( # 11206 )       |
| Pennsylvania ( # 68-00312 ) | South Carolina ( # 81005 ) | Virginia ( # 00045 )       |
| Vermont ( # VT 11206 )      |                            |                            |

Test descriptions preceded by an asterisk "\*" indicate that testing has been performed per NSF International requirements but is not within its scope of accreditation.

The reported result for Odor, Phenolics, Potassium, Specific Conductance and Total Residual Chlorine cannot be used for compliance purposes within the State of Arizona.

**Notes:**

- 1) Bottled water sold in the United States shall not contain Fluoride in excess of the levels published by the USFDA in 21 CFR Part 165.110. These levels are based on the annual average of maximum daily air temperatures at the location where the bottled water is sold at retail. Please refer to the most current edition of the regulation to determine the Fluoride maximum level that pertains to your product.
- 2) A blank on the FDA SOQ column indicates that no maximum level has been established by the FDA for that contaminant.
- 3) An ND result means that the contaminant was not detected at or above the detection limit for the instrument.

For a list of NSF International Method Detection Limits refer to  
[http://www.nsf.org/media/enevs/documents/minimum\\_detection\\_level\\_spreadsheet.pdf](http://www.nsf.org/media/enevs/documents/minimum_detection_level_spreadsheet.pdf).



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# TEST REPORT

**Send To: C0211289**Mr. Michael Glasgow  
City of Flint, Municipality  
1101 South Saginaw Street  
Flint, MI 48502**Facility: C0211290**City of Flint Water Plant  
4500 North Dort Highway  
Flint MI 48505  
United States

| Result          | COMPLETE                    | Report Date | 05-DEC-2014 |
|-----------------|-----------------------------|-------------|-------------|
| Customer Name   | City of Flint, Municipality |             |             |
| Tested To       | EPA_DWR                     |             |             |
| Description     | Qtr 4 - Water Sample        |             |             |
| Test Type       | Test only                   |             |             |
| Job Number      | J-00142265                  |             |             |
| Project Number  | 9329404 (CL03)              |             |             |
| Project Manager | Anna Ciechanowski           |             |             |

**Thank you for having your product tested by NSF International.**

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

**Report Authorization**

Kerri Levanseler - Director, Chemistry Laboratory

**Date** 05-DEC-2014

**General Information**

Standard: EPA\_DWR

Date and Time Sampled: 11/24/2014 09:26 EST

Product Description: Qtr 4 - Water Sample

Sample Id: S-0001103517

Description: Qtr 4 - Water Sample - 11/24/2014 09:26 EST

Sampled Date: 11/24/2014

Received Date: 11/25/2014

| Testing Parameter               | Reporting Limit | Result | Units |
|---------------------------------|-----------------|--------|-------|
| <b>Radiologicals</b>            |                 |        |       |
| Radium-226                      | 1               | ND     | pCi/L |
| Radium-226, Radium-228 Combined | 1               | ND     | pCi/L |
| Radium-228                      | 1               | ND     | pCi/L |
| P1 Gross Alpha                  | 3               | ND     | pCi/L |
| P1 Gross Beta                   | 4               | ND     | pCi/L |



## &lt;&lt;Additional Information&gt;&gt;

Sample Id: S-0001103517

| Test Parameter                                                        | Date Analyzed | Time Analyzed | Date Prepared/ Processed |
|-----------------------------------------------------------------------|---------------|---------------|--------------------------|
| Radiologicals                                                         |               |               |                          |
| Total Radium-226, Radium-228 Combined Activity                        | 4-DEC-2014    |               |                          |
| Gross Alpha and Beta Radioactivity in Drinking Water (Ref: EPA 900.0) | 4-DEC-2014    |               |                          |


**Testing Laboratories:**

|                                                        | Flag | Id     | Address                                                        |
|--------------------------------------------------------|------|--------|----------------------------------------------------------------|
| All work performed at:<br>(Unless otherwise specified) |      | NSF_AA | NSF International<br>789 N. Dixboro Road<br>Ann Arbor MI 48105 |

**References to Testing Procedures:**

| NSF Reference | Parameter / Test Description                                          |
|---------------|-----------------------------------------------------------------------|
| C0842         | Gross Alpha and Beta Radioactivity in Drinking Water (Ref: EPA 900.0) |
| C0980         | Total Radium-226, Radium-228 Combined Activity                        |

**Certifications:**

|                             |                            |                            |
|-----------------------------|----------------------------|----------------------------|
| Arizona ( # AZ0655 )        | California ( # 03214 CA )  | Connecticut ( # PH-0625 )  |
| Florida ( # E-87752 FL )    | Hawaii                     | Indiana                    |
| Maryland ( # 201 )          | Michigan ( # 0048 )        | North Carolina ( # 26701 ) |
| New Jersey ( # MI770 )      | Nevada ( # MI000302010A )  | New York ( # 11206 )       |
| Pennsylvania ( # 68-00312 ) | South Carolina ( # 81005 ) | Virginia ( # 00045 )       |
| Vermont ( # VT 11206 )      |                            |                            |

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[http://www.nsf.org/media/enevents/documents/minimum\\_detection\\_level\\_spreadsheet.pdf](http://www.nsf.org/media/enevents/documents/minimum_detection_level_spreadsheet.pdf).

**Rennaker, Joanne (DEQ)**

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**From:** Rosenthal, Adam (DEQ)  
**Sent:** Thursday, June 11, 2015 11:31 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: Monthly Bromate Results  
**Attachments:** May 2015 Bromate.pdf

fyi, ND

Adam

**From:** Michael Glasgow [<mailto:mglasgow@cityofflint.com>]  
**Sent:** Thursday, June 11, 2015 11:29 AM  
**To:** Rosenthal, Adam (DEQ)  
**Subject:** Monthly Bromate Results

Adam,

Here is a copy of the bromate test results from the month of May.

--

Mike Glasgow  
Utilities Administrator  
City of Flint

**NSF International**

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1-800.NSF.MARK | +1-734.769.8010 | www.nsf.org

# TEST REPORT

**Send To: C0211289**

Mr. Michael Glasgow  
City of Flint, Municipality  
1101 South Saginaw Street  
Flint, MI 48502

**Facility: C0211290**

City of Flint Water Plant  
4500 North Dort Highway  
Flint MI 48505  
United States

| Result          | COMPLETE                        | Report Date | 08-JUN-2015 |
|-----------------|---------------------------------|-------------|-------------|
| Customer Name   | City of Flint, Municipality     |             |             |
| Tested To       | USFDA CFR Title 21 Part 165.110 |             |             |
| Description     | Municipal Water                 |             |             |
| Test Type       | Test Only                       |             |             |
| Job Number      | J-00176235                      |             |             |
| Project Number  | 10005233 (CL17)                 |             |             |
| Project Manager | Anna Ciechanowski               |             |             |

**Thank you for having your product tested by NSF International.**

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

**Report Authorization**

Kerri L. LeVanseler  
Kerri Levanseler - Director, Chemistry Laboratory

**Date** 08-JUN-2015

**General Information**

Standard: USFDA CFR Title 21 Part 165.110  
Date and Time Sampled: 05/26/2015 07:45 EDT  
Product Description: Municipal Water  
Test Description: Bromate - May 2015 - Additional

Sample Id: S-0001160148  
Description: Municipal Water - 05/26/2015 07:45 EDT  
Sampled Date: 05/26/2015  
Received Date: 05/29/2015

| Testing Parameter                                      | Reporting Limit | Result | FDA SOQ | Units | P / F |
|--------------------------------------------------------|-----------------|--------|---------|-------|-------|
| <b>Disinfection Residuals/Disinfection By-Products</b> |                 |        |         |       |       |
| Bromate                                                | 5               | ND     | 10      | ug/L  | Pass  |



## &lt;&lt;Additional Information&gt;&gt;

Sample Id: S-0001160148

| Test Parameter                                  | Date Analyzed | Time Analyzed | Date Prepared/ Processed |
|-------------------------------------------------|---------------|---------------|--------------------------|
| Disinfection Residuals/Disinfection By-Products |               |               |                          |
| Bromate (Ref: EPA 300.1)                        | 3-JUN-2015    |               |                          |




**Testing Laboratories:**

|                                                        | Flag | Id     | Address                                                        |
|--------------------------------------------------------|------|--------|----------------------------------------------------------------|
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**References to Testing Procedures:**

| NSF Reference | Parameter / Test Description |
|---------------|------------------------------|
| C3015         | Bromate (Ref: EPA 300.1)     |

**Certifications:**

|                             |                            |                            |
|-----------------------------|----------------------------|----------------------------|
| Arizona ( # AZ0655 )        | California ( # 03214 CA )  | Connecticut ( # PH-0625 )  |
| Florida ( # E-87752 FL )    | Hawaii                     | Indiana                    |
| Maryland ( # 201 )          | Michigan ( # 0048 )        | North Carolina ( # 26701 ) |
| New Jersey ( # MI770 )      | Nevada ( # MI000302010A )  | New York ( # 11206 )       |
| Pennsylvania ( # 68-00312 ) | South Carolina ( # 81005 ) | Virginia ( # 00045 )       |
| Vermont ( # VT 11206 )      |                            |                            |

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[http://www.nsf.org/media/enews/documents/minimum\\_detection\\_level\\_spreadsheet.pdf](http://www.nsf.org/media/enews/documents/minimum_detection_level_spreadsheet.pdf).

**Rennaker, Joanne (DEQ)**

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**From:** Crooks, Jennifer <crooks.jennifer@epa.gov>  
**Sent:** Tuesday, June 02, 2015 8:18 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ)  
**Cc:** Benzie, Richard (DEQ); Philip, Kris (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** FW: Ms. Walters' Follow-up sampling results  
**Attachments:** 1505006 FINAL EXCEL 28 May 15 1621.xls; 1505006 FINAL May 28 15 1621.PDF; 1505006\_work order.pdf

FYI from Miguel.

**From:** Deltoral, Miguel  
**Sent:** Thursday, May 28, 2015 5:49 PM  
**To:** Poy, Thomas  
**Cc:** Bair, Rita; Damato, Nicholas; Porter, Andrea; Crooks, Jennifer  
**Subject:** Ms. Walters' Follow-up sampling results

Attached are the results from Ms. Walters' testing following the replacement of her service line. Lead levels look good and copper is less than 1/2 the action level through the new copper service line.

The first 15 samples were the sequential samples (kitchen tap to water main) which came back fine. Sample 16 is the bathroom tap which came back fine. Samples 17 and 18 were from the hot water heater where one result was high, likely from residual particulate lead from before the service line work.

Miguel A. Del Toral  
 Regulations Manager  
 U.S. EPA R5 GWDWB  
 77 West Jackson Blvd, (WG-15J)  
 Chicago, IL 60604  
 Phone: (312) 886-5253

**From:** Griffin, Sylvia  
**Sent:** Thursday, May 28, 2015 04:29 PM  
**To:** Deltoral, Miguel  
**Cc:** Wroble, Amanda  
**Subject:** FW: 1505006; ICP-MS metals (DW) (Cu, Pb, Zn); Flint, MI

Please see the final results report. Should you encounter any problems with this transmittal, please email or give me a call.

Thank you.

-Sylvia

**From:** Wroble, Amanda  
**Sent:** Thursday, May 28, 2015 4:26 PM  
**To:** Griffin, Sylvia  
**Subject:** 1505006; ICP-MS metals (DW) (Cu, Pb, Zn); Flint, MI

Amanda Wroble, Ph.D.  
Chemist and Sample Coordinator  
USEPA Region 5 Chicago Regional Laboratory  
536 S. Clark St. ML-10C  
Chicago, IL 60605  
(312) 353-0375

SAMPDATA

[illegible]

## SAMPDATA

|             |              |        |          |    |           |       |       |            |
|-------------|--------------|--------|----------|----|-----------|-------|-------|------------|
| Water Divis | Flint, Michi | [none] | US EPA R | 18 | 1505006-1 | Water | Water | 05/13/2015 |
| Water Divis | Flint, Michi | [none] | US EPA R | 18 | 1505006-1 | Water | Water | 05/13/2015 |
| Water Divis | Flint, Michi | [none] | US EPA R | 18 | 1505006-1 | Water | Water | 05/13/2015 |

Page 3

## SAMPDATA

|            |            |         |                    |                    |           |       |
|------------|------------|---------|--------------------|--------------------|-----------|-------|
| 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) | 200.8/no di Lead   | 7439-92-1 | FALSE |
| 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) | 200.8/no di Copper | 7440-50-8 | FALSE |
| 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) | 200.8/no di Zinc   | 7440-66-6 | FALSE |

## SAMPDATA

| TIC   | Result | DL     | RL    | UNITS | RPTtoMDL | BASIS | DILUTION | SPIKELEV |
|-------|--------|--------|-------|-------|----------|-------|----------|----------|
| FALSE | 1.30   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 13.1   | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 70.9   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 0.687  | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 20.1   | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 23.2   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 3.01   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 141    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 76.8   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 1.76   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 336    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 45.4   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 1.17   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 419    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 32.2   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 1.03   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 463    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 24.8   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 0.800  | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 529    | 0.220  | 10.0  | ug/L  | FALSE    | NA    | 10       |          |
| FALSE | 19.6   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 0.666  | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 554    | 0.220  | 10.0  | ug/L  | FALSE    | NA    | 10       |          |
| FALSE | 14.9   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 3.07   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 571    | 0.220  | 10.0  | ug/L  | FALSE    | NA    | 10       |          |
| FALSE | 11.6   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 3.93   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 345    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 10.3   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 1.94   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 233    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | U      | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 1.17   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 171    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | U      | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 0.864  | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 139    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | U      | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 0.670  | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 110    | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | U      | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 0.505  | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 91.5   | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | U      | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 5.52   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 29.7   | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 71.3   | 0.190  | 10.0  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 31.7   | 0.0140 | 0.500 | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 70.4   | 0.0220 | 1.00  | ug/L  | FALSE    | NA    | 1        |          |
| FALSE | 883    | 1.90   | 100   | ug/L  | FALSE    | NA    | 10       |          |



## SAMPDATA

|       |      |        |       |      |       |    |   |  |
|-------|------|--------|-------|------|-------|----|---|--|
| FALSE | 9.74 | 0.0140 | 0.500 | ug/L | FALSE | NA | 1 |  |
| FALSE | 35.0 | 0.0220 | 1.00  | ug/L | FALSE | NA | 1 |  |
| FALSE | 346  | 0.190  | 10.0  | ug/L | FALSE | NA | 1 |  |



## SAMPDATA

|  |  |  |    |  |  |  |  |  |
|--|--|--|----|--|--|--|--|--|
|  |  |  | AW |  |  |  |  |  |
|  |  |  | AW |  |  |  |  |  |
|  |  |  | AW |  |  |  |  |  |



SAMPDATA

|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

[illegible]

## SAMPDATA

|  |  |   |  |
|--|--|---|--|
|  |  | 1 |  |
|  |  | 2 |  |
|  |  | 4 |  |

## QC DATA

| LABNAME  | LABSAMPL  | QCTYPE      | MATRIX | PREPDATE   | ANALDATE   | BATCH   | METHODC            | METHODN |
|----------|-----------|-------------|--------|------------|------------|---------|--------------------|---------|
| US EPA R | B15E029-E | Blank       | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-E | Blank       | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-E | Blank       | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-E | LCS         | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-E | LCS         | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-E | LCS         | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-L | Duplicate   | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-L | Duplicate   | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-L | Duplicate   | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-L | Duplicate   | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-L | Duplicate   | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-L | Duplicate   | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-N | Matrix Spik | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-N | Matrix Spik | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-N | Matrix Spik | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-N | Matrix Spik | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-N | Matrix Spik | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |
| US EPA R | B15E029-N | Matrix Spik | Water  | 05/19/2015 | 05/19/2015 | B15E029 | Metals ICP-MS (DW) |         |



## QC DATA

| PREPNAM     | ANALYTE | CASNUMB   | SURROGA | TIC   | RESULT | DL     | RL    | UNITS |
|-------------|---------|-----------|---------|-------|--------|--------|-------|-------|
| 200.8/no di | Lead    | 7439-92-1 | FALSE   | FALSE | U      | 0.0140 | 0.500 | ug/L  |
| 200.8/no di | Copper  | 7440-50-8 | FALSE   | FALSE | U      | 0.0220 | 1.00  | ug/L  |
| 200.8/no di | Zinc    | 7440-66-6 | FALSE   | FALSE | U      | 0.190  | 10.0  | ug/L  |
| 200.8/no di | Lead    | 7439-92-1 | FALSE   | FALSE | 18.9   | 0.0140 | 0.500 | ug/L  |
| 200.8/no di | Copper  | 7440-50-8 | FALSE   | FALSE | 18.9   | 0.0220 | 1.00  | ug/L  |
| 200.8/no di | Zinc    | 7440-66-6 | FALSE   | FALSE | 18.9   | 0.190  | 10.0  | ug/L  |
| 200.8/no di | Lead    | 7439-92-1 | FALSE   | FALSE | 1.28   | 0.0140 | 0.500 | ug/L  |
| 200.8/no di | Copper  | 7440-50-8 | FALSE   | FALSE | 13.0   | 0.0220 | 1.00  | ug/L  |
| 200.8/no di | Zinc    | 7440-66-6 | FALSE   | FALSE | 70.9   | 0.190  | 10.0  | ug/L  |
| 200.8/no di | Lead    | 7439-92-1 | FALSE   | FALSE | 1.94   | 0.0140 | 0.500 | ug/L  |
| 200.8/no di | Copper  | 7440-50-8 | FALSE   | FALSE | 237    | 0.0220 | 1.00  | ug/L  |
| 200.8/no di | Zinc    | 7440-66-6 | FALSE   | FALSE | 8.23   | 0.190  | 10.0  | ug/L  |
| 200.8/no di | Lead    | 7439-92-1 | FALSE   | FALSE | 21.2   | 0.0140 | 0.500 | ug/L  |
| 200.8/no di | Copper  | 7440-50-8 | FALSE   | FALSE | 32.9   | 0.0220 | 1.00  | ug/L  |
| 200.8/no di | Zinc    | 7440-66-6 | FALSE   | FALSE | 92.3   | 0.190  | 10.0  | ug/L  |
| 200.8/no di | Lead    | 7439-92-1 | FALSE   | FALSE | 22.1   | 0.0140 | 0.500 | ug/L  |
| 200.8/no di | Copper  | 7440-50-8 | FALSE   | FALSE | 256    | 0.0220 | 1.00  | ug/L  |
| 200.8/no di | Zinc    | 7440-66-6 | FALSE   | FALSE | 28.8   | 0.190  | 10.0  | ug/L  |

## QC DATA

| RPTtoMDL | BASIS | DILUTION | SOURCEID  | SOURCER | SPIKELEV | RECOVER | RPD    | UPPERCL |
|----------|-------|----------|-----------|---------|----------|---------|--------|---------|
| FALSE    | NA    | 1        |           |         |          |         |        |         |
| FALSE    | NA    | 1        |           |         |          |         |        |         |
| FALSE    | NA    | 1        |           |         |          |         |        |         |
| FALSE    | NA    | 1        |           |         | 20.00    | 94.4    |        | 115     |
| FALSE    | NA    | 1        |           |         | 20.00    | 94.6    |        | 115     |
| FALSE    | NA    | 1        |           |         | 20.00    | 94.5    |        | 115     |
| FALSE    | NA    | 1        | 1505006-0 | 1.30    |          |         | 1.77   |         |
| FALSE    | NA    | 1        | 1505006-0 | 13.1    |          |         | 0.326  |         |
| FALSE    | NA    | 1        | 1505006-0 | 70.9    |          |         | 0.0163 |         |
| FALSE    | NA    | 1        | 1505006-1 | 1.94    |          |         | 0.129  |         |
| FALSE    | NA    | 1        | 1505006-1 | 233     |          |         | 1.76   |         |
| FALSE    | NA    | 1        | 1505006-1 | 8.14    |          |         | 1.11   |         |
| FALSE    | NA    | 1        | 1505006-0 | 1.30    | 20.00    | 99.6    |        | 125     |
| FALSE    | NA    | 1        | 1505006-0 | 13.1    | 20.00    | 99.2    |        | 125     |
| FALSE    | NA    | 1        | 1505006-0 | 70.9    | 20.00    | 107     |        | 125     |
| FALSE    | NA    | 1        | 1505006-1 | 1.94    | 20.00    | 101     |        | 125     |
| FALSE    | NA    | 1        | 1505006-1 | 233     | 20.00    | 115     |        | 125     |
| FALSE    | NA    | 1        | 1505006-1 | 8.14    | 20.00    | 103     |        | 125     |

## QC DATA

| LOWERCL | RPDCL | ANALYST | PSOLIDS | LNOTE | ANOTE | ANALYTEORDER |
|---------|-------|---------|---------|-------|-------|--------------|
|         |       | AW      |         |       |       | 1            |
|         |       | AW      |         |       |       | 2            |
|         |       | AW      |         |       |       | 4            |
| 85      |       | AW      |         |       |       | 1            |
| 85      |       | AW      |         |       |       | 2            |
| 85      |       | AW      |         |       |       | 4            |
|         | 20    | AW      |         |       |       | 1            |
|         | 20    | AW      |         |       |       | 2            |
|         | 20    | AW      |         |       |       | 4            |
|         | 20    | AW      |         |       |       | 1            |
|         | 20    | AW      |         |       |       | 2            |
|         | 20    | AW      |         |       |       | 4            |
| 75      |       | AW      |         |       |       | 1            |
| 75      |       | AW      |         |       |       | 2            |
| 75      |       | AW      |         |       |       | 4            |
| 75      |       | AW      |         |       |       | 1            |
| 75      |       | AW      |         |       |       | 2            |
| 75      |       | AW      |         |       |       | 4            |

LNOTE

| QUALIFIER | DESCRIPTION |
|-----------|-------------|
|-----------|-------------|



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5 CHICAGO REGIONAL LABORATORY  
536 SOUTH CLARK STREET  
CHICAGO, ILLINOIS 60605

**Date:** 5/28/2015  
**Subject:** Review of Region 5 Data for Flint, Michigan  
**To:** Water Division, Drinking Water  
77 West Jackson Boulevard  
Chicago, IL 60604  
**From:** Amanda Wroble, Chemist  
US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with EPA's *Guidance on Environmental Data Verification and Data Validation* (Document EPA QA/G-8), CRL verified and validated the data but does not perform data quality assessment based on project plans.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X \_\_\_\_\_

Please contact the analyst with any technical report issues, Amanda Wroble at (312)-353-0375 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

**Attached are Results for: Flint, Michigan**

\_\_\_\_\_  
Data Management Coordinator and Date Transmitted

**Analyses included in this report:**

Metals ICP-MS (DW)



Environmental Protection Agency Region 5  
**Chicago Regional Laboratory**

536 South Clark Street, Chicago, IL 60605  
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water  
77 West Jackson Boulevard  
Chicago IL, 60604

Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

## ANALYSIS CASE NARRATIVE

### GENERAL INFORMATION

CRL received 18 drinking water samples for copper, lead, and zinc analysis by inductively coupled plasma-mass spectrometry (ICP-MS) on 14 May 2015 that were assigned to work order 1505006. The designated analyst for these samples, Amanda Wroble, can be reached at 312.353.0375.

The samples were received unpreserved. Therefore, 2 mL of nitric acid was added to each 1 L sample. At least twenty-four hours elapsed before subsampling began. All holding times were met.

No digestion is required for drinking water samples. Samples were analyzed in batch B15E029 over two runs using CRL SOP METALS001 (EPA Method 200.8), Revision 3. Copper dilutions for samples 1505006-07 thru -09 and a zinc dilution for sample 1505006-17 were reported from Run 2.

### SAMPLE ANALYSIS AND RESULTS

The data reported herein meet the data quality objectives referenced in personal email communication with the project manager dated May 12, 2015 and the quality assurance project plan "Impacts on Lead Concentration in Drinking Water Samples Due to Sample Location and Sample Collection Protocols" dated January 20, 2011 referenced therein.

### QUALITY CONTROL

All quality control audits were within CRL limits for the requested analytes or did not result in qualification of the data.



## Environmental Protection Agency Region 5 Chicago Regional Laboratory

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Water Division, Drinking Water  
77 West Jackson Boulevard  
Chicago IL, 60604

Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

### ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled    | Date Received   |
|-----------|---------------|--------|-----------------|-----------------|
| 1         | 1505006-01    | Water  | May-13-15 09:00 | May-14-15 11:00 |
| 2         | 1505006-02    | Water  | May-13-15 09:00 | May-14-15 11:00 |
| 3         | 1505006-03    | Water  | May-13-15 09:01 | May-14-15 11:00 |
| 4         | 1505006-04    | Water  | May-13-15 09:01 | May-14-15 11:00 |
| 5         | 1505006-05    | Water  | May-13-15 09:02 | May-14-15 11:00 |
| 6         | 1505006-06    | Water  | May-13-15 09:02 | May-14-15 11:00 |
| 7         | 1505006-07    | Water  | May-13-15 09:03 | May-14-15 11:00 |
| 8         | 1505006-08    | Water  | May-13-15 09:03 | May-14-15 11:00 |
| 9         | 1505006-09    | Water  | May-13-15 09:04 | May-14-15 11:00 |
| 10        | 1505006-10    | Water  | May-13-15 09:04 | May-14-15 11:00 |
| 11        | 1505006-11    | Water  | May-13-15 09:05 | May-14-15 11:00 |
| 12        | 1505006-12    | Water  | May-13-15 09:05 | May-14-15 11:00 |
| 13        | 1505006-13    | Water  | May-13-15 09:07 | May-14-15 11:00 |
| 14        | 1505006-14    | Water  | May-13-15 09:07 | May-14-15 11:00 |
| 15        | 1505006-15    | Water  | May-13-15 09:08 | May-14-15 11:00 |
| 16        | 1505006-16    | Water  | May-13-15 20:15 | May-14-15 11:00 |
| 17        | 1505006-17    | Water  | May-13-15 20:16 | May-14-15 11:00 |
| 18        | 1505006-18    | Water  | May-13-15 21:19 | May-14-15 11:00 |



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Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

## Metals by ICP-MS using EPA 200.8 (modified) US EPA Region 5 Chicago Regional Laboratory

1 (1505006-01) Water Sampled: May-13-15 09:00 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 1.30   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 13.1   |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 70.9   |                       |     | 10.0               | "     | "        | "       | "         | "         |

2 (1505006-02) Water Sampled: May-13-15 09:00 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 0.687  |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 20.1   |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 23.2   |                       |     | 10.0               | "     | "        | "       | "         | "         |

3 (1505006-03) Water Sampled: May-13-15 09:01 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 3.01   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 141    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 76.8   |                       |     | 10.0               | "     | "        | "       | "         | "         |

4 (1505006-04) Water Sampled: May-13-15 09:01 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 1.76   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 336    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 45.4   |                       |     | 10.0               | "     | "        | "       | "         | "         |

5 (1505006-05) Water Sampled: May-13-15 09:02 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 1.17   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 419    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 32.2   |                       |     | 10.0               | "     | "        | "       | "         | "         |





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Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

## Metals by ICP-MS using EPA 200.8 (modified) US EPA Region 5 Chicago Regional Laboratory

6 (1505006-06) Water Sampled: May-13-15 09:02 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 1.03   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 463    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 24.8   |                       |     | 10.0               | "     | "        | "       | "         | "         |

7 (1505006-07) Water Sampled: May-13-15 09:03 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 0.800  |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 529    |                       |     | 10.0               | "     | 10       | "       | "         | May-20-15 |
| Zinc    | 19.6   |                       |     | 10.0               | "     | 1        | "       | "         | May-19-15 |

8 (1505006-08) Water Sampled: May-13-15 09:03 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 0.666  |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 554    |                       |     | 10.0               | "     | 10       | "       | "         | May-20-15 |
| Zinc    | 14.9   |                       |     | 10.0               | "     | 1        | "       | "         | May-19-15 |

9 (1505006-09) Water Sampled: May-13-15 09:04 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 3.07   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 571    |                       |     | 10.0               | "     | 10       | "       | "         | May-20-15 |
| Zinc    | 11.6   |                       |     | 10.0               | "     | 1        | "       | "         | May-19-15 |

10 (1505006-10) Water Sampled: May-13-15 09:04 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 3.93   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 345    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 10.3   |                       |     | 10.0               | "     | "        | "       | "         | "         |



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Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

## Metals by ICP-MS using EPA 200.8 (modified) US EPA Region 5 Chicago Regional Laboratory

11 (1505006-11) Water Sampled: May-13-15 09:05 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 1.94   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 233    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | U      |                       |     | 10.0               | "     | "        | "       | "         | "         |

12 (1505006-12) Water Sampled: May-13-15 09:05 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 1.17   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 171    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | U      |                       |     | 10.0               | "     | "        | "       | "         | "         |

13 (1505006-13) Water Sampled: May-13-15 09:07 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 0.864  |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 139    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | U      |                       |     | 10.0               | "     | "        | "       | "         | "         |

14 (1505006-14) Water Sampled: May-13-15 09:07 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 0.670  |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 110    |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | U      |                       |     | 10.0               | "     | "        | "       | "         | "         |

15 (1505006-15) Water Sampled: May-13-15 09:08 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 0.505  |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 91.5   |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | U      |                       |     | 10.0               | "     | "        | "       | "         | "         |



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Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

## Metals by ICP-MS using EPA 200.8 (modified) US EPA Region 5 Chicago Regional Laboratory

16 (1505006-16) Water Sampled: May-13-15 20:15 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 5.52   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 29.7   |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 71.3   |                       |     | 10.0               | "     | "        | "       | "         | "         |

17 (1505006-17) Water Sampled: May-13-15 20:16 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 31.7   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 70.4   |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 883    |                       |     | 100                | "     | 10       | "       | "         | May-20-15 |

18 (1505006-18) Water Sampled: May-13-15 21:19 Received: May-14-15 11:00

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Dilution | Batch   | Prepared  | Analyzed  |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Lead    | 9.74   |                       |     | 0.500              | ug/L  | 1        | B15E029 | May-19-15 | May-19-15 |
| Copper  | 35.0   |                       |     | 1.00               | "     | "        | "       | "         | "         |
| Zinc    | 346    |                       |     | 10.0               | "     | "        | "       | "         | "         |



# Environmental Protection Agency Region 5 Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605  
Phone: (312) 353-8370 Fax: (312) 886-2591

Water Division, Drinking Water  
77 West Jackson Boulevard  
Chicago IL, 60604

Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

## Metals by ICP-MS using EPA 200.8 (modified) - Quality Control US EPA Region 5 Chicago Regional Laboratory

### Batch B15E029 - 200.8/no digestion

#### Blank (B15E029-BLK1)

Prepared & Analyzed: May-19-15

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC | Limits | RPD | Limit |
|---------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|------|--------|-----|-------|
| Lead    | U      |                       |     | 0.500              | ug/L  |                |                  |      |        |     |       |
| Copper  | U      |                       |     | 1.00               | "     |                |                  |      |        |     |       |
| Zinc    | U      |                       |     | 10.0               | "     |                |                  |      |        |     |       |

#### LCS (B15E029-BS1)

Prepared & Analyzed: May-19-15

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC  | Limits | RPD | Limit |
|---------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|-------|--------|-----|-------|
| Lead    | 18.9   |                       |     | 0.500              | ug/L  | 20.00          |                  | 94.4% | 85-115 |     |       |
| Copper  | 18.9   |                       |     | 1.00               | "     | 20.00          |                  | 94.6% | 85-115 |     |       |
| Zinc    | 18.9   |                       |     | 10.0               | "     | 20.00          |                  | 94.5% | 85-115 |     |       |

#### Duplicate (B15E029-DUP1)

Source: 1505006-01

Prepared & Analyzed: May-19-15

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC | Limits | RPD    | Limit |
|---------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|------|--------|--------|-------|
| Lead    | 1.28   |                       |     | 0.500              | ug/L  |                | 1.30             |      |        | 1.77   | 20    |
| Copper  | 13.0   |                       |     | 1.00               | "     |                | 13.1             |      |        | 0.326  | 20    |
| Zinc    | 70.9   |                       |     | 10.0               | "     |                | 70.9             |      |        | 0.0163 | 20    |

#### Duplicate (B15E029-DUP2)

Source: 1505006-11

Prepared & Analyzed: May-19-15

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC | Limits | RPD   | Limit |
|---------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|------|--------|-------|-------|
| Lead    | 1.94   |                       |     | 0.500              | ug/L  |                | 1.94             |      |        | 0.129 | 20    |
| Copper  | 237    |                       |     | 1.00               | "     |                | 233              |      |        | 1.76  | 20    |
| Zinc    | 8.23   |                       |     | 10.0               | "     |                | 8.14             |      |        | 1.11  | 20    |

#### Matrix Spike (B15E029-MS1)

Source: 1505006-01

Prepared & Analyzed: May-19-15

| Analyte | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit | Units | Spike<br>Level | Source<br>Result | %REC  | Limits | RPD | Limit |
|---------|--------|-----------------------|-----|--------------------|-------|----------------|------------------|-------|--------|-----|-------|
| Lead    | 21.2   |                       |     | 0.500              | ug/L  | 20.00          | 1.30             | 99.6% | 75-125 |     |       |
| Copper  | 32.9   |                       |     | 1.00               | "     | 20.00          | 13.1             | 99.2% | 75-125 |     |       |
| Zinc    | 92.3   |                       |     | 10.0               | "     | 20.00          | 70.9             | 107%  | 75-125 |     |       |



## Environmental Protection Agency Region 5 Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605  
Phone: (312) 353-8370 Fax: (312) 886-2591

Water Division, Drinking Water  
77 West Jackson Boulevard  
Chicago IL, 60604

Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

Reported:  
May-28-15 16:21

### Metals by ICP-MS using EPA 200.8 (modified) - Quality Control US EPA Region 5 Chicago Regional Laboratory

#### Batch B15E029 - 200.8/no digestion

| Matrix Spike (B15E029-MS2) |        |                       |     | Source: 1505006-11             |       |                |                  |      |                |     |              |
|----------------------------|--------|-----------------------|-----|--------------------------------|-------|----------------|------------------|------|----------------|-----|--------------|
|                            |        |                       |     | Prepared & Analyzed: May-19-15 |       |                |                  |      |                |     |              |
| Analyte                    | Result | Flags /<br>Qualifiers | MDL | Reporting<br>Limit             | Units | Spike<br>Level | Source<br>Result | %REC | %REC<br>Limits | RPD | RPD<br>Limit |
| Lead                       | 22.1   |                       |     | 0.500                          | ug/L  | 20.00          | 1.94             | 101% | 75-125         |     |              |
| Copper                     | 256    |                       |     | 1.00                           | "     | 20.00          | 233              | 115% | 75-125         |     |              |
| Zinc                       | 28.8   |                       |     | 10.0                           | "     | 20.00          | 8.14             | 103% | 75-125         |     |              |



Environmental Protection Agency Region 5  
**Chicago Regional Laboratory**

536 South Clark Street, Chicago, IL 60605  
Phone:(312)353-8370 Fax:(312)886-2591

Water Division, Drinking Water  
77 West Jackson Boulevard  
Chicago IL, 60604

Project: Flint, Michigan  
Project Number: [none]  
Project Manager: Miguel Del Toral

**Reported:**  
May-28-15 16:21

**Notes and Definitions**

U Not Detected  
NR Not Reported



# Environmental Protection Agency Region 5 Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605  
Phone: (312) 353-8370 Fax: (312) 886-2591

## WORK ORDER

Printed: 5/20/2015 8:35:08AM

**1505006**

### US EPA Region 5 Chicago Regional Laboratory

**Client:** Water Division, Drinking Water  
**Project:** Flint, Michigan

**Project Manager:** Greg Mitsakopoulos  
**Project Number:** [none]

**Report To:**

Miguel Del Toral  
Water Division, Drinking Water

77 West Jackson Boulevard  
Chicago, IL 60604

Phone: (312) 886-5253  
Fax: (312) 886-2001

**Date Due:** Jul-15-15 15:00 (60 day TAT)

**Received By:** Robert Snyder

**Date Received:** May-14-15 11:00

**Logged In By:** Robert Snyder

**Date Logged In:** May-14-15 16:20

**Samples Received at:** 17.9°C  
**Sample tags/labels:** Yes  
**Seals Intact:** Yes  
**Received on ice:** No  
**Paperwork Included:** Yes

| Analysis                                                                                       | Due             | TAT | Expires         | Comments |
|------------------------------------------------------------------------------------------------|-----------------|-----|-----------------|----------|
| <b>1505006-01 1 [Water] Sampled May-13-15 09:00 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP-MS (DW)                                                                             | Jul-15-15 12:00 | 60  | Nov-09-15 09:00 | pH = 6   |
| Metals ICP (DW)                                                                                | Jul-15-15 12:00 | 60  | Nov-09-15 09:00 | pH = 6   |
| <b>1505006-02 2 [Water] Sampled May-13-15 09:00 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                | Jul-15-15 12:00 | 60  | Nov-09-15 09:00 | pH = 6   |
| Metals ICP-MS (DW)                                                                             | Jul-15-15 12:00 | 60  | Nov-09-15 09:00 | pH = 6   |
| <b>1505006-03 3 [Water] Sampled May-13-15 09:01 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                | Jul-15-15 12:00 | 60  | Nov-09-15 09:01 | pH = 6   |
| Metals ICP-MS (DW)                                                                             | Jul-15-15 12:00 | 60  | Nov-09-15 09:01 | pH = 6   |
| <b>1505006-04 4 [Water] Sampled May-13-15 09:01 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                | Jul-15-15 12:00 | 60  | Nov-09-15 09:01 | pH = 6   |
| Metals ICP-MS (DW)                                                                             | Jul-15-15 12:00 | 60  | Nov-09-15 09:01 | pH = 6   |
| <b>1505006-05 5 [Water] Sampled May-13-15 09:02 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                | Jul-15-15 12:00 | 60  | Nov-09-15 09:02 | pH = 6   |
| Metals ICP-MS (DW)                                                                             | Jul-15-15 12:00 | 60  | Nov-09-15 09:02 | pH = 6   |

## WORK ORDER

Printed: 5/20/2015 8:35:08AM

1505006

## US EPA Region 5 Chicago Regional Laboratory

Client: Water Division, Drinking Water  
Project: Flint, Michigan

Project Manager: Greg Mitsakopoulos  
Project Number: [none]

| Analysis                                                                                        | Due             | TAT | Expires         | Comments |
|-------------------------------------------------------------------------------------------------|-----------------|-----|-----------------|----------|
| <b>1505006-06 6 [Water] Sampled May-13-15 09:02 (GMT-06:00) Central Time (US &amp; Canada)</b>  |                 |     |                 |          |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:02 | pH = 6   |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:02 | pH = 6   |
| <b>1505006-07 7 [Water] Sampled May-13-15 09:03 (GMT-06:00) Central Time (US &amp; Canada)</b>  |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:03 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:03 | pH = 6   |
| <b>1505006-08 8 [Water] Sampled May-13-15 09:03 (GMT-06:00) Central Time (US &amp; Canada)</b>  |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:03 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:03 | pH = 6   |
| <b>1505006-09 9 [Water] Sampled May-13-15 09:04 (GMT-06:00) Central Time (US &amp; Canada)</b>  |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:04 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:04 | pH = 6   |
| <b>1505006-10 10 [Water] Sampled May-13-15 09:04 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:04 | pH = 6   |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:04 | pH = 6   |
| <b>1505006-11 11 [Water] Sampled May-13-15 09:05 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:05 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:05 | pH = 6   |
| <b>1505006-12 12 [Water] Sampled May-13-15 09:05 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:05 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:05 | pH = 6   |
| <b>1505006-13 13 [Water] Sampled May-13-15 09:07 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:07 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:07 | pH = 6   |
| <b>1505006-14 14 [Water] Sampled May-13-15 09:07 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:07 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:07 | pH = 6   |



## WORK ORDER

Printed: 5/20/2015 8:35:08AM

1505006

## US EPA Region 5 Chicago Regional Laboratory

Client: Water Division, Drinking Water  
Project: Flint, Michigan

Project Manager: Greg Mitsakopoulos  
Project Number: [none]

| Analysis                                                                                        | Due             | TAT | Expires         | Comments |
|-------------------------------------------------------------------------------------------------|-----------------|-----|-----------------|----------|
| <b>1505006-15 15 [Water] Sampled May-13-15 09:08 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 09:08 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 09:08 | pH = 6   |
| <b>1505006-16 16 [Water] Sampled May-13-15 20:15 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 20:15 | pH = 6   |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 20:15 | pH = 6   |
| <b>1505006-17 17 [Water] Sampled May-13-15 20:16 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 20:16 | pH = 6   |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 20:16 | pH = 6   |
| <b>1505006-18 18 [Water] Sampled May-13-15 21:19 (GMT-06:00) Central Time (US &amp; Canada)</b> |                 |     |                 |          |
| Metals ICP (DW)                                                                                 | Jul-15-15 12:00 | 60  | Nov-09-15 21:19 | pH = 6   |
| Metals ICP-MS (DW)                                                                              | Jul-15-15 12:00 | 60  | Nov-09-15 21:19 | pH = 6   |

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Wednesday, March 19, 2014 4:51 PM  
**To:** Busch, Stephen (DEQ)  
**Cc:** Brim, Richard (DEQ); Craig, John (DEQ); Sygo, Jim (DEQ); Shaler, Karen (DEQ); Willard, Veronica (DEQ)  
**Subject:** FW: New 3.13

I spoke with Mike earlier and suggested language that conveys that Flint has elected to leave the DWSD system. I think this addresses our issue. Your thoughts?

Liane J. Shekter Smith, P.E., Chief  
 Office of Drinking Water and Municipal Assistance  
 Michigan Department of Environmental Quality  
 517-284-6543

---

**From:** Robinson, Michael [<mailto:MRobinson@wnj.com>]  
**Sent:** Wednesday, March 19, 2014 4:47 PM  
**To:** Shekter Smith, Liane (DEQ)  
**Subject:** FW: New 3.13

---

**From:** Robinson, Michael  
**Sent:** Wednesday, March 19, 2014 4:36 PM  
**To:** 'Brim, Richard (DEQ)'  
**Subject:** New 3.13

“Respondent has chosen to use its WTP to supply water to its customers and leave the DWSD after receipt of a notice of termination of service from DWSD. In order for Respondent to continue to use the WTP, Respondent must undertake the KWA public improvement project or undertake other public improvement projects to continue to use the Flint River, such as additional WTP public improvements, source water protection public improvements, and public improvements to obtain a back-up water supply, in order to comply with Act 399.”

Mike



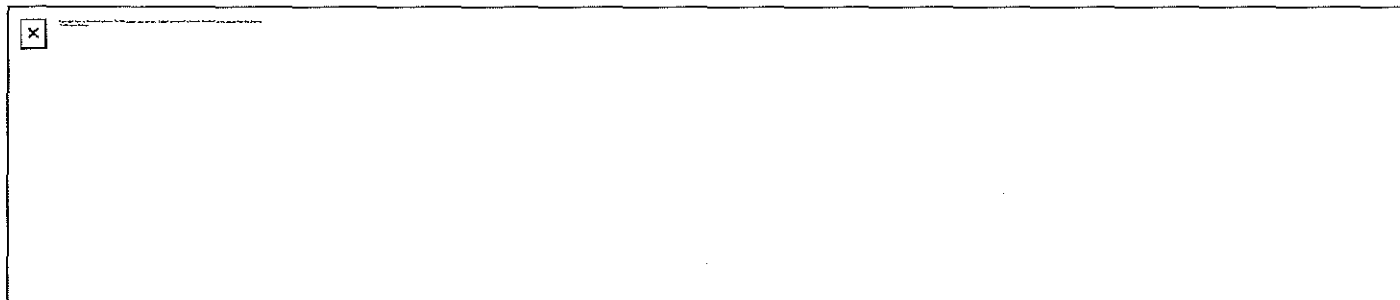
**Rennaker, Joanne (DEQ)**

---

**From:** Thelen, Mary Beth (DEQ)  
**Sent:** Thursday, October 08, 2015 10:49 AM  
**To:** DEQ-EXE-MGMT-TEAM; DEQ-District-Coordinators  
**Cc:** DEQ-EXE-MGMT-TEAM-Secretaries; Olszewski, Rosemarie (DEQ)  
**Subject:** FW: NEWS RELEASE: Gov. Rick Snyder: Move back to Detroit water provides best protection for public health in Flint

FYI as needed.

**From:** GOV Newsroom [mailto:govnewsroom@govsubscriptions.michigan.gov]  
**Sent:** Thursday, October 08, 2015 10:23 AM  
**To:** Thelen, Mary Beth (DEQ)  
**Subject:** NEWS RELEASE: Gov. Rick Snyder: Move back to Detroit water provides best protection for public health in Flint

**CONTACTS:**

Sara Wurfel or Dave Murray

Governor's Office: 517-335-6397

Brad Wurfel, 517-284-6713

Department of Environmental Quality

Jennifer Eisner, 517-230-9804

Department of Health and Human Services

Kathryn Thomas, 810-766-1734 Mott  
Foundation

Jason Lorenz, 810-237-2039 City of Flint

**FOR IMMEDIATE RELEASE**

Thursday, Oct. 8, 2015

**Gov. Rick Snyder: Move back to Detroit water provides best protection for public health in Flint**

*State, city, Mott Foundation, join to fund switch until KWA is ready*

FLINT, Mich. – Flint families and children will be better protected by reconnecting with the Great Lakes Water Authority as the source of the city's drinking water until the Karegnondi Water Authority pipeline is completed, Gov. Rick Snyder said.

Snyder said Thursday that he will request the state Legislature to provide half, or \$6 million, of the \$12 million needed to reconnect with the authority through next summer, when the KWA is expected to be completed. The Flint city government will provide \$2 million and the Charles Stewart Mott Foundation has committed \$4 million.

"All Flint residents need clean, safe drinking water," Snyder said. "The technical experts helping the city on its water advisory all agree this move back to the Great Lakes Water Authority provides the best public health protection for children and families. This effort today is the result of people coming together to solve a problem. I appreciate Detroit's willingness to reconnect with Flint, the Mott Foundation's generous commitment, and the dedication of all parties to come together to protect Flint families and children."

Flint city leaders requested the state's help to fund the reconnection and to assist with health and infrastructure issues. Flint's move to the Great Lakes Water Authority is expected to cost about \$1.3 million per month until the Karegnondi Water Authority is completed next summer.

"It's heartening to know so many people are working at so many levels to bring safe, clean water back to Flint," Mott Foundation President Ridgway White said. "We believe this transitional solution is the right and necessary thing to do, and we're glad we could help the state and the city make it happen."

The move to Detroit water, which is expected to carry, carries many public health benefits. As large bodies of water, the Great Lakes are naturally prone to fewer problems from large rain events and other runoff issues that can sometimes be present in shallower rivers. Additionally, the Great Lakes Water Authority water already has additional corrosion control, using phosphates to help coat the insides of pipes and limit lead from leaching into the water.

However, reconnecting with the authority will not completely resolve the city's problem with lead service lines or aging infrastructure. It will take time for pipes in Flint to become coated with the phosphate corrosion control. Additionally, some households in the city could experience lead in their drinking water until all lead pipes and plumbing are replaced.

"Reconnecting to Detroit is the fastest way to deliver clean, safe water to Flint and stabilize the infrastructure system," Flint Mayor Dayne Walling said. "I appreciate the state, the Mott Foundation, Detroit, and the county's participation in a solution for Flint's water problems. The health and safety of Flint's families, children and seniors is my top priority, and reconnecting to Detroit is a major step that the city could not take alone given budget constraints."

To best protect public health, Snyder said state and local authorities will continue to carry out steps outlined on Oct. 2 in a comprehensive action plan, including continued testing, the use of faucet filters and providing residents with accurate information about steps to eliminate lead exposure. The Michigan Departments of Environmental Quality and Health and Human Services today also committed an additional \$3.5 million for water filters, free lead testing through the state laboratory for Flint water customers, and hiring additional staff to conduct health exposure monitoring for lead

in drinking water.

Free filters are available for current MDHHS clients at the 125 E. Union St. or 4809 Clio Road MDHHS office locations. For residents who are not currently enrolled in MDHHS assistance programs, free filters are available at the Genesee County Community Action Resource Department offices at 2727 Lippincott and 601 North Saginaw in Flint. Staff will be at all four locations from 9 a.m. to 4 p.m., Monday through Friday, to distribute filters and assist residents who have questions about proper installation. At the Lippincott location only, extended hours will be offered this weekend, including until 7 p.m. on Thursday and Friday and from 10 a.m. to 2 p.m. on Saturday.

Other good practices for residents concerned about lead include turning on the cold water tap and running the water until it's as cold as it will go. Additionally, only use cold water for cooking, drinking and especially mixing baby formula.

### ***School test results released; more investigation planned***

The state today also released the first results from its lead screening program in schools and homes. Of 37 total samples taken at 13 buildings, four samples spread over three buildings exceeded the federal action level of 15 parts per billion.

However, this sampling provides only an initial screen, and the state is committing to further testing water and inspecting plumbing at these schools. Until testing is complete, schools are advised to continue using bottled water and filtration as a precaution to protect children.

In addition, free testing is still available for any other Flint school, including daycares and Head Starts. Free testing is also available for any Flint resident.

Additional information, including more detailed lead screening results, is available at [www.michigan.gov/flintwater](http://www.michigan.gov/flintwater).

###

STAY CONNECTED:




---

This email was sent to [thelenm2@michigan.gov](mailto:thelenm2@michigan.gov) on behalf of: The Executive Office of the Governor · 111 South Capitol Avenue · Lansing, MI 48909 · 517-335-7858

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Friday, October 16, 2015 10:23 AM  
**To:** Busch, Stephen (DEQ); Benzie, Richard (DEQ); Cook, Pat (DEQ); Prysby, Mike (DEQ)  
**Cc:** Sygo, Jim (DEQ); Wurfel, Brad (DEQ); Krisztian, George (DEQ)  
**Subject:** FW: pathogens

**From:** Dayne Walling [mailto:dwalling@cityofflint.com]  
**Sent:** Friday, October 16, 2015 10:21 AM  
**To:** Natasha Henderson  
**Cc:** Thelen, Mary Beth (DEQ); Sean Kammer; Krisztian, George (DEQ); Tommasulo, Karen (DEQ); Shekter Smith, Liane (DEQ); Lyon, Nick (DHHS); Prysby, Mike (DEQ); Wurfel, Brad (DEQ); Edgerton, Shelly (LARA); Busch, Stephen (DEQ); Wyant, Dan (DEQ); Howard Croft (hcroft@cityofflint.com); Shaler, Karen (DEQ); Pallone, Maggie (DEQ); Dykema, Linda D. (DHHS); Sygo, Jim (DEQ)  
**Subject:** pathogens

----- Forwarded message -----

**From:** Jason Lorenz <jlorenz@cityofflint.com>  
**Date:** Fri, Oct 16, 2015 at 9:59 AM  
**Subject:** Fwd: FW: Flint Water Opportunistic Pathogens  
**To:** Natasha Henderson <nhenderson@cityofflint.com>, Dayne Walling <dwalling@cityofflint.com>, Howard Croft <hcroft@cityofflint.com>

----- Forwarded message -----

**From:** "Matthew Bleicher" <mbleicher@sbgstv.com>  
**Date:** Oct 16, 2015 9:32 AM  
**Subject:** FW: Flint Water Opportunistic Pathogens  
**To:** "Jason Lorenz" <jlorenz@cityofflint.com>  
**Cc:**

---

**From:** ZIGMOND KOZICKI [mailto:zigpsych@sbcglobal.net]  
**Sent:** Thursday, October 15, 2015 11:36 AM  
**To:** newstips  
**Cc:** Stephanie Baiyasi  
**Subject:** Flint Water Opportunistic Pathogens

Please join the press briefing regarding opportunistic pathogens (OPs)

Facilitated by:

Dr. Zigmond A. Kozicki DHA, MSA, MA

Dr. Stephanie J.S. Baiyasi, DVM, HSAC

Friday 10/16/15 in Flint, Michigan, at the:  
Holiday Inn Express, 1150 Robert T. Longway, Meeting Room 106, Flint,  
Michigan 48503 ph.810-238-7744

Primary Purpose: to raise awareness and alert the public about the threat of  
opportunistic pathogens (OPs) in Flint drinking water.

Ziggy Kozicki, DHA, MSA, MA, LLP

989-450-1451

[zigpsych@sbcglobal.net](mailto:zigpsych@sbcglobal.net)  
[kozickza@udmercy.edu](mailto:kozickza@udmercy.edu)  
[Kozic1za@cmich.edu](mailto:Kozic1za@cmich.edu)

"You must be the change you wish to see in the world."  
- *Mohandas K. Gandhi*



Think Green! Before printing this e-mail ask the question, is it necessary?

On Thu, Oct 15, 2015 at 7:10 AM, Natasha Henderson <[nhenderson@cityofflint.com](mailto:nhenderson@cityofflint.com)> wrote:

Hello All:

I look forward to the meeting in Friday.

Thanks,

Natasha L. Henderson, City Administrator  
City of Flint, Michigan  
@Samsung Galaxy Note 4

On Oct 14, 2015 6:59 PM, "Thelen, Mary Beth (DEQ)" <[THELENM2@michigan.gov](mailto:THELENM2@michigan.gov)> wrote:

This is to confirm that the first meeting has been scheduled for Friday, October 16, 10:00 a.m.  
in Natasha Henderson's office.



The following from the state will be in attendance in person or by telephone:

George Krisztian, City of Flint Plan Coordinator and Laboratory Director, Department of Environmental Quality (in person)

Shelly Edgerton, Deputy Director, Department of Licensing and Regulatory Affairs (in person)

Dr. Linda Dykema, Department of Health and Human Services (in person OR by telephone)

Dr. Eden Wells, Chief Medical Executive, Department of Health and Human Services (by telephone)

I have been working with Sean on these arrangements.

Thanks.

Mary Beth

Mary Beth Thelen

Management Assistant to Director Dan Wyant

Department of Environmental Quality

Constitution Hall, 6th Floor South

Phone: 517-284-6712 or 284-6700 (new numbers)

Fax: 517-241-7401

[Thelenm2@michigan.gov](mailto:Thelenm2@michigan.gov)

---

**From:** Krisztian, George (DEQ)

**Sent:** Tuesday, October 13, 2015 4:38 PM

**To:** Natasha Henderson; Sean Kammer

**Cc:** Dayne Walling; Howard Croft ([hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)); Wyant, Dan (DEQ); Sygo, Jim (DEQ); Thelen, Mary Beth (DEQ); Shaler, Karen (DEQ); Wurfel, Brad (DEQ); Pallone, Maggie (DEQ); Tommasulo, Karen (DEQ); Dykema, Linda D. (DHHS); Edgerton, Shelly (LARA); Lyon, Nick (DHHS); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)

**Subject:** RE: Preliminary and Deliberative: Not subject to FOIA Weekly meetings

Hi Natasha,

I look forward to working with everyone there. Can you please work with Mary Beth to get the first meeting Scheduled? If possible, I would like the first meeting to take place this week. A lot of things are happening and I want to make sure that we are all coordinated in this effort.

Thank you!

George

George L. Krisztian

Flint Action Plan Coordinator

Laboratory Director

Michigan Department of Environmental Quality

Desk ph (517) 284-6719

Cell ph (517) 204-0381

**From:** Natasha Henderson [<mailto:nhenderson@cityofflint.com>]

**Sent:** Tuesday, October 13, 2015 3:14 PM

**To:** Krisztian, George (DEQ); Sean Kammer

**Cc:** Dayne Walling; Howard Croft ([hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)); Wyant, Dan (DEQ); Sygo, Jim (DEQ); Thelen, Mary Beth (DEQ); Shaler, Karen (DEQ); Wurfel, Brad (DEQ); Pallone, Maggie (DEQ); Tommasulo, Karen (DEQ); Dykema, Linda D. (DHHS); Edgerton, Shelly (LARA); Lyon, Nick (DHHS); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)

**Subject:** Re: Preliminary and Deliberative: Not subject to FOIA Weekly meetings

Hello George,

I will serve as the point of contact for the City to schedule on-going meetings. Also, I have included my Assistant, Sean Kammer in this email.

Thanks,

Natasha L. Henderson, City Administrator

**City of Flint, Michigan**

1101 S. Saginaw St.

Flint, MI 48502

Email: [nhenderson@cityofflint.com](mailto:nhenderson@cityofflint.com)

Phone: (810) 237-2057

[www.cityofflint.com](http://www.cityofflint.com)

On Mon, Oct 12, 2015 at 11:36 AM, Krisztian, George (DEQ) <[krisztiang@michigan.gov](mailto:krisztiang@michigan.gov)> wrote:

Mr. Mayor,

I would like to schedule weekly meetings with you and your key staff so that we can ensure that we have a coordinated effort in resolving the water issue. I would like for the initial meetings to be face to face and I, along with others, will come to Flint for these.

If possible I would like the first meeting to be either Tuesday or Wednesday of this week (10/13 or 10/14) and I would also like to ask for a tour of the Flint Water Treatment Plant.

Mary Beth Thelen will serve as the DEQ's point on coordinating these meetings. Can you please let us know who would be the appropriate contact on your end?

Thank you very much!

George

George L. Krisztian

Flint Action Plan Coordinator

Laboratory Director

Michigan Department of Environmental Quality

Desk ph (517) 284-6719

Cell ph (517) 204-0381

--

Dayne Walling

Mayor, City of Flint

City Hall, 1101 S. Saginaw St.

Flint, MI 48502

810-766-7346

[mayor@cityofflint.com](mailto:mayor@cityofflint.com)

[www.cityofflint.com](http://www.cityofflint.com)

follow me on twitter at <http://twitter.com/mayorwalling>

**Rennaker, Joanne (DEQ)**

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Tuesday, October 14, 2014 3:38 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: Phone Message - Questions Regarding Chloride Levels in Flint River Water

Can you handle this one?

---

**From:** Berry, Virginia (DEQ)  
**Sent:** Tuesday, October 14, 2014 12:39 PM  
**To:** Wurfel, Brad (DEQ)  
**Cc:** Feuerstein, Heather (DEQ)  
**Subject:** Phone Message - Questions Regarding Chloride Levels in Flint River Water

Hi Brad!

A Mr. Walter Smith-Randolph of NBC 25 – Flint phoned, and he has questions regarding the Flint river water chloride levels. His number is: 810-247-1305.

Thanks!

Ginny Berry  
DEQ - Office of the Great Lakes  
Michigan Coastal Management Program  
Areas of Concern  
(517) 284-5052  
[berryv@michigan.gov](mailto:berryv@michigan.gov)

**Rennaker, Joanne (DEQ)**

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**From:** Prysby, Mike (DEQ)  
**Sent:** Tuesday, August 19, 2014 10:26 AM  
**To:** Busch, Stephen (DEQ); Rosenthal, Adam (DEQ)  
**Subject:** FW: PRESS RELEASE: Water Advisory Update  
**Attachments:** Water Advisory 8.18.2014.pdf

Here is a copy of the most recent press release from the city concerning the BWA. Although the statement is accurate in that no additional Fecal Coliform sample results were obtained from the affected area; the remaining portion of the first paragraph is poorly worded and doesn't portray the reason for issuing the BWA. The statement defers to an "abnormal test" due to sampling error over the most recent 48 hours as the trigger for the BWA. This is false as the BWA was in effect for over 72 hours at the time of the press release and was issued because of the fecal coliform result and the number of total coliform results obtained from the affected area between the 12<sup>th</sup> and the 14<sup>th</sup>. Also, while sampling error could be possible...other potential causes (LOP, mainbreak, Xconn, improper connections, etc.) should have been discussed in the press release.

Michael Prysby, P.E.  
District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

---

**From:** Fonger, Ronald [<mailto:RFONGER1@mlive.com>]  
**Sent:** Tuesday, August 19, 2014 9:50 AM  
**To:** Prysby, Mike (DEQ)  
**Subject:** FW: PRESS RELEASE: Water Advisory Update

Mike. Here's the city statement I mentioned.

**Ron Fonger**  
MLive Media Group  
Reporter

mobile 810.347.9963  
email [rfonger1@mlive.com](mailto:rfonger1@mlive.com)  
address 540 S. Saginaw St. #101, Flint MI 48502

**From:** Jason Lorenz [<mailto:jlorenz@cityofflint.com>]  
**Sent:** Monday, August 18, 2014 5:52 PM  
**Subject:** PRESS RELEASE: Water Advisory Update

**For Immediate Release****City of Flint Boil Water Advisory Still in Effect for Area Affected by Discovery of Abnormal Water Sample**

*Flint, Michigan – August 18, 2014* – The City of Flint's Utilities Department has received word today from the Department of Environmental Quality that the boil water advisory issued for a small portion of the city is still in effect although additional testing has shown no signs of E-coli or fecal coliform bacteria in the water. Testing over the last 48 hours has shown that the water tests negative for the presence of fecal coliform bacteria and E-coli, but an abnormal test result triggered the advisory. It is believed that a sampling error is to blame for the abnormal test; however, as a precaution, the advisory will remain in effect until the next citywide sampling has been completed. The next round of routine testing will take place on Tuesday, August 19, 2014 with the possibility that the advisory could be lifted as early as Wednesday, August 20, 2014.

Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at nine different sites around the city. Drinking water contamination due to E-coli or coliform bacteria is very rare due to the fact that the bacteria cannot survive in the water for very long. The colder temperature of water in the system coupled with the regular blending of chlorine into the water makes for a hostile environment for these kinds of bacteria. The Flint Water Treatment Plant works diligently to provide water of the highest quality to everyone in the city.

–END–

-Jason Lorenz  
Public Information Officer  
City of Flint  
(810) 237-2039  
[jlorenz@cityofflint.com](mailto:jlorenz@cityofflint.com)



CITY OF FLINT  
OFFICE OF EMERGENCY MANAGER  
DARNELL EARLEY  
ICMA-CM, MPA

Jason Lorenz  
Public Information Officer  
(810) 237-2039  
jlorenz@cityofflint.com

**For Immediate Release**

**City of Flint Boil Water Advisory Still in Effect for Area Affected by  
Discovery of Abnormal Water Sample**

*Flint, Michigan – August 18, 2014* – The City of Flint's Utilities Department has received word today from the Department of Environmental Quality that the boil water advisory issued for a small portion of the city is still in effect although additional testing has shown no signs of E-coli or fecal coliform bacteria in the water. Testing over the last 48 hours has shown that the water tests negative for the presence of fecal coliform bacteria and E-coli, but an abnormal test result triggered the advisory. It is believed that a sampling error is to blame for the abnormal test; however, as a precaution, the advisory will remain in effect until the next citywide sampling has been completed. The next round of routine testing will take place on Tuesday, August 19, 2014 with the possibility that the advisory could be lifted as early as Wednesday, August 20, 2014.

Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at nine different sites around the city. Drinking water contamination due to E-coli or coliform bacteria is very rare due to the fact that the bacteria cannot survive in the water for very long. The colder temperature

–CONTINUE–





CITY OF FLINT  
OFFICE OF EMERGENCY MANAGER  
DARNELL EARLEY  
ICMA-CM, MPA

of water in the system coupled with the regular blending of chlorine into the water makes for a hostile environment for these kinds of bacteria. The Flint Water Treatment Plant works diligently to provide water of the highest quality to everyone in the city.

—END—

**Rennaker, Joanne (DEQ)**

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**From:** Thelen, Mary Beth (DEQ)  
**Sent:** Monday, September 28, 2015 7:27 AM  
**To:** Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Wurfel, Brad (DEQ); Pallone, Maggie (DEQ)  
**Cc:** Thelen, Mary Beth (DEQ)  
**Subject:** FW: Proposed Press Conference on Flint Drinking Water

**Please keep confidential.**

Director sent this to the Governor's office this morning **and asked that** I send it to you as FYI.

MBT

P.S. Brad, below, Director sent to Sara twice instead of you.

---

**From:** Wyant, Dan (DEQ)  
**Sent:** Monday, September 28, 2015 7:18 AM  
**To:** Muchmore, Dennis (GOV); Lyon, Nick (DCH); Hollins, Harvey (GOV)  
**Cc:** Wurfel, Sara (GOV); Wurfel, Sara (GOV); Lasher, Geralyn (DCH); Thelen, Mary Beth (DEQ)  
**Subject:** Proposed Press Conference on Flint Drinking Water

Per the ongoing issues in Flint concerning their drinking water, I would offer the following recommendations. Let's discuss.

### **Recommendation**

Press Conference in Flint – Wednesday, Thursday or Friday.

### **Participants**

Mayor of Flint  
 Dan Wyant – Michigan Department of Environmental Quality  
 Nick Lyon – Department of Community Health  
 Susan Hedman – Region 5 Administrator or EPA  
 Harvey Hollins – Governor's office  
 Local Public Health Department

### **Announcement**

Federal – State – Local action plan to address Flint Drinking Water

1. Governor Snyder names Dr. Dean Sienko as Flint drinking water Public Health Advisor.
2. All Flint schools water will immediately be tested to ensure that drinking water is safe.
3. Advisories will be disseminated recommending citizens flush your cold water pipes, use only water from the cold water tap for drinking, cooking and especially for making baby formula.

4. Implementation of fully optimized corrosion controls in the Flint drinking water system.
5. Expanded water testing of at risk properties.
6. Offer water testing at no cost to Flint residents to assure water is safe.
7. Convene a safe drinking water “ Technical Review Advisory” to ensure best technology, practices and science is being utilized, including EPA’s expertise and assistance from their Office of Research and Development.
8. Offer bottled water and premixed formula if test results indicate high levels of lead.
9. Accelerate water system improvements to address replacement of lead service lines.

Dan Wyant, Director  
Department of Environmental Quality  
517-284-6700 (New Number)

**Rennaker, Joanne (DEQ)**

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**From:** Rosenthal, Adam (DEQ)  
**Sent:** Wednesday, April 16, 2014 1:01 PM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: Proposed Water Monitoring - City of Flint

Adam Rosenthal, EQA  
MDEQ – Office of Drinking Water and Municipal Assistance  
Lansing District – Constitution Hall 1SW  
PO Box 30242  
Lansing, MI 48909  
517-284-6644  
fax: 517-241-3571

**From:** Michael Glasgow [<mailto:mglasgow@cityofflint.com>]  
**Sent:** Wednesday, April 16, 2014 12:59 PM  
**To:** Rosenthal, Adam (DEQ)  
**Subject:** Proposed Water Monitoring - City of Flint

Adam,

Good afternoon, I am contacting you in regards to possible changes in our monitoring for our change to full time operation out of the Flint river. I am expecting changes to our Water Quality Monitoring parameters, and possibly our DBP and lead & copper monitoring plan. Also, I am wondering about our MOR required testing. I know you have probably been in contact with Howard Croft, however I have not seen anything except the notes you or Prysby made on the last page of our 2014 monitoring schedule "that things were subject to change". Any information would be greatly appreciated, because it looks as if we will be starting the plant up tomorrow and are being pushed to start distributing water as soon as possible. As the acting F-1, I would like to make sure we are monitoring, reporting and meeting our requirements before I give the O.K to start distributing water.

Thanks,

Mike Glasgow  
Laboratory & Water Quality Supervisor  
City of Flint Water Plant  
(810)787-6537 ext. 3512

**Rennaker, Joanne (DEQ)**

---

**From:** Henry, James <jhenry@gchd.us>  
**Sent:** Thursday, October 01, 2015 3:57 PM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Public Health Emergency Declaration  
**Attachments:** public health emergency announcement 10-1-15.pdf

---

**From:** Sandlin, Mary  
**Sent:** Thursday, October 1, 2015 2:33 PM  
**To:** GCHD-Everyone  
**Subject:** Public Health Emergency Declaration

Mary E. Sandlin  
Clerical Coordinator  
Genesee County Health Department  
630 S. Saginaw Street, Suite 4  
Flint, MI 48502-1540  
(810) 257-3812 FAX: (810) 257-3147  
[msandlin@gchd.us](mailto:msandlin@gchd.us)



Genesee County  
Health Department

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at <http://www.gchd.us>



# Genesee County Board of Commissioners

1101 BEACH STREET, ROOM 312 FLINT, MICHIGAN 48502

TELEPHONE: (810) 257-3020

FAX: (810) 257-3008

October 1, 2015

## Public Health Emergency Declaration for People Using the Flint City Water Supply with the Flint River as the Source

The County is issuing an Emergency Advisory recommending that people not drink the water coming from the City of Flint using the Flint River as the water source unless:

It has been tested to assure it does not contain elevated levels of lead.

It is being filtered through a National Sanitation Foundation (NSF) approved filter certified to remove lead that meets ANSI standard 53.

Findings reported in the Detroit Free Press September 30, 2015 indicate that Governor Snyder has publically acknowledged that Flint's water supply "appears" to have problems. Snyder has conceded that "it appears that (water) lead levels could be higher or have increased," and that there are "probably things that weren't fully understood when the switch was made." This is in direct contrast to previous reports from the State that downplayed the severity of the situation and conflicted with local data released by researchers at Hurley Medical Center.

Young children are most vulnerable to leads effects, because prior to age six, their brain and central nervous system are still forming and easily susceptible to damage. For an adult to suffer significant health effects, exposure to lead would have to be sustained and more intense. Most adults who are affected by lead have been exposed in an occupational setting, such as working as a house painter or in a battery recycling plant.

Pregnant women are at special risk because the lead they absorb crosses the placenta and enters the fetus.

It's important to remember that there is no known safe level of lead in a human body, Experts now use a reference level of 5 micrograms per deciliter to identify children with blood lead levels that are much higher than most children's levels. This new level is based on the U.S. population of children ages 1-5 years who are in the highest 2.5% of children when tested for lead in their blood.

Lead in water can contribute to a child's blood lead level. The Michigan Department of Environmental Quality, who regulates municipal water supplies, has assured us that the water leaving the Flint Water Plant meets all Federal and State requirements. The City of Flint has a documented problem with lead in its drinking water due to service and household lines that may contain lead or lead solder which can leach lead because of the corrosivity of the water since changing to the Flint River as the source supply. Generally, those who are most vulnerable

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PEGGE ADAMS  
DISTRICT 9

to leads health effects from exposure to unfiltered tap water are the very youngest children. For this reason, if you are not sure about the lead content in your tap water, it's best to either use a filter that has been found to be effective for reducing or eliminating lead, or to use bottled water instead. Water filters should be National Sanitation Foundation (NSF) certified to remove lead and meet ANSI standard 53. If these options are not available to you, then it's best to let the water run for at least five minutes before using it for either drinking or cooking purposes. Always use cold water instead of hot water for drinking and cooking.

It's especially important to avoid using untested or unfiltered tap water for mixing infant formula unless you can assure your water is lead free.

When leaded gasoline was in widespread use in this country, the lead came out the tail pipe and was deposited in yards near the roads. That lead may still be in those yards. In addition, lead paint continues to be a major source of childhood lead poisoning and can be found in homes built before 1978 when lead paint was banned in the U.S. and may be a hazard inside and outside the home especially where paint is worn or flaking.

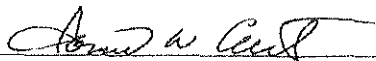
There are many other potential sources of lead exposure, including:

- "Home remedies" and cosmetics imported from other countries
- Tamarind or chili-based candies from Mexico
- Stained glass windows
- Fishing sinkers
- Firing ranges
- Old, deteriorated mini-blinds
- Bean pots and painted ceramics
- Crystal decanters
- Lead crystal glassware

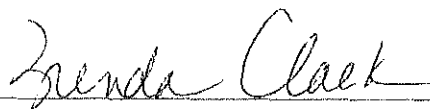
Since no safe level has been identified it is in everyone's interest to reduce exposure to lead as much as possible. Recommendations on ways to reduce lead exposure can be found on the Genesee County Health Department website [www.gchd.us](http://www.gchd.us) and Center for Disease Control and Prevention website: <http://www.cdc.gov/nceh/lead/tips.htm>.

Recent data provided by Hurley researchers has indicated a significant increase in blood lead levels in children after the switch to Flint River water. The County Health Officer has requested that MDHHS provide specific data to support their claim that state data is more comprehensive and does not show a significant increase. To date the state has failed to provide the requested data by the September 30, 2015 deadline in our previous request to the state.

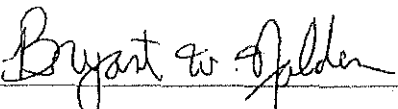
## COUNTY OF GENESEE

BY: Date: 10-1-15

Jamie W. Curtis, Chairperson  
Board of Commissioners

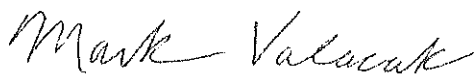
BY: Date: 10-1-15

Brenda Clack, Chairperson  
Human Services Committee  
Board of Commissioners

BY: Date: 10-1-15

Bryant W. Nolden, Vice Chairperson  
Board of Commissioners

## GENESEE COUNTY HEALTH DEPARTMENT

BY: Date: 10-1-15

Mark Valacak, M.P.H.  
Health Officer



**Rennaker, Joanne (DEQ)**

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**From:** Thelen, Mary Beth (DEQ)  
**Sent:** Thursday, October 01, 2015 3:42 PM  
**To:** Wyant, Dan (DEQ); Sygo, Jim (DEQ); Pallone, Maggie (DEQ); Busch, Stephen (DEQ);  
 Shekter Smith, Liane (DEQ); Krisztian, George (DEQ); Benzie, Richard (DEQ)  
**Cc:** Shaler, Karen (DEQ); Devereaux, Tracy Jo (DEQ)  
**Subject:** FW: Public Health Emergency Declared

FYI.

---

**From:** Olszewski, Rosemarie (DEQ)  
**Sent:** Thursday, October 01, 2015 3:40 PM  
**To:** Thelen, Mary Beth (DEQ); Wurfel, Brad (DEQ); Tommasulo, Karen (DEQ); Feuerstein, Heather (DEQ)  
**Subject:** Public Health Emergency Declared

[http://www.clickondetroit.com/news/public-health-emergency-declared-due-to-lead-in-flint-water/35601670?ens=1&utm\\_source=Local+Breaking+News&utm\\_medium=email&utm\\_campaign=Breaking+News+Alerts\\_54fe12cc0cf293a65e21650d\\_det&utm\\_content=20151001\\_1436](http://www.clickondetroit.com/news/public-health-emergency-declared-due-to-lead-in-flint-water/35601670?ens=1&utm_source=Local+Breaking+News&utm_medium=email&utm_campaign=Breaking+News+Alerts_54fe12cc0cf293a65e21650d_det&utm_content=20151001_1436)

*Rosemarie*

*Rosemarie Olszewski  
 General Office Assistant - Executive Division  
 Michigan Department of Environmental Quality  
 Constitution Hall, 525 W. Allegan St.  
 6<sup>th</sup> Floor South Tower, Pillar P6  
 Telephone: 517-284-6700  
 Fax: 517-241-7401*

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Friday, October 02, 2015 10:16 AM  
**To:** schock.michael@epa.gov  
**Cc:** Busch, Stephen (DEQ)  
**Subject:** FW: question for ORD/Mike Schock  
**Attachments:** SCAN0912.pdf

Michael,

Attached is the flow schematic for the Flint WTP....the schematic shows UV disinfection; however, this is not in place....and the operators are using lime for softening. Soda ash is not being used at this time.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

---

**From:** Crooks, Jennifer [<mailto:crooks.jennifer@epa.gov>]  
**Sent:** Thursday, October 01, 2015 5:57 PM  
**To:** Rosenthal, Adam (DEQ); Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Cc:** Benzie, Richard (DEQ); Philip, Kris (DEQ); Poy, Thomas  
**Subject:** RE: question for ORD/Mike Schock

I'm out of the office tomorrow, so if you've been able to track down a schematic of the Flint's treatment plant, perhaps you can forward it to Mike Schock in Cincinnati? His email is [schock.michael@epa.gov](mailto:schock.michael@epa.gov).

If not, I'm back in the office on Monday and maybe you can steer me toward the City to obtain a schematic. I'll check in with you then.

Thank you all.

Jennifer

---

**From:** Crooks, Jennifer  
**Sent:** Wednesday, September 30, 2015 11:51 AM  
**To:** Rosenthal, Adam (DEQ); Prysby, Mike (DEQ); 'Busch, Stephen (DEQ)'  
**Cc:** Richard Benzie; kris philip; Thomas Poy  
**Subject:** question for ORD/Mike Schock  
**Importance:** High

Tom P told me that your Director, Dan Wyatt, asked that his staff work with ORD/Mike Schock and Darren Lytle. Mike and Darren are both working on getting up to speed on the basics of the Flint water treatment scheme. I had a request from Mike Schock this morning about information about treatment and various sample results for Flint. So, I sent them the final OEL report from Flint that is on their website, as well as the 5 MORs that are also on Flint's website.

Mike had an additional question; he's looking for a schematic of the Flint treatment process to help him evaluate the possible successfulness of phosphate treatment at Flint. See Mike's brief explanation below.

I don't want to make this a big project if it's not handy; would Mike Glasgow have this schematic?

Thank you all! I know your time is very valuable right now.

Jennifer

---

**From:** Schock, Michael  
**Sent:** Wednesday, September 30, 2015 10:57 AM  
**To:** Crooks, Jennifer  
**Cc:** Lytle, Darren  
**Subject:** RE: more pdfs

Jennifer;

Thank you so much!

Would you happen to know if any other report has, or that you might have somewhere, a currently-valid process schematic for the entire set of treatments done at the Flint plant? It would be helpful to have a better picture of where things like softening, type of coagulant and GAC fit into the picture. There are several potential interrelationships that would affect the successfulness of the phosphate treatment proposed and dosage, and the instability cause by the major chemistry change from Detroit finished water (which I understand was from their Lake Huron-fed plant).

--Mike

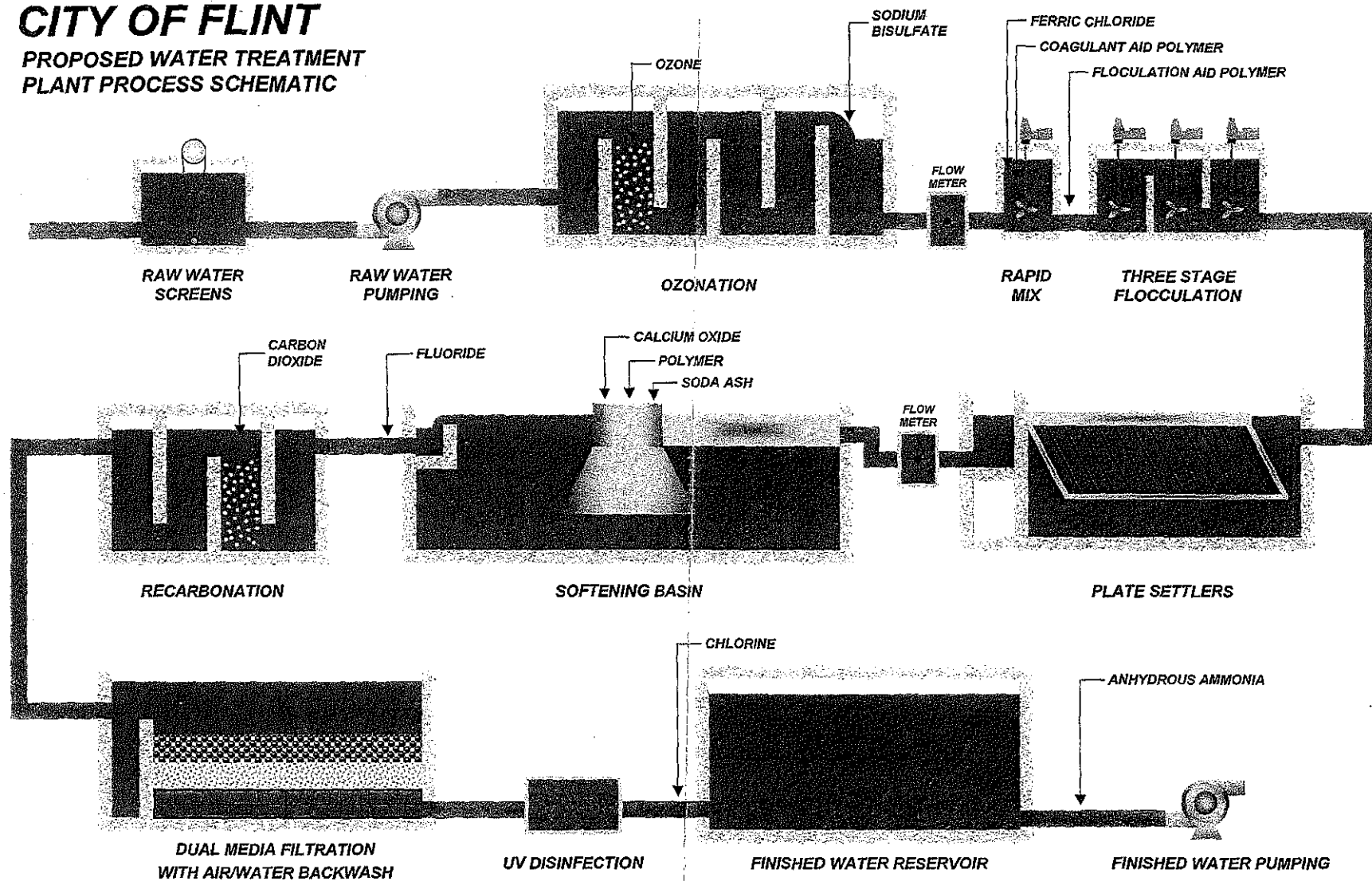
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**From:** Crooks, Jennifer  
**Sent:** Wednesday, September 30, 2015 9:29 AM  
**To:** Schock, Michael; Lytle, Darren  
**Subject:** more pdfs

April 2015 MOR is not on the website.

# CITY OF FLINT

## PROPOSED WATER TREATMENT PLANT PROCESS SCHEMATIC



**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Monday, October 19, 2015 5:18 PM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Recommissioning the 72-inch transmission main

Mike – I'm not seeing a follow-up e-mail to George on this. Could you please respond? Thanks.

---

**From:** Krisztian, George (DEQ)  
**Sent:** Thursday, October 15, 2015 10:38 AM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Sygo, Jim (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** RE: Recommissioning the 72-inch transmission main

Mike,

How is the flush water being disposed? Do we have an answer to that?

George

George L. Krisztian  
 Flint Action Plan Coordinator  
 Laboratory Director  
 Michigan Department of Environmental Quality  
 Desk ph (517) 284-6719  
 Cell ph (517) 204-0381

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, October 15, 2015 10:31 AM  
**To:** Howard Croft ([hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)); Michael Glasgow; [bwright@cityofflint.com](mailto:bwright@cityofflint.com); Tim Davidek ([T\\_DAVIDEK@gcdcwws.com](mailto:T_DAVIDEK@gcdcwws.com)); [jfobrien@gcdcwws.com](mailto:jfobrien@gcdcwws.com); [mhorgan@gcdcwws.com](mailto:mhorgan@gcdcwws.com)".GWIA.SOM-GWIA01; Krisztian, George (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Benzie, Richard (DEQ); Rosenthal, Adam (DEQ)  
**Subject:** Recommissioning the 72-inch transmission main

Based upon discussions with Genesee County and the city of Flint, the portion of the 72-inch transmission main (pipeline) that was taken out of service, while the Flint Water Treatment Plant (WTP) treated water from the Flint River, was flushed and disinfected in accordance to AWWA Standard C651-14. Two sets of samples were collected from two locations 16 hours apart for total coliform analysis. The city of Flint and Genesee County has informed the DEQ that both sets of samples are Non-Detect for total coliform. Based upon the disinfection procedure and the absence of total coliform from both sets of samples, the un-used portion of the pipeline may be placed into service.

Michael Prysby, P.E.

District Engineer  
Office of Drinking Water and Municipal Assistance  
517 290-8817

**Rennaker, Joanne (DEQ)**

---

**From:** Crooks, Jennifer <crooks.jennifer@epa.gov>  
**Sent:** Tuesday, September 08, 2015 12:21 PM  
**To:** Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Cc:** Poy, Thomas  
**Subject:** FW: Reporter inquiry --> link to reporter story from Friday

I'm hoping that DEQ's Lead Public Education will become priority reading materials for citizens, so they know how to be proactive; instead of reading articles like this and being reactive.

Any idea when DPH will have their PE ready to distribute?

Jennifer

**From:** Porter, Andrea  
**Sent:** Tuesday, September 08, 2015 10:29 AM  
**To:** Deltoral, Miguel; Poy, Thomas; Bair, Rita; Damato, Nicholas  
**Cc:** Shoven, Heather; Crooks, Jennifer  
**Subject:** RE: Reporter inquiry --> link to reporter story from Friday

Hi All,

There is already a story by Jessica Dupnack that was aired on Friday:

<http://www.abc12.com/home/headlines/Flint-mother-said-the-water-gave-her-son-Lead-poisoning-324496551.html>

Thanks,  
 Andrea Porter

Environmental Engineer  
 Ground Water & Drinking Water Branch  
 U.S. EPA, Region 5 (WG-15J)  
 77 W. Jackson Blvd.  
 Chicago, IL 60604  
 Phone: 312-886-4427  
 Fax: 312-697-2656

**From:** Deltoral, Miguel  
**Sent:** Tuesday, September 08, 2015 7:12 AM  
**To:** Poy, Thomas; Bair, Rita; Damato, Nicholas  
**Cc:** Porter, Andrea; Shoven, Heather; Crooks, Jennifer  
**Subject:** Reporter inquiry

Just FYI - I had a voicemail from Jessica Dupnack (a reporter in MI) regarding the Walters' sample results and I forwarded it to Pete Cassell as requested.

Miguel A. Del Toral  
 Regulations Manager  
 U.S. EPA R5 GWDWB

77 West Jackson Blvd, (WG-15J)  
Chicago, IL 60604  
Phone: (312) 886-5253



**Rennaker, Joanne (DEQ)**

---

**From:** Pallone, Maggie (DEQ)  
**Sent:** Monday, November 02, 2015 11:51 AM  
**To:** Wyant, Dan (DEQ); Wurfel, Brad (DEQ); Sygo, Jim (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Krisztian, George (DEQ)  
**Cc:** Shaler, Karen (DEQ); Thelen, Mary Beth (DEQ); Butler, Sonya (DEQ)  
**Subject:** FW: Response from EPA on using SRF for Private Line Replacement  
**Attachments:** 10-6-2015 Response - Kildee.pdf; 100615 SRF for Private Line Replacement (Hedman).pdf

Follow up communication between Kildee and EPA on replacement of lead service lines and the use of SRF dollars. Nothing that hasn't already been clarified to us by Susan and others at EPA, but sending so you have this in your files.

Maggie

**From:** Dickinson, Jordan [<mailto:Jordan.Dickinson@mail.house.gov>]  
**Sent:** Friday, October 30, 2015 5:10 PM  
**To:** Pallone, Maggie (DEQ) <[PalloneM@michigan.gov](mailto:PalloneM@michigan.gov)>  
**Subject:** Response from EPA on using SRF for Private Line Replacement

Hi Maggie,

Here is the letter we discussed. I look forward to hearing from you next week.

Have a great weekend,

**Jordan Dickinson**

Legislative Assistant

Congressman Dan Kildee (MI-05)

227 Cannon House Office Building

Washington, D.C. 20515

Phone: (202) 225-3611

[www.dankildee.house.gov](http://www.dankildee.house.gov)



[Sign up for Congressman Dan Kildee's e-newsletter](#)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF WATER

OCT 28 2015

The Honorable Dan Kildee  
House of Representatives  
Washington, D.C. 20515

Dear Congressman Kildee:

Thank you for your October 6, 2015, letter asking whether federal law permits a state to use the Drinking Water State Revolving Fund to finance the replacement of privately owned lead water service lines.

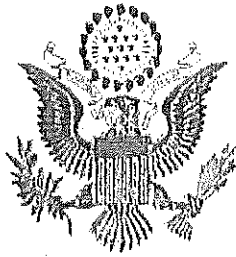
Drinking Water State Revolving Fund loans can be used to finance lead service line replacement on public and private property, provided the loans are made to an eligible entity in accordance with the Safe Drinking Water Act to protect public health, and all other Drinking Water State Revolving Fund requirements are met. The eligible entity in this case is the Flint community water system. The U.S. Environmental Protection Agency is actively discussing the option of using the Drinking Water State Revolving Fund for lead service line replacement with the Michigan Department of Environmental Quality and the City of Flint.

Again, thank you for your letter. If you have further questions, please contact me or your staff may contact Cathy Davis in the EPA's Office of Congressional and Intergovernmental Relations at Davis.CatherineM@epa.gov or (202) 564-2703.

Sincerely,

A handwritten signature in black ink that reads "Kenneth J. Kopocis".

Kenneth J. Kopocis  
Deputy Assistant Administrator



October 6, 2015

Administrator Susan Hedman  
Environmental Protection Agency Region 5  
77 West Jackson Boulevard  
Chicago, IL 60604

Administrator Hedman:

An independent scientific study recently discovered that the water in my hometown of Flint, MI, contains dangerous levels of lead. I, along with many others, am pursuing a variety of avenues to help address this situation and I wanted to clarify one possible option: It is our understanding that federal law permits states to use Safe Drinking Water State Revolving Funds to finance the replacement of privately owned lead water service lines, is this correct?

I received the attached letter from Michigan Governor Rick Snyder on October 2, 2015, asking for my assistance in regards to this question and I would appreciate further clarification.

Again, thank you for helping to clarify this question as well as exploring all options to ensure the people in Flint have safe drinking water.

Sincerely,

A handwritten signature in black ink, appearing to read "Dan Kildee".

Dan Kildee  
MEMBER OF CONGRESS

A handwritten signature in black ink, appearing to read "Debbie Stabenow".

Debbie Stabenow  
U.S. SENATOR

A handwritten signature in black ink, appearing to read "Gary C. Peters".

Gary C. Peters  
U.S. SENATOR

**Rennaker, Joanne (DEQ)**

---

**From:** Cook, Pat (DEQ)  
**Sent:** Tuesday, October 20, 2015 11:57 AM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Safety data sheet for Phosphoric Acid  
**Attachments:** Document.pdf

Info regarding DWSD's CC chemical. They use an Innophos "Phosphoric Acid 75% Technical" product which is an NSF Standard 60 certified. Max feed rate is 13 mg/l as product.

pat

-----Original Message-----

From: Johnson, Stephanie (DEQ)  
Sent: Tuesday, October 20, 2015 11:34 AM  
To: Cook, Pat (DEQ)  
Cc: Donaldson, Kristina (DEQ)  
Subject: FW: Safety data sheet for Phosphoric Acid

Hi Pat,

Here's information on DWSD's corrosion control program. I've verified this at the Northeast plant, Springwells and Southwest so far. Let me know if you need anything else.

-----Original Message-----

From: Annie Philip [<mailto:aphilip@dwsd.org>]  
Sent: Tuesday, October 20, 2015 8:32 AM  
To: Johnson, Stephanie (DEQ)  
Cc: jacob  
Subject: Safety data sheet for Phosphoric Acid

Hi Stephanie,

DWSD uses Phosphoric Acid 75% (Orthophosphoric Acid) at a dosage of 1ppm for corrosion control. The supplier is PVS Nolwood Chemicals, Inc. Please see attached safety Data Sheet for Phosphoric acid.

Thank you

Annie C Philip  
Operations Team Leader

Northeast Water Treatment Plant  
11000 East Eight Mile Rd.  
Detroit, MI. 48205  
(313)-245-1605 (office)

(313)-999-3401 (cell)  
[aphilip@dwsd.org](mailto:aphilip@dwsd.org)  
City of Detroit  
Mike Duggan, Mayor

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

From: "Detroit Water & Sewerage Dept" <[NE-CHMLAB-HP575@dwsd.org](mailto:NE-CHMLAB-HP575@dwsd.org)>  
To: [aphilip@dwsd.org](mailto:aphilip@dwsd.org)  
Sent: Tuesday, October 20, 2015 8:22:38 AM  
Subject: Safety data sheet for Phosphoric Acid

Please open the attached document. This document was digitally sent to you using an HP Digital Sending device.

## Safety Data Sheet



## Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

### 1.1 Product identifier

|                                  |                                        |
|----------------------------------|----------------------------------------|
| <b>Product Name</b>              | • <b>Phosphoric Acid 75% Technical</b> |
| <b>Synonyms</b>                  | • Orthophosphoric Acid                 |
| <b>CAS Number</b>                | • 7664-38-2                            |
| <b>SDS Number/Grade</b>          | • 3b                                   |
| <b>EC Number</b>                 | • 231-633-2                            |
| <b>EU Index Number</b>           | • 015-011-00-6                         |
| <b>REACH Registration Number</b> | • 01-2119485924-24-0037                |

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

|                                   |                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Relevant identified use(s)</b> | • Polymerization of propylene; alkylating catalyst. Control of bacteria growth in selected processed foods. Flocculation agent for clarification of sugar juices after liming process. Various other uses in food products. Chemical – Strengthening or fortifying weak phosphoric acid solutions. Polymerization of propylene; alkylating catalyst |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 1.3 Details of the supplier of the safety data sheet

|                               |                                                                                                                             |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Manufacturer</b>           | • Innophos<br>259 Prospect Plains Rd. Bldg A<br>Cranbury, NJ 08512-3706<br>United States                                    |
| <b>Telephone (Technical)</b>  | • 609-495-2495                                                                                                              |
| <b>Responsible Party - EU</b> | • LSR Associates Ltd<br>Woolley Road<br>Alconbury, Cambridgeshire PE28 4HS<br>United Kingdom<br><br>info@lsr-associates.com |
| <b>Telephone (General)</b>    | • +44 (0) 1954 212132                                                                                                       |

|                                                                                                                     |           |
|---------------------------------------------------------------------------------------------------------------------|-----------|
| Distributed By:<br><b>PVS NOLWOOD CHEMICALS, INC.</b><br>10900 Harper Avenue<br>Detroit, MI 48213<br>(313) 925-0300 |           |
| PVS ITEM #                                                                                                          | PVS SDS # |
| Multi                                                                                                               | 0486      |

CONTROLLED DOCUMENT  
IF STAMPED IN RED

### 1.4 Emergency telephone number

|                     |                                                                                |
|---------------------|--------------------------------------------------------------------------------|
| <b>Manufacturer</b> | • 800-424-9300 - Chemtrec - within USA and Canada                              |
| <b>Manufacturer</b> | • +1 703-527-3887 - Chemtrec - outside USA and Canada (collect calls accepted) |
| <b>Manufacturer</b> | • 615-386-7816 - Innophos Emergency Communication Team (ECT)                   |

## Section 2: Hazards Identification

### EU/EEC

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]  
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

## PHOS ACID 75% TECHNICAL

**2.1 Classification of the substance or mixture**

CLP

- Corrosive to Metals 1 - H290
- Skin Corrosion 1B - H314

DSD/DPD

- Corrosive (C)
- R34

**2.2 Label Elements**

CLP

**DANGER**

- Hazard statements** • H290 - May be corrosive to metals  
 H314 - Causes severe skin burns and eye damage.

**Precautionary statements**

- Prevention** • P234 - Keep only in original container.  
 P260 - Do not breathe mist/vapours/spray.  
 P264 - Wash thoroughly after handling.  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.
- Response** • P390 - Absorb spillage to prevent material damage.  
 P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
 P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  
 P363 - Wash contaminated clothing before reuse.  
 P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
 P310 - Immediately call a POISON CENTER or doctor/physician.  
 P321 - Specific treatment (see supplemental first aid instructions on this label).  
 P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- Storage/Disposal** • P406 - Store in corrosive resistant/ container with a resistant inner liner.  
 P405 - Store locked up.  
 P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

DSD/DPD



- Risk phrases** • R34 - Causes burns.
- Safety phrases** • S36 - Wear suitable protective clothing.  
 S37 - Wear suitable gloves.  
 S39 - Wear eye/face protection.  
 S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**2.3 Other Hazards**

CLP

- According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

DSD/DPD

- This product is considered dangerous according to the European Directive 67/548/EEC.

**United States (US)**

According to OSHA 29 CFR 1910.1200 HCS

**2.1 Classification of the substance or mixture**

## PHOS ACID 75% TECHNICAL

## OSHA HCS 2012

- Corrosive to Metals 1 - H290
- Skin Corrosion 1B - H314

## 2.2 Label elements

## OSHA HCS 2012

**DANGER**

- Hazard statements** • May be corrosive to metals - H290  
 Causes severe skin burns and eye damage. - H314

**Precautionary statements**

- Prevention** • Keep only in original container. - P234  
 Do not breathe mist/vapours/spray. - P260  
 Wash thoroughly after handling. - P264  
 Wear protective gloves/protective clothing/eye protection/face protection. - P280
- Response** • Absorb spillage to prevent material damage. - P390  
 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. - P303+P361+P353  
 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. - P301+P330+P331  
 Wash contaminated clothing before reuse. - P363  
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. - P304+P340  
 Immediately call a POISON CENTER or doctor/physician. - P310  
 Specific treatment, see supplemental first aid information. - P321  
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. - P305+P351+P338
- Storage/Disposal** • Store in corrosive resistant/ container with a resistant inner liner. - P406  
 Store locked up. - P405  
 Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. - P501

## 2.3 Other hazards

## OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

**Canada**

## According to WHMIS

## 2.1 Classification of the substance or mixture

## WHMIS

- Corrosive - E

## 2.2 Label elements

## WHMIS



- Corrosive - E

## 2.3 Other hazards

## WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).



## Section 3 - Composition/Information on Ingredients

### 3.1 Substances

| Composition     |                                      |            |                                                                                     |                                                                                                                                                              |          |
|-----------------|--------------------------------------|------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Chemical Name   | Identifiers                          | %          | LD50/LC50                                                                           | Classifications According to Regulation/Directive                                                                                                            | Comments |
| Phosphoric acid | CAS:7664-38-2<br>EC Number:231-633-2 | 36% TO 95% | Ingestion/Oral-Rat LD50 • 1.25 g/kg<br>Inhalation-Rat LC50 • 25.5 mg/m <sup>3</sup> | EU DSD/DPD: Annex I: C; R34<br>EU CLP: Annex VI: Skin Corr. 1B, H314, Corr. to Metals 1, H290<br>OSHA HCS 2012: Skin Corr. 1B, H314, Corr. to Metals 1, H290 | NDA      |

### 3.2 Mixtures

- Material does not meet the criteria of a mixture in accordance with Regulation (EC) No 1272/2008.

## Section 4 - First Aid Measures

### 4.1 Description of first aid measures

#### Inhalation

- Administer oxygen if breathing is difficult. Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give artificial respiration if victim is not breathing. Move victim to fresh air.

#### Skin

- For minor skin contact, avoid spreading material on unaffected skin. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Wash skin with soap and water. Remove and isolate contaminated clothing and shoes. Wash contaminated clothing before reuse.

#### Eye

- In case of contact with substance, immediately flush eyes with running water for at least 15 minutes. Seek immediate medical attention, preferably with an ophthalmologist. If the physician is not immediately available, eye irrigation should be continued for an additional 15 minutes. If it is necessary to transport the patient to a physician and the eye needs to be bandaged, use a dry sterile cloth pad and cover both eyes.

#### Ingestion

- If swallowed give 2-3 glasses of water if victim is conscious and alert. Do not give anything by mouth to an unconscious person. Do NOT induce vomiting. Obtain medical attention immediately if ingested. Do not use mouth-to-mouth method if victim ingested the substance. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. Persons attending the victim should avoid direct contact with heavily contaminated clothing and vomitus. Wear impervious gloves while decontaminating skin and hair.

### 4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

### 4.3 Indication of any immediate medical attention and special treatment needed

#### Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

### 4.4 Other information

- Call 911 or emergency medical service. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

## Section 5 - Firefighting Measures

### 5.1 Extinguishing media

**Suitable Extinguishing Media** • Not combustible. Use extinguishing media suitable for surrounding fire.

**Unsuitable Extinguishing Media** • None known.

### 5.2 Special hazards arising from the substance or mixture

**Unusual Fire and Explosion Hazards** • Not combustible.  
Under fire conditions, toxic, corrosive fumes are emitted.

**Hazardous Combustion Products** • Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.  
Oxides of phosphorus.

### 5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
- Keep unauthorized personnel away.
- Evacuate residents who are downwind of fire.
- Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.
- Persons who may have been exposed to contaminated smoke should be immediately examined by a physician and checked for symptoms of poisoning. The symptoms should not be mistaken for heat exhaustion or smoke inhalation.

## Section 6 - Accidental Release Measures

### 6.1 Personal precautions, protective equipment and emergency procedures

**Personal Precautions** • Ventilate enclosed areas. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

**Emergency Procedures** • Keep unauthorized personnel away. Dike spill using absorbent or impervious materials such as earth, sand or clay. Dike or retain dilution water or water from firefighting for later disposal.

### 6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas. Runoff from fire control or dilution water may cause pollution.

### 6.3 Methods and material for containment and cleaning up

**Containment/Clean-up Measures** • Exercise caution during neutralization as considerable heat may be generated. Neutralize spill area with soda ash, sodium bicarbonate or lime. Flush neutralized spill with copious amounts of water.

### 6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

## Section 7 - Handling and Storage

### 7.1 Precautions for safe handling

**Handling** • Do not get on skin or in eyes. Avoid breathing vapors and mists. Do not ingest. Handle and open container with care. Use only with adequate ventilation. Use caution when combining with water; DO NOT add water to corrosive liquid, ALWAYS add corrosive liquid to water while stirring to prevent release of heat, steam and fumes. This product reacts violently with bases liberating heat and causing spattering.

## 7.2 Conditions for safe storage, including any incompatibilities

### Storage

- Store in a dry, well-ventilated place. Store locked up. Keep away from incompatible materials. Ventilate enclosed areas.

### 7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

## Section 8 - Exposure Controls/Personal Protection

### 8.1 Control parameters

| Exposure Limits/Guidelines          |          |                                                                                                     |                                                     |                                                                                                                                                                                             |                                                |                                      |
|-------------------------------------|----------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------|
|                                     | Result   | ACGIH                                                                                               | Argentina                                           | Australia                                                                                                                                                                                   | Austria                                        | Belgium                              |
| Phosphoric acid<br>(7664-38-2)      | STELs    | 3 mg/m <sup>3</sup> STEL                                                                            | 3 mg/m <sup>3</sup> STEL [CMP-CPT]                  | 3 mg/m <sup>3</sup> STEL                                                                                                                                                                    | 2 mg/m <sup>3</sup> STEL [KZW]<br>(4 X 15 min) | 2 mg/m <sup>3</sup> STEL             |
|                                     | TWAs     | 1 mg/m <sup>3</sup> TWA                                                                             | 1 mg/m <sup>3</sup> TWA [CMP]                       | 1 mg/m <sup>3</sup> TWA                                                                                                                                                                     | Not established                                | 1 mg/m <sup>3</sup> TWA              |
|                                     | MAKs     | Not established                                                                                     | Not established                                     | Not established                                                                                                                                                                             | 1 mg/m <sup>3</sup> TWA [TMW]                  | Not established                      |
| Exposure Limits/Guidelines (Con't.) |          |                                                                                                     |                                                     |                                                                                                                                                                                             |                                                |                                      |
|                                     | Result   | China                                                                                               | Czech Republic                                      | Denmark                                                                                                                                                                                     | Egypt                                          | Finland                              |
| Phosphoric acid<br>(7664-38-2)      | STELs    | 3 mg/m <sup>3</sup> STEL                                                                            | Not established                                     | Not established                                                                                                                                                                             | 3 mg/m <sup>3</sup> STEL                       | 2 mg/m <sup>3</sup> STEL             |
|                                     | TWAs     | 1 mg/m <sup>3</sup> TWA                                                                             | 1 mg/m <sup>3</sup> TWA                             | 1 mg/m <sup>3</sup> TWA                                                                                                                                                                     | Not established                                | 1 mg/m <sup>3</sup> TWA              |
|                                     | Ceilings | Not established                                                                                     | 2 mg/m <sup>3</sup> Ceiling                         | Not established                                                                                                                                                                             | Not established                                | Not established                      |
| Exposure Limits/Guidelines (Con't.) |          |                                                                                                     |                                                     |                                                                                                                                                                                             |                                                |                                      |
|                                     | Result   | France                                                                                              | Germany DFG                                         | Germany TRGS                                                                                                                                                                                | Greece                                         | Hong Kong                            |
| Phosphoric acid<br>(7664-38-2)      | STELs    | 0.5 ppm STEL [VLCT]<br>(indicative limit); 2<br>mg/m <sup>3</sup> STEL [VLCT]<br>(indicative limit) | Not established                                     | Not established                                                                                                                                                                             | 3 mg/m <sup>3</sup> STEL                       | 3 mg/m <sup>3</sup> STEL             |
|                                     | TWAs     | 0.2 ppm TWA [VME]<br>(indicative limit); 1<br>mg/m <sup>3</sup> TWA [VME]<br>(indicative limit)     | Not established                                     | 2 mg/m <sup>3</sup> TWA AGW<br>(The risk of damage<br>to the embryo or<br>fetus can be<br>excluded when AGW<br>and BGW values are<br>observed, Inhalable<br>fraction, exposure<br>factor 2) | 1 mg/m <sup>3</sup> TWA                        | Not established                      |
|                                     | Ceilings | Not established                                                                                     | 4 mg/m <sup>3</sup> Peak<br>(inhalable fraction)    | Not established                                                                                                                                                                             | Not established                                | Not established                      |
|                                     | MAKs     | Not established                                                                                     | 2 mg/m <sup>3</sup> TWA MAK<br>(inhalable fraction) | Not established                                                                                                                                                                             | Not established                                | Not established                      |
| Exposure Limits/Guidelines (Con't.) |          |                                                                                                     |                                                     |                                                                                                                                                                                             |                                                |                                      |
|                                     | Result   | Hungary                                                                                             | India                                               | Indonesia                                                                                                                                                                                   | Ireland                                        | Israel                               |
| Phosphoric acid<br>(7664-38-2)      | TWAs     | 1 mg/m <sup>3</sup> TWA [AK]                                                                        | 1 mg/m <sup>3</sup> TWA                             | 1 mg/m <sup>3</sup> TWA                                                                                                                                                                     | 1 mg/m <sup>3</sup> TWA                        | 1 mg/m <sup>3</sup> TWA              |
|                                     | STELs    | 2 mg/m <sup>3</sup> STEL [CK]                                                                       | 3 mg/m <sup>3</sup> STEL                            | Not established                                                                                                                                                                             | 2 mg/m <sup>3</sup> STEL                       | 3 mg/m <sup>3</sup> STEL             |
| Exposure Limits/Guidelines (Con't.) |          |                                                                                                     |                                                     |                                                                                                                                                                                             |                                                |                                      |
|                                     | Result   | Italy                                                                                               | Japan                                               | Korea                                                                                                                                                                                       | Malaysia                                       | Mexico                               |
| Phosphoric acid                     | TWAs     | 1 mg/m <sup>3</sup> TWA                                                                             | 1 mg/m <sup>3</sup> OEL                             | 1 mg/m <sup>3</sup> TWA (Serial<br>No. 459)                                                                                                                                                 | 1 mg/m <sup>3</sup> TWA                        | 1 mg/m <sup>3</sup> TWA LMPE-<br>PPT |

## PHOS ACID 75% TECHNICAL

|                                            |               |                                                                                                                                                                           |                      |                               |                  |                        |
|--------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------|------------------|------------------------|
| (7664-38-2)                                | STELs         | 2 mg/m3 STEL                                                                                                                                                              | Not established      | 3 mg/m3 STEL (Serial No. 465) | Not established  | 3 mg/m3 STEL (LMPE-CT] |
| <b>Exposure Limits/Guidelines (Con't.)</b> |               |                                                                                                                                                                           |                      |                               |                  |                        |
|                                            | <b>Result</b> | <b>Netherlands</b>                                                                                                                                                        | <b>New Zealand</b>   | <b>NIOSH</b>                  | <b>Norway</b>    | <b>OSHA</b>            |
| Phosphoric acid (7664-38-2)                | TWAs          | 1 mg/m3 TWA                                                                                                                                                               | 1 mg/m3 TWA          | 1 mg/m3 TWA                   | 1 mg/m3 TWA      | 1 mg/m3 TWA            |
|                                            | STELs         | 2 mg/m3 STEL                                                                                                                                                              | Not established      | 3 mg/m3 STEL                  | Not established  | Not established        |
| <b>Exposure Limits/Guidelines (Con't.)</b> |               |                                                                                                                                                                           |                      |                               |                  |                        |
|                                            | <b>Result</b> | <b>Philippines</b>                                                                                                                                                        | <b>Poland</b>        | <b>Portugal</b>               | <b>Singapore</b> | <b>South Africa</b>    |
| Phosphoric acid (7664-38-2)                | STELs         | Not established                                                                                                                                                           | 2 mg/m3 STEL [NDSCh] | 3 mg/m3 STEL [VLE-CD]         | 3 mg/m3 STEL     | 3 mg/m3 STEL           |
|                                            | TWAs          | 1 mg/m3 TWA                                                                                                                                                               | 1 mg/m3 TWA [NDS]    | 1 mg/m3 TWA [VLE-MP]          | 1 mg/m3 PEL      | 1 mg/m3 TWA            |
| <b>Exposure Limits/Guidelines (Con't.)</b> |               |                                                                                                                                                                           |                      |                               |                  |                        |
|                                            | <b>Result</b> | <b>Spain</b>                                                                                                                                                              | <b>Sweden</b>        | <b>Switzerland</b>            | <b>Taiwan</b>    | <b>United Kingdom</b>  |
| Phosphoric acid (7664-38-2)                | MAKs          | Not established                                                                                                                                                           | Not established      | 1 mg/m3 TWA [MAK]             | Not established  | Not established        |
|                                            | STELs         | 2 mg/m3 STEL [VLA-EC]                                                                                                                                                     | 3 mg/m3 STV          | 2 mg/m3 STEL [KZW] (4 X 15)   | Not established  | 2 mg/m3 STEL           |
|                                            | TWAs          | 1 mg/m3 TWA [VLA-ED] (indicative limit value; it is prohibited the partial or complete commercialization or use of this substance as a phytosanitary or biocide compound) | 1 mg/m3 LLV          | Not established               | 1 mg/m3 TWA      | 1 mg/m3 TWA            |
| <b>Exposure Limits/Guidelines (Con't.)</b> |               |                                                                                                                                                                           |                      |                               |                  |                        |
|                                            | <b>Result</b> | <b>Venezuela</b>                                                                                                                                                          |                      |                               |                  |                        |
| Phosphoric acid (7664-38-2)                | STELs         | 3 mg/m3 STEL [LEB]                                                                                                                                                        |                      |                               |                  |                        |
|                                            | TWAs          | 1 mg/m3 TWA [CAP]                                                                                                                                                         |                      |                               |                  |                        |

## 8.2 Exposure controls

### Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

### Personal Protective Equipment

#### Respiratory

- Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

#### Eye/Face

- Wear face shield and eye protection. An emergency eye wash must be readily accessible to the work area. Ensure safety shower is available near all areas of bulk storage, delivery and use.

#### Hands

- Wear protective gloves selected with regard to both durability as well as permeation resistance.

#### Skin/Body

- Wear protective clothing

### General Industrial Hygiene Considerations

- Do not get in eyes or on skin or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Handle in accordance with good industrial hygiene and safety practice.

### Environmental Exposure Controls

- Follow best practice for site management and disposal of waste.

#### Key to abbreviations

## PHOS ACID 75% TECHNICAL

ACGIH = American Conference of Governmental Industrial Hygiene

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

MSHA = Mine Safety and Health Administration

NIOSH = National Institute of Occupational Safety and Health

OEL = Occupational Exposure Limit(s)

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Level determined by the Occupational Safety and Health Administration (OSHA)

STEL = Short Term Exposure Limits are based on 15-minute exposures

STEV = Short Term Exposure Value

NAB = Threshold Values (Indonesia)

TWAEV = Time-Weighted Average Exposure Value

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

## Section 9 - Physical and Chemical Properties

### 9.1 Information on Physical and Chemical Properties

| Material Description                |                                   |                        |                                                       |
|-------------------------------------|-----------------------------------|------------------------|-------------------------------------------------------|
| Physical Form                       | Liquid                            | Appearance/Description | Colorless viscous liquid with no odor.                |
| Color                               | Colorless                         | Odor                   | Odorless                                              |
| Odor Threshold                      | Data lacking                      |                        |                                                       |
| General Properties                  |                                   |                        |                                                       |
| Boiling Point                       | 100 to 200 C(212 to 392 F)        | Melting Point          | Refer to Product data sheet for specific information. |
| Decomposition Temperature           | Data lacking                      | pH                     | < 1                                                   |
| Specific Gravity/Relative Density   | 1.22 to 1.81 Water=1 @ 25 C(77 F) | Water Solubility       | Miscible                                              |
| Viscosity                           | Data lacking                      | Explosive Properties   | Not relevant.                                         |
| Oxidizing Properties:               | Not relevant.                     |                        |                                                       |
| Volatility                          |                                   |                        |                                                       |
| Vapor Pressure                      | < 2 mmHg (torr) @ 20 C(68 F)      | Vapor Density          | Data lacking                                          |
| Evaporation Rate                    | Data lacking                      |                        |                                                       |
| Flammability                        |                                   |                        |                                                       |
| Flash Point                         | Not relevant                      | UEL                    | Not relevant                                          |
| LEL                                 | Not relevant                      | Autoignition           | Not relevant                                          |
| Flammability (solid, gas)           | Not relevant.                     |                        |                                                       |
| Environmental                       |                                   |                        |                                                       |
| Octanol/Water Partition coefficient | Data lacking                      |                        |                                                       |

### 9.2 Other Information

- No additional physical and chemical parameters noted.

## Section 10: Stability and Reactivity

### 10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

### 10.2 Chemical stability

- Stable

### 10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

### 10.4 Conditions to avoid

- Incompatible materials.

## 10.5 Incompatible materials

- Strong oxidizing agents, strong reducing agents, bases and certain metals

## 10.6 Hazardous decomposition products

- Oxides of phosphorus.

## Section 11 - Toxicological Information

### 11.1 Information on toxicological effects

**Other Material Information**      • This material is an acid. The primary effects and toxicity of this material are due to its corrosive nature.

|                         | CAS       |                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHOS ACID 75% TECHNICAL | 7664-38-2 | <b>Acute Toxicity:</b> Ingestion/Oral-Rat LD50 • 1530 mg/kg • Comments: Data for phosphoric acid; Skin-Rabbit LD50 • 2740 mg/kg;<br><b>Irritation:</b> Eye-Rabbit • 119 mg/kg • Severe irritation, irreversible, burns (corrosive) • Comments: Data for phosphoric acid; Skin-Rabbit • 595 mg/kg 24 Hour(s) • Severe Irritation, Irreversible, burns (corrosive) |

| GHS Properties                | Classification                                                                                                                                                                                                                                                                          |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acute toxicity                | EU/CLP • Acute Toxicity - Dermal - Data lacking; Acute Toxicity - Inhalation - Data lacking; Acute Toxicity - Oral - Data lacking<br>OSHA HCS 2012 • Acute Toxicity - Dermal - Inconclusive data; Acute Toxicity - Inhalation - Inconclusive data; Acute Toxicity - Oral - Data lacking |
| Aspiration Hazard             | EU/CLP • Data lacking<br>OSHA HCS 2012 • Not relevant                                                                                                                                                                                                                                   |
| Carcinogenicity               | EU/CLP • Classification criteria not met<br>OSHA HCS 2012 • Classification criteria not met                                                                                                                                                                                             |
| Germ Cell Mutagenicity        | EU/CLP • Classification criteria not met<br>OSHA HCS 2012 • Classification criteria not met                                                                                                                                                                                             |
| Skin corrosion/Irritation     | EU/CLP • Skin Corrosion 1B<br>OSHA HCS 2012 • Skin Corrosion 1B                                                                                                                                                                                                                         |
| Skin sensitization            | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                                                                                                                                                                                                                   |
| STOT-RE                       | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                                                                                                                                                                                                                   |
| STOT-SE                       | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                                                                                                                                                                                                                   |
| Toxicity for Reproduction     | EU/CLP • Classification criteria not met<br>OSHA HCS 2012 • Classification criteria not met                                                                                                                                                                                             |
| Respiratory sensitization     | EU/CLP • Data lacking<br>OSHA HCS 2012 • Data lacking                                                                                                                                                                                                                                   |
| Serious eye damage/Irritation | EU/CLP • Data lacking<br>OSHA HCS 2012 • Classification criteria not met                                                                                                                                                                                                                |

**Route(s) of entry/exposure**      • Inhalation, Skin, Eye, Ingestion

### Potential Health Effects

#### Inhalation

**Acute (Immediate)**      • Under normal conditions of use, no health effects are expected.

## PHOS ACID 75% TECHNICAL

- Chronic (Delayed)**
- Repeated or prolonged exposure to corrosive fumes may cause bronchial irritation with chronic cough.
- Skin**
- Acute (Immediate)**
- Causes severe skin burns and eye damage.
- Chronic (Delayed)**
- Repeated or prolonged exposure to corrosive materials will cause dermatitis.
- Eye**
- Acute (Immediate)**
- Corrosive. Can cause permanent damage to the cornea, blindness.
- Chronic (Delayed)**
- Repeated or prolonged exposure to corrosive materials or fumes may cause conjunctivitis.
- Ingestion**
- Acute (Immediate)**
- Causes corrosion, burns to mouth and esophagus, abdominal pain, chest pain, nausea, vomiting, diarrhea, seizures. Aspiration of the swallowed or vomited product can cause severe pulmonary complications.
- Chronic (Delayed)**
- Repeated or prolonged exposure to corrosive materials or fumes may cause gastrointestinal disturbances.
- Carcinogenic Effects**
- This product does not contain any ingredient designated by IARC, NTP, ACGIH or OSHA as probable or suspected human carcinogens.

## Key to abbreviations

LD = Lethal Dose

TC = Toxic Concentration

## Section 12 - Ecological Information

### 12.1 Toxicity

| PHOS ACID 75% TECHNICAL |                    |            | 7664-38-2 |                     |          |
|-------------------------|--------------------|------------|-----------|---------------------|----------|
| Dosage                  | Species            | Duration   | Results   | Exposure Conditions | Comments |
| 138 mg/L                | Fish: Mosquitofish | 96 Hour(s) | LC50      | NDA                 | NDA      |

### 12.2 Persistence and degradability

- No data found for product.

### 12.3 Bioaccumulative potential

- No data found for product.

### 12.4 Mobility in Soil

- No data found for product.

### 12.5 Results of PBT and vPvB assessment

- PBT and vPvB assessment has not been carried out.

### 12.6 Other adverse effects

#### Ecological Fate

- No data found for product.

### 12.7 Other Information

- No specific biodegradation test data located. While acidity of this material is readily reduced in natural waters, the resulting phosphate may persist indefinitely or incorporate into biological systems.

## Section 13 - Disposal Considerations

### 13.1 Waste treatment methods

## PHOS ACID 75% TECHNICAL

**Product waste**

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. This material is considered an EPA hazardous waste. EPA "RCRA" Hazardous Waste Code: "C" Corrosive.

**Packaging waste**

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

**Section 14 - Transport Information**

|           | 14.1 UN number | 14.2 UN proper shipping name | 14.3 Transport hazard class(es) | 14.4 Packing group | 14.5 Environmental hazards |
|-----------|----------------|------------------------------|---------------------------------|--------------------|----------------------------|
| DOT       | UN1805         | Phosphoric acid solution     | NDA                             | III                | NDA                        |
| TDG       | UN1805         | PHOSPHORIC ACID, LIQUID      | NDA                             | III                | NDA                        |
| IMO/IMDG  | UN1805         | PHOSPHORIC ACID SOLUTION     | NDA                             | III                | NDA                        |
| IATA/ICAO | UN1805         | Phosphoric Acid, Solution    | NDA                             | III                | NDA                        |

**14.6 Special precautions for user**

- None known.

**14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

- Not relevant.

**14.8 Other information**

- The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.
- DOT • Phosphoric acid has a reportable quantity of 5000 lbs (2270 kg) as listed in Appendix A to 49 CFR 172.101.

**Section 15 - Regulatory Information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****SARA Hazard Classifications**

- Acute

| Inventory       |           |            |             |       |           |           |
|-----------------|-----------|------------|-------------|-------|-----------|-----------|
| Component       | CAS       | Canada DSL | Canada NDSL | China | EU EINECS | EU ELNICS |
| Phosphoric acid | 7664-38-2 | Yes        | No          | Yes   | Yes       | No        |

| Inventory (Con't.) |           |             |                   |      |
|--------------------|-----------|-------------|-------------------|------|
| Component          | CAS       | New Zealand | Philippines PICCS | TSCA |
| Phosphoric acid    | 7664-38-2 | Yes         | Yes               | Yes  |

**Canada****Labor****Canada - List of Prohibited and Restricted Cosmetic Ingredients (The Cosmetic Ingredient Hotlist)**

- Phosphoric acid 7664-38-2 Not Listed

**Canada - WHMIS - Classifications of Substances**

- Phosphoric acid 7664-38-2 E (including <=85%)

**Canada - WHMIS - Ingredient Disclosure List**

- Phosphoric acid 7664-38-2 1 %



## PHOS ACID 75% TECHNICAL

**Environment****Canada - 2004 NPRI (National Pollutant Release Inventory)**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Canada - 2005 NPRI (National Pollutant Release Inventory)**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Canada - CEPA - Greenhouse Gases Subject to Mandatory Reporting**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Canada - CEPA - Priority Substances List**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Canada - DWQ (Drinking Water Quality) - IMACs**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Other****Canada - Accelerated Reduction/Elimination of Toxics (ARET)**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Canada New Brunswick****Environment****Canada - New Brunswick - Ozone Depleting Substances - Schedule A**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Canada - New Brunswick - Ozone Depleting Substances - Schedule B**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Germany****Environment****Germany - TA Luft - Types and Classes**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Germany - Water Classification (VwVwS) - Annex 1**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes**

|                   |           |                                                         |
|-------------------|-----------|---------------------------------------------------------|
| • Phosphoric acid | 7664-38-2 | ID Number 392, hazard class 1<br>- low hazard to waters |
|-------------------|-----------|---------------------------------------------------------|

**Germany - Water Classification (VwVwS) - Annex 3**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Philippines****Other****Philippines - Priority Chemical List**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

**Singapore****Other****Singapore - Corrosive and Explosive Substances - Corrosive Substances**

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## PHOS ACID 75% TECHNICAL

## Thailand

## Environment

## Thailand - Quantities of Chemicals

|                   |           |                                 |
|-------------------|-----------|---------------------------------|
| • Phosphoric acid | 7664-38-2 | 1 mg/m3 Quantities of Chemicals |
|-------------------|-----------|---------------------------------|

## Thailand - Water Quality Criteria - Maximum Concentration Allowance

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## United States

## Labor

## U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - OSHA - Specifically Regulated Chemicals

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## Environment

## U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - CAA (Clean Air Act) - Class II Ozone Depletors

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

|                   |           |                                    |
|-------------------|-----------|------------------------------------|
| • Phosphoric acid | 7664-38-2 | 5000 lb final RQ; 2270 kg final RQ |
|-------------------|-----------|------------------------------------|

## U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - CERCLA/SARA - Section 313 - Emission Reporting

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## Other

## U.S. - FDA - Direct Food Additives

|                   |           |            |
|-------------------|-----------|------------|
| • Phosphoric acid | 7664-38-2 | Not Listed |
|-------------------|-----------|------------|

## U.S. - FDA - Food Additives Generally Recognized as Safe (GRAS)

|                   |           |                 |
|-------------------|-----------|-----------------|
| • Phosphoric acid | 7664-38-2 | 21 CFR 182.1073 |
|-------------------|-----------|-----------------|

## U.S. - FDA - Total Food Additives List Sourced from EAFUS

133.123, 133.124, 133.129,  
133.169, 133.173, 133.178,

## PHOS ACID 75% TECHNICAL

- Phosphoric acid

7664-38-2

133.179, 163.110, 163.111,  
163.112, 175.300, 177.2260,  
178.1010, 178.3520, 182.1073,  
73.275, 73.85**U.S. - USDA - National Organic Program - Substances Allowed as Ingredients in or on Organic Processed Products**

- Phosphoric acid

7664-38-2

(cleaning of food-contact  
surfaces and equipment only)**United States - California****Environment****U.S. - California - Proposition 65 - Carcinogens List**

- Phosphoric acid

7664-38-2

Not Listed

**U.S. - California - Proposition 65 - Developmental Toxicity**

- Phosphoric acid

7664-38-2

Not Listed

**U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)**

- Phosphoric acid

7664-38-2

Not Listed

**U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)**

- Phosphoric acid

7664-38-2

Not Listed

**U.S. - California - Proposition 65 - Reproductive Toxicity - Female**

- Phosphoric acid

7664-38-2

Not Listed

**U.S. - California - Proposition 65 - Reproductive Toxicity - Male**

- Phosphoric acid

7664-38-2

Not Listed

**15.2 Chemical Safety Assessment**

- No Chemical Safety Assessment has been carried out.

**Section 16 - Other Information****Last Revision Date**

- 14/October/2014

**Preparation Date**

- 14/October/2014

**Disclaimer/Statement of Liability**

- The information herein is given in good faith but no warranty, expressed or implied, is made.

**Key to abbreviations**

NDA = No Data Available

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Wednesday, August 05, 2015 8:30 AM  
**To:** Busch, Stephen (DEQ)  
**Cc:** Benzie, Richard (DEQ); Prysby, Mike (DEQ); Devereaux, Tracy Jo (DEQ)  
**Subject:** FW: schedule meeting

Steve -

I'd like to respond today, if possible. My preference would be for you to participate in any call. What is your availability?

**From:** Lutgarde Raskin [<mailto:raskin@umich.edu>]  
**Sent:** Wednesday, August 05, 2015 12:10 AM  
**To:** Shekter Smith, Liane (DEQ)  
**Cc:** Krista Wigginton  
**Subject:** Fwd: schedule meeting

Dear Liane,

I had sent the email below to you last week, and just resent it because I may have used the wrong email address in my original email. Would you have time to talk to us this week?

Best regards,  
 Lut

----- Forwarded message -----

**From:** Lutgarde Raskin <[raskin@umich.edu](mailto:raskin@umich.edu)>  
**Date:** Tue, Aug 4, 2015 at 11:52 PM  
**Subject:** schedule meeting  
**To:** [shekterl@michigan.gov](mailto:shekterl@michigan.gov)  
**Cc:** Krista Wigginton <[kwigg@umich.edu](mailto:kwigg@umich.edu)>

Dear Liane,

My colleague Krista Wigginton and I would like to set up a skype meeting or conference call with you. We have been approached to perform water quality analyses for Flint residents. We have learned about the situation in Flint through various sources and have a good idea of the complexity of the problem. Rather than working with residents only, we would also like to involve the utility and appropriate MDEQ personnel. Brian Steglitz recommended we talk to you before approaching others. Would you be able to discuss this with us on short notice? We are available tomorrow and Monday.

Thank you in advance for your help,  
 Lut

*Lutgarde Raskin, Ph.D., WEF Fellow, AAM Fellow  
 Altarum/ERIM Russell O'Neal Professor of Engineering and Graduate Chair  
 Dept. of Civil and Environmental Engineering  
 University of Michigan  
 1351 Beal Ave., 107 EWRE Bldg.*

Ann Arbor, MI 48109-2125

734-647-6920; [raskin@umich.edu](mailto:raskin@umich.edu); <http://envbiotech.engin.umich.edu/>

Check out the new Royal Society of Chemistry Journal: Environmental Science: Water Research & Technology (ES:WRT), which showcases high quality research and innovative technologies relevant to engineered systems and the built environment that promote sustainable water resources. Publications in ES:WRT are available for free through a registered account.



**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Wednesday, September 30, 2015 3:23 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: School Supply Line Information - Invitation to view  
**Attachments:** School water supply lines.xls

Steve,

Below is the information that Robert compiled concerning number of schools served by Flint and their service line material. I couldn't the Goggle map application to open...it will be interesting to compare the listing of schools from LHD's lead sampling.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

**From:** Robert Bincsik [<mailto:rbincsik@cityofflint.com>]  
**Sent:** Wednesday, September 30, 2015 3:17 PM  
**To:** Prysby, Mike (DEQ)  
**Subject:** Fwd: School Supply Line Information - Invitation to view

Mike please find attached of list of what I believe to be all the active school buildings in Flint. Also there is a google map of their location. Hope this is what you're looking for if you need anything else please let me know and I will try to help in any way I can.

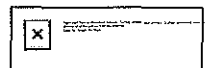
aroberts@cityofflint.com has invited you to **view** the following map:



School Supply Line Information

**Open**

Google My Maps is an easy-to-use map app for collaboratively authoring, maintaining or making decisions around maps.



--

*Thank you,*

*Robert Bincsik*

*Water Service Center Supervisor  
City of Flint  
3310 E. Court Street  
Flint, MI 48506  
Ph: 810.766.7202 ext. 3413  
Fx: 810.743.5758*

| Row # | School Name                         | Street Address                        | Supply line size, inches |
|-------|-------------------------------------|---------------------------------------|--------------------------|
| 1     | Brownell K2 Stem Academy            | 6302 Oxley Dr., Flint, MI 48504       | 4                        |
| 2     | Doyle Ryder Elementary School       | 1040 N. Saginaw St., Flint, MI 48503  | 4                        |
| 3     | Durant-Tuuri-Mott Elementary School | 1518 University Ave., Flint, MI 48504 | 6                        |
| 4     | Eisenhower Elementary School        | 1235 Pershing St., Flint, MI 48503    | 4                        |
| 5     | Freeman Elementary School           | 4001 Ogema Ave., Flint, MI 48507      | 4                        |
| 6     | Holmes 3-6 Stem Academy             | 6602 Oxley Dr., Flint, MI 48504       | 6                        |
| 7     | Neithercut Elementary School        | 2010 Crestbrook Ln., Flint, MI 48507  | 4                        |
| 8     | Pierce Elementary School            | 1101 W. Vernon Dr., Flint, MI 48503   | (n/a)                    |
| 9     | Potter Elementary School            | 2500 N. Averill Ave., Flint, MI 48506 | 4                        |
| 10    | Northridge Academy                  | 530 W. Pierson Rd., Flint, MI 48505   | 4                        |
| 11    | International Academy of Flint      | 2820 S. Saginaw St., 48503            | 4                        |
| 12    | Richfield Public School Academy     | 3807 N. Center Rd., Flint, MI 48506   | 2                        |
| 13    | Powers Catholic High School         | 1505 W. Court St., Flint, MI 48503    | 8                        |
| 14    | Michigan School for the Deaf        | 1235 W. Court St., Flint, MI 48503    | 8                        |
| 15    | Mott Middle College High School     | 1401 E. Court St., Flint, MI 48503    | 8                        |



| Supply line material | Map page     | Street name     | house no. | Notes                                          |
|----------------------|--------------|-----------------|-----------|------------------------------------------------|
| cast iron            | D-2 mains    | Oxley Dr.       | 6302      |                                                |
| cast iron            | H-10 mains   | N. Saginaw St.  | 1040      |                                                |
| cast iron            | F-12 mains   | University Ave. | 1518      |                                                |
| cast iron            | F-14 mains   | Pershing St.    | 1235      |                                                |
| cast iron            | K-17 mains   | Ogema Ave.      | 4001      |                                                |
| cast iron            | D-2 mains    | Oxley Dr.       | 6602      |                                                |
| cast iron            | F-17 mains   | Crestbrook Ln.  | 2010      |                                                |
| (n/a)                | K-12 mains   | W. Vernon Dr.   | 1101      | only the 8 inch fire line<br>noted on dwg.     |
| cast iron            | M-8 mains    | N. Averill Ave. | 2500      |                                                |
| cast iron            | F-4 mains    | W. Pierson Rd.  | 530       | noted on dwg as St. Agnes<br>Church and School |
| cast iron            | I-15 mains   | S. Saginaw St.  | 2820      | noted on dwg as Lincoln<br>School              |
| copper               | N-6 curb box | N. Center Rd.   | 3807      |                                                |
| cast iron            | F-14 mains   | W. Court St.    | 1505      | Also see G-14 mains                            |
| cast iron            | F-14 mains   | W. Court St.    | 1235      | Also see G-14 mains                            |
| ductile iron         | J-11 mains   | E. Court St.    | 1401      | noted on dwg as "Student<br>Center"            |

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Tuesday, March 17, 2015 11:08 AM  
**To:** Wurfel, Brad (DEQ)  
**Cc:** Benzie, Richard (DEQ); Busch, Stephen (DEQ); Lachance, Amy (DEQ); Ostrander, Debbie (DEQ); Rosenthal, Adam (DEQ)  
**Subject:** FW: SDWA Violations

Brad –

As requested, the following information has been gleaned from our database regarding violations:

In calendar years 2013 and 2014, we've identified 1100 violations (200 are standards violations, i.e., MCLs; and 910 other violations).

This represents 326 community water supplies that had violations over these two years.

Flint has 5 violations in those 2 years (TTHM MCLs at 2 sites and 2 bacti MCLs (1 with E. coli that counts as an additional violation)).

Please let us know if you know additional information.

Liane

**Rennaker, Joanne (DEQ)**

---

**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Friday, February 20, 2015 1:40 PM  
**To:** Benzie, Richard (DEQ)  
**Cc:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Steve Carmody interview. Can you do Friday?

You should discuss with Steve and Mike.

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Friday, February 20, 2015 11:05 AM  
**To:** Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: Steve Carmody interview. Can you do Friday?

Hey, all. Michigan Radio's Steve Carmody is looking to do a piece with us next Tuesday on Flint's water. The angle is looking at the Flint River as a source. I've been parsing this out with Mike Alexander in WRD – looking at the waters, what they flow through upstream of the intake, what that means for the quality of the source.

Carmody also wants to look at it comparatively. As in, what other municipalities around the state are using rivers? I'm aware of Manistique, Blissfield, Alma (?), and ... ??? What is the quality of those sources, comparatively?

I know, tough story to do. I need some counsel from Drinking water people, collaborating with WRD counterparts, to get us prepped. And I think we'll need one of you three to be part of this interview on Tuesday. Let me know when the drawing of straws is over. Thanks! ☺

b

---

**From:** Alexander, Michael (DEQ)  
**Sent:** Friday, February 20, 2015 10:56 AM  
**To:** Wurfel, Brad (DEQ)  
**Subject:** RE: Steve Carmody interview. Can you do Friday?

We are all set for Tuesday afternoon at 3 PM. Let me know if that time doesn't work and where should we have it? I can get a conference room if you want me to.

Michael Alexander, WRD  
 Department of Environmental Quality  
**Phone 517-449-7971**  
[alexanderm2@michigan.gov](mailto:alexanderm2@michigan.gov)

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Friday, February 20, 2015 10:10 AM  
**To:** Alexander, Michael (DEQ)  
**Subject:** RE: Steve Carmody interview. Can you do Friday?

Hmmmm. Not what he imparted when I talked to him, but I get what you're saying. Drinking water intake, or drinking water source? Blissfield, Manistique and (I think) Alma use surface water as sources. Is that what he's looking for? Comparative water quality discussion?

---

**From:** Alexander, Michael (DEQ)  
**Sent:** Friday, February 20, 2015 9:54 AM  
**To:** Wurfel, Brad (DEQ)  
**Subject:** RE: Steve Carmody interview. Can you do Friday?

Just got off the phone with Steve Carmody. He wants to know how the Flint River water quality is as it relates to a drinking water intake, which is not necessarily the type of water quality assessment we conduct in WRD. We can certainly be part of the discussion if the topic of typical types of inputs to the Flint compared to other Michigan watersheds, but we wouldn't be able to make any statements as to how it compares to other drinking water intakes around MI. I would think someone from Office of Drinking Water and Radiological Protection would be better to answer that question. Thoughts?

Michael Alexander, WRD  
 Department of Environmental Quality  
 Phone 517-449-7971  
[alexanderm2@michigan.gov](mailto:alexanderm2@michigan.gov)

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Friday, February 20, 2015 8:55 AM  
**To:** Alexander, Michael (DEQ)  
**Subject:** RE: Steve Carmody interview. Can you do Friday?

You in today? Call my cell or tell me where you're sitting and I'll come see you.  
 b

---

**From:** Alexander, Michael (DEQ)  
**Sent:** Friday, February 20, 2015 8:17 AM  
**To:** Wurfel, Brad (DEQ)  
**Subject:** RE: Steve Carmody interview. Can you do Friday?

Hi Brad,

Sometime later this afternoon would be best. It will give us a little more time to prep. I was home with a sick child and the rest of WRD was in training yesterday. Can you please verify for me that he wants to talk about water quality for Flint River, not drinking water treatment? Are there any particular items other than Flint's treatment system you want us to stay away from?

Michael Alexander, WRD  
 Department of Environmental Quality  
 Phone 517-449-7971  
[alexanderm2@michigan.gov](mailto:alexanderm2@michigan.gov)

**From:** Wurfel, Brad (DEQ)  
**Sent:** Thursday, February 19, 2015 2:55 PM  
**To:** Alexander, Michael (DEQ)  
**Subject:** Steve Carmody interview. Can you do Friday?

Hey, Mike. Steve wants to do the interview in person. He can be here Friday, optimally any time between 10 a.m. and 4 p.m.

Can this work for you (and whomever you want to join the conversation)?

b

Brad Wurfel  
Communications Director  
Michigan Department of Environmental Quality  
517-284-6713  
517-230-8006 cell

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, October 08, 2015 7:28 AM  
**To:** Sygo, Jim (DEQ)  
**Cc:** Busch, Stephen (DEQ)  
**Subject:** FW: TAC Team Summary 10\_7\_15  
**Attachments:** TAC Meeting Summary 10\_7\_15.pdf

Jim,

Below is a summary of the TAC meeting prepared by Howard Kroft for the Director's information.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

**From:** Howard Croft [<mailto:hcroft@cityofflint.com>]  
**Sent:** Thursday, October 08, 2015 5:41 AM  
**To:** Amy Hovey; Andy Leavitt; Brent Wright; Darren Lytle; Dayne Walling; donna. cole; edwardsm; Gerald (Jed) Natzke; Howard Croft; James Henry; Jamie Gaskin; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; [larry.koehler@mcc.edu](mailto:larry.koehler@mcc.edu); Laura Sullivan; Lawrence Reynolds; Lawrence Reynolds; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Bincsik; [rosejo@msu.edu](mailto:rosejo@msu.edu); Russell Hudson; Samir Matta; [schock.michael@epa.gov](mailto:schock.michael@epa.gov); Sean Kammer; Busch, Stephen (DEQ); Warren Green; John Monsees; Kevin Keane  
**Subject:** Re: TAC Team Summary 10\_7\_15

All,

Please find attached, the summary of Wednesday's meeting.

Thank you,

On Wed, Oct 7, 2015 at 9:42 PM, Howard Croft <[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)> wrote:  
 All,

I want to personally thank everyone for participating in today's meeting, it is encouraging to see the commitment that exists to address the concerns around health. I apologize for the poor phone reception we experienced today, I will have that corrected at the next meeting.

I am sending a summary of today's meeting and have attempted to chronicle the highlights or major points that we discussed. I have also included an electronic version of Marc Edwards presentation and will forward any other documents that are requested.

Please look for continued communication from me as we work to move forward as fast as possible. I expect to have November and December dates selected very soon and will maintain the stream of information to this team as it becomes available.

Please do not hesitate to email or call me with any questions or requests.

Thank you,

--

**Howard Croft**

Public Works Director

City of Flint

1101 S. Saginaw Street

Flint, MI 48502

PH# 810.766.7135 Ext.2043

[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)

--

**Howard Croft**

Public Works Director

City of Flint

1101 S. Saginaw Street

Flint, MI 48502

PH# 810.766.7135 Ext.2043

[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)

**City of Flint  
Technical Advisory Committee Meeting  
Summary**

**Location:** Flint City Hall

**Date:** Wednesday October 7, 2015

**Time:** 2:00 pm

**Introductions**

Everyone gave individual introductions in round table fashion

**Comments**

The City Administrator Natasha Henderson commented on the urgency of the situation stressing that time is of the essence and we hoped to achieve a consensus opinion from the Advisory Group.

**System Overview/Update**

DPW Director Howard Croft discussed the original formation of the group, the fact that the group was engaged throughout the TTHM concerns, and the value of having experts gathered to together along with the medical community for a substantive discussion. An additional goal is to have a more unified public voice all working to be solution driven with good communication.

**VA Tech Findings**

Marc Edwards of VA Tech (through a conference call in) narrated a presentation that he prepared for the meeting. (The presentation is provided on the email).

Laura Sullivan of Kettering translated a part of the presentation due to poor phone connection.

**Q-** John O'Brien of the Drain Commissioners office asked if the VA Tech study had compared Flint River water and water from DWSD running through comparable distribution systems. John also commented on the timetable and progress status of the KWA stating that 38 miles of pipe are in the ground and continues to be installed at ~5 miles a month projecting completion by mid-2016, weather permitting.

**A –** Marc Edwards's response was yes, the comparison was done on equal terms.

**EPA Comments**

Darren Lytle of the EPA spoke and said that he had toured the Flint Plant earlier in the day with Utilities Administrator Mike Glasgow and was comfortable with what he saw. His comments also touched on a technical nature which drew brief conversation from Warren Green of LAN.

Mr. Lytle agreed to stay involved through the implementation of KWA, requested more data to review and asked that Michael Schock of the EPA who could not attend today be considered one of the top lead experts in the nation and that we keep him updated at every step.

**Mayor's Comments**

DPW Director introduced Mayor Walling made comments thanking everyone for their participation and asked if anyone had a valid reason to NOT go back to DWSD.

There was no direct response but John O'Brien questioned what the expectations were going to be and that lead levels would not be reduced to zero. Several people responded that this was understood.

Dr. Lawrence Reynolds gave comments that focused on the short and long term impact of lead levels especially in children.



Pete Levine and Kirk Smith also commented that they saw no “pro” to staying on the Flint River as opposed to switching back to DWSD.

### **DWSD Option**

City Administrator Natasha Henderson asked the committee to not look at cost but at the health and science of what is the best interim source of water for residents. She said she would like to go back to DWSD both as a resident and as City Administrator.

Warren Green of LAN asked that as an engineer, he would like to see the actual data that was derived from the VA Tech studies and brought up the need for corrosion control or the addition of phosphate regardless of the water source.

### **Corrosion Control**

Discussion around corrosion control continued with Darren Lytle of the EPA, Marc Edwards, and Warren Green discussing dosing with each source and questioning the timetable of rebuilding a film layer.

### **Service Line Replacement**

Skipping Filters for a moment, DPW Director Howard Croft displayed a draft copy of a Lead Service Line Replacement plan for Flint that mirrors the Washington D.C. model and looks for a grant funding source to assist with the homeowner side of the line. Mr. Croft also commented on the partnership formed with U of M Flint to get all of the lead service lines identified and put into GIS data points.

### **Update on Filters**

Jamie Gaskin, United Way CEO gave a full update on how the United Way has been the hub for coordination efforts regarding distributing filters to residents. Jamie reiterated that they have made a request of the state to supply them with leadership support that has gone unfulfilled.

Jamie also addressed the early morning question of whether or not the 25,000 “Brita” filters that were being distributed would filter lead, this brand was purchased by the state and is being distributed by DHHS. Eden Wells the Michigan Chief Medical Official addressed that the research had been done and the filters were indeed NSF certified and filter lead.

Andy Leavitt commented on the scope of work that Jamie and the United Way undertook outside of their normal purview and their swift action.

### **Committee Recommendation**

Howard Croft announced that as committee chair, given the meetings discussions, he was prepared to make a recommendation from the TAC tem to the City Administrator and Mayor that the city return to DWSD as a water source. (Pending any objections from the group – no objections were made)

Director also commented that providing water from the Treatment Plant was still under review and pro’s and con’s were being evaluated prior to a firm decision being brought forth.

Drawing the meeting to a close, the DPW Director committed that weekly updates would be provided to the Technical Advisory Committee and that November and December meetings would be set up to maintain better communication.

Meeting closed at approximately 4:15 pm.

### **Howard Croft**

Public Works Director  
City of Flint

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, October 08, 2015 7:24 AM  
**To:** Busch, Stephen (DEQ); Cook, Pat (DEQ); Benzie, Richard (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** FW: TAC Team Summary 10\_7\_15  
**Attachments:** Flint Corrosion Presentation final.pdf

Attached is VA Tech's ppt discussion of the corrosion concerns in Flint and the comparison to Detroit water regarding corrosion. It would be more helpful to see the methodology of the study, actual data, and how samples were collected.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

**From:** Howard Croft [<mailto:hcroft@cityofflint.com>]  
**Sent:** Wednesday, October 07, 2015 9:43 PM  
**To:** Amy Hovey; Andy Leavitt; Brent Wright; Darren Lytle; Dayne Walling; donna. cole; edwardsm; Gerald (Jed) Natzke; Howard Croft; James Henry; Jamie Gaskin; Jason Lorenz; jmikewright; JoAnne Herman; John O'Brien; Kirk Smith; [larry.koehler@mcc.edu](mailto:larry.koehler@mcc.edu); Laura Sullivan; Lawrence Reynolds; Lawrence Reynolds; Michael Glasgow; Michael Wright; Mike Lane; Prysby, Mike (DEQ); Natasha Henderson; Norb Birchmeier; Pete Levine; Robert Bincsik; [rosejo@msu.edu](mailto:rosejo@msu.edu); Russell Hudson; Samir Matta; [schock.michael@epa.gov](mailto:schock.michael@epa.gov); Sean Kammer; Busch, Stephen (DEQ); Warren Green; John Monsees  
**Subject:** TAC Team Summary 10\_7\_15

All,

I want to personally thank everyone for participating in today's meeting, it is encouraging to see the commitment that exists to address the concerns around health. I apologize for the poor phone reception we experienced today, I will have that corrected at the next meeting.

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Please look for continued communication from me as we work to move forward as fast as possible. I expect to have November and December dates selected very soon and will maintain the stream of information to this team as it becomes available.

Please do not hesitate to email or call me with any questions or requests.

Thank you,

--

**Howard Croft**

Public Works Director

City of Flint

1101 S. Saginaw Street

Flint, MI 48502

PH# 810.766.7135 Ext.2043

[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)

**Synergistic Impacts of Corrosive Water and  
Interrupted Corrosion Control on Chemical/  
Microbiological Water Quality:  
The Flint, MI Water Crisis**



**NSF RAPID:**

National Science Foundation

*“used for proposals having a severe urgency...., including quick-response research on natural or anthropogenic disasters and similar unanticipated events.”*

Flint  
Water  
is very  
corrosive.

Detroit  
water is  
not.

**Table 1. Water quality parameters for drinking water supplied in Flint, MI before and after the April 2014 switch**

| Parameter                               | Before <sup>1</sup> | After <sup>2</sup> |
|-----------------------------------------|---------------------|--------------------|
| pH                                      | 7.38                | 7.61               |
| Hardness (mg/L as CaCO <sub>3</sub> )   | 101                 | 183                |
| Alkalinity (mg/L as CaCO <sub>3</sub> ) | 78                  | 77                 |
| Chloride (mg/L)                         | 11.4                | 92                 |
| Sulfate (mg/L)                          | 25.2                | 41                 |
| CSMR <sup>3</sup>                       | 0.45                | 1.6                |
| Inhibitor (mg/L as P)                   | 0.35                | NONE               |
| Larson Ratio <sup>4</sup>               | 0.5                 | 2.3                |

<sup>1</sup>Source: City of Flint Monthly Operation Report, June 2015 Available from [www.cityofflint.com](http://www.cityofflint.com)

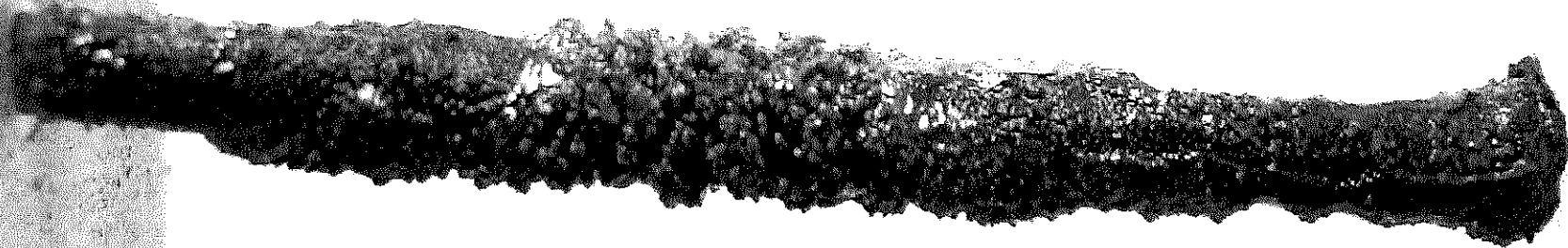
# Corrosive Water: Destroys Pipe Infrastructure



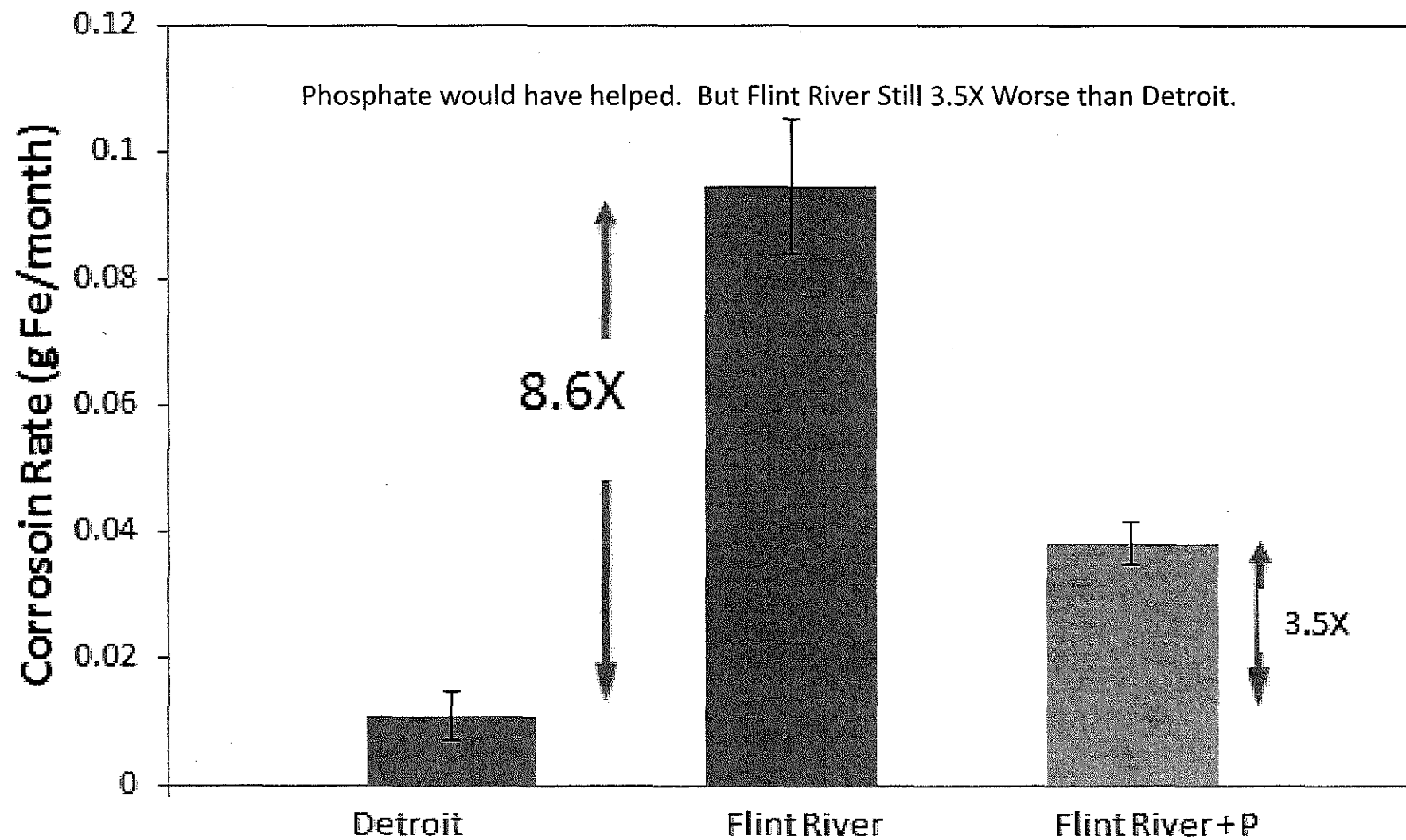
Detroit Water



Flint Water

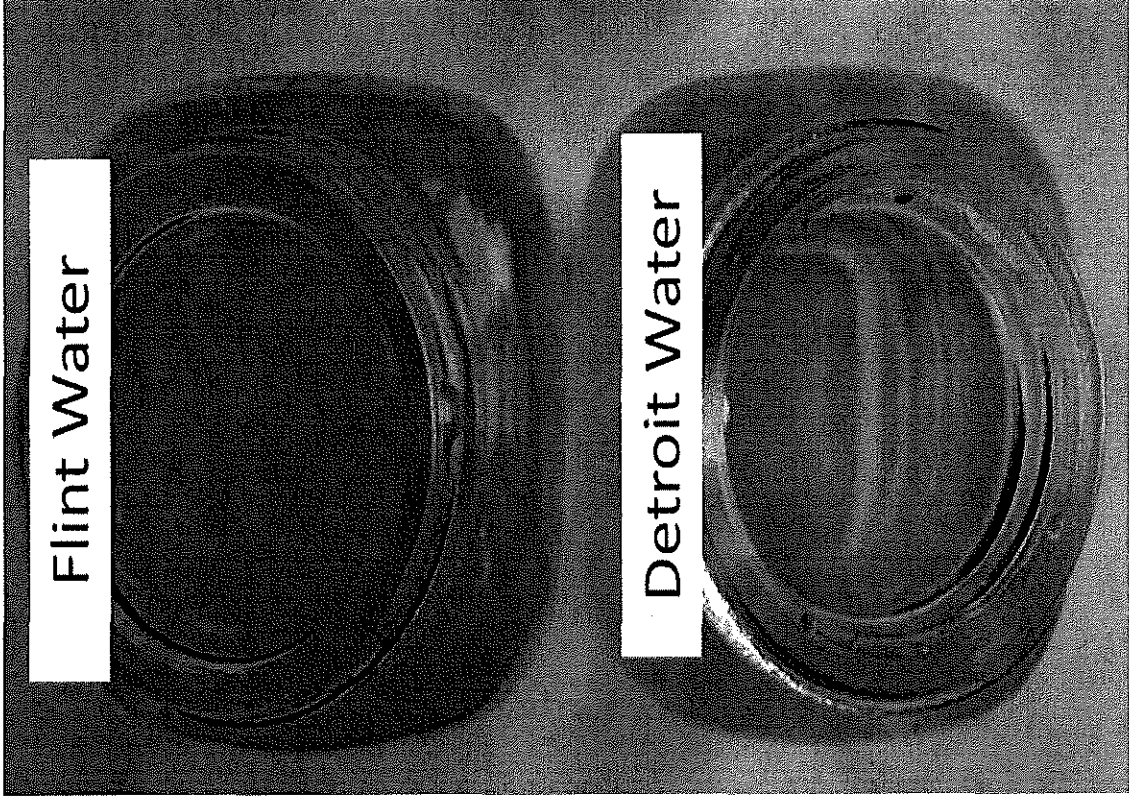
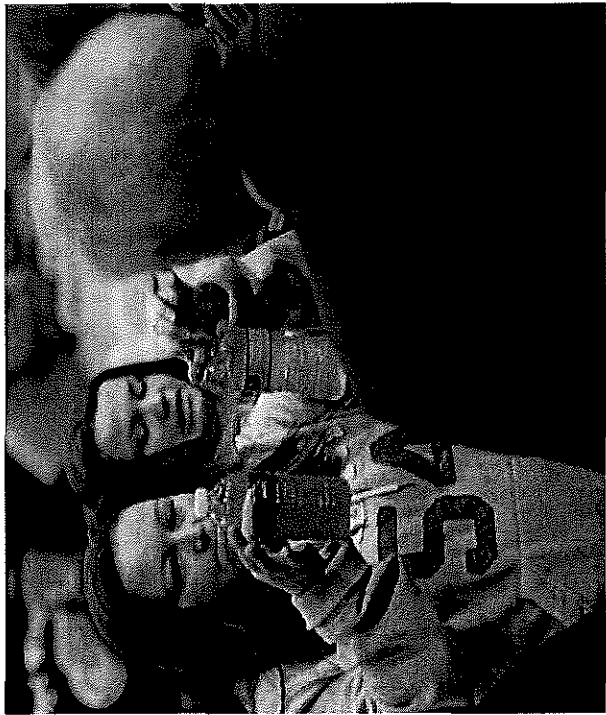


**Steel Exposed One Month to Detroit vs. Flint River Water**

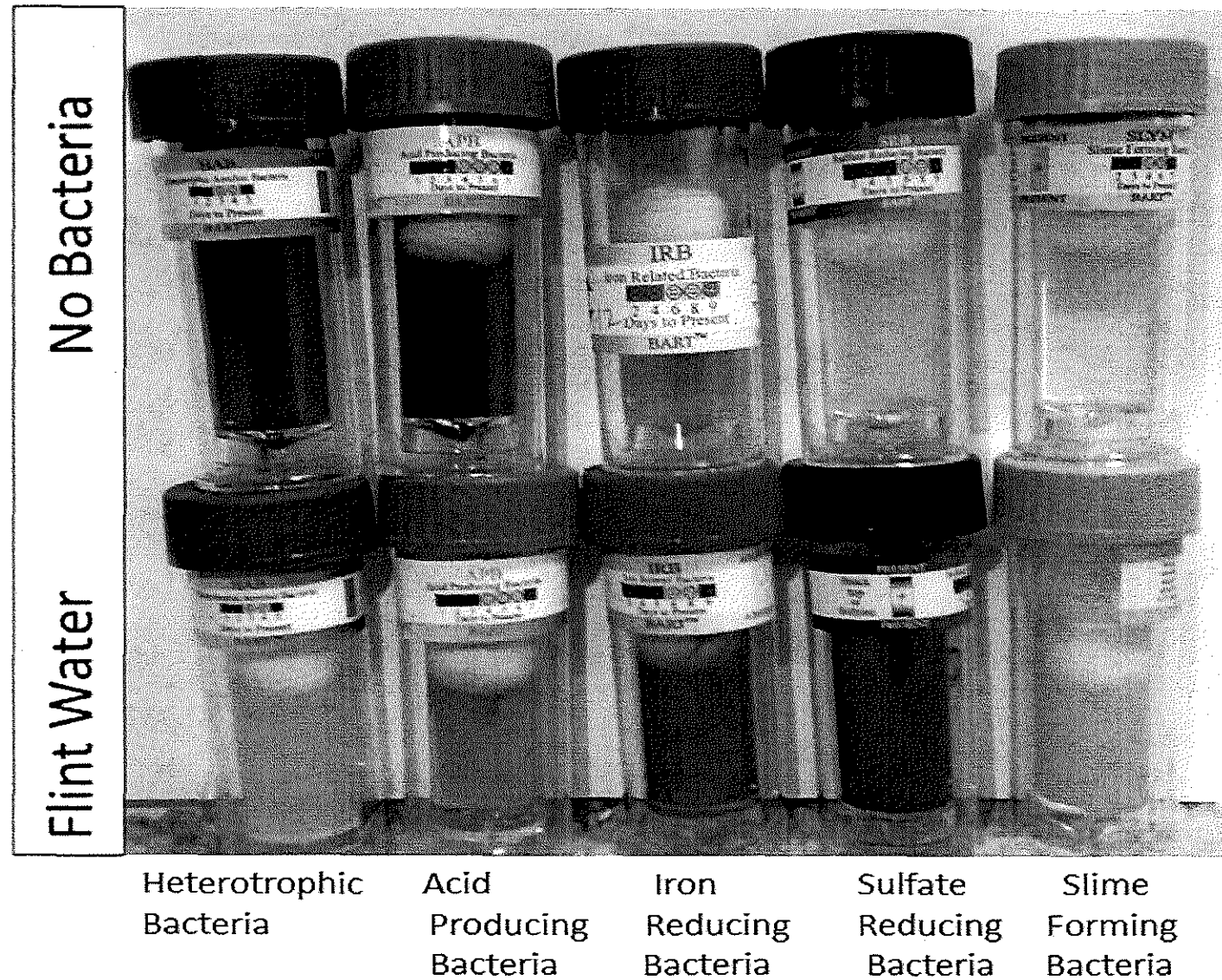




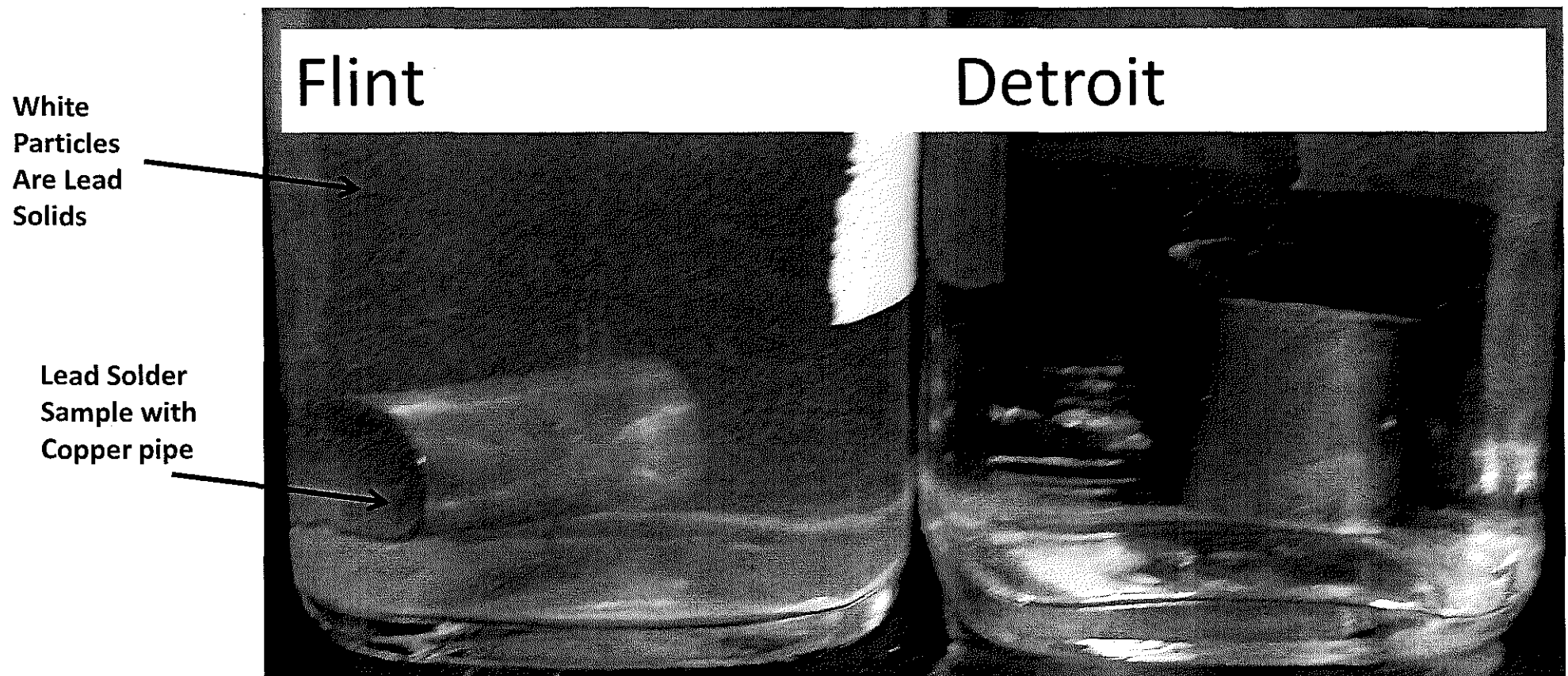
**Corrosive Water:**  
Causes Odors,  
Colors, Bad Tastes



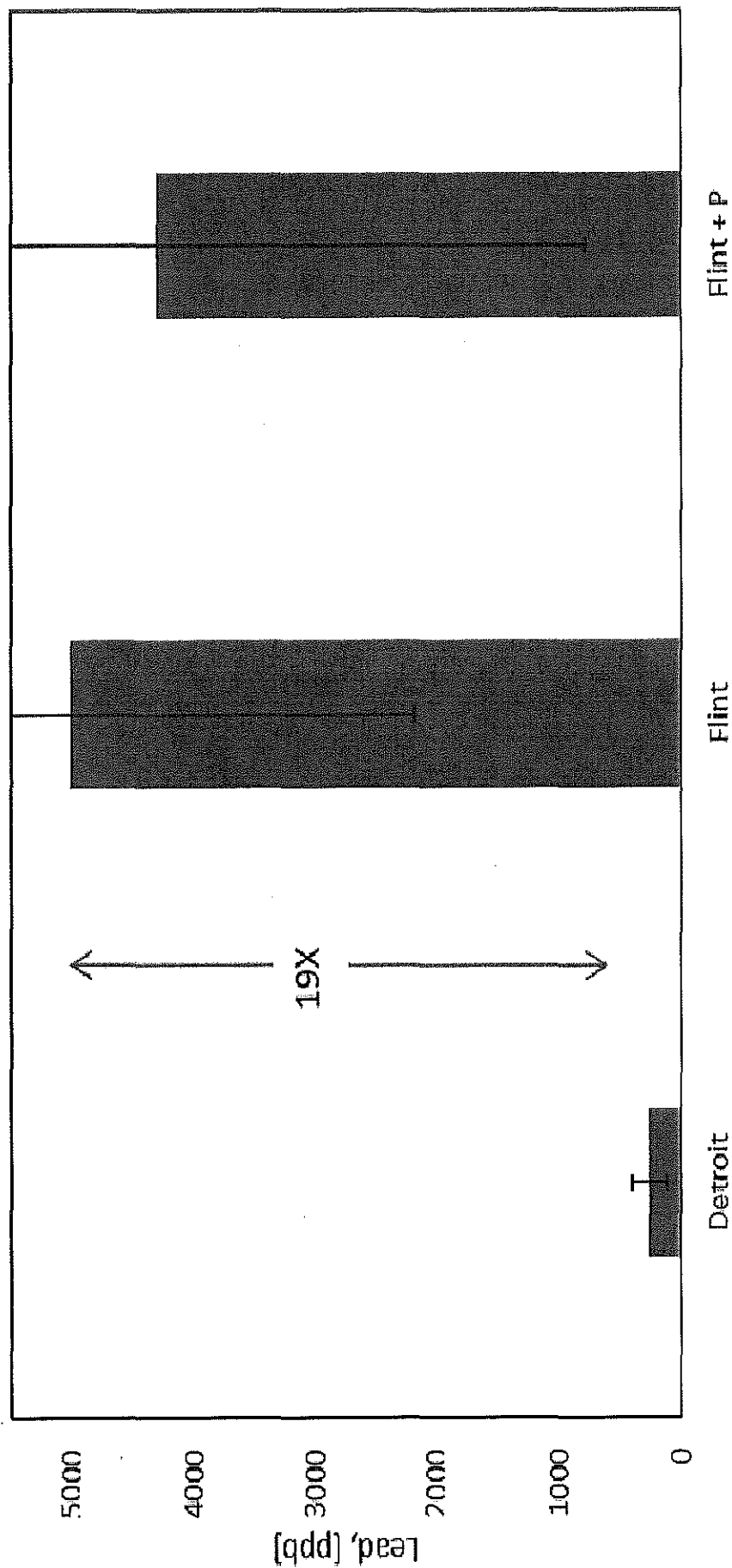
# High Levels of Corrosion Causing Bacteria



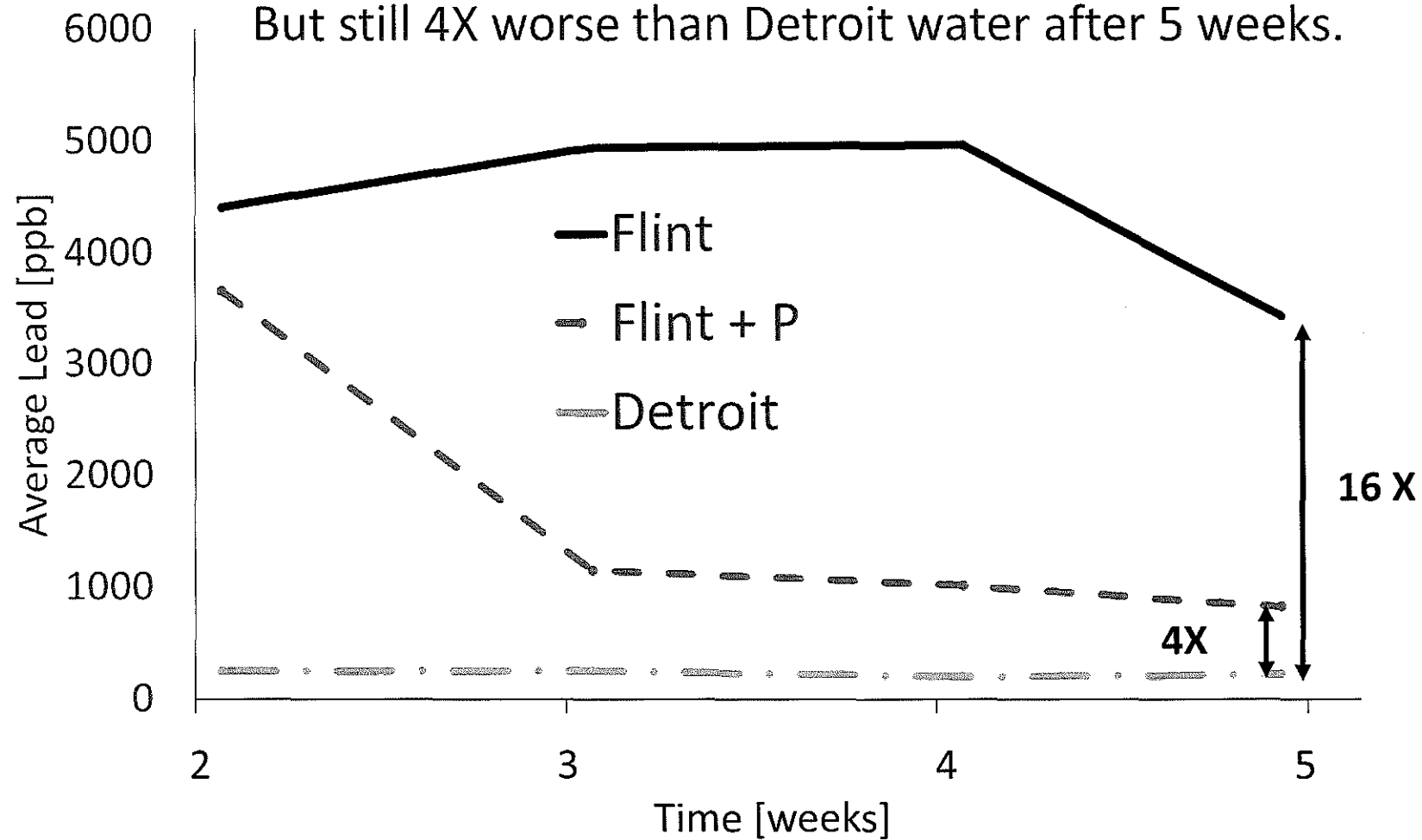
# Corrosive Water: Increases Lead. Effects VISIBLE immediately in lab tests!



# 5000 ppb = Hazardous Waste Levels of Lead



Phosphate (P) corrosion inhibitor would have helped.  
But still 4X worse than Detroit water after 5 weeks.



## INITIATED CONFIRMATION TESTING OF LEAD CORROSIVITY AT ONE LOCAL ELEMENTARY AND ONE HIGH SCHOOL

**Vickie Weiss**

City School ~ Room 00  
11920 S. Saginaw  
Grand Blanc MI – 48439

4-5<sup>th</sup> Graders  
12+5 Bottles

**Emily Cizmas**

2283 E. Scottwood Ave.  
Burton, MI 48529

Bendle High School,  
Burton  
14+5 Bottles

**Experimental Rigs has  
also been sent to:**

**Brad Wurfel**

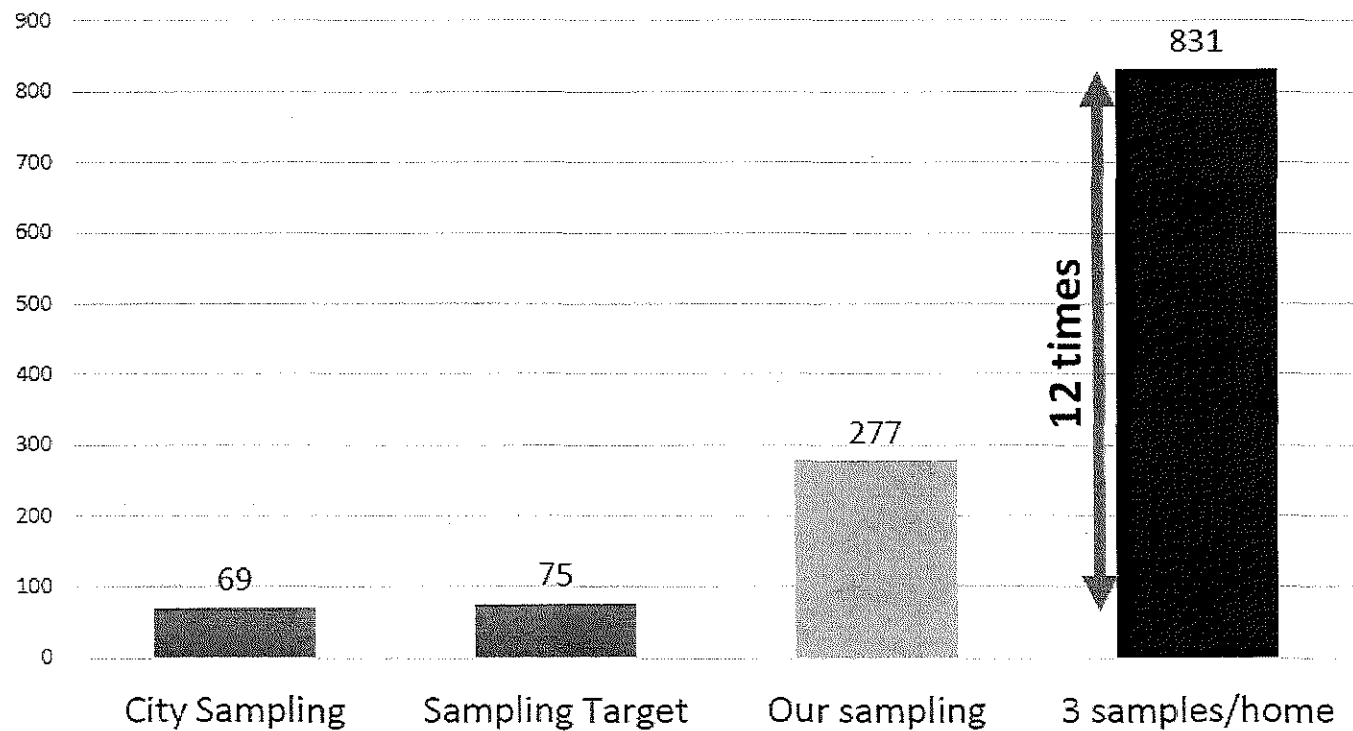
Director of  
Communication  
Michigan DEQ  
P.O. Box 30473  
Lansing, MI 48909-6700

9 Bottles

**Aug 20 - Sep 8**

# #FlintWater sampling response from #FlintCitizenScientists

No. of samples tested for Lead





# The Team in Flint and from ACLU-Michigan





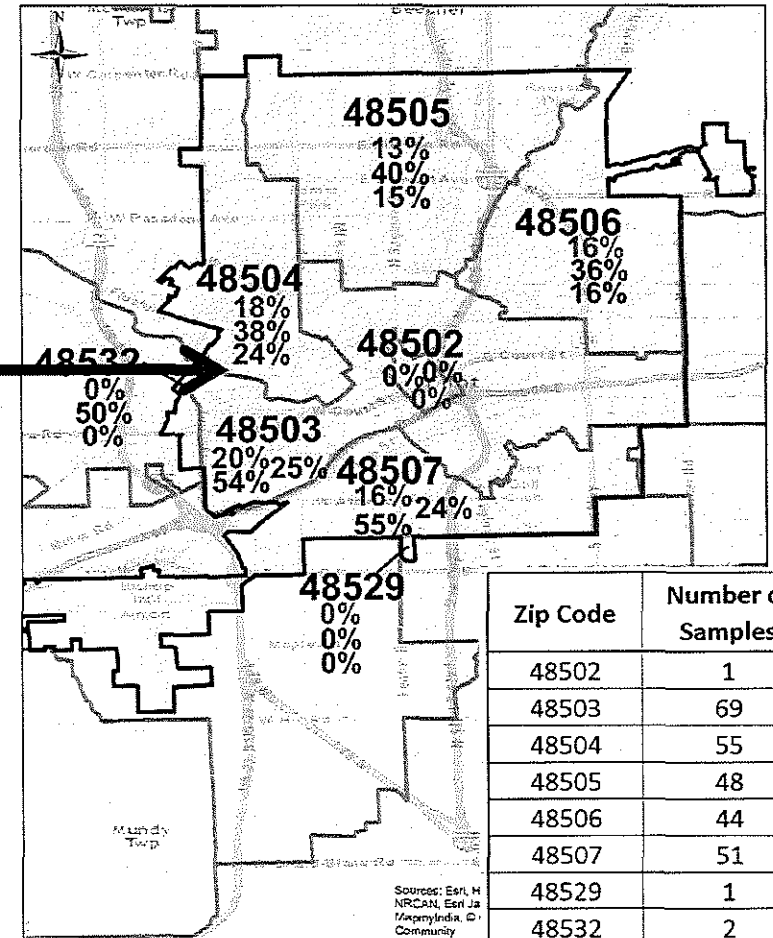
# PEDIATRIC LEAD EXPOSURE IN FLINT, MI: CONCERNS FROM THE MEDICAL COMMUNITY

Higher Risk Zip Codes  
For EBL

90%'ile from low risk homes  
> EPA Action Level

## Flint, MI

Legend:  
Blue %: Percent First Draw Samples over 15 ppb  
Black %: Percent Any Samples over 5 ppb  
Red %: Percent Any Samples over 15 ppb



## Corrosion control treatment to reduce lead in Flint water.

### 1. **Switch back to the non-corrosive Detroit water.**

Flint's lead levels would drop markedly in about one month.

**2. Add orthophosphate to Flint River water.** Orthophosphate will not reduce lead leaching from all lead plumbing sources. Based on experimental data, lead levels would likely be reduced by 5X, but still 4X higher than Detroit. Iron corrosion still much higher than Detroit.

*If orthophosphate had been added to Flint water, continuing the corrosion control used in Detroit water, the Flint Water Crisis would not have occurred.*

# About us

## Research Team

### Undergraduate Students:

Margaret **Carolan**, Kim **Hughes**,  
Rebecca **Jones**

### Graduate Students

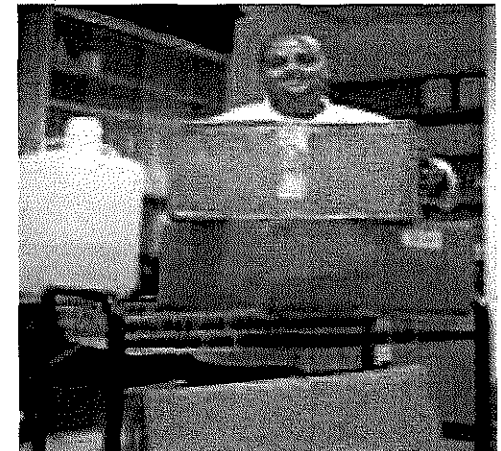
#### (in alphabetical order):

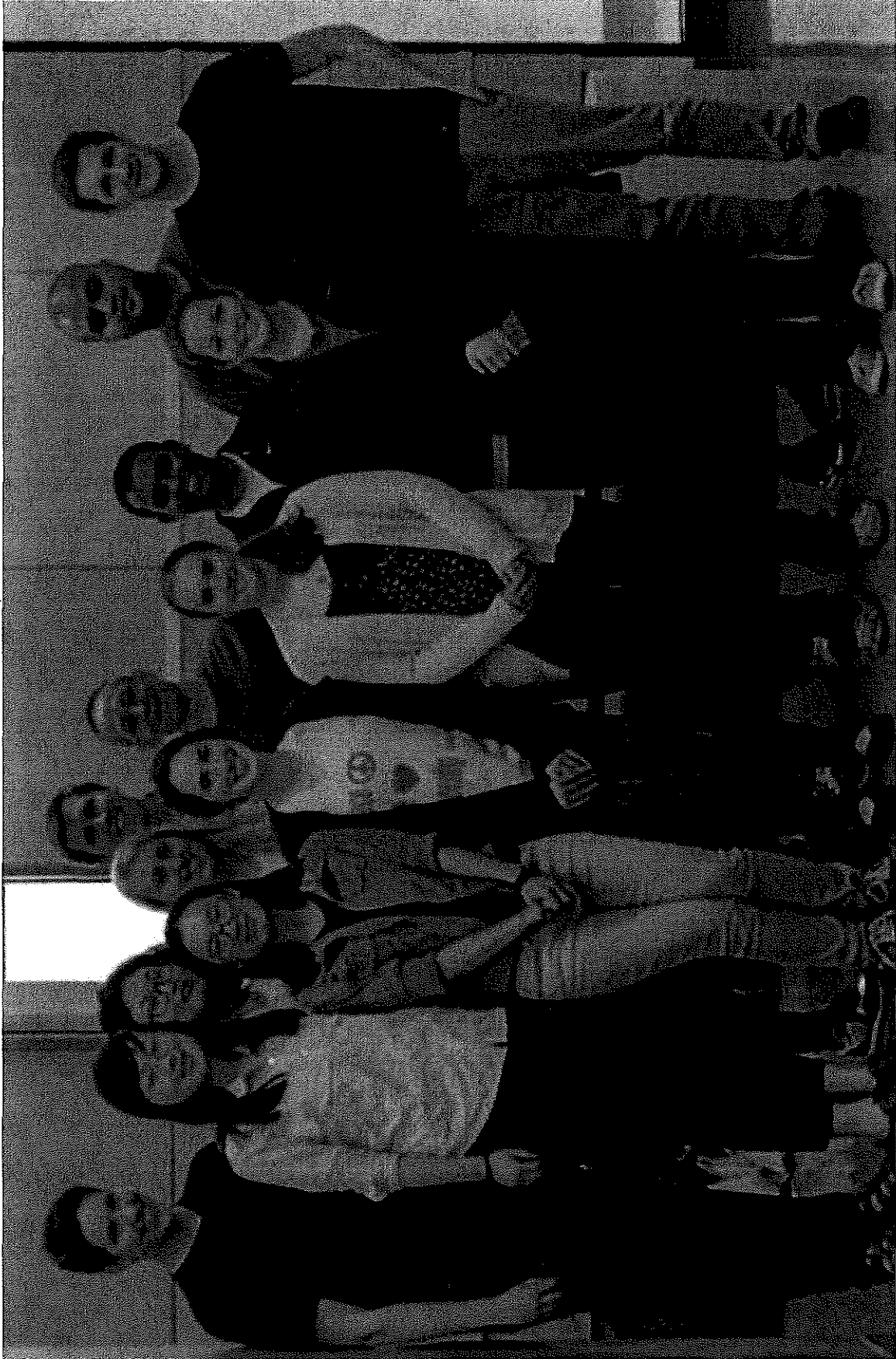
Christina **Devine**, Emily **Garner**,  
Anurag **Mantha**, Rebekah **Martin**,  
Colin **Richards**, William **Rhoads**,  
Siddhartha **Roy**, Min **Tang**,  
Ni “Joyce” **Zhu**

### Post-docs/Research Scientists (in alphabetical order): Drs.

Brandi **Clark**, Dongjuan **Dai**, Sheldon **Masters**, Jeffrey **Parks**,  
Kelsey **Pieper**, David “Otto” **Schwake**, Fei **Wang**

Principal Investigators: Dr. Marc **Edwards**, Dr. Amy **Pruden**, Dr. Joseph **Falkinham III**

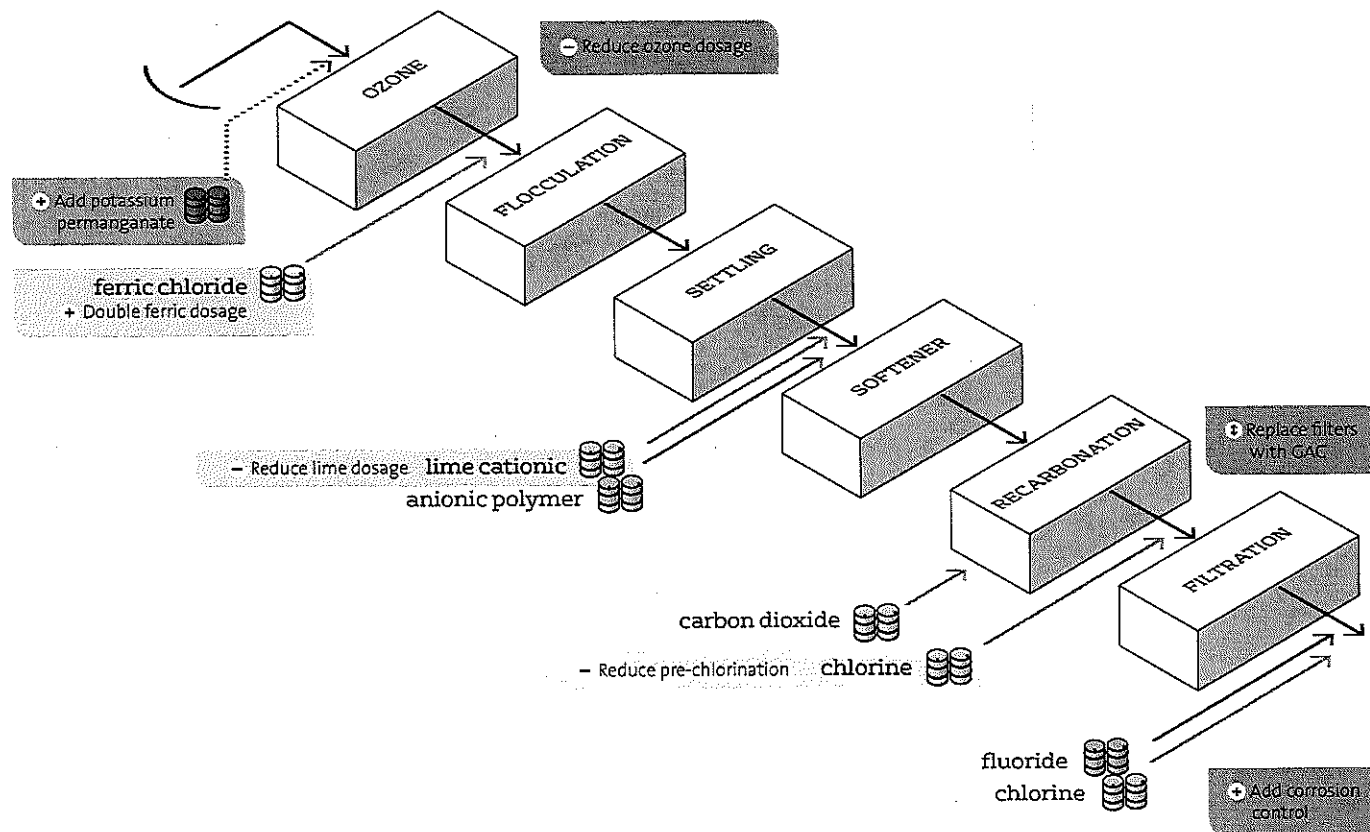




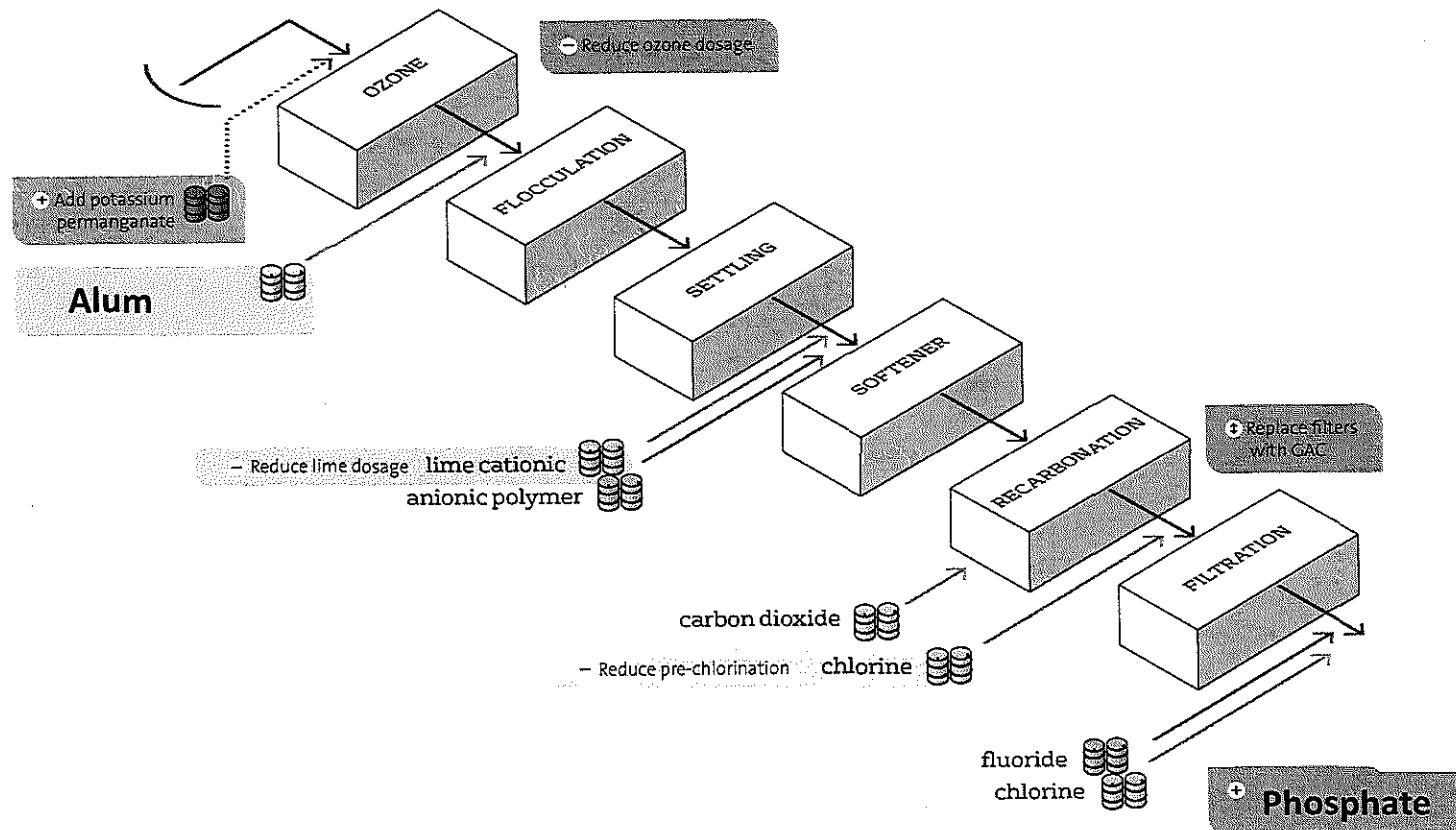
# Acknowledgements

- NSF
  - Flint Citizens
  - Wateryoufightingfor (Melissa Mays and Lee-Anne Walters)
  - Miguel Del Toral (Region 5 EPA)
  - ACLU-MICHIGAN (Curt Guyette)
  - Senator Ananich and Dan Kildee (and Great Staff)
  - **Flint Medical Community (esp. Mona Hanna-Attisha and Hurley team)**
  - Genesee County Health Department
  - Concerned Pastors for Social Action
  - Democracy Defense League
  - Others
- 
- City of Flint Water Department (Glasgow/Croft)

# Treatment Option 1



# Treatment Option 2



CSMR for Ferric Chloride vs Alum

|                 | Cl <sup>-</sup> | SO <sup>-</sup> | CSMR |
|-----------------|-----------------|-----------------|------|
| Ferric Chloride | 80              | 27              | 2.96 |
| Alum            | 44              | 77              | 0.57 |



**Rennaker, Joanne (DEQ)**

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Friday, March 06, 2015 9:45 AM  
**To:** Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Tap Filters

Should have copied you both. Apologies!

b

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Thursday, March 05, 2015 4:26 PM  
**To:** Hollins, Harvey (GOV); 'Wyant, Dan (WyantD@michigan.gov)'; Agen, Jarrod (GOV)  
**Cc:** Baird, Richard (GOV); 'Wurfel, Sara (GOV) (Wurfels@michigan.gov)'  
**Subject:** FW: Tap Filters

Harvey,

Since group call Tuesday I have been working out how the filter idea might take shape.

To reiterate some key points so we're all clear:

1. DEQ does not inspect individuals' homes in a situation like this. It's the city's system, their operators handle all complaints and maintenance. In fact, our folks alerted me that the city's got union rules in place forbidding any contractor from touching the system.
2. DEQ's role is limited to ensuring the plant is operating to state standards and the water it produces meets potability standards. The aesthetic issues drawing concern from residents – color, odor, taste – stem from a variety of things. Age of the system and prolonged lack of upkeep is the leading factor. But in some areas, another contributing factor is changes in water flow – source used to come from the south, now comes from the north, so some pipes are flowing in reverse, stirring up whatever was settled for a long time. In some sections, large pipes that historically served large communities are now serving a much smaller customer base, contributing to water stagnating in the system. In some areas, household connections are old and worn, so two neighbors may be having dramatically different experiences. My point is, the challenge takes many forms and there's no single solution that will bring sweeping change. The two consultants hired by the city have, as I understand it, both reinforced this idea in their assessments, so that's good.
3. The fix for this will be years in the making, truly. Even if full funding were available, 'big dig' projects can't all happen at once. The city needs to get an assessment of its infrastructure so it can prioritize its needs, and I understand they're working on that. In the near term, maintenance this spring / summer – things like cleaning the pipes in key sections and flushing the system via the hydrants – could offer some short term results. I know nobody wants to just wait for spring, but that is something important to keep in mind.
4. In the meantime, the group discussed possibly making home water filters available somehow. The National Safety Foundation is a Michigan company, headquartered and founded in Ann Arbor, that develops standards for all kinds of infrastructure. They're a globally recognized source for standard setting. A look at their site reveals there are myriad filtration options on the market and within each type (faucet mounted, whole house line filters, etc) there are filters that focus on different aspects of purification.

If this idea begins to get legs, I'd suggest testing some different models on the local water at the customer level to see if they work. I'd also suggest the idea be focused on tap-mounted models to promote clean, appealing drinking water. And I'd suggest this program could be funded in whole or in part by the state, but would need to be administered by the city (reinforcing the fact that they own, operate and service the system). I've got some information on filter models below.

Two more considerations: One, while the state has provided residents in some communities with bottled water in the past, it always has to do with their water being somehow contaminated – as in, some kind of chemical plume that impaired local drinking water sources. This would be the first time the state took steps to deal with what is an aesthetic issue on a system where the water is meeting state drinking water standards.

#### Water filter info:

ANSI NSF Standard 42 Covers bacteriostasis, taste and odor (associated only with chlorine removal), and other aesthetic conditions

[http://standards.nsf.org/apps/group\\_public/download.php/19895/NSF\\_42-11%20-%20watermarked.pdf](http://standards.nsf.org/apps/group_public/download.php/19895/NSF_42-11%20-%20watermarked.pdf)

ANSI NSF Standard 53 Covers health effects removal

[http://standards.nsf.org/apps/group\\_public/download.php/19896/NSF\\_53-11a%20-%20watermarked.pdf](http://standards.nsf.org/apps/group_public/download.php/19896/NSF_53-11a%20-%20watermarked.pdf)

It is important to note that the filters are not required to meet all aspects of the standard, only the portions they want to make claims for. So product information for each filter must be reviewed to determine its applicability.

Most of these point of use filters are basic activated carbon filters that simply remove taste and odor specifically associated with chlorine, not other things like iron, manganese, hydrogen sulfide, etc. that can also impact taste and odor as well as color.

It is important to recognize that taste and odor is generally an individual preference and such standards have for the most part not been developed because groups of individuals may still consider taste and odor issues to exist even after levels for such a standard have been met.

Other considerations are that the test water for such filters attempting to meet the standard uses hardness levels of 170 mg/L or less. Flint's water at times may be above this level, which could then impact filter performance and longevity.

Most of these filters are designed to be replaced after 100 gallons or less of use, a period of about 3 months for most households. In addition the tests allow for initial pressure drops of up to 15 psi. This may limit use in households that already rely on minimum pressure within their household plumbing.

Regarding the health effects standards, as the Flint water system already meets such requirements, with the exception of the current TTHM locational running annual average, there is little point to the use of these filters for such a purpose.

To the point you'd asked about the other day, while Flint and Detroit are leading examples of unmaintained infrastructure, Flint is not alone by any means.

This recent infrastructure report card

<http://www.infrastructurereportcard.org/michigan/michigan-overview/>

Lists Michigan with a \$13.8 Billion need over the next 20 years.

<http://www.infrastructurereportcard.org/a/#p/state-facts/michigan>

Here's a link to the 2009 Report Card for Michigan Infrastructure  
<http://www.michiganreportcard.com/>

From the report:

"A significant portion of the state's primary distribution system is nearing 100 years old. CWS are facing a significant challenge to maintain the vast network of aging, underground infrastructure. Within the city of Detroit alone, approximately 80% of its distribution piping was installed prior to 1940, which is not unusual for CWS in Michigan."

"The age of the majority of the state's distribution system is the primary contributor to normal decay and failure. In many cases, pipe life has far exceeded useful service life. Much of the older water systems consist of undersized mains constructed of materials such as unlined cast iron pipe. Minor fluctuations in system flows or pressure may cause red water complaints and even result in pipe failure. All CWS should have routine flushing and valve maintenance programs; however many are hesitant due to the time and cost."

"Under the Stage 2 Disinfection Byproducts Rule, all CWS that disinfect are required to provide increased trihalomethane (THM) and haloacetic acid (HAA5) monitoring due to the potential byproducts of chlorine reactions within the pipe system. Corrosion, scale, solid suspension on the interior sidewall of pipe, in addition to the age and condition of the system will require diligent rehabilitation investment to maintain system integrity."

"While better materials and advanced technology is available to replace the aging distribution system, resources remain scarce when compared with the magnitude of the rehabilitation task at hand. Too often, distribution system replacement costs are underfunded and the first item to be slashed when budget problems arise. Overall, distribution system maintenance is reactionary in much of the older systems. Since the majority of the antiquated system will require removal and replacement beyond the CWS funding resources for systematic upgrade, a reactionary rehabilitation program is inevitable and must be funded accordingly."

Call or email me if you need anything further.

b

Brad Wurfel  
Communications Director  
Michigan Department of Environmental Quality  
517-284-6713  
517-230-8006 cell

**Rennaker, Joanne (DEQ)**

---

**From:** Kolhoff, Thomas (DEQ)  
**Sent:** Friday, October 23, 2015 6:32 AM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Busch, Stephen (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

Hi Mike,  
I'm not sure how or why this was sent to me.....FYI. You may have already received a copy. Thanks.

Tom

*Thomas Kolhoff*  
DEQ, WRD, Lansing District  
P.O. Box 30242  
Lansing, Michigan 48909  
517-284-6666  
kolhofft@michigan.gov

---

**From:** Sheila Bailey-Waddell [mailto:sheila.bw@hotmail.com]  
**Sent:** Friday, October 23, 2015 12:56 AM  
**To:** Kolhoff, Thomas (DEQ) <KOLHOFFT@michigan.gov>  
**Subject:** FW: Ticket #23002-490657 Response Sent

---

**From:** [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
**To:** [prysbym@michigan.gov](mailto:prysbym@michigan.gov)  
**Subject:** FW: Ticket #23002-490657 Response Sent  
**Date:** Wed, 21 Oct 2015 20:41:09 -0400

Mike,

It has come to my attention and that of the public that federal laws were not adhered to in water quality testing. I am reasonably certain that complaints have been submitted to your office. It is my contention that they were intentionally ignored in the style of the communications, below. I shouldn't have to test my own water.

Thank you,  
Sheila

---

Sent from my MetroPCS Android device

----- Original message-----

**From:** Prysby, Mike (DEQ)

**Date:** Fri, Oct 2, 2015 10:04 AM

**To:** [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com);

**Cc:** Busch, Stephen (DEQ); Benzie, Richard (DEQ);

**Subject:** RE: Ticket #23002-490657 Response Sent

Sheila,

I am responding to your e-mail to address your concerns with lead Flint's drinking water. The drinking water treated at the Water Treatment Plant (WTP) and distributed to Flint residents meets all applicable drinking water standards and has not detected the presence of lead in any plant tap samples (water that leaves the WTP). Although the drinking water standards are being met, and compliance with the Action Level for lead is being achieved (90% of selected sites sampled throughout the city are at or below the 15 parts per billion Action Level for lead in accordance to EPA's monitoring requirements), there is no safe level for lead in drinking water. Compliance with the lead Action Level; however, does not mean that under certain conditions that some residents may have water within their domestic plumbing system that has leached lead from either a lead service line or lead solder.

The only way to know if you are being exposed to a higher concentration of lead at your residency is to have a sample collected from your residency and analyzed for lead at a certified laboratory. It is our understanding that the city of Flint is working with their customers on lead sampling requests without charge. You will need contact the city to arrange for the sampling.

If lead is present in the water at your home or if there is uncertainty, our advice is to minimize stagnation of the water prior to consumption by running your faucet for several minutes to clear out the stagnated water from your plumbing and service line.

Below is a link that provide additional information regarding lead in drinking water.

<http://water.epa.gov/drink/contaminants/basicinformation/lead.cfm>

If you have any further concerns regarding lead in your drinking water or on any other water related matter, please don't hesitate to contact me.

Michael Prysby, P.E.

District Engineer

Office of Drinking Water and Municipal Assistance

517 290-8817

---

**From:** Sheila Bailey-Waddell [<mailto:sheila.bw@hotmail.com>]

**Sent:** Wednesday, September 30, 2015 8:43 PM

**To:** Hill, Charles (DEQ); Selden, Barry (DEQ); Smith, Laura (DEQ); Prysby, Mike (DEQ)  
**Subject:** RE: Ticket #23002-490657 Response Sent

Hello,

Have you not heard that the water quality in Michigan is detrimental to its residents? It is filled with lead; killing our children and the elderly who are most vulnerable. What is the EPA doing about this? Even the hospitals are forced to order distilled water for patients (in/out). I want expeditious answers.

Thank you,  
 Sheila

---

From: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
 To: [hillc@michigan.gov](mailto:hillc@michigan.gov); [seldenb@michigan.gov](mailto:seldenb@michigan.gov); [smithl16@michigan.gov](mailto:smithl16@michigan.gov)  
 Subject: FW: Ticket #23002-490657 Response Sent  
 Date: Thu, 7 May 2015 17:16:50 -0400

---

From: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
 To: [safewater\\_support@supportportal.com](mailto:safewater_support@supportportal.com); [bartholi@msu.edu](mailto:bartholi@msu.edu); [info@cityofflint.com](mailto:info@cityofflint.com); [senator@stabenow.senate.gov](mailto:senator@stabenow.senate.gov); [bennettc4@michigan.gov](mailto:bennettc4@michigan.gov)  
 Subject: RE: Ticket #23002-490657 Response Sent  
 Date: Thu, 7 May 2015 16:41:38 -0400  
 Hello,

It is unfortunate that you don't track local drinking water information. So in essence your tracking efforts are limited to the auspices of NRCS Water Division only for the conservation of farming and other natural (non-human) resources. What if, by chance, the local water source is not being accurate in their reporting of safe drinking water and source supply?

Thank you,  
 Sheila

<http://mi.water.usgs.gov/pubs/MISC/RTSMI-0121/pdf/WTO222b.pdf>

---

From: [safewater\\_support@supportportal.com](mailto:safewater_support@supportportal.com)  
 To: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
 Date: Thu, 20 Feb 2014 08:25:04 -0500  
 Subject: Ticket #23002-490657 Response Sent  
 The Safe Drinking Water Hotline has responded to your question(s).  
 Hello,

Thank you for contacting the Safe Drinking Water Hotline. You had some concerns regarding your local water quality. Please review the information included below:

The Safe Drinking Water Hotline does not track local drinking water information. The best source of specific

information about your drinking water is your water supplier. Water suppliers that serve the same people year-round are required to send their customers an annual water quality report called a Consumer Confidence Report (CCR). The CCR describes any contaminants that have been detected in your drinking water, how these detection levels compare to health-based national drinking water standards, and the source of your drinking water. To obtain a copy of your CCR, you may search online at <http://cfpub.epa.gov/safewater/ccr/index.cfm>. If your water system's report is not online, you should contact your local water provider to obtain a copy of this report. To find the telephone number for your local water provider, please check your water utility bill, your local phone book, or search online at <http://cfpub.epa.gov/safewater/ccr/index.cfm>.

If your city has a population in excess of 100,000, they are obligated to publish the reports online. Many local governments have sites where reports can be posted, even if a system itself does not have a site. EPA will make links from its Web site (<http://water.epa.gov/drink/index.cfm>) to all the reports of which it is aware (Preparing Your Drinking Water Consumer Confidence Report: Revised Guidance for Community Water Suppliers), EPA816-R-05-002).

If your city has not made the 2012 report available, please contact your state water program. They are the regulatory and enforcement agency for all public water systems in your state. The state water program should help you find the data. You can find contact information to your state by following the link below:

<http://water.epa.gov/drink/local/index.cfm>. <http://cfpub.epa.gov/safewater/ccr/index.cfm>.

EPA's Safe Drinking Water Hotline answers questions about the regulations and programs developed in response to the Safe Drinking Water Act. The Safe Drinking Water Hotline provides information, including access to publications, on EPA's drinking water standards, source water protection, and underground injection wells. The Hotline also provides referrals to state public water supply supervision programs, state underground injection control programs, and state laboratory certification programs.

If you have additional questions, you may contact the Safe Drinking Water Hotline at the following number: (800) 426-4791 -- Toll Free

For more information, please visit EPA's Office of Ground Water and Drinking Water Internet web site:

<http://water.epa.gov/drink/index.cfm>.

Thank you for your interest in safe drinking water.

#### **Ticket Information:**

Ticket #: 23002-490657

Date Created: 2/19/2014 02:18 PM EST

Subject: Water Quality Assessment

Question: I live in Flint Michigan. What I have learned is Michigan appears to have 2012 and 2014 reports but neither are being reported by EPA. On this side of reporting for this data, we have no information as to the status of the 2012 or 2014 data. There are automotive plants in my area and the water quality is suspected to be less than satisfactory for residents.

#### **To update or check the status of this Ticket:**

Go to: <http://safewater.supportportal.com/link/portal/23002/23015/Ticket/490657>

Log in, and you will be automatically taken to the Ticket page.

**Rennaker, Joanne (DEQ)**

---

**From:** Bennett, Charles (DEQ)  
**Sent:** Thursday, May 07, 2015 4:50 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

Steve, I don't know if this is a legit email or not, but if it is, you should've been cc'd rather than me, it seems...

chuck

Charles Bennett, PE  
 DEQ Water Resources Division  
 Lansing District Office  
[BennettC4@michigan.gov](mailto:BennettC4@michigan.gov)  
 ph 517-284-6659; fax 517-241-3571

---

**From:** Sheila Bailey-Waddell [mailto:[sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)]  
**Sent:** Thursday, May 07, 2015 4:42 PM  
**To:** EPA Safe Drinking Water Hotline; [bartholi@msu.edu](mailto:bartholi@msu.edu); [info@cityofflint.com](mailto:info@cityofflint.com); Senator Debbie Stabenow; Bennett, Charles (DEQ)  
**Subject:** RE: Ticket #23002-490657 Response Sent

Hello,

It is unfortunate that you don't track local drinking water information. So in essence your tracking efforts are limited to the auspices of NRCS Water Division only for the conservation of farming and other natural (non-human) resources. What if, by chance, the local water source is not being accurate in their reporting of safe drinking water and source supply?

Thank you,  
 Sheila

<http://mi.water.usgs.gov/pubs/MISC/RTSMI-0121/pdf/WTO222b.pdf>

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**From:** [safewater\\_support@supportportal.com](mailto:safewater_support@supportportal.com)  
**To:** [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
**Date:** Thu, 20 Feb 2014 08:25:04 -0500  
**Subject:** Ticket #23002-490657 Response Sent

The Safe Drinking Water Hotline has responded to your question(s).

Hello,

Thank you for contacting the Safe Drinking Water Hotline. You had some concerns regarding your local water quality. Please review the information included below:

The Safe Drinking Water Hotline does not track local drinking water information. The best source of specific information about your drinking water is your water supplier. Water suppliers that serve the same people year-round are required to send their customers an annual water quality report called a Consumer Confidence Report (CCR). The CCR describes any contaminants that have been detected in your drinking water, how these



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2. Log in, and you will be automatically taken to the Ticket page.

**Rennaker, Joanne (DEQ)**

---

**From:** Benzie, Richard (DEQ)  
**Sent:** Friday, May 08, 2015 2:16 PM  
**To:** Busch, Stephen (DEQ); Rosenthal, Adam (DEQ); Prysby, Mike (DEQ)  
**Cc:** Devereaux, Tracy Jo (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

I don't know if you have had any contact with this person and I am unsure that a response is necessary, as it was forwarded as an FYI.

It is difficult to determine what is being requested, but it looks like a customer of Flint asked EPA for drinking water quality and when EPA told her to contact her water system, she tried to get the information from the state but contacted WRD. It also sounds like she questions relying upon the local supplier to report monitoring results.

You could contact her to see if we can be of assistance or send her a message indicating that we (you) are the source of drinking water information if she doesn't want to get it from the city.

---

**From:** Devereaux, Tracy Jo (DEQ)  
**Sent:** Friday, May 08, 2015 8:22 AM  
**To:** Philip, Kris (DEQ); Benzie, Richard (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

fyi

Thanks,

*Tracy Jo*

---

**From:** Smith, Laura (DEQ)  
**Sent:** Thursday, May 07, 2015 5:39 PM  
**To:** Devereaux, Tracy Jo (DEQ)  
**Cc:** Hill, Charles (DEQ); Selden, Barry (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

Please forward to the appropriate staff in the Office of Drinking Water and Municipal Assistance.

Thanks,

*Laura*

---

**From:** Sheila Bailey-Waddell [<mailto:sheila.bw@hotmail.com>]  
**Sent:** Thursday, May 07, 2015 5:17 PM  
**To:** Hill, Charles (DEQ); Selden, Barry (DEQ); Smith, Laura (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

---

From: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)

To: [safewater\\_support@supportportal.com](mailto:safewater_support@supportportal.com); [bartholi@msu.edu](mailto:bartholi@msu.edu); [info@cityofflint.com](mailto:info@cityofflint.com); [senator@stabenow.senate.gov](mailto:senator@stabenow.senate.gov); [bennettc4@michigan.gov](mailto:bennettc4@michigan.gov)

Subject: RE: Ticket #23002-490657 Response Sent

Date: Thu, 7 May 2015 16:41:38 -0400

Hello,

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Thank you,  
Sheila

<http://mi.water.usgs.gov/pubs/MISC/RTSMI-0121/pdf/WTO222b.pdf>

From: [safewater\\_support@supportportal.com](mailto:safewater_support@supportportal.com)

To: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)

Date: Thu, 20 Feb 2014 08:25:04 -0500

Subject: Ticket #23002-490657 Response Sent

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If your city has a population in excess of 100,000, they are obligated to publish the reports online. Many local governments have sites where reports can be posted, even if a system itself does not have a site. EPA will make links from its Web site (<http://water.epa.gov/drink/index.cfm>) to all the reports of which it is aware (Preparing Your Drinking Water Consumer Confidence Report: Revised Guidance for Community Water Suppliers), EPA816-R-05-002).

If your city has not made the 2012 report available, please contact your state water program. They are the regulatory and enforcement agency for all public water systems in your state. The state water program should help you find the data. You can find contact information to your state by following the link below:

<http://water.epa.gov/drink/local/index.cfm>.<http://cfpub.epa.gov/safewater/ccr/index.cfm>.

EPA's Safe Drinking Water Hotline answers questions about the regulations and programs developed in

response to the Safe Drinking Water Act. The Safe Drinking Water Hotline provides information, including access to publications, on EPA's drinking water standards, source water protection, and underground injection wells. The Hotline also provides referrals to state public water supply supervision programs, state underground injection control programs, and state laboratory certification programs.

If you have additional questions, you may contact the Safe Drinking Water Hotline at the following number:

(800) 426-4791 -- Toll Free

For more information, please visit EPA's Office of Ground Water and Drinking Water Internet web site:

<http://water.epa.gov/drink/index.cfm>.

Thank you for your interest in safe drinking water.

**Ticket Information:**

Ticket #: 23002-490657

Date Created: 2/19/2014 02:18 PM EST

Subject: Water Quality Assessment

Question: I live in Flint Michigan. What I have learned is Michigan appears to have 2012 and 2014 reports but neither are being reported by EPA. On this side of reporting for this data, we have no information as to the status of the 2012 or 2014 data. There are automotive plants in my area and the water quality is suspected to be less than satisfactory for residents.

**To update or check the status of this Ticket:**

1. Go to: <http://safewater.supportportal.com/link/portal/23002/23015/Ticket/490657>
2. Log in, and you will be automatically taken to the Ticket page.

**Rennaker, Joanne (DEQ)**

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**From:** Devereaux, Tracy Jo (DEQ)  
**Sent:** Thursday, October 01, 2015 8:32 AM  
**To:** Rennaker, Joanne (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

Please forward to appropriate staff in your district.

Thanks,

*Tracy Jo*

---

**From:** Smith, Laura (DEQ)  
**Sent:** Thursday, October 01, 2015 8:28 AM  
**To:** Shekter Smith, Liane (DEQ); Devereaux, Tracy Jo (DEQ)  
**Subject:** FW: Ticket #23002-490657 Response Sent

FYI

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**From:** Ostlund, Peter (DEQ)  
**Sent:** Thursday, October 01, 2015 8:13 AM  
**To:** Smith, Laura (DEQ); Russell, Jon (DEQ)  
**Subject:** RE: Ticket #23002-490657 Response Sent

Flint drinking water, refer it to Liane

Peter Ostlund, Assistant Division Chief  
 Water Resources Division  
 517-898-5128  
[ostlundp@michigan.gov](mailto:ostlundp@michigan.gov)

---

**From:** Smith, Laura (DEQ)  
**Sent:** Thursday, October 1, 2015 8:10 AM  
**To:** Russell, Jon (DEQ) <[RUSSELLJ@michigan.gov](mailto:RUSSELLJ@michigan.gov)>; Ostlund, Peter (DEQ) <[OSTLUNDP@michigan.gov](mailto:OSTLUNDP@michigan.gov)>  
**Subject:** FW: Ticket #23002-490657 Response Sent

I have no idea what this is all about or how she got e-mail addresses for some of our staff or how she determined who to send her e-mail to but since Charlie and Barry are your employees, I'm sending this to you as an FYI.

Thanks,

*Laura*

---

**From:** Sheila Bailey-Waddell [<mailto:sheila.bw@hotmail.com>]  
**Sent:** Wednesday, September 30, 2015 8:43 PM  
**To:** Hill, Charles (DEQ); Selden, Barry (DEQ); Smith, Laura (DEQ); Prysby, Mike (DEQ)  
**Subject:** RE: Ticket #23002-490657 Response Sent

Hello,

Have you not heard that the water quality in Michigan is detrimental to its residents? It is filled with lead; killing our children and the elderly who are most vulnerable. What is the EPA doing about this? Even the hospitals are forced to order distilled water for patients (in/out). I want expeditious answers.

Thank you,  
Sheila

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From: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
 To: [hillc@michigan.gov](mailto:hillc@michigan.gov); [seldenb@michigan.gov](mailto:seldenb@michigan.gov); [smithl16@michigan.gov](mailto:smithl16@michigan.gov)  
 Subject: FW: Ticket #23002-490657 Response Sent  
 Date: Thu, 7 May 2015 17:16:50 -0400

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From: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
 To: [safewater\\_support@supportportal.com](mailto:safewater_support@supportportal.com); [bartholi@msu.edu](mailto:bartholi@msu.edu); [info@cityofflint.com](mailto:info@cityofflint.com);  
[senator@stabenow.senate.gov](mailto:senator@stabenow.senate.gov); [bennettc4@michigan.gov](mailto:bennettc4@michigan.gov)  
 Subject: RE: Ticket #23002-490657 Response Sent  
 Date: Thu, 7 May 2015 16:41:38 -0400

Hello,

It is unfortunate that you don't track local drinking water information. So in essence your tracking efforts are limited to the auspices of NRCS Water Division only for the conservation of farming and other natural (non-human) resources. What if, by chance, the local water source is not being accurate in their reporting of safe drinking water and source supply?

Thank you,  
Sheila

<http://mi.water.usgs.gov/pubs/MISC/RTSMI-0121/pdf/WTO222b.pdf>

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From: [safewater\\_support@supportportal.com](mailto:safewater_support@supportportal.com)  
 To: [sheila.bw@hotmail.com](mailto:sheila.bw@hotmail.com)  
 Date: Thu, 20 Feb 2014 08:25:04 -0500  
 Subject: Ticket #23002-490657 Response Sent

The Safe Drinking Water Hotline has responded to your question(s).

Hello,

Thank you for contacting the Safe Drinking Water Hotline. You had some concerns regarding your local water quality. Please review the information included below:

The Safe Drinking Water Hotline does not track local drinking water information. The best source of specific

information about your drinking water is your water supplier. Water suppliers that serve the same people year-round are required to send their customers an annual water quality report called a Consumer Confidence Report (CCR). The CCR describes any contaminants that have been detected in your drinking water, how these detection levels compare to health-based national drinking water standards, and the source of your drinking water. To obtain a copy of your CCR, you may search online at <http://cfpub.epa.gov/safewater/ccr/index.cfm>. If your water system's report is not online, you should contact your local water provider to obtain a copy of this report. To find the telephone number for your local water provider, please check your water utility bill, your local phone book, or search online at <http://cfpub.epa.gov/safewater/ccr/index.cfm>. If your city has a population in excess of 100,000, they are obligated to publish the reports online. Many local governments have sites where reports can be posted, even if a system itself does not have a site. EPA will make links from its Web site (<http://water.epa.gov/drink/index.cfm>) to all the reports of which it is aware (Preparing Your Drinking Water Consumer Confidence Report: Revised Guidance for Community Water Suppliers), EPA816-R-05-002).

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If you have additional questions, you may contact the Safe Drinking Water Hotline at the following number: (800) 426-4791 -- Toll Free

For more information, please visit EPA's Office of Ground Water and Drinking Water Internet web site: <http://water.epa.gov/drink/index.cfm>.

Thank you for your interest in safe drinking water.

#### **Ticket Information:**

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#### **To update or check the status of this Ticket:**

1. Go to: <http://safewater.supportportal.com/link/portal/23002/23015/Ticket/490657>
2. Log in, and you will be automatically taken to the Ticket page.

**Rennaker, Joanne (DEQ)**

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**From:** Sygo, Jim (DEQ)  
**Sent:** Wednesday, November 04, 2015 5:18 PM  
**To:** Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ); Krisztian, George (DEQ)  
**Subject:** FW: Transmittal of Final Report - High Lead at Three Residences in Flint, Michigan  
**Attachments:** Transmittal of Final redacted Report to MDEQ.pdf

Release of the report from Del Toral. With redactions?

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**From:** Hyde, Tinka [<mailto:hyde.tinka@epa.gov>]  
**Sent:** Wednesday, November 04, 2015 4:06 PM  
**To:** Sygo, Jim (DEQ); [hcroft@cityofflint.gov](mailto:hcroft@cityofflint.gov)  
**Cc:** [nhenderson@cityofflint.gov](mailto:nhenderson@cityofflint.gov)  
**Subject:** Transmittal of Final Report - High Lead at Three Residences in Flint, Michigan

Please find attached the Final Report - High Lead at Three Residences in Flint, Michigan. The report has been redacted to remove personally identifiable and medical information. Please let me know if you have any questions.

Tinka G. Hyde  
Water Division Director  
USEPA W-15J  
77 W. Jackson Blvd  
Chicago, IL 60604

Office: 312-886-9296  
Cell: 312-735-9428





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 REGIONAL ADMINISTRATOR  
 77 WEST JACKSON BOULEVARD  
 CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

**MEMORANDUM**

**DATE:** November 4, 2015

**SUBJECT:** Transmittal of Final Report - High Lead at Three Residences in Flint, Michigan

**FROM:** Tinka G. Hyde *Tinka G. Hyde*  
 Water Division Director

**TO:** Jim Sygo  
 Deputy Director  
 Michigan Department of Environmental Quality

Howard Croft  
 Director of Flint Public Works

Enclosed please find for your file a final redacted version of a report prepared by EPA Scientist, Miguel Del Toral, regarding lead in drinking water at three residences in Flint, Michigan. The redactions remove personally identifiable and medical information. This report has been finalized and is also being provided to the National Drinking Water Advisory Council (NDWAC) for discussion during their upcoming meeting on November 17-19, 2015. We understand you saw an earlier version of this document; and note that most of the recommendations in that interim report are already being implemented (e.g., the City of Flint has switched back to Detroit water; filters have been provided to residents; and additional corrosion control treatment will be implemented).

The final report contains important new information indicating that physical disturbances of lead service lines can dislodge the protective coating that prevents lead from leaching into drinking water. The final report recommends notifying residents about the potential risks of increased lead levels in drinking water when work is undertaken that may disturb lead service lines.

cc: Natasha L. Henderson, City of Flint Administrator

## High Lead Levels in Flint, Michigan

The purpose of this report is to present the findings of activities conducted in response to high lead levels in drinking water reported to the United States Environmental Protection Agency Region 5 Office (EPA) by a resident in the City of Flint, Michigan.

### Background Information

Prior to April 30, 2014, the City of Flint purchased water from the City of Detroit. On April 30, 2014, the City of Flint switched from utilizing purchased water from Detroit to a new water source, the Flint River. Subsequent to the change in source water, the City of Flint experienced a number of water quality issues resulting in violations of National Primary Drinking Water Regulations (NPDWR) including acute and non-acute Coliform Maximum Contaminant Level (MCL) violations and Total Trihalomethanes (TTHM) MCL violations (see Appendix A).

Beginning in January 2015, [REDACTED], a resident of Flint, called the Flint Water Department (FWD) regarding the water quality in her home. In response to the initial and subsequent calls, the FWD visited the [REDACTED] home on a number of occasions and also collected tap water samples. [REDACTED] also contacted EPA regarding these same water quality issues and medical issues she believes are associated with the water quality in Flint.

Following initial calls on the general water quality, on February 26, 2015, [REDACTED] contacted EPA regarding high lead levels found in her drinking water by the City of Flint. The result of the initial lead in water sample collected by the City of Flint on February 18, 2015 from the [REDACTED] home was 104 µg/L and the level of iron in the water exceeded the capability of the instrument to measure (>3.3 mg/L). On February 26, 2015, upon receiving the lead results from [REDACTED], the EPA contacted the Michigan Department of Environmental Quality (MDEQ) regarding the high lead result. The MDEQ advised that the City of Flint collect a follow-up sample for lead at the [REDACTED] home.

On March 3, 2015, the City of Flint collected a follow-up sample for lead at the [REDACTED] residence and the result of this second sample was 397 µg/L<sup>1</sup>. Subsequent to receiving her second result, EPA spoke to [REDACTED] via phone on March 19, 2015, and the following information was provided by [REDACTED]:

- The [REDACTED] home is a HUD home which was gutted and renovated in 2011. All existing plumbing had been removed and the [REDACTED] installed plastic plumbing.
- Due to high iron levels in the tap water, the [REDACTED] installed an iron filter downstream of the service line inlet into the home.
- [REDACTED] indicated that at this time they are not drinking the water or using it for cooking. She stated that her child's blood lead level (BLL) was originally at [REDACTED] in 2012 and that a more recent test showed it had increased to [REDACTED], but she noted that

<sup>1</sup> Note: A third water sample had been collected on April 2, 2015, but the results had not been provided to the [REDACTED] at the time the interim report was written. The third lead in water sample result was 707 µg/L.

*Final Report, October 21, 2015*

the BLL testing was done well after the child had stopped drinking the water and may have been higher during the time the child was consuming the water.

- Water samples collected by the City of Flint from her home were collected from the kitchen tap after the iron filter was physically removed.
- The Flint Water Department (FWD) informed [REDACTED] that her service line does not connect to the water main in front of her home as is typically the case for most homes.
- On March 18, 2015, City of Flint personnel went to the [REDACTED] home to locate the external shut-off valve in conjunction with the planned replacement of the [REDACTED] service line and were unsuccessful. Eventually it was discovered that the external shut-off valve was located at the corner of [REDACTED] and Bryant Street, two houses down from the [REDACTED] home.

As part of EPA's effort to respond to [REDACTED] concerns regarding her water results, EPA contacted the FWD. The following information was provided to EPA by the FWD:

- [REDACTED] home is one of the first homes built on the block and the service line runs for approximately 50-60 yards, connecting to the water main on Bryant Street which runs perpendicular to [REDACTED] (see Appendix A).
- Flint has a large number of lead service lines, so it would not be surprising to find that this is a very long lead line.
- The first sample from the [REDACTED] home was collected with the iron filter in place, and the second was with the iron filter physically removed. The iron filter was located just after the water meter.
- [REDACTED] showed FWD a video of her son 10 minutes after taking a bath, and that he had a full body rash in the video.

It was a common practice in the early 1900s to purchase large parcels of land and later subdivide them. Since service lines are typically run from the water main to the nearest location on a property and it is possible that the [REDACTED] home may have originally been part of a larger parcel of land that encompassed the two homes that now exist adjacent to the [REDACTED] home and was subsequently divided, leaving the original home connected to the same service connection and water main, while the newer homes were connected to a more recent water main installed along [REDACTED].

Based on a suspected conflict of interest at the healthcare facility that originally tested her son's BLL, [REDACTED] took her son to a different healthcare facility to have his blood lead tested again. On April 1, 2015, [REDACTED] provided EPA with a copy of her child's blood lead testing performed on March 27, 2015, showing a higher BLL ([REDACTED]) than the original test.

Due to the persistently high lead results, the FWD shut off the water service to the [REDACTED] home on April 3, 2015. Per agreement between the FWD and [REDACTED], her home was then connected to her neighbor's home via a garden hose, from one hose bib to another. This was understood to be a temporary measure until the [REDACTED] service line could be replaced. The [REDACTED] used this water connection only for bathing, washing dishes and washing clothes.

At the invitation of [REDACTED], EPA visited the [REDACTED] home on April 27, 2015, and reviewed the internal plumbing and information provided by [REDACTED], including water samples and spent filter cartridges. During this visit, EPA observed that the internal pipes, valves and connectors at the [REDACTED] residence were made of CPVC plastic, approved by NSF for potable drinking water applications, with a few minor metal connectors. A review of the treatment units in the home by EPA found that there was no iron filter in the home as had previously been thought. The only active treatment device in the home was a whole-home sediment filter which utilizes NSF certified Whirlpool WHKF-WHWC cartridge filters for sediment removal and taste/odor. There was also a non-functioning 'Water Resources International Hydro-Quad Commercial Water Processor' which was bypassed (see Appendix A).

At the request of [REDACTED], Dr. Marc Edwards at Virginia Tech provided sampling instructions to [REDACTED] for collecting a series of samples from her home. As part of the instructions, on the night of April 27, 2015, the water at the [REDACTED] residence was turned back on temporarily and the kitchen tap was flushed for 25 minutes at low flow prior to letting the water sit overnight. A series of sequential samples were collected the following morning (April 28, 2015) and sent to Dr. Edwards for analysis.

Dr. Edwards provided [REDACTED] with the results of the analyses and also shared the results with EPA on May 5, 2015, along with information regarding other chemical parameters tested (see Appendix B). In addition to very high lead levels in all sample results, the analytical data shows a correlation between lead and phosphate as well as lead and aluminum in all samples. On April 24, 2015, EPA had learned that Flint did not have corrosion control treatment in place and also learned that Flint was using ferric chloride as a coagulant. Consequently, as the City of Flint is not utilizing phosphate or alum as treatment chemicals since the source switch, the results indicate that it is likely that the phosphate and aluminum were being released from the scale within the distribution system network. This scale would have formed on the inside of the pipes in Flint during the time when the City was purchasing water from Detroit, as Detroit utilizes orthophosphate for corrosion control and alum as a coagulant in their water filtration process.

Research conducted by EPA on lead content in pipe scales has shown that scales which form on the inside of lead pipes can be released or dislodged into the water and may contain a high percentage of lead (Appendix C). Although the results received from Virginia Tech were indicative of the presence of a lead service line, the FWD indicated that no records existed to confirm whether any portion of the service line connecting to the [REDACTED] home was made of lead. However, given the high lead levels found, it was presumed that at least a portion of the service line was likely made of lead. In the course of following up on the high lead at the [REDACTED] home, additional sample results provided to EPA from other residences in Flint also showed high lead levels.

Primarily from a public health standpoint, but also from a research standpoint, it was important to try to find out what the cause of these very high lead levels might be. EPA Region 5, EPA's Office of Research and Development and others have been working

together collaboratively to better understand lead release mechanisms from lead service lines in anticipation of upcoming revisions to the Lead and Copper Rule (LCR) and as part of a collaborative effort in EPA Region 5 to study potential options for optimizing phosphate treatment to control lead in water and the need to reduce phosphorus discharges into the environment. Since the [REDACTED] service line was scheduled for replacement on May 6, 2015 and the presumption was that at least a portion of the service line was lead, EPA visited the [REDACTED] home on the day of the service line replacement to gather information and service line pipe samples that could provide additional information as to how lead levels could get as high as they did in this case.

The original service line to the [REDACTED] home was disconnected and two service line pipe segments from this service line were extracted on May 6, 2015. Additional tap water samples were collected also from two homes on Bryant Street that were connected to the same water main as the [REDACTED] home (Appendix A). The samples were collected from these homes as they had more typical service line lengths as compared with the [REDACTED] home. During the same visit, patches of asphalt were also noted along the curb on Browning Avenue, indicating that excavation had occurred. These patches, which were in proximity of the [REDACTED] service line in the parkway (see Appendix C) may be one of the potential factors contributing to the high lead at the [REDACTED] home, as it has been shown that physical disturbances to pipes can dislodge the scales within those pipes.

The two service line segments that were extracted were subsequently identified as galvanized iron pipe. Analyses conducted by Virginia Tech on the extracted portions of the pipe indicate that the galvanized iron pipe was fairly typical in terms of composition (see Appendix C). The galvanized iron portion ran from inside the [REDACTED] home to the external shut-off valve at the corner of [REDACTED] and Bryant Street. The remainder of the [REDACTED] original service line from the shut-off valve to the water was made of lead.

Although the service line had been disconnected from the [REDACTED] home, it was not possible to retrieve a segment of the lead portion of the service line as it was beyond the shut-off valve which had been closed and left in place. Following the disconnection of the original service line, a new service line made of copper was installed from the [REDACTED] home to the water main in front of the home on [REDACTED]. Subsequent to the replacement of the service line at the [REDACTED] home, water samples were also collected from the [REDACTED] home and sent to the EPA Chicago Regional Laboratory for analysis. In all three homes, the sequential samples were collected using standard protocols used in prior sequential sampling efforts to capture water samples reflecting lead levels from the kitchen tap to the water main. Two additional samples were collected from the water heater drain valve at the [REDACTED] home to determine if lead deposits had accumulated in the water heater, and a final sample was collected from the bathroom tap. The sequential sampling results indicate that the service line replacement eliminated the high lead levels and that no residual lead had accumulated within the plastic plumbing of the [REDACTED] residence, which was a potential concern and possibility based on prior research. One of the two samples collected from the [REDACTED] hot water heater had high lead (32 µg/L), likely from lead particulate that had accumulated in the tank, and the sample collected from the bathroom was 5.5 µg/L.

The sequential samples collected from the two homes on Bryant Street had differing results. At the first home (Site 2), a series of 15 sequential one-liter samples were collected and the results are indicative of a service line that does not contain any portion that is made of lead. Consequently the lead results were low overall for samples representative of the service line. The first sample in the sequential sampling series was the highest, which potentially indicates the presence of leaded brass in the faucet or underlying sink fixtures. Some leaded brasses manufactured prior to the 2011 lead-free law have been shown to release high levels of lead in certain water qualities. Leaded-solder was ruled out as the home plumbing consisted of galvanized iron pipe, and it is presumed that if the galvanized iron pipe were contributing the higher lead, the lead levels would be more consistent in all 15 samples.

At the second home (Site 3), a series of 15 sequential one-liter samples were collected from the kitchen tap and the results indicated that there were no significant sources of lead within the home plumbing but that a portion of the service line is likely made of lead, as indicated by the characteristic peaking of lead levels in the liters capturing water from the service line between the property and the water main, where the portions of many service lines in Flint are made of lead.

All three sets of sequential samples were analyzed for lead, copper, iron, phosphorus and cadmium. In contrast to the samples analyzed by Virginia Tech from the [REDACTED] home prior to the removal of the original service line, no phosphorus was present in the sequential samples at the [REDACTED] home following the replacement of the service line. In addition, no phosphorus was detected in the sequential samples from the two homes on Bryant Street. These results indicate that the source of high lead, aluminum and phosphorus in the analyses conducted by Virginia Tech was likely dislodged or disintegrated scale from within the [REDACTED] original service line.

The sequential sampling results from the [REDACTED] home before and after service line replacement, as well as the results from the two homes on Bryant Street are included in Appendix B.

Although relative contributions cannot be determined, there are a number of factors that could have contributed to the high lead levels found at the [REDACTED] home as follows:

1) Corrosiveness of water and lack of mitigating (corrosion control) treatment

The corrosiveness of the water and the absence of mitigative treatment to control lead release are well known factors that can contribute to high lead release.

2) Presence of a lead service line

Lead service lines are the largest source of lead, when present, and can contribute up to 75 percent of the total mass of lead released into the water. The portion of the original service line from the water main to the external shut-off valve at the corner of [REDACTED] and Bryant Street, estimated to be approximately 25 feet in length, was found to be a lead

pipe. In addition, studies have also shown that the scales within galvanized iron pipe downstream of lead pipe segments can be 'seeded' with lead from the lead portion of the service line. The [REDACTED] service line was much longer than most typical service lines which would allow accumulation of a greater total mass of scale within the pipe.

### 3) Physical disturbances

A recent EPA study indicates that physical disturbances in proximity to lead service lines can cause the dislodging of the protective scales from within the service lines. The photograph in Appendix C shows the scale that was dislodged from inside a lead service line during routine maintenance work in another city due to a physical disturbance of the line. The dislodged scale and sediment contained a very high concentration of lead. At the time of the EPA visit to the [REDACTED] home, there were two patches of new asphalt visible on [REDACTED] along the parkway where the [REDACTED] original service line was located, indicating recent excavation and possible recent physical disturbances to the [REDACTED] service line (Appendix C). These potential disturbances were along the galvanized iron section of the service line and as noted above, research has shown that the presence of lead pipe upstream can 'seed' the galvanized iron pipe downstream with lead, which results in an accumulation of lead-bearing scales within the galvanized pipe downstream of the lead portion of the service line. It is reasonable to assume that these physical disturbances to the galvanized iron portion of the service line could therefore result in the same dislodging of scale and sediment as studies have shown can happen with lead service lines.

The street disturbances on [REDACTED] occurred after the [REDACTED] moved into the home along the portion of the service line made of galvanized iron pipe. There were no visible signs of disturbance on Bryant Street where the lead portion of the [REDACTED] service line was situated (see Appendix C). It is likely, given the extremely high lead levels found and the co-occurrence of aluminum, phosphorus and lead, that the long segment of galvanized iron pipe was seeded with lead over the entire length of the pipe and the physical disturbances and other factors such as the water chemistry resulted in the release of large amounts of the high-lead bearing scale and sediment into the water. Virginia Tech also found nearly perfect correlations between the lead in water and markers for galvanized pipe scales including zinc.

### Recommendations

As indicated by the results from the [REDACTED] home and previous EPA work, the presence of lead pipes over many years has likely resulted in the accumulation of lead in the scales within non-lead pipes downstream of the lead pipe and physical disturbances to the lead or non-leaded portions of the service lines have the potential to release large amounts of scale and sediment that could pose an immediate and acute health hazard to the residents. Consequently, even with corrosion control treatment in place in the future, physical disturbances will be capable of dislodging the high lead-bearing scale and sediment from non-lead pipes as well as lead pipes, as was the case in the earlier EPA study.

Obtaining information on the lead reservoirs in the scales within the lead and non-leaded portions of intact service lines is essential for determining the potential risk to residents

from lead-bearing scale released as lead lines are replaced as well as the risk that may remain following removal of the lead lines, where the non-lead portions of service lines are left in place.

As the [REDACTED] service line was very long compared to the length of most typical service lines, it is important to assess the potential risk posed by the scale reservoirs in more typical lengths of service lines by extracting both the leaded and non-leaded portions of service lines which have not been physically disturbed. The service lines chosen for extraction and analysis should be representative of the materials commonly used downstream of the lead pipe (e.g., galvanized iron, copper, plastic). Extraction/handling procedures should be developed by EPA to ensure that damage to the scales from the excavation, extraction and delivery of the service line segments is minimized. Sequential sampling should also be conducted on a representative group of homes with common plumbing materials (e.g., galvanized iron, copper, plastic) to determine the extent to which the lead from the service line has seeded the interior plumbing in homes.

It is also critically important to develop and incorporate ongoing training and public education on the potential for high lead release from the scales as a result of any future physical disturbances to service lines and mitigative actions that residents can take to lower their exposure risk. The training and educational material should be assessed for clarity, meaningfulness, and accessibility by a group of residents and health experts to ensure the effectiveness of the communications.

At a minimum, immediate training and public education on the potential risks posed by physical disturbances to service lines should be developed by communications experts and provided to residents, community groups, elected officials, health departments, pediatricians and gynecologists, water and non-water utilities (gas, electric, cable, etc.), plumbing organizations and contractors. Residents should be notified of scheduled work by water and non-water utilities and informed of the potential risk of increased lead levels due to these disturbances.



## **Appendix A – Background Information**

### ***National Primary Drinking Water Regulations (NPDWR) Violations – City of Flint***

Following the switch to the Flint River, the City of Flint experienced a series of NPDWR violations as follows:

- Acute Coliform MCL violation in August 2014
- Monthly Coliform MCL violation in August 2014
- Monthly Coliform MCL violation in September 2014
- Average TTHM MCL violation in December 2014
- Average TTHM MCL violation in March 2015
- Average TTHM MCL violation in June 2015

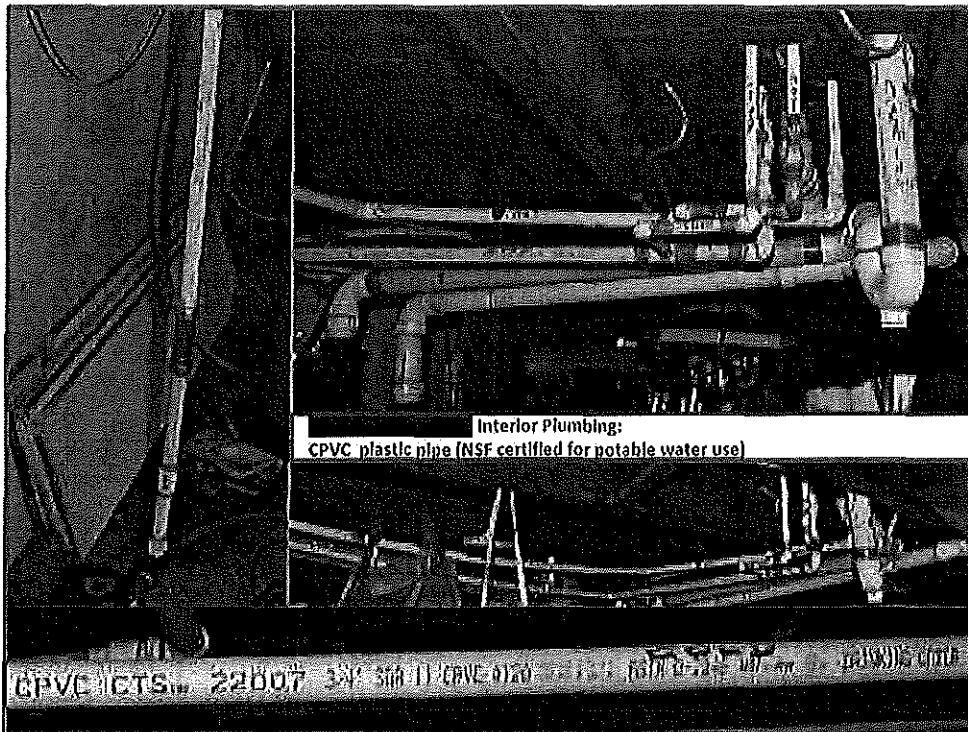
### ***Sampling Sites***

The map below shows the three homes that were sampled as provides information on the length of the service lines and the plumbing material. Two portions of the original service line were extracted and analyzed and a third portion was collected from the entry point into the home, but not analyzed.

**[map redacted because it shows Personally Identifiable Information]**

*Final Report, October 21, 2015****Internal Plumbing –*** [REDACTED]

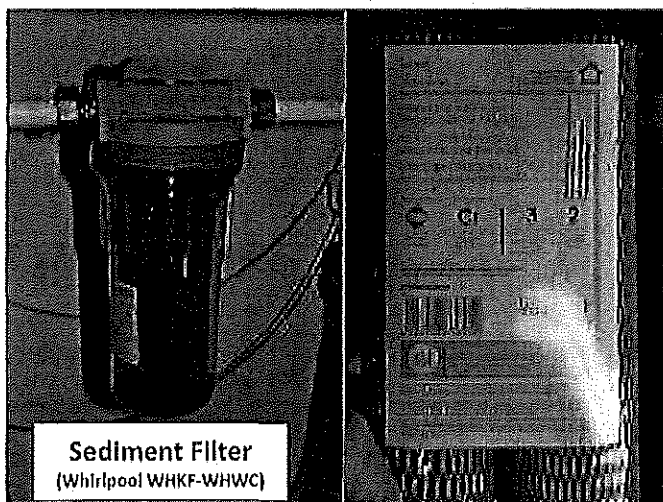
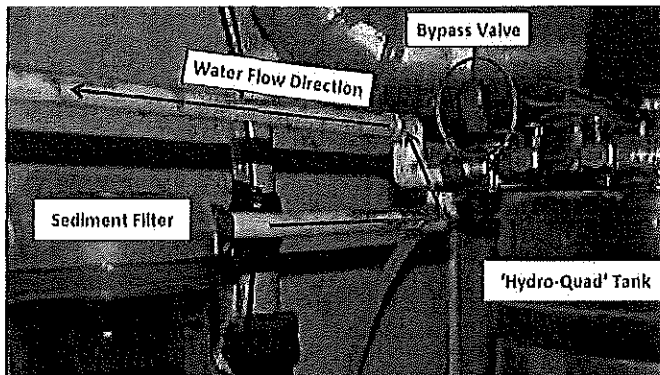
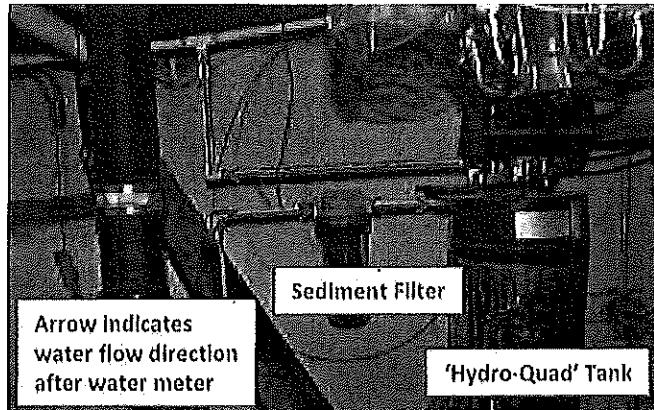
The following pictures were taken at the [REDACTED] home located at [REDACTED]. With the exception of a few minor metallic connectors, all potable water plumbing in the home was found to be CPVC plastic pipe which is NSF-certified for drinking water use.



*Final Report, October 21, 2015*

### **Treatment Units – [REDACTED]**

The [REDACTED] home has a whole-home sediment filter, as well a non-functioning 'Hydro-Quad Commercial Water Processor' which is bypassed. There was no iron filter in the home as had been previously reported.



## Appendix B – Analytical Results

Lead in water sampling results from the [REDACTED] residence ([REDACTED])

### City of Flint Samples

The City of Flint collected water samples from the [REDACTED] residence and analyzed them for lead. The results for each date are listed below.

February 18, 2015: 104 µg/L

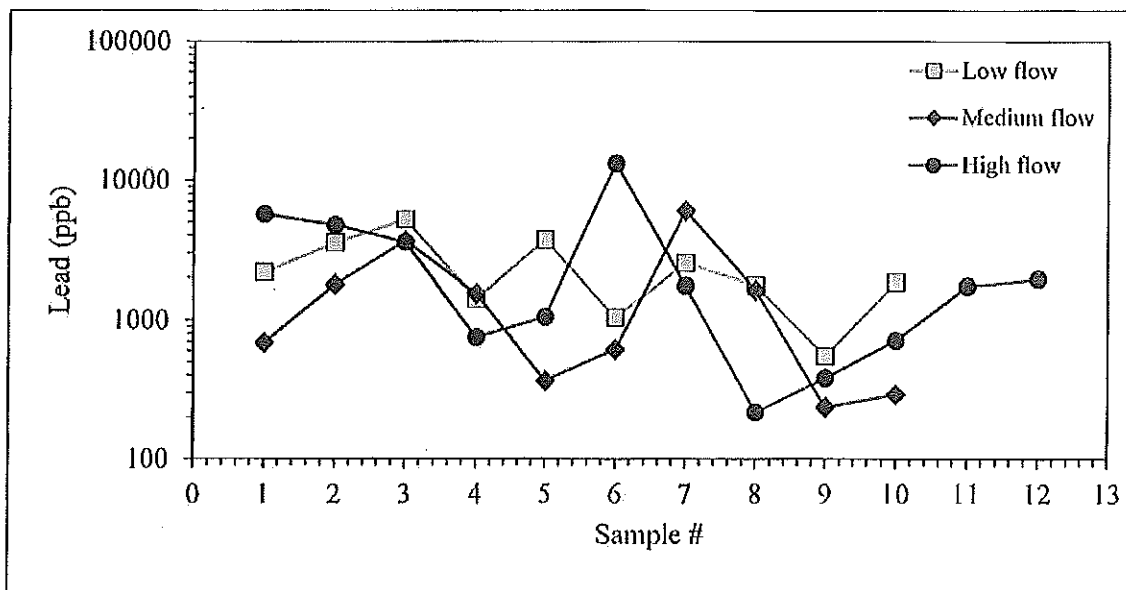
March 3, 2015: 397 µg/L

April 2, 2015: 707 µg/L\*

\*This sample result had not been provided to the [REDACTED] at the time the interim report was written.

### Virginia Tech Sampling Results (provided courtesy of Virginia Tech)

Samples were collected from the [REDACTED] home following an extended stagnation period (April 3, 2015 to April 27, 2014) after the water at the [REDACTED] residence had been shut off. The water was turned back on and three sets of sequential samples were collected on April 28, 2015, at different flow rates (low, medium and high).



Final Report, October 21, 2015

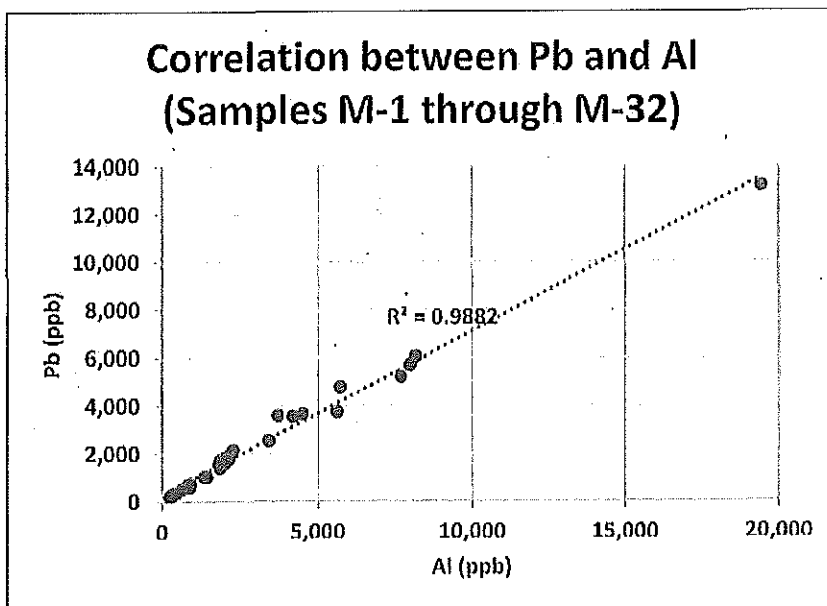
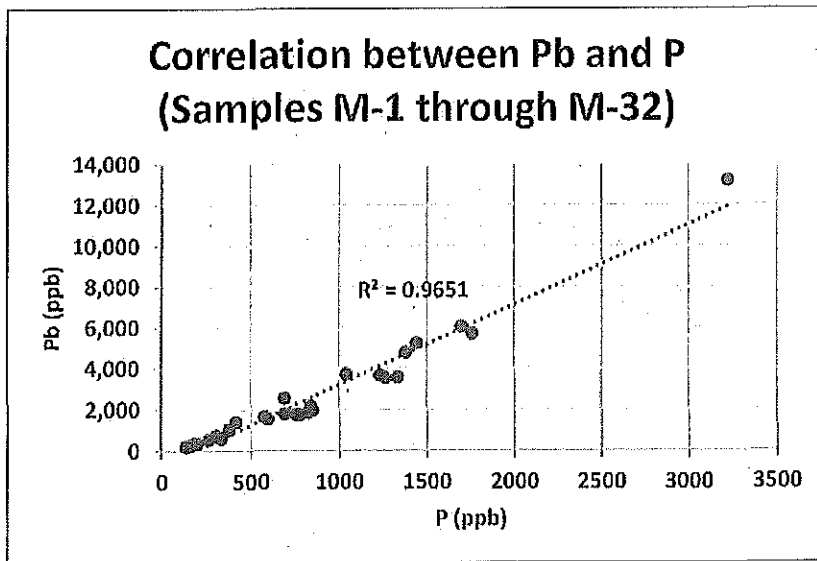
| Element<br>(units) | Low Flow          |        |        |        |        |        |        |                      |        |        |
|--------------------|-------------------|--------|--------|--------|--------|--------|--------|----------------------|--------|--------|
|                    | 1 L Sample Bottle |        |        |        |        |        |        | 125 mL Sample Bottle |        |        |
|                    | M-1               | M-2    | M-3    | M-4    | M-5    | M-6    | M-7    | M-21                 | M-22   | M-23   |
| Ag (ppb)           | 0                 | 0      | 0      | 0      | 0      | 0      | 0      | 0                    | 0      | 0      |
| Al (ppb)           | 2,285             | 4,199  | 7,683  | 1,856  | 5,623  | 1,422  | 3,413  | 1,865                | 666    | 2,015  |
| As (ppb)           | 3.3               | 3.9    | 4      | 2      | 3.2    | 2      | 2.6    | 3.6                  | 1.9    | 3.1    |
| Ba (ppb)           | 31.3              | 39.8   | 27.7   | 21.2   | 24.2   | 20.9   | 22.8   | 31.3                 | 21.3   | 32.6   |
| Ca (ppb)           | 43,150            | 43,620 | 43,580 | 42,590 | 43,030 | 42,030 | 42,440 | 40,790               | 41,050 | 41,460 |
| Cd (ppb)           | 2.5               | 4.2    | 5.7    | 1.9    | 3.9    | 2      | 2.5    | 2.2                  | 1.4    | 2.4    |
| Cl (ppm)           | 1,206             | 1,148  | 1,272  | 1,178  | 1,187  | 1,214  | 1,218  | 1,641                | 1,076  | 1,044  |
| Co (ppb)           | 1.1               | 1.7    | 0.9    | 0.4    | 0.7    | 0.4    | 0.5    | 0.9                  | 0.3    | 1      |
| Cr (ppb)           | 2.1               | 2.5    | 2.6    | 1.3    | 1.9    | 1.6    | 1.5    | 1.8                  | 1.3    | 1.7    |
| Cu (ppb)           | 235               | 355    | 294    | 94     | 146    | 101    | 112    | 180                  | 82     | 178    |
| Fe (ppb)           | 3,598             | 4,928  | 3,419  | 1,446  | 3,029  | 2,142  | 1,780  | 3,096                | 1,344  | 3,241  |
| K (ppb)            | 3,480             | 3,508  | 3,445  | 3,435  | 3,430  | 3,391  | 3,409  | 3,256                | 3,319  | 3,341  |
| Mg (ppb)           | 10,310            | 11,910 | 17,990 | 11,290 | 15,470 | 10,610 | 12,720 | 8,861                | 9,396  | 9,098  |
| Mn (ppb)           | 1,734             | 2,790  | 1,093  | 462    | 703    | 429    | 652    | 1,382                | 442    | 1,509  |
| Mo (ppb)           | 2.3               | 2.3    | 1.9    | 1.9    | 1.9    | 1.8    | 1.8    | 1.7                  | 1.7    | 1.8    |
| Na (ppb)           | 17,790            | 17,860 | 17,810 | 17,620 | 17,650 | 17,410 | 17,610 | 16,960               | 17,100 | 17,280 |
| Ni (ppb)           | 9.8               | 16     | 30.7   | 8.1    | 23.2   | 6.2    | 15.3   | 6.6                  | 3.7    | 6.8    |
| P (ppb)            | 835               | 1,267  | 1,441  | 416    | 1,040  | 379    | 691    | 773                  | 261    | 819    |
| Pb (ppb)           | 2,171             | 3,550  | 5,224  | 1,412  | 3,735  | 1,038  | 2,542  | 1,759                | 552    | 1,857  |
| S (ppm)            | 28.5              | 28.7   | 28.5   | 28.4   | 28.5   | 28     | 28     | 26                   | 27     | 27.1   |
| Se (ppb)           | 0.2               | 0      | -0.1   | 0.1    | 0.2    | 0      | 0.3    | 0                    | 0      | 0.2    |
| Si (ppb)           | 3,212             | 5,281  | 12,320 | 4,474  | 9,401  | 3,770  | 6,231  | 2,619                | 2,582  | 2,775  |
| Sn (ppb)           | 4.6               | 4.9    | 6.1    | 2.2    | 4.5    | 2.3    | 3      | 2.3                  | 1.5    | 2.3    |
| Sr (ppb)           | 129.4             | 132.3  | 128.5  | 125    | 127.7  | 125.3  | 126.1  | 126.3                | 125.5  | 128    |
| Tl (ppb)           | 3.4               | 5.8    | 8.3    | 2.1    | 5.8    | 1.9    | 3.1    | 3                    | 1.4    | 3.1    |
| U (ppb)            | 1                 | 1.6    | 2.6    | 0.8    | 1.9    | 0.7    | 1.2    | 0.9                  | 0.4    | 0.9    |
| V (ppb)            | 13.9              | 17.5   | 23.9   | 9.8    | 17.6   | 8.9    | 13.8   | 12.2                 | 6      | 10.8   |
| Zn (ppb)           | 1,055             | 1,848  | 2,731  | 777    | 1,890  | 839    | 979    | 746                  | 513    | 808    |

| Element<br>(units) | Medium Flow       |        |        |        |        |        |        |                      |        |        |
|--------------------|-------------------|--------|--------|--------|--------|--------|--------|----------------------|--------|--------|
|                    | 1 L Sample Bottle |        |        |        |        |        |        | 125 mL Sample Bottle |        |        |
|                    | M-8               | M-9    | M-10   | M-11   | M-12   | M-13   | M-14   | M-24                 | M-25   | M-26   |
| Ag (ppb)           | 0                 | 0      | 0      | 0      | 0      | 0      | 0      | 0                    | 0      | 0      |
| Al (ppb)           | 891               | 2,142  | 4,493  | 1,810  | 431    | 877    | 8,159  | 2,005                | 286    | 347    |
| As (ppb)           | 2.2               | 2.9    | 3.9    | 2.5    | 2      | 2.3    | 4.6    | 2.7                  | 1.8    | 2      |
| Ba (ppb)           | 22                | 29.1   | 36.3   | 28     | 18.9   | 22.6   | 37.1   | 26.2                 | 18.9   | 19.4   |
| Ca (ppb)           | 41,520            | 41,580 | 42,080 | 41,490 | 41,020 | 40,850 | 42,010 | 40,940               | 41,110 | 40,550 |
| Cd (ppb)           | 1.5               | 2.4    | 4      | 2.1    | 1      | 1.5    | 4.9    | 2.9                  | 0.9    | 1      |
| Cl (ppm)           | 1,329             | 1,211  | 1,252  | 1,225  | 1,507  | 1,321  | 1,324  | 1,179                | 1,258  | 1,318  |
| Co (ppb)           | 0.4               | 0.8    | 1.3    | 0.7    | 0.2    | 0.4    | 1.4    | 0.7                  | 0.2    | 0.2    |
| Cr (ppb)           | 1.1               | 1.5    | 2.2    | 1.4    | 1.2    | 1.1    | 3.5    | 2.1                  | 1.1    | 1.1    |
| Cu (ppb)           | 104               | 151    | 257    | 144    | 65     | 119    | 267    | 166                  | 52     | 59     |
| Fe (ppb)           | 1,510             | 2,476  | 4,254  | 2,258  | 912    | 1,471  | 4,563  | 3,450                | 711    | 820    |
| K (ppb)            | 3,363             | 3,391  | 3,370  | 3,352  | 3,344  | 3,311  | 3,360  | 3,308                | 3,356  | 3,311  |
| Mg (ppb)           | 9,769             | 9,960  | 12,360 | 9,703  | 9,331  | 9,513  | 16,430 | 10,820               | 9,237  | 9,166  |
| Mn (ppb)           | 498               | 1,185  | 1,878  | 1,052  | 231    | 536    | 1,947  | 967                  | 167    | 220    |
| Mo (ppb)           | 1.8               | 1.8    | 1.8    | 1.9    | 1.8    | 1.8    | 2.2    | 2                    | 1.7    | 1.7    |
| Na (ppb)           | 17,240            | 17,370 | 17,370 | 17,310 | 17,190 | 17,010 | 17,320 | 17,020               | 17,140 | 16,950 |
| Ni (ppb)           | 4.1               | 7.7    | 16.2   | 6.8    | 2.7    | 3.8    | 33     | 7.7                  | 2.1    | 2.4    |
| P (ppb)            | 321               | 690    | 1,233  | 595    | 178    | 332    | 1,697  | 573                  | 144    | 163    |
| Pb (ppb)           | 688               | 1,791  | 3,655  | 1,549  | 366    | 616    | 6,048  | 1,631                | 237    | 292    |
| S (ppm)            | 27.6              | 27.5   | 27.3   | 27.3   | 27.1   | 26.9   | 27     | 26.4                 | 27     | 26.6   |
| Se (ppb)           | 0                 | 0      | 0.2    | 0.1    | 0.1    | 0.2    | 0.2    | 0.3                  | 0.1    | 0      |
| Si (ppb)           | 2,892             | 3,591  | 6,180  | 3,307  | 2,445  | 2,756  | 11,280 | 4,184                | 2,274  | 2,303  |
| Sn (ppb)           | 2.2               | 2.6    | 4.4    | 2.5    | 1.4    | 1.8    | 4.9    | 3                    | 1      | 1.1    |
| Sr (ppb)           | 124               | 128    | 128    | 126    | 124    | 124    | 128    | 126                  | 125    | 124    |
| Tl (ppb)           | 1.6               | 2.9    | 5.5    | 2.5    | 1      | 1.2    | 7.7    | 2.7                  | 0.4    | 0.6    |
| U (ppb)            | 0.5               | 0.9    | 1.7    | 0.9    | 0.4    | 0.5    | 2.7    | 0.9                  | 0.3    | 0.3    |
| V (ppb)            | 8.4               | 11.9   | 17.5   | 10.4   | 8.2    | 8.4    | 25.1   | 9.7                  | 6      | 7.4    |
| Zn (ppb)           | 657               | 933    | 1,669  | 836    | 366    | 592    | 1,934  | 1,304                | 305    | 337    |

| Element<br>(units) | High Flow         |        |        |        |        |        |                      |        |        |        |        |        |
|--------------------|-------------------|--------|--------|--------|--------|--------|----------------------|--------|--------|--------|--------|--------|
|                    | 1 L Sample Bottle |        |        |        |        |        | 125 mL Sample Bottle |        |        |        |        |        |
|                    | M-15              | M-16   | M-17   | M-18   | M-19   | M-20   | M-27                 | M-28   | M-29   | M-30   | M-31   | M-32   |
| Ag (ppb)           | 0                 | 0      | 0      | 0      | 0      | 0      | 0                    | 0      | 0      | 0      | 0      | 0      |
| Al (ppb)           | 7,984             | 5,713  | 3,714  | 912    | 1,354  | 19,440 | 1,893                | 248    | 455    | 822    | 1,859  | 2,176  |
| As (ppb)           | 5                 | 4.1    | 4.3    | 1.9    | 2.1    | 7.4    | 2.9                  | 2      | 2.2    | 2.3    | 3.2    | 3.4    |
| Ba (ppb)           | 40                | 37     | 45     | 21     | 22     | 41     | 32                   | 19     | 20     | 22     | 31     | 34     |
| Ca (ppb)           | 42,200            | 41,870 | 41,760 | 41,120 | 41,110 | 43,860 | 41,410               | 40,730 | 40,990 | 40,550 | 41,000 | 41,050 |
| Cd (ppb)           | 5.6               | 4.1    | 3.7    | 1.4    | 1.9    | 9.3    | 2.2                  | 0.9    | 1.2    | 1.6    | 2.1    | 2.5    |
| Cl (ppm)           | 1,347             | 1,261  | 1,088  | 1,150  | 1,138  | 1,285  | 891                  | 1,261  | 1,309  | 1,215  | 1,121  | 1,226  |
| Co (ppb)           | 1.6               | 1.4    | 1.7    | 0.4    | 0.4    | 1.9    | 0.9                  | 0.2    | 0.3    | 0.4    | 0.9    | 1      |
| Cr (ppb)           | 2.8               | 2.4    | 2.6    | 1.3    | 1.3    | 4.8    | 1.7                  | 1.1    | 1.5    | 1.5    | 1.6    | 1.8    |
| Cu (ppb)           | 541               | 24     | 276    | 89     | 105    | 351    | 165                  | 52     | 70     | 96     | 167    | 192    |
| Fe (ppb)           | 4,926             | 4,288  | 5,323  | 1,509  | 1,705  | 6,491  | 3,074                | 667    | 1,215  | 1,591  | 3,026  | 3,349  |
| K (ppb)            | 3,363             | 3,350  | 3,343  | 3,327  | 3,305  | 3,410  | 3,361                | 3,320  | 3,348  | 3,287  | 3,333  | 3,331  |
| Mg (ppb)           | 15,910            | 13,430 | 9,758  | 9,633  | 10,240 | 29,890 | 9,110                | 9,158  | 9,305  | 9,462  | 9,051  | 9,157  |
| Mn (ppb)           | 2,067             | 2,058  | 2,818  | 498    | 503    | 1,975  | 1,401                | 149    | 301    | 534    | 1,369  | 1,638  |
| Mo (ppb)           | 2                 | 2      | 2      | 1.9    | 1.9    | 2.2    | 1.8                  | 1.8    | 1.8    | 1.8    | 1.8    | 1.8    |
| Na (ppb)           | 17,340            | 17,310 | 17,280 | 17,110 | 16,980 | 17,540 | 17,370               | 17,040 | 17,210 | 16,840 | 17,250 | 17,230 |
| Ni (ppb)           | 30.6              | 21.7   | 11.8   | 4.6    | 5.8    | 80     | 7.5                  | 3      | 2.8    | 3.9    | 6.3    | 7.2    |
| P (ppb)            | 1,758             | 1,378  | 1,336  | 308    | 378    | 3,224  | 771                  | 134    | 199    | 299    | 756    | 847    |
| Pb (ppb)           | 5,702             | 4,781  | 3,585  | 755    | 1,055  | 13,200 | 1,752                | 217    | 384    | 715    | 1,742  | 1,962  |
| S (ppm)            | 27.2              | 26.9   | 26.8   | 26.7   | 26.6   | 27.1   | 27                   | 26.6   | 26.9   | 26.2   | 26.8   | 26.4   |
| Se (ppb)           | 0.2               | 0.2    | 0.2    | 0      | 0      | 0.1    | 0                    | 0.2    | 0.1    | 0.2    | 0.1    | 0.1    |
| Si (ppb)           | 10,530            | 7,660  | 3,636  | 2,830  | 3,573  | 26,740 | 2,680                | 2,258  | 2,422  | 2,687  | 2,661  | 2,826  |
| Sn (ppb)           | 5.6               | 4.2    | 3.8    | 1.8    | 2      | 8.9    | 2.2                  | 1      | 1.3    | 1.6    | 2.2    | 2.5    |
| Sr (ppb)           | 129               | 128    | 129    | 125    | 125    | 131    | 128                  | 125    | 125    | 125    | 127    | 127    |
| Ti (ppb)           | 8.2               | 6.1    | 6.2    | 1.1    | 2.2    | 16.9   | 3.7                  | 0.5    | 0.8    | 1.3    | 3      | 3.1    |
| U (ppb)            | 2.7               | 2      | 1.6    | 0.5    | 0.6    | 5.6    | 0.9                  | 0.3    | 0.4    | 0.5    | 0.9    | 1      |
| V (ppb)            | 24.3              | 19.8   | 16.3   | 6.8    | 8.3    | 51.3   | 10.2                 | 6.5    | 7.8    | 8      | 10.9   | 11.7   |
| Zn (ppb)           | 2,520             | 1,622  | 1,305  | 593    | 796    | 3,652  | 752                  | 293    | 395    | 603    | 739    | 856    |

### Correlation between lead, phosphorus and aluminum

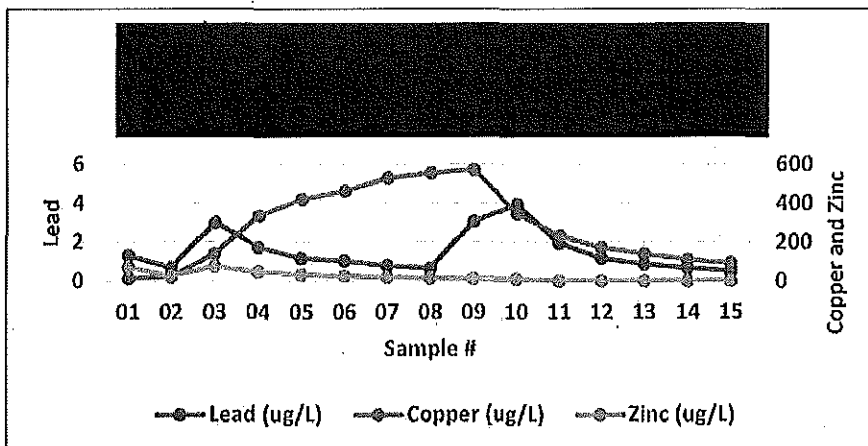
The correlation of lead and phosphate, as well as lead and aluminum, indicate that the samples were captured scale and sediment that had formed inside the pipes while the City of Flint was purchasing water from Detroit. The absence of these chemicals in the current treatment provided by Flint indicate that these elements were not in the water passing through the pipes, but came from the scales inside the service line which had disintegrated into the water or were dislodged into the water.





*U.S. EPA Region 5 sampling***██████████ residence (following replacement of service line)**

Following the replacement of the ██████████ original service line, a series of 15 sequential samples were collected from the kitchen tap to measure the lead levels and other parameters to ensure that the high lead from the original service line had not contaminated the interior plumbing at the ██████████ home. With the exception of two areas, lead levels were low throughout the ██████████ plumbing following the service line replacement. The two sources of lead that were still detected in the plumbing are likely the water meter (Sample 3) and the new external service shut-off valve (Samples 9-11). Although new brass plumbing components must be lead-free, there can still be some lead that is released from these components.



██████████: (██████████ home)

**After Service Line Replacement**

| Sample # | Site Description | Copper (ug/L) | Lead (ug/L) | Zinc (ug/L) | Cadmium (mg/L) | Iron (mg/L) | Phosphorus (mg/L) |
|----------|------------------|---------------|-------------|-------------|----------------|-------------|-------------------|
| 01       | Kitchen          | 13.1          | 1.3         | 70.9        | U              | 0.171       | U                 |
| 02       | Kitchen          | 20.1          | 0.687       | 23.2        | U              | 0.117       | U                 |
| 03       | Kitchen          | 141           | 3.01        | 76.8        | U              | 0.144       | U                 |
| 04       | Kitchen          | 336           | 1.76        | 45.4        | U              | 0.151       | U                 |
| 05       | Kitchen          | 419           | 1.17        | 32.2        | U              | 0.149       | U                 |
| 06       | Kitchen          | 463           | 1.03        | 24.8        | U              | 0.149       | U                 |
| 07       | Kitchen          | 529           | 0.8         | 19.6        | U              | 0.146       | U                 |
| 08       | Kitchen          | 554           | 0.666       | 14.9        | U              | 0.147       | U                 |
| 09       | Kitchen          | 571           | 3.07        | 11.6        | U              | 0.195       | U                 |
| 10       | Kitchen          | 345           | 3.93        | 10.3        | U              | 0.282       | U                 |
| 11       | Kitchen          | 233           | 1.94        | 0           | U              | 0.283       | U                 |

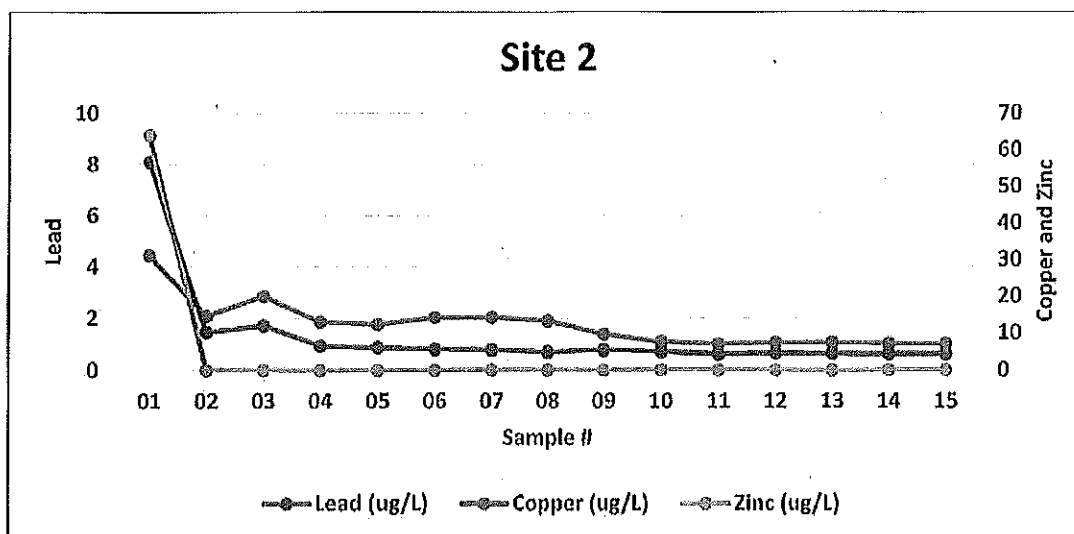
██████████. (██████████ home)

### After Service Line Replacement

| Sample # | Site Description | Copper (ug/L) | Lead (ug/L) | Zinc (ug/L) | Cadmium (mg/L) | Iron (mg/L) | Phosphorus (mg/L) |
|----------|------------------|---------------|-------------|-------------|----------------|-------------|-------------------|
| 12       | Kitchen          | 171           | 1.17        | 0           | U              | 0.290       | U                 |
| 13       | Kitchen          | 139           | 0.864       | 0           | U              | 0.292       | U                 |
| 14       | Kitchen          | 110           | 0.67        | 0           | U              | 0.294       | U                 |
| 15       | Kitchen          | 91.5          | 0.505       | 0           | U              | 0.297       | U                 |
| 16       | Bathroom         | 29.7          | 5.52        | 71.3        | U              | 0.259       | U                 |
| 17       | Water Heater     | 70.4          | 31.7        | 883         | U              | 0.540       | 0.0877            |
| 18       | Water Heater     | 35            | 9.74        | 346         | U              | 0.0870      | U                 |

### Site #2 (Bryant Street)

Based on the results found at this home, it does not appear that any portion of the service line is made of lead, and as a result, the lead levels are low in most samples. The exception is in Sample 1 which reflects water within approximately 15 feet of the kitchen tap and is likely due to brass components in the faucet, underlying valves and fixtures.



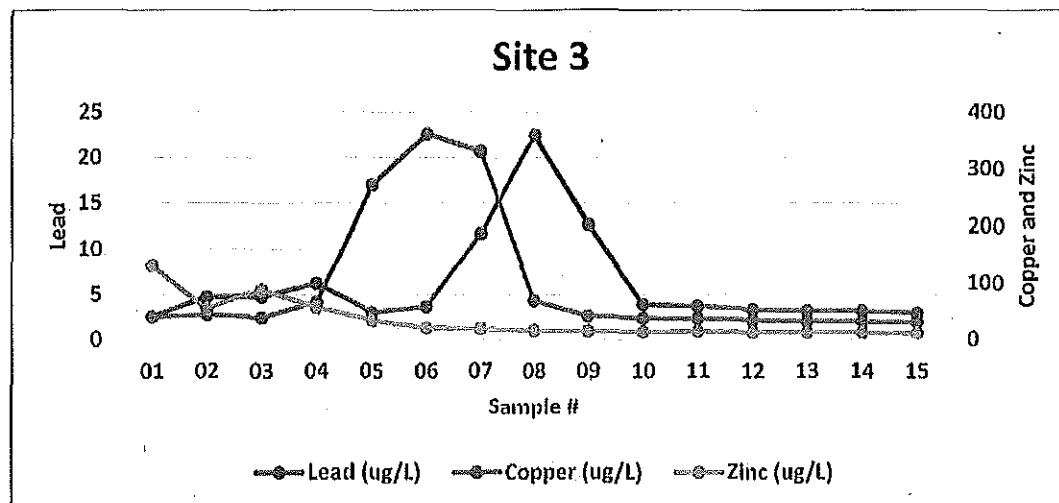
## Site 2

(Note: U for Zinc replaced with 0 to show on graph)

| Sample # | Copper (ug/L) | Lead (ug/L) | Zinc (ug/L) | Cadmium (mg/L) | Iron (mg/L) | Phosphorus (mg/L) |
|----------|---------------|-------------|-------------|----------------|-------------|-------------------|
| 01       | 31.1          | 8.11        | 64          | U              | 0.0307      | U                 |
| 02       | 14.7          | 1.46        | U           | U              | 0.0302      | U                 |
| 03       | 20            | 1.72        | U           | U              | 0.0302      | U                 |
| 04       | 13            | 0.933       | U           | U              | 0.0301      | U                 |
| 05       | 12.3          | 0.862       | U           | U              | 0.0311      | U                 |
| 06       | 14.2          | 0.795       | U           | U              | 0.0298      | U                 |
| 07       | 14.2          | 0.769       | U           | U              | 0.0311      | U                 |
| 08       | 13.3          | 0.691       | U           | U              | 0.0317      | U                 |
| 09       | 9.6           | 0.774       | U           | U              | 0.0319      | U                 |
| 10       | 7.57          | 0.715       | U           | U              | 0.0313      | U                 |
| 11       | 7.04          | 0.611       | U           | U              | 0.0301      | U                 |
| 12       | 7.3           | 0.655       | U           | U              | 0.0336      | U                 |
| 13       | 7.37          | 0.644       | U           | U              | 0.0308      | U                 |
| 14       | 7.09          | 0.631       | U           | U              | 0.0313      | U                 |
| 15       | 7.05          | 0.621       | U           | U              | 0.0300      | U                 |

## Site #3 (Bryant Street)

Based on the results found at this home, it appears that the portion of the service line from the external service shut-off valve to the water main is made of lead as indicated by the increase in lead levels in samples 7 through 9.



### Site 3

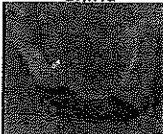
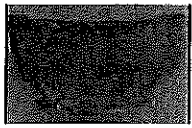
| Sample # | Copper<br>(ug/L) | Lead<br>(ug/L) | Zinc<br>(ug/L) | Cadmium<br>(mg/L) | Iron<br>(mg/L) | Phosphorus<br>(mg/L) |
|----------|------------------|----------------|----------------|-------------------|----------------|----------------------|
| 01       | 40.7             | 2.63           | 132            | U                 | 0.0622         | U                    |
| 02       | 44.4             | 4.77           | 55.3           | U                 | 0.249          | U                    |
| 03       | 39.3             | 4.79           | 88.8           | U                 | 0.179          | U                    |
| 04       | 66.8             | 6.26           | 57.2           | U                 | 0.346          | U                    |
| 05       | 272              | 3.07           | 34.2           | U                 | 0.105          | U                    |
| 06       | 362              | 3.7            | 21.4           | U                 | 0.0598         | U                    |
| 07       | 331              | 11.7           | 19.5           | U                 | 0.0512         | U                    |
| 08       | 69.9             | 22.5           | 16.6           | U                 | 0.0399         | U                    |
| 09       | 42.5             | 12.7           | 15.1           | U                 | 0.0480         | U                    |
| 10       | 38.4             | 3.94           | 14.4           | U                 | 0.0489         | U                    |
| 11       | 37.5             | 3.72           | 14.5           | U                 | 0.0492         | U                    |
| 12       | 34.8             | 3.39           | 13.6           | U                 | 0.0481         | U                    |
| 13       | 33.1             | 3.23           | 13.1           | U                 | 0.0484         | U                    |
| 14       | 32.8             | 3.2            | 13             | U                 | 0.0480         | U                    |
| 15       | 31.4             | 3              | 12.3           | U                 | 0.0490         | U                    |

#### Analysis of [REDACTED] original service line pipe (galvanized iron portions)

Lead can also be found in galvanized pipe coatings as a contaminant in the zinc that is used to coat the surface of iron pipe in the galvanizing process. As such, two sections of the [REDACTED] original service line were analyzed for lead content.

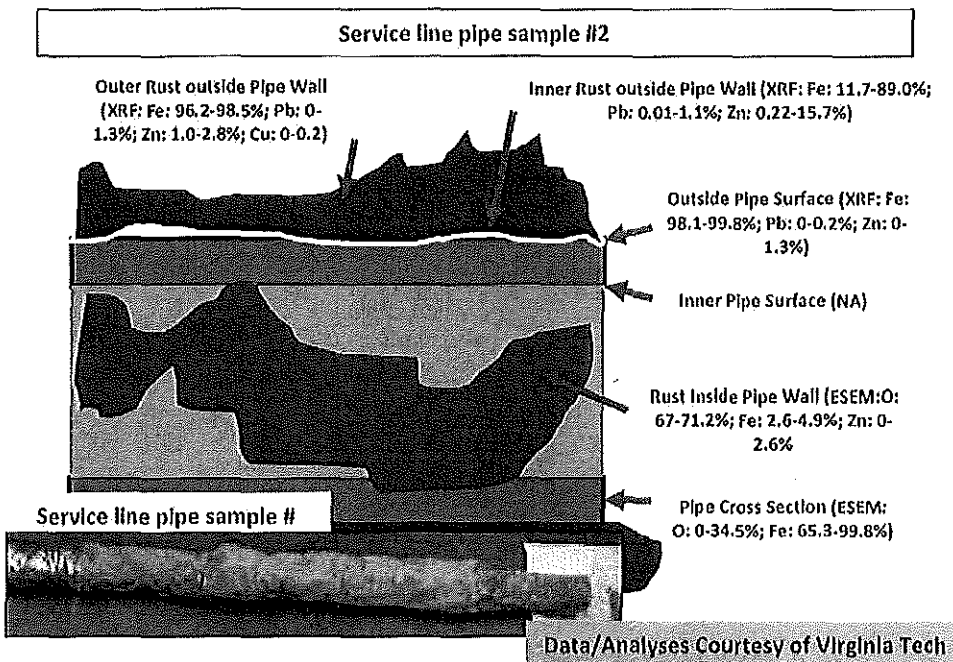
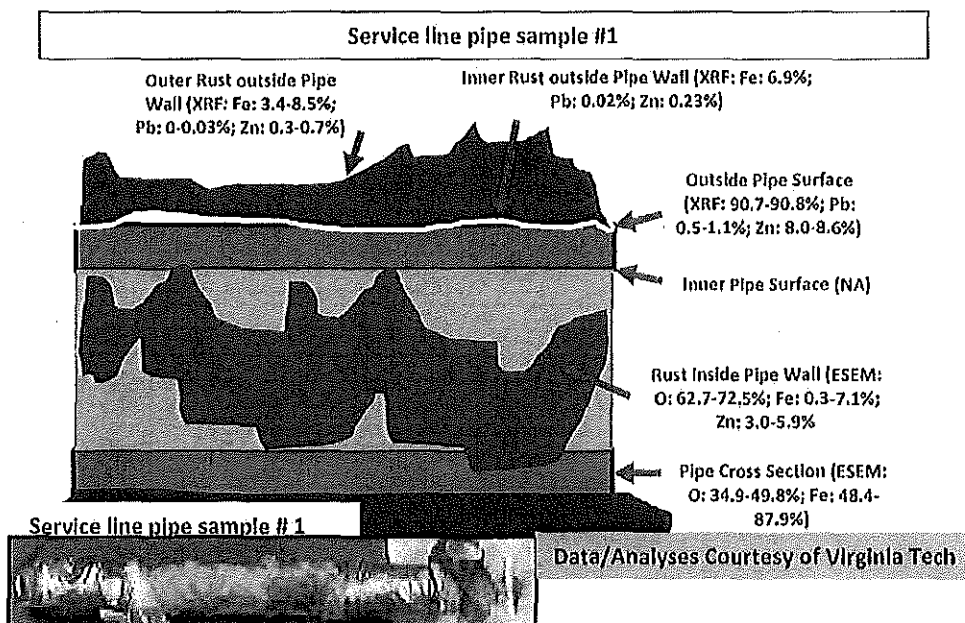
The images and data presented below are for a typical range of galvanized iron pipe.

#### Lead Content of Galvanized Iron Pipe - Examples

| China                                                                               | Turkey                                                                              | US                                                                                  | No ID                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |
| Inside: Fe: 16.8-94.3%, Zn: 0.1-83.7%, Pb: 0-0.7%                                   | Inside: Fe: 13.1-26.8%, Zn: 71.3-85.9%, Pb: 0.4-0.9%                                | Inside: Fe: 0.9-37.4%, Zn: 61.3-96.8%, Pb: ND                                       | Inside: Fe: 3.9-69.1%, Zn: 29.3-93.1%, Pb: 0-1.3%                                   |
|  |  |  |  |
| Outside: Fe: 4.6-12.6%, Zn: 81.5-94.1%, Pb: 1.0-1.1%                                | Outside: Fe: 37.6-57.1%, Zn: 41.6-60.1%, Pb: 0.8-1.0%                               | Outside: Fe: 1.8-14.9%, Zn: 19-98.1%, Pb: ND                                        | Outside: Fe: 7.2-13.0%, Zn: 86.2-91.7%, Pb: 0.5-0.8%                                |

Data/Analyses Courtesy of Virginia Tech

Below are the results of the galvanized pipe analyses conducted by Virginia Tech on the two sections of galvanized iron pipe from the [REDACTED] original service line. The analyses indicate that the [REDACTED] original service line was a typical galvanized iron pipe.



### Lead portion of the [REDACTED] original service line

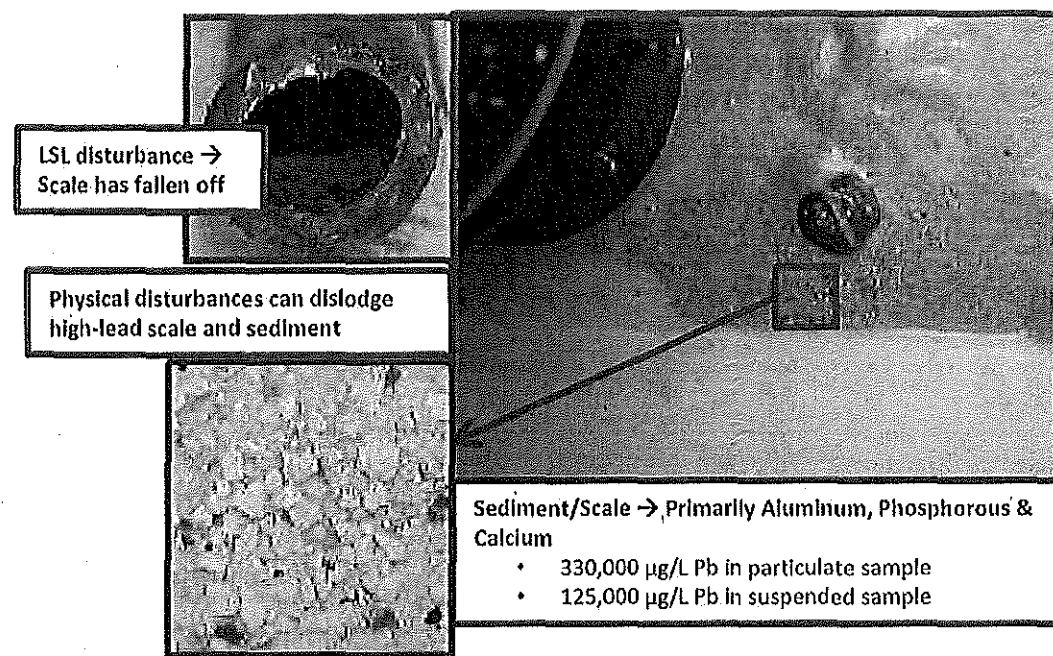
Lead service lines can contribute up to 75 percent of the total mass release into the water. The portion of the [REDACTED] original service line from the water main to the external shut-off valve at the corner of [REDACTED] and Bryant Street is made of lead and is estimated to be approximately 25 feet in length.



## Appendix C – Additional Information

### *Physical disturbance of lead service lines*

A recent EPA study indicates that physical disturbances to lead service lines or in proximity to lead service lines can cause the dislodging of the protective scales from within the lines. The photograph below shows the scale that was dislodged from inside a lead service line during routine maintenance work in another city due to a physical disturbance of the line. The dislodged scale and sediment contained a very high concentration of lead.



Lead service line scale analyses were found to be a common factor for the majority of sites with high lead levels. It is also possible that low water usage may play a role in sites with the highest lead levels.

Lead service line scale analyses conducted by EPA's Office of Research and Development or obtained from peer-reviewed published literature from cities across the U.S. and in Canada (summarized below) show that scales within lead service lines can contain very high concentrations of lead. The yellow highlighted column in the table below shows the percentage of lead that has been found within different scales inside of lead service lines.

| Lead & Element Percentages in Important Corrosion Byproduct Solids |                                                                      |       |      |       |       |      |      |
|--------------------------------------------------------------------|----------------------------------------------------------------------|-------|------|-------|-------|------|------|
| Mineral Name                                                       | Formula                                                              | % Pb  | %C   | %O    | %S    | % P  | %Cl  |
| litharge, massicot                                                 | PbO                                                                  | 97.80 | 0.00 | 7.20  | 0.00  | 0.00 |      |
| plattnerite, scrutinyite                                           | PbO <sub>2</sub>                                                     | 86.60 | 0.00 | 13.40 | 0.00  | 0.00 |      |
| Cerussite                                                          | PbCO <sub>3</sub>                                                    | 77.50 | 4.50 | 18.00 | 0.00  | 0.00 |      |
| Hydrocerussite                                                     | Pb <sub>3</sub> (CO <sub>3</sub> ) <sub>2</sub> (OH) <sub>2</sub>    | 80.10 | 3.10 | 16.50 | 0.00  | 0.00 | 0.00 |
| Plumbonacrite                                                      | Pb <sub>10</sub> (CO <sub>3</sub> ) <sub>6</sub> (OH) <sub>6</sub> O | 81.30 | 2.80 | 15.70 | 0.00  | 0.00 | 0.00 |
| Anglesite                                                          | PbSO <sub>4</sub>                                                    | 68.30 | 0.00 | 21.10 | 10.60 | 0.00 | 0.00 |

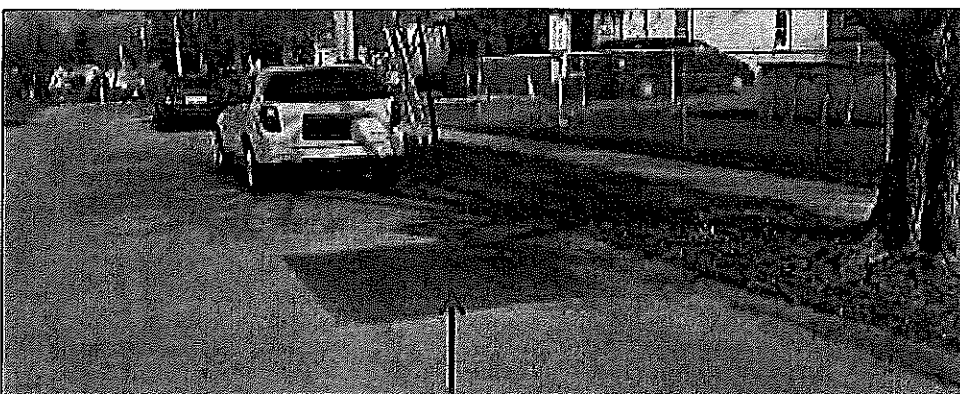
| Lead & Element Percentages in Important Corrosion Byproduct Solids |                            |       |      |       |      |      |      |
|--------------------------------------------------------------------|----------------------------|-------|------|-------|------|------|------|
| Mineral Name                                                       | Formula                    | % Pb  | % C  | % O   | % S  | % P  | % Cl |
| Leadhillite, Susannite, MacPhersonite                              | $Pb_4(SO_4)(CO_3)_2(OH)_2$ | 76.80 | 2.20 | 17.80 | 3.00 | 0.00 | 0.00 |
| Hydroxypyromorphite                                                | $Pb_5(PO_4)_3OH$           | 77.43 | 0.00 | 15.55 | 0.00 | 6.95 | 0.00 |
| Chloropyromorphite                                                 | $Pb_5(PO_4)_3Cl$           | 76.38 | 0.00 | 14.15 | 0.00 | 6.85 | 2.61 |
| Tertiary Lead Orthophosphate                                       | $Pb_3(PO_4)_2$             | 76.60 | 0.00 | 15.80 | 0.00 | 7.60 | 0.00 |
| Lead(II) orthophosphate                                            | $Pb_3(PO_4)_2$             | 76.60 | 0.00 | 15.80 | 0.00 | 7.60 | 0.00 |

While visiting the [REDACTED] home, two fresh patches of asphalt were seen along the parkway where the [REDACTED] original service line was located. The jarring and vibration associated with excavation can dislodge the high lead-bearing scales from within the service line pipes.



Recent patch (#1) of asphalt along curb next to the parkway where the [REDACTED] service line runs.

Photograph taken by U.S. EPA on April 27, 2015



Recent patch (#2) of asphalt along curb next to the parkway where the [REDACTED] service line runs.

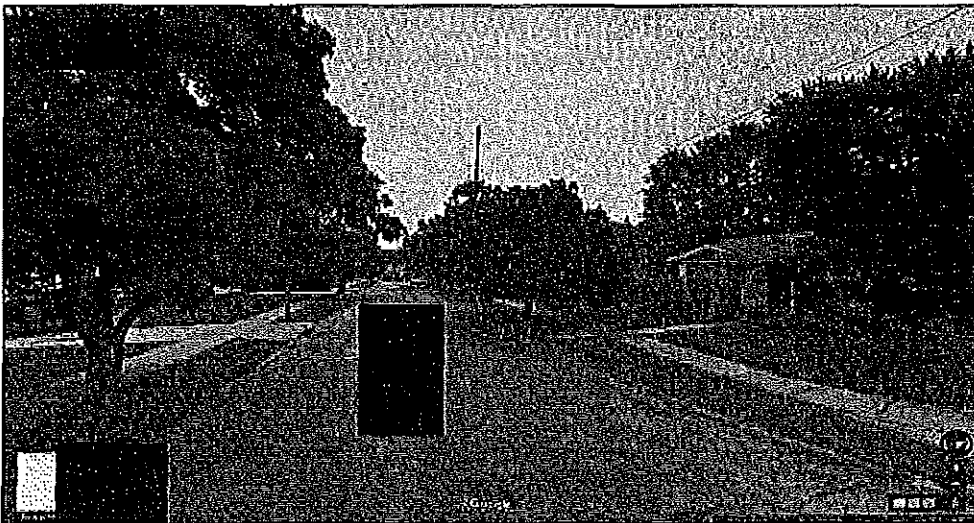
Photograph taken by U.S. EPA on April 27, 2015





July 2011 image [REDACTED] (view from [REDACTED] toward Bryant Street).

Google 'Street View' Image 1 captured in July 2011 shows no patches in street along curb next to the parkway where the [REDACTED] service line runs toward Bryant Street, indicating that the physical disturbances occurred after the date this image was captured (July 2011).



July 2011 image of [REDACTED] (view from Bryant Street toward [REDACTED]).

Google 'Street View' Image 2 captured in July 2011 shows no patches in street along curb next to the parkway where the [REDACTED] service line runs toward Bryant Street, indicating that the physical disturbances occurred after the date this image was captured (July 2011).



Corner of [REDACTED] and Bryant Street (location of [REDACTED] original external shut-off valve).

Photograph taken by EPA on April 27, 2015 shows no visible signs of physical disturbances in the vicinity of the lead portion of the [REDACTED] service line from the external shut-off valve to the water main on Bryant Street.

**Rennaker, Joanne (DEQ)**

---

**From:** Crooks, Jennifer <crooks.jennifer@epa.gov>  
**Sent:** Monday, March 23, 2015 5:06 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Busch, Stephen (DEQ); Poy, Thomas; Deltoral, Miguel; Shoven, Heather  
**Subject:** FW: TTHM Health Effects  
**Attachments:** TTHM PN template.pdf

Hi, Mike and Steve. Mike, as I recall from our phone call in February about the TTHM health effects with Tom Poy (see below), we talked about the State including the "pregnant" in your sample PN you send to the system with the TTHM violation letter. Rather than ask the City to re-issue the PN with the "pregnant", you said the next violation would include the "pregnant" in your sample PN. I see the PN in your March 5 violation letter to Flint; but I'm not seeing the word "pregnant" added to the PN. Can the City add "pregnant" to its PN now?  
 Jennifer

---

**From:** Crooks, Jennifer  
**Sent:** Thursday, February 12, 2015 2:36 PM  
**To:** Prysby, Mike (DEQ)  
**Cc:** Busch, Stephen (DEQ); Poy, Thomas; Deltoral, Miguel  
**Subject:** TTHM Health Effects

Mike—Good talking with you this morning. I'm so glad I was able to snag Tom Poy to discuss the TTHM health effects issue with you.

Miguel said that TTHMs *MAY* cause miscarriages, which is more of an acute risk. Thus, the "pregnant" should be in the PN, so women know there could be risk, and can make their own decisions.

I included the link for PN Handbook, and a PDF of the PN template for TTHMs.  
 See page 104 of the PN Handbook (I also included as a PDF attached); here is the link:  
<http://water.epa.gov/lawsregs/rulesregs/sdwa/publicnotification/upload/PNrevisedPNHandbookMarch2010.pdf>

Paul Joice, [Paul.A.Joice@hud.gov](mailto:Paul.A.Joice@hud.gov)  
 I don't have his phone number—perhaps you could call the Mayor's office to get Paul's phone number?

Eric Burneson, [burneson.eric@epa.gov](mailto:burneson.eric@epa.gov)  
 202-564-5250

I think the Key Message here is that there are other studies out there that point to other Health Effects from TTHMs, but there's not enough information for EPA to say that these are definitely additional Health Effects to be concerned about, so EPA cannot put this in writing/in the PN.

Jennifer  
 312-886-0244

## Stage 2 DBPR TTHM or HAA5 MCL Violation Notice – Template 2-19

### IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

#### [Contaminant, i.e., Total Trihalomethanes (TTHM) or Haloacetic Acid 5 (HAA5)] MCL Violation at [System]

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did (are doing) to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Testing results from [provide date range] show that our system exceeds the standard, or maximum contaminant level (MCL), for [TTHM/HAA5]. The standard for [TTHM/HAA5] is [MCL]. It is determined by averaging all the samples collected at each sampling location for the past 12 months. The level of [TTHM/HAA5] averaged at one of our system's locations for [provide date range] was [level].

#### What should I do?

- There is nothing you need to do. You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.
- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water.

#### What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

[TTHM are four volatile organic chemicals] [HAA5 are five haloacetic acid compounds] which form when disinfectants react with natural organic matter in the water.

*[\*People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.\*] Or*

*[\*People who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.\*]*

#### What is being done?

[Describe corrective action.] We anticipate resolving the problem within [estimated time frame] (or the problem was resolved on [give date]).

For more information, please contact [name of contact] at [phone number] or [mailing address].

*\*Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.\**

This notice is being sent to you by [system]. State Water System ID#: \_\_\_\_\_.

Date distributed: \_\_\_\_\_.

**Rennaker, Joanne (DEQ)**

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**From:** Prysby, Mike (DEQ)  
**Sent:** Monday, December 29, 2014 11:10 AM  
**To:** Busch, Stephen (DEQ)  
**Cc:** Rosenthal, Adam (DEQ); Benzie, Richard (DEQ)  
**Subject:** FW: TTHM Violation Notification

Steve,

According to R 325.10403 (3), a (i)

Community water supplies shall provide notice (Tier 2) by using both of the following forms of delivery

- (i) Mail or direct delivery to each customer receiving a bill

As far as I see in the rules .....Flint needs to send the TTHM PN via direct mail.....and is stated in the Dec. 16<sup>th</sup> Violation Notice letter.

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

**From:** Brent Wright [<mailto:bwright@cityofflint.com>]  
**Sent:** Monday, December 29, 2014 10:58 AM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Cc:** Howard Croft; Daugherty Johnson; Michael Glasgow  
**Subject:** TTHM Violation Notification

Mike, Steve

Concerning the violation notification for TTHM's the city needs clarification on the delivery of notification. In the last violation notification for Total Coliform the City published it in the local paper and posted it on the city website, this satisfied the DEQ requirements. Would this be adequate for the TTHM notification? Thank you for your prompt reply concerning this matter.

--

**Brent Wright**  
**Water Plant Supervisor**  
**City of Flint**  
**4500 N. Dort Hwy.**

**Flint, MI. 48505**

**Ph: 810.787.6537 ext. 3510**

**Fx: 810.787.3710**

**Rennaker, Joanne (DEQ)**

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**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Friday, October 16, 2015 11:47 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ); Cook, Pat (DEQ); Rosenthal, Adam (DEQ)  
**Subject:** FW: Urgent Request for Clarification: Letter to Lee-Anne Walters and justification for invalidating her samples.

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**From:** Wyant, Dan (DEQ)  
**Sent:** Thursday, October 15, 2015 1:27 PM  
**To:** Krisztian, George (DEQ); Sygo, Jim (DEQ); Shekter Smith, Liane (DEQ)  
**Subject:** Fwd: Urgent Request for Clarification: Letter to Lee-Anne Walters and justification for invalidating her samples.

Sent from my iPhone

Begin forwarded message:

**From:** Marc Edwards <edwardsm@vt.edu>  
**Date:** October 15, 2015 at 10:44:08 AM EDT  
**To:** <WyantD@michigan.gov>, <lwalters313@gmail.com>, Andrew Leavitt <ALeavitt@senate.michigan.gov>, Melissa Mays <indigrace@gmail.com>, "Dickinson, Jordan" <Jordan.Dickinson@mail.house.gov>  
**Subject:** Urgent Request for Clarification: Letter to Lee-Anne Walters and justification for invalidating her samples.

Hi Dan,

Thank you for your help (if any) with the MDEQ FOIA. I received the documents last night. I was hoping you could help me with something ASAP.

One of the things creating distrust between Flint residents and MDEQ, is a long list of miscommunications and false statements by your employees. I want you to help us understand one of those miscommunications as soon as possible.

On August 4<sup>th</sup> your employee's Wurfel, Busch and Shekter Smith met with Melissa and Lee-Anne. According to Melissa and Lee-Anne, in a meeting with the governor's Chief of Staff, your employee's could not explain to them, why Lee-Anne's samples were invalidated (i.e., thrown out of the samples used to calculate the 90%ile lead).

For your information, on the basis of records from the City, Lee-Anne's home is the ONLY home in the 2015 sampling pool that is proven to have a lead pipe. I have compared the sample sites that the city used to the database that Flint has put together, **and of 11 samples in the database that the city claims had a lead pipe, ZERO actually had a lead pipe.** Michigan and Federal law further states that if a sample is taken from a home with a lead pipe, **even if it has a point of use device like a filter or softener**, once that sample is collected it cannot be invalidated (see below). EPA R5 staff explicitly told your employee's in writing, that Lee-Anne's samples had to

be counted for compliance purposes. **Your employee's nonetheless, over R5's written instructions and the law, threw out the only Flint LCR samples known to be legitimate in the 2015 sampling round.** They also double counted Melissa's samples for LCR compliance purposes, even though her house does not have a lead pipe, and has no lead plumbing. So I hope you can see the "adding insult to injury" dimension of your employee's actions. The irony - using samples from the chief critics of MDEQ, to cheat on the LCR monitoring. Specifically, counting a lead free site twice (when it should not be counted at all), and throwing out three samples from the only home known to have lead pipe. We also now have data that shows every single sample we could check in the 2015 round, did not have a lead pipe at all.

Furthermore, according to Melissa and Lee-Anne, the Governor's chief of staff ordered your employee's, to as soon as possible, communicate to Lee-Anne why her samples were invalidated. According to Melissa and Lee-Anne, the governor's chief of staff further ordered your employees to "CC" him on that communication. The governor's chief of staff also apparently asked them to get Lee-Anne's address and phone number, so that they could be sure their communication got to her, and they refused, and insisted they had all of Leigh-Anne's information.

In the FOIA production, I was surprised to see that there is an e-mail to Lee-Anne dated August 25<sup>th</sup>. This is surprising because Lee-Anne never received that e-mail. Moreover, there is an apology to Lee-Anne that the e-mail is late, and furthermore, the chief of staff is not cc'd. Lee-Anne has looked in her spam and other files, and there is no evidence that this late e-mail ever reached her.

I am hoping you can get to the bottom of this, and see first of all 1) why the chief of staff was not cc'd as requested, 2) if this e-mail was actually sent, and produce some evidence that it was, and 3) try to understand why your employee's illegally invalidated Lee-Anne's samples over the objections of EPA and Lee-Anne. And I am hoping you can do this today. My understanding is that you are out and about trying to re-establish public trust in MDEQ, and this would be a good place to start.

Best Regards,

Marc Edwards

From your own web page.

c. Softeners and Other Point of Use (POU) and Point of Entry (POE) Devices:

**Sampling sites with faucets that have POU or POE treatment devices, such as softeners, shall not be used as Tier 1, 2, or 3 sites unless insufficient Tiered sites are available. Field staff shall encourage water supplies to sample from a kitchen or bathroom tap that is not normally connected to the softener. If a sample of softened water is analyzed, then the water supply may consider returning to the same site to collect a sample of unsoftened water. Some residents may be able to bypass the softener at the tap. Both sample results (softened and unsoftened) will be used to calculate the 90th percentile. Sample results shall not be deemed improper on the basis that the water passed through a softener.**



**Rennaker, Joanne (DEQ)**

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**From:** Shekter Smith, Liane (DEQ)  
**Sent:** Tuesday, August 25, 2015 8:41 AM  
**To:** Busch, Stephen (DEQ); Benzle, Richard (DEQ); Sygo, Jim (DEQ)  
**Cc:** Devereaux, Tracy Jo (DEQ); Creal, William (DEQ)  
**Subject:** FW: Water Emergency

FYI –

Thanks Bill. I hadn't seen this before.

---

**From:** Creal, William (DEQ)  
**Sent:** Tuesday, August 25, 2015 6:56 AM  
**To:** Shekter Smith, Liane (DEQ)  
**Subject:** Fwd: Water Emergency

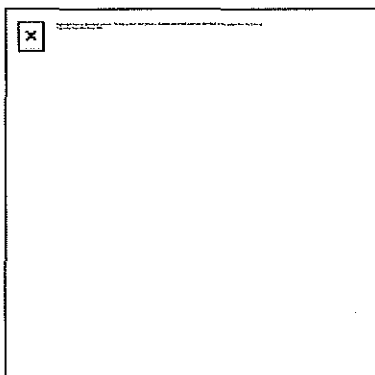
Sent from my iPhone

Begin forwarded message:

**From:** Caleb Laieski <[caleb\\_m\\_laieski@yahoo.com](mailto:caleb_m_laieski@yahoo.com)>  
**Date:** August 25, 2015 at 12:36:00 AM EDT  
**To:** <[mayor@cityofflint.com](mailto:mayor@cityofflint.com)>  
**Cc:** <[McCarthy.Gina@epamail.epa.gov](mailto:McCarthy.Gina@epamail.epa.gov)>, <[r5hotline@epa.gov](mailto:r5hotline@epa.gov)>, <[hedman.susan@epa.gov](mailto:hedman.susan@epa.gov)>, <[Hyde.Tinka@epa.gov](mailto:Hyde.Tinka@epa.gov)>, <[WyantD@michigan.gov](mailto:WyantD@michigan.gov)>, <[CREALW@michigan.gov](mailto:CREALW@michigan.gov)>, <[NRC@uscg.mil](mailto:NRC@uscg.mil)>  
**Subject:** Water Emergency

Emergency Personnel and Honorable Officials:

**I am extremely concerned after being sent the following photo and this issue needs to be investigated ASAP -**



Flint tap water.

In 2014, Flint's emergency manager disconnected the city from the Detroit Water and Sewerage Department (DWSD) and started providing residents with water from the Flint River. Since that time, residents have been struggling to maintain access to a clean, safe drinking water supply.

Residents of Flint report having tap water with high levels of copper, lead, THMs (chemicals that result when chlorine mixes with organic matter), tin, lime and iron. The water is often brown or bluish-green in color and contains sediment. As a result, people are experiencing symptoms including hair loss, lead poisoning and diseases related to consuming high levels of copper (to name a few).

The Flint River clearly is not a safe, reliable source for the city's drinking water. It was as easy as pushing a button to disconnect from DWSD; it's time to push the button again, reconnecting Flint to DWSD and providing Flint residents with the clean, safe water they deserve.

Please reconnect Flint to the Detroit Water and Sewerage Department immediately and make water safe and clean for all.

Begin forwarded message:

**Date:** August 4, 2015 at 4:08:13 PM EDT

**From:** "Lynna Kauchek, Food & Water Watch" <[act@fwwatch.org](mailto:act@fwwatch.org)>

**Reply-To:** "Lynna Kauchek, Food & Water Watch" <[act@fwwatch.org](mailto:act@fwwatch.org)>

**To:** Caleb Laieski <[caleb\\_m\\_laieski@yahoo.com](mailto:caleb_m_laieski@yahoo.com)>

**Subject:** Dangerously toxic drinking water



**Residents of Flint, Michigan Have Dangerously Toxic Drinking Water**  
**Sign the Petition: Demand Clean, Safe Drinking Water for Flint!**

**Would you drink water  
with dangerous levels of  
lead and copper?**

Dear Caleb,

**It's hard to believe that in 2015, residents of an American town are being poisoned by their public water system.**

About a year ago, Flint, Michigan residents were switched from getting water from the Detroit Water and Sewerage Department to getting water from the Flint River, all in an attempt to cut costs. **But this change has cost the people of Flint greatly.**

**Sign the petition to tell the Flint City Council and Mayor to switch Flint back to Detroit's clean drinking water — it's as easy as pushing a button!**

Flint residents like Melissa Mays are trying to get their story out nationally to bring more attention to their fight.

*In April 2014, a button was pushed that changed my life and thousands of others in Flint, Michigan. For over a year now, we have been drinking toxic water and suffering the severe health challenges that have come as a result.*

*Since Flint started providing us with water from the Flint River, my water has turned bluish-green from all the copper in the water, the levels of lead have quadrupled and we have been notified about high levels of TTHMs (chemicals that are formed when chlorine mixes with organic matter). And the pH of my water is 4, which means that it's as acidic as tomato juice!*

*Other neighbors have experienced brown water and have found traces of tin, lime and iron in their water. Members of my community have been reporting cases of lead poisoning, and many neighbors have reported that their hair is falling out because of our toxic water. Due to the high levels of copper in my water, I am suffering from osteoarthritis and bone spurs at the age of 36.*

**Access to safe drinking water is a human right. Demand that Mayor Walling and Flint City Council give the people of Flint clean, safe water!**

Like other Michigan cities, Flint is struggling financially. In 2014, Flint's emergency manager decided that, as a cost-saving measure, the city would stop buying clean, safe water from Detroit and start providing residents with water from the Flint River.

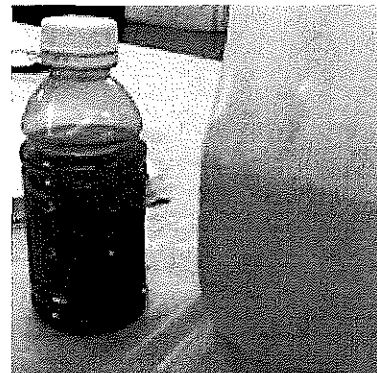
**But the Flint River experiment has not panned out.** The city has failed to adequately treat the water from the Flint River to make it safe to drink. Almost immediately after the switch, residents noticed changes in smell, color and taste of the water coming out of their taps, and tests showed high levels of bacteria that forced the city to issue boil advisories.

To kill the bacteria, the city increased the amount of chlorine in the water, which resulted in the high levels of toxic trihalomethanes (TTHMs that Melissa mentions). Samples show levels of lead contamination in the water that's off the charts (likely due to Flint's inability to prevent lead from the old pipes from leaching into the water). A well-known neurotoxin, lead poisoning can have severe long-term impacts on children's developing brains.<sup>1</sup>

**It is abundantly clear that the Flint River is not a safe, reliable source for the city's drinking water. Sign the petition to tell Flint Mayor Walling and the Flint City Council to switch back to Detroit Water to ensure clean, safe drinking water for Flint.**

It was as easy as pushing a button to disconnect from Detroit's water service, it's time to push the button again to reconnect Flint to Detroit Water and provide Flint residents with the clean, safe water they deserve.

I am collecting petitions from people all over the country to deliver in person to the Flint City Council and



Flint tap water.

**No One Should Have to Drink Toxic Water!**

Mayor at the end of August. I hope you'll help bring national attention to this issue by signing the petition to the Flint Mayor and City Council to give residents access to safe drinking water.

Thank you for taking action,

Lynna Kauchek  
Senior Organizer  
Food & Water Watch  
act(at)fwwatch(dot)org

1. Aging Pipes Are Poisoning America's Tap Water, *The Atlantic*, July 29, 2015.

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FOOD & WATER WATCH • 1616 P STREET NW, SUITE 300  
WASHINGTON, DC 20036 • TEL: (202) 683-2500

[Manage your subscription or unsubscribe](#)

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Thursday, September 25, 2014 10:16 AM  
**To:** Busch, Stephen (DEQ)  
**Subject:** FW: Water rates  
**Attachments:** Water Rates FY2015.xls

Here's more recent water rate info from Flint

Michael Prysby, P.E.  
 District Engineer  
 Office of Drinking Water and Municipal Assistance  
 517 290-8817

**From:** Brent Wright [<mailto:bwright@cityofflint.com>]  
**Sent:** Thursday, September 25, 2014 10:14 AM  
**To:** Prysby, Mike (DEQ)  
**Subject:** Re: Water rates

Here you go Mike, also did you get my voice mail on Tuesday?

On Thu, Sep 25, 2014 at 10:08 AM, Brent Wright <[bwright@cityofflint.com](mailto:bwright@cityofflint.com)> wrote:  
 Working on it.

On Thu, Sep 25, 2014 at 9:02 AM, Prysby, Mike (DEQ) <[PRYSBYM@michigan.gov](mailto:PRYSBYM@michigan.gov)> wrote:  
 Brent

Can u provide me with a copy of Flint's most recent water rate structure? I have an 11am meeting today and that info may be helpful....thanks

Sent from my iPhone

--  
 Brent Wright  
 Water Plant Supervisor  
 City of Flint  
 4500 N. Dort Hwy.  
 Flint, MI. 48505  
 Ph: 810.787.6537 ext. 3510  
 Fx: 810.787.3710

--

**Brent Wright**  
**Water Plant Supervisor**  
**City of Flint**  
**4500 N. Dort Hwy.**  
**Flint, MI. 48505**  
**Ph: 810.787.6537 ext. 3510**  
**Fx: 810.787.3710**

**SCHEDULE OF WATER RATES & CHARGES  
EFFECTIVE FOR BILLS DUE AFTER JULY 1, 2014**

**WATER CONSUMPTION RATES**

Metered Water

| Rates per 100 cubic feet (ccf) | Rates Effective FY2014 |                   | Rates For Bills Due in FY15 |                   |
|--------------------------------|------------------------|-------------------|-----------------------------|-------------------|
|                                | Inside City Rate       | Outside City Rate | Inside City Rate            | Outside City Rate |
| Through 35 ccf                 | 7.512                  | 11.259            | 7.920                       | 11.880            |
| Next 1,965 ccf                 | 7.310                  | 10.765            | 7.620                       | 11.420            |
| Over 2,000 ccf                 | 5.792                  | 8.677             | 6.090                       | 9.140             |

**WATER MONTHLY SERVICE CHARGES**

Remote Meter Monthly Charge

| Meter Size | Rates Effective FY2014 |                     | Rates For Bills Due in FY15 |                     |
|------------|------------------------|---------------------|-----------------------------|---------------------|
|            | Inside City Charge     | Outside City Charge | Inside City Charge          | Outside City Charge |
| 5/8"       | 21.776                 | 32.483              | 22.900                      | 34.170              |
| 3/4"       | 41.861                 | 62.706              | 44.030                      | 65.950              |
| 1"         | 55.283                 | 82.792              | 58.150                      | 87.080              |
| 1-1/2"     | 55.283                 | 82.792              | 58.150                      | 87.080              |
| 2"         | 55.283                 | 82.792              | 58.150                      | 87.080              |

Commercial & Industrial Monthly Charge

| Meter Size | Rates Effective FY2014 |                     | Rates For Bills Due in FY15 |                     |
|------------|------------------------|---------------------|-----------------------------|---------------------|
|            | Inside City Charge     | Outside City Charge | Inside City Charge          | Outside City Charge |
| 5/8"       | 53.385                 | 80.134              | 55.790                      | 83.740              |
| 3/4"       | 61.263                 | 91.715              | 64.020                      | 95.840              |
| 1"         | 75.103                 | 112.673             | 78.480                      | 117.740             |
| 1-1/2"     | 107.756                | 161.785             | 112.600                     | 169.060             |
| 2"         | 150.622                | 226.086             | 157.400                     | 236.260             |
| 3"         | 297.448                | 448.469             | 310.830                     | 468.650             |
| 4"         | 523.495                | 785.366             | 547.050                     | 820.710             |
| 6"         | 1,029.429              | 1,543.867           | 1,075.750                   | 1,613.340           |
| 8"         | 1,492.875              | 2,239.473           | 1,560.050                   | 2,340.240           |
| 10"        | 2,060.754              | 3,107.476           | 2,153.480                   | 3,247.300           |
| 12"        | 2,493.124              | 3,739.505           | 2,605.310                   | 3,907.770           |
| 16"        | 3,102.636              | 4,653.867           | 3,242.250                   | 4,863.280           |
| 20"        | 3,351.483              | 5,463.817           | 3,501.980                   | 5,709.670           |

**SCHEDULE OF SEWER RATES & CHARGES  
EFFECTIVE FOR BILLS DUE AFTER July 1, 2014**

**SEWAGE FLOW RATES**

Residential Sewage Flow Rates

|                                                             | Rates Effective FY2014 |                   | Rates For Bills Due FY15 |                   |
|-------------------------------------------------------------|------------------------|-------------------|--------------------------|-------------------|
|                                                             | Inside City Rate       | Outside City Rate | Inside City Rate         | Outside City Rate |
| Rate per 100 cubic feet (ccf)<br>(Based upon metered water) | 4.800                  | 5.285             | 5.170                    | 5.680             |

Commercial & Industrial Waste Rates

|                                               | Rates Effective FY2014 |                   | Rates For Bills FY15 |                   |
|-----------------------------------------------|------------------------|-------------------|----------------------|-------------------|
|                                               | Inside City Rate       | Outside City Rate | Inside City Rate     | Outside City Rate |
| Volume (per 100 cubic feet)                   | 1.795                  | 2.036             | 1.930                | 2.189             |
| Suspended Solids (per pound)                  | 0.550                  | 0.548             | 0.591                | 0.589             |
| Biological/Chemical Oxygen Demand (per pound) | 1.169                  | 1.312             | 1.257                | 1.410             |
| Phosphorus (per pound)                        | 1.657                  | 1.683             | 1.781                | 1.809             |
| Industrial Charge (per 100 cubic feet)        | 0.030                  | 0.030             | 0.032                | 0.032             |

Wholesale Rates

|                             |       |
|-----------------------------|-------|
| Beecher Metro District Rate | 1.335 |
|-----------------------------|-------|

**SEWER MONTHLY SERVICE CHARGE**

Residential - Remote Read Meter Charge

| <u>Meter Size</u> | Rates Effective FY2014 |                     | Rates For Bills FY15 |                     |
|-------------------|------------------------|---------------------|----------------------|---------------------|
|                   | Inside City Charge     | Outside City Charge | Inside City Charge   | Outside City Charge |
| 5/8"              | 32.002                 | 41.010              | 34.480               | 44.190              |
| 3/4"              | 46.922                 | 56.005              | 50.560               | 60.350              |
| 1"                | 65.340                 | 76.986              | 70.410               | 82.960              |
| 1-1/2"            | 65.340                 | 76.986              | 70.410               | 82.960              |
| 2"                | 65.340                 | 76.986              | 70.410               | 82.960              |

Commercial & Industrial Charge

| <u>Meter Size</u> | Rates Effective FY2014 |                     | Rates For Bills FY15 |                     |
|-------------------|------------------------|---------------------|----------------------|---------------------|
|                   | Inside City Charge     | Outside City Charge | Inside City Charge   | Outside City Charge |
| 5/8"              | 51.919                 | 58.120              | 55.900               | 62.570              |
| 3/4"              | 64.434                 | 73.620              | 69.370               | 79.260              |
| 1"                | 84.708                 | 98.050              | 91.200               | 105.560             |
| 1-1/2"            | 137.843                | 164.800             | 148.400              | 177.430             |
| 2"                | 196.163                | 232.430             | 211.190              | 250.240             |
| 3"                | 438.083                | 522.870             | 471.620              | 562.930             |
| 4"                | 721.842                | 886.010             | 777.140              | 953.890             |
| 6"                | 1,459.948              | 1,770.130           | 1,571.800            | 1,905.740           |
| 8"                | 2,148.213              | 2,646.520           | 2,312.790            | 2,849.270           |
| 10"               | 2,918.392              | 3,522.540           | 3,141.970            | 3,792.410           |
| 12"               | 3,426.233              | 4,132.570           | 3,688.720            | 4,449.170           |
| 16"               | 4,523.945              | 5,497.910           | 4,870.530            | 5,919.110           |
| 20"               | 5,326.865              | 6,532.020           | 5,734.960            | 7,032.440           |



**Rennaker, Joanne (DEQ)**

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**From:** Sygo, Jim (DEQ)  
**Sent:** Friday, October 30, 2015 9:06 AM  
**To:** Busch, Stephen (DEQ); Prysby, Mike (DEQ)  
**Subject:** FW: We need to discuss today

Will this be part of the letter coming out today?

---

**From:** Kaplan, Robert [<mailto:kaplan.robert@epa.gov>]  
**Sent:** Friday, October 30, 2015 8:58 AM  
**To:** Sygo, Jim (DEQ)  
**Subject:** We need to discuss today

Jim,

In the interests of time, I am sending over a comment from TF discussions directly. There are a few technical concerns about the permit issued to Flint. Could you consider the comment below and let me know your thoughts? It's important to all that we get this nailed down without delaying the feeding of corrosion control. Thanks.

*There is a unit "issue" in the section of phosphate dosages. In our phone call the other day, DEQ indicate the units discussed were mg/L as P, when we questioned how much phosphate was being consumed in the Flint system from the Detroit water feed. This also came up in a prior discussion on the phone Darren and I had with DEQ about observations of phosphate loss, even within Detroit. The recommendations Darren and I provided for an initial dose of a total amount of PO<sub>4</sub> (as PO<sub>4</sub>), were that the target residual to the estimated theoretical point of diminishing returns to optimize phosphate (in lieu of having it be determined by actual pilot testing) should be in the 3-4 mg/L as PO<sub>4</sub> neighborhood, closer to 4.*

*At this time (but not when they change water supplies!) they only need to supplement the PO<sub>4</sub> coming from Detroit. Thus, the pumps to be installed should have the minimum capacity to dose to achieve the 3-4 mg/L as PO<sub>4</sub> level (1-1.3 mg/L as P), with extra capacity to achieve 4-6 mg/L as PO<sub>4</sub> (1.3 to 2 mg/L as P), to assure that they could overcome an estimated system pipe wall demand. So, the design max dosage for the pumps should be 6 mg/L as PO<sub>4</sub> – (the minimum amount of phosphate received from Detroit, in mg/L as PO<sub>4</sub>). The minimum would be 3.5 to 5 mg/L as PO<sub>4</sub> – (the maximum amount of phosphate received from Detroit, in mg/L as PO<sub>4</sub>).*

*I seem to recall that we were assured on our phone call the other day that the changes were being made to address our concerns, but that the units were in mg/L as P. Since the conversion factor of P to PO<sub>4</sub> is 3, then clearly, the target residual would be about 1-1.3 mg/L as P, but it looks like the units are PO<sub>4</sub> in this permit. They say the max design dosage would be 1.5 mg/L, which is still a little low, if the units truly are mg/L as P (4.5 mg/L supplement on top of received water). But I'm really confused by the level they say is received from Detroit, because they very explicitly say "as PO<sub>4</sub>" in the engineering report that is the basis for the permit request, not as "P."*

*I'm thinking some water samples should be taken for alkalinity and orthophosphate (or total P, given it's a phosphoric acid product, for convenience of analysis and preservation) and have your R5 laboratory analyze them, so that we can be sure of the phosphate and alkalinity levels.*

Sent from my iPhone

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Saturday, September 06, 2014 10:10 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** Fwd: Boil Water Update  
**Attachments:** Scan028.PDF; ATT00001.htm

See attached. I will contact Brent tomorrow afternoon on the latest sample results.

Sent from my iPhone

Begin forwarded message:

**From:** Brent Wright <[bwright@cityofflint.com](mailto:bwright@cityofflint.com)>  
**Date:** September 6, 2014, 7:51:29 PM EDT  
**To:** "Prysby, Mike (DEQ)" <[prysbym@michigan.gov](mailto:prysbym@michigan.gov)>  
**Subject:** Boil Water Update

Mike see attached

--

**Brent Wright**  
**Water Plant Supervisor**  
**City of Flint**  
**4500 N. Dort Hwy.**  
**Flint, MI. 48505**  
**Ph: 810.787.6537 ext. 3510**  
**Fx: 810.787.3710**

**LOCALIZED DRINKING WATER WARNING**  
**Coliform bacteria detected in localized area of Flint water system**  
**BOIL YOUR WATER BEFORE USING**

Our water system detected the presence of coliform bacteria in the water supply on September 3, 2014. We routinely monitor for the presence of drinking water contaminants. We took routine samples for coliform bacteria during on September 2, 2014 from all sampling locations throughout the city. The location near Flushing Road and Chevrolet Avenue showed the presence of coliform bacteria. We took three repeat samples at this location and at adjacent locations on September 3 and again on September 4, 2014. Two of the three samples on the 3<sup>rd</sup> showed the presence of total coliform bacteria and three of the three samples collected on the 4<sup>th</sup> in this same area showed the presence of total coliform bacteria. On September 5<sup>th</sup> two of three sample showed presence of total coliform bacteria. **Updated area of ML King and Pasadena.** On September 4<sup>th</sup> one sample showed presence of total coliform bacteria. On September 5<sup>th</sup> two of the three samples at adjacent locations showed presence of total coliform bacteria. All other monitoring locations in the City continue to show no presence of Coliform bacteria.

**What should I do?**

**DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and preparing food. Boiling kills bacteria and other organisms in the water. **Continue using boiled or bottled water until further notice.** This boil notice is limited to the area bordered by Dayton Street (north), DuPont Street (east), Flint River (south), and LaVelle Road to Flint River (west).

**The current boil water notice is being expanded to the north.** This boil water notice is being expanded to the area bordered by Stewart Ave. (north), Saginaw (east), Hamilton Ave (south), and Clio Rd (west).

If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water.

**What does this mean?**

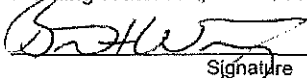
Total coliform bacteria are generally not harmful themselves. *Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present.*

Usually, coliforms are a sign that there could be a problem with the treatment or distribution system (pipes). Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or E. coli, are present. We did not find any of these bacteria in our subsequent testing. If we had, we would have notified you immediately. However, we are still finding coliforms in the drinking water.

CERTIFICATION:

2310  
WSSN: «WSSN»

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.



Signature

PLANT SUPERVISOR

Title

9/6/2014

Date Distributed

Reminder to water supplier: This notice / certification must be sent to the DNRE.

**What happened? What is being done?**

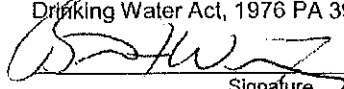
We are still detecting coliform bacteria. We will inform you when our sampling shows that no bacteria are detected. We are flushing the system and increasing the chlorine residual within the affected area. We anticipate resolving the problem within the next two to three days. In the meantime, please continue using boiled or bottled water until we notify you otherwise.

If you have questions, you may contact Mr. Brent Wright of the City of Flint at 810-787-6537, [bwright@cityofflint.com](mailto:bwright@cityofflint.com), 4500 North Dort Highway, Flint MI. 48505 or Daughtry Johnson, Utilities Administrator (810) 766-7135, ext. 2602. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

CERTIFICATION:

WSSN: «WSSN»

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.



Signature

PLANT SUPERVISOR

Title

9/6/2014

Date Distributed

Reminder to water supplier: This notice / certification must be sent to the DNRE.

**Rennaker, Joanne (DEQ)**

---

**From:** Prysby, Mike (DEQ)  
**Sent:** Saturday, February 14, 2015 12:21 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** Fwd: City Water Tech Team

Steve,  
Not sure if this is something I can (or should) participate in.

Sent from my iPhone

Begin forwarded message:

**From:** Howard Croft <[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)>  
**Date:** February 14, 2015 at 8:44:52 AM EST  
**To:** "Prysby, Mike (DEQ)" <[prysbym@michigan.gov](mailto:prysbym@michigan.gov)>  
**Subject:** City Water Tech Team

Mike,

The City of Flint has contracted with Veolia North America in order to have an additional review of the water system. As part of this review, we are working to develop a Technical Advisory Committee (TAC) that will that will receive reports and interact with the technical staff from Veolia. The City has identified 8 - 12 entities or individuals that we are extending an invitation to participate on this committee.

I would like to extend this invitation to you or your designee to be a representative on the TAC team which we hope to have established by early next week.

I understand that this is short notice but if you would consider the offer and confirm or deny your participation I would greatly appreciate it. We are hoping to announce the names of this team at a Public Works Committee meeting Wednesday February 18th. The details of the first meeting and the ongoing agenda which is anticipated to extend through the implementation of the Karegnondi Water Authority as a water source will also be unveiled next week..

Thank you,

---

**Howard Croft**  
Public Works Director  
City of Flint  
1101 S. Saginaw Street  
Flint, MI 48502  
PH# 810.766.7135 Ext.2043  
[hcroft@cityofflint.com](mailto:hcroft@cityofflint.com)

**Rennaker, Joanne (DEQ)**

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Monday, October 05, 2015 10:11 AM  
**To:** Pallone, Maggie (DEQ); Tommasulo, Karen (DEQ); Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)  
**Subject:** Fwd: comment for Michigan Radio story?

Sent from my iPhone

Begin forwarded message:

**From:** Rebecca Williams <[rmwillia@umich.edu](mailto:rmwillia@umich.edu)>  
**Date:** October 5, 2015 at 9:54:11 AM EDT  
**To:** "Brad (DEQ) Wurfel" <[WurfelB@michigan.gov](mailto:WurfelB@michigan.gov)>  
**Subject:** comment for Michigan Radio story?

Hey Brad,

Would anyone from DEQ want to comment on this blog post from Dr. Marc Edwards that's out this morning?:

<http://flintwaterstudy.org/2015/10/investigation-of-mdeqs-new-corrosion-control-claim-reveals-more-deception-and-incompetence-where-is-the-epa/>

Our deadline for the Environment Report segment is 2pm today. Lindsey is also producing news spots for this afternoon. Both stories focus on corrosion control.

thanks,

Rebecca Williams  
Senior Reporter  
Michigan Radio  
(734) 647-3497 desk  
(734) 355-7215 cell

**Rennaker, Joanne (DEQ)**

---

**From:** Anderson, Madhu (DEQ)  
**Sent:** Wednesday, January 21, 2015 1:05 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** Fwd: Document for Review  
**Attachments:** DWSD and Flint Water Issue, 1.12.15.pdf; ATT00001.htm

Steve - thought you might want to see this as well.

*Madhu*

Madhu R. Anderson

Director, Office of Policy | Michigan Department of Environmental Quality  
 office 517 284 6702 | cell 517 290 9653

Begin forwarded message:

**From:** "Thelen, Mary Beth (DEQ)" <THELENM2@michigan.gov>  
**Date:** January 21, 2015 at 11:51:53 AM EST  
**To:** "Creal, William (DEQ)" <CREALW@michigan.gov>, "Shekter Smith, Liane (DEQ)" <SHEKTERL@michigan.gov>, "Anderson, Madhu (DEQ)" <AndersonM30@michigan.gov>, "Sygo, Jim (DEQ)" <SygoJ@michigan.gov>, "Datema, Maggie (DEQ)" <DatemaM@michigan.gov>, "Epkey, Amy (DEQ)" <epkeya@michigan.gov>  
**Cc:** "Shaler, Karen (DEQ)" <SHALERK@michigan.gov>, "Willard, Veronica (DEQ)" <WILLARDV@michigan.gov>, "Smith, Laura (DEQ)" <SMITHL16@michigan.gov>, "Feuerstein, Heather (DEQ)" <FeuersteinH@michigan.gov>, "Wilcox, Candra (DEQ)" <WilcoxC2@michigan.gov>  
**Subject:** FW: Document for Review

Director asked that I share this with you.

Mary Beth

Mary Beth Thelen  
 Management Assistant to Director Dan Wyant  
 Department of Environmental Quality  
 Constitution Hall, 6th Floor South  
 Phone: 517-284-6712 or 284-6700 (new numbers)  
 Fax: 517-241-7401  
[Thelenm2@michigan.gov](mailto:Thelenm2@michigan.gov)

---

**From:** Adamczyk, Lynne (GOV)  
**Sent:** Friday, January 16, 2015 10:27 AM  
**To:** Thelen, Mary Beth (DEQ); Pleyte, Beth (Treasury); VanSickle, Michele (GOV); Clement, Elizabeth (GOV); Rospond, Laurie (GOV); Hall, Jean (GOV); Brader, Valerie (GOV)  
**Subject:** Document for Review

FYI

Lynne Adamczyk  
 Executive Assistant  
 Office of Governor Rick Snyder  
 517-373-3400 (o)



517-241-9412 (d)  
[adamczyk1@michigan.gov](mailto:adamczyk1@michigan.gov)

CITY OF DETROIT  
WATER AND SEWERAGE DEPARTMENT  
OFFICE OF THE DIRECTOR

735 RANDOLPH STREET  
DETROIT, MICHIGAN 48226-2830  
WWW.DETROITMI.GOV

Wyant/Saxton  
RB/Dm/EC/DP  
JW/VB  
FYE

January 12, 2015

Mr. Darnell Earley, Emergency Manager  
Mr. Dayne Walling, Mayor  
City of Flint  
1101 S. Saginaw Street  
Flint, Michigan 48502

Dear Messrs. Earley and Walling:

Regarding: Re-establishing Detroit Water and Sewerage Department Water Service

I was recently referred to a report in MLive in which there was reference to the City of Flint (City) potentially re-visiting its decision to utilize Flint River water as a water source prior to the completion of the KWA pipeline. Within that report, there appeared to be some incorrect assumptions about the cost of water service from the Detroit Water and Sewerage Department (DWSD). I write to you today to express the willingness of DWSD to resume delivery of drinking water to the City and its residents. We have monitored the water quality issues that have troubled the City since May, 2014, and understand that many of the difficulties stem from the limited access to source water. Please know that DWSD is ready, willing and able to resume service to the City if you so desire.

If the City is interested in a long term arrangement with DWSD, with this goal in mind, we offer that the City can immediately reconnect to the DWSD system at no additional charge to the City and at the same "expired contract" rate that the City was paying in April, 2014, modified to reflect the 4% increase experienced by all other wholesale customers in July, 2014. The resulting rate structure is a fixed monthly rate of \$846,700 and a commodity rate of \$14.92/Mcf. In order to facilitate contract negotiations, DWSD is willing to extend this rate to the City (and to Genesee County as the City's partner and former customer) until June 30, 2015.

We at DWSD take very seriously the matter of drinking water quality, and we are as concerned as you must be by the continued quality issues faced by the City. We are confident that DWSD can provide you with a solution for reliable, safe, high quality water on an expeditious timeline. Please contact me directly at (313) 224-4701 if you wish to discuss this offer further.

Sincerely yours,

*Sue F. McCormick*

Sue F. McCormick  
Director

cc: Governor Rick Snyder -- (via U.S. Mail)  
Flint City Council, (via U.S. Mail and Electronic Mail)  
Eric Mays; Jacqueline Poplar (c/o Jennie Johnson); Kerry Nelson (c/o Jennie Johnson); Joshua Freeman;  
Wantwaz Davis; Herbert Winfrey (c/o Jennie Johnson); Monica Galloway, Vicki VanBuren; Scott  
Kincaid (c/o Jennie Johnson)  
Jeff Wright, GCDC -- (via Electronic Mail)  
Mayor Mike Duggan (via Electronic Mail)  
James Fausone, BOWC (via Electronic Mail)  
Robert Daddow, GLWA (via Electronic Mail)

**Rennaker, Joanne (DEQ)**

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**From:** Wurfel, Brad (DEQ)  
**Sent:** Monday, February 02, 2015 4:35 PM  
**To:** Wyant, Dan (DEQ); Datema, Maggie (DEQ); Tommasulo, Karen (DEQ); Thelen, Mary Beth (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ)  
**Subject:** Fwd: Flint event on Tuesday  
**Attachments:** 2 FDCVT Grant Awards draft.docx; ATT00001.htm; Briefing Flint grant announcement.docx; ATT00002.htm; RELEASE Flint water grants.docx; ATT00003.htm

All,

Here is some early information about the event tomorrow in Flint. State leaders, including director Wyant, Will announce \$2 million in distress community grants. Based on what little I know so far, it sounds a little bit like SAW grants.

Will share more details when I get them.

b

Sent from my iPhone

Begin forwarded message:

**From:** "Murray, David (GOV)" <[MurrayD1@michigan.gov](mailto:MurrayD1@michigan.gov)>  
**Date:** February 2, 2015 at 1:34:21 PM EST  
**To:** "Agen, Jarrod (GOV)" <[AgenJ@michigan.gov](mailto:AgenJ@michigan.gov)>, "Stanton, Terry A. (Treasury)" <[StantonT@michigan.gov](mailto:StantonT@michigan.gov)>, "Wurfel, Sara (GOV)" <[Wurfels@michigan.gov](mailto:Wurfels@michigan.gov)>, "Wurfel, Brad (DEQ)" <[WurfelB@michigan.gov](mailto:WurfelB@michigan.gov)>, "Biehl, Laura (GOV)" <[BiehlL@michigan.gov](mailto:BiehlL@michigan.gov)>, "Hollins, Harvey (GOV)" <[hollinsh@michigan.gov](mailto:hollinsh@michigan.gov)>, "Clayton, Stacie (GOV)" <[claytons3@michigan.gov](mailto:claytons3@michigan.gov)>, "Walsh, John (GOV)" <[WalshJ@michigan.gov](mailto:WalshJ@michigan.gov)>, "Brownfield, Michael (GOV)" <[BrownfieldM2@michigan.gov](mailto:BrownfieldM2@michigan.gov)>, "Allard, Claire (GOV)" <[allardc1@michigan.gov](mailto:allardc1@michigan.gov)>, "Rexford, Tori (GOV)" <[rexfordt@michigan.gov](mailto:rexfordt@michigan.gov)>  
**Subject:** Flint event on Tuesday

Good afternoon team,

Just wanted to touch base on Tuesday's event in Flint. Unless told otherwise, I'm continuing to prepare for the event.

I touched base with Harvey and Stacie, who recommended we proceed. Harvey is approaching some stakeholders about appearing at the event, and will forward those names to me later today.

I left a message with Dick Posthumus to see if he has any concerns about proceeding.

The Senate Democrats said Sen. Ananich will want to appear. Katie Carey from the House said she would forward information to Rep. Neeley and Phelps. I have not heard back from her yet.

I've attached the backgrounder and the draft releases from Governor's Communications and Treasury. I've sent a message to the mayor's office about a quote, but have not heard back yet.

Brad and I spoke about Director Wyant's role and potential comments. He will point out that there are things the state can do to help monitor the situation, but also will note that the city's water infrastructure is aging, which contributes to the problems.

We need some direction on an advisory. Should this be listed on a typical advisory from the governor's office, or come from Treasury? Do we even issue an advisory in favor of just contacting media directly in the morning?

Please give the draft releases a read for potential changes, or let me know of other concerns.

Thank you!

Dave

**Dave Murray**

Deputy Press Secretary | Executive Office of Governor Rick Snyder

[MurrayD1@michigan.gov](mailto:MurrayD1@michigan.gov)

517-335-6397, office

517-449-8343, mobile

Twitter: @michigandmurray



STATE OF MICHIGAN  
DEPARTMENT OF TREASURY  
LANSING

RICK SNYDER  
GOVERNOR

R. KEVIN CLINTON  
STATE TREASURER

February 3, 2015

**FOR IMMEDIATE RELEASE**

[www.michigan.gov/treasury](http://www.michigan.gov/treasury)

**Contact: Terry Stanton, Treasury**  
**(517) 335-2167**

**Dave Murray, Governor**  
**(517) 335-6397**

draft

***Gov. Rick Snyder announces grants helping distressed municipalities with water, public safety, appraisal issues***

*\$8 million awarded for projects aimed at improving services, quality of life*

LANSING, Mich. -- Gov. Rick Snyder today awarded \$8 million to six municipalities to fund various improvement projects, including water system and street lighting enhancements and technology upgrades through the Financially Distressed Cities, Villages, and Townships Grant Program.

Municipalities are eligible for the grants if they are experiencing one or more conditions indicative of "probable financial stress," as defined by Public Act 436 of 2012, the Local Financial Stability and Choice Act.

"Municipalities receiving this special funding are some of the areas hardest hit by the Great Recession," Snyder said. "I am pleased we can offer funding assistance to help these local governments improve various public services their taxpayers and residents expect and deserve."

Under the grant program, funding may be used to pay for specific projects, services, or strategies that move a city, village, or township toward financial stability. There was \$8 million appropriated for the program with a \$2 million cap, per local unit.

The following communities will receive funding this year, with projects and amounts noted (alphabetical order):

| Local Unit            | Project Description                                                                                                                                                        | Amount    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| City of Benton Harbor | Complete a property reappraisal to provide updated and accurate assessing records. Additionally, community enhancement through blight management and sidewalk replacement. | \$475,000 |
| City of Benton Harbor | Water system enhancement through water main replacements and fire hydrant repairs.                                                                                         | \$434,960 |

|                       |                                                                                                                     |             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------|-------------|
| City of Ecorse        | Public safety enhancement through improved street lighting.                                                         | \$350,000   |
| City of Flint         | Water system enhancement through improved waste management.                                                         | \$1,100,000 |
| City of Flint         | Water system enhancement through leak detection and pipe assessments.                                               | \$900,000   |
| City of Hamtramck     | Complete a property reappraisal to provide updated and accurate assessing records.                                  | \$167,860   |
| City of Hamtramck     | Upgrade City Hall security.                                                                                         | \$50,000    |
| City of Hamtramck     | Public safety enhancement through improved street lighting.                                                         | \$404,600   |
| City of Highland Park | Water system enhancement through meter replacement, leak detection, and system repairs.                             | \$2,000,000 |
| City of Inkster       | Complete a property reappraisal to provide updated and accurate assessing records.                                  | \$73,460    |
| City of Inkster       | Water system enhancement through fire hydrant repairs.                                                              | \$150,000   |
| City of Inkster       | Provide a backup power source for public safety.                                                                    | \$30,000    |
| City of Inkster       | Public safety enhancement through the creation of a multi-jurisdictional narcotic team.                             | \$240,000   |
| City of Inkster       | Public safety enhancement through police officer training.                                                          | \$41,970    |
| City of Inkster       | Public safety enhancement through the deployment of an additional police officer.                                   | \$320,000   |
| City of Lincoln Park  | Public safety enhancement through updated technology.                                                               | \$143,490   |
| City of Melvindale    | Public safety enhancement through fleet replacement of police vehicles and updated technology.                      | \$88,000    |
| City of Pontiac       | Community enhancement through blight management.                                                                    | \$125,000   |
| City of River Rouge   | Public safety enhancement through improved street lighting. Additionally, infrastructure replacements to City Hall. | \$591,508   |
| Royal Oak Township    | Public safety enhancement through improved street lighting                                                          | \$86,559    |
| Royal Oak Township    | Public safety enhancement of police services.                                                                       | \$217,593   |

Applications for the next round of Financially Distressed Cities, Villages, and Townships Grant Program will be available on the Department of Treasury website this spring. Applications must be submitted to Treasury by the close of business on XXX, XXX 31, 2015.

Preference is generally given to applicants from local units in which:

- A financial emergency has been declared in the past five years;
- An approved deficit elimination plan for the general fund is currently in place; or,
- Two or more conditions indicating “probable financial distress” currently exist.

For more information about FDCVT grants, including an application for cities, villages, and townships, visit [www.michigan.gov/revenuesharing](http://www.michigan.gov/revenuesharing).

###

\*Conditions of “probable financial distress” relating solely to school districts are not included as conditions for FDCVT, as school districts are not eligible.

## **Briefing: Grant announcement in Flint**

Tuesday, Feb. 3, 2015, 3-4 p.m.

Haskell Community Center, 2201 Forest Hills Ave. Flint

Governor's communications: Dave Murray, [murrayd1@michigan.gov](mailto:murrayd1@michigan.gov), 517-449-8343

DEQ communications: Brad Wurfel, [wurfelb@michigan.gov](mailto:wurfelb@michigan.gov), 517-230-8006

Treasury communications: Terry Stanton, [stantont@michigan.gov](mailto:stantont@michigan.gov), 517-830-5807

### **Purpose**

The state government is providing support for the Flint government as it addresses issues with its water system. The state on Tuesday is announcing that Flint is receiving two grants totaling \$2 million related to water system improvements through the Financially Distressed Cities, Villages and Townships grant program. DEQ Director Dan Wyant will address ongoing efforts with his agency to test Flint water and explain why the city is facing some of its problems. Senate Minority Leader Jim Ananich, D-Flint, will discuss his appreciation for the ongoing support for the city and its residents.

### **Attending**

- Harvey Hollins, director of the Michigan Office of Urban Initiatives
- Dan Wyant, director of the Michigan Department of Environmental Quality
- Wayne Workman, deputy treasurer, Michigan Department of Treasury
- Jerry Ambrose, Flint emergency manager
- Dayne Walling, Flint mayor
- State Sen. Jim Ananich
- State Rep. Sheldon Neeley
- State Rep. Phil Phelps

### **Agenda**

- 3:00 PM – 3:05 PM: Harvey Hollins announces that Flint has received two grants totaling \$2 million.
- 3:05 PM – 3:10 PM: Dan Wyant discusses the state's ongoing role in monitoring Flint's water and any assistance that has been provided and will continue to be provided.
- 3:10 PM – 3:15 PM: Mayor Dayne Walling remarks about appreciation for state assistance.
- 3:15 PM – 3:20 PM: Sen. Jim Ananich remarks about appreciation for state assistance.
- 3:20 PM – 3:25 PM: Rep. Neeley remarks.
- 3:25 PM – 3:35 PM: Harvey Hollins closing remarks, opens floor to media questions.
- 3:35 PM: Event ends, though this might be optimistic.

### **Background**

- The quality of Flint water has been a high-profile concern in recent weeks, with residents complaining about the color, taste and smell of tap water since a switch to Flint River water as a temporary source as a pipeline is built to Lake Huron as a water source starting in 2016.
  - Residents have attended meetings with jugs of brownish water.
  - U.S. Kildee has worked with labor and community groups to distribute bottled water.

- Mayor Walling has issued a letter (included below) calling for state and federal assistance for the city, including forgiveness of some \$20 million in debt through the Drinking Water Revolving Loan Fund and calling for the governor to come to Flint personally.
  - Walling also submitted a guest column to the Flint Journal with similar requests.
    - He said the loan forgiveness is needed for the city to upgrade its water treatment process.
  - Governor and Mayor Walling had a telephone conversation on Friday, and the mayor has pledged to work together on solutions.
- Rep. Sheldon Neeley also has sent the governor a letter, saying that his constituents “are on the verge of civil unrest.”
- The Department of Environmental Quality has been monitoring the water situation, with a detailed backgrounder and talking points attached below.
- The Treasury Department is announcing Tuesday that Flint is among the cities receiving a combined \$8 million the Financially Distressed Cities, Villages and Townships grant program.
  - The announcement of the other grants will follow the Flint announcement.
    - The Flint grants are \$1.1 million to allow the city to replace the functions of the old incinerator with new water pollution control facility allowing for the disposal of waste to landfills.
    - The other is \$900,000 to allow the city to hire a contractor to perform a leak detection survey, which will lead to prioritizing repairs.
  - A breakdown of the grants is included below.

#### **Treasury breakdown of Flint grants**

Flint Incinerator: The grant project entails shutting down the current Water Pollution Control Facility Incinerator (due to the incinerator not being up to new EPA standards). In order to meet EPA standards, it would cost roughly \$8.8M in upgrades to the current incinerator. The grant funding will allow them to replace the functions of the old incinerator by constructing new facilities which will allow for the disposal of waste to landfills.

##### **Budget Breakdown**

|                         |                 |
|-------------------------|-----------------|
| Construction Contractor | \$1,050,000     |
| Project Management      | <u>\$50,000</u> |
| Total                   | \$1,100,000     |

Flint Leak Detection: The grant project will allow the city to hire a contractor to perform a leak detection survey of the city water lines. The city will receive a map of leak locations and an assessment of leak severity. This data will allow the city to prioritize leak repair. The project also covers the expense of conducting a water pipe line wall thickness condition assessment on a portion of the city’s pipes. The assessment will guide the city’s water main replacement program.

##### **Budget Breakdown**

|                               |           |
|-------------------------------|-----------|
| Project Planning              | \$90,000  |
| Mobilization of Crew to Site  | \$27,000  |
| Leak Detection < 16” diameter | \$378,000 |



|                                  |                  |
|----------------------------------|------------------|
| Leak Detection 16" diameter or > | \$270,000        |
| Pipe Condition Assessments       | <u>\$135,000</u> |
| Total                            | \$900,000        |

### **DEQ backgrounder on Flint water**

Following the formal approval of Flint into the KWA in 2012, DWSD sent Flint a letter saying their contract was thereby terminated (by early 2013).

Genesee County has been using DWSD water without a contract since May 2014. But Flint took the letter to imply a water cutoff, and promptly turned to DEQ with a proposal to use the Flint River (their historic backup system).

This proposed shift was pitched primarily as a money saver. But it put the city in the business of water production, where they historically had been in the business of water transmission. DEQ approved the use of the river as a source, based on the treatment plant's past performance as a standby facility and the improvements we outlined prior to a switchover.

Several municipalities around the state use surface water supplies (rivers): Blissfield near Monroe, Manistique, and Alma to name a few.

The city completed the upgrades at the water plant the facility and DEQ approved it April 2014.

There were some initial hiccups. Last summer, there were a couple of 'boil water' notices issued. One for a water test that showed e. coli, one for a break in the water main.

The challenge to using the Flint River as a source is that the condition of the water is variable and changes with season and weather. It has substantially more organic matter than deep lake sources like Lake Huron. This organic matter is mobilized by high water events, and warm weather also can account for more organic material in the water.

The treatment of the organic matter is done with chlorine. One might conclude that the continual answer is just to use more chlorine to achieve water safety. However, at some point on the continuum, the chlorine and organic matter create TTHM – total trihalomethanes – as a byproduct. When the standard for those is exceeded over several consecutive quarters of testing, the supply is required by law to issue public notice and submit an approved plan for addressing the situation.

You'll note that this regulatory approach means TTHM testing is done quarterly. That means people who use the system are exposed to TTHM for several months before the public notice is required. It's because TTHM is a chronic health threat. Over the long term (measured in decades), continued exposure can contribute to some known health problems. If this were an immediate health threat, customers would receive immediate notification to boil their water or not use it.

Put in context, the EPA (which established the standard and the rule) estimates the existence of the TTHM standard prevents an estimated 280 bladder cancer cases each year ... out of more than 330 million people who use public water supplies around the country.

It's not "nothing." State and federal law requires quarterly testing for TTHM and that the public be informed of it when the annual average of four quarters' worth of consecutive testing shows TTHM

levels exceeding 80 parts per billion. Flint's results managed to exceed the annual average in three quarters, and they must develop a plan to address it.

But it's not like an eminent threat to public health. Unlike an e. Coli or even total coliform bacteria maximum contaminant level, which require immediate public notification and response and are part of daily / hourly testing of public water supplies, TTHMs pose a public health concern with chronic, long-term exposure.

It's clear the nature of the threat was communicated poorly. It's also clear that folks in Flint are concerned about other aspects of their water – taste, smell and color being among the top complaints.

The Safe Drinking Water Act requires public water supplies be tested for more than 90 regulated contaminants, including microbial contaminants. The act, and the program here in Michigan, work to ensure that water is safe to drink. The act does not regulate aesthetic values of water. Here are some factors affecting the aesthetics of water in Flint.

1. It's the Flint River. The water supplied by DWSD historically came from Lake Huron. It's softer. With hard water, you get a different flavor and feel. It's why General Motors suspended use of Flint Water – it was rusting their parts. Also, there's the 'organics' factor (discussed previously).
2. The system is old. Flint has more than 500 miles of water pipes. More than half of those pipe miles are more than 75 years old. Much of it is cast iron. Hard water can react with cast iron and exacerbates the rusty factor, which creates that brown water that angry residents were holding up in jugs for the media cameras last week. Valve failure has also been a key challenge. The system has an estimated 7,500+ valves. When they stick open or stick shut, it affects the hydraulics of the system and increase areas of stagnation. The city has a backlog of valves that need to be addressed. They've done half a dozen or so since November.
3. Flint is old. Many of the homes served by the system are old. Brown water complaints may also be attributable to cast iron pipes in customers' service connection to the city lines. The DEQ has been encouraging people with water coloration concerns to contact the city and see whether it is the service line or the City's line causing the issue. Again, discoloration is not an indicator of water quality or water safety, but we recognize that nobody likes it.

**In summary**, the City of Flint has tremendous need to address its water delivery system. We are not aware that they have any capital improvement funds for preventative maintenance in place, much less line replacement project monies that will require hundreds of millions.

The City was approved for a Revolving Fund loan in 2008 or 2009. As a Distressed Community, they qualified for flexible terms and 2 percent interest rate Revolving Fund Loan. After they were notified they were approved for the loan, they declined it. Previous SRF loans from the state to Flint bear an outstanding balance of \$20.7 million today.

The DEQ continues working with the city to address the TTHM issue. They can take interim steps – from scrubbing the insides of transmission lines to carefully monitoring the hydraulic challenges in their system – to address customers' aesthetic concerns. Their TTHM numbers already are showing dramatic improvement; the November testing showed only one of seven sample points exceeding the standard.

The key now is that the standard is an average of three quarters' worth of results. It will be some time before they are officially "not in violation." However, depending on weather in 2015, it's not unforeseeable that we will be having this conversation again by next Christmas.

The key to the conversation is that TTHM is not a top health concern. That's key because residents need to understand TTHM in context, and it is key because it appears the mayor has seized on the public panic (sparked, frankly, by their poor communication of the violation notice) to ask the state for loan forgiveness and more money for their infrastructure improvement.

Another key thing to remember is that once the city connects to the new KWA system in 2016, this issue will fade in the rearview.

**Key messages:**

1. The DEQ Drinking Water program works with communities around the state to ensure that municipalities provide customers with clean, safe drinking water.
2. Municipal water supplies are tested rigorously and regularly for more than 90 regulated contaminants, including microbial contaminants that pose an immediate public health concern.
3. Flint's exceedance of the TTHM standard should reassure residents that the testing program is effective.
4. TTHM is not an immediate health threat. It is a chronic concern, one that can be problematic over the course of several decades of exposure. The public was notified because the law requires the city to make public notification, so that everyone can make informed decisions. This is particularly true for people with infants or those with compromised immune systems.
5. The DEQ is working with the City to address the situation. Recent tests show the TTHM numbers dropping rapidly. The department will continue working with the city in the months ahead, and residents should feel confident that their water is safe to drink unless the DEQ or City notifies them otherwise.
6. The discoloration and odor issues some Flint residents are experiencing are separate issues from the TTHM issue. TTHM is odorless, colorless and measured in parts per billion.
7. Flint water customers who have questions or concerns about their water should first contact the city to get answers and help. They also can contact the Michigan DEQ.

**Mayor Walling's Facebook post**

Friend,

Access to clean, safe, affordable water is a basic human right.

That's why I just sent Gov. Snyder my Flint Water Improvement Plan. It focuses on the areas of safety, quality, access, investment and education. My letter urges the governor to quickly implement these ideas so that Flint's water is 100% safe.

Please contact Gov. Snyder by calling (517) 335-6397 (or by clicking [here](#)) and ask him to take action immediately to implement my plan and ensure Flint's water is safe.

My plan offers new ideas and also builds on successful models of utility, energy and assistance programs at the state and federal levels. Here is my plan:

**Safety & Quality**

- 100% Safety is the standard

- City of Flint releases testing data to assure safety and expands testing to households with support from the Michigan Department of Environmental Quality
- Support alternatives for those advised not to drink the water by their doctors through the Michigan Health Endowment Fund and community partners to protect the vulnerable like seniors and infants
- Bring on experienced river water treatment operational management in the City of Flint
- Require water testing data to be released quarterly by law in all Michigan communities

#### Access

- Announce an amnesty program for turn-ons and reduce the turn-on cost in Flint
- Develop a revised payment plan policy to allow customers to come back on to the Flint system
- New Federal and State partnership to establish new Drinking Water Emergency Assistance Fund for customers (modeled on Federal and State energy utility programs: Low Income Home Energy Assistance Program; Michigan Energy Assistance Program; State Emergency Relief)

#### Investment

- Accelerate water system improvements outlined in the City of Flint Capital Improvement Plan through Federal and State Investments
- State approves City of Flint's Distressed Cities Fund applications
- Federal and State forgiveness of payment to Drinking Water Revolving Loan Fund
- Federal and State financing for future improvements
- City Water Department implements budgeted FY15 projects including leak detection, valve repairs, new pipes and meter replacements

#### Education

- Develop a community partnership to provide household and business customers with information on testing and conservation
- Ongoing partnership with Michigan Department of Human Services, United Way, Salvation Army and community organizations to provide information on water assistance
- Expand youth energy initiative to assist households with conservation and efficiency (piloted in summer 2014 with Northwestern High School students, EcoWorks and Consumers Energy)

The struggle with our water has gone on for too long. The state must take action and do its part. Please ask Gov. Snyder to take action immediately to implement my plan and ensure Flint's water is safe. Thank you for your ongoing support.

#### Links to coverage

- [Mayor, governor have 'long, productive' talk about Flint's water problems](#), Jan. 30
- [2,000 more gallons of water headed to Flint for giveaway](#), Jan. 30, 2015
- [Flint emergency manager says there are two big reasons not to reconnect Detroit water](#), Jan. 29
- [Flint Democracy Defense League plans four meetings on city's water problems](#), Jan. 29
- [Environmentalism sends out new warnings about Flint water](#), NBC, Jan. 27
- [Erin Brockovich says on Facebook she's prepared to come to Flint](#), MLive, Jan. 27
- [Mott Community College not waiting for Flint to ensure safe water](#), MLive, Jan. 26
- [Detroit water chief says she's willing to sell emergency water to Flint -- no strings attached](#), Jan. 26
- [Mayor says governor needs to visit Flint to see water crisis first hand](#), MLive, Jan. 26
- [Need water? Flint groups collect 600 cases, plan distribution this week](#), MLive, Jan. 26

- Incoming Flint water expert would have 'continual oversight' until new pipeline connected, Jan. 25
- Looking back at Flint's water problems (photo gallery), MLive, Jan. 25
- Flint water problems: Switch aimed to save \$5 million -- but at what cost?, MLive, Jan. 23
- State says its already 'working diligently' on Flint's water problems, MLive, Jan. 22
- Officials say Flint water is getting better, but many residents unsatisfied, MLive, Jan. 21



STATE OF MICHIGAN  
EXECUTIVE OFFICE  
LANSING

RICK SNYDER  
GOVERNOR

BRIAN CALLEY  
L.T. GOVERNOR

**CONTACTS:**

Sara Wurfel or Dave Murray, Governor's Office  
517-335-6397  
Terry Stanton, Department of Treasury  
517-335-2167

**FOR IMMEDIATE RELEASE**

December 14, 2015

## **Gov. Rick Snyder awards Flint \$2 million in Distressed Cities grants for water system infrastructure improvements**

*Funding to be used for leak detection, waste incinerator replacement*

LANSING, Mich. – Gov. Rick Snyder today awarded Flint \$2 million in grants for water system infrastructure improvements, part of an overall \$8 million plan to help cities through the Financially Distressed Cities, Villages, and Townships Grant Program.

Flint is among six municipalities receiving grants through the program. The city will use the funding to detect leaks in its water lines and replace its Water Pollution Control Facility Incinerator.

"There are opportunities for the state government to assist Flint city leaders as they address issues related to the city's water system," Snyder said. "These grants will help recovering cities improve public services and infrastructure, improving the quality of life for all residents."

The grants to Flint were announced today at the Haskell Community Center by Harvey Hollins, director of the state's Office of Urban Initiatives and Wayne Workman, the state's deputy treasurer. They were joined by Dan Wyant, director of the Michigan Department of Environmental Quality, Flint Emergency Manager Jerry Ambrose, Mayor Dayne Walling, state Senate Minority Leader Jim Ananich, state Reps. Sheldon Neeley and Phil Phelps.

Flint was awarded \$900,000 to allow the city to hire a contractor to perform a leak detection survey of the city water lines. The city will receive a map of leak locations and an assessment of leak severity, allowing the city to prioritize leak repair. The project also covers the expense of conducting a water pipe line wall thickness condition assessment on a portion of the city's pipes. The assessment will guide the city's water main replacement program.

The city also was awarded \$1.1 million to shut down its current Water Pollution Control Facility incinerator and replace it with new facilities which will allow for the disposal of waste in landfills. The existing facilities are not up to federal Environmental Protection Agency standards.

Municipalities are eligible for the grants if they are experiencing one or more conditions indicative of "probable financial stress," as defined by Public Act 436 of 2012, the Local Financial Stability and Choice Act.

Under the grant program, funding may be used to pay for specific projects, services, or strategies that move a city, village, or township toward financial stability. There was \$8 million appropriated for the program with a \$2 million cap, per local unit.

##

**Rennaker, Joanne (DEQ)**

---

**From:** Wurfel, Brad (DEQ)  
**Sent:** Friday, October 02, 2015 4:33 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** Fwd: Flint River question

Call me ASAP please thanks.

Sent from my iPhone

Begin forwarded message:

**From:** "Flesher, John" <jflesher@ap.org>  
**Date:** October 2, 2015 at 2:43:49 PM EDT  
**To:** "Wurfel, Brad (DEQ)" <WurfelB@michigan.gov>  
**Subject:** Flint River question

Brad,

Editor's question: What is the problem with the Flint River? Is it particularly polluted from heavy industry days?

Thanks,

John Flesher  
The Associated Press  
120 W. Front Street  
Traverse City, Mich. 49684  
Office: 231-929-4180  
Cell: 231-944-9133

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**Rennaker, Joanne (DEQ)**

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**From:** Wurfel, Brad (DEQ)  
**Sent:** Thursday, July 30, 2015 9:54 AM  
**To:** Busch, Stephen (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Thelen, Mary Beth (DEQ); Wyant, Dan (DEQ)  
**Subject:** Fwd: Flint Water Meeting

Steve, we need you at this meeting next week Tuesday. Please let me know if you can join.  
Liane and Dan, FYI.

Sent from my iPhone

Begin forwarded message:

**From:** "Muchmore, Dennis (GOV)" <[muchmored@michigan.gov](mailto:muchmored@michigan.gov)>  
**Date:** July 30, 2015 at 9:42:32 AM EDT  
**To:** "Wurfel, Brad (DEQ)" <[WurfelB@michigan.gov](mailto:WurfelB@michigan.gov)>  
**Cc:** "Clement, Elizabeth (GOV)" <[clemente@michigan.gov](mailto:clemente@michigan.gov)>, "Hollins, Harvey (GOV)" <[hollinsh@michigan.gov](mailto:hollinsh@michigan.gov)>, "Saxton, Thomas (Treasury)" <[SaxtonT@michigan.gov](mailto:SaxtonT@michigan.gov)>, "Workman, Wayne (TREASURY)" <[WorkmanW@michigan.gov](mailto:WorkmanW@michigan.gov)>  
**Subject:** Flint Water Meeting

Can you join us with some Flint community leaders on Tuesday at 9:30 to talk about these water quality issues (probably need to bring your science guy)? Tom and Wayne will be there and Harvey and I promised these pastors we'd have real information for them and we do.

**Rennaker, Joanne (DEQ)**

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**From:** Wurfel, Brad (DEQ)  
**Sent:** Thursday, January 22, 2015 10:43 AM  
**To:** Prysby, Mike (DEQ); Busch, Stephen (DEQ)  
**Cc:** Shekter Smith, Liane (DEQ); Karen Tommasulo  
**Subject:** Fwd: Flint water

Mike, can you please contact Robin Erb at the Free Press?  
 I provided her and essential briefing, as she had not previously covered this issue.  
 But my remarks were on background.

Thanks.

b

Sent from my iPhone

Begin forwarded message:

**From:** "Erb, Robin" <[rerb@freepress.com](mailto:rerb@freepress.com)>  
**Date:** January 22, 2015 at 10:39:18 AM EST  
**To:** "WurfelB@michigan.gov" <[WurfelB@michigan.gov](mailto:WurfelB@michigan.gov)>  
**Subject:** Flint water

Thanks for the time just now; it was nice to speak to you again.

I'd love to connect with Mike as soon as he has a few minutes. I'm also hoping to nail down a timeline for the boil advisories, the dates of the samples that were problematic, when DEQ notified Flint of the exceedance problems, and the dates of meetings that DEQ has had with residents.

My direct line is 313-222-2708. My cell is 313-378-6007.

Again, many thanks.

(And really, I don't think you're crazy to hang out on a slab of ice waiting for fish. Nope, not at all. Weirdo.)

*Robin Erb*

Detroit Free Press Medical Writer  
 160 W. Fort Street  
 Detroit, MI 48226  
 Metro desk: 313-222-6601  
 Direct line: 313-222-2708

Follow me on Twitter @Freephealth

**Rennaker, Joanne (DEQ)**

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**From:** Wurfel, Brad (DEQ)  
**Sent:** Tuesday, April 08, 2014 1:05 PM  
**To:** Busch, Stephen (DEQ)  
**Subject:** Fwd: flint's application for flint river withdrawals

Steve, can you or one of your staff please help the Flint Journal?

Sent from my iPhone

Begin forwarded message:

**From:** "Fonger, Ronald" <[RFONGER1@mlive.com](mailto:RFONGER1@mlive.com)>  
**Date:** April 8, 2014 at 12:13:31 PM EDT  
**To:** "[wurfelb@michigan.gov](mailto:wurfelb@michigan.gov)" <[wurfelb@michigan.gov](mailto:wurfelb@michigan.gov)>  
**Subject:** flint's application for flint river withdrawals

Hi Brad:

I met with several Flint officials yesterday about the city's application for Flint River withdrawals, which they submitted last week.

I'm interested in getting a copy of that application if I can in advance of the permit being acted on.

I'm also interested in knowing the outcome as soon as possible.

What's my best course of action?

**Ron Fonger**  
MLive Media Group  
Reporter

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